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Appendix J

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Alternative Development Supporting Documentation

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Table J-1. Alternatives for Evaluated Waste Sites

General Waste Site Information		Information for Development of Alternatives							
Waste Site	Site Description	Applicable Previous Decision Documents	Type of Exceedance (Assumed for Sites Remaining for Remedial Action)	Assumed Areal Foot Print Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS (see Table 8-1)	Alternative 2	Alternative 3	Alternative 4
100-B-22:1	<p>This site consists of the 100-B Area Water Treatment Facilities, soils associated with these facilities, and any remaining piping not already associated with existing sites.</p> <p>Piping between 183-B and 185 -B195 -B. The pipelines in this waste site were uncovered during the removal of effluent pipelines and soils. As pipeline removal progressed, an effort was made to photograph, accurately locate, and in some cases perform limited chemical and radiological investigations of the pipelines. The basis for no-action determination was process history, which indicates the only additive to the process water in the pipelines came from the 183-B Facility. Chemicals added at the 183-B Facility included chlorine, sulfuric acid, alum, ferric sulfate, separan (a coagulant), and lime. Trace contamination from the sulfuric acid that was added to adjust the pH of the water, would be diluted in the cooling water. There was no evidence to suggest that the pipelines were ever a source of human-health risk due to the addition of sulfuric acid.</p>	EPA/ROD/R10-99/039	Human Health Direct Contact risk likely in shallow soil (less than 4.6m [15 ft] bgs)	3,371,151 m ² (36,285,480 ft ²)	2.1 m (6.9 ft)	Cr(VI) in pipe scale	Maintain Existing Soil Cover and Institutional Controls. Annual Site Inspection.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 3,371,151 m ² (36,285,480 ft ²) to 2.1 m (6.9 ft) bgs. Disposal at Environmental Restoration Disposal Facility (ERDF) or other approved disposal facility. Assume stabilization is required at ERDF.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 3,371,151 m ² (36,285,480 ft ²) to 2.1 m (6.9 ft) bgs. Disposal at ERDF or other approved disposal facility. Assume stabilization is required at ERDF.
100-B-34	<p>The 100-B-34 site was created to address residual segments from other pipeline waste sites that could not be remediated due to the presence of overlying active utilities. A section of 7.6 cm (3-in) steel soft water line that was converted for use with sodium dichromate about 1962. The pipeline ran between the 184-B Power House and the 183-C Head HOuse. The majority of the pipeline was remediated as the 100-B-28 waste site. This section could not be removed due to the presence of the active export water line. Following discussion with DOE-RL and USEPA, the section was filled with grout to flush residual sodium dichromate liquid out for collection. The potential for pipe leakage beneath these sections cannot be addressed while the utilites remain active. Therefore, the section was administratively removed and reassigned to the 100-B-34 site. Two sections of 1.7-m (66-in) stell process sewer that carried effluent from the 105-C Reactor to the retention basins. The majority of the pipelines were remediated as the 100-C-6:1 pipelines. These sections could not be removed due to the presence of an overlying active export water line. This section of pipe was previously known a 100-C-6:5, but is now part of the 100-B-34 waste site.</p>	EPA/ROD/R10-99/039	Human Health Direct Contact risk likely in shallow soil (less than 4.6m [15 ft] bgs)	809 m ² (8,712 ft ²)	5.5 m (18 ft)	Radionuclides, Total Chromium, Cr(VI), Mercury, and Lead	Maintain Existing Soil Cover, Institutional Controls, and Monitored Natural Attenuation. Annual Site Inspection.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 809 m ² (8,712 ft ²) to a maximum depth of 5.5 m (18 ft)bgs. Disposal at ERDF or other approved disposal facility. Assume stabilization is required at ERDF.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 809 m ² (8,712 ft ²) to a maximum depth of 5.5 m (18 ft)bgs. Disposal at ERDF or other approved disposal facility. Assume stabilization is required at ERDF.

Table J-1. Alternatives for Evaluated Waste Sites

General Waste Site Information		Information for Development of Alternatives							
Waste Site	Site Description	Applicable Previous Decision Documents	Type of Exceedance (Assumed for Sites Remaining for Remedial Action)	Assumed Areal Foot Print Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS (see Table 8-1)	Alternative 2	Alternative 3	Alternative 4
100-C-9:4	The 100-C-9 Waste Site includes the underground sanitary and process sewers and process pipelines associated with the 100-C Area pre-reactor water treatment facilities. The 100-C-9:4 subsite consists of the cooling water transfer lines located in tunnels between the 190-C Pump House and the 105-C Reactor Building.	EPA/ROD/R10-99/039	Human Health Direct Contact risk likely in shallow soil (less than 4.6m [15 ft] bgs)	105 m ² (1,133 ft ²)	4.9 m (16 ft)	Cr (VI) in pipe scale	Maintain Existing Soil Cover, Institutional Controls, and Monitored Natural Attenuation. Annual Site Inspection.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 105 m ² (1,133 ft ²) to 4.9 m (16 ft). Disposal at Environmental Restoration Disposal Facility (ERDF) or other approved disposal facility. Assume stabilization is required at ERDF.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 105 m ² (1,133 ft ²) to 4.9 m (16 ft). Disposal at Environmental Restoration Disposal Facility (ERDF) or other approved disposal facility. Assume stabilization is required at ERDF.
118-B-1	The original 105-B Burial Ground contained six to eight trenches, but was expanded over its operational lifetime to 23 trenches. The site was to have received general reactor waste from the B Reactor including the following: aluminum tubes, lead bricks, thermocouples, vertical and horizontal aluminum thimbles, stainless-steel gun barrels, and expendables (e.g., plastic, wood, and cardboard). Spline silos were also constructed at the burial ground, which were vertical metal culverts, 3 to 3.7 m (10 to 12 ft) in diameter, built presumably to receive reactor poison splines and other metal wastes. In 1952, the burial ground received contaminated tritium pots, irradiated process tubing, contaminated fuel spacers (perfs), solid tritium wastes, and high-level liquid tritium wastes that were sealed in a 7.6 cm (3-in.) -diameter iron pipe. In 1956, the second extension to the burial ground was added and was used for the burial of contaminated yokes from B Reactor. In the mid-1960s, the third extension was added to the north side of the original burial ground. Historical data on the contents of these trenches are not as detailed as with earlier extensions but are presumed to include "general" reactor and construction waste from modifications to the B Reactor. Waste materials from the Tritium Separation (P-10) Project were also buried here, including lithium-aluminum alloy, lead, mercury, aluminum cladding, and palladium.	EPA/ROD/R10-99/039	Human Health Direct Contact risk likely in shallow soil (less than 4.6m [15 ft] bgs) and groundwater/surface water protection risk for tritium.	5,261 m ² (56,628 ft ²)	21.9 m (72 ft)	Strontium-90 and Tritium	Maintain Existing Soil Cover, Institutional Controls, and Monitored Natural Attenuation. Annual Site Inspection.	Surface Barrier with Evapotranspiration Cover	1) Minimal Design Sampling 2) Remove, Treatment, and Disposal (RTD) area of 5,261 m ² (56,628 ft ²) to 21.9 m (72 ft) bgs. Disposal at ERDF or other approved disposal facility. Assume stabilization/solidification required at ERDF.

Table J-1. Alternatives for Evaluated Waste Sites

General Waste Site Information		Information for Development of Alternatives							
Waste Site	Site Description	Applicable Previous Decision Documents	Type of Exceedance (Assumed for Sites Remaining for Remedial Action)	Assumed Areal Foot Print Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS (see Table 8-1)	Alternative 2	Alternative 3	Alternative 4
118-B-6	The 108-B Solid Waste Burial Ground No. 2 was used for disposal of wastes from the "metal line" of the P-10 Tritium Separation Project. One of the pipes was filled with waste and capped, and the other was partially filled with waste and capped. Finally, both pipes were capped with a concrete pad.	EPA/ROD/R10-99/039	Groundwater/surface water protection risk for tritium	162 m ² (1,742 ft ²)	16 m (52.5 ft)	Tritium	Maintain Existing Soil Cover, Institutional Controls, and Monitored Natural Attenuation. Annual Site Inspection.	Surface Barrier with Evapotranspiration Cover	1) Minimal Design Sampling 2) Remove, Treatment, and Disposal (RTD) area of 162m ² (1,742 ft ²) to 16 m (52.5 ft) bgs. Disposal are ERDF or other approved disposal facility. Assume stabilization/solidification required at ERDF.
118-B-8:1	The 118-B-8:1 subsite addresses the 105-B Reactor Building. This unit is an inactive plutonium-production reactor, including the reactor block and associated shielding, the fuel storage basin, and ancillary/support areas of the 105-B Building. Contaminated soil beneath the fuel storage basin area is identified for remedial action. The reactor rests on a 7-m (23-ft) thick concrete foundation topped with cast-iron blocks that served as a thermal shield. The building walls consist of reinforced concrete in the lower portions and concrete blocks in the upper portions with thickness varying from 0.9 to 1.5 m (3 to 5 ft). The roof is composed of precast concrete roof tiles, except for the discharge area enclosure and inner horizontal rod room where the roof was composed of 1.8-m (6-ft) thick reinforced concrete. The reactor was known as a "single-pass" reactor due to the once-through nature of its light water cooling systems. Treated water was passed directly through long, horizontal tubes in the reactors, where the solid, jacketed uranium fuel rods underwent active neutron bombardment. From there, the water was pumped out the back of the piles to radioactive effluent sewers.	EPA/ROD/R10-99/039	Human Health Direct Contact risk likely in shallow soil (less than 4.6m [15 ft] bgs)	162 m ² (1,742 ft ²)	Not Applicable, Surface Barrier technology due to proximity to B Reactor.	Strontium-90 and Cesium-137	Maintain Existing Soil Cover, Institutional Controls, and Monitored Natural Attenuation. Annual Site Inspection.	Surface Barrier with Asphalt Cover	Surface Barrier with Asphalt Cover

Table J-1. Alternatives for Evaluated Waste Sites

General Waste Site Information		Information for Development of Alternatives							
Waste Site	Site Description	Applicable Previous Decision Documents	Type of Exceedance (Assumed for Sites Remaining for Remedial Action)	Assumed Areal Foot Print Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS (see Table 8-1)	Alternative 2	Alternative 3	Alternative 4
118-B-8:3	The 118-B-8:3 subsite consists of pipeline segments generally within the "buffer zone" around the 105-B Reactor Building. These segments could not be addressed with other pipeline waste sites due to their proximity to the reactor. The subsite includes a wide range of functional pipeline segments, including radioactive effluent process sewers, general process sewers, and sanitary sewers.	EPA/ROD/R10-99/039	Human Health Direct Contact risk likely in shallow soil (less than 4.6m [15 ft] bgs)	105 m ² (1,133 ft ²)	7 m (23 ft)	Radionuclides and Metals	Maintain Existing Soil Cover, Institutional Controls, and Monitored Natural Attenuation. Annual Site Inspection.	Maintain Existing Soil Cover, Institutional Controls, and Monitored Natural Attenuation. Annual Site Inspection.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 105 m ² (1,133 ft ²) to a maximum depth of 7 m (23 ft). Disposal at ERDF or pther approved disposal facility. Assume stabilization is required at ERDF.
132-B-2	The unit is part of the 105-B Reactor Gas and Exhaust Air System. The unit is still standing and constructed of reinforced concrete with a base diameter of approximately 4.9 m (16 ft).	EPA/ROD/R10-99/039	Building/Structure, Human Health Direct Contact risk likely for surface contaminated structure.	445 m ² (4,792 ft ²)	5.9 m (19.3 ft)	Radionuclides	Institutional Controls and Monitored Natural Attenuation. Annual Site Inspection.	Institutional Controls and Monitored Natural Attenuation. Annual Site Inspection.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 445 m ² (4,792 ft ²) to a maximum depth of 5.9 m (19.3 ft) bgs. Disposal at ERDF or other approved disposal facility. Assume stabilization is required at ERDF.
132-B-5	The 132-B-5 site is the remaining footprint of the former 115-B/C Gas Recirculation Facility. The 115-B/C facility filtered and recirculated the inert gas that surrounded the core of the reactors. The recirculation cycle included cooling, drying, and filtering of the large gas volumes before re-entry into the reactors. The 110-B Pressurized Gas Storage Facility provided the source gas for the recirculation facility.	EPA/ROD/R10-99/039	Human Health Direct Contact risk likely in shallow soil (less than 4.6m [15 ft] bgs)	1,538 m ² (16,553 ft ²)	3.3m (10.8 ft)	Radionuclides	Maintain Existing Soil Cover, Institutional Controls, and Monitored Natural Attenuation. Annual Site Inspection.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 1,538 m ² (16,553 ft ²) to 3.3 m (10.8 ft) bgs. Disposal at ERDF or other approved disposal facility. Assume stabilization/solidification required at ERDF.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 1,538 m ² (16,553 ft ²) to 3.3 m (10.8 ft) bgs. Disposal at ERDF or other approved disposal facility. Assume stabilization/solidification required at ERDF.

Table J-1. Alternatives for Evaluated Waste Sites

General Waste Site Information		Information for Development of Alternatives							
Waste Site	Site Description	Applicable Previous Decision Documents	Type of Exceedance (Assumed for Sites Remaining for Remedial Action)	Assumed Areal Foot Print Requiring Remediation	Assumed Depth of Contamination Requiring Remediation	COPCs Considered for the FS (see Table 8-1)	Alternative 2	Alternative 3	Alternative 4
1607-B5	The 1607-B5 Septic Tank System received sanitary sewage from the 181-B Pumphouse.	EPA/ROD/R10-99/039	Human Health Direct Contact risk likely in shallow soil (less than 4.6m [15 ft] bgs)	105 m ² (1,133 ft ²)	3.5 m (11.5 ft)	Metals and Polycyclic Aromatic Hydrocarbons	Maintain Existing Soil Cover and Institutional Controls. Annual Site Inspection.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 105 m ² (1,133 ft ²) to 3.5 m (11.5 ft) bgs. Disposal at ERDF or other approved disposal facility. Assume stabilization/solidification required at ERDF.	1) Minimal Design Sampling, 2) Remove, Treatment, and Disposal (RTD) area of 105 m ² (1,133 ft ²) to 3.5 m (11.5 ft) bgs. Disposal at ERDF or other approved disposal facility. Assume stabilization/solidification required at ERDF.



Environmental Calculation Cover Page

Part 1: Completed by the Responsible Manager

Project: Feasibility Study Report for the 100-BC Source Operable units (OU) and the 100-BC-5 Groundwater OU (DOE/RL-2010-96) **Date:** 7/12/12

Calculation Title & Description: 100-BC Cost Estimate Scoping Forms for Feasibility Study Alternative Costing

Preparer: Bruce Gilkeson	Basis of Qualification: Experience and Education
Checker: Todd Dye	Basis of Qualification: Experience and Education
Senior Reviewer: Jeff Johnson	Basis of Qualification: Experience and Education

Part 2: Completed by Preparer **Revision No.:** 1
Calculation No.: ECF-100BC1-11-0150

Revision History:

Revision No.	Description	Date	Affected Pages
1	Updated site information	7/12/12	All

Part 3: Document Review & Approval:

Preparer:
 Bruce Gilkeson

 NAME/POSITION

 SIGNATURE _____
 DATE

Checker:
 Todd Dye

 NAME/POSITION

 SIGNATURE _____
 DATE

Senior Reviewer:
 Jeff Johnson

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 SIGNATURE _____
 DATE

Responsible Manager:
 Phil Burke

 NAME/POSITION

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 DATE

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Appendices

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Terms

ARCL	allowable residual contamination level
CERCLA	Comprehensive Environmental Compensation and Liability Act of 1980.
COC	Contaminant of Concern
FS	Feasibility Study
GPM	gallons per minute
GW	groundwater
IC	Institutional Controls
ISS	Interim safe storage
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
OU	Operable Unit
PRGs	Preliminary Remedial Goals
RTD	Remove, treat, dispose

1 Purpose

The purpose of this calculation is to document and describe cost estimate inputs and key assumptions that support the *Remedial Investigation/Feasibility Study Report for the 100-BC Source Operable units (OU) and the 100-BC-5 Groundwater OU (DOE/RL-2010-96)*. The feasibility study (FS) cost inputs are derived from site features, physical parameters, and characteristics of the 100-BC source operable units (OU) and 100-BC-5 groundwater OU. The FS cost estimates are prepared to an accuracy of +50%/-30%, and used as part of the detailed and comparative analysis of remedial alternatives under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, (CERCLA). This analysis ultimately leads to recommendation of a preferred alternative in the proposed plan.

2 Background

This calculation brief supports development of remedial action alternative cost estimates for the identified 100-BC-1 and 100-BC-2 source OU waste sites and the 100-BC-5 groundwater OU contaminant plumes (remedial action target area). A range of alternatives was developed in the FS, for each target area based on the type of preliminary remediation goal exceeded. The waste site and groundwater alternatives were developed independently to allow greater flexibility in selecting recommended alternatives for each target area. Table 1 lists the waste sites that were evaluated as part of this process.

Table 1. 100-BC Waste Sites			
Shallow Zone Sites			
100-B-15	100-B-22:1	100-B-34	100-C-9:4
118-B-1	118-B-6	118-B-8:1	118-B-8:3
132-B-1	132-B-2	132-B-3	132-B-4
132-B-5	132-C-1	132-C-3	1607-B5
Deep Zone Sites			
100-B-5	100-B-14:1	100-B-8:1 & 2	100-B21:4
100-C-6:1	116-B-11	116-B-2	116-B-3
116-B-4	116-B-5	116-C-1	116-C-2A
116-C-2B	116-C-2C	116-C-3	116-C-5
118-C-1	118-C-3:2	116-B-16	116-B-6A
116-B-1			

The following remedial action alternatives for waste sites were developed for consideration in the FS:

Waste Site Alternatives:

- **Alternative HH-1: No Action Alternative.** The National Contingency Plan (NCP) (40 CFR 300.430(e)(6)) requires consideration of a No Action Alternative. The No Action Alternative, which serves as a baseline for evaluating other remediation action alternatives, is retained throughout the FS process. No action means that no remediation

would be implemented to alter the existing conditions. For this alternative, it was assumed that all site remedial activities and interim actions (with the possible exception of backfilling any open excavations for safety purposes) will be discontinued. No conceptual designs or cost estimates are prepared for Alternative 1 because no actions are proposed.

- **Alternative HH-2: Institutional Controls and Monitored Natural Attenuation**
 Monitored natural attenuation (MNA) and Institutional Controls (ICs) will be applied for waste site contaminants of concern (COCs).
- **Alternative HH-3: Remove, Treat, Dispose (RTD), Optimized with Other Technologies.** This alternative uses RTD for removal of contamination that presents an unacceptable risk to humans health from direct contact with shallow contaminated soil. Surface barriers are used at waste sites which pose an unacceptable risk to surface water and groundwater protection and where soil removal is impeded by close proximity to a reactor.
- **Alternative HH-4: Aggressive Remove, Treat, Dispose (RTD/Excavation).** This alternative uses RTD for removal of waste site contamination to the total depth of contamination above preliminary remedial goals (PRGs). A surface barrier is used at waste site 118-B-8:1 where soil removal is impeded by close proximity to a reactor.

Table 2 list the Groundwater alternatives that have been developed as part of this process.

Table 2. 100-BC Groundwater
Alternative GW-2 - Ground Water Monitoring only – 31 existing and 11 new monitoring wells
Alternative GW-3 – River Protection Pump and Treat (Moderate Action) - 31 existing and 11 new monitoring wells; 6 extraction wells; 6 injection wells
Alternative GW- 4 – Aggressive Pump and Treat (More Action) -31 existing and 11 new monitoring wells; 12 extraction wells; 12 injection wells

The following remedial action alternatives for groundwater were developed for consideration in the FS:

Groundwater Alternatives:

- **Alternative GW-1: No Action Alternative.** The National Contingency Plan (NCP) (40 CFR 300.430(e)(6)) requires consideration of a No Action Alternative. The No Action Alternative, which serves as a baseline for evaluating other remediation action alternatives, is retained throughout the FS process. No action means that no remediation would be implemented to alter the existing conditions. This includes ceasing any monitoring activities. No conceptual designs or cost estimates are prepared for Alternative GW-1 because no actions are proposed.

- **Alternative GW -2: Institutional Controls and Monitored Natural Attenuation**
 Monitored natural attenuation (MNA) and Institutional Controls (ICs) will be applied for all groundwater contaminants of concern (COCs).
- **Alternative GW-3: River Protection Pump-and-Treat.** Groundwater pump-and-treat will be used to hydraulically contain contaminated groundwater discharge to the Columbia River and restore groundwater to levels below PRGs. Ion exchange will be used for treatment of Cr(VI) and strontium-90 contaminated groundwater. MNA and ICs will be applied to the tritium contaminated groundwater.
- **Alternative GW-4: Aggressive Pump-and-Treat Groundwater Treatment.** A large groundwater pump-and-treat system will be used to remove contaminant mass from the aquifer at 100-BC and restore groundwater to levels below PRGs. Ion exchanged will be used for treatment of Cr(VI) and strontium-90 contaminated groundwater. MNA and ICs will be applied to the tritium contaminated groundwater.

3 Methodology

Development of the cost inputs for the 100-BC OU alternatives generally requires simple calculations performed in Microsoft Excel (MS Excel)[™] spreadsheets. Examples of the types of calculations included in this calculation brief include:

- Total number of groundwater samples = Number of groundwater samples per well x number of wells
- Total pipe length (ft) = Average length of pipe run for each extraction and injection well (ft) x number of wells
- Average groundwater extraction rate = nominal flow rate for each well x number of wells.

Due to the basic nature of these calculations, development of a detailed methodology for each calculation was not conducted. Section 4 provides the key inputs and assumptions that support each calculation and section 6 provides a summary of the spreadsheet calculations

4 Assumptions and Input

This section describes the overall assumptions applicable to the 100-BC alternatives. The information used in the form is presented in DOE/RL-2010-96. Table 2 lists the reference by input parameter used in the Shallow/Deep zone and groundwater cost estimate. Appendix A contains narrative files with site specific assumptions and inputs used for shallow and deepzone soil sites. Appendix B contains narrative files with site specific assumptions and inputs used for groundwater. Appendix C contains pdf copies of the Waste Site Information Database Summaries for all sites listed in Table 1.

Table 3. Vadose Zone and Groundwater Cost Estimate Parameter Assumptions and Inputs	
Input Parameter	Reference Source / Or General Equation
Excavation	

[™] Microsoft Excel (MS Excel) is a trademark of Microsoft Corporation.

Table 3. Vadose Zone and Groundwater Cost Estimate Parameter Assumptions and Inputs	
Input Parameter	Reference Source / Or General Equation
Waste Site Area (ft ²)	Spread Sheet 100-BC_Site Info (Appendix A)
Depth to Top of Contamination(ft)	Spread Sheet 100-BC_Site Info (Appendix A)
Depth, ft	Spread Sheet 100-BC_Site Info (Appendix A)
Length & Width	WIDS
Expected Safety Level	Spread Sheet 100-BC_Site Info (Appendix A)
Construction Notes	Engineering Judgment
Capping	
Cap Type	Spread Sheet 100-BC_Site Info (Appendix A)
Area, sf	Spread Sheet 100-BC_Site Info (Appendix A)
Safety Level	Spread Sheet 100-BC_Site Info (Appendix A)
Cap Construction Notes	Engineering Judgement
GW Extraction, Injection, & Monitoring Wells	
number of wells – all well types	ECF-100BC5-11-0115
flow rate per well, gpm – EW & IW	ECF-100BC5-11-0115
depth to static water table, ft – all well types	Based on surrounding wells
depth to base of contam, ft – all well types	Based on surrounding wells
Expected Safety Level – all well types	ECF-100BC5-11-0115
type of submersible pump	Engineering Judgement
well depth – all well types	Engineering Judgement
well casing dia, in – all well types	Engineering Judgement
screen length, ft – all well types	ECF-100BC5-11-0115
transfer pipe type	Engineering Judgement
transfer pipe location	ECF-100BC5-11-0115
transfer piping length, ft	ECF-100BC5-11-0115
transfer piping dia, in	Engineering Judgement
Number of Pumping Stations – Influent & Effluent	ECF-100BC5-11-0115
Pumping Station flow – Influent & Effluent	ECF-100BC5-11-0115
Influent Collection Tanks - Extraction	Engineering Judgement
Feed Tanks - Injection	Engineering Judgement

Table 3. Vadose Zone and Groundwater Cost Estimate Parameter Assumptions and Inputs	
Input Parameter	Reference Source / Or General Equation
Tank Capacity - Injection & Extraction	Engineering Judgement
Well Pump Replacement – all well types	Engineering Judgement
Well Rehab – all well types	Engineering Judgement
Well Replacement – all well types	Engineering Judgement
Treatment Systems	
IX Extr for Cr(VI), gpm	ECF-100BC5-11-0115
IX Extr for Sr-90, gpm	ECF-100BC5-11-0115
Wells w/ Sr-90 treated by IX	ECF-100BC5-11-0115
P&T Monitoring Sample Points(EW & effluent tank)	Engineering Judgement
P&T Monitoring verification - years	Engineering Judgement
During 1 st yr P&T Monitoring – Samples/yr per well	ECF-100BC5-11-0115
After 1 st yr P&T Monitoring – Samples/yr per well	ECF-100BC5-11-0115
Post P&T Monitoring verification - years	ECF-100BC5-11-0115
Post P&T Monitoring verification - Samples/yr per well	ECF-100BC5-11-0115

Table 3 presents how costs associated with institutional controls will be handled for the 100-BC FS cost estimate.

Table 4. River Corridor Institutional Control Approach	
Program Scope (Scope and Costs Associated with the Site Institutional Controls (Cost to be borne by the Program))	Individual Waste Site Scope (Costs to be included within the FS for sites that require ICs and/or leave contamination less than 15 ft below land surface)
Five Year review preparation and reporting	Annual Inspection of the waste site (based on existing records annual inspections are estimated to be approximately \$1500/year)

Maintenance and Operation of the Excavation Permit Program	If included in the remedial alternative, maintenance of an existing soil cover (costs and frequency to be estimated based on existing program used for the Central Plateau and adjusted for waste site size)
Deed Maintenance, Zoning Restrictions, and Legal costs	If Barrier is included in the remedial alternative, all costs associated with the O&M of the barrier (to be based on size and type of barrier recommended)
Signage and access to waste sites	If groundwater monitoring is required--costs of new monitoring wells, sampling of the wells, analytical costs and associated reporting
Site Security	

5 Software Applications

Microsoft Office Excel 2007 was used to perform the calculations. Excel is a “Site Licensed Client Software” and is exempt from formal control requirements of PRC-PRO-IRM-309, Controlled Software Management.

6 Calculation

For excavations, and caps the calculations will be performed according to *Environmental Calculation File Excavation Template_VI (ECF-HANFORD-11-0037)*

7 Results/Conclusions

The cost inputs, assumptions, and calculations presented in the previous sections were used to develop detailed descriptions for each alternative, and document cost estimate assumptions in standard estimating forms to be used by the estimator. Appendix A and Appendix B presents all assumptions, inputs, and calculations that are carried forward into the final cost estimate.

8 References

- DOE/RL-2010-96, Draft A, *Remedial Investigation/Feasibility Study for the 100-BC-1, 100-BC-2, and 100-BC-5 Operable Units*, CH2M Hill Plateau Remediation Company, Richland, Washington
- ECF-100BC5-11-0068, Rev. 0, *100-BC Plume Maps for Spring and Fall 2010*, CH2M Hill Plateau Remediation Company, Richland, Washington
- ECF-HANFORD-11-0037 *Environmental Calculation File Excavation Template_VI*, CH2M Hill Plateau Remediation Company, Richland, Washington
- ECF -100BC5-11-0115, Rev 1, *Modeling of RI/FS Design Alternatives for 100-BC-5*, CH2M Hill Plateau Remediation Company, Richland, Washington

Appendix A

Cost Estimate Inputs and Assumptions for Shallow and Deep Zone Sites

100-BC Source Operable Units					
					Date: 7/12/12
Study Group	Site Number	Description	Alternative 2 - Less Action	Alternative 3 - Moderate Action	Alternative 4
ARCL					
	132-B-5	Subgrade footprint	Institutional Controls - Annual site Inspection Duration - 150 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total contamination Area - .38 ac Depth of Excavation - 10.8ft Depth of Top of Cont - 3.3ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total contamination Area - .38 ac Depth of Excavation - 10.8ft Depth of Top of Cont - 3.3ft Safety Level - D
B Reactor Museum Sites					
	118-B-8:3	Pipeline	Institutional Controls - Annual site Inspection MNA Duration - 75 yrs	Institutional Controls - Annual site Inspection Duration - 75 yrs	RTD to total depth above PRGs See Site 118-B-8:3 Pipeline Data, Dimensions and Lengths
	132-B-2	Stack	Institutional Controls - Annual site Inspection MNA Duration - 75 yrs	Institutional Controls - Annual site Inspection Duration - 75 yrs	RTD to total depth above PRGs & demo the Stack Area - .11 ac Depth of Excavation - 19.3ft Depth of Top of Cont - 16ft Safety Level - D
Deep Exposure Human Health Risk					
	100-B-14:1		Institutional Controls - Annual site Inspection MNA Duration - 150 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 0.50 ac Depth of Excavation - 25ft Depth of Top of Cont - 15ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 0.50 ac Depth of Excavation - 25ft Depth of Top of Cont - 15ft Safety Level - D
	100-B-5		Institutional Controls - Annual site Inspection MNA Duration - 17 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area -0.32 ac Depth of Excavation - 59.1 ft Depth of Top of Cont - 21ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area -0.32 ac Depth of Excavation - 59.1 ft Depth of Top of Cont - 21ft Safety Level - D

Study Group	Site Number	Description	Alternative 2 - Less Action	Alternative 3 - Moderate Action	Alternative 4
	100-B-8:1 (includes 100-C-6:1)		Institutional Controls - Annual site Inspection MNA Duration - 24 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area -0.81 ac Depth of Excavation - 24.6 ft Depth of Top of Cont - 21.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area -0.81 ac Depth of Excavation - 24.6 ft Depth of Top of Cont - 21.0 ft Safety Level - D
	100-B-8:2		Institutional Controls - Annual site Inspection MNA Duration - 35 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 16.68 ac Depth of Excavation - 19.68ft Depth of Top of Cont - 15.0ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 16.68 ac Depth of Excavation - 19.68ft Depth of Top of Cont - 15.0ft Safety Level - D
	116-B-1		Institutional Controls - Annual site Inspection MNA Duration - 1 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 0.46 ac Depth of Excavation - 29.52 ft Depth of Top of Cont - 15.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 0.46 ac Depth of Excavation - 29.52 ft Depth of Top of Cont - 15.0 ft Safety Level - D
	116-B-11		Institutional Controls - Annual site Inspection MNA Duration - 150 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 3.60 ac Depth of Excavation - 19.7 ft Depth of Top of Cont - 16.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 3.60 ac Depth of Excavation - 19.7 ft Depth of Top of Cont - 16.0 ft Safety Level - D
	116-B-2		Institutional Controls - Annual site Inspection MNA Duration - 34 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area -0.11 ac Depth of Excavation - 19.3 ft Depth of Top of Cont - 16.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area -0.11 ac Depth of Excavation - 19.3 ft Depth of Top of Cont - 16.0 ft Safety Level - D

Study Group	Site Number	Description	Alternative 2 - Less Action	Alternative 3 - Moderate Action	Alternative 4
	116-B-3		Institutional Controls - Annual site Inspection MNA Duration - 1 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - .11 ac Depth of Excavation -19.3ft Depth of Top of Cont - 16.1ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - .11 ac Depth of Excavation -19.3ft Depth of Top of Cont - 16.1ft Safety Level - D
	116-B-4		Institutional Controls - Annual site Inspection MNA Duration - 126 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - .15 ac Depth of Excavation -18.37 ft Depth of Top of Cont - 18.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - .15 ac Depth of Excavation -18.37 ft Depth of Top of Cont - 18.0 ft Safety Level - D
	116-B-5		Institutional Controls - Annual site Inspection MNA Duration - 1 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - .01 ac Depth of Excavation -21.32 ft Depth of Top of Cont - 18.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - .01 ac Depth of Excavation -21.32 ft Depth of Top of Cont - 18.0 ft Safety Level - D
	116-B-6A (includes 116-B-16)		Institutional Controls - Annual site Inspection MNA Duration - 80 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - .05 ac Depth of Excavation -19.68 ft Depth of Top of Cont - 5.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - .05 ac Depth of Excavation -19.68 ft Depth of Top of Cont - 5.0 ft Safety Level - D
	116-C-1		Institutional Controls - Annual site Inspection MNA Duration - 150 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 2.7 ac Depth of Excavation -39.36 ft Depth of Top of Cont - 20.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 2.7 ac Depth of Excavation -39.36 ft Depth of Top of Cont - 20.0 ft Safety Level - D

Study Group	Site Number	Description	Alternative 2 - Less Action	Alternative 3 - Moderate Action	Alternative 4
	116-C-2A (includes 116-C-2B & 116-C-2C)		Institutional Controls - Annual site Inspection MNA Duration - 58 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 0.22 ac Depth of Excavation -54.12 ft Depth of Top of Cont - 23.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 0.22 ac Depth of Excavation -54.12 ft Depth of Top of Cont - 23.0 ft Safety Level - D
	116-C-3		Institutional Controls - Annual site Inspection MNA Duration - 81 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 0.01 ac Depth of Excavation -27.22 ft Depth of Top of Cont - 24.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 0.01 ac Depth of Excavation -27.22 ft Depth of Top of Cont - 24.0 ft Safety Level - D
	116-C-5		Institutional Controls - Annual site Inspection MNA Duration - 43 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 6.34 ac Depth of Excavation -18.37 ft Depth of Top of Cont - 15.0 ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 6.34 ac Depth of Excavation -18.37 ft Depth of Top of Cont - 15.0 ft Safety Level - D
	118-C-1		Institutional Controls - Annual site Inspection MNA Duration - 150 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 1.0 ac Depth of Excavation -27.0 ft Depth of Top of Cont - 24.0ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 1.0 ac Depth of Excavation -27.0 ft Depth of Top of Cont - 24.0ft Safety Level - D
	118-C-3:2 (includes 100-B-21:4)		Institutional Controls - Annual site Inspection MNA Duration - 143 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 1.0 ac Depth of Excavation -26.0 ft Depth of Top of Cont - 15 .0ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total depth above PRGs Area - 1.0 ac Depth of Excavation -26.0 ft Depth of Top of Cont - 15 .0ft Safety Level - D

Study Group	Site Number	Description	Alternative 2 - Less Action	Alternative 3 - Moderate Action	Alternative 4
Waste Sites Remainig for Remedial Action Sites					
	1607-B5	Contaminated Soil, Pipeline, Tank, Waste site Remaining for Remdial Action	Institutional Controls - Annual site Inspection Duration - 75 yrs	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total contamination depth Area - .026 ac Depth of Excavation - 11.5ft Depth of Top of Cont - 0ft Safety Level - D	RTD to total contamination depth Area - .026 ac Depth of Excavation - 11.5ft Depth of Top of Cont - 0ft Safety Level - D
	100-B-34	Contaminated Soil, Pipeline, Tank, Waste site Remaining for Remdial Action	Institutional Controls - Annual site Inspection Duration - 75 yrs	RTD to total contamination depth Area - 0.20 ac Depth of Excavation - 18 ft Depth of Top of Cont - 5.9 ft Safety Level - D	RTD to total contamination depth Area - 0.20 ac Depth of Excavation - 18 ft Depth of Top of Cont - 5.9 ft Safety Level - D
Special Sites					
	100-B-22:1	Pipelines	Institutional Controls - Annual site Inspection Duration - 75 yrs	RTD to total contamination depth Area - 833 ac Depth of Excavation -6.9 ft Depth of Top of Cont - 0ft Safety Level - D	RTD to total contamination depth Area - 833 ac Depth of Excavation -6.9 ft Depth of Top of Cont - 0ft Safety Level - D
	100-C-9:4	Pipelines, Post-ROD to Go	Institutional Controls - Annual site Inspection Duration - 75 yrs	RTD to total contamination depth Area - 0.23 ac Depth of Excavation - 16ft Depth of Top of Cont - 3.3ft Safety Level - D	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total contamination depth Area - 0.23 ac Depth of Excavation - 16ft Depth of Top of Cont - 3.3ft Safety Level - D
Surface Water and Groundwater Protection Sites					
	118-B-1	CVP Deep Zone FootPrint, Deep Direct Exposure/Tritium	Institutional Controls - Annual site Inspection Duration - 75 yrs	Capping with an Evapotranspiration Cap Duration - 75 yrs Area - 1.3 ac Safety Level - D Type -RCRA D (Non Hazardous Waste)	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total contamination depth Area - 1.35 ac Depth of Excavation - 72ft Depth of Top of Cont - 16ft

Study Group	Site Number	Description	Alternative 2 - Less Action	Alternative 3 - Moderate Action	Alternative 4
					Safety Level - D
	118-B-6	Contaminated Soil	Institutional Controls - Annual site Inspection Duration - 20 yrs	Capping with an Evapotranspiration Cap Duration - 75 yrs Area - .04 ac Safety Level - D Type -RCRA D (Non Hazardous Waste)	Minimal Design Sampling, follow rule of thumb for confirmation/verification sampling RTD to total contamination depth Area - .014 ac Depth of Excavation - 52.5ft Depth of Top of Cont - 0ft Safety Level - D

Shallow HH Exposure Sites

	118-B-8:1	Contaminated Soil	Institutional Controls - Annual site Inspection Duration - 190 yrs	Capping with an Asphalt Cap Duration - 75 yrs Area - .04 ac Safety Level - D Type -RCRA D (Non Hazardous Waste)	Capping with an Asphalt Cap Duration - 75 yrs Area - .04 ac Safety Level - D Type -RCRA D (Non Hazardous Waste)
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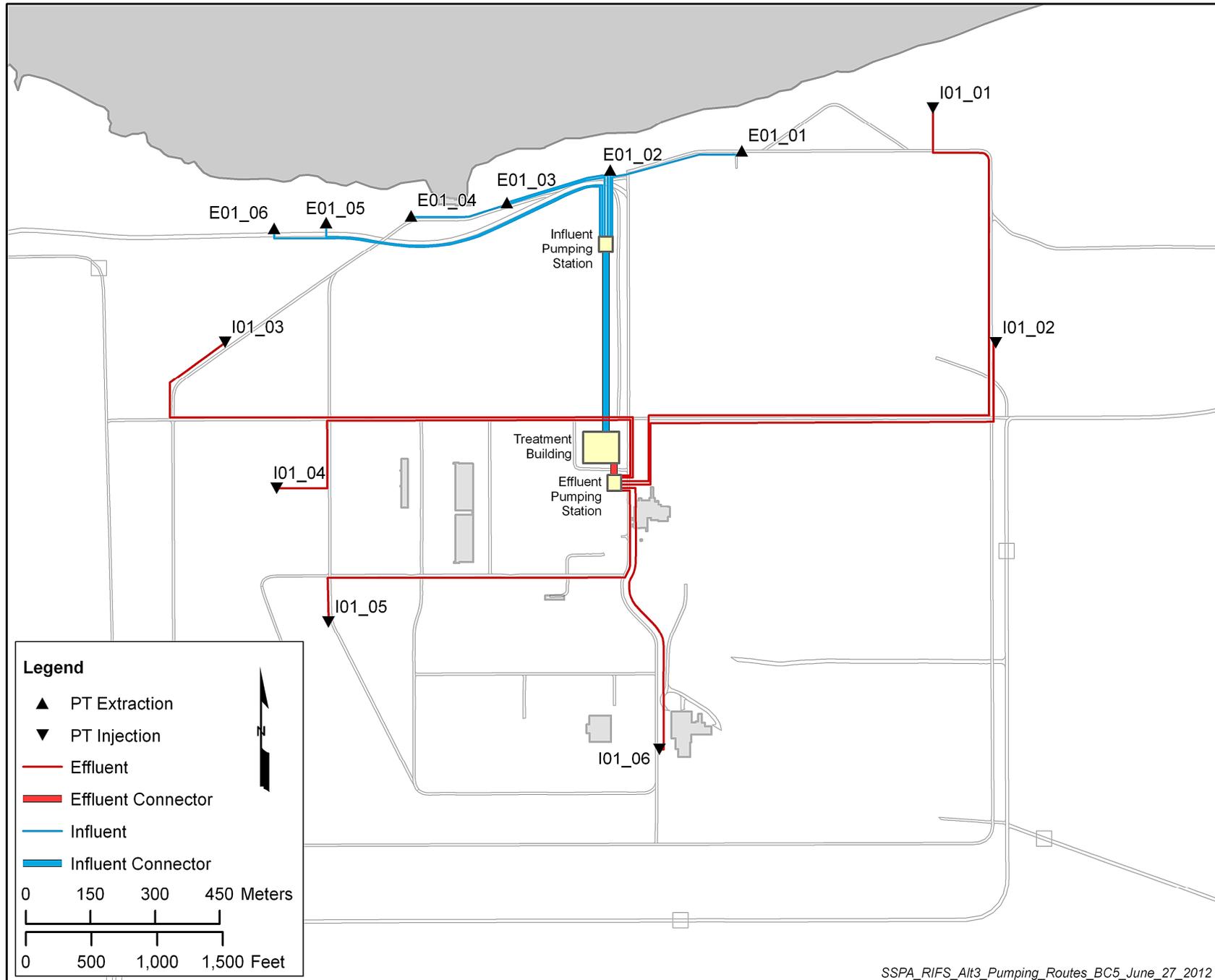
Site 118-B-8:3 Pipeline Data, Dimensions and Lengths								
							Date	7/12/2012
Dimensions (IN)	Dimensions (FT)	Material	Type	Segment length (m)	Segment length (ft)	Invert Depth (assumed average) (m)	Invert Depth (assumed average) (ft)	
6	0.50	Wrought Iron	Process Sewer	38.08	124.95	4	13.1	
6	0.50	Vitrified Clay Pipe	Radioactive Process Sewer	12.71	41.7	4.5	14.8	
6	0.50	Vitrified Clay Pipe	Radioactive Process Sewer	12.67	41.6	4.5	14.8	
6	0.50	Cast Iron	Radioactive Process Sewer	12.17	39.9	5	16.4	
6	0.50	Vitrified Clay Pipe	Radioactive Process Sewer	12.64	41.5	4.5	14.8	
8	0.67	Vitrified Clay Pipe	Radioactive Process Sewer	72.99	239.5	4.5	14.8	
12	1.00	Steel	Radioactive Process Sewer	50.84	166.8	3	9.8	
30	2.50	Reinforced Concrete pipe	Radioactive Process Sewer	14.00	45.9	6.5	21.3	
12	1.00	Cast Iron	Radioactive Process Sewer	11.46	37.6	3	9.8	
8	0.67	Vitrified Clay Pipe	Radioactive Process Sewer	12.38	40.6	4.5	14.8	
6	0.50	Vitrified Clay Pipe	Radioactive Process Sewer	11.94	39.2	4.5	14.8	
6	0.50	Vitrified Clay Pipe	Radioactive Process Sewer	1.38	4.5	4	13.1	
6	0.50	Vitrified Clay Pipe	Radioactive Process Sewer	4.44	14.6	3	9.8	
6	0.50	Vitrified Clay Pipe	Process Sewer	17.70	58.1	2.5	8.2	
6	0.50	Wrought Iron	Process Sewer	31.92	104.7	4	13.1	
36	3.00	Reinforced Concrete pipe	Process Sewer	60.88	199.7	6	19.7	
36	3.00	Reinforced Concrete pipe	Process Sewer	33.52	110.0	5.5	18.0	
8	0.67	Vitrified Clay Pipe	Process Sewer	41.42	135.9	3	9.8	
6	0.50	Vitrified Clay Pipe	Process Sewer	10.00	32.8	2.5	8.2	
8	0.67	Vitrified Clay Pipe	Sanitary Sewer	59.79	196.2	2.5	8.2	
30	2.50	Reinforced Concrete pipe	Radioactive Process Sewer	28.31	92.9	6.5	21.3	
8	0.67	Cast Iron	Radioactive Process Sewer	32.01	105.0	5	16.4	
48	4.00	Unknown	Radioactive Process Sewer	6.17	20.2	5	16.4	
66	5.50	Steel	Radioactive Process Sewer	28.80	94.5	7	23.0	
15	1.25	Vitrified Clay Pipe	Radioactive Process Sewer	58.66	192.4	5	16.4	
4	0.33	Vitrified Clay Pipe	Process Sewer	13.79	45.2	2	6.6	
8	0.67	Vitrified Clay Pipe	Sanitary Sewer	54.36	178.4	2.5	8.2	
6	0.50	Vitrified Clay Pipe	Sanitary Sewer	60.08	197.1	2.5	8.2	
8	0.67	Vitrified Clay Pipe	Sanitary Sewer	31.24	102.5	2.5	8.2	

Appendix B

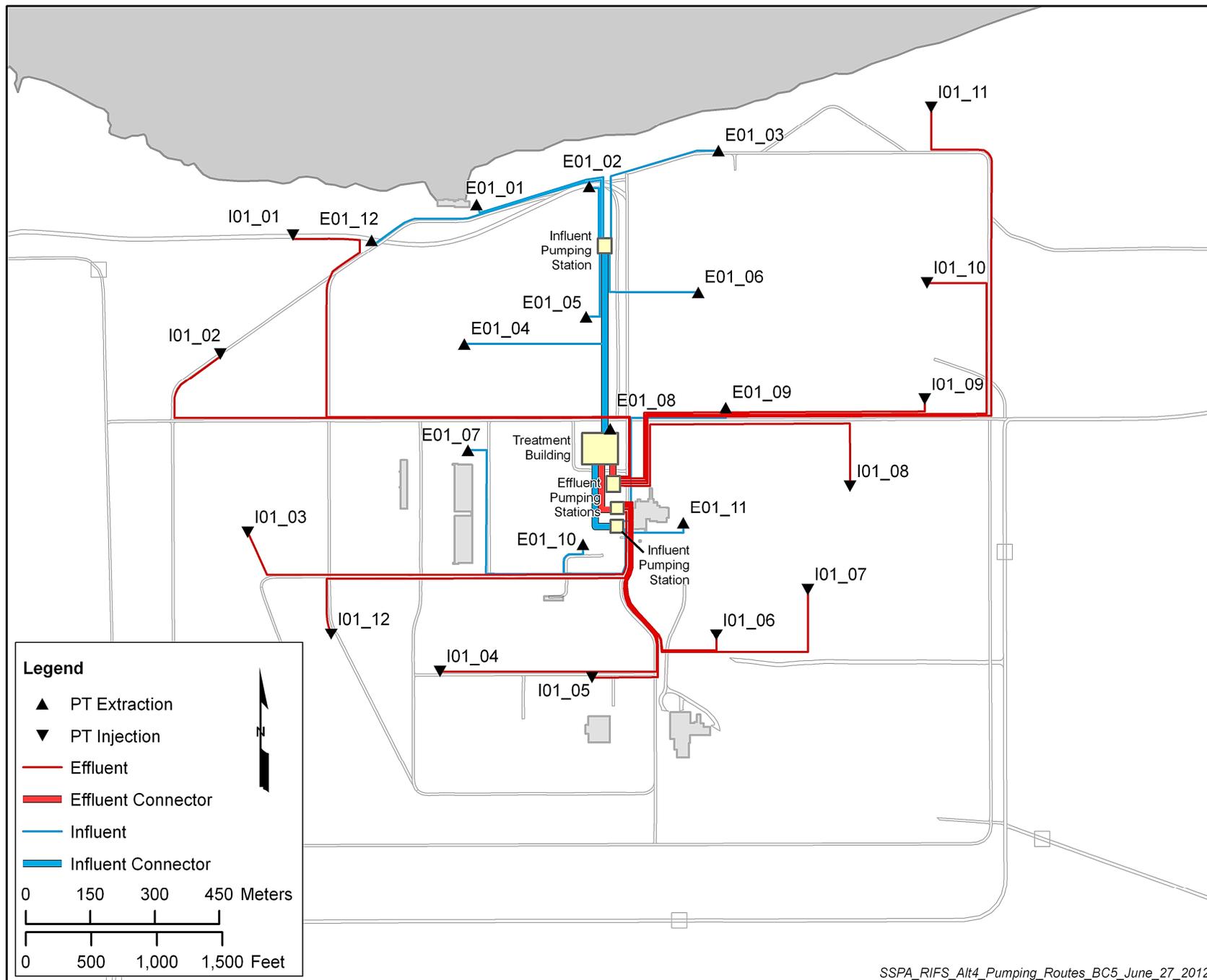
Cost Estimate Inputs and Assumptions for GW Extraction, Injection, & Monitoring Wells

100 BC FS Groundwater Key Quantities

Alternative Name	Alt 2 - Less Action	Alt 3 - Moderate Action	Alt 4 - More Action
MNA	NA	NA	NA
Average Sample Depth, ft	66	66	66
# of Events (First Year)	4	4	4
Samples/Event (First Year)	42	42	42
# of Yrs (Out Years)	103	68	48
Events per Yr (Out Years)	1	1	1
Samples/Event (Out Years)	42	42	42
New GW Monitoring Wells	11	11	11
Assumed well depth	200	200	200
Groundwater Extraction			
Number of Wells	NA	NA	NA
Flow rate per well, gpm	NA	6	12
Depth to Static Water Table, ft	NA	75	75
Depth to Top of Confining Layer, ft	NA	66	66
Depth to Base of Contamination, ft	NA	180	180
Assumed well depth	NA	180	180
Expected Safety Level	NA	200	200
Type of Submersible Pump	NA	D	D
Well Casing Diameter, in	NA	4", 56-95 gpm, 101'<	4", 56-95 gpm, 101'<
3" HDPE Transfer Piping, ft	NA	8	8
8" HDPE Transfer Piping, ft	NA	10951	14755
Influent Pumping Stations (New)	NA	1376	1984
Influent Pumping Station Flow, ea	NA	1	2
Influent collection tanks	NA	450	900
Tank Capacity Each, gal	NA	1	1
Groundwater Injection	NA	17500	35000
Groundwater Injection			
Number of Injection Wells	NA	NA	NA
Injection Rate per Well, gpm	NA	6	12
Depth to Top of Aquifer, ft	NA	75	75
Aquifer Thickness, ft	NA	53	53
Assumed well depth	NA	125	125
Expected Safety Level	NA	200	200
Well Casing Diameter, in	NA	D	D
Screen Length per well, ft	NA	8	8
3" HDPE Transfer Piping, ft	NA	105	105
8" HDPE Transfer Piping, ft	NA	24103	42602
10" HDPE Transfer Piping, ft	NA	98	526
Effluent Pumping Stations (New)	NA	NA	NA
Effluent Pumping Station Flow, ea	NA	1	2
Feed Tank(s)	NA	450	900
Tank Capacity Each, gal	NA	1	1
Well and Pump O&M Schedule	NA	17500	35000
Well and Pump O&M Schedule			
Extraction Well Pump Replacement, yrs	NA	NA	NA
Extraction Well Rehab, yrs	NA	5	5
Extraction Well Replacement, yrs	NA	10	10
Injection Well Pump Replacement, yrs	NA	20	20
Injection Well Rehab, yrs	NA	5	5
Injection Well Replacement, yrs	NA	2	2
Monitoring Well Pump Replacement, yrs	NA	10	10
Monitoring Well Rehab, yrs	5	5	5
Monitoring Well Replacement, yrs	NA	NA	NA
Monitoring Well Replacement, yrs	30	30	30
Treatment Systems			
Ion Exchange for Cr(VI), gpm (nominal)	NA	NA	NA
IX Bldg Square feet	NA	450	900
Ion Exchange for Sr-90, gpm (nominal)	NA	NA	NA
BiInfiltration area, sf	NA	150	300
Treatment Flow Reduction I	NA	NA	NA
Start Yr	NA	NA	NA
End Yr	NA	NA	NA
Treatment Flow Reduction II	NA	NA	NA
Start Yr	NA	NA	NA
End Yr	NA	NA	NA
Treatment Flow Reduction III	NA	NA	NA
Start Yr	NA	NA	NA
End Yr	NA	NA	NA
BiInjection Flow, gpm	NA	0	NA
Wells w/ Sr-90 treated by IX	NA	2	4
P&T Monitoring Sample Points (EWs and effluent tank)	NA	7	13
Active P&T Monitoring - years	NA	64	16
During 1st yr P&T Monitoring - samples/yr per well	NA	4	4
After 1st year P&T Monitoring - samples/yr per well	NA	1	1
Post P&T Monitoring Verification - years	NA	5	5
Post P&T Monitoring Verification - samples/yr per well	NA	2	2
Treatment systems annual online fraction	NA	0.85	0.85



SSPA_RIFS_Alt3_Pumping_Routes_BC5_June_27_2012



Appendix C

Waste Site Information Database Summary Reports

5/21/2012

Waste Information Data System General Summary Report

Site Code: 100-B-5**Site Reclassification Status:** Interim Closed OutPage 1

Site Names: 100-B-5; 105-B Effluent Vent Trench; 116-B-9; Effluent Vent Disposal Trench**Site Type:** Trench**Start Date:** 1/1/1954**Status:** Inactive**End Date:** 1/1/1956**Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-1**Site Description:**

The site has been remediated and closed out. The waste site was the result of leakage that occurred at a junction box [probably at the 0.61 meter (2-foot) vent pipe], where the 1.4 meter (54-inch) 100-B Reactor cross tie pipeline effluent joined the 1.7 meter (66-inch) 100-C Reactor pipeline effluent, resulting in contamination of the area (Dorian and Richards).

Location Description:

The site was believed to be located east of the 105-B Reactor Building, west of the 100-C Reactor effluent pipeline, north of the 100-B Reactor effluent cross tie pipeline, and north of the junction box where the east-west 100-B effluent pipeline joined the north-south 100-C effluent pipeline. The site location was identified as site number 23 on site drawing H-1-4049.

Process Description:

The junction box (part of site 100-C-6, 100-C Reactor Cooling Water Effluent Underground Pipelines, but pertinent to this site) was a concrete structure that was 5.6 meters (18.5 feet) long by 5.6 meters (18.5 feet) wide by 8.2 meters (27 feet) deep. The outer walls of the structure were 0.46 meters (1.5 feet) thick. Two sides of the structure were double-walled providing the structure with two chambers. The 1.4-meter (54-inch) 100-B Reactor cross tie pipeline (invert) entered from the west through a double concrete wall, while the 1.7-meter (66-inch) 100-C Reactor pipeline (invert) entered the structure from the south through a single concrete wall. A single 1.7-meter (66-inch) pipeline exited the structure to the north through the double walled portion of the structure. The interior of the structure was accessible via metal ladder rungs. The original structure had a 0.61-meter (2-foot) vent pipe. The vent pipe was located approximately 2.35 meters (7.7 feet) southwest of the southwest corner of the junction box. The vent was above grade 1.4 meters (4.6 feet) and had a valve on the top. A new 0.31-meter (12-inch) vent pipe was added later. The vent pipe was located approximately 2.3 meters (7.5 feet) south and 1.8 meters (6 feet) east of the southwest corner of the junction box. The vent was above grade approximately 1 meter (3.3 feet) (pipe + valve handle) and had a valve handle on the top. The effluent flowed out of the junction box via the 1.7-meter (66-inch) pipeline and downhill (gravity flow since there was no pump station at 100-B) to the retention basins. On the 100-C effluent pipeline north of the junction box about 80 meters (262 feet) was an inspection manhole. The manhole (riser) was marked "Confined Space 063" and "Fixed Contamination Area FCA-B-0003".

Associated Structures:

Associated sites include the 100-C-6 and 100-B-8 Reactor Cooling Water Effluent Underground Pipelines.

Site Comment:

An update to the post closure requirements was received from BHI, in February 2003, to add "Revegetation; institutional controls to prevent uncontrolled drilling or excavations into the deep zone [below 43.6 meters (15 feet)]."

It was determined the waste site should not be called an unplanned release, because similar releases apparently occurred multiple times over at least a 2 year time period.

J.J. Dorian and V. R. Richards reported in the "Radiological Characterization of the Retired 100 Areas" that leakage occurred in the junction box where the 1.4-meter (54-inch) cross tie pipeline joined the 1.7-meter

Site Code: 100-B-5**Site Reclassification Status: Interim Closed Out**

Page 2

(66-inch) effluent pipeline resulting in contamination of the area. The report gives a coordinate for the northernmost "H" (sample number) sample taken by Dorian and Richards. These coordinates place the sample about 6: meters (200 feet) north of the junction box and about 20 meters (65 feet) south of the inspection manhole. The information on the sample holes map states "100-B/C JB Leak" suggesting the point of origin for the contamination was the junction box. Due to decreasing elevation, the contamination spread north and west along the 100-C effluent pipeline.

Six subsurface soil samples were taken up to 9 meters (30 feet) west of the junction box and 59 meters (195 feet) to the north of the junction box. Dorian and Richards concluded that soil contamination extended 7.6 meters (25 feet) away from the effluent pipeline.

A check of the slope was made on July 16, 1997 using Global Positioning System (GPS) equipment. The distance from the junction box to a surveyed point (located north and just west of the effluent pipeline) was 67 meters (220 feet) with an elevation change of 0.8 meters (2.5 feet). With these values, the slope calculates to 0.012 or 1.2%.

Waste Information:

Type:	Process Effluent	Amount:	
Category:	Radioactive	Units:	Not Specified
Physical State:	Liquid	Reported Date:	
Start Date:	1/1/1954	End Date:	

Description:

The waste was process effluent contaminated soil. Sample numbers (Dorian and Richards) and depths were: B - 4.6, 6.1, 8.4 meters (15, 20, 27.5 feet); C - 3.05 meters (10 feet); D - 4.6, 6.1, 8.4 meters (15, 20, 27.5 feet); E - 4.6, 5.3, 7.6 meters (15, 17.5, 25 feet); F - 4.6, 6.1, 8.4 meters (15, 20, 27.5 feet); H - 6.1 meters (20 feet). Samples were analyzed for plutonium-238, plutonium-239/240, strontium-90, hydrogen-3, europium-152, cobalt-60, europium-154, cesium-234, cesium-137, europium-155, and uranium.

References:

1. H. V. Clukey, 5/10/1956, Tabulation of Radioactive Liquid Waste Disposal Facilities, HW -43121.
2. Dorian and Richards, 5/26/1978, Radiological Characterization of the Retired 100 Areas, UNI-946.

Dimensions:

Length:	30.48 Meters	100.00 Feet
Width:	3.05 Meters	10.00 Feet
Depth/Height:	3.05 Meters	10.00 Feet
Site Shape:	Not Specified	

References:

1. H. V. Clukey, 5/10/1956, Tabulation of Radioactive Liquid Waste Disposal Facilities, HW-43121.

Field Work:

Type:	Site Walkdown
Begin Date:	3/18/1998
End Date:	3/18/1998
Purpose:	Surveillance

Type:	Analytical Sampling
Begin Date:	5/7/2003

Site Code: 100-B-5

Site Reclassification Status: Interim Closed Out

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End Date: 5/7/2003

Purpose: Cleanup Verification

Comment:

Cleanup verification samples, including QA/QC samples were collected and analyzed for the established contaminants of concern. The HEIS Shallow Zone sample numbers were J00N74 through J00N85 and J00N93 HEIS Deep Zone sample numbers were J00N88 through J00N90, J00N92 and J00N94.

References:

1. Cleanup Verification Package for the 100-B-5 Effluent Vent Disposal Trench, CVP-2003-00014, Rev 0.

Regulatory Information:

Programmatic Responsibility

Responsible

Contractor/Subcontractor: WCH Washington Closure Hanford

Reclassifying

Contractor/Subcontractor: None

Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes

TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit: No

TSD Number:

RCRA Part A Permit : No

Closure Plan: No

RCRA Permit Status: Not Specified

Septic Permit: No

216/218 Permit:

Inert LandFill: No

NPDES:

Air Operating Permit: No

State Waste Discharge Permit:

Air Operating Permit Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA

Unit Category: CERCLA Past Practice (CPP)

TPA Appendix : C

Remediation and Closure

Decision Document: Interim Action Record of Decision, 100 Area Remaining Sites (1999)

Decision Document Status: Final

Closure Document: Cleanup Verification Package (CVP)

Closure Type: Not Specified

Post Closure Requirments:

Institutional controls to prevent uncontrolled drilling or excavation into the deep zone (i.e., below 4.6 m [15 ft]) are required

Closure Group:

Site Code: 100-B-5**Site Reclassification Status: Interim Closed Out**

Page 4

Closure Group Name: CG 100-B-5
Type: Interim**Remediation Action:**

Remedial action at the 100-B-5 site was conducted in May 2003. Excavation of the 100-B-5 site involved removing the overburden materials, removing sections of the 100-C-6 and 100-B-8 Reactor effluent pipelines, removing a pipeline junction box, and removing contaminated soil. Contaminated materials including the pipeline sections and concrete junction box were disposed of at the ERDF. Cleanup demonstration of the reactor effluent pipelines will be included in a future CVP and will reference this CVP for the small section of pipelines remediated with the 100-B-5 site.

Remedial action objectives (RAOs) and goals (RAGs) for the site were documented in the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100 HR-1, 100 HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units (ROD) and the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP). Excavation was driven by remedial action objectives for direct exposure, protection of groundwater, and protection of the Columbia River.

At the completion of the remedial action, the total excavation was approximately 4,450 meters squared (47,900 square feet) in area with a maximum depth of 8.5 meters (27.9 feet) below ground surface. Approximately 16,320 metric tons (17,950 tons) of material from the site were disposed of at the Environmental Restoration Disposal Facility. In addition to the 100-B-5 site, the portions of the 100 B-8 and 100-C-6 Reactor cooling water effluent pipelines beneath the site were remediated with the 100-B-5 site. Cleanup verification of the rest of the adjacent large pipeline sites (100-C-6 and 100-B-8) will be included in the CVPs for those sites.

The CVP has demonstrated that remedial action at the site has met the RAOs and corresponding RAGs established in the ROD and RDR/RAWP. The remaining soils at the site have been sampled, analyzed, and modeled. The results of this effort indicated that the material from the site containing COCs at concentrations exceeding RAGs have been excavated and disposed at the ERDF. These results also indicate that residual concentrations in the shallow zone will support future land uses that can be represented (or bounded) by a rural-residential scenario and that residual concentrations throughout the site do not pose a threat to groundwater or the Columbia River.

Excavated Material:

Quantity: 16,320.00
Unit Type: Loose Cubic Yards
Disposition: Environmental Restoration Disposal Facility

Cleanup Verification:

The 100-B-5 site consisted of shallow zone and deep zone decision units. The shallow zone decision unit contained three decision subunits, which were divided into 12 sampling areas. The deep zone decision unit was divided into three sampling areas. One composite cleanup verification sample was collected from each sample area.

For the respective points of compliance, remedial action goals (RAGs) were established to identify contaminant of concern (COCs). Waste site COCs identified through process knowledge for the 105-B and 105-C Reactor cooling water effluent pipelines are listed in the 100 Area Remedial Action Sampling and Analysis Plan (SAP). Additional pipeline COCs identified during remediation include lead, mercury, total chromium, and hexavalent chromium. Because the site was associated with leaks from the cooling water effluent pipelines, the site COCs and the pipeline COCs are the same. The COCs for the site consisted of the following: americium-241, cesium-137, cobalt-60, europium-152, europium-154, europium-155, plutonium-238, plutonium-239/240, strontium-90, uranium-238, lead, mercury, total chromium, hexavalent chromium.

Sampling:

Sampling Region: Shallow zone
Constituent List: Cesium-137, Hexavalent Chromium, Mercury, Gross alpha, Americium-241, AEA

Site Code: 100-B-5**Site Reclassification Status: Interim Closed Out**Page 5

Sampling Region: Deep zone**Constituent List:** Cesium-137, Hexavalent Chromium, Mercury, Gross alpha, Gross beta, Americium-241**Institutional Controls:**

The acceptability of unrestricted direct exposure to deep zone soils has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone (i.e., below 4.6 meters [15 feet]) are required. The site has been verified to be remediated in accordance with the ROD and may be backfilled.

Statement Of Protectiveness:

This CVP demonstrates that remedial action at the 100-B-5 site has achieved the RAOs and corresponding RAC established in the ROD (EPA 1999) and RDR/RAWP (DOE-RL 2002). The remaining soils at the 100-B-5 site have been sampled, analyzed and modeled. The results of this effort indicate that the materials from the 100-B-5 site containing COCs at concentrations exceeding RAGs have been excavated and disposed of at the ERDF. These results also indicate that residual concentrations in the shallow zone will support future land uses that can be represented (or bounded) by a rural-residential scenario and that residual concentrations throughout the site do not pose a threat to groundwater or the Columbia River. The acceptability of unrestricted direct exposure to deep zone soils has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone (i.e., below 4.6 meters [15 ft]) are required. The 100-B-5 site is verified to be remediated in accordance with the ROD (EPA 1999) and may be backfilled.

Images:**Pathname:** [//mapweb.rl.gov/widsimg/100b/1845/1845_01.jpg](http://mapweb.rl.gov/widsimg/100b/1845/1845_01.jpg)**Date Taken:** 3/18/1998**Description:**

Photo shows the junction box associated with the leak.

References:

1. LA Dietz, 2/27/2003, Updates to WIDS Database, 105989.
2. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
3. Cleanup Verification Package for the 100-B-5 Effluent Vent Disposal Trench, CVP-2003-00014, Rev 0.
4. Heid, 1/1/1956, PROCESS WASTE SYSTEM, HW-46715 Sketch B.
5. K. R. Heid, 11/14/1956, Unconfined Underground Radioactive Waste and Contamination - 100 Areas, HW-46715.
6. Chas. T. Main, Inc., General Electric, 5/4/1952, PROCESS SEWER CROSS CONNECTION, P-5550, Rev 2.
7. H. V. Clukey, 5/10/1956, Tabulation of Radioactive Liquid Waste Disposal Facilities, HW -43121.
8. Dorian and Richards, 5/26/1978, Radiological Characterization of the Retired 100 Areas, UNI-946.
9. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
10. Jim Sharpe, 5/9/1997, FDO: From the Desk of Jim Sharpe - Supporting Documentation For Waste Site 100-B-5, FDO:5-9-97.
11. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
12. 1/1/2001, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 3.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 100-B-14**Site Reclassification Status:** Interim Closed OutPage 1

Site Names: 100-B-14; 100-B Area Process and Sanitary Sewer Underground Pipelines**Site Type:** Process Sewer**Start Date:** 1/1/1944**Status:** Inactive**End Date:** 1/1/1969**Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-1**Site Description:**

The waste site encompassed pre-reactor underground process and sanitary pipelines and sewers, and was divided into seven subsites for decision-making purposes based on functional use and geographical location. The subsites included: 1) Main Process Sewer Collection Pipelines, 2) Sanitary Sewer Pipelines, 3) West Process Sewer Feeder Pipelines from 182-B and 183-B, 4) Cooling Water Pipelines and Tunnels from 190-B, 5) Sodium Dichromate and Sodium Silicate Pipelines, 6) Process Sewer Feeder Pipeline from 184-B and 184-B Ash Slurry Line, and 7) Process Sewer Feeder Pipelines from 185-B and 190-B.

Location Description:

These pipelines were mostly north and west of the 105-B Reactor and north of the 183-B Filter House. Most joined to empty into the 116-B-7 Outfall. Others emptied into the 126-B-1 Power House Ash Pit, and the 1607-B2 and 1607-B7 Septic Systems. The sodium dichromate pipeline connected the 108-B Laboratory and the 190-B building, and the treated reactor cooling water ran from the 190-B Facility to the 105-B Reactor.

Process Description:

These pipelines carried a variety of non-radioactive waste fluids, product (sodium dichromate), treated cooling water (pre-reactor), and sewage.

Associated Structures:

Buildings associated with these pipelines included the 105-B Reactor, 190-B Facility, 108-B Laboratory, 182-B and 183-B Filter Buildings, 184-B Power House, 115-B Filter House, and 1700-Series support buildings.

Site Comment:

These pipelines were separated from the other pipelines in 100-B-7 in March 2001, to allow the clean water pipes (100-B-7) to be Rejected through the TPA-MP-14 process. In a WCH interoffice memo (WCH CCN-131227) dated 12/14/06 discovery pipelines identified as DS-IOOBC-009, DS-100BC-012, and DS-100BC-034 originally assigned to 100-B-21 were identified as being part of the 100-B-14 waste site.

SubSites:

SubSite Code: 100-B-14:1**SubSite Names:** 100-B-14:1; Main Process Sewer Collection Pipelines**Classification:** Accepted**ReClassification:** Interim Closed Out**Description:**

The main process line site consisted of 1270 meters (4166 ft) of pipe ranging from 0.3 m (12 in.) diameter vitrified-clay pipe to 1.82 meter (72 in) diameter reinforced concrete pipe (RCP).

References:

Site Code: 100-B-14**Site Reclassification Status: Interim Closed Out**Page 2

1. Linda Dietz, 1/21/2004, Subsite information for 100-B-14, 100-B Area Process and Sanitary Sewer Underground Pipelines.
 2. 2/20/2007, REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-14:1 PROCESS SEWER (Attachment to Waste Site Reclassification Form 2004-005), RSVP-2004-005, Rev 0.
 3. 7/1/2007, The 300 Area Waste Acid Treatment System Closure Plan, DOE/RL-90-11, Rev 0.
 4. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
 5. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.
 6. 1/1/2004, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 4.
-

SubSite Code: 100-B-14:2
SubSite Names: 100-B-14:2; Sanitary Sewer Pipelines
Classification: Accepted
ReClassification: Interim Closed Out

Description:

This subsite included septic sewer pipelines servicing several buildings and areas:

The 115-B Gas Recirculation sanitary sewer site consists of approximately 311 meters (1020 feet) of 20 centimeter (8 inch) vitrified clay sewer pipe;

The 190-B Pumphouse was serviced by 10, 15, and 20 centimeter (4, 6 and 8 inch) vitrified clay sewer pipes of various lengths;

The 183-B Water Treatment facility was serviced by a 200 meter (660 feet) long, 20 centimeter (8 inch) vitrified clay sewer pipe;

The 1700-B Series Support Buildings and 108-B Building were serviced by 15 and 20 centimeter (6 and 8 inch) vitrified clay pipes of various lengths.

References:

1. 8/10/2006, Update Subsites 100-B-14, remove subsites 8 & 9 and withdraw reclass control number 2004-058. Reclass #2004-06 will be used for 14:2 per L. Dietz, 100-B-14:2.
 2. REMAINING SITES VERIFICATION PACKAGE FOR THE 1607-B2 SEPTIC SYSTEM AND 100-B-14:2 SANITARY SEWER SYSTEM (Attachment to Waste Site Reclassification Form 2006-055), RSVP-2006-055, Rev 0.
 3. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
-

SubSite Code: 100-B-14:3
SubSite Names: 100-B-14:3; West Process Sewer Feeder Pipelines from 182-B and 183-B
Classification: Accepted
ReClassification: No Action

Description:

The subsite consisted of the process sewer pipelines that exited from the 182-B reservoir and 183-B water treatment facilities. These process sewer lines were collected into a single 1.67 meter (5.5-foot) reinforced concrete box sewer that fed into the main process sewer collection line serving the 185-B/190-B Pumphouse, 105-B Reactor, and the 108-B Tritium Separation Facility. The basis for separating this subsite from the main process sewer line was that these lines carried effluent from facilities known to be potential sources of radioactive and chemical contaminants.

References:

SubSite Code: 100-B-14:4
SubSite Names: 100-B-14:4; Cooling Water Pipelines and Tunnels from 190-B

Site Code: 100-B-14**Site Reclassification Status: Interim Closed Out**Page 3

Classification: Accepted**ReClassification:** No Action**Description:**

This subsite included the pipes and tunnels from the 190-B Building to the road east of the 105-B Reactor. They were twin tunnels at each reactor. The tunnel dimensions varied, but were about 3.3 m wide by 3.6 m high (10 ft by 12 ft). They covered a distance of about 140.2 m (460 ft) from the pumphouses to the reactor. Each tunnel from the 190-C pumphouse held one 20.3 cm (8 in) steam line and three 61 cm (24 in) water pipes. Each tunnel from the 190-B pumphouse and annex held twelve 30.5 cm (12 in), and two 45.7 cm (18 in) pipelines for cooling water to the 105-B Reactor. The pipes from the edge of the road to the reactor should be included in 118-B-8, as they cannot be removed until the reactor is addressed.

References:

1. 9/16/2004, Waste Site Reclassification Form, 2004-008, WSRF-2004-008.

SubSite Code: 100-B-14:5**SubSite Names:** 100-B-14:5; Sodium Dichromate and Sodium Silicate Pipelines**Classification:** Accepted**ReClassification:** No Action**Description:**

The subsite consisted of the sodium dichromate and sodium silicate product pipelines that transferred product from 108-B Building to 185/190-B facilities.

References:

SubSite Code: 100-B-14:6**SubSite Names:** 100-B-14:6; Process Sewer Feeder Pipeline from 184-B and 184-B Ash Slurry Line**Classification:** Accepted**ReClassification:** No Action**Description:**

This subsite included the process sewer pipelines from the 184-B Powerhouse, flowing north to the ash pit, and flowing east to the main trunk line (100-B-14:1) on both the north and south sides of the powerhouse. The underground piping for the 184-B Powerhouse included sanitary (clean) waterlines, a sanitary sewer line and process sewer lines. These pipelines consist of: Sanitary waterline pipelines: These pipelines consist of sanitary water pipelines, filtered water pipelines, and raw and condenser water pipelines. Proceeding from west to east along the south side of the building the pipelines include: 1607-B-3 Sanitary Sewer Pipeline: This piping is a 20.3 cm (8 in) diameter vitrified clay pipe that exited the northwest corner of the 184-B Powerhouse to the 1607-B-3 Septic Tank. 184-B Powerhouse Ash Pipeline: This pipeline is a 20.3 cm (8 in) diameter ashcolite pipe that was used to discharge coal ash that was mixed with raw water and sluiced from the 184-B Powerhouse to the 126 B Ash Pit. 184-B Process Sewer Pipelines: There are four locations where process sewer pipelines exit the 184-B Powerhouse and eventually discharge into the main 100-B-14 Process Sewer Pipeline connecting to the 116-B-7 Outfall. There is also a pipeline that discharges from the powerhouse blow-off tank into the 184-B Process Sewer Pipelines. These pipelines required confirmatory sampling and included: Two pipelines, a 15.2 cm (6 in) diameter vitrified clay pipe and a 20.3 cm (8 in) diameter vitrified clay pipe, both on the left south side of the building, that discharged into a 30.5 cm (12 in) diameter vitrified clay pipe and eventually into the main process sewer line. A 30.5 cm (12 in) diameter steel pipe near the center south side of the building that discharged into a 130.5 cm (2 in) diameter vitrified clay pipe and eventually into the main process sewer line. A 38.1 cm (15 in) diameter vitrified clay pipe on the north side of the building that discharged directly into the main process sewer pipeline.

References:

Site Code: 100-B-14**Site Reclassification Status: Interim Closed Out**

Page 4

1. Remaining Sites Verification Package for 100-B-14:6 Powerhouse Pipelines Site (Attached Reclass Form 2004-010), RSVP 100-B-14:6, Rev 0.

SubSite Code: 100-B-14:7
SubSite Names: 100-B-14:7; Process Sewer Feeder Pipelines from 185-B and 190-B
Classification: Accepted
ReClassification: No Action

Description:

This subsite consisted of the pipelines that were used to control the temperature of process water used in association with the 185-B Deaeration Building and the 190-B Pumphouse. The pipelines were from the south side of the 185-B and 190-B facilities and ended at the sump on the southeast corner of 190-B. The subsite included the sump. The sump was a 14.3 m by 10.4 m by 4.6 m deep (47 ft by 34 ft by 15 ft deep) reinforced concrete reservoir, and was open to the environment. An 80 m (260 ft) long, 61 cm (24 in) diameter cast-iron pipe exited the south side of the 185-B Building and fed the sump. A 10 m (30 ft) long, 76 cm (30 in) diameter cast-iron pipe that exited the south side of the 190-B Pumphouse joined this pipe. The pipe entered the sump on the south side near the west corner at approximately 3 m (9 ft) below ground surface (coordinates N 144444.427; E 565173.872).

References:

1. Remaining Sites Verification Package for 100-B-14:7 185-B/190-B Sump and Pipelines (Attached Reclass Form 2004-011), RSVP 100-B-14:7, Rev 0.

Waste Information:

Type:	Equipment	Amount:	
Category:	Unknown	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

The waste site consisted of abandoned process and sanitary sewer pipelines, and residual chemicals remaining on the pipes. Chemical additives to the reactor cooling water included aluminum sulfate (alum) with excess hydrated calcium oxide, sulfuric acid, chlorine, and sodium dichromate. Water pH was maintained at about 7.5, the free chlorine residual was approximately 0.2 milligrams/liter, and sodium dichromate was added at a rate of about 2 milligrams/liter. One length of the product piping held undiluted sodium dichromate: the pipe from the 185-B/190-B to the 108-B Building (per drawing M2913, Sheet 5). This pipeline was in use only for a few years, until the sodium dichromate was added to the cooling water at the 185-B Building. (Note: Reference: WHC-SD-EN-TI-169 is for 100-F, and applies equally to 100-B).

References:

1. J. J. Sharpe, J. K. Linville, 1/2/2001, 100-B/C Reactor Area Underground Pipeline Historical Information Summary, BHI-01453.
 2. D. H. DeFord, 7/6/1993, 100-F Reactor Site Technical Baseline Report Including Operable Units 100-FR-1 and 100-FR-2, WHC-SD-EN-TI-169, Rev 0.

Field Work:

Type: Analytical Sampling
Begin Date: 9/1/2003
End Date: 10/1/2003
Purpose: Confirmatory 100-B-14:6

Comment:

Site Code: 100-B-14**Site Reclassification Status: Interim Closed Out**Page 5

Confirmatory sampling was conducted in September and October 2003. The maximum detected results from the pipe scale and soil samples were used to support waste site reclassification. HEIS Sample numbers included: J00YR2 through J00YR9, and J00YV0. The contaminants of potential concern (COPCs) were identified based on existing analytical data, historical process information, and historical uses and practices associated with the 184-B Powerhouse facility and process sewers. The COPCs included inductively coupled plasma (ICP) metals, mercury, hexavalent chromium, and polychlorinated biphenyls (PCBs). Historical information did not indicate radiological constituent COPCs. The absence of radiological contamination at this site was confirmed using gamma energy analysis (GEA) and gross alpha and gross beta sample analyses for screening purposes.

References:

1. Remaining Sites Verification Package for 100-B-14:6 Powerhouse Pipelines Site (Attached Reclass Form 2004-010), RSVP 100-B-14:6, Rev 0.

Type: Analytical Sampling
Begin Date: 10/1/2003
End Date: 10/1/2003
Purpose: Confirmation 100-B-14:7

Comment:

Confirmatory sampling was conducted in October 2003. The sampling approach consisted of collecting three samples of pipe scale material from each of three manholes and one soil sample from below one manhole/pipe. The maximum detected results from the scale and soil samples were used to support waste site reclassification. HEIS Sample numbers included: J00YW2 through J00YW9, J00YX0 and J00YX1. The contaminants of potential concern (COPCs) were identified based on existing analytical data, historical process information, and historical uses and practices associated with the 182-B and 183-B facilities. The COPCs included inductively coupled plasma (ICP) metals, mercury and hexavalent chromium. Historical information did not indicate radiological constituent COPCs. The absence of radiological contamination at this site was confirmed using gamma energy analysis (GEA) and gross alpha and gross beta sample analyses for screening purposes.

References:

1. Remaining Sites Verification Package for 100-B-14:7 185-B/190-B Sump and Pipelines (Attached Reclass Form 2004-011), RSVP 100-B-14:7, Rev 0.

Type: Analytical Sampling
Begin Date: 10/1/2004
End Date: 10/1/2004
Purpose: Confirmatory 100-B-14:5

Comment:

Confirmatory sampling was conducted in October 2003. The sampling approach consisted of collecting three samples of pipe scale material from each of three manholes and one soil sample from below one manhole/pipe. The maximum detected results from the scale and soil samples were used to support waste site reclassification. HEIS Sample numbers included: J00YT0 through J00YT5. Contaminants of potential concern (COPCs) were identified based on historical process information associated with water treatment at the 108-B and 185-B/190-B facilities. These COPCs included inductively coupled plasma (ICP) metals and hexavalent chromium. Historical information did not indicate radiological constituent COPCs. The absence of radiological contamination at this site was confirmed using gamma energy analysis (GEA) and gross alpha and gross beta sample analyses for screening purposes.

References:

1. Remaining Sites Verification Package for 100-B-14:5 Sodium Dichromate and Sodium Silicate Lines, RSVP-100-B-14:5, Rev 0.

Site Code: 100-B-14

Site Reclassification Status: Interim Closed Out

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Type: Analytical Sampling
Begin Date: 10/1/2003
End Date: 10/1/2003
Purpose: Verification 100-B-14:3

Comment:

Confirmatory sampling was conducted in October 2003. The sampling approach consisted of collecting three samples of pipe scale material from each of three manholes and one soil sample from below one manhole/pipe. The maximum detected results from the scale and soil samples were used to support waste site reclassification. HEIS Sample numbers included: J00YN2, J00YN3, J00YN5, J00YN6, J00YN8, J001004, J00YX and J0YP0. The contaminants of potential concern (COPCs) were identified based on existing analytical data, historical process information, and historical uses and practices associated with the 182-B and 183-B facilities. The COPCs included inductively coupled plasma (ICP) metals, mercury, hexavalent chromium, sulfate, pH, semivolatile organic compounds, and polychlorinated biphenyls (PCBs). Historical information did not indicate radiological constituent COPCs. The absence of radiological contamination at this site was confirmed using gamma energy analysis (GEA) and gross alpha and gross beta sample analyses for screening purposes.

References:

1. Remaining Sites Verification Package for 100-B-14:3 West Process Sewer Pipelines Site, (Attached Reclassification form 2004-007), RSVP 100-B-14:3.

Regulatory Information:**Programmatic Responsibility****Responsible**

Contractor/Subcontractor: WCH Washington Closure Hanford

Reclassifying

Contractor/Subcontractor: None

Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes

TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit: No

TSD Number:

RCRA Part A Permit : No

Closure Plan: No

RCRA Permit Status: Not Specified

Septic Permit: No

216/218 Permit:

Inert LandFill: No

NPDES:

Air Operating Permit: No

State Waste

Air Operating Permit

Discharge Permit:

Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA

Unit Category: CERCLA Past Practice (CPP)

TPA Appendix : C

Remediation and Closure

Decision Document: Explanation of Significant Difference for the 100 Area Remaining Sites Interim ROD (2/2004)

Site Code: 100-B-14

Site Reclassification Status: Interim Closed Out

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Decision Document Status: Final

Closure Document: Remaining Sites Verification Package (RSVP)

Closure Type: Not Specified

Post Closure Requirements:

Deep zone institutional controls were only required for subsite 14:1.

Images:

Pathname: [//mapweb.rl.gov/widsimg/100b/4488/4488_01.jpg](http://mapweb.rl.gov/widsimg/100b/4488/4488_01.jpg)

Date Taken: 6/3/2003

Description:

A photo showing one of the vitrified clay sanitary sewer pipelines from 100-B-14:2.

References:

1. J. J. Sharpe, J. K. Linville, 1/2/2001, 100-B/C Reactor Area Underground Pipeline Historical Information Summary, BHI-01453.
2. Linda Dietz, 1/21/2004, Subsite information for 100-B-14, 100-B Area Process and Sanitary Sewer Underground Pipelines.
3. Dietz, L, 12/14/2006, Interoffice memo: Summary of the disposition of the 100-B-21, 100-B/C miscellaneous pipelines to date, and disposition of three redundant entries, WCH CCN 131227.
4. D. H. DeFord, 7/6/1993, 100-F Reactor Site Technical Baseline Report Including Operable Units 100-FR-1 and 100-FR-2, WHC-SD-EN-TI-169, Rev 0.
5. Remaining Sites Verification Package for 100-B-14:5 Sodium Dichromate and Sodium Silicate Lines, RSVP-100-B-14:5, Rev 0.
6. 2/20/2007, REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-14:1 PROCESS SEWER (Attachment to Waste Site Reclassification Form 2004-005), RSVP-2004-005, Rev 0.
7. Remaining Sites Verification Package for 100-B-14:3 West Process Sewer Pipelines Site, (Attached Reclassification form 2004-007), RSVP 100-B-14:3.
8. Remaining Sites Verification Package for 100-B-14:7 185-B/190-B Sump and Pipelines (Attached Reclass Form 2004-011), RSVP 100-B-14:7, Rev 0.
9. Remaining Sites Verification Package for 100-B-14:6 Powerhouse Pipelines Site (Attached Reclass Form 2004-010), RSVP 100-B-14:6, Rev 0.
10. REMAINING SITES VERIFICATION PACKAGE FOR THE 1607-B2 SEPTIC SYSTEM AND 100-B-14:2 SANITARY SEWER SYSTEM (Attachment to Waste Site Reclassification Form 2006-055), RSVP-2006-055, Rev 0.
11. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
12. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.
13. 1/1/2004, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 4.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 100-B-15**Site Classification:** AcceptedPage 1

Site Names: 100-B-15; 100BC River Effluent Pipelines; 100BC River Lines**Site Type:** Radioactive Process Sewer**Start Date:****Status:** Inactive**End Date:****Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-1**Site Description:**

This site includes the 100-B/C Area river effluent pipelines (river lines) that extend from each of the three outfalls into the main channel of the Columbia River.

Location Description:

The river lines are located in the Columbia River, adjacent to the 100BC area. The lines extend north into the main channel of the river from three outfall structures located near the river shore.

Process Description:

The river effluent pipeline from 116-B-7 (1904-B1) provided for the discharge of reactor cooling water and the B Area process sewers until 1955. After that time, it provided only for the discharge of B Area process sewers, and reactor cooling water was rerouted through a new, higher capacity 132-B-6 (1904-B2) pipeline. In 1952 the 1904-C pipelines (and the 132-C-2 outfall) discharged reactor cooling water for the new C Reactor and C Area process sewers. In the event any of the pipelines became plugged or had to be removed from service during operation, the effluent overflowed the effected outfall and entered the river via an attached spillway.

Associated Structures:

The site is associated with the 116-B-7 (1904-B1 outfall), 132-B-6 (the 1904-B2 outfall), and 132-C-2 (the 1904-C outfall); the 100-B Reactor Cooling Water Effluent Underground Pipelines (100-B-8), the 100 B Area Process and Sanitary Sewer Underground Pipelines (100-B-14), the 100-C Reactor Cooling Water Effluent Underground Pipelines (100-C-6), and the 100-C Area Process and Sanitary Sewer Underground Pipelines (100-C-9); the 107-B Retention Basin (116 B-11), the 107-B Liquid Waste Disposal Trench (116-B-1), the 107-C Retention Basins (116-C-5), and the 107-C Liquid Waste Disposal Trench; and 100-B-24 (the 1904-B1 Spillway), 100-B-25 (the 1904-B2 Spillway), 100-B-26 (and the 1904 C Spillway).

Site Comment:

A description of each river line follows. The river line from 1904-B1 (116-B-7) outfall is constructed of 107-centimeter (42-inch) diameter carbon steel pipe with a 1.3-centimeter (1/2-inch) thick wall. The line is 228 meters (750 feet) long. The last 13 meters (40 feet) of the pipeline are exposed on the river floor. The river line from 1904-B2 (132-B-6) outfall is constructed of 168-centimeter (66-inch) diameter carbon steel pipe with a 1.3-centimeter (1/2-inch) thick wall. The line is 210 meters (690 feet) long. The last 30 meters (100 feet) of the pipeline are exposed on the river floor. The river lines from 1904-C (132-C-2) consist of two 137-centimeter (54-inch) diameter steel pipe with a 1.3-centimeter (1/2-inch) thick walls. The lines are 152 meters (500 feet) long. Both lines are exposed at various locations along the pipe run. Originally, the 1904-B1, 1904-B2 and the 1904-C Outfalls, Spillways (Flumes) and river pipelines were included in the outfall site. Due to remediation project needs the outfall structures, the River Effluent Discharge lines (100-B-15) and the spillways (flumes) (100-B-24, 100-B-25 and 100-B-26) have been documented as separate waste sites. During a 1994 geophysical survey the river lines were observed as being partially exposed on the river floor. For detailed information, please see the Field Work entry. During 2001 and 2002, the three outfall structures were removed, the associated spillways were covered with clean soil, and the exposed (outfall) ends of all pipelines left in place were plugged with poured concrete. Per the requirements of TriParty Commitment C-106-06B for DOE/RL to "Submit an engineering evaluation of the final disposition of the river pipelines and outfall structures

Site Code: 100-B-15**Site Classification: Accepted**

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to EPA and Ecology" by July 31, 2005, the 100-B-15 river effluent pipelines, along with other river effluent pipelines in the 100 Area, will be addressed through an Explanation of Significant Differences (a CERCLA decision document).

Waste Information:

Type:	Process Effluent	Amount:	
Category:	Mixed	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

The waste includes the pipelines and the contaminated scale contained within them. Contaminants of concern/potential concern are based on those for the outfalls themselves. They include americium-241, cesium-137, cobalt-60, europium-152, europium-154, europium-155, nickel-63, plutonium-238, plutonium-239/240, strontium-90, tritium, uranium-234, uranium-235, uranium-238, hexavalent chromium, total chromium, mercury, and lead.

References:

1. P. G. Doctor, 100 Area River Effluent Pipelines Risk Assessment, BHI-01148, Rev 0.
2. 1/1/2004, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 4.

Field Work:

Type:	Geophysical Survey
Begin Date:	7/8/1994
End Date:	7/8/1994
Purpose:	map location

Comment:

The purpose of the investigation was to map the location and depth of the river effluent pipelines that extend into the Columbia River. The survey was conducted by Golder Associates, Seattle. There was a concern that some of the pipelines may be uncovered and thus a hazard to navigation. Transects, 61 to 91 meters (200 to 300 feet in length centered over the pipelines, were run by the survey vessel. The Precision Echosounder, Side-Scan Sonar, and Ground Penetrating Radar proved to be the best combination of instrumentation for imaging the pipelines. At site 116-B-7, the 107 centimeter (42 inch) pipeline extends approximately 121.9-meter (400 feet) offshore and is exposed on the river floor over the last 12.2-meter (40 feet). The relief of the pipeline where it is exposed varies from 0.6-0.9 meters (2-3 feet). The depth of burial varies from 0.3-0.9-meters (1-3 feet). At site 132-B-6, the 168 centimeter (66 inch) pipeline extends approximately 121.9-meters (400-feet) offshore and is exposed on the river bed along the outer 30.5-meters (100-feet). The relief at these exposures varies from 0.3-0.9-meters (1-3 feet). Where the pipeline is buried, the sediment cover varies from 0.3-0.9-meters (1-3 feet). At site 132-C-2, large boulders that project 0.3-0.9 meters (1-3 feet) above the river bed are present throughout this site. The two 137 meters (54-inch) pipelines extend approximately 91.4 meter (300-feet) offshore. Both of the pipelines are exposed at various locations along the lower section of the alignment. The depth of burial for both pipelines, along the upper section of the alignment, varies from 0.3-0.9 meters (1-3 feet).

References:

1. P. J. Valcich, 6/7/1994, Columbia River Effluent Pipeline Survey, WHC-SD-EN-TI-278, Rev 0.

Type:	Analytical Sampling
Begin Date:	7/13/2001
End Date:	9/17/2001
Purpose:	Future remediation project

Site Code: 100-B-15**Site Classification: Accepted**Page 3

Comment:

100-B/C Area River Effluent Pipelines Radionuclide Sampling Report is the subject of an interoffice memo that details radiological characterization data from the river effluent pipelines at the 100-B/C Reactor Area collected in 2001. The purpose of this limited investigation was to collect relevant data for possible future remediation efforts involving the river effluent pipeline system. Following the removal of the outfall structures (116-B-7, 132-B-6 and 132-C-2), sediment or scale samples were collected from the river effluent pipelines. The analytical results of recent sediment/scale material from the river effluent pipelines are reported with the following HEIS sample numbers: B12K17, B12W87 through B12W89. Sample results were compared to previous samples documented in HEIS. Dose rate information was determined by placing a TLD inside of the pipelines leading from the 132-C-2 outfall for fifty hours. In September 2001, just prior to the lines being sealed with concrete following removal of the outfalls, the lines were sampled for radionuclides. One scraping was taken from the outfall end of each pipeline. The results were comparable with the 1984 and 1995 studies, in that europium was the predominant radionuclide. All of the scale or sediment material collected exceeded the cleanup standard by at least an order of magnitude.

References:

1. D. W. Shea, 7/10/2001, 100-B/C Area River Effluent Pipelines Radionuclide Sampling Report.

Type: Analytical Sampling
Begin Date: 3/1/1984
End Date: 4/30/1984
Purpose: Obtain Pipe and Sediment Samples

Comment:

In early spring of 1984, an effluent line from the 1904-C outfall was one of three riverlines sampled as part of a characterization activity. Pipe section and sediment samples were collected and analyzed for radioactivity. The predominate isotopes in the lines were Europium-152 and 154. The highest concentration came from interior pipe scraping samples. Most activity seemed to be fixed within the rust on the interior pipe surfaces, from which the scrapings were collected. The contact dose rate on the outside of the pipe surface was zero. The contact dose rate on the interior surface was less than 1 millirem/year. In 1984 the 1904-C pipelines were physically and radiologically characterized. Radiological characterization included monitoring the exterior surface of the pipes, sampling settled solids at the interior bottom of the pipes, and sampling interior scale. The contact dose rate on the exterior of the pipelines was zero. The predominant isotopes found inside the pipes were cobalt and europium, with roughly twice the concentrations of each in the scale versus the settled solids. Both lines were found to be exposed over nearly their entire length in the riverbed. They bore no signs of externally induced damage or corrosion. Also, much of each pipeline was undermined and unsupported.

References:

1. JF Beckstrom, 4/17/1986, River Discharge Lines Characterization Report, UNI-3262.

Type: Analytical Sampling
Begin Date: 7/25/1995
End Date: 7/25/1995
Purpose: Characterize the effluent pipeline

Comment:

Four scale and three sediment samples were collected from the inside of the pipeline using a robot equipped with radiation monitoring instruments, video camera, and sample collection devices. Ultrasonic tests were performed at three locations within the pipeline to measure wall thickness, which served as an indicator of the corrosion rate of the pipelines. Sample numbers included B0GCJ3 through B0GCJ9, B0GCL5, and B0GCK0 through B0GCK6.

References:

Site Code: 100-B-15

Site Classification: Accepted

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1. K. L. Dunks, 1/1/1996, 100 Area River Effluent Pipelines Characterization Report, BHI-00538.

Regulatory Information:

Programmatic Responsibility

Responsible

Contractor/Subcontractor: WCH Washington Closure Hanford

Reclassifying

Contractor/Subcontractor: None

Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes

TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit: No

TSD Number:

RCRA Part A Permit: No

Closure Plan: No

RCRA Permit Status: Not Specified

Septic Permit: No

216/218 Permit:

Inert LandFill: No

NPDES:

Air Operating Permit: No

State Waste

**Air Operating Permit
 Number(s):**

Discharge Permit:

Tri-Party Agreement

Lead Regulatory Agency: EPA

Unit Category: Decontamination & Decommissioning (D&D)

TPA Appendix : C

Remediation and Closure

Decision Document: None

Decision Document Status: None

Closure Document: None

Closure Type: Not Specified

Post Closure Requirments:

Images:

Pathname: [//mapweb.rl.gov/widsimg/100b/4490/4490_01.jpg](http://mapweb.rl.gov/widsimg/100b/4490/4490_01.jpg)

Date Taken: 5/19/1955

Description:

Aerial photo of the BC Area, all three outfalls are shown.

Pathname: [//mapweb.rl.gov/widsimg/100b/4490/4490_02.jpg](http://mapweb.rl.gov/widsimg/100b/4490/4490_02.jpg)

Date Taken: 12/31/1951

Description:

Photo of construction of the 1904-C river effluent pipelines

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Site Classification: Accepted

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Pathname: [//mapweb.rl.gov/widsimg/100b/4490/4490_03.jpg](http://mapweb.rl.gov/widsimg/100b/4490/4490_03.jpg)

Date Taken: 9/15/2001

Description:

Photo shows the remediation of the 132-C Outfall, in the foreground is 100-B-26 Spillway. The pipelines in the background are the 100-B-15 River Effluent Pipelines.

Pathname: [//mapweb.rl.gov/widsimg/100b/4490/4490_04.jpg](http://mapweb.rl.gov/widsimg/100b/4490/4490_04.jpg)

Date Taken: 9/15/2001

Description:

Concrete plugs in the photo are in the ends of the 1904-C Effluent Pipelines.

References:

1. K. L. Dunks, 1/1/1996, 100 Area River Effluent Pipelines Characterization Report, BHI-00538.
2. P. G. Doctor, 100 Area River Effluent Pipelines Risk Assessment, BHI-01148, Rev 0.
3. Cleanup Verification Package for the 116-B-7, 132-B-6 and 132-C-2 B/C Outfalls, CVP-2002-00003, Rev 0.
4. L. A. Dietz, 4/12/2005, WIDS Submissions- Revisions to the Spillways and River Pipelines for 100-B/C, 100-D/DR, 100-F-, 100-H, 100-KE/KW, 100-N and 100-NE Areas, CCN 120461.
5. Shea, D. W., 7/10/2001, 100-B/C Area River Effluent Pipelines Radionuclide Sampling Report, CCN 101009.
6. D. W. Shea, 7/10/2001, 100-B/C Area River Effluent Pipelines Radionuclide Sampling Report.
7. 1/1/1952, Process Sewer Outfall Structure, Sheet 2, P-5553, Rev 1.
8. 1/1/1952, Process Sewer Outfall Structure, Sheet 1, P-5552, Rev 2.
9. 1/1/1956, 100-C Effluent Line Survey, P-5684, Rev 1.
10. 1/1/1952, Process Sewer Outfall Structure, Sheet 2, P-5542, Rev 3.
11. 1/1/1952, Process Sewer Outfall Structure, Sheet 1, P-5541, Rev 2.
12. Process Sewers 1904-B, Plan, Profile, and Concrete Discharge Structures, 100 B Area, W-72094.
13. P. J. Valcich, 6/7/1994, Columbia River Effluent Pipeline Survey, WHC-SD-EN-TI-278, Rev 0.
14. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC-SD-EN-TI-220.
15. JF Beckstrom, 4/17/1986, River Discharge Lines Characterization Report, UNI-3262.
16. 1/1/1956, Effluent Line 107B to River, Plan and Profile., H-1-26050, Rev 2.
17. 1/1/1957, Spillway Flume, Structural., H-1-26051, Rev 1.
18. 1/1/1957, Outfall Structure, Architectural, Structural., H-1-26051, Rev 4.
19. 1/1/1952, 100-B Effluent Lines Survey, H-1-1148, Rev 3.
20. 1/1/2004, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 4.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 100-B-21**Site Reclassification Status:** Interim Closed Out

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Site Names: 100-B-21; 100-B/C Miscellaneous Pipelines**Site Type:** Process Sewer**Start Date:****Status:** Inactive**End Date:****Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-1**Site Description:**

The site consisted of a variety of underground pipelines that were uncovered during removal of the 100-B/C Reactor effluent pipelines and soils. The pipelines did not belong to previously-established waste sites. They have been grouped together based on the type of pipeline and potential closeout pathways for each.

Location Description:

Locations were described in terms of easting (E), northing (N), and elevation (meters). Elevations are NAVD88.

Process Description:

The pipelines in this waste site were uncovered during the removal of effluent pipelines and soils. As pipeline removal progressed, an effort was made to photograph, accurately locate (at least the exposed end), and in some cases perform limited chemical and radiological investigations of the pipelines. A number of the pipelines were not identified in drawings. Some of the pipelines were included in other waste sites, thus, gaps exist in the numbering of the pipelines included in this waste site. (DS = Discovery Structure, 100BC = Area, and 002 = next available number). Numbers (by themselves) (e.g., 26) were assigned to pipelines by the excavation subcontractor. Large-diameter pipeline generally means pipeline greater than 50.8 centimeters (20 inches).

Site Comment:

The 100-B-21 site was created, originally containing 21 pipeline segments, to include miscellaneous pipeline segments that were uncovered during the removal of the 100-B/C Reactor effluent pipelines and soils. The discovery pipelines that could not be associated with a previously-established waste site were grouped together into the 100-B-21 waste site based on the type of pipeline and potential closeout pathways for each. Several of the segments have been deferred to the 118-B-8:3 (105-B Reactor Miscellaneous Pipeline Segments) site. As the world's first full-scale nuclear reactor 105-B reactor was placed on the National Register of Historic Places. Currently the B Reactor is a controlled-access museum and there is ongoing study to maintain that status. Therefore, a 7.6 meter (25 foot) buffer zone has been established around the structure. Pipelines in the area of the 105-B reactor building have been cut approximately 15.2 meters (50 feet) from the reactor footprint so as not to disturb the 105-B Reactor structure. The numbering system for the segments was created and assigned by the subcontractor as they were recorded in the field. The following segments remain unassigned to a site or subsite until the remediation contractor notifies WIDS. In a WCH interoffice memo (WCH CCN-131227) dated 12/14/06 discovery pipelines identified as DS-100BC-009, DS-100BC-012, and DS-100BC-034 originally assigned to 100-B-21 were identified as being part of the 100-B-14 waste site. Discovery pipeline DS-100BC-007 was identified as being part of the 100-B-7 waste site.

SubSites:**SubSite Code:** 100-B-21:1**SubSite Names:** 100-B-21:1; Steel Pipeline Segment**Classification:** Accepted**ReClassification:** No Action**Description:**

Site Code: 100-B-21**Site Reclassification Status: Interim Closed Out**

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Discovery pipelines that could not be associated with a previously-established waste site were grouped together into the 100-B-21 waste site based on the type of pipeline and potential closeout pathways for each. Two of these pipeline segments, (DS-IOOBC-016 and DS-100BC-022), were designated as subsite 100-B-21:1. The Remaining Sites Verification Package (RSVP) 2005-052 has demonstrated that the pipeline segments have met the objectives for reclassification to "no action". The current site conditions have achieved the remedial action objectives and the corresponding remedial action goals as established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP) and the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, (ROD).

The evaluation of these pipelines included site histories, analytical data, process knowledge, and field observations based on field screening, and laboratory data.

The DS-100BC-016 pipeline segment consisted of a 20-centimeter (8-inch) diameter, east-west-running steel pipe found during excavation of waste site 100-C-6, the 100-C Reactor effluent underground pipelines. The pipe had an asbestos-containing tar-based spiral wrap. Where the pipeline crossed the excavation of the 100-C-6 pipelines, the pipeline segment was removed. The pipeline was left in place at coordinates, E 565473, N 144466 and elevation 145.194.

The DS-100BC-022 pipeline segment consisted of a 2.5-centimeter (1-inch) diameter pipeline discovered during the remediation of the 100-C-3 site. The pipeline was documented in an area to the southeast of the 105-C Reactor near the former location of the 119-C sample building. The pipeline connected to a larger 10.2-centimeter (4-inch) pipeline south of where the smaller section of pipeline was discovered. The larger pipeline was a water supply line, and no contaminants of potential concern were identified beyond the asbestos commonly found in the wrapping on this type of pipe. The small pipeline was considered analogous to the large pipeline.

References:

1. REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-21:1 SUBSITE (100-B/C MISCELLANEOUS PIPELINES DS-100BC-016 AND DS-100BC-022) Attachment to Waste Site Reclassification Form 2005-052, RSVP-2005-052, Rev 1.
2. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
3. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.

SubSite Code: 100-B-21:2
SubSite Names: 100-B-21:2; Asbestos/Tar Wrapped Pipeline
Classification: Accepted
ReClassification: Interim Closed Out

Description:

The Remaining Sites Verification Package 2008-003 documents that the 100-B-21:2 subsite meets the objective for Interim Closed Out as established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area and the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units (Remaining Sites Rod).

The 100-B-21 :2 waste site consists of the discovery pipeline originally designated DS-IOOBC-002. When discovered, this pipeline was described as 2.5 cm (1-in.) diameter asbestos-wrapped metal pipe protruding 1.5 m (5 ft) horizontally from the bank of the Columbia River. The history of the 100-B-21:2 pipeline, prior to its discovery in 2003, is unknown. The pipeline did not appear on the historical construction drawings. The location and orientation of the pipeline suggested that it was associated with the 116-B-11 Retention Basin and discharged to the river embankment. It was smaller than most drain lines, suggesting it was a pressurized water pipe, though the exact purpose remained unknown. The northern end of the 100-B-21:2 pipeline, originally discovered at N145362, E565307, was located west of the 116-B-7 outfall structure and north of the 100-BC perimeter road. During remediation the pipeline was determined to extend due south, under the 100-BC perimeter road to the edge of 116-B-11 Retention Basin excavation boundary.

References:

1. Remaining Sites Verification Package for the 100-B-21:2 Subsite (100-B/C DISCOVERY PIPELINE DS-100BC-002) (Attachment to Waste Site Reclassification Form 2008-003), RSVP-2008-003.

SubSite Code: 100-B-21:3
SubSite Names: 100-B-21:3; Asbestos Wrapped Steel Pipeline
Classification: Accepted
ReClassification: Interim Closed Out

Description:

The Remaining Sites Verification Package for the 100-B-21:3 (RSVP-2008-052) subsite has documented that the current site conditions have achieved the remedial action objectives (RAOs) and the corresponding remedial action goals (RAGs) as established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP) and the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, (ROD).

Discovered in 2003, the DS-100BC-019 pipeline was described as a 20 cm (8-in.) diameter steel pipe with an asbestos-containing, tar-based spiral pipeline wrap and mechanical joints. This pipeline protruded from a sidewall of a railroad track bed cut, located just south of the 116-B-15 Percolation Pit, and ran in a north-south direction.

In June 2007, during remedial activities, it was discovered that the DS-100BC-019 pipeline and DS-100BC-016 pipeline were connected; therefore, the DS-100BC-016 pipeline was incorporated into the 100-B-21:3 subsite and both pipeline segments were removed. The DS-100BC-016 pipeline, mapped at Washington State Plane coordinates N 14463, E 565473, had been investigated separately and reclassified as No Action in the 100-B-21 subsite.

References:

1. Work Instruction for Verification Sampling of the 100-B-21:3, DS-100BC-019 Discovery Pipeline Waste Site, WCH 0100B-WI-G0028, Rev 0.
2. REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-21:3 ASBESTOS WRAPPED STEEL PIPELINES (DISCOVERY PIPELINES DS-100BC-019 AND DS-100BC-016), RSVP-2008-052, Rev 0.
3. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
4. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.

SubSite Code: 100-B-21:4
SubSite Names: 100-B-21:4; Pipeline from the 105-C Reactor East to 116-C-2B Sump
Classification: Accepted
ReClassification: Interim Closed Out

Description:

The Remaining Sites Verification Package, RSVP-2009-041, has documented that the subsite has met the remedial action objectives (RAOs) and remedial action goals (RAGs) as established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP)) and the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units (Remaining Sites ROD).

The 100-B-21:4 subsite was located in the 100-BC-1 Operable Unit of the Hanford Site, and was previously classified as the DS-100BC-044 discovery pipeline segment. The 20-cm (8-in.) stainless steel, radioactive chemical waste pipeline was at a depth of 6.1 m (20 ft) below ground surface (bgs). The pipeline ran from the northwestern corner of the 105-C Reactor Building, under the 105-C Metal Examination Facility (MEF), and discharged into the 116-C-2B Pluto Crib Pump Station. Although there is documentation of a smaller pipeline exiting the MEF and connecting to the DS-100BC-44 pipeline, this smaller pipeline or residual connection joints were not found during remediation, and they are assumed to have never been present. Drain lines from the ME

Site Code: 100-B-21**Site Reclassification Status: Interim Closed Out**

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to the 116-C-2B sump and other facilities are believed to have been removed during decontamination and decommissioning activities at the 105-C Reactor Building or during field remediation of the 100-C-6:1 process effluent pipelines.

References:

1. Remaining Sites Verification Package for the 100-B-21:2 Subsite (100-B/C DISCOVERY PIPELINE DS-100BC-002) (Attachment to Waste Site Reclassification Form 2008-003), RSVP-2008-003.
2. 2/9/2010, REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-21:4 PIPELINE FROM THE 105-REACTOR TO THE 116-C-2B SUMP, RSVP-2009-041, Rev 0.
3. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
4. 1/1/2009, Remedial Design Report/ Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 6.
5. 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 5.

Waste Information:

Type:	Process Effluent	Amount:	
Category:	Mixed	Units:	Not Specified
Physical State:	Not Specified	Reported Date:	

Description:

Contaminants of Potential Concern are listed only for sites known to have contaminants. (DS-100BC-002) Contaminants of potential concern are asbestos, semivolatile organic analytes, phenanthrene, fluoranthene, pyrene, benzo (a, b, and k) anthracene, chrysene, mercury, and lead. (DS-100BC-016) The potential contaminants of concern are asbestos, lead, and arsenic. (DS-100BC-019) The potential contaminants of concern are americium-241, and asbestos. (DS-100BC-022) The potential contaminants of concern include asbestos.

Dimensions:

Site Shape: Not Specified

Comments:

Dimensions were noted during site characterization, see individual subsites for specific information.

Field Work:

Type: Analytical Sampling
Begin Date: 6/11/2003
End Date: 9/23/2003
Purpose: Characterization

Comment:

The sample data results have not been loaded into HEIS.

Type: Geophysical Survey
Begin Date: 3/7/2009
End Date: 3/7/2009
Purpose: evaluation

Comment:

Site Code: 100-B-21

Site Reclassification Status: Interim Closed Out

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The geophysical interpretation identified the pipeline and noted low amplitude anomalies (thought to be large boulders) in the subsurface.

References:

1. Mitchell, T, Geophysical Site Investigation Summary, 0578518.

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: None
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit: **TSD Number:**
RCRA Part A Permit : **Closure Plan:**
RCRA Permit Status: Not Specified
Septic Permit: No **216/218 Permit:**
Inert LandFill: **NPDES:**
Air Operating Permit: **State Waste**
Air Operating Permit **Discharge Permit:**
Number(s):

Tri-Party Agreement

Lead Regulatory Agency: Not Specified
Unit Category: To Be Determined (TBD)
TPA Appendix : C

Remediation and Closure

Decision Document: Explanation of Significant Difference for the 100 Area Remaining Sites Interim ROD (8/2009)
Decision Document Status: Final
Closure Document: Remaining Sites Verification Package (RSVP)
Closure Type: Not Specified

Post Closure Requirments:

Subsite 4 requires institutional controls to prevent uncontrolled drilling or excavation into the deep zone.

Images:

Pathname: [//mapweb.rl.gov/widsimg/100b/5113/5113_01.jpg](http://mapweb.rl.gov/widsimg/100b/5113/5113_01.jpg)

Date Taken: 7/28/2003

Description:

Pipeline DS-100BC-002 discovered during remedial actions. 100-B-21:2

Site Code: 100-B-21

Site Reclassification Status: Interim Closed Out

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Pathname: [//mapweb.rl.gov/widsimg/100b/5113/5113_02.jpg](http://mapweb.rl.gov/widsimg/100b/5113/5113_02.jpg)

Date Taken: 6/28/2003

Description:

Closer view of asbestos-wrapped metal pipeline. DS-100BC-002, 100-B-21:2

Pathname: [//mapweb.rl.gov/widsimg/100b/5113/5113_03.jpg](http://mapweb.rl.gov/widsimg/100b/5113/5113_03.jpg)

Date Taken: 6/3/2003

Description:

Close up view of asbestos wrap from a pipeline. DS-100BC-002, 100-B-21:2

Pathname: [//mapweb.rl.gov/widsimg/100b/5113/5113_04.jpg](http://mapweb.rl.gov/widsimg/100b/5113/5113_04.jpg)

Date Taken: 6/3/2003

Description:

Steel pipeline with a tar-based spiral pipeline wrap and mechanical joints. DS-100BC-016, 100-B-21:1

Pathname: [//mapweb.rl.gov/widsimg/100b/5113/5113_05.jpg](http://mapweb.rl.gov/widsimg/100b/5113/5113_05.jpg)

Date Taken: 6/3/2003

Description:

Steel pipeline with asbestos wrap discovered protruding from the sidewall of the railroad track bed cut. DS-100BC-019, 100-B-21:3

Pathname: [//mapweb.rl.gov/widsimg/100b/5113/5113_06.jpg](http://mapweb.rl.gov/widsimg/100b/5113/5113_06.jpg)

Date Taken: 6/3/2003

Description:

Pipe wrap that was removed from a pipeline.

Pathname: [//mapweb.rl.gov/widsimg/100b/5113/5113_07.jpg](http://mapweb.rl.gov/widsimg/100b/5113/5113_07.jpg)

Date Taken: 9/3/2003

Description:

Rusty pipeline is slightly visible at bottom of trench. Half way up the trench side wall a yellow, loose solid was observed at pipeline breaks and leaks.

Pathname: [//mapweb.rl.gov/widsimg/100b/5113/5113_08.jpg](http://mapweb.rl.gov/widsimg/100b/5113/5113_08.jpg)

Date Taken: 6/3/2003

Description:

Discolored soil at pipeline breaks and leaks.

Pathname: [//mapweb.rl.gov/widsimg/100b/5113/5113_09.jpg](http://mapweb.rl.gov/widsimg/100b/5113/5113_09.jpg)

Date Taken: 9/3/2003

Description:

Steel pipeline with a tar-based spiral pipeline wrap and mechanical joints. DS-100BC-016, 100-B-21:1

Pathname: [//mapweb.rl.gov/widsimg/100b/5113/5113_12.jpg](http://mapweb.rl.gov/widsimg/100b/5113/5113_12.jpg)

Date Taken: 6/3/2003

Description:

Pipeline was discovered during the cleanup of 100-C-3. DS-1000BC-022, 100-B-21:1

References:

1. Carlson, Rich A, 9/23/2003, 100-B-14 Process and Sanitary Sewer Underground Pipelines, 0100B-CA-V0182.
2. Strom, D N, 100-BC Pipelines, 0100B-CA-V0114.
3. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.
4. Mitchell, T, Geophysical Site Investigation Summary, 0578518.
5. D. W. Shea, 7/10/2001, 100-B/C Area River Effluent Pipelines Radionuclide Sampling Report.
6. Dietz, L, 12/14/2006, Interoffice memo: Summary of the disposition of the 100-B-21, 100-B/C miscellaneous pipelines to date, and disposition of three redundant entries, WCH CCN 131227.
7. 1/19/2006, Transfer and Defer Portions of the 100-B-21, 100-B/C Miscellaneous Pipelines, WCH CCN

124805.

8. Remaining Sites Verification Package for the 100-B-21:2 Subsite (100-B/C DISCOVERY PIPELINE DS-100BC-002) (Attachment to Waste Site Reclassification Form 2008-003), RSVP-2008-003.

9. REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-21:3 ASBESTOS WRAPPED STEEL PIPELINES (DISCOVERY PIPELINES DS-100BC-019 AND DS-100BC-016), RSVP-2008-052, Rev 0.

10. Shea, Dave W, Logbook 3 and 4, EL-1548-3, EL-1548-4.

11. Shea, D W, 1/1/2003, Logbook EL-1548-2, EL-1548-2.

12. Shea, D W, 11/19/2002, 100 B/C Pipeline Remediation Non-Sampling Activities, EL-1557-2.

13. Shea, D W, Logbook, EL-1573.

14. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.

15. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 100-B-22**Site Reclassification Status:** Interim Closed OutPage 1

Site Names: 100-B-22; 100-B Water Treatment Facilities, Pipelines, and Surrounding Soils**Site Type:** Dumping Area**Start Date:****Status:** Inactive**End Date:****Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-1**Site Description:**

This waste site includes the 100-B water treatment facilities, pipelines and associated soils. To facilitate remedial requirements and regulatory documentation, the site has been divided into subsites. Subsite 1 consists of the underground transfer piping that interconnected the 100-B Area Water Treatment Facilities and associated soils. 100-B-22:1 was determined to be a No Action site. Subsite 2 consisted of the water treatment facility structures (183-B Filter House, 185-B Deaeration Building, 195-B Process Pump House). The 100-B-22:2 facilities were demolished and the subsite was Interim Closed Out.

Location Description:

The water treatment facilities occupied an area approximately 275 meters (900 feet) wide by 365 meters (1200 feet) long and were 91 meters (300 feet) directly west of the 105-B Reactor Building. The location of each facility follows: The 183-B Filter Plant structures were located along the centerline N144511 and between E564776 and E564846. The headhouse was located at E564781, N144511. The 12 flocculation basins were located at E564790, N144511. The 12 sedimentation basins were located at E564809, N144511. The filter building was located at E564839, N144511. Storage tanks were located at E565112, N144511. The process pump house was located at E565144, N144511.

Process Description:

The 100-B Area Water Treatment Facilities were operated from 1944 until 1968, they provided large volumes of high-quality cooling water to the 105-B Reactor. The primary facilities (in the order of the treated water flow) included: 181-B River Pump House or Head House, Flocculation and Sedimentation Basins, Filter Building, 183-B Clear Water Reservoir (126-B-2) and Pump Room; the 185-B Deaeration Facility, the 190-B Process Pump House; and the 108-B Chemical Pump House (132-B-1). Water was removed from the Columbia River by pumps at the 181-B River Pump House and stored temporarily at the 182-B Reservoir. From 182-B, the water was pumped to the 183-B Filter House, where it was treated for use as process cooling water for the B Reactor. Here, chlorine was added to control algae, and sulfuric acid was added to lower the water pH to 7.5 for the coagulation and filtration process. Coagulants included alum, ferric sulfate, and Separan. Following coagulation and settling, the water passed through filters consisting of anthracite coal, sand, and gravel. After filtration, lime was added to raise the pH back to 7.8, and the water was stored temporarily in underground clearwells. The clarified water was next passed through the 185-B Deaeration Plant, where sodium dichromate was added at a rate of 2 parts per million. Until 1950 the sodium dichromate was mixed at the 108-B Chemical Pump House and sent via underground piping to storage tanks inside the 183-B Building. After 1950, sodium dichromate mixing was moved to 183-B. The actual injection points for the sodium dichromate were at the intake header for the storage tanks in the 190-B Process Pump House.

Associated Structures:

126-B-2 (183-B Clear Water Reservoir), 132-B-1 and 100-B-14 (108-B Chemical Pump House), 105-B Reactor

Site Comment:

Much of the sulfuric acid had been purchased "used" from a mining company and was heavily contaminated with lead and mercury. All of the water treatment facilities have been decommissioned. In 1986 through early 1987, hazardous waste and asbestos removal occurred at the head house, sedimentation basins, filter

Site Code: 100-B-22**Site Reclassification Status: Interim Closed Out**

Page 2

building, and pump room portion of the filter building. Later, in 1987, the head house, flocculation and sedimentation basins, and filter building were demolished. Waste was used as fill in the sedimentation basins. Samples were obtained from the north mixing chamber, the surface of a sedimentation basin overflow trough, the floor area near the bauxite reactor in the head house, and the bauxite conveyor system housing. All four samples indicated gross alpha at levels greater than the release limits. Following demolition, 2.6 cubic meters (93.3 cubic feet) of waste from naturally occurring radionuclides associated with the alum system (bauxite) were disposed of to a 200 West Area burial ground. Additionally, 40.3 cubic meters (1,424 cubic feet) of asbestos were sent to the Central Landfill for disposal. No record has been found that sampling for the sulfuric acid contaminants, lead and mercury, was done. Between April 1993 and May 1994, the 185-B Deaeration Plant and 190-B Process Pump House were decommissioned. This included the removal of equipment, supplies, and hazardous materials; demolition of structures down to 1 meter (3 feet) below grade; backfilling and grading; and recycling of demolition material. There was extensive dichromate contamination of the concrete pedestals, walls, and drainage trough in the water tank storage portion of the 190-B Building. A contractor was hired to remove all dichromate-contaminated concrete off site. All other concrete was reduced to gravel-sized rubble and was ultimately used as fill material for the 183-C decommissioning project. No dichromate staining was found during a pre-demolition walkdown of the water tunnels to the 105-B Building. The tunnels were demolished to the 105-B Building security fence line. This included cracking the bottoms of the tunnels to prevent standing water, demolishing the tops of the tunnels into the tunnels themselves, and backfilling with clean gravel. The tunnels were sealed at the fence line with a combination of steel bracing and railroad ties (discussion with S. G. Marske, September 2004).

Release Description:

One dichromate release was noted as "a large spill in September 1966" (Gerber 1993), but was believed to have occurred on the north side of the 183-C Headhouse (discussion with J. J. Sharpe, September 2004). Unplanned releases are unknown.

SubSites:

SubSite Code: 100-B-22:1
SubSite Names: 100-B-22:1; Piping Between 183-B and the 185-B/195-B Building(s)
Classification: Accepted
ReClassification: No Action

Description:

The pipelines in this subsite were determined to require No Action. Subsite 1 consists of the underground transfer piping that interconnected the 100-B Area Water Treatment Facilities and associated soils. The 100-B-22:1 Pipelines and Associated Soils waste site is limited to pipelines that interconnected the 183-B Filter House (including the 126-B-2 Clearwells), the 185-B Deaeration Plant, and the 190-B Process Pumphouse. All of the 100-B-22:1 pipelines are larger than 0.15 meter (6 in.) in diameter and were used for cooling water.

References:

1. REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-22:1 PIPELINES AND ASSOCIATED SOILS (Attachment to Waste Site Reclassification Form 2005-042), RSVP-2005-042, Rev 0.
2. 7/1/2007, The 300 Area Waste Acid Treatment System Closure Plan, DOE/RL-90-11, Rev 0.
3. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
4. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.

SubSite Code: 100-B-22:2
SubSite Names: 100-B-22:2; 183-B Filter House, 185-B Deaeration Building, 195-B Process Pump House a
Classification: Accepted
ReClassification: Interim Closed Out

Description:

100-B-22:2 consisted of the 183-B Filter House, 185-B Deaeration Plant, and 190-B Process Pumphouse footprints and associated soils. The 183-B clearwells are excluded from this waste site, as they are addressed separately as the 126-B-2 waste site. These facilities were designed to supply, treat, store, and transport coolir water to the 105-B Reactor. The facilities have been decommissioned and demolished to approximately 1 mete (3 ft) below ground surface.

In 2006 and 2009, confirmatory samples were collected from test pits that targeted the entry points for process chemicals into the facilities. Visual investigation and focused sampling was done. Based on confirmatory sample results, it was determined that soil remediation was required only for a small drain line associated with the 183-B headhouse. The remediation was performed in May 2009, by excavating approximately 40 bank cubic meters (50 bank cubic yards) of pipe debris and soil and disposing it at the Environmental Restoration Disposal Facility.

A reclassification to Interim Closed Out for the 100-B-22:2 subsite is supported based on site history, process knowledge, field observations, and comparison of residual contaminant concentrations against RAGs. The Remaining Sites Verification Package (RSVP-2010-004) for 100-B-22:2 has documented that the site has met th remedial action objectives (RAOs) and the corresponding remedial action goals (RAGs) as established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area and the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units. (Remaining Sites ROD).

References:

1. REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-22:2, 100-B WATER TREATMENT FACILITIES, (Attachment to Waste Site Reclassification Form 2010-004), RSVP-2010-004, Rev 0.
2. Explanation of Significant Differences for the 100 Area Remaining Sites Interim Remedial Action Record of Decision, Hanford Site, Benton County, Washington, EPA, 2009, Rev 0.
3. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
4. 1/1/2009, Remedial Design Report/ Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 6.
5. 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 5.

Waste Information:

Type:	Soil	Amount:	
Category:	Unknown	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

Fill material placed over potentially contaminated soil and demolished concrete structures. The concrete flocculation and sedimentation basins were collapsed into themselves, and backfilled at least partially with waste material. No record has been found characterizing this waste material, nor has a record been found that any soil samples were taken.

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.

Type:	Equipment	Amount:	
Category:	Nondangerous/nonradioactive	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

Site Code: 100-B-22**Site Reclassification Status: Interim Closed Out**

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Best available information (Sharpe and Linville 2000, Plate 4) indicates that the underground piping connecting the 183-B Filter House and the 185-B/190-B Process Pump House is still in place. The lines are up to 600 meters (1,968 feet) long, and include reinforced concrete, cast iron, and steel pipes up to 137 centimeters (54 inches) in diameter. The paths of the lines are generally north of and parallel to an existing road, N144406; and south of and parallel to an existing road, N144631.

References:

1. J. J. Sharpe, J. K. Linville, 1/2/2001, 100-B/C Reactor Area Underground Pipeline Historical Information Summary, BHI-01453.

Type:	Soil	Amount:	
Category:	Hazardous/Dangerous	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

Contaminants of Potential Concern: Contaminants of potential concern (COPCs) include lead, mercury, hexavalent chromium, and polychlorinated biphenyls (PCBs). Fill material was placed over potentially contaminated soil. Sulfuric acid was added at the 183-B Head house for more than 20 years. Much of the sulfuric acid was known to be contaminated with significant amounts of lead and mercury. The sulfuric acid was unloaded at the facility from two railroad car locations. It is reasonable to assume that, during the early hectic years of operation, some unplanned and unreported spills may have occurred. No record has been found that the soil in the area of the headhouse was sampled and tested for lead and mercury prior to backfilling.

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.

Type:	Soil	Amount:	
Category:	Hazardous/Dangerous	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

Two 75,700 liter (20,000 gallon) acid storage tanks, believed to contain concentrated sulfuric acid, were located 12.2 meters (40 feet) south of the south end of the 185-B Deaeration Plant. Acid was unloaded from railroad cars near this location and acid was transferred from these tanks into the Deaeration Plant. The sulfuric acid was contaminated with significant concentrations of lead and mercury. It is prudent to assume unplanned and unreported leaks and spills of this acid may have occurred during the many years of operation of this plant. No records have been found to indicate that soil samples for lead and mercury were taken from this area during or after decommissioning. The tanks were located at E565113, N144451.

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.

Type:	Soil	Amount:	
Category:	Nondangerous/nonradioactive	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

Concrete is located approximately 1 meter (3 feet) below clean fill material. Decommissioning of the 185-B Deaeration Plant, 190-B Process Pump House, and associated pipe tunnels, generally allowed any portion of a structure that was 1 meter (3 feet) below grade to be left in place. Foundation concrete for both buildings, as well as the demolished parts of the tunnels, remain underground, generally within the area bounded by E56510; and E565245, and N144444 and N144584.

Site Code: 100-B-22

Site Reclassification Status: Interim Closed Out

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References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.

Dimensions:

Length:	365.00 Meters	1197.51 Feet
Width:	275.00 Meters	902.23 Feet
Sq. Area:	100,375.00 Square Meters	1080426.46 Square Feet
Site Shape:	Rectangle	

Comments:

The dimensions of the individual facilities follow. The head house was a three-story building 40.8 meters (134 feet) long by 10.7 meters (32 feet) wide by 17 meters (56 feet) high. The 12 flocculation basins occupied an area 199 meters (654 feet) long by 9 meters (30 feet) wide by 3 meters (10 feet) deep. The twelve concrete sedimentation basins occupied an area 198 meters (650 feet) long by 30.5 meters (100 feet) wide by 6 meters (20 feet) deep. The Filter building was 198 meters (648 feet) long by 12.2 meters (40 feet) wide by 12.2 meters (40 feet) high. The Process Pump Building was 93 meters (306 feet) long, by 14.6 meters (48 feet) wide by 55.5 meters (182 feet) high. The process pump house shared a common wall with the 185-B building and was 139 meters (456 feet) long by 20 meters (67 feet) wide by 56 meters (184 feet) high.

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.
 2. E. I. DuPont De Nemours and Company, Inc., 1/1/1945, Construction, Hanford Engineer Works: History of the Project, HAN-10970, Volume III.
 3. R. K. Wahlen, 1/1/1989, History of 100-B Area, WHC-EP-0273.
 4. M. S. Gerber, Manhattan Project Buildings and Facilities at the Hanford Site: a Construction History, WHC-MR-0425.

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor:	None
Reclassifying Contractor/Subcontractor:	None
Responsible Project:	Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit:		TSD Number:	
RCRA Part A Permit:		Closure Plan:	
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:		NPDES:	

Site Code: 100-B-22

Site Reclassification Status: Interim Closed Out

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Air Operating Permit:
Air Operating Permit
Number(s):

State Waste
Discharge Permit:

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Decision Document: Explanation of Significant Difference for the 100 Area Remaining Sites Interim
ROD (8/2009)
Decision Document Status: Final
Closure Document: None
Closure Type: Not Specified

Post Closure Requirments:

No deep zone institutional controls are required.

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.
2. Perrott, M W, 9/26/2006, Subsite text from WCH, 100-B-22.
3. J. J. Sharpe, J. K. Linville, 1/2/2001, 100-B/C Reactor Area Underground Pipeline Historical Information Summary, BHI-01453.
4. Marske, S. G., 1/1/1994, Final Decommissioning Report for the 185/190-B Main Pump House Complex, BHI-00057, Rev 0.
5. DuPont de Nemours, E. I. and Company, Richland, Washington, 1/1/1945, Construction Hanford Engineer Works U.S. Contract No. W-7412-ENG-1 DuPont Project 9536 History of the Project, HW-10970, Volume II.
6. E. I. DuPont De Nemours and Company, Inc., 1/1/1945, Construction, Hanford Engineer Works: History of the Project, HAN-10970, Volume III.
7. R. K. Wahlen, 1/1/1989, History of 100-B Area, WHC-EP-0273.
8. M. S. Gerber, Manhattan Project Buildings and Facilities at the Hanford Site: a Construction History, WHC-MR-0425.
9. REMAINING SITES VERIFICATION PACKAGE FOR THE 100-B-22:1 PIPELINES AND ASSOCIATED SOILS (Attachment to Waste Site Reclassification Form 2005-042), RSVP-2005-042, Rev 0.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 100-B-34

Site Classification: Accepted

Page 1

Site Names: 100-B-34; B/C-Area Pipelines under Active Utilities/Structures

Site Type: Product Piping

Start Date:

Status: Inactive

End Date:

Hanford Area: 100B

Pipe Type: Not Specified

OU/WMA: TBD

Site Description:

The site consists of miscellaneous pipelines in the 100-B/C Area that required remediation but were deferred due to the presence of active utilities. There are three pipeline segments that were administratively removed from the original waste sites [100-B-28 (RSVP-2009-057) and 100-C-6:1) and placed in this one so that the former could be reclassified.

The following pipeline segments have been included in this waste site:

- 1) A section of 7.62 cm (3 in) steel soft water line that was converted for use with sodium dichromate about 1962 (P-5528, P-5649). The pipeline ran between the 184-B Power House and the 183-C Head House. The majority of the pipeline was remediated as 100-B-28. This section could not be removed due to the presence of active export water line. Following discussion with the U.S. Department of Energy, Richland Operations Office (DOE-RL), and U.S. Environmental Protection Agency (EPA), the section was filled with grout to flush residual sodium dichromate liquid out for collection. However, the potential for pipe leakages beneath these sections cannot be addressed while the utilities remain active. Therefore, in agreement with DOE-RL and EPA, the section was administratively removed and reassigned to this site (150166). Another section of the same pipeline was assigned to 100-C-7:1 so that it would be closed during that remedial activity.
- 2) Two sections of 1.7 m (66 in) steel process sewer that carried effluent from the 105-C Reactor to the retention basin (P-5591, M-1904-B Sheets 4 and 9). The majority of the pipelines were remediated as 100-C-6:1. These sections could not be removed due to the presence of an overlying active export water line (CVP-2003-00022). This piece of pipe was previously known as 100-C-6:5, but is now considered part of 100-B-34.

Location Description:

The pipeline segments are located throughout the 100-B/C Area.

Regulatory Information:

Programmatic Responsibility

Responsible

Contractor/Subcontractor:

Reclassifying

Contractor/Subcontractor:

Responsible Project:

Site Evaluation

Solid Waste Management Unit:

TPA Waste Management Unit Type :

Permitting

RCRA Part B Permit:

TSD Number:

RCRA Part A Permit :

Closure Plan:

RCRA Permit Status:

Site Code: 100-B-34

Site Classification: Accepted

Page 2

Septic Permit:

216/218 Permit:

Inert LandFill:

NPDES:

Air Operating Permit:

State Waste

Air Operating Permit

Discharge Permit:

Number(s):

Tri-Party Agreement

Lead Regulatory Agency:

Unit Category:

TPA Appendix :

Remediation and Closure

Decision Document:

Decision Document Status:

Closure Document:

Closure Type:

Post Closure Requirments:

References:

1. WCH, 4/5/2010, Transmittal of Approved Waste Site Reclassification Form and Supporting Documentation for the 100-B-28, 183-C, WCH CCN 150166, Rev 0.
2. BHI, 4/1/2004, CVP for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
3. GE, 12/16/1953, OUTSIDE LINES - SEWERS, M-1904-B, Sht 4.
4. BHI, 4/1/2004, CVP for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
5. GE, 4/22/1959, OUTSIDE LINES - SEWERS, M-1904-B, Sht 9.
6. GE, 12/16/1953, OUTSIDE LINES - SEWERS, M-1904-B, Sht 4.
7. BHI, 4/1/2004, CVP for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
8. GE, 5/14/1969, UNDERGROUND PIPING SANITARY, FIRE & FILTERED WATER, P -5528, Rev 15.
9. GE, 4/22/1959, OUTSIDE LINES - SEWERS, M-1904-B, Sht 9.
10. GE, 12/16/1953, OUTSIDE LINES - SEWERS, M-1904-B, Sht 4.
11. BHI, 4/1/2004, CVP for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
12. GE, 5/14/1969, UNDERGROUND PIPING SANITARY, FIRE & FILTERED WATER, P -5528, Rev 15.
13. GE, 7/13/1951, 100C SITE LAYOUT PLAN, P-5591.
14. GE, 12/16/1953, OUTSIDE LINES - SEWERS, M-1904-B, Sht 4.
15. GE, 4/22/1959, OUTSIDE LINES - SEWERS, M-1904-B, Sht 9.
16. BHI, 4/1/2004, CVP for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
17. GE, 7/13/1951, 100C SITE LAYOUT PLAN, P-5591.
18. GE, 8/22/1951, PH CONTROL - LIME ADDITION, P-5649, Rev 0.
19. GE, 5/14/1969, UNDERGROUND PIPING SANITARY, FIRE & FILTERED WATER, P -5528, Rev 15.
20. GE, 12/16/1953, OUTSIDE LINES - SEWERS, M-1904-B, Sht 4.
21. GE, 4/22/1959, OUTSIDE LINES - SEWERS, M-1904-B, Sht 9.
22. BHI, 4/1/2004, CVP for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
23. GE, 7/13/1951, 100C SITE LAYOUT PLAN, P-5591.

Site Code: 100-B-34

Site Classification: Accepted

Page 3

24. GE, 8/22/1951, PH CONTROL - LIME ADDITION, P-5649, Rev 0.
25. GE, 5/14/1969, UNDERGROUND PIPING SANITARY, FIRE & FILTERED WATER, P -5528, Rev 15.
26. GE, 12/16/1953, OUTSIDE LINES - SEWERS, M-1904-B, Sht 4.
27. GE, 4/22/1959, OUTSIDE LINES - SEWERS, M-1904-B, Sht 9.
28. BHI, 4/1/2004, CVP for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
29. WCH, 4/5/2010, RSVP 100-B-28, 183-C Headhouse to the 183-B Pumphouse Sodium Dichromate Transfer Pipeline, RSVP-2009-057, Rev 0.
30. WCH, 4/5/2010, RSVP 100-B-28, 183-C Headhouse to the 183-B Pumphouse Sodium Dichromate Transfer Pipeline, RSVP-2009-057, Rev 0.
31. Len Habel, 9/19/2011, 100-C-6:5 Moved to 100-B-34.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 100-B-8**Site Reclassification Status:** Interim Closed Out

Page 1

Site Names: 100-B-8; 100-B Reactor Cooling Water Effluent Underground Pipelines**Site Type:** Radioactive Process Sewer**Start Date:** 1/1/1944**Status:** Inactive**End Date:** 1/1/1968**Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-1**Site Description:**

The site encompassed the underground 100-B Reactor cooling water effluent pipelines. These included the effluent pipelines that transported 118-B-8 (105-B Reactor) cooling water from the reactor core to the 116-B-11 (107-B) Retention Basin, and from the basin to the 116-B-7 (1904-B) outfall structure. This waste site included all associated expansion and valve boxes and excluded the retention basin, outfall structure, and those effluent pipelines that were within the confines of the 105-B Reactor Building or that run from the outfall structure to the bottom of the river. It also excludes all reactor influent pipelines that are upstream (untreated and treated water pipelines) of the 105-B Reactor Building.

Location Description:

The site included of all the underground reactor effluent lines running from the 105-B Reactor Building to the Columbia River. This includes segments between the reactor building and the retention basin, and between the basin and the outfall structure. It excludes the reactor building (and a 7.6 meter [25 foot] buffer zone for the B Reactor Museum), retention basin, and outfall structure, each of which is treated as a unique waste site. Also included are the cross-tie underground lines (one north and one south) that connect the 100-B Reactor effluent system to the 100-C Reactor effluent system (100-C-6).

Process Description:

Effluent water passed from the reactor rear face and gravity flowed through the underground effluent pipelines, junction boxes and diversion boxes to the retention basins where it was held up for a short period of time to allow thermal and radiological cooling before being released through the outfall structure to the Columbia River. During periods of reactor fuel cladding ruptures, some effluent was diverted to an open trench.

Associated Structures:

Related structures include the 116-B-11 (107-B) Retention Basin, the 116-B-7 (1904-B) Outfall, the 105-B Reactor, the 100-C-6 Effluent Pipelines, and the 100-B-15 River Pipelines.

Site Comment:

The site is being added in keeping with the desire of Environmental Restoration Contractor (ERC) remediation planning leadership to divide reactor site process sewers into upstream (pre-reactor) and downstream (post-reactor) components, and to maximize the flexibility of project planners by separating 100-B Reactor components from 100-C Reactor components. The parts of these pipelines located north of "B" Avenue are part of Group I remediation. Ground Penetrating Radar (GPR) was performed to compare current "as-is" pipelines with historic drawings, plans and process knowledge.

SubSites:**SubSite Code:** 100-B-8:1**SubSite Names:** 100-B-8:1; 100-B Area South Effluent Pipelines**Classification:** Accepted**ReClassification:** Interim Closed Out

Site Code: 100-B-8**Site Reclassification Status: Interim Closed Out**Page 2

Description:

Cleanup Verification Package 2003-00022 (CVP) has documented completion of remedial action for the 100-B-8:1 subsite. The CVP demonstrated that remedial action at the 100-B/C south pipelines site had achieved remedial action objectives (RAOs) and goals (RAGs) as established in the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units (ROD) and the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP).

The site included the underground 105-B Reactor effluent pipelines running from within 7.5 meters (25 feet) of the reactor building north to B Avenue, including all associated expansion joints and valve boxes. Also included are the cross-tie underground lines that connected the 105-B Reactor effluent system to the 105-C Reactor effluent pipeline system. Sites that are excluded from the CVP are the associated retention basin and outfall structure, which was treated as unique waste sites. The 105-B Reactor effluent pipeline subsites (100-B-8:2) are located north of B Avenue and were addressed in a separate CVP.

References:

1. Cleanup Verification Package for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
2. Dave Shea and Mark Sturges, 3/29/2001, Map of 100-B/C Area Effluent Pipelines for Subsites.
3. 1/1/1995, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units, EPA 1995.
4. 1/1/2001, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 3.

SubSite Code: 100-B-8:2
SubSite Names: 100-B-8:2; 100-B Area North Effluent Pipelines
Classification: Accepted
ReClassification: Interim Closed Out

Description:

Cleanup Verification Package 2003-00019 (CVP) documented completion of remedial action for the 100-B/C Effluent Pipeline subsites located north of B Avenue (100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 collective referred to as the 100-B/C north pipelines site). The 100-B-8:2 subsite portion includes the 105-B Reactor effluent pipelines from B Avenue north to the 116-B-1 Trench, the pipelines from the 116-B-11 Retention Basin the 116-B-7 Outfall (located just north of pipelines 3 and 4 terminations), and the east-west connecting pipeline from 100-B-8:2 to the diversion box for the 100-C-6 pipelines, which was just south of the 116-C-5 Retention Basin. It also includes the pipeline connecting this diversion box to the 116-C-5 Retention Basin and the northernmost section of pipe 11 that drained into the 116-C-5 Retention Basin; these pipelines were removed and backfilled but not entirely sampled as part of the 116-C-5 remedial action (BHI 1997).

Cleanup verification for pipes 11 and 25 were conducted as part of CVP-2003-00019. Drawings identifying previous sampling locations were used to ensure that pipe 11 and pipe 25 corridors were excavated to below clean backfill elevations prior to verification sampling.

References:

1. 4/2/2004, Cleanup Verification Package for the 100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 100-B/C North Effluent Pipelines, CVP-2003-00019, Rev 0.
2. Dave Shea and Mark Sturges, 3/29/2001, Map of 100-B/C Area Effluent Pipelines for Subsites.
3. M. H. Sturges, S. G. Weiss, 5/23/2001, Pipelines and 116-C-5; Correspondence Between Mark Sturges and Steve Weiss.

Waste Information:

Type:	Process Effluent	Amount:	
Category:	Mixed	Units:	Not Specified

Site Code: 100-B-8**Site Reclassification Status: Interim Closed Out**Page 3

Physical State: Solid and Liquid
Start Date: 1/1/1944**Reported Date:**
End Date: 1/1/1968**Description:**

The waste is radioactively contaminated steel piping, concrete, and soil. Reactor cooling water became radioactively contaminated as it passed through the reactor core. Activation products created in the water included calcium-41, chromium-51, and zinc-65. Activation products from the reactor core that were picked up and transported by the cooling water included tritium, carbon-14, cobalt-60, nickel-63, and europium-152/154/155. Fuel element fission products, such as strontium-90, and cesium-137, as well as transuranics such as plutonium-239/240 were introduced into cooling water due to fuel cladding failures. Concentrations of radionuclides in cooling water during normal reactor operations were approximately 0.2 microcuries/liter. Concentrations of radionuclides have built up in rust flakes and scale on the inner surfaces of the pipelines and in sludge in the diversion and junction boxes. Average beta-gamma concentrations for the effluent pipeline scale and junction/diversion boxes were 83,000 and 120,000 picocuries/liter, respectively. Average plutonium-239/240 concentrations were 66 picocuries/gram for the effluent pipeline scale and 720 picocuries/gram for the sludge at the bottom of the diversion and junction boxes. Direct readings of the bottom of the effluent pipelines averaged approximately 40,000 counts/minute with a Geiger-Mueller probe. Additional chemicals were added to the effluent for purposes of water treatment. These included aluminum sulfate (alum), with excess hydrated calcium oxide, sulfuric acid, chlorine, and sodium dichromate. Water pH was maintained at about 7.5, and the free chlorine residual was approximately 0.2 milligrams/liter.

References:

1. Dennis DeFord, 10/24/1996, From the Desk of DH DeFord to LA Dietz - Subject: Discovery Site, 100B Reactor Cooling Water Effluent Underground Lines, FDO:10-24-96.

Field Work:**Type:** Analytical Sampling
Begin Date: 11/10/2003
End Date: 11/19/2003
Purpose: Cleanup Verification 100-B-8:1**Comment:**

Cleanup verification samples including QA/QC samples consisted of 50 shallow zone samples, 11 deep zone samples, 56 overburden samples. The final verification samples were collected between November 10, 2003, and concluded on November 19, 2004, and were analyzed for the established contaminants of concern. The numerous sample numbers are listed in appendix A of CVP-2003-00022 and also in the HEIS database.

References:

1. Cleanup Verification Package for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.

Type: Site Walkdown
Begin Date: 3/18/1998
End Date: 3/18/1998
Purpose: Surveillance**Type:** Analytical Sampling
Begin Date: 8/12/2002
End Date: 7/24/2003
Purpose: Cleanup verification 100-B-8:2**Comment:**

Site Code: 100-B-8**Site Reclassification Status: Interim Closed Out**

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Cleanup verification samples including QA/QC samples consisted of 193 shallow zone samples, 104 deep zone samples, 260 overburden samples, and 72 discovery area samples. The final verification samples were collected between August 12, 2002, and concluded on July 24, 2003, and were analyzed for the established contaminant of concern. The sample numbers are too numerous to list and as of March 1, 2004 have not been reported to HEIS, however they are available in appendix A of CVP-2003-00019 .

References:

1. 4/2/2004, Cleanup Verification Package for the 100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 100-B/C Non Effluent Pipelines, CVP-2003-00019, Rev 0.

Regulatory Information:**Programmatic Responsibility****Responsible**

Contractor/Subcontractor: WCH Washington Closure Hanford

Reclassifying

Contractor/Subcontractor: None

Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes

TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit: No

TSD Number:

RCRA Part A Permit : No

Closure Plan: No

RCRA Permit Status: Not Specified

Septic Permit: No

216/218 Permit:

Inert LandFill: No

NPDES:

Air Operating Permit: No

State Waste

Air Operating Permit

Discharge Permit:

Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA

Unit Category: CERCLA Past Practice (CPP)

TPA Appendix : C

Remediation and Closure

Decision Document: Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)

Decision Document Status: Final

Closure Document: None

Closure Type: Not Specified

Post Closure Requirements:

Institutional controls to prevent uncontrolled drilling or excavation into deep zone soils are required.

Images:

Site Code: 100-B-8

Site Reclassification Status: Interim Closed Out

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Pathname: [//mapweb.ri.gov/widsimg/100b/3912/3912_01.gif](http://mapweb.ri.gov/widsimg/100b/3912/3912_01.gif)

Date Taken: 5/24/2001

Description:

This is a copy of the fax from Mark Sturges to Steve Weiss. Pipeline falling in the shaded area has been sampled and removed. At 116-C-5, pipeline falling inside the hand-drawn bubble, but outside the shaded area has been removed but not sampled.

References:

1. Bergstrom, K.A., and T.H. Mitchell, Geophysical Investigation of the 116-C-5 Retention Basin 100-BC-1, Operable Unit, BHI-00716, Rev 0.
2. Bergstrom, K.A., and T.H. Mitchell, 2/8/1996, Geophysical Investigation of the 116-B-11 Retention Basin, 116-B-1 Liquid Waste Disposal Trench, and 116-B-13 Sludge Trench, 100-BC-1 Operable Unit, BHI-00717, Rev 0.
3. 4/2/2004, Cleanup Verification Package for the 100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 100-B/C North Effluent Pipelines, CVP-2003-00019, Rev 0.
4. Cleanup Verification Package for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
5. D. H. DeFord, 7/6/1993, 100-F Reactor Site Technical Baseline Report Including Operable Units 100-FR-1 and 100-FR-2, WHC-SD-EN-TI-169, Rev 0.
6. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC-SD-EN-TI-220.
7. General Electric, 2/28/1963, EFFLUENT SYSTEM ELEVATION FLOW DIAGRAM - 100 B-C, H-1-13058, Rev 1, Sht 1.
8. Douglas United Nuclear, Inc., 11/10/1966, PROCESS WASTE SYSTEM - 100-B, H-1-71586, Rev 0, Sht 1.
9. Dennis DeFord, 10/24/1996, From the Desk of DH DeFord to LA Dietz - Subject: Discovery Site, 100B Reactor Cooling Water Effluent Underground Lines, FDO:10-24-96.
10. 1/1/1995, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units, EPA, 1995.
11. 1/1/2001, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 3.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 100-C-6**Site Reclassification Status:** Interim Closed OutPage 1

Site Names: 100-C-6; 100-C Reactor Cooling Water Effluent Underground Pipelines**Site Type:** Radioactive Process Sewer**Start Date:** 1/1/1952**Status:** Inactive**End Date:** 1/1/1969**Hanford Area:** 100C**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

The site includes the underground 105-C Reactor cooling water effluent pipelines. These include those effluent pipelines that transported 105-C Reactor cooling water from the reactor to the 116-C-5 (107-C Retention Basin), and from the basin to the 132-B-6 and 132-C-2 Outfall Structures and/or to the 116-C-1 Liquid Waste Disposal Trench. This waste site includes all associated expansion and valve boxes and excludes the retention basin (separate site), outfall structures (separate sites), and those effluent pipelines that are within the confines of the 105-C Reactor Building or that run from the outfall structures to the bottom of the river. It also excludes all reactor influent pipelines that are upstream of the reactor building.

Location Description:

The site is the location of all underground reactor effluent lines running from the 105-C Reactor Building to the Columbia River. This includes segments between the reactor building and the retention basin, and between the basin and the outfall structures. Also included are the underground lines that run from the retention basin to the 116-C-1 Trench. It excludes the reactor building (and a 1.5 meter [5 foot] buffer), retention basin, and outfall structures, each of which is treated as a unique waste site.

Process Description:

Effluent water passed from the reactor rear face and gravity flowed through the underground effluent lines, junction boxes and diversion boxes to the retention basins where it was held up for a short period of time to allow thermal and radiological cooling before being released through the outfall structure to the Columbia River. During periods of reactor fuel cladding ruptures, some effluent was diverted to an open trench.

Associated Structures:

Related structures include the 116-C-5 Retention Basin, the 132-B-6 and 132-C-2 Outfalls, the 116-C-1 Trench, the 105-C Reactor, the 100-B-8 Effluent Pipelines, and the 100-B-15 River Pipelines.

Site Comment:

The February 2004 Cleanup Verification Package 2003-00019 (CVP) documented completion of remedial action for the 100-B/C Effluent Pipeline subsites located north of B Avenue (100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4). These pipelines, located north of "B" Avenue, are part of Group 1 remediation. Ground Penetrating Radar (GPR) was performed to compare current "as-is" pipelines with historic drawings and process knowledge.

The April 2004 Cleanup Verification Package 2003-00022 documented completion of remedial action for the 100 B/C South Effluent Pipeline subsite 100-C-6:1.

In September 2011, 100-C-6:5 pipe segments became part of the 100-B-34 wastes site.

The site was added in keeping with the desire of Environmental Restoration Contractor (ERC) remediation planning leadership to divide reactor site process sewers into upstream (pre-reactor) and downstream (post-reactor) components, and to maximize the flexibility of project planners by separating 100-C Reactor components from 100-B Reactor components.

SubSites:

Site Code: 100-C-6**Site Reclassification Status: Interim Closed Out**

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SubSite Code: 100-C-6:1
SubSite Names: 100-C-6:1; 100-C Area South Effluent Pipelines
Classification: Accepted
ReClassification: Interim Closed Out

Description:

This subsite included the underground reactor effluent pipelines surrounding the 118-C-3:1 (105-C Reactor) to within 1.5 meters (5 feet) of the reactor foundation, and running north from the reactor to B Avenue. This subsite excluded two 110 foot sections of pipeline that passed beneath the Export Water Line, see 100-C-6:5. The Cleanup Verification Package 2003-00022 (CVP), documented completion of remedial action for the 100-C-6:1 subsite. Also included are the cross-tie underground lines that connected the 105-B Reactor effluent system to the 105-C Reactor effluent pipeline system. Sites that are excluded from the CVP are the associated retention basin and outfall structure, which was treated as unique waste sites. The 105-C Reactor effluent pipeline subsites (100-C-6:2, 100-C-6:3, 100-C-6:4) were located north of B Avenue and addressed in a separate CVP.

References:

1. Cleanup Verification Package for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
2. Dave Shea and Mark Sturges, 3/29/2001, Map of 100-B/C Area Effluent Pipelines for Subsites.
3. 1/1/1995, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units, EPA 1995.
4. 1/1/2001, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 3.

SubSite Code: 100-C-6:2
SubSite Names: 100-C-6:2; 100-C Area North Effluent Pipelines
Classification: Accepted
ReClassification: Interim Closed Out

Description:

Cleanup Verification Package 2003-00019 (CVP) documented completion of remedial action for the 100-B/C Effluent Pipeline subsites located north of B Avenue (100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 collective referred to as the 100-B/C north pipelines site). The 100-C-6:2 subsite included the 105-C Reactor effluent pipelines from B Avenue north to the 116-C-5 Retention Basin, and included the diversion box just south of the 116-C-5 Retention Basin.

References:

1. 4/2/2004, Cleanup Verification Package for the 100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 100-B/C North Effluent Pipelines, CVP-2003-00019, Rev 0.
2. Dave Shea and Mark Sturges, 3/29/2001, Map of 100-B/C Area Effluent Pipelines for Subsites.

SubSite Code: 100-C-6:3
SubSite Names: 100-C-6:3; 100-C Retention Basin to Outfalls Effluent Pipelines
Classification: Accepted
ReClassification: Interim Closed Out

Description:

Cleanup Verification Package 2003-00019 (CVP) documented completion of remedial action for the 100-B/C Effluent Pipeline subsites located north of B Avenue (100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 collective referred to as the 100-B/C north pipelines site). The 100-C-6:3 subsite included the 105-C underground effluent pipelines that ran between the 116-C-5 Retention Basin, 116-C-1 Trench, 132-B-6 Outfall, and 132 C 2 Outfall, and between the 116-B-11 Retention Basin and 116-B-1 Trench. Also included are the westernmost pipelines from the 116-C-5 Retention Basin to the junction box south of 116-C-5, and the pipeline on the north side of 116-C-5 that ran to the junction box immediately north of the eastern basin. One section of this subsite, (pipeline segment 16) was removed and backfilled but not entirely sampled as part of the 116-C-5 remedial action (BHI

Site Code: 100-C-6**Site Reclassification Status: Interim Closed Out**Page 3

1997). Pipeline Section 16 was sampled for cleanup verification with this subsite.

References:

1. 4/2/2004, Cleanup Verification Package for the 100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 100-B/C North Effluent Pipelines, CVP-2003-00019, Rev 0.
2. Dave Shea and Mark Sturges, 3/29/2001, Map of 100-B/C Area Effluent Pipelines for Subsites.
3. M. H. Sturges, S. G. Weiss, 5/23/2001, Pipelines and 116-C-5; Correspondence Between Mark Sturges and Steve Weiss.

SubSite Code: 100-C-6:4
SubSite Names: 100-C-6:4; B/C Pipelines Discovery Areas
Classification: Accepted
ReClassification: Interim Closed Out

Description:

Cleanup Verification Package 2003-00019 (CVP) documented completion of remedial action for the 100-B/C Effluent Pipeline subsites located north of B Avenue (100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4, collectively referred to as the 100-B/C north pipelines site). This CVP also included eleven areas discovered to have radiological contamination above background, called "discovery areas." They are collectively identified as subsite 100-C-6:4.

Some areas were identified prior to commencement of the 100-B/C pipeline remediation activities, while others were found during the pipeline remediation process. The source of contamination for these areas has not been established, although the adjacent effluent piping and the 116-C-5 Retention Basins are suspected sources.

References:

1. 4/2/2004, Cleanup Verification Package for the 100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 100-B/C North Effluent Pipelines, CVP-2003-00019, Rev 0.

SubSite Code: 100-C-6:5
SubSite Names: 100-C-6:5; Pipelines Sections Under Export Water Line (transferred to 100-B-34)
Classification: Not Accepted
ReClassification: None

Description:

This waste site is two sections of pipe, approximately 110 feet long, that crossed under the active Export Water line. The line segments were left in place so as not to undermine the active 42 inch export water line that pass above these effluent lines. For remediation purposes, these sections of piping were transferred to waste site 100-B-34.

References:

1. Len Habel, 9/19/2011, 100-C-6:5 Moved to 100-B-34.
2. Len Habel, 9/19/2011, 100-C-6:5 Moved to 100-B-34.

Waste Information:

Type:	Process Effluent	Amount:	
Category:	Mixed	Units:	Not Specified
Physical State:	Solid and Liquid	Reported Date:	
Start Date:	1/1/1952	End Date:	1/1/1969

Description:

The waste was contaminated steel piping, concrete, and soil. Reactor cooling water became radioactively contaminated as it passed through the reactor core. Activation products created in the water included calcium-41, chromium-51, and zinc-65. Activation products from the reactor core that were picked up and

Site Code: 100-C-6**Site Reclassification Status: Interim Closed Out**

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transported by the cooling water included tritium, carbon-14, cobalt-60, nickel-63, and europium-152/154/155. Fuel element fission products such as strontium-90, and cesium-137, as well as transuranics such as plutonium-239/240 were introduced into cooling water due to fuel cladding failures. Concentrations of radionuclides in cooling water during normal reactor operations were approximately (0.2 microcuries/liter). Concentrations of radionuclides have built up in rust flakes and scale on the inner surfaces of the pipelines and in sludge in the diversion and junction boxes. Average beta-gamma concentrations for the effluent line scale and junction/diversion boxes are 83,000 and 120,000 picocuries/liter, respectively. Average plutonium-239/240 concentrations are 66 picocuries/gram for the effluent line scale and 720 picocuries/gram for the sludge at the bottom of the diversion and junction boxes. Direct readings of the bottom of the effluent lines averaged approximately 40,000 counts/minute with a Geiger-Mueller probe. Additional chemicals were added to the effluent for purposes of water treatment. These included aluminum sulfate (alum), with excess hydrated calcium oxide, sulfuric acid, chlorine, and sodium dichromate. Water pH was maintained at about 7.5, and the free chlorine residual was approximately 0.2 milligrams/liter. The waste is any remaining process effluent and the contaminated pipelines.

References:

1. D. H. DeFord, 7/6/1993, 100-F Reactor Site Technical Baseline Report Including Operable Units 100-FR-1 and 100-FR-2, WHC-SD-EN-TI-169, Rev 0.
2. Dennis DeFord, 10/25/1996, From the Desk of DH DeFord to LA Dietz - Subject: Discovery Site, 100-C Reactor Cooling Water Effluent Underground Lines, FDO:10-28-96.

Field Work:

Type: GPS Surveys
Begin Date: 1/6/1999
End Date: 1/6/1999
Purpose: to map GPR stakes

Comment:

The post and chain barrier around one of the concrete structures associated with 100-C-6 was mapped. This particular structure is inside the 105C fence line. The reference for this task is an electronic file found under \\BHI002\hgis-gps\job-217. Also, the DIS CCN is 0510362.

Type: Analytical Sampling
Begin Date: 11/10/2003
End Date: 11/19/2003
Purpose: Cleanup Verification 100-C-6:1

Comment:

Cleanup verification samples including QA/QC samples consisted of 50 shallow zone samples, 11 deep zone samples, 56 overburden samples. The final verification samples were collected between November 10, 2003, and concluded on November 19, 2004, and were analyzed for the established contaminants of concern. The numerous sample numbers are listed in appendix A of CVP-2003-00022 and also in the HEIS database.

References:

1. Cleanup Verification Package for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.

Type: Analytical Sampling
Begin Date: 8/12/2002
End Date: 7/24/2003
Purpose: Cleanup verification 100-C-6:2

Comment:

Site Code: 100-C-6

Site Reclassification Status: Interim Closed Out

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Cleanup verification samples including QA/QC samples consisted of 193 shallow zone samples, 104 deep zone samples, 260 overburden samples, and 72 discovery area samples. The final verification samples were collected between August 12, 2002, and concluded on July 24, 2003, and were analyzed for the established contaminant of concern. The sample numbers are too numerous to list and as of March 1, 2004 have not been reported to HEIS, however they are available in appendix A of CVP-2003-00019 .

References:

1. 4/2/2004, Cleanup Verification Package for the 100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 100-B/C Non Effluent Pipelines, CVP-2003-00019, Rev 0.

Type: GPS Surveys
Begin Date: 7/16/1997
End Date: 7/29/1997
Purpose: Mapping

Comment:

A junction box was mapped during this survey.

Type: Site Walkdown
Begin Date: 3/18/1998
End Date: 3/18/1998
Purpose: Surveillance

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
		State Waste Discharge Permit:	
Air Operating Permit:	No		
Air Operating Permit Number(s):			

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Site Code: 100-C-6

Site Reclassification Status: Interim Closed Out

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Decision Document: Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)
Decision Document Status: Final
Closure Document: None
Closure Type: Not Specified

Post Closure Requirements:

Images:

Pathname: [//mapweb.rl.gov/widsimg/100c/3914/3914_01.jpg](http://mapweb.rl.gov/widsimg/100c/3914/3914_01.jpg)

Date Taken: 1/6/1999

Description:

According to WIDS, this site is mislabeled "118-C-2." It is probably a valve pit associated with 100-C-6 (100-C Reactor Cooling Water Effluent Underground Pipeline).

Pathname: [//mapweb.rl.gov/widsimg/100c/3914/3914_02.gif](http://mapweb.rl.gov/widsimg/100c/3914/3914_02.gif)

Date Taken: 5/24/2001

Description:

This is a copy of the fax from Mark Sturges to Steve Weiss. Pipeline falling in the shaded area has been sampled and removed. At 116-C-5, pipeline falling inside the hand-drawn bubble, but outside the shaded area has been removed but not sampled.

References:

1. Bergstrom, K.A, and T.H. Mitchell, Geophysical Investigation of the 116-C-5 Retention Basin 100-BC-1, Operable Unit, BHI-00716, Rev 0.
2. Bergstrom, K.A., and T.H. Mitchell, 2/8/1996, Geophysical Investigation of the 116-B-11 Retention Basin, 116-B-1 Liquid Waste Disposal Trench, and 116-B-13 Sludge Trench, 100-BC-1 Operable Unit, BHI-00717, Rev 0.
3. WM Hayward, 8/1/2000, Final Report for Isolation of Potential Passive Vents at RARA Project Sites, BHI-01413.
4. 4/2/2004, Cleanup Verification Package for the 100-B-8:2, 100-C-6:2, 100-C-6:3, and 100-C-6:4 100-B/C North Effluent Pipelines, CVP-2003-00019, Rev 0.
5. Cleanup Verification Package for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
6. Dorian and Richards, 5/26/1978, Radiological Characterization of the Retired 100 Areas, UNI-946.
7. D. H. DeFord, 7/6/1993, 100-F Reactor Site Technical Baseline Report Including Operable Units 100-FR-1 and 100-FR-2, WHC-SD-EN-TI-169, Rev 0.
8. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC-SD-EN-TI-220.
9. General Electric, 2/28/1963, EFFLUENT SYSTEM ELEVATION FLOW DIAGRAM - 100 B-C, H-1-13058, Rev 1, Sht 1.
10. Douglas United Nuclear, Inc., 11/10/1966, PROCESS WASTE SYSTEM - 100-B, H-1-71586, Rev 0, Sht 1.
11. Dennis DeFord, 10/25/1996, From the Desk of DH DeFord to LA Dietz - Subject: Discovery Site, 100-C Reactor Cooling Water Effluent Underground Lines, FDO:10-28-96.
12. 1/1/1995, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units, EPA, 1995.
13. 1/1/2001, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 3.
14. Len Habel, 9/19/2011, 100-C-6:5 Moved to 100-B-34.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 100-C-9**Site Reclassification Status:** Interim Closed Out

Page 1

Site Names: 100-C-9; 100-C Area Process and Sanitary Sewer Underground Pipelines**Site Type:** Process Sewer**Start Date:** 1/1/1952**Status:** Inactive**End Date:** 1/1/1969**Hanford Area:** 100C**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

This site consisted of approximately 3,000 meters (9,842.5 feet) of 100-C area miscellaneous underground pipelines separated into four subsites. The subsites included: the main process sewers associated with the 105-C Reactor operations, the sanitary sewer feeder pipelines to four septic systems (1607-B8, 1607-B9, 1607-B10), the 183-C Clearwell pipelines, and the 100-C cooling water transfer lines and tunnels. All of the subsites have been reclassified (for individual reclass status see the subsites), therefore, the site is considered closed out.

Location Description:

The pipelines came from the 183-C Head House, Sedimentation/Filter Building, and Clearwells, the 190-C Pump House, and joined to form the 2,143-meter (7,032-foot) long concrete flume. The flume contained two side-by-side 4 foot by 6 foot (1.2 meter by 1.8 meter) process sewers that eventually drained at the 132-C-2 Outfall Structure.

Process Description:

These pipelines carried a variety of non-radioactive waste fluids, treated cooling water (pre-reactor), and septage. This site did not include the clean water pipelines, pipelines otherwise identified with septic systems, or the main reactor effluent pipelines (100-C-6).

Associated Structures:

The buildings that discharged to the process and septic sewers are the 183-C Facilities and 190-C Pump House discharged to 1607-B8; the 105-C Reactor discharged to the 1607-B9 Septic system pipeline, and the 190-C Pump House connected to the 105-C Reactor through the treated cooling water pipelines.

Site Comment:

These pipelines were separated from 100-C-5 in March 2001 to allow Rejection of the clean water pipes (100-C-5) through the TPA-MP-14 process. According to historical documentation, Summary of 100-B/C Reactor Operations and Result wastes, Hanford Site, WHC-SD-EN-RPT-004, Rev. 0, there was an unplanned release of sodium dichromate in September 1966. A transfer pump was left running for 2 days, allowing 140,000 lbs. of sodium dichromate solution to escape through the large concrete twin box process sewer pipeline into the Columbia River. A sample of scale from the concrete flume showed 3,090 parts per million (ppm) of hexavalent chromium.

SubSites:**SubSite Code:** 100-C-9:1**SubSite Names:** 100-C-9:1; 100-C Main Process Sewer Collection Line**Classification:** Accepted**ReClassification:** Interim Closed Out**Description:**

In accordance with the Remaining Sites Verification Package (RSVP-2004-012), the verification sampling results

supported a reclassification of the subsite to Interim Closed Out. The current site conditions have achieved the remedial action objectives and the corresponding remedial action goals established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP) and the Interim Action Record of Decision for the 100-BC-1, 100-BC2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, (Remaining Sites ROD).

The subsite included pipelines from the 183-C and 190-C facilities that fed into the main process sewer which consisted of a dual 1.2-meter by 1.8-meter (48-inch by 72-inch)-reinforced concrete box sewer that shared a central dividing wall. The dual reinforced concrete box sewers were often referred to as the twin box culvert. The floor, top, and walls of the twin box culvert were approximately 0.3 meters (1 foot) thick. Given the construction sequence, leaks from the cold joints could have developed at any point along the length of the structure between the floor and walls.

References:

1. REMAINING SITES VERIFICATION PACKAGE FOR THE 100-C-9:1 MAIN PROCESS SEWER COLLECTION LINE, (Attachment to Waste Site Reclassification Form 2004-012), RSVP-2004-012, Rev 0.
2. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
3. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.
4. 1/1/2004, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 4.

SubSite Code: 100-C-9:2
SubSite Names: 100-C-9:2; 100-C Sanitary Sewer Lines
Classification: Accepted
ReClassification: Interim Closed Out

Description:

The Remaining Sites Verification Package (RSVP-2004-013) has documented that the 100-C-9:2 subsite has met the objectives for reclassification of the subsite to Interim Closed Out. The current subsite conditions have achieved the remedial action objectives and the corresponding remedial action goals established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP) and the Interim Action Record of Decision for the 100-BC-1, 100-BC2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, (Remaining Sites ROD).

The subsite consisted of the feeder pipelines for the former 1607-B8, 1607-B9, 1607-B 10, and 1607-B 11 septic systems (septic tank and drain field). All four of the septic systems and underlying contaminated soils were removed between March and May 2003, leaving the feeder pipelines in place.

Exceedance of screening values does not necessarily indicate the existence of risk to ecological receptors. Residual concentrations of antimony, cadmium, total chromium, copper, lead, mercury, vanadium, and zinc were within the range of Hanford Site background levels, and boron concentrations were consistent with those seen elsewhere at the Hanford Site (no established background value is available). Concentrations of chromium, copper, lead, mercury, and zinc were within the range of Hanford Site background levels. All exceedances of screening values at the subsite will be evaluated in the context of additional lines of evidence for ecological effects following a baseline risk assessment for the river corridor portion of the Hanford Site, which will include more complete quantitative ecological risk assessment. That baseline risk assessment will be used to support the final closeout decision for the 100-C-9 site.

References:

1. REMAINING SITES VERIFICATION PACKAGE FOR THE 100-C-9:2 SANITARY SEWER PIPELINES (Attachment to Waste Site Reclassification Form 2004-013), RSVP-2004-013, Rev 0.
 2. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
 3. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.
 4. 1/1/2004, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 4.
-

Site Code: 100-C-9**Site Reclassification Status: Interim Closed Out**Page 3

SubSite Code: 100-C-9:3
SubSite Names: 100-C-9:3; 183-C Clearwell Pipelines
Classification: Accepted
ReClassification: No Action

Description:

This subsite included the process sewer pipelines surrounding the 183-C Clearwells (demolished) to the point of junction with the main process sewer collection line. The clearwells were used to store treated cooling water for the 105-C reactor. Chromium was added to the treated water at concentrations between 2-4 ppm (parts per million) as a corrosion inhibitor. The primary contaminant of concern was hexavalent chromium.

This subsite consisted of the process sewer pipelines that drained from the 183-C Clearwells. The clearwell drains ran from circular aboveground steel tanks and connected to cast-iron process sewers surrounding the tanks. The cast-iron process sewers eventually drained to the main twin box process sewers that connected to the 190-C Facility. The basis for separating this site from the other 100-C-9 sites is that these process sewer lines were isolated from facilities known to be potential sources of radioactive and chemical contaminants.

References:

1. Remaining Sites Verification Package for 100-C-9:3 183-C Clearwells Site (Attachment to Waste Site Reclassification Form 2004-014), RSVP-2004-014, Rev 0.

SubSite Code: 100-C-9:4
SubSite Names: 100-C-9:4; 100-C Cooling Water Transfer Pipelines and Tunnels
Classification: Accepted
ReClassification: No Action

Description:

This subsite consisted of the Cooling Water transfer lines located in tunnels between the 190-C Pump House and the 105-C Reactor building. Six 0.6 meter (24 inch) steel pipes located in two tunnels transferred treated cooling water from the 190-C Pump House to the 105-C Reactor. The portions of the tunnels from the 190-C building to just west of the Ventilation house of each tunnel were removed with D of the 190-C Building. Radiological contamination may also have existed as contaminated biological waste products (i.e. bat guano)

References:

1. Remaining Sites Verification Package for 100-C-9:4 Cooling Water Pipe Tunnels Site (Attachment to Waste Site Reclassification Form 2004-015), RSVP-2004-015, Rev 0.

Waste Information:

Type:	Equipment	Amount:	
Category:	Unknown	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

The subsite consisted of the non-radioactively contaminated process and septic sewer pipelines associated with the 105-C Reactor operations. The 1607-B9 septic system serviced the 105-C Reactor and thus may be radioactively contaminated. Any contamination associated with these pipelines was expected to be in residual amounts. Chemical additives to the reactor cooling water included aluminum sulfate (alum) with excess hydrated calcium oxide, sulfuric acid, chlorine, and sodium dichromate. Water pH was maintained at about 7.5, the free chlorine residual was approximately 0.2 milligrams/liter, and sodium dichromate was added at a rate of about 2 milligrams/liter. (Note: Reference: WHC-SD-EN-TI-169 is for 100-F, and applies equally to 100-C).

References:

1. J. J. Sharpe, J. K. Linville, 1/2/2001, 100-B/C Reactor Area Underground Pipeline Historical Information Summary, BHI-01453.

Site Code: 100-C-9**Site Reclassification Status: Interim Closed Out**

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2. D. H. DeFord, 7/6/1993, 100-F Reactor Site Technical Baseline Report Including Operable Units 100-FR-1 and 100-FR-2, WHC-SD-EN-TI-169, Rev 0.

Dimensions:

Length: 3,000.00 Meters 9842.52 Feet
Site Shape: Not Specified

Comments:

This amount represents the approximate linear total of the entire site.

Field Work:

Type: Analytical Sampling
Begin Date: 1/16/2002
End Date: 1/16/2002
Purpose: Characterize pipe for future remediation

Comment:

Samples B13Y04 and B13Y02-A were taken of scale from inside the pipe. The results are (in picoCuries per gram except as noted): Am-241: 1.1 (undetected) Co-60: 1.25 Cs-137: 4.75 Eu-152: 7.68 Eu-154: 1.3 (undetected) Eu-155: 0.31 (undetected) Pu-238: 1.2 (undetected) Pu-239/240: 1.2 (undetected) Sr-90: 0.69 (undetected) U-235: 0.128 (undetected) U-233/234: 1.06 (undetected) U-235: 0.128 (undetected) U-238: 1.59 hexavalent chromium: 3,090 parts per million. Based on the sample results, the analytes of concern are Eu-152 U-238, and hexavalent chromium.

References:

1. Dean Strom, 3/1/2002, 72 Inch Twin Box Process Sewer Line (100-C-9).

Type: Analytical Sampling
Begin Date: 10/1/2003
End Date: 10/1/2003
Purpose: Confirmatory 100-C-9:3

Comment:

Sampling verification for the RSVP focused on the contaminants of potential concern (COPCs) that were identified based on existing analytical data, historical process information, and historical uses and practices associated with the 182-B Settling Pond and 183-B Water Filtering Facility. The COPCs include inductively coupled plasma (ICP) metals, mercury, hexavalent chromium, semivolatile organic compounds, and polychlorinated biphenyls. HEIS confirmatory sample numbers collected in October 2003 were J00YX3 through J00YX9, J01002 and J01003. Process knowledge, historical information, and field observations were used to identify the junction box location to collect samples of the pipe scale and underlying soil at the location of the 100-C-9:3 site with the greatest potential for residual contamination. In accordance with the focused sampling approach and Washington Administrative Code (WAC) 173-340-740(7)(d)(iii), direct comparison of the sample results with the remedial action goals (RAGs) is an acceptable method to evaluate compliance with cleanup objectives. The sample results are stored in the Environmental Restoration (ENRE) Project Specific Database prior to archiving in the Hanford Environmental Information System (HEIS).

References:

1. Remaining Sites Verification Package for 100-C-9:3 183-C Clearwells Site (Attachment to Waste Site Reclassification Form 2004-014), RSVP-2004-014, Rev 0.

Site Code: 100-C-9

Site Reclassification Status: Interim Closed Out

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Type: Analytical Sampling
Begin Date: 11/1/2003
End Date: 11/1/2003
Purpose: Confirmatory 100-C-9:4

Comment:

Sampling verification for the RSVP focused on the contaminants of potential concern (COPCs) that were identified based on existing analytical data, historical process information, and historical uses and practices associated with the 182-B Settling Pond and 183-B Water Filtering Facility. The COPCs include inductively coupled plasma (ICP) metals, mercury, hexavalent chromium, semivolatile organic compounds, and polychlorinated biphenyls. HEIS confirmatory sample numbers collected in November 2003 were J012K1 through J012K3. Process knowledge, historical information, and field observations were used to identify the junction box location to collect samples of the pipe scale and underlying soil at the location of the 100-C-9:3 site with the greatest potential for residual contamination. In accordance with the focused sampling approach and Washington Administrative Code (WAC) 173-340-740(7)(d)(iii), direct comparison of the sample results with the remedial action goals (RAGs) is an acceptable method to evaluate compliance with cleanup objectives. The sample results are stored in the Environmental Restoration (ENRE) Project Specific Database prior to archiving in the Hanford Environmental Information System (HEIS).

References:

1. Remaining Sites Verification Package for 100-C-9:4 Cooling Water Pipe Tunnels Site (Attachment to Waste Site Reclassification Form 2004-015), RSVP-2004-015, Rev 0.

Regulatory Information:**Programmatic Responsibility****Responsible**

Contractor/Subcontractor: WCH Washington Closure Hanford

Reclassifying

Contractor/Subcontractor: None

Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes

TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit: No

TSD Number:

RCRA Part A Permit : No

Closure Plan: No

RCRA Permit Status: Not Specified

Septic Permit: No

216/218 Permit:

Inert LandFill: No

NPDES:

Air Operating Permit: No

State Waste

Air Operating Permit

Discharge Permit:

Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA

Unit Category: CERCLA Past Practice (CPP)

TPA Appendix : C

Remediation and Closure

Site Code: 100-C-9

Site Reclassification Status: Interim Closed Out

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Decision Document: Explanation of Significant Difference for the 100 Area Remaining Sites Interim ROD (2/2004)
Decision Document Status: Final
Closure Document: Remaining Sites Verification Package (RSVP)
Closure Type: Not Specified

Post Closure Requirements:

See specific subsites for institutional control requirements.

References:

1. J. J. Sharpe, J. K. Linville, 1/2/2001, 100-B/C Reactor Area Underground Pipeline Historical Information Summary, BHI-01453.
2. Dean Strom, 3/1/2002, 72 Inch Twin Box Process Sewer Line (100-C-9).
3. D. H. DeFord, 7/6/1993, 100-F Reactor Site Technical Baseline Report Including Operable Units 100-FR-1 and 100-FR-2, WHC-SD-EN-TI-169, Rev 0.
4. REMAINING SITES VERIFICATION PACKAGE FOR THE 100-C-9:2 SANITARY SEWER PIPELINES (Attachment to Waste Site Reclassification Form 2004-013), RSVP-2004-013, Rev 0.
5. REMAINING SITES VERIFICATION PACKAGE FOR THE 100-C-9:1 MAIN PROCESS SEWER COLLECTION LINE, (Attachment to Waste Site Reclassification Form 2004-012), RSVP-2004-012, Rev 0.
6. Remaining Sites Verification Package for 100-C-9:3 183-C Clearwells Site (Attachment to Waste Site Reclassification Form 2004-014), RSVP-2004-014, Rev 0.
7. Remaining Sites Verification Package for 100-C-9:4 Cooling Water Pipe Tunnels Site (Attachment to Waste Site Reclassification Form 2004-015), RSVP-2004-015, Rev 0.
8. U. S. Atomic Energy Commission, 10/20/1961, Piping- Schematic Underground Sewer and Water Lines, H-1-13050, Rev 1.
9. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
10. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.
11. 1/1/2001, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 3.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-B-1

Site Reclassification Status: Interim Closed Out

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Site Names: 116-B-1; Process Effluent Trench; 107-B Liquid Waste Disposal Trench

Site Type: Trench

Start Date: 1/1/1950

Status: Inactive

End Date: 1/1/1968

Hanford Area: 100B

Pipe Type: Not Specified

OU/WMA: 100-BC-1

Site Description:

The site has been remediated and closed out. The 116-B-1 Liquid Waste Disposal Trench was dug to receive effluent routed from 116-B-11 (107-B Retention Basin). The unit ran from southwest to northeast. The site included the 40.6 centimeter (16 inch) diameter steel piping from 116-B-11. Historical documents described the trench as a french drain or an excavation that was partly or completely filled with coarse gravel and had dimensions of 61 meters (200 feet) long by 9.1 meters (30 feet) wide by 4.6 meters (15 feet) deep. A geophysical investigation of 116-B-1 performed in November and December 1996 showed the trench was almost twice as long as indicated by historical information (see Dimensions). The Ground Penetrating Radar (GPR) survey identified a pipeline, labeled #10 in the survey report, entering the trench at its southwest end. No other pipelines were evident. A significant volume of buried debris was present in the northeastern half of the trench.

Location Description:

The site was located east of the 107-B Retention Basin.

Associated Structures:

The site was associated with the 107-B Retention Basin and the 107-C Retention Basin.

Site Comment:

This site was included in the Group 1 Remedial Action Sites that were cleaned up under the Environmental Restoration Contract.

Institutional Control (IC) requirements were revised by DOE letter 05-AMRC-0078 on 1/4/2005.

Historical accounts stated the unit was covered to grade with clean fill. A significant amount of clean fill material remained at the site and extended 1.2 meters to 1.8 meters (4 feet to 6 feet) above the surrounding grade. Sampling indicated that this fill material may be the material originally excavated to form the trench.

Waste Information:

Type: Misc. Trash and Debris

Amount:

Category: Unknown

Units: Not Specified

Physical State: Solid

Reported Date:

Description:

Geophysical investigation identified a high concentration of subsurface debris in the northeastern half of the trench.

References:

1. Bergstrom, K.A., and T.H. Mitchell, 2/8/1996, Geophysical Investigation of the 116-B-11 Retention Basin, 116-B-1 Liquid Waste Disposal Trench, and 116-B-13 Sludge Trench, 100-BC-1 Operable Unit, BHI-00717, Rev 0.

Type: Process Effluent

Amount:

60,000,000.00

Site Code: 116-B-1**Site Reclassification Status: Interim Closed Out**

Page 2

Category:	Mixed	Units:	Liters
Physical State:	Solid and Liquid	Reported Date:	

Description:

The site received effluent from the 107-B Retention Basin at times of high activity due to fuel element failures. The fission products of 54 fuel ruptures were routed to this site.

References:

1. Design Basis for the 100 B/C, 100 D, and 100 H Remediation Project Group 1 Sites, 0100X-DB-G0001, Rev 0.
2. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Dimensions:

Length:	112.78 Meters	370.00 Feet
Width:	15.24 Meters	50.00 Feet
Depth/Height:	4.57 Meters	15.00 Feet
Sq. Area:	1,718.71 Square Meters	18499.98 Square Feet
Site Shape:	Rectangle	

References:

1. Bergstrom, K.A., and T.H. Mitchell, 2/8/1996, Geophysical Investigation of the 116-B-11 Retention Basin, 116-B-1 Liquid Waste Disposal Trench, and 116-B-13 Sludge Trench, 100-BC-1 Operable Unit, BHI-00717, Rev 0.

Field Work:

Type:	Analytical Sampling
Begin Date:	10/6/1998
End Date:	2/24/1999
Purpose:	Cleanup Verification

Comment:

The contaminants of concern for the site were americium-241, cobalt-60, cesium-137, europium-152 & 154, nickel-63, plutonium-238, 239/240, strontium-90, uranium-238, total chromium, and hexavalent chromium. For the overburden material, mercury and lead were also contaminants of concern. For the overburden, 10 samples (B0JD59, 60, 62-64, and 66-70), plus one duplicate (B0JD71) and one split (B0PLW0) were taken. For the shallow zone, eight samples (B0TPH8 & 9, and B0TPJ0 through 5), with one duplicate (B0TPJ6), one split (B0TXP2), and one equipment blank (B0TPJ7) were taken. For the Deep zone, six samples (B0TPF4 through 9) one duplicate (B0TPH0), and one split (B0TPH1) were taken. The Remedial Action Goals (RAGs) for direct exposure, groundwater protection, and surface water protection were achieved. Materials that contained the contaminants of concern at concentrations that exceed the RAGs were excavated, sampled, and analyzed, and shipped to ERDF. The overburden material is suitable for use as backfill.

References:

1. Cleanup Verification Package for the 116-B-1 Process Effluent Trench, CVP-99-00012, Rev 0.

Type:	Geophysical Survey
Begin Date:	11/1/1996
End Date:	12/1/1996
Purpose:	Delineate trench and pipelines

Site Code: 116-B-1

Site Reclassification Status: Interim Closed Out

Page 3

Comment:

A 3 meter by 3 meter (10 foot by 10 foot) grid was placed over a 107 meter by 275 meter (350 foot by 900 foot) site, including 116-B-11 and 116-B-13). The trench as detected by the geophysics is different than the documented size, and contained other debris. See BHI-00717 for complete results.

Regulatory Information:**Programmatic Responsibility****Responsible****Contractor/Subcontractor:** WCH Washington Closure Hanford**Reclassifying****Contractor/Subcontractor:** None**Responsible Project:** Not Specified**Site Evaluation****Solid Waste Management Unit:** Yes**TPA Waste Management Unit Type :** Waste Disposal Unit**Permitting****RCRA Part B Permit:** No**TSD Number:****RCRA Part A Permit :** No**Closure Plan:** No**RCRA Permit Status:** Not Specified**Septic Permit:** No**216/218 Permit:****Inert LandFill:** No**NPDES:****Air Operating Permit:** No**State Waste****Air Operating Permit****Discharge Permit:****Number(s):****Tri-Party Agreement****Lead Regulatory Agency:** EPA**Unit Category:** CERCLA Past Practice (CPP)**TPA Appendix :** C**Remediation and Closure****Decision Document:** Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)**Decision Document Status:** Final**Closure Document:** Cleanup Verification Package (CVP)**Closure Type:** Not Specified**Post Closure Requirments:**

Revegetation; institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet) are required.

Closure Group:**Closure Group Name:** CG 116-B-1**Type:** Interim**Reclassification Status:** Prepared**Reclassified On:** 12/8/1999**Excavation Start Date:** 10/6/98**Excavation Completed Date:** 2/1/1999

Remediation Action:

Excavation of the 116-B-1 site began on October 6, 1998, by removing the overburden materials and underlying contaminated soil. Based on field screening, overburden materials that were identified as potentially clean were placed in stockpiles for potential use as backfill. Overburden materials that were found to be contaminated were disposed of at ERDF. On January 6, 1999, the excavation had reached the design limit at El. 128.0 m (438 ft). Soils not meeting direct exposure RAGs based on field screening results were excavated, loaded into shipping containers, and disposed of at ERDF. Cleanup verification sampling began on February 1, 1999, and was finished on February 24, 1999. At the completion of the remedial action and removal of the engineered structure, the excavation area floor was approximately 1,863.3 square meters (20,056 ft or 0.460 acres) at a depth of approximately 4.6 meters (15 ft), and approximately 43,033 metric tons (47,436 tons) of material from the site were disposed of at ERDF. The excavation will be backfilled in the near future to the reference grade of El. 132 meters (438 ft). Clean backfill may be taken from the clean overburden pile and other sources of clean material that have been surveyed in accordance with the SAP (DOE-RL 1998a) and that are appropriate for use as backfill. Overburden from 116-B-1, 116-C-5, and pipeline excavation was segregated and sampled for potential use as clean backfill.

The maximum dose rate (all pathways) predicted from the RESRAD dose assessment model is 5 mrem/year in 1999, and decreases to 0.014 mrem/year in 1,000 years, based on samples taken from the excavation walls and floor. Hexavalent chromium is the only non-radionuclide carcinogenic contaminant of concern; the risk value was three orders of magnitude below the individual and cumulative risk limits.

Excavated Material:

Quantity: 43,033.00
Unit Type: Metric Tons
Disposition: Environmental Restoration Disposal Facility

Institutional Controls:

Institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet)) are required.

Statement Of Protectiveness:

As demonstrated in this verification package, the RAGs for direct exposure, groundwater protection, and surface water protection have been achieved. Based on this, the RAOs that define the extent to which the waste sites require cleanup have also been met. Materials that contain COCs at concentrations that exceed the RAGs have been excavated, sampled, analyzed, and shipped to ERDF. The remaining soil has been sampled, analyzed, and modeled to show that no residual COC concentrations in vadose zone soils pose a threat to human health, groundwater, or the Columbia River. The 116-B-1 site is thus verified to be remediated and no longer poses a threat to human health or the environment and may be backfilled. The overburden described in this CVP is suitable for use as backfill.

Images:

Pathname: [//mapweb.ri.gov/widsimg/100b/0013/0013_01.jpg](http://mapweb.ri.gov/widsimg/100b/0013/0013_01.jpg)

Date Taken: 2/1/1996

Description:

This figure shows the location map for the 116-B-1, 116-B-11, and 116-B-3 sites.

References:

1. Design Basis for the 100 B/C, 100 D, and 100 H Remediation Project Group 1 Sites, 0100X-DB-G0001, Rev 0.
2. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
3. V. R. Richards, 9/27/1991, WIDS Site Modification, 116-B-1.

4. Bergstrom, K.A., and T.H. Mitchell, 2/8/1996, Geophysical Investigation of the 116-B-11 Retention Basin, 116-B-1 Liquid Waste Disposal Trench, and 116-B-13 Sludge Trench, 100-BC-1 Operable Unit, BHI-00717, Rev 0.
5. U. S. AEC: Safety and Quality Assurance Division, 7/1/1974, Historical Summary of Inventory of Hanford Radioactively Contaminated Waste Disposal Facilities.
6. Alvin L. Langstaff, 2/8/1999, 100 Area Waste Site Excavations completed by 12-31-98.
7. Carpenter, R. W., 11/13/1992, Waste Sites 100 B/C Area As Described in Historical Documents .
8. Carpenter, R. W., 1/1/1995, Process Knowledge Data of Specific 100-B Area Waste Sites.
9. K. R. Heid, 11/14/1956, Unconfined Underground Radioactive Waste and Contamination - 100 Areas, HW-46715.
10. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
11. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
12. Douglas United Nuclear, Inc., 7/1/1967, Effluent Disposal Test Site, H-1-71728, Rev 0.
13. Cleanup Verification Package for the 116-B-1 Process Effluent Trench, CVP-99-00012, Rev 0.
14. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.
15. S.G. Weiss, 1/1/1996, Mitigation Action Plan for Liquid Waste Sites in the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units, DOR/RL-96-19.
16. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-B-11

Site Reclassification Status: Interim Closed Out

Page 1

Site Names: 116-B-11; 116-B-11 Retention Basin; 107-B Retention Basin

Site Type: Retention Basin

Start Date: 1/1/1944

Status: Inactive

End Date: 1/1/1968

Hanford Area: 100B

Pipe Type: Not Specified

OU/WMA: 100-BC-1

Site Description:

The site has been remediated and closed out. It included the retention basin and the two effluent pipes running parallel to, and adjacent to, the north side of the basins. These pipes were removed as part of the plume removal during the retention basin remedial action.

Location Description:

The 116-B-11 Retention Basin were located near the northern edge of the 100-B Area and is located north of 116-C-5 (107-C Retention Basin).

Process Description:

The 116-B-11 Retention Basin was constructed to hold cooling water effluent from the 105-B Reactor to allow for thermal cooling and radioactive decay prior to release to the Columbia River. This unit was a concrete-lined basin with wooden baffles. The basin was divided lengthwise into two halves designed to operate independently. The floor and walls consist of concrete slabs, their joints were originally closed with neoprene water seals. From the basin floor to approximately 3 meters (10 feet) above the floor, the walls sloped and were approximately 0.1 meter (4 inches) thick. The upper 3 meter (10-foot) sections of the walls were vertical and ranged in thickness from about 1.7 meters (5 feet 8 inches) at the bottom to 0.3 meter (1 foot) at the top. The unit was backfilled with soil to a depth of almost 1.2 meters (4 feet).

Associated Structures:

The 116-B-11 Retention Basin is associated with the 105-B Reactor, the 116-B-1 Liquid Waste Disposal Trench, 116-B-7 (1904-B1 Outfall), and the 132-B-6 (1904-B2 Outfall).

Site Comment:

The 116-B-11 Retention Basin received reactor cooling water from 1944 until 1954. After 1954, the effluent from the 105-B Reactor was diverted to the 116-C-5 Retention Basin because 116-B-11 had cracked and repair efforts were unsuccessful. For at least 14 years after being retired, 116-B-11 was purposely kept wet to prevent it from drying out and allowing wind action to spread contaminants to the surrounding area. To maintain wetness, overflow water from the 105-B Reactor fuel storage basin was routed to the retention basin. Ground Penetrating Radar (GPR) and Electromagnetic Induction (EMI) imaging were used to evaluate this site. An analysis of the derived data demonstrated that remnants of the wall and pumphouse were scattered along the edges of the original wall. Additionally, boulders measuring approximately 1 meter (3 foot) in diameter were identified in the southeast corner and western end of the southern half of the basin. The entire southern half and most of the northern half of the basin were filled with soil from the 116-C-1 excavation after the GPR and EMI analysis. GPR was also used to analyze pipelines which were depicted on historical drawings. A description of that analysis is presented in the survey report (BHI-00717).

This site is included in the Group 1 Remedial Action Sites scheduled for cleanup under the Environmental Restoration Contract.

Institutional Control (IC) requirements were revised by DOE letter 05-AMRC-0078 on 1/4/2005.

Waste Information:

Site Code: 116-B-11**Site Reclassification Status: Interim Closed Out**

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Type:	Water	Amount:	
Category:	Mixed	Units:	Not Specified
Physical State:	Liquid	Reported Date:	
Start Date:	1/1/1944	End Date:	1/1/1954

Description:

This unit received cooling water effluent from the 105-B Reactor for radioactive decay and thermal cooling prior release to the Columbia River. Total radionuclide inventories in the vicinity of the unit ranged from 5 to over 400 curies. Eighty percent of the total radionuclide inventory is contained within the soil adjacent to the unit. Approximately 10 curies have leached into the concrete floor and walls.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Unplanned Release:**Release Name:****Reported Date:****Occurrence Report #:****Begin Date:****End Date:****Description:**

In early 1952, gross leakage was detected at the inlet of the 105-B effluent line. The leakage steadily increased in volume. The extent of the contamination was within the site's AC-5-40 permanent posting.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Unplanned Release:**Release Name:****Reported Date:****Occurrence Report #:****Begin Date:****End Date:****Description:**

In late 1952, there was a leak near the #2 Diversion Box for the 76-centimeter (30-inch) line. The extent of the contamination was within the site's AC-5-40 permanent posting.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Site Code: 116-B-11

Site Reclassification Status: Interim Closed Out

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Unplanned Release:**Release Name:** 100-B-10, 107-B Basin Leak and Warm Springs**Reported Date:****Occurrence Report #:****Begin Date:****End Date:****Description:**

In February 1949, several warm springs, supporting algae growth, were observed along the Columbia River below the retention basin. A sample of the water showed beta activity of $4E-3$ microcuries/liter.

References:

1. Patterson, C. M., 2/28/1949, #174 - H. I. Divisions Report on 100 and 300 Areas for the Period February 1 - 28, 1949, HW-12732.

Unplanned Release:**Release Name:****Reported Date:****Occurrence Report #:****Begin Date:****End Date:****Description:**

In late 1952, there was a leak near the 20-centimeter (8-inch) riser for the temporary by-pass line northeast of the 105-B Building.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Unplanned Release:**Release Name:****Reported Date:****Occurrence Report #:****Begin Date:****End Date:****Description:**

In February 1954, a break occurred in the basin and the area around the basin was covered with water. The extent of the contamination was within the site's AC-5-40 permanent posting.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
2. Remedial Investigation/Feasibility Study Work Plan for the 100-BC-1 Operable Unit, Hanford Site, Richland, Washington, DOE/RL-90-07, Rev 0.

Dimensions:

Length:	142.34 Meters	467.00 Feet
Width:	70.10 Meters	230.00 Feet
Depth/Height:	6.10 Meters	20.00 Feet

Site Code: 116-B-11

Site Reclassification Status: Interim Closed Out

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Sq. Area: 10,126.43 Square Meters 108999.90 Square Feet
Site Shape: Not Specified

Comments:

At the completion of the remedial excavation, the floor was about 14,000 square meters (150,696 feet) at a depth of 5 meters (16.4 feet).

References:

1. Design Basis for the 100 B/C, 100 D, and 100 H Remediation Project Group 1 Sites, 0100X-DB-G0001, Rev 0.
2. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
3. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
4. Remedial Investigation/Feasibility Study Work Plan for the 100-BC-1 Operable Unit, Hanford Site, Richland, Washington, DOE/RL-90-07, Rev 0.
5. U.S. Department of Energy, 1/1/1995, Proposed Plan for Interim Remedial Measures at the 100-BC-1 Operable Unit, DOE/RL-94-99.
6. Cleanup Verification Package for the 116-B-11 Retention Basin, CVP-99-00001.
7. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.
8. U.S. Department of Energy, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 1.
9. S.G. Weiss, 1/1/1996, Mitigation Action Plan for Liquid Waste Sites in the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units, DOR/RL-96-19.

Field Work:

Type: Geophysical Survey
Begin Date: 11/1/1996
End Date: 12/1/1996
Purpose: Locate and map walls and pipelines

References:

1. Bergstrom, K.A., and T.H. Mitchell, 2/8/1996, Geophysical Investigation of the 116-B-11 Retention Basin, 116-B-1 Liquid Waste Disposal Trench, and 116-B-13 Sludge Trench, 100-BC-1 Operable Unit, BHI-00717, Rev 0.

Type: GPS Surveys
Begin Date: 4/14/1998
End Date: 4/14/1998
Purpose: Sample locations

Type: Analytical Sampling
Begin Date: 11/19/1998
End Date: 12/8/1998
Purpose: Closeout verification sampling

Comment:

Site Code: 116-B-11

Site Reclassification Status: Interim Closed Out

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Samples were taken from both the shallow zone (side walls) and deep zone (excavation floor, below 5 meters [16 feet]). The contaminants of concern were americium-241, cobalt-60, cesium-137, europium-152, 154, 155, nickel-63, plutonium-238, 239/240, strontium-90, uranium-238, total chromium, hexavalent chromium, lead, and mercury. Shallow zone sample numbers are B0T0C0 through B0T0C6 and B0T0B8, with quality assurance samples B0T0B7, B0T0B9, and B0T0R8. Verification samples taken for the deep zone were B0T092 through B0T098, and B0T0B0 through B0T0B4. Deep zone quality assurance samples were B0T099 and B0T0R7. All sampling results showed that no residual contaminants of concern in vadose zone soils pose a threat to human health, groundwater, or the Columbia River.

References:

1. Cleanup Verification Package for the 116-B-11 Retention Basin, CVP-99-00001.

Regulatory Information:

Programmatic Responsibility

Responsible

Contractor/Subcontractor: WCH Washington Closure Hanford

Reclassifying

Contractor/Subcontractor: None

Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes

TPA Waste Management Unit Type : Other Storage Area

Permitting

RCRA Part B Permit: No

TSD Number:

RCRA Part A Permit : No

Closure Plan: No

RCRA Permit Status: Not Specified

Septic Permit: No

216/218 Permit:

Inert LandFill: No

NPDES:

Air Operating Permit: No

State Waste

Air Operating Permit

Discharge Permit:

Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA

Unit Category: CERCLA Past Practice (CPP)

TPA Appendix : C

Remediation and Closure

Decision Document: Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)

Decision Document Status: Final

Closure Document: Cleanup Verification Package (CVP)

Closure Type: Not Specified

Post Closure Requirments:

Revegetation; institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet) are required.

Site Code: 116-B-11

Site Reclassification Status: Interim Closed Out

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Closure Group:

Closure Group Name:	CG 116-B-11		
Type:	Interim		
Reclassification Status:	Prepared	Reclassified On:	12/8/1999
Excavation Start Date:	11/27/97	Excavation Completed Date:	12/8/1998

Remediation Action:

Excavation of the 116-B-11 site began on November 26, 1997, to remove overburden materials and underlying contaminated soil. All overburden materials were determined to be contaminated and were disposed of at the ERDF. On October 28, 1998, removal of contaminated soil had reached the design limits at the base of the engineered structure (El. 127.5 m [418.3 ft]). Soils not meeting direct exposure RAGs based on field screening results were excavated, loaded into shipping containers, and disposed of at ERDF. Cleanup verification sampling was conducted on November 19 and 20, 1998, for the deep zone, and on December 8, 1998, for the shallow zone. Contaminated soil associated with the process effluent pipelines was partially removed; the rest remains for final remediation with pipelines and a separate cleanup verification package. The 100-BC process effluent pipelines are scheduled to be removed within the next few years. The 116-B-11 sidewall areas that are adjacent to future pipeline excavation areas were not sampled as part of the cleanup verification effort. These areas will be sampled and verified clean as part of the effluent pipeline remediation efforts. At the completion of the remedial action and removal of the engineered structure, the excavation area was approximately 14,000 square meters (150,696 ft²) at a depth of 5.0 m (16.4 ft), and approximately 165,178 metric tons (182,109 tons) of material from the site were disposed of at the ERDF. The excavation will be backfilled in the near future with clean fill materials to the reference grade of El. 132.5 m (434.7 ft). Backfill will be provided by use of clean source material from an area located near the 116-B-11 site that has been surveyed in accordance with the SA (DOE-RL 1998a) and that is appropriate for use as backfill.

The site has been excavated and remediated. Results of the sampling, testing, and analyses for the 116-B-11 site cleanup indicate that all remedial action objectives and goals for direct exposure, protection of groundwater and protection of surface waters (including the Columbia River) have been met.

The material removed from the site (approximately 165,178 metric tons [182,109 tons]) was disposed of in the Environmental Restoration Disposal Facility (ERDF). The excavation will be backfilled with clean material to the reference grade of elevation 132.5 meters (434.7 feet).

Excavated Material:

Quantity:	165,178.00
Unit Type:	Metric Tons
Disposition:	Environmental Restoration Disposal Facility

Institutional Controls:

Institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet)) are required.

Statement Of Protectiveness:

As demonstrated in this verification package, the RAGs for direct exposure, groundwater protection, and surface water protection (including protection of the Columbia River) have all been achieved. Materials that contain CC at concentrations that exceed the RAGs have been excavated, sampled, analyzed, and where required, the materials were removed and shipped to ERDF. The remaining soil has been sampled, analyzed, and modeled to show that no residual COC concentrations in vadose zone soils pose a threat to human health, groundwater, or the Columbia River. The 116-B-11 site is thus verified to be remediated and no longer poses a threat to human health or the environment.

Images:

Pathname: [//mapweb.ri.gov/widsimg/100b/0015/0015_01.jpg](http://mapweb.ri.gov/widsimg/100b/0015/0015_01.jpg)

Date Taken: 4/14/1998

Description:

This photo looks west towards the 116-B-11 Retention Basin.

Pathname: [//mapweb.ri.gov/widsimg/100b/0015/0015_02.jpg](http://mapweb.ri.gov/widsimg/100b/0015/0015_02.jpg)

Date Taken: 2/1/1996

Description:

This figure shows the location map for the 116-B-1, 116-B-11, and 116-B-3 sites.

Pathname: [//mapweb.ri.gov/widsimg/100b/0015/0015_03.jpg](http://mapweb.ri.gov/widsimg/100b/0015/0015_03.jpg)

Date Taken: 2/1/1996

Description:

This figure shows the documented pipelines from historical drawings and plans.

Pathname: [//mapweb.ri.gov/widsimg/100b/0015/0015_04.jpg](http://mapweb.ri.gov/widsimg/100b/0015/0015_04.jpg)

Date Taken: 2/1/1996

Description:

This figure shows the interpreted piping system for the 116-B-11 Retention Basin.

Pathname: [//mapweb.ri.gov/widsimg/100b/0015/0015_06.gif](http://mapweb.ri.gov/widsimg/100b/0015/0015_06.gif)

Date Taken: 5/24/2001

Description:

This is a copy of the fax from Mark Sturges to Steve Weiss. Pipeline falling in the shaded area has been sampled and removed. At 116-C-5, pipeline falling inside the hand-drawn bubble, but outside the shaded area has been removed but not sampled.

Pathname: [//mapweb.ri.gov/widsimg/100b/0015/0015_07.jpg](http://mapweb.ri.gov/widsimg/100b/0015/0015_07.jpg)

Date Taken: 3/19/1968

Description:

Retention basins are in the upper left of photo.

References:

1. Design Basis for the 100 B/C, 100 D, and 100 H Remediation Project Group 1 Sites, 0100X-DB-G0001, Rev 0.
2. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
3. Bergstrom, K.A., and T.H. Mitchell, 2/8/1996, Geophysical Investigation of the 116-B-11 Retention Basin, 116-B-1 Liquid Waste Disposal Trench, and 116-B-13 Sludge Trench, 100-BC-1 Operable Unit, BHI-00717, Rev 0.
4. Mark H. Sturges, Steve G. Weiss, 5/22/2001, Effluent Pipeline Removal with 116-B-11, Correspondence between S.G. Weiss and M. H. Sturges.
5. Alvin L. Langstaff, 2/8/1999, 100 Area Waste Site Excavations completed by 12-31-98.
6. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
7. Patterson, C. M., 2/28/1949, #174 - H. I. Divisions Report on 100 and 300 Areas for the Period February 1 - 28, 1949, HW-12732.
8. Dorian and Richards, 5/26/1978, Radiological Characterization of the Retired 100 Areas, UNI-946.
9. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
10. Remedial Investigation/Feasibility Study Work Plan for the 100-BC-1 Operable Unit, Hanford Site, Richland, Washington, DOE/RL-90-07, Rev 0.
11. U.S. Department of Energy, 1/1/1995, Proposed Plan for Interim Remedial Measures at the 100-BC-1 Operable Unit, DOE/RL-94-99.
12. Cleanup Verification Package for the 116-B-11 Retention Basin, CVP-99-00001.
13. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.

14. U.S. Department of Energy, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 1.
15. S.G. Weiss, 1/1/1996, Mitigation Action Plan for Liquid Waste Sites in the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units, DOR/RL-96-19.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-B-16

Site Reclassification Status: Interim Closed Out

Page 1

Site Names: 116-B-16; 111-B Fuel Examination Tank

Site Type: Storage Tank

Start Date:

Status: Inactive

End Date: 1/1/1968

Hanford Area: 100B

Pipe Type: Not Specified

OU/WMA: 100-BC-1

Site Description:

This site has been remediated and closed out. The unit was a vegetation free, cobble-covered field located within a barricaded area at the former site of the 111 -B Building. The floor, foundation, and tank were the only remaining portions of the building. The fuel examination tank was located along the west side of the barricaded area. A curved, capped ventilation pipe extended about 25 centimeters (10 inches) above ground just north and east of the tank location. The barricaded area was surrounded by light duty steel posts with light duty chain and has been posted with "Caution: Underground Radioactive Material" signs. The tank was constructed of concrete. It is believed that the tank was filled with either sand or concrete before the site was abandoned.

Location Description:

The site was located below the northwest corner of the 111-B Metallurgical Examination Building floor, southeast of the 105-B Reactor Building, adjacent to 116-B-6A, and within the 105 B/C Exclusion Area.

Process Description:

The 116-B-16 Fuel Examination Tank, was a low-level liquid waste disposal site that was operational during the lifetime of the 111 -B Metallurgical Examination Building. The tank received liquid wastes from the decontamination of fuel element spacers and other equipment as well as from other 111 -B Building activities.

Associated Structures:

The site was associated with the 111 -B Metallurgical Examination Building.

Site Comment:

In April 1990, the Pacific Northwest National Laboratory conducted a treatability test of the in situ vitrification process at the adjacent 116-B-6A crib site. In situ vitrification is a thermal treatment process that converts contaminated soil into a chemically inert and stable glass and crystalline product. This test was a demonstration of technology rather than a remedial action to stabilize waste. A barrier wall and cooling system were installed to prevent the 116-B-16 Fuel Examination Tank from being affected by the heat of vitrification. The in situ vitrification at this site reached 4.3 meters (14 feet) below grade and produced a block of vitrified material between 10.7 meters (35 feet) and 12.2 meters (40 feet) in diameter, approximately 3.8 meters (12 feet) high, and weighing between 726 metric tons (800 tons) and 816 metric tons (900 tons). The tank was excavated and the exposed surfaces were sampled and analyzed. All vitrified material was removed during remediation of the 116-B-6A/116-B-16 site and was disposed of at ERDF.

Waste Information:

Type: Process Effluent

Amount:

Category: Radioactive

Units: Not Specified

Physical State: Liquid

Reported Date:

Description:

The unit is believed to have received wastes similar to those identified in 116-B-6A (111 -B Crib No. 1); i.e., radioactive waste from equipment decontamination, the 111 -B Building, and liquid wastes from fuel element

Site Code: 116-B-16**Site Reclassification Status: Interim Closed Out**Page 2

spacer decontamination.

References:

1. R. F. Griffin, 11/26/1991, WIDS Site Addition, 116-B-16.

Dimensions:

Length:	3.25 Meters	10.67 Feet
Width:	1.75 Meters	5.75 Feet
Depth/Height:	2.74 Meters	9.00 Feet
Sq. Area:	5.69 Square Meters	61.30 Square Feet
Site Shape:	Not Specified	

References:

1. E. C. Powers, 8/24/1983, 100 Area Decommissioning Detailed Work Procedure, Examination Tank Removal UNC-DWP-111 -B.

Field Work:

Type: Analytical Sampling
Begin Date: 5/20/1999
End Date: 6/18/1999
Purpose: Cleanup Verification

Comment:

The cleanup verification package for the 116-B-6A Crib and 116-B-16 Fuel Examination Tank, because of their close proximity to each other and similar contaminants of concern (COCs), were excavated as one remedial action site and are hereinafter referred to as the 116-B-6A/116-B-16 site. The contaminants of concern (COCs) for the site 116-B-6A/116-B-16 were uranium-238, cobalt-60, cesium-137, strontium-90. The contaminants of potential concern (COPCs) were uranium-233/234, europium-152/154, hexavalent chromium and mercury. The original list in the SAP (DOE/RL 1998a) also identified volatile organic compounds as a COPC. However, volatile organic compounds were not found during remediation of this site and, therefore, are not addressed further in the cleanup verification package. Although hexavalent chromium levels were all below detection, this analyte was retained as a COC due to its historical sensitivity in the 100-B/C Area. For the shallow zone eleven samples (B0VFM7, B0VLC6-8, B0WX74-77), plus one duplicate (B0VLC4), one split (B0VFM8), and one equipment blank (B0VLC5) were taken. For the deep zone three samples (B0VFW7-8, B0VFX0), one duplicate (B0VFW9) and one split (B0VFX1) were taken.

References:

1. DB Encke, 7/1/1998, 111 -B Metal Examination Facility Concrete Tank Interim Characterization Report.
2. Bechtel Hanford, Inc, Cleanup Verification Package for the 116-B-6A Crib and 116-B-16 Fuel Examination Tank, CVP-99-00011, Rev 0.

Type: GPS Surveys
Begin Date: 3/18/1998
End Date: 3/18/1998
Purpose: Mapping

Comment:

A global positioning system (GPS) was performed on the area surrounded by Contamination Area posting.

Type: Site Walkdown

Site Code: 116-B-16

Site Reclassification Status: Interim Closed Out

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Begin Date: 3/18/1998
 End Date: 3/18/1998
 Purpose: Surveillance

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
 Reclassifying Contractor/Subcontractor: None
 Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
 TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit: No TSD Number:
 RCRA Part A Permit: No Closure Plan: No
 RCRA Permit Status: Not Specified
 Septic Permit: No 216/218 Permit:
 Inert LandFill: NPDES:
 Air Operating Permit: No State Waste Discharge Permit:
 Air Operating Permit Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA
 Unit Category: CERCLA Past Practice (CPP)
 TPA Appendix : C

Remediation and Closure

Decision Document: Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995); Proximity Site to 116-B-6A
 Decision Document Status: Final
 Closure Document: Cleanup Verification Package (CVP)
 Closure Type: Not Specified

Post Closure Requirments:

Revegetation; institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet))

Closure Group:

Closure Group Name: CG 116-B-6A and 116-B-16
 Type: Interim
 Reclassification Status: Prepared Reclassified On: 5/17/2000

Remediation Action:

Excavation of the 116-B-6A/116-B-16 site involved removing the overburden materials, the contaminated

Site Code: 116-B-16**Site Reclassification Status: Interim Closed Out**

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structure, and underlying contaminated soil. Based on field screening, overburden materials identified as potentially clean were placed in stockpiles for potential use as backfill. Materials shown to be contaminated were disposed of at the ERDF. On May 12, 1999, the excavation reached the design limit at El. 141.4 meters (464 ft). Cleanup verification sampling began on May 20, 1999, and was finished on June 18, 1999.

The cleanup verification package for the 116-B-6A Crib and 116-B-16 Fuel Examination Tank, because of their close proximity to each other and similar contaminants of concern (COCs), were excavated as one remedial action site and are hereinafter referred to as the 116-B-6A/116-B-16 site.

At the completion of the remedial action, the total excavation was approximately 603.5 meters squared (6,496 square feet or 0.15 acres) in area with a maximum depth of approximately 4.6 meters (15 feet). Approximately 5,072 metric tons (5,591 tons) of material from the site were disposed of at the Environmental Restoration Disposal Facility. The excavation will be backfilled in the near future (written June 6, 2000) with appropriate materials to the reference grade El. 146 meters (479 feet).

Results of the sampling, laboratory analyses, and data evaluations for the 116-B-6A/116-B-16 site indicate that remedial action objectives and goals for direct exposure, protection of ground water, and protection of the Columbia River have been met. However, this site close out includes a deed restriction against drilling or digging into the deep zone soils (below 4.6 m [15 ft] depth).

Excavated Material:

Quantity: 5,072.00
Unit Type: Metric Tons
Disposition: Environmental Restoration Disposal Facility

Institutional Controls:

Institutional controls to prevent uncontrolled drilling or excavation into the deep zone [i.e., below 4.6 m (15 ft)] are required.

Statement Of Protectiveness:

This verification package demonstrates that remedial action at the 116-B-6A/116-B-16 site has achieved the RAOs and corresponding RAGs established in the approved interim action ROD (EPA 1995) and RDR/RAWP (DOE-RL 1998b). Materials that contain COCs at concentrations exceeding the RAGs have been excavated and disposed of at the ERDF. The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. This scenario assumes multiple exposure pathways (e.g., ingestion, inhalation, direct exposure) for shallow zone soils. (The acceptability of unrestricted direct exposure to deep zone soils has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone [i.e., below 4.6 meters (15 ft)] are required.) This verification package also demonstrates that residual COC concentrations pose no threat to groundwater or the Columbia River. The 116-B-6A/ 116-B-16 site is thus verified to be remediated in accordance with the ROD and may be backfilled.

Images:**Pathname:** [//mapweb.rl.gov/widsimg/100b/0020/0020_01.jpg](http://mapweb.rl.gov/widsimg/100b/0020/0020_01.jpg)**Date Taken:** 3/18/1998**Description:**

Photo shows the core drill rig containment area. The riser is the bore hole location.

Pathname: [//mapweb.rl.gov/widsimg/100b/0020/0020_02.jpg](http://mapweb.rl.gov/widsimg/100b/0020/0020_02.jpg)**Date Taken:** 1/7/1997**Description:**

Site Code: 116-B-16

Site Reclassification Status: Interim Closed Out

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Pathname: [//mapweb.ri.gov/widsimg/100b/0020/0020_03.jpg](http://mapweb.ri.gov/widsimg/100b/0020/0020_03.jpg)

Date Taken: 1/7/1997

Description:

Pathname: [//mapweb.ri.gov/widsimg/100b/0020/0020_04.jpg](http://mapweb.ri.gov/widsimg/100b/0020/0020_04.jpg)

Date Taken: 3/18/1998

Description:

Photo shows the site, covered with plastic during the bore hole drilling activity.

Pathname: [//mapweb.ri.gov/widsimg/100b/0020/0020_05.gif](http://mapweb.ri.gov/widsimg/100b/0020/0020_05.gif)

Date Taken: 1/1/2000

Description:

Hanford Site Map and 116-B-6A/116-B-16 Site Plan.

References:

1. 1/1/1999, Instruction Guide for the Remediation of the 100-BC-1, 100-DR-1, and 100-HR-1 Waste Sites, 0100X-IG-G0001, Rev 1.
2. DB Encke, 7/1/1998, 111 -B Metal Examination Facility Concrete Tank Interim Characterization Report.
3. R. F. Griffin, 11/26/1991, WIDS Site Addition, 116-B-16.
4. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
5. E. C. Powers, 8/24/1983, 100 Area Decommissioning Detailed Work Procedure, Examination Tank Removal., UNC-DWP-111 -B.
6. J. J. Dorian to R. A. Paasch, 8/26/1983, Environmental Assessment of 111 -B Metallurgical Building Decommissioning., UNC Internal Memo.
7. Bechtel Hanford, Inc, Cleanup Verification Package for the 116-B-6A Crib and 116-B-16 Fuel Examination Tank, CVP-99-00011, Rev 0.
8. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.

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Waste Information Data System General Summary Report

Site Code: 116-B-2**Site Reclassification Status:** Interim Closed Out

Page 1

Site Names: 116-B-2; B-Storage Basin Crib; 105-B Storage Basin Trench**Site Type:** Trench**Start Date:** 1/1/1946**Status:** Inactive**End Date:** 1/1/1946**Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-1**Site Description:**

This site was remediated and closed out on February 24, 2000. It is no longer marked or posted. The trench was used one time to receive approximately 4E+06 liters (1.1E+06 gallons) of storage basin water that became contaminated when a fuel rod was accidentally cut in half. The trench was backfilled after use with clean dirt.

Location Description:

The 116-B-2 site was located near the center of the 100-B Area, approximately 865 meters (2,838 feet) from the Columbia River and 76 meters (250 feet) northeast of 105-B Storage Basin.

Process Description:

The trench was only used once in 1946 to receive contaminated basin water after a fuel element was accidentally cut in half in the 105-B Fuel Storage Basin.

Site Comment:

Soil samples were collected in 1978 by Dorian and Richards.
Institutional Control (IC) requirements were revised by DOE letter 05-AMRC-0078 on 1/4/2005.

Waste Information:

Type:	Water	Amount:	4,000,000.00
Category:	Radioactive	Units:	Liters
Physical State:	Liquid	Reported Date:	

Description:

This unit was dug and used once after a fuel element was accidentally cut in half in the 105-B Storage Basin. Basin water was discharged to this unit in an attempt to remove radionuclides from the fuel storage basin cooling water for contamination control.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
2. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
3. N. A. Homan to S. M. Griffin, 11/14/1990, Review Comments on the 1990 Hanford Site Waste Management Units Report from 100 Area Environmental Protection, DSI.

Dimensions:

Length:	22.86 Meters	75.00 Feet
Width:	3.05 Meters	10.00 Feet
Depth/Height:	4.57 Meters	15.00 Feet

Site Code: 116-B-2

Site Reclassification Status: Interim Closed Out

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Site Shape: Not Specified

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
2. N. A. Homan to S. M. Griffin, 11/14/1990, Review Comments on the 1990 Hanford Site Waste Management Units Report from 100 Area Environmental Protection, DSI.

Field Work:

Type: Analytical Sampling
Begin Date: 6/4/1999
End Date: 6/7/1999
Purpose: Cleanup verification sampling

Comment:

Seven samples were taken in the shallow zone (above 4.6 meters [15 feet]), including three QA/QC samples: B0VMM1, B0VMM4, B0VMM5, B0VMM6, B0VMM2 (duplicate of B0VMM1), B0VMM7 (split of B0VMM1), and B0VMM3 (equipment blank). Five samples were taken in the deep zone, including two QA/QC samples: B0VF69, B0VF70, B0VF72, B0VF71 (duplicate of B0VF70) and B0VF73 (split of B0VF70).

References:

1. Bechtel Hanford, Inc. (BHI), Cleanup Verification Package for the 116-B-2 Fuel Storage Basin Trench, CVP-99-00015, Rev 0.

Type: GPS Surveys
Begin Date: 9/29/1998
End Date: 9/29/1998
Purpose: to map GPR stakes

Comment:

Three stakes from a previous GPR investigation were gps-ed. The reference for this task is an electronic file found under \\BHI002\hgis-gps\job-197.

Type: Geophysical Survey
Begin Date: 1/1/1991
End Date: 12/31/1996
Purpose: Verify the location of trench.

Comment:

The surveys were performed in 1991, 1992, and 1996 to verify the location of the trench. The data suggested that two trenches possibly existed at this location. One of these trenches was the 116-B-2 Liquid Disposal Trench. The second trench appears to contain solid waste. All contaminated materials were removed during the remedial activities.

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor:	WCH	Washington Closure Hanford
Reclassifying Contractor/Subcontractor:		None
Responsible Project:		Not Specified

Site Code: 116-B-2

Site Reclassification Status: Interim Closed Out

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Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Not Specified

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
		State Waste	
Air Operating Permit:	No	Discharge Permit:	
Air Operating Permit			
Number(s):			

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Decision Document: Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)
Decision Document Status: Final
Closure Document: Cleanup Verification Package (CVP)
Closure Type: Not Specified

Post Closure Requirments:

Revegetation; institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet) are required.

Closure Group:

Closure Group Name: CG 116-B-2
Type: Interim

Remediation Action:

Excavation of the 116-B-2 site began on February 17, 1999, by removing the overburden materials and underlying contaminated soil. Based on field screening, materials identified as potentially clean were placed in stockpiles for potential use as backfill. Materials that were found to be contaminated were disposed of at the ERDF. After completion of the initial excavation to design limits, several contaminated areas (i.e., plumes) were discovered. Each of the plumes was excavated and the new surfaces were screened for contamination. On May 20, 1999, the excavation had reached the final limit at El. 138.4 meters (454.2 feet). Cleanup verification sampling began on May 21, 1999, and was finished on June 24, 1999.

At the completion of the remedial action, the excavation floor area was approximately 459 square meters (4,94 square feet) at a depth of approximately 4.9 meters (16 feet), and approximately 9,393 metric tons (10,354 tons) of material from the site had been disposed of at ERDF.

The excavation was backfilled with clean fill materials to the reference grade of El. 143.3 meters (470.2 feet). Clean backfill may be taken from the clean overburden pile and other sources of clean material that have been verified clean in accordance with the SAP (DOE-RL 1998) and that are appropriate for use as backfill.

The cleanup verification package (CVP) demonstrated that remedial action at the 116-B-2 site has achieved the RAOs and corresponding RAGs established in the approved interim action ROD (EPA 1995) and RDR/RAWP.

Materials that contained COCs at concentrations exceeding the RAGs have been excavated and disposed of at the ERDF. The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. This scenario, described in Section 4.2 of the CVP, assumes multiple exposure pathways (e.g., ingestion, inhalation, direct exposure) for shallow zone soils. (The acceptability of unrestricted direct exposure to deep zone soils has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone [i.e., below 4.6 meters (5 feet)] are required.) The verification package also demonstrated that residual COC concentrations pose no threat to groundwater or the Columbia River. Thus, the 116-B-2 site was verified to be remediated and may be backfilled.

Excavated Material:

Quantity: 9,393.00
Unit Type: Metric Tons
Disposition: Environmental Restoration Disposal Facility

Cleanup Verification:

The waste site COCs identified in the 100 Area Remedial Action Sampling and Analysis Plan include Cesium-137, Europium 152, Europium-154, Strontium-90, Uranium-238, Uranium-233/234, Hexavalent chromium.

Institutional Controls:

Institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters {15 feet}) are required.

Statement Of Protectiveness:

This verification package demonstrates that remedial action at the 116-B-2 site has achieved the RAOs and corresponding RAGs established in the approved interim action ROD (EPA 1995) and RDR/RAWP (DOE-RL 1998b). Materials that contain COCs at concentrations exceeding the RAGs have been excavated and disposed of at the ERDF. The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. This scenario, described in Section 4.2, assumes multiple exposure pathways (e.g., ingestion, inhalation, direct exposure) for shallow zone soils. (The acceptability of unrestricted direct exposure to deep zone soils has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone {i.e., below 4.6 meters (15 ft)} are required.) The verification package also demonstrates that residual COC concentrations pose no threat to groundwater or the Columbia River. The 116-B-2 site is thus verified to be remediated and may be backfilled.

References:

1. K.A. Bergstrom, 11/12/1996, Interoffice Memo from K.A. Bergstrom to G.C. Kelty regarding the Results of the Geophysical Investigations of the Group 3 Waste Sites, 039006.
2. 11/5/1996, Design Basis for the Remedial Action of the 100 B/C and 100 D Group 3 Waste Sites, 0100X-DB-G0003.
3. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
4. U. S. AEC: Safety and Quality Assurance Division, 7/1/1974, Historical Summary of Inventory of Hanford Radioactively Contaminated Waste Disposal Facilities.
5. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
6. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
7. Bechtel Hanford, Inc. (BHI), Cleanup Verification Package for the 116-B-2 Fuel Storage Basin Trench, CVP-99-00015, Rev 0.
8. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1,

Site Code: 116-B-2

Site Reclassification Status: Interim Closed Out

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100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.
9. N. A. Homan to S. M. Griffin, 11/14/1990, Review Comments on the 1990 Hanford Site Waste Management Units Report from 100 Area Environmental Protection, DSI.

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Waste Information Data System General Summary Report

Site Code: 116-B-3

Site Reclassification Status: Interim Closed Out

Page 1

Site Names: 116-B-3; 105-B Pluto Crib

Site Type: Crib

Start Date: 1/1/1951

Status: Inactive

End Date: 1/1/1952

Hanford Area: 100B

Pipe Type: Not Specified

OU/WMA: 100-BC-1

Site Description:

The 116-B-3 Pluto Crib has been remediated and was closed out on February 24, 2000. It is no longer marked or posted.

This unit was a wooden crib shored with railroad ties, filled with gravel and covered to grade with clean soil. A concrete marker indicates the position of the crib. Clukey (1954) indicates that the crib is a french drain, otherwise defined as a "tile or pipe buried vertically, sometimes gravel-filled". After its use, the crib was reportedly unearthed and shored with wooden ties.

Location Description:

This unit was located within the 105-B Area exclusion fence, about 30 meters (100 feet) east of the 105-B Building and about 847 meters (2,780 feet) from the 100-year flood level of the Columbia River.

Process Description:

This pluto crib received 105-B cooling water wastes that had been contaminated by cladding ruptures of fuel elements. Cooling water diversion occurred when a fuel element rupture was detected within a process tube. The water was diverted from the affected process tube through a valve on the rear of the reactor face known as a "pluto valve" and through rubber hose to the crib. The wooden crib was buried so that its upper surface was approximately at grade. A hatch on the upper surface was opened to receive the rubber hose and the crib was allowed to flood.

Site Comment:

Source documents have conflicting information on when this site began and ceased operation. Start dates range from 1950 to 1951 and end dates range from 1952 to 1956. The dates included in UNI-946 are assumed to be correct due to the authors' past knowledge.

Institutional Control (IC) requirements were revised by DOE letter 05-AMRC-0078 on 1/4/2005.

Waste Information:

Type:	Water	Amount:	4,000.00
Category:	Mixed	Units:	Liters
Physical State:	Liquid	Reported Date:	
Start Date:	1/1/1951	End Date:	1/1/1952

Description:

The site received effluent from reactor tubes containing ruptured fuel elements.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Site Code: 116-B-3

Site Reclassification Status: Interim Closed Out

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Dimensions:

Length:	3.05 Meters	10.00 Feet
Width:	3.05 Meters	10.00 Feet
Depth/Height:	6.10 Meters	20.00 Feet
Overburden Depth:	3.05 Meters	10.00 Feet
Sq. Area:	23.23 Square Meters	250.00 Square Feet
Site Shape:	Not Specified	

References:

1. Shearer, Jeffrey P. with Roger W. Carpenter, 4/4/1996, Depth of 100BC Sites.
2. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
3. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Field Work:

Type: Analytical Sampling
Begin Date: 4/13/1999
End Date: 5/12/1999
Purpose: Cleanup verification sampling

Comment:

Seven shallow zone samples were taken, including three QA/QC samples: B0VFJ3, B0VFJ6 to B0VFJ8, B0VFJ4 (duplicate of B0VFJ3), B0VFJ9 (split of B0VFJ3), and B0VFJ5 (equipment blank). Five deep zone (4.6 meters [15 feet]) samples were taken, including two QA/QC: B0VD41, B0VD42, B0VD44, B0VD43 (duplicate of B0VD42) and B0VD45 (split of B0VD42).

References:

1. Bechtel Hanford Inc. (BHI), Cleanup Verification Package for the 116-B-3 Pluto Crib, CVP-99-00013, Rev 0.

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	

Site Code: 116-B-3

Site Reclassification Status: Interim Closed Out

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Air Operating Permit: No **State Waste Discharge Permit:**

Air Operating Permit Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA

Unit Category: CERCLA Past Practice (CPP)

TPA Appendix : C

Remediation and Closure

Decision Document: Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)

Decision Document Status: Final

Closure Document: Cleanup Verification Package (CVP)

Closure Type: Not Specified

Post Closure Requirments:

Revegetation; institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet) are required.

Closure Group:

Closure Group Name: CG 116-B-3

Type: Interim

Reclassification Status: Prepared **Reclassified On:** 2/24/2000

Excavation Start Date: 2/17/99 **Excavation Completed Date:** 3/11/1999

Remediation Action:

Excavation of the 116-B-3 site began on February 17, 1999, by removing the overburden materials and underlying contaminated soil. Based on field screening, materials identified as potentially clean were placed in stockpiles for potential use as backfill. Cleanup verification sampling began on April 13, 1999, and was finished on May 12, 1999. At the completion of the remedial action, the area of the excavation was approximately 112.3 square meters (1,209.6 ft²) at a maximum depth of approximately 4.6 meters (15 ft). Approximately 244 metric tons of material from the site were disposed at the ERDF. The excavation was to be backfilled with clean fill materials to the reference grade of El. 143 meters (469 feet). The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. The acceptability of unrestricted direct exposure to deep zone soils has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone [i.e., below 4.6 meters (15 feet)] are required.) The verification package also demonstrated that residual COPC concentrations pose no threat to groundwater at the Columbia River. Thus, the 116-B-3 site has been verified to be remediated and may be backfilled.

Excavated Material:

Quantity: 244.00

Unit Type: Metric Tons

Disposition: Environmental Restoration Disposal Facility

Cleanup Verification:

From process knowledge and identified in the 100 Area Remedial Action Sampling and Analysis Plan (SAP) (DOE/RL-1998), contaminants of concern (COCs) included cesium-137, strontium-90, uranium-233/234, and hexavalent chromium.

Institutional Controls:

Institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet)) are required.

Statement Of Protectiveness:

This verification package demonstrates that remedial action at the 116-B-3 site has achieved the RAOs and corresponding RAGs established in the approved interim action ROD (EPA 1995) and RDR/RAWP (DOE-RL 1998b). Materials that contain COCs at concentrations exceeding the RAGs have been excavated and disposed at the ERDF. The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. This scenario assumes multiple exposure pathways (e.g., ingestion, inhalation, direct exposure) for shallow zone soils. (The acceptability of unrestricted direct exposure to deep zone soils has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone [i.e., below 4.6 meters (15 ft)] are required.) The verification package also demonstrates that residual COC concentrations pose no threat to groundwater or the Columbia River. The 116-B-3 site is thus verified to be remediated and may be backfilled.

References:

1. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
2. Shearer, Jeffrey P. with Roger W. Carpenter, 4/4/1996, Depth of 100BC Sites.
3. K. W. Owens to P. M. Johnson, 7/31/1980, Letter: Site Information for Alternative Studies at Hanford, Let. # 65463-80-046.
4. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
5. H. V. Clukey, 10/8/1954, Tabulation of Radioactive Liquid Waste Disposal Facilities, HW -33305.
6. Dorian and Richards, 5/26/1978, Radiological Characterization of the Retired 100 Areas, UNI-946.
7. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
8. Bechtel Hanford Inc. (BHI), Cleanup Verification Package for the 116-B-3 Pluto Crib, CVP-99-00013, Rev 0.
9. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-B-4 **Site Reclassification Status:** Interim Closed Out Page 1

Site Names: 116-B-4; 105-B Dummy Decontamination Disposal Crib; 105-B Dummy Decontamination French Drain

Site Type: French Drain **Start Date:** 1/1/1957

Status: Inactive **End Date:** 1/1/1968

Hanford Area: 100B **Pipe Type:** Not Specified

OU/WMA: 100-BC-1

Site Description:

This site has been remediated and closed out. It is no longer marked or posted. The unit had a graded rock and sand bottom. It was marked with four yellow steel posts and had a curved stainless steel pipe in the center along with a painted concrete marker. The site included a feed pipe that originated at the 105-B Building.

Location Description:

The 116-B-4 site was located near the center of the 100-B Area and was approximately 806.6 meters (2,646 feet) from the Columbia River and approximately 21 m (69 ft) south of 116-B-3 Pluto Crib.

Process Description:

The 116-B-4 French Drain received spent acid rinse water from the 105-B Dummy Decontamination Facility, which was used for the decontamination of fuel element spacers and other reactor hardware. The french drain was fed by a single, underground stainless steel pipe. Acids were neutralized within the 105-B Dummy Decontamination Facility prior to discharge to the french drain.

Associated Structures:

The site was associated with the 105-B Building (118-B-8).

Site Comment:

This unit was misidentified during sampling as the 105-B Pluto Crib. Radionuclide inventories calculated for the 105-B Pluto Crib actually belong to this site. Institutional Control (IC) requirements were revised by DOE letter 05-AMRC-0078 on 1/4/2005.

Waste Information:

Type:	Process Effluent	Amount:	300,000.00
Category:	Mixed	Units:	Liters
Physical State:	Liquid	Reported Date:	

Description:

The site received spent acid and rinse water from the 105-B Dummy (fuel element spacers and reactor hardware) Decontamination Facility.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
2. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

Dimensions:

Site Code: 116-B-4

Site Reclassification Status: Interim Closed Out

Page 2

Depth/Height:	4.57 Meters	15.00 Feet
Diameter:	1.22 Meters	4.00 Feet
Sq. Area:	6.04 Square Meters	65.00 Square Feet
Site Shape:	Not Specified	

References:

1. Shearer, Jeffrey P. with Roger W. Carpenter, 4/4/1996, Depth of 100BC Sites.
2. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Field Work:

Type: Analytical Sampling
Begin Date: 7/1/1995
End Date: 5/6/1999
Purpose: Cleanup Verification Sampling

Comment:

Seven shallow zone (above 4.6 meters [15 feet]) were taken on May 5, 1999, including three QA/QC samples: B0VF62, B0VF63, B0VF66, B0VF67, B0VF64 (duplicate of B0VF63), B0VF68 (split of B0VF63), and B0VF65 (equipment blank). Thirteen samples were taken in the deep zone on April 29, 1999, and in July 1995, including two QA/QC samples: B0VD46, B0VD47, B0VD49, B0G8S0, B0G8S1, B0G8S3, B0G8S8, B0G8S9, B0GCS8, B0GCS9, B0GCS7, B0VD48 (duplicate of B0VD47), and B0VD50 (split of B0VD47).

References:

1. Bechtel Hanford Inc. (BHI), Cleanup Verification Package for the 116-B-4 French Drain, CVP-99-00014, Rev

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
		State Waste Discharge Permit:	
Air Operating Permit:	No		
Air Operating Permit Number(s):			

Tri-Party Agreement

Site Code: 116-B-4**Site Reclassification Status: Interim Closed Out**Page 4

Quantity: 8,700.00
Unit Type: Metric Tons
Disposition: Environmental Restoration Disposal Facility

Cleanup Verification:

From process knowledge, the waste site contaminants of concern (COCs) identified in the SAP include cobalt-60, cesium-137, europium-152, europium-154, europium-155, and plutonium-239/240. The cleanup verification package (CVP) demonstrated that remedial action at the 116-B-4 site has achieved the RAOs and corresponding RAGs established in the approved Interim Action ROD (EPA 1995) and RDR/RAWP (DOE-RL 1998). The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. The acceptability of unrestricted direct exposure to deep zone soils has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone [i.e., below 4.6 meters (5 feet)] are required.

Institutional Controls:

Institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet)) are required.

Statement Of Protectiveness:

This verification package demonstrates that remedial action at the 116-B-4 site has achieved the RAOs and corresponding RAGs established in the approved Interim action ROD (EPA 1995) and RDR/RAWP (DOE-RL 1998b). Materials that contain COCs at concentrations exceeding the RAGs have been excavated and disposed at the ERDF. The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. This scenario assumes multiple exposure pathways (e.g., ingestion, inhalation, direct exposure) for shallow zone soils. (The acceptability of unrestricted direct exposure to deep zone soils has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone [i.e., below 4.6 meters (15 ft)] are required.) The verification package also demonstrates that residual COC concentrations pose no threat to groundwater or the Columbia River. The 116-B-4 site is thus verified to be remediated and may be backfilled.

References:

1. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
2. J. G. April, 3/15/1996, 100-B/C Demonstration Project Final Report, BHI-00752.
3. Shearer, Jeffrey P. with Roger W. Carpenter, 4/4/1996, Depth of 100BC Sites.
4. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
5. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
6. Bechtel Hanford Inc. (BHI), Cleanup Verification Package for the 116-B-4 French Drain, CVP-99-00014, Rev 0.
7. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.
8. U.S. Department of Energy (DOE/RL), 1/1/1995, 100-BC-1 Excavation Demonstration Project Plan, DOE/RL-95-56, Rev 3.
9. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

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Waste Information Data System General Summary Report

Site Code: 116-B-5

Site Reclassification Status: Interim Closed Out

Page 1

Site Names: 116-B-5; 116-B-5 Crib; 116-B-5 Trench; 108-B Crib

Site Type: Crib

Start Date: 1/1/1950

Status: Inactive

End Date: 1/1/1968

Hanford Area: 100B

Pipe Type: Not Specified

OU/WMA: 100-BC-1

Site Description:

This waste site has been remediated. The crib structure and its contents have been removed. The crib was constructed of concrete timbers and consisted of 12 rectangular cells in a single row. Each cell was partially filled with sandy gravel and had a separate concrete lid. For cleanup purposes, the cells were identified using the letters "A" through "L", with cell A being the southernmost cell.

Location Description:

The crib was located approximately 46 meters (150 feet) north of the 108-B Building site (132-B-1) and east of the 108-B Ventilation Exhaust Stack Burial Ground (132-B-3).

Site Comment:

Institutional Control (IC) requirements were revised by DOE letter 05-AMRC-0078 on 1/4/2005.

A geophysical survey of this site was performed in 1992 and an expansion of the survey area was integrated with the original work in 1995. Survey results were published in BHI-00344.

Waste Information:

Type: Process Effluent

Amount: 10,000,000.00

Category: Radioactive

Units: Liters

Physical State: Liquid

Reported Date:

Description:

The site received liquid tritium wastes from the 108 Building. Only wastes of less than 1 microcuries/cubic centimeter were discharged to this unit.

References:

1. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.

Dimensions:

Length: 27.03 Meters 88.67 Feet

Width: 2.44 Meters 8.00 Feet

Depth/Height: 3.54 Meters 11.60 Feet

Overburden Depth: 0.61 Meters 2.00 Feet

Site Shape: Rectangle

References:

1. J. G. April, 3/15/1996, 100-B/C Demonstration Project Final Report, BHI-00752.

Site Code: 116-B-5

Site Reclassification Status: Interim Closed Out

Page 2

Field Work:

Type: Geophysical Survey
Begin Date: 1/1/1995
End Date: 1/1/1995
Purpose: Determine dimensions and location of crib

Comment:

The crib and surrounding area were clearly delineated. See BHI-00344 for results.

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: No
TPA Waste Management Unit Type : Not Specified

Permitting

RCRA Part B Permit: No **TSD Number:**
RCRA Part A Permit: No **Closure Plan:** No
RCRA Permit Status: Not Specified
Septic Permit: No **216/218 Permit:**
Inert LandFill: No **NPDES:**
Air Operating Permit: No **State Waste Discharge Permit:**
Air Operating Permit Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Decision Document: Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)
Decision Document Status: Final
Closure Document: None
Closure Type: Not Specified

Post Closure Requirments:

Revegetation; no institutional controls to prevent uncontrolled drilling or excavations into the deep zone [below 4.6 meters (15 feet)] are required.

Closure Group:

Site Code: 116-B-5**Site Reclassification Status: Interim Closed Out**Page 3

Closure Group Name: CG 116-B-5**Type:** Interim**Reclassification Status:** Prepared**Reclassified On:** 1/14/1997**Excavation Start Date:** 6/1/95**Excavation Completed Date:****Remediation Action:**

In June 1995, the site was excavated as part of the 100-B/C Demonstration Project. Remedial action was accomplished by excavating approximately 300 cubic meters (10,600 cubic feet) of soil from the crib and demolishing the concrete crib structure, leaving an open excavation approximately 34 meters (112 feet) by 8 meters (26 feet) to a 5 meter (16 feet) depth. The soils within and surrounding the crib were sampled and analyzed. The soils from cells C and D containing levels of tritium above cleanup standards were taken to the Environmental Restoration Disposal Facility (ERDF). All other soils sampled were within cleanup standards. A "100 NPL Agreement/Change Control Form" documenting the close out of the 116-B-5 Crib was submitted on January 8, 1997 and signed by the Environmental Protection Agency Project Manager on January 14, 1997. The form also authorized the backfilling of the waste site.

Excavated Material:**Quantity:** 300.00**Unit Type:** Bank Cubic Meters**Disposition:** Environmental Restoration Disposal Facility**Cleanup Verification:**

There were 137 samples taken during remediation activities. The samples are identified as follows: 116-B5-00; 116-B5-008, 116-B5A-10, 116-B5A-12.5, 116-B5A-14.5, 116-B5B-10, 116-B5B-12.5, 116-B5B-14.5, 116-B5C-6, 116-B5D-10, 116-B5D-12.5, 116-B5D-15, 116-B5E-10, 116-B5E-12.5, 116-B5E-15, 116-B5F-10, 116-B5F-12.5, 116-B5F-15, 116-B5G-10, 116-B5G-12.5, 116-B5G-15, 116-B5H-10, 116-B5H-12.5, 116-B5H-15, 116-B5I-10, 116-B5I-12.5, 116-B5I-15, 116-B5I-D, A_BTM, A_PILE, B_BTM, B0G7C2 through B0G7C9, B0G7C7ND, B0G7D0 through B0G7D9, B0G7F0 through B0G7F9, B0G7G0 through B0G7G3, B0G7G6 through B0G7G9, B0G7H0 through B0G7H9, B0G7J0 through B0G7J9, B0G7K0 through B0G7K9, B0G7L0 through B0G7L9, B0G7M0 through B0G7N1 through B0G7N9, B0G7P1, B0G8Z4, B0G8Z5, CELL8TOP, CELLAPS1, CELLAPS2, CELLBPS1, H95023 through H95027, PIPELCA, and PIPELCB. A summary table showing the samples results is published in the 100-B/C Demonstration Project Final Report (BHI-00752).

Institutional Controls:

No institutional controls to prevent uncontrolled drilling or excavations into the deep zone [below 4.6 meters (: feet)] are required.

Statement Of Protectiveness:

Soils from cells C and D containing levels of tritium above the clean up standard were shipped to the Environmental Restoration disposal Facility. Both excavated soils and residual soils were sampled and analyzed. The resultant data was evaluated against remedial action objectives stated in the Record of Decision for the 100-BC-1, 100-DR-1 and 100-HR-1 Operable Unit Interim Remedial Actions (EPA, September 1995), in accordance with the Remedial Design Report/Remedial Action Work Plan for the 100 Area (DOE/RL-96-17). The results of this evaluation, contained in the attached verification package, demonstrate attainment of the remedial action objectives. This form documents agreement among the parties listed below authorizing classification of the subject waste site from the TPA solid waste management unit listing as closed out and authorizing backfill the waste site. Final removal from the NPL will occur at a future date.

Images:

Site Code: 116-B-5

Site Reclassification Status: Interim Closed Out

Page 4

Pathname: [//mapweb.ri.gov/widsimg/100b/0024/0024_01.jpg](http://mapweb.ri.gov/widsimg/100b/0024/0024_01.jpg)

Date Taken:

Description:

116-B-5 site condition subsequent to excavation. Figure 3-6, BHI-00752 Rev. 0. E9601061a.2.

Pathname: [//mapweb.ri.gov/widsimg/100b/0024/0024_02.jpg](http://mapweb.ri.gov/widsimg/100b/0024/0024_02.jpg)

Date Taken:

Description:

Photograph showing 116-B-5 exposed crib. Figure 3-4, BHI-00752 Rev. 0. E9601061a.1.

Pathname: [//mapweb.ri.gov/widsimg/100b/0024/0024_03.jpg](http://mapweb.ri.gov/widsimg/100b/0024/0024_03.jpg)

Date Taken:

Description:

Excavation/demolition of the 116-B-5 crib. Figure 3-5, BHI-00752 Rev. 0. E9601061a.1.

References:

1. LA Dietz, 2/27/2003, Updates to WIDS Database, 105989.
2. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
3. J. G. April, 3/15/1996, 100-B/C Demonstration Project Final Report, BHI-00752.
4. Mitchell, T. H. and K. A. Bergstrom, 8/4/1995, Geophysical Investigations of the 116-B-3 Pluto Crib, 116-B-4 French Drain, 116-B-5 Crib, 100-BC-1 Operable Unit, BHI-00344, Rev 00.
5. Glenn Van Sickle, 1/8/1997, 100 NPL Agreement/Change Control Form for the Close Out of the 116-B-5 Crib.
6. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
7. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
8. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
9. N. A. Homan to S. M. Griffin, 11/14/1990, Review Comments on the 1990 Hanford Site Waste Management Units Report from 100 Area Environmental Protection, DSI.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-B-6A

Site Reclassification Status: Interim Closed Out

Page 1

Site Names: 116-B-6A; 111-B Crib No. 1; 116-B-6-1

Site Type: Crib

Start Date: 1/1/1951

Status: Inactive

End Date: 1/1/1968

Hanford Area: 100B

Pipe Type: Not Specified

OU/WMA: 100-BC-1

Site Description:

This site has been remediated and closed out. An in-situ vitrification treatability test that was conducted in April, 1990.

Location Description:

The site was located immediately north of the 111 -B Building Site.

Process Description:

The 116-B-6A Crib received radioactive liquid wastes from equipment decontamination performed in the 111 -B Building, as well as from the decontamination of fuel element spacers.

Site Comment:

The site's location had been in question prior to an in-situ vitrification treatability test that was conducted in April, 1990. Historical research and ground penetrating radar positively identified the location, size, and construction of the crib prior to the test. In situ vitrification is a thermal treatment process that converts contaminated soil into a chemically inert and stable glass and crystalline product. This test was a demonstration of technology rather than a remedial action to stabilize waste. A barrier wall and cooling system were installed to prevent the nearby 116-B-16 Fuel Examination Tank from being affected by the heat of vitrification. The in situ vitrification at this site reached 4.3 meters (14 ft) below grade and produced a block of vitrified material between 10.7 m (35 ft) and 12.2 m (40 ft) in diameter, approximately 3.8 (12 ft) high, and weighing between 726 metric tons (800 tons) and 816 metric tons (900 tons). At the conclusion of the test, a block estimated to be 10.7 to 12.2 meters (35 to 40 feet) in diameter remained that was estimated to weigh between 7.3E+05 to 8.2E+05 kilograms (800 to 900 tons). The site was backfilled with clean fill material to grade at the end of the test. All vitrified material was removed during remediation of the 116-B-6A/116-B-16 site and was disposed of at ERDF.

Waste Information:

Type: Process Effluent

Amount: 5,000.00

Category: Mixed

Units: Liters

Physical State: Liquid

Reported Date:

Description:

The unit received radioactive liquid wastes from equipment decontamination performed in the 111 -B Building, as well as from the decontamination of fuel element spacers performed at the 111 -B Building Decontamination Station.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Site Code: 116-B-6A

Site Reclassification Status: Interim Closed Out

Page 2

Dimensions:

Length:	3.66 Meters	12.00 Feet
Width:	2.44 Meters	8.00 Feet
Depth/Height:	4.57 Meters	15.00 Feet
Overburden Depth:	1.83 Meters	6.00 Feet
Sq. Area:	23.23 Square Meters	250.00 Square Feet
Site Shape:	Not Specified	

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
2. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Field Work:

Type: Analytical Sampling
Begin Date: 5/20/1999
End Date: 6/18/1999
Purpose: Cleanup Verification

Comment:

The cleanup verification package for the 116-B-6A Crib and 116-B-16 Fuel Examination Tank, because of their close proximity to each other and similar contaminants of concern (COCs), were excavated as one remedial action site and are hereinafter referred to as the 116-B-6A/116-B-16 site. The contaminants of concern (COCs) for the sites 116-B-6A/116-B-16 were uranium-238, cobalt-60, cesium-137, strontium-90. The contaminants of potential concern (COPCs) were uranium-233/234, europium-152/154, hexavalent chromium and mercury. The original list in the SAP (DOE/RL 1998a) also identified volatile organic compounds as a COPC. However, volatile organic compounds were not found during remediation of this site and, therefore, are not addressed further in the cleanup verification package. Although hexavalent chromium levels were all below detection, this analyte was retained as a COC due to its historical sensitivity in the 100-B/C Area. For the shallow zone eleven samples (B0VFM7, B0VLC6-8, B0WX74-77), plus one duplicate (B0VLC4), one split (B0VFM8), and one equipment blank (B0VLC5) were taken. For the deep zone three samples (B0VFW7-8, B0VFX0), plus one duplicate (B0VFW9), and one split (B0VFX1) were taken.

References:

1. Bechtel Hanford, Inc, Cleanup Verification Package for the 116-B-6A Crib and 116-B-16 Fuel Examination Tank, CVP-99-00011, Rev 0.

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Site Code: 116-B-6A

Site Reclassification Status: Interim Closed Out

Page 3

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
		State Waste	
Air Operating Permit:	No	Discharge Permit:	
Air Operating Permit			
Number(s):			

Tri-Party Agreement

Lead Regulatory Agency:	EPA
Unit Category:	CERCLA Past Practice (CPP)
TPA Appendix :	C

Remediation and Closure

Decision Document:	Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)
Decision Document Status:	Final
Closure Document:	Cleanup Verification Package (CVP)
Closure Type:	Not Specified

Post Closure Requirments:

Revegetation: Institutional controls preventing drilling or excavation into the deep zone are required.

Closure Group:

Closure Group Name:	CG 116-B-6A and 116-B-16		
Type:	Interim		
Reclassification Status:	Prepared	Reclassified On:	5/17/2000

Remediation Action:

Excavation of the 116-B-6A/116-B-16 site involved removing the overburden materials, the contaminated structure, and underlying contaminated soil. Based on field screening, overburden materials identified as potentially clean were placed in stockpiles for potential use as backfill. Materials shown to be contaminated were disposed of at the ERDF. On May 12, 1999, the excavation reached the design limit at El. 141.4 meters (464 ft). Cleanup verification sampling began on May 20, 1999, and was finished on June 18, 1999.

The cleanup verification package for the 116-B-6A Crib and 116-B-16 Fuel Examination Tank, because of their close proximity to each other and similar contaminants of concern (COCs), were excavated as one remedial action site and are hereinafter referred to as the 116-B-6A/116-B-16 site.

At the completion of the remedial action, the total excavation was approximately 603.5 meters squared (6,496 square feet or 0.15 acres) in area with a maximum depth of approximately 4.6 meters (15 feet). Approximately 5,072 metric tons (5,591 tons) of material from the site were disposed of at the Environmental Restoration Disposal Facility. The excavation will be backfilled in the near future (written June 6, 2000) with appropriate materials to the reference grade El. 146 meters (479 feet).

Results of the sampling, laboratory analyses, and data evaluations for the 116-B-6A/116-B16 site indicate that remedial action objectives and goals for direct exposure, protection of ground water, and protection of the Columbia River have been met. However, this site close out includes a deed restriction against drilling or diggir into the deep zone soils (below 4.6 m [15 ft] depth).

Excavated Material:

Site Code: 116-B-6A**Site Reclassification Status: Interim Closed Out**Page 4

Quantity: 5,072.00
Unit Type: Metric Tons
Disposition: Environmental Restoration Disposal Facility

Institutional Controls:

Institutional controls to prevent uncontrolled drilling or excavation into the deep zone [i.e., below 4.6 m (15 ft)] are required.

Statement Of Protectiveness:

This verification package demonstrates that remedial action at the 116-B-6A/116-B-16 site has achieved the RAOs and corresponding RAGs established in the approved interim action ROD (EPA 1995) and RDR/RAWP (DOE-RL 1998b). Materials that contain COCs at concentrations exceeding the RAGs have been excavated and disposed of at the ERDF. The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. This scenario assumes multiple exposure pathways (e.g., ingestion, inhalation, direct exposure) for shallow zone soils. (The acceptability of unrestricted direct exposure to deep zone soils has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone [i.e., below 4.6 meters (15 ft)] are required.) This verification package also demonstrates that residual COC concentrations pose no threat to groundwater or the Columbia River. The 116-B-6A/ 116-B-16 site is thus verified to be remediated in accordance with the ROD and may be backfilled.

Images:**Pathname:** [//mapweb.ri.gov/widsimg/100b/0025/0025_01.jpg](http://mapweb.ri.gov/widsimg/100b/0025/0025_01.jpg)**Date Taken:** 1/1/2000**Description:**

Hanford Site map and 116-B-6A/116-B-16 Site Plan.

References:

1. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
2. R. H. Griffin, 4/21/1993, WIDS Site Modification, Sites in 116-B-6A, 126-B-3, 116-C-3, 1607-B10, 1607-B11.
3. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
4. J. Luey, 9/1/1992, In Situ Vitrification of a Mixed Waste Contaminated Soil Site: The 116-B-6A Crib, PNL-8281.
5. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
6. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
7. Bechtel Hanford, Inc, Cleanup Verification Package for the 116-B-6A Crib and 116-B-16 Fuel Examination Tank, CVP-99-00011, Rev 0.
8. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-C-1**Site Reclassification Status:** Interim Closed OutPage 1

Site Names: 116-C-1; 107-C Liquid Waste Disposal Trench**Site Type:** Trench**Start Date:** 1/1/1952**Status:** Inactive**End Date:** 1/1/1968**Hanford Area:** 100C**Pipe Type:** Not Specified**OU/WMA:** 100-BC-1**Site Description:**

This site has been interim closed out after remediation. It has been backfilled and revegetated. The revegetation included a test plot to determine the need for additional topsoil and irrigation on remediated waste sites.

The 116-C-1 site was constructed in 1952 and was located northeast of the 116-C-5 Retention Basin facility, approximately 253 meters (830 feet) from the 100-year flood level of the Columbia River.

Location Description:

116-C-1 was an inactive liquid waste site located approximately 300 meters (1,000 feet) east of 116-B-11 (107-B Retention Basin).

Process Description:

The 167-meters-long, 32-meters-wide, 5-meters-deep (548-ft-long, 105-ft-wide, 16.4-ft-deep) site was a former process effluent disposal trench (unlined) that received 700 million liters (184 million gallons) of contaminated cooling water from the 100-B/C Area Retention Basins after ruptured fuel elements were detected in the reactors (DOE-RL-93-06). The 116-C-1 site continued to receive contaminated cooling water until reactor operations ceased in 1968. An additional 40 billion liters (more than 10 billion gallons) of high-temperature reactor cooling water was discharged to the site during a 150-day infiltration test in 1967. This test likely influenced the distribution of contaminants beneath the site.

Influent water was transferred to the trench via two 107-centimeters (42-inches) steel pipes leading from the 168-centimeters (66 inches) outfall pipelines that lead from the 116-C-5 Retention Basins to the river. Two additional 61-centimeters (24-inches) pipes discharged influent water to the site. The contaminated water discharged to the site soils continued from 1952 to 1968. After operations ceased in 1968, the site was decommissioned as part of the Radiation Area Remedial Action (RARA) Program. The RARA activities at the 116-C-1 site included the placement of at least 1.5 meters (4.9 feet) of fill material (shielding) over the entire base of the trench to stabilize the exposed contaminated surfaces of the engineered structure.

Associated Structures:

The site was associated with 116-C-5 (107-C Retention Basin) and 116-B-11 (107-B Retention Basin).

Site Comment:

This site was included in the Group 1 Remedial Action Sites for cleanup under the Environmental Restoration Contract. The site has been excavated. The material removed from the site was disposed of in the Environmental Restoration Disposal Facility (ERDF).

Institutional Control (IC) requirements were revised by DOE letter 05-AMRC-0078 on 1/4/2005.

Release Description:

The 116-C-1 Trench received 700 million liters (184 million gallons) of contaminated cooling water from the 100-B/C Area Retention Basins. The site continued to receive contaminated cooling water until reactor operations ceased in 1968. An additional 40 billion liters (more than 10 billion gallons) of high-temperature reactor cooling water was discharged to the site during a 150-day infiltration test in 1967.

Site Code: 116-C-1

Site Reclassification Status: Interim Closed Out

Page 2

Waste Information:

Type:	Process Effluent	Amount:	44,284,500,000.00
Category:	Mixed	Units:	Liters
Physical State:	Liquid	Reported Date:	

Description:

The site received effluent overflow from 116-C-5 (107-C Retention Basin) during reactor outages due to rupture fuel elements. Beginning in 1955, this site also served 116-B-11 (107-B Retention Basin). The trench was used in 1967 for an infiltration test in which the total cooling water volume from B-Reactor was disposed in the trench. During the test, an estimated 4.4E+10 liters (1.17E+10 gallons) of effluent water were released. From process knowledge, the waste site contaminants of concern (COCs) identified are: Americium-241, Cobalt-60, Cesium-137, Europium-152, -154, -155, Nickel-63, Plutonium-238, -239/240, Strontium-90, Uranium-238, Total Chromium, Hexavalent chromium, Mercury, and Lead.

References:

1. V. R. Richards, 5/1/1991, WIDS Data Modifications; 116-B-8, 116-B-10, 116-C-1, 116-DR-1, 116-DR-2, 116-DR-8, 116-F-5, 116-F-7, 116-H-1, 118-D-2, 118-F-1, 118-F-5, 118-H-2, 118-K-1, 118-KE-2, 122-DR-1, 126-F-1, 132-F-6, 132-H-1, 132-H-3.
2. BHI, Cleanup Verification Package for the 116-C-1 Process Effluent Trench, CVP-98-00006, Rev 0.
3. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
4. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
5. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Dimensions:

Length:	152.40 Meters	500.00 Feet
Width:	15.24 Meters	50.00 Feet
Depth/Height:	6.10 Meters	20.00 Feet
Overburden Depth:	1.83 Meters	6.00 Feet
Site Shape:	Not Specified	

References:

1. Design Basis for the 100 B/C, 100 D, and 100 H Remediation Project Group 1 Sites, 0100X-DB-G0001, Rev 0.
2. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
3. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Field Work:

Type:	Analytical Sampling
Begin Date:	10/1/1997
End Date:	1/15/1998
Purpose:	Cleanup Verification Sampling

Comment:

Verification Samples were taken from the clean overburden pile excavated from the 116-C-1 Retention Basin and used as backfill; the shallow zone soils (also called sidewalls); and deep zone soils. The deep zone soils were taken from the floor of the excavation and from a test pit dug from the floor of the excavation to groundwater. Sample numbers B0J2W8, B0J2W9, B0J2X0 through B0J2X9, B0J2Y0 through B0J2Y5, and B0J2T9 are from the overburden. Sample numbers B0J2W0 through B0J2W7 and B0J2T8 are from the sidewalls (shallow zone). Sample numbers B0J2V0 through B0J2V9, B0J2S6 through B0J2S9, B0J2T0, B0J2T1, B0J2T7, B0J322, B0HH76 through B0HH79, H96031 through H96034, and B0J323 are from the deep zone (floor). Sample numbers B0JD04 through B0JD12, B0J2Y8, WDOH122.5, WDOH121.5, H98001, and H98002 are from the deep zone (test pit). The results of these sample analyses are contained in HEIS and the Project-Specific Database.

References:

1. BHI, Cleanup Verification Package for the 116-C-1 Process Effluent Trench, CVP-98-00006, Rev 0.

Type: Geophysical Survey
Begin Date: 6/1/1995
End Date: 7/1/1995
Purpose: Geophysical survey results.

Comment:

A summary map and interpretation of the survey results are available in BHI-00613.

Type: Analytical Sampling
Begin Date: 1/1/1978
End Date: 1/1/1978
Purpose: Soil sampling.

Comment:

Soil sampling indicated the maximum radiological contamination was about 6 meters (20 feet) below grade. Result summary: Sampling detected toluene, diethylphthalate, di-n-butylphthalate and bis(2-ethylhexyl)phthalate. No pesticides or polychlorinated biphenyls (PCBs) were detected and inorganic metals did not exceed Hanford 95% upper threshold limits.

Type: GPS Surveys
Begin Date: 5/12/1995
End Date: 5/19/1995
Purpose: Mapping

Comment:

The cobble covered area was surveyed.

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

Site Code: 116-C-1 Site Reclassification Status: Interim Closed Out Page 4

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
		State Waste	
Air Operating Permit:	No	Discharge Permit:	
Air Operating Permit Number(s):			

Tri-Party Agreement

Lead Regulatory Agency:	EPA
Unit Category:	CERCLA Past Practice (CPP)
TPA Appendix :	C

Remediation and Closure

Decision Document:	Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)
Decision Document Status:	Final
Closure Document:	Cleanup Verification Package (CVP)
Closure Type:	Not Specified

Post Closure Requirments:

Revegetation; institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet) are required.

Closure Group:

Closure Group Name:	CG 116-C-1		
Type:	Interim		
Reclassification Status:	Prepared	Reclassified On:	1/21/1999
Excavation Start Date:	4/23/97	Excavation Completed Date:	

Remediation Action:

The 116-C-1 site cleanup activities consisted of the 100-B/C Demonstration Project and the final remedial action. The purpose of the 100-B/C Demonstration Project was to initiate a limited remedial action in the 100 areas to address uncertainties in remedial design and planning.

The excavation area boundary was a 38 by 38 meter (124.7 by 124.7 ft) square located in the southwest third of the trench. The material was removed in 1.5 meters (5.0 ft) lifts to an approximate elevation of 126 meters (415 ft). The side slopes were approximately 1.5 horizontal to 1.0 vertical. The excavation and disposal of the engineered structure and RARA backfill began on July 15, 1996, and was completed on November 15, 1996.

Eight contaminated soil plumes extending beyond the engineered structure were identified during the subsequent field screening and sampling efforts. The excavation and disposal of the plume areas began on April 23, 1997, and were completed on October 28, 1997. After the soil plume excavation was completed, a test pit was excavated down to groundwater to further characterize the subsurface. The test pit was centered at an area of elevated activity (identified by radionuclide field surveys) near the 116-C-1 inlet pipes. The test pit effort began on December 15, 1997, and was completed on January 15, 1998. Soil samples were taken from each quadrant of the test pit and composited for each of the eight 1-m (3-ft) test pit lifts. When the final test pit samples were obtained, 1 meter of clean native soil from identified borrow pits to the south was placed in the bottom of the test pit. Backfill of the test pit occurred in approximately the same sequence as when the soils were removed using the stockpiled materials. The backfill was placed in 1 meters (3 ft) compacted lifts.

During excavation, field screening and onsite gamma energy analysis (GEA) at the Radiological Counting Facility

(RCF) were used to distinguish between potentially clean materials and contaminated materials for disposal at ERDF. Excavated overburden materials that were identified as potentially clean were placed in segregated piles near the site for potential use as clean backfill. Soils that did not meet direct exposure RAGs (based on field screening) were disposed of at ERDF.

Cleanup Verification:

More than 230 samples were collected for GEA, and 35 grab samples were taken and analyzed at quick turn-around laboratories. Data from these samples were used to corroborate data obtained from field screening and to assist in waste characterization. A total of 37 final verification composite samples were taken and sent to an offsite laboratory for analysis.

Institutional Controls:

Institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet)) are required.

Statement Of Protectiveness:

As demonstrated in this verification package, the RAGs for direct exposure, groundwater protection, and surface water protection (including protection of the Columbia River) have all been achieved. Materials that contain CC at concentrations that exceed the RAGs have been excavated, sampled, analyzed, and where required, the materials were removed and shipped to ERDF. The remaining soil has been sampled, analyzed, and modeled to show that no residual COC concentrations in vadose zone soils pose an unacceptable threat to human health, groundwater, or the Columbia River. The 116-C-1 site is thus verified to be remediated and no longer poses an unacceptable threat to human health or the environment.

Images:

Pathname: [//mapweb.rl.gov/widsimg/100c/0029/0029_01.jpg](http://mapweb.rl.gov/widsimg/100c/0029/0029_01.jpg)

Date Taken: 6/16/1967

Description:

Negative 45222-11 cn.

Pathname: [//mapweb.rl.gov/widsimg/100c/0029/0029_02.jpg](http://mapweb.rl.gov/widsimg/100c/0029/0029_02.jpg)

Date Taken: 6/16/1967

Description:

Enlargement of burned area. Negative 45222-11 cn.

Pathname: [//mapweb.rl.gov/widsimg/100c/0029/0029_03.gif](http://mapweb.rl.gov/widsimg/100c/0029/0029_03.gif)

Date Taken: 6/1/1998

Description:

This figure shows the 116-C-1 Vicinity Map and Site Plan.

Pathname: [//mapweb.rl.gov/widsimg/100c/0029/0029_04.gif](http://mapweb.rl.gov/widsimg/100c/0029/0029_04.gif)

Date Taken: 6/2/1998

Description:

This figure shows the 116-C-1 Pre- and Post-Remediation Topographic Plans.

Pathname: [//mapweb.rl.gov/widsimg/100c/0029/0029_06.gif](http://mapweb.rl.gov/widsimg/100c/0029/0029_06.gif)

Date Taken: 6/2/1998

Description:

This figure shows the 116-C-1 North Face Overburden Sampling Areas.

Pathname: [//mapweb.rl.gov/widsimg/100c/0029/0029_07.gif](http://mapweb.rl.gov/widsimg/100c/0029/0029_07.gif)

Date Taken: 6/2/1998

Description:

This figure shows the 116-C-1 South Face Overburden Sampling Areas.

Site Code: 116-C-1

Site Reclassification Status: Interim Closed Out

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Pathname: [//mapweb.ri.gov/widsimg/100c/0029/0029_08.gif](http://mapweb.ri.gov/widsimg/100c/0029/0029_08.gif)

Date Taken: 6/2/1998

Description:

This figure shows the 116-C-1 Shallow Zone Sampling Areas.

Pathname: [//mapweb.ri.gov/widsimg/100c/0029/0029_09.gif](http://mapweb.ri.gov/widsimg/100c/0029/0029_09.gif)

Date Taken: 6/2/1998

Description:

This figure shows the 116-C-1 Deep Zone Sampling Areas.

Pathname: [//mapweb.ri.gov/widsimg/100c/0029/0029_10.gif](http://mapweb.ri.gov/widsimg/100c/0029/0029_10.gif)

Date Taken: 6/1/1998

Description:

This figure shows the 116-C-1 Site-Specific Verification Model.

References:

1. Design Basis for the 100 B/C, 100 D, and 100 H Remediation Project Group 1 Sites, 0100X-DB-G0001, Rev 0.
2. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
3. J. G. April, 3/15/1996, 100-B/C Demonstration Project Final Report, BHI-00752.
4. Bergstrom, K.A. and T.M. Mitchell, Geophysical Investigation of the 116-C-1 Liquid Waste Disposal Trench, 100-BC-1 Operable Unit, BHI-00613.
5. Shearer, Jeffrey with Glenn Van Sickle, 3/14/1997, Excavation of 116-C-1.
6. Alvin L. Langstaff, 2/8/1999, 100 Area Waste Site Excavations completed by 12-31-98.
7. V. R. Richards, 5/1/1991, WIDS Data Modifications; 116-B-8, 116-B-10, 116-C-1, 116-DR-1, 116-DR-2, 116-DR-8, 116-F-5, 116-F-7, 116-H-1, 118-D-2, 118-F-1, 118-F-5, 118-H-2, 118-K-1, 118-KE-2, 122-DR-1, 126-F-1, 132-F-6, 132-H-1, 132-H-3.
8. Richland Environmental Restoration Project Monthly Progress Report: November 1996.
9. M.H. Sturges, 1/25/1999, Transmittal of Signed 116-C-1 Waste Site Reclassification Form.
10. BHI, Cleanup Verification Package for the 116-C-1 Process Effluent Trench, CVP-98-00006, Rev 0.
11. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
12. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
13. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
14. U.S. Department of Energy, 1/1/1995, Proposed Plan for Interim Remedial Measures at the 100-BC-1 Operable Unit, DOE/RL-94-99.
15. 100 Area Source Operable Unit Focused Feasibility Study, DOE/RL-94-61.
16. 1/1/1993, Limited Field Investigation Report for the 100-BC-1 Operable Unit, DOE/RL-93-06, Rev 0.
17. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.
18. U.S. Department of Energy, 1/1/1997, Data Quality Objectives Summary Report for the 100-BC-1, 100-BC-2, 100-DR-1, and 100-DR-2 Group 3 Waste Sites, DOE/RL-96-111 .

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-C-2A**Site Reclassification Status:** Interim Closed Out

Page 1

Site Names: 116-C-2A; 105-C Crib; 105-C Pluto Crib; 116-C-2**Site Type:** Crib**Start Date:** 1/1/1952**Status:** Inactive**End Date:** 1/1/1969**Hanford Area:** 100C**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

This site has been remediated and closed out.

The pluto crib was constructed of concrete ties that were notched and stacked in a log cabin formation. Walls of concrete ties were constructed to divide the crib into 12 sections. Spaces between the ties were filled with sand. The crib was covered over by concrete roof slabs. A 20-centimeter (8-inch) well casing extended through the crib and ended 36 meters (118 feet) below grade.

Location Description:

The crib is located 275 feet east of the northeast corner of the 105-C Building

Site Comment:

This was the largest of the 100 Area Pluto Crib and was unique in that effluents passed through a settling tank and sand filter before being discharged to the crib. A 20-centimeter (8-inch) schedule 40 stainless steel pipe ran from the 105-C Reactor Building to the 116-C-2B Pump Station. From the pump station, waste flowed through a 10-centimeter (4-inch) clay vitrified pipe that led to the 116-C-2C Sand Filter. The pipe was around 1.2 meters (4 feet) below grade at its junction with the pump station and 0.9 meters (3 feet) below grade at its junction with the sand filter. A 20-centimeter (8-inch) clay vitrified pipe, located approximately 6.1 meters (20 feet) below grade, similarly led from the sand filter to the Pluto crib. The sand filter and Pluto Crib were 12.6 meters (41.5 feet) apart. Wastes were drained by gravity from the sand filter to the Pluto Crib. After decommissioning, the crib and a surrounding depression were filled to grade with gravel and sand.

Waste Information:**Type:** Process Effluent**Amount:** 7,500,000.00**Category:** Mixed**Units:** Liters**Physical State:** Liquid**Reported Date:****Start Date:** 1/1/1952**End Date:** 1/1/1969**Description:**

This unit was initially used for the disposal of reactor cooling effluent after fuel cladding failures. Unknown additional quantities of contaminated wastes included wash water from the decontamination of dummy fuel elements on the 105-C wash pad, contaminated water received from the 105-C Metal Examination Facility, and liquid wastes received from the 105-C Reactor rear face. Potential contaminants of concern include americium-241, plutonium-238/239/240, cobalt-60, cesium-137 and strontium-90. Reports vary as to the amounts of different chemicals disposed of at the Pluto Crib site. Two reports state that the crib contained 500 kilograms (1,100 pounds) of sodium dichromate, 1,000 kilograms (2,200 pounds) of sodium oxalate, and 1,000 kilograms (2,200 pounds) of sodium sulfamate. Another report, states that the crib contained 990 kilograms (2,180 pounds) of sodium dichromate, 2,100 kilograms (4,630 pounds) of sodium oxalate, and 6,600 kilograms (14,550 pounds) of sodium sulfamate. Sodium hydroxide and nitric acid were also believed to be disposed at the site. The total waste volume is listed as 7.5E+06 liters (1.98E+06 gallons).

References:

Site Code: 116-C-2A**Site Reclassification Status: Interim Closed Out**

Page 2

1. 11/5/1996, Design Basis for the Remedial Action of the 100 B/C and 100 D Group 3 Waste Sites, 0100X-DB-G0003.
2. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
3. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Dimensions:

Length:	6.78 Meters	22.25 Feet
Width:	4.66 Meters	15.30 Feet
Depth/Height:	5.10 Meters	16.73 Feet
Overburden Depth:	6.10 Meters	20.00 Feet
Sq. Area:	83.61 Square Meters	900.00 Square Feet
Site Shape:	Not Specified	

Comments:

Previously, the depth was recorded to be 7.92 meters (26.00 ft) (Carpenter, 1994). The dimensions above show the extent of contamination and excavation.

References:

1. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
2. 4/1/2000, Cleanup Verification Package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, 116-C-2C San Filter, and Overburden Soils from Group 3 Sites at the 100-B/C Area, CVP-99-00019, Rev 0.

Field Work:

Type: Analytical Sampling
Begin Date: 5/17/1999
End Date: 7/1/1999
Purpose: Cleanup Verification

Comment:

The cleanup verification package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, & 116-C-2C Sand Filter were combined into a single remediation area and are hereinafter referred to as the 116-C-2ABC site. The overburden was removed from the 116-C-2ABC, 116-B-2, 116-B-3, 116-B-4, 116-B-9 and 116-B-12 waste sites located in the 100-BC-1 and 100-BC-2 Operable units. The contaminants of concern for the site (116-C-2ABC) were americium-241, cesium-137, cobalt-60, europium-152, 154 & 155, plutonium 238 & 239/240, strontium-90 and uranium-238. For the overburden material, uranium 233/234 was also a contaminant of concern. For the overburden, eight samples (B0VFL1-6, B0VFM3, 4), plus one duplicate (B0VFM5), one split (B0VFL7) and one equipment blank (B0VFM4) were taken. For the shallow zone eight samples (B0VN26-29, B0VN31-34), plus one duplicate (B0VN30), one split (B0VN37) and one equipment blank (B0VN35) were taken. For the deep zone three samples (B0VHK5, 6, 8), plus one duplicate (B0VHK7), and one split (B0VHK9) were taken. Results of the sampling, testing, and analyses for the 116-C-2ABC site and BC Overburden indicate that all remedial action objectives and goals for direct exposure, protection of groundwater, and protection of surface waters (including the Columbia River) have been met.

References:

1. 4/1/2000, Cleanup Verification Package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, 116-C-2C San Filter, and Overburden Soils from Group 3 Sites at the 100-B/C Area, CVP-99-00019, Rev 0.

Regulatory Information:

Site Code: 116-C-2A

Site Reclassification Status: Interim Closed Out

Page 3

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit: No **TSD Number:**
RCRA Part A Permit: No **Closure Plan:** No
RCRA Permit Status: Not Specified
Septic Permit: No **216/218 Permit:**
Inert LandFill: No **NPDES:**
Air Operating Permit: No **State Waste Discharge Permit:**
Air Operating Permit Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Decision Document: Amendment to the Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1997)
Decision Document Status: Final
Closure Document: Cleanup Verification Package (CVP)
Closure Type: Not Specified

Post Closure Requirments:

Revegetation; institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet))

Closure Group:

Closure Group Name: CG 116-C-2A, 116-C-2B and 116-C-2C
Type: Interim
Reclassification Status: Prepared **Reclassified On:** 3/15/2000

Remediation Action:

The cleanup verification package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, & 116-C-2C Sand Filter were combined into a single remediation area and are hereinafter referred to as the 116-C-2ABC site. The overburden was removed from the 116-C-2ABC, 116-B-2, 116-B-3, 116-B-4, 116-B-9 and 116-B-12 waste sites located in the 100-BC-1 and 100-BC-2 Operable units. Excavation of the 116-C-2ABC site began on March 3, 1999, by removing the overburden materials, contaminated structures, and underlying contaminated soil. Based on field screening, materials identified as potentially clean were placed in stockpiles for potential use as backfill. Materials that were found to be contaminated have been disposed of at ERDF. On May 7, 1999, the excavation

Site Code: 116-C-2A**Site Reclassification Status: Interim Closed Out**Page 4

had reached the design limit at El. 141.36 meters (464 ft). Cleanup verification sampling began on May 17, 1998 and was finished on July 1, 1999.

In accordance with the Interim Action Record of Decision for the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units (ROD) (EPA 1995), the remedial actions were performed so as to allow future land uses at the site that can be represented (or bounded) by a rural-residential exposure scenario. The scenario assumes multiple exposure pathways for shallow zone soils (e.g., ingestion and inhalation) and no contact with or exposure to deep zone soils (e.g., below 4.6 meters [15 feet]); institutional controls will be required to prevent drilling or excavation into the deep zone.

At the completion of the remedial action, the area of the excavation was approximately 2,516 square meters (27,728 square feet) at a maximum depth of approximately 9.15 meters (30 feet). Approximately 15,939 metric tons (17,570 tons) of material were disposed of at ERDF. Approximately 2,000 cubic meters (70,629 cubic feet) of overburden was set aside from the 116-C-2ABC site as potentially clean. The excavation will be backfilled in the near future (written April 6, 2000) with clean fill materials to the reference grade of El. 150.5 meters (494 feet).

Results of the sampling, testing, and analyses for the 116-C-2ABC site and BC Overburden indicate that all remedial action objectives and goals for direct exposure, protection of groundwater, and protection of surface waters (including the Columbia River) have been met.

Excavated Material:

Quantity: 15,939.00
Unit Type: Metric Tons
Disposition: Environmental Restoration Disposal Facility

Cleanup Verification:**Institutional Controls:**

Institutional controls will be required to prevent drilling or excavation into the deep zone without appropriate measures to protect human health and the environment.

Statement Of Protectiveness:

This verification package demonstrates that remedial action at the 116-C-2A,B,C sites have achieved the RAOs and corresponding RAGs established in the approved interim action ROD (EPA 1995) and RDR/RAWP (DOE-RL 1998b). The package also demonstrates that BC Overburden materials meet these same RAGs. Materials from the 116-C-2ABC site that contain COCs at concentrations exceeding the RAGs have been excavated and disposed of at the ERDF. The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. This scenario assumes multiple exposure pathways (e.g., ingestion, inhalation, direct exposure) for shallow zone soils and no contact with or exposure to deep zone soils (i.e., below 4.6 meters [15 ft]); therefore institutional controls will be required to prevent drilling or excavation into the deep zone without appropriate measures to protect human health and the environment. The evaluations also demonstrate that residual COC concentrations pose no threat to groundwater or the Columbia River. The 116-C-2ABC site is thus verified to be remediated and may be backfilled with BC Overburden or other clean materials.

Images:

Pathname: [//mapweb.rl.gov/widsimg/100c/0030/0030_01.jpg](http://mapweb.rl.gov/widsimg/100c/0030/0030_01.jpg)

Date Taken:

Description:

Pluto crib is the area within yellow steel posts.

References:

1. 11/5/1996, Design Basis for the Remedial Action of the 100 B/C and 100 D Group 3 Waste Sites, 0100X-DB-G0003.
2. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
3. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
4. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
5. 4/1/2000, Cleanup Verification Package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, 116-C-2C Sand Filter, and Overburden Soils from Group 3 Sites at the 100-B/C Area, CVP-99-00019, Rev 0.
6. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-C-2B**Site Reclassification Status:** Interim Closed Out

Page 1

Site Names: 116-C-2B; 116-C-2B Pump Station; 105-C Pluto Crib Pump Station; 116-C-2-1**Site Type:** Pump Station**Start Date:** 1/1/1952**Status:** Inactive**End Date:** 1/1/1969**Hanford Area:** 100C**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

This site has been remediated and interim closed out. This unit was a rectangular shaped, concrete sump. A diamond-plate steel access hole cover was located in the northwest corner, and a vent was located at the east end. The site included all underground pipelines between the 105-C Reactor and the 116-C-2C Sand Filter.

Location Description:

The site was located northwest of the 116-C-2C Sand Filter.

Associated Structures:

The associated structures were the 116-C-2A Pluto Crib, 116-C-2C Sand Filter, and the 105-C Reactor.

Waste Information:**Type:** Process Effluent**Amount:****Category:** Mixed**Units:** Not Specified**Physical State:** Liquid**Reported Date:****Description:**

The unit received waste from the 105-C Reactor and pumped it into the 116-C-2C (105-C Pluto Crib Sand Filter

References:

1. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC-SD-EN-TI-220.

Dimensions:**Length:** 3.05 Meters 10.00 Feet**Width:** 2.94 Meters 9.66 Feet**Depth/Height:** 9.14 Meters 30.00 Feet**Sq. Area:** 18.58 Square Meters 200.00 Square Feet**Site Shape:** Not Specified**References:**

1. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

2. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

Field Work:**Type:** Geophysical Survey**Begin Date:** 12/15/1998

Site Code: 116-C-2B

Site Reclassification Status: Interim Closed Out

Page 2

End Date: 12/15/1998

Purpose: Map pipes and utilities and other unknowns

Comment:

Several pipelines/utilities were detected within the survey area. At one point, an anomaly was detected that had the characteristics of a burial structure with a flat top.

References:

1. Kevin Bergstrom, Tom Mitchell, 12/15/1998, ERC Geophysical Investigation Summary, 116-C-2B Pluto Crib Pump Station.

Type: Analytical Sampling

Begin Date: 5/17/1999

End Date: 7/1/1999

Purpose: Cleanup Verification

Comment:

The cleanup verification package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, & 116-C-2C Sand Filter were combined into a single remediation area and are hereinafter referred to as the 116-C-2ABC site. The overburden was removed from the 116-C-2ABC, 116-B-2, 116-B-3, 116-B-4, 116-B-9 and 116-B-12 waste sites located in the 100-BC-1 and 100-BC-2 Operable units. The contaminants of concern for the site (116-C-2ABC) were americium-241, cesium-137, cobalt-60, europium-152, 154 & 155, plutonium 238 & 239/240, strontium-90 and uranium-238. For the overburden material, uranium 233/234 was also a contaminant of concern. For the overburden, eight samples (B0VFL1-6, B0VFM3, 4), plus one duplicate (B0VFM5), one split (B0VFL7) and one equipment blank (B0VFM4) were taken. For the shallow zone eight samples (B0VN26-29, B0VN31-34), plus one duplicate (B0VN30), one split (B0VN37) and one equipment blank (B0VN35) were taken. For the deep zone three samples (B0VHK5, 6, 8), plus one duplicate (B0VHK7), and one split (B0VHK9) were taken.

References:

1. 4/1/2000, Cleanup Verification Package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, 116-C-2C San Filter, and Overburden Soils from Group 3 Sites at the 100-B/C Area, CVP-99-00019, Rev 0.

Type: GPS Surveys

Begin Date: 1/6/1999

End Date: 1/6/1999

Purpose: to map GPR stakes

Comment:

Four stakes from a GPR investigation were gps-ed. The four corners of the lid were also surveyed at this time. The reference for this task is an electronic file found under \\BHI002\hgis-gps\job-217. Also, the DIS CCN is 0510362.

Regulatory Information:

Programmatic Responsibility

Responsible

Contractor/Subcontractor: WCH Washington Closure Hanford

Reclassifying

Contractor/Subcontractor: None

Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes

Site Code: 116-C-2B

Site Reclassification Status: Interim Closed Out

Page 3

TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit :	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
		State Waste	
Air Operating Permit:	No	Discharge Permit:	
Air Operating Permit			
Number(s):			

Tri-Party Agreement

Lead Regulatory Agency:	EPA
Unit Category:	CERCLA Past Practice (CPP)
TPA Appendix :	C

Remediation and Closure

Decision Document:	Amendment to the Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1997)
Decision Document Status:	Final
Closure Document:	Cleanup Verification Package (CVP)
Closure Type:	Not Specified

Post Closure Requirments:

Revegetation; institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet))

Closure Group:

Closure Group Name:	CG 116-C-2A, 116-C-2B and 116-C-2C		
Type:	Interim		
Reclassification Status:	Prepared	Reclassified On:	3/15/2000

Remediation Action:

The cleanup verification package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, & 116-C-2C Sand Filter were combined into a single remediation area and are hereinafter referred to as the 116-C-2ABC site. The overburden was removed from the 116-C-2ABC, 116-B-2, 116-B-3, 116-B-4, 116-B-9 and 116-B-12 waste sites located in the 100-BC-1 and 100-BC-2 Operable units. Excavation of the 116-C-2ABC site began on March 3, 1999, by removing the overburden materials, contaminated structures, and underlying contaminated soil. Based on field screening, materials identified as potentially clean were placed in stockpiles for potential use as backfill. Materials that were found to be contaminated have been disposed of at ERDF. On May 7, 1999, the excavation had reached the design limit at El. 141.36 meters (464 ft). Cleanup verification sampling began on May 17, 1999 and was finished on July 1, 1999.

In accordance with the Interim Action Record of Decision for the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units (ROD) (EPA 1995), the remedial actions were performed so as to allow future land uses at the site that can be represented (or bounded) by a rural-residential exposure scenario. The scenario assumes multiple exposure pathways for shallow zone soils (e.g., ingestion and inhalation) and no contact with or exposure to deep zone soils (e.g., below 4.6 meters [15 feet]); institutional controls will be required to prevent drilling or excavation into the deep zone.

At the completion of the remedial action, the area of the excavation was approximately 2,516 square meters

Site Code: 116-C-2B**Site Reclassification Status: Interim Closed Out**

Page 4

(27,728 square feet) at a maximum depth of approximately 9.15 meters (30 feet). Approximately 15,939 metric tons (17,570 tons) of material were disposed of at ERDF. Approximately 2,000 cubic meters (70,629 cubic feet) of overburden was set aside from the 116-C-2ABC site as potentially clean. The excavation will be backfilled in the near future (written April 6, 2000) with clean fill materials to the reference grade of El. 150.5 meters (494 feet).

Results of the sampling, testing, and analyses for the 116-C-2ABC site and BC Overburden indicate that all remedial action objectives and goals for direct exposure, protection of groundwater, and protection of surface waters (including the Columbia River) have been met.

Excavated Material:

Quantity: 15,939.00
Unit Type: Metric Tons
Disposition: Environmental Restoration Disposal Facility

Cleanup Verification:**Institutional Controls:**

Institutional controls will be required to prevent drilling or excavation into the deep zone without appropriate measures to protect human health and the environment.

Statement Of Protectiveness:

This verification package demonstrates that remedial action at the 116-C-2A,B,C sites have achieved the RAOs and corresponding RAGs established in the approved interim action ROD (EPA 1995) and RDR/RAWP (DOE-RL 1998b). The package also demonstrates that BC Overburden materials meet these same RAGs. Materials from the 116-C-2ABC site that contain COCs at concentrations exceeding the RAGs have been excavated and disposed of at the ERDF. The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. This scenario assumes multiple exposure pathways (e.g., ingestion, inhalation, direct exposure) for shallow zone soils and no contact with or exposure to deep zone soils (i.e., below 4.6 meters [15 ft]); therefore institutional controls will be required to prevent drilling or excavation into the deep zone without appropriate measures to protect human health and the environment. The evaluations also demonstrate that residual COC concentrations pose no threat to groundwater or the Columbia River. The 116-C-2ABC site is thus verified to be remediated and may be backfilled with BC Overburden or other clean materials.

Images:

Pathname: [//mapweb.rl.gov/widsimg/100c/0031/0031_01.jpg](http://mapweb.rl.gov/widsimg/100c/0031/0031_01.jpg)

Date Taken: 1/6/1999

Description:

This photo was taken looking east towards the site.

References:

1. Kevin Bergstrom, Tom Mitchell, 12/15/1998, ERC Geophysical Investigation Summary, 116-C-2B Pluto Crib Pump Station.
2. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
3. K. A. Gano, 6/3/1987, Designation Numbers for UNC Controlled Waste Sites in the 100 Areas, UNI-4433.
4. 4/1/2000, Cleanup Verification Package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, 116-C-2C Sand Filter, and Overburden Soils from Group 3 Sites at the 100-B/C Area, CVP-99-00019, Rev 0.
5. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.
6. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-C-2C**Site Reclassification Status:** Interim Closed Out

Page 1

Site Names: 116-C-2C; 116-C-8; 105-C Pluto Crib Sand Filter; 116-C-2-2**Site Type:** Sand Filter**Start Date:** 1/1/1952**Status:** Inactive**End Date:** 1/1/1969**Hanford Area:** 100C**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

This site has been remediated and closed out. The structure was an open-bottom concrete box placed in a sand and gravel pit. It was covered with concrete shielding slabs. Contaminated water was spread over the surface of the sand filter media by distribution trays. The site included the underground pipelines from the 105-C Pluto Crib Sand Filter to the 116-C-2A Pluto Crib.

Location Description:

The site is located west of the 116-C-2A (105-C Pluto Crib).

Process Description:

Effluent passed through this filter prior to being discharged to the soil column of the 116-C-2 Crib.

Associated Structures:

This unit was associated with 116-C-2A (105-C Pluto Crib) and 116-C-2B (105-C Pluto Crib Pump Station).

Site Comment:

The 105-C Pluto Crib sand filter contained about 10 times the level of residual radioactivity than any of the other pluto cribs sampled in 1976. Direct dose readings of the filter media surface ranged from 80 to 450 mR/hr. Alpha readings of the filter media surface using a PAM were 20,000 d/m. The high levels of radioactivity were attributed to contaminated liquid wastes received from the 105-C irradiated fuel examination facility.

Waste Information:**Type:** Process Effluent**Amount:** 7,500,000.00**Category:** Mixed**Units:** Liters**Physical State:** Liquid**Reported Date:****Description:**

The 105-C Pluto crib sand filter was sampled and surveyed between 2/6/76 and 4/5/76. Based on sample results, the sand filter contains an estimated radioactive inventory of 260 curies (Table 3.4-9, page 3-30, UNI-946) in 90,000 cubic feet of soil (about 6,100,000 Kg). Beta-gamma concentrations in the sand filter averaged 42,000 pCi/g with a maximum value reported of 7,300,000 pCi/g in a sample taken from an inlet distribution tray. Radioactivity in this sample was primarily due to cobalt-60 although high levels of strontium-90 (29,000 pCi/g) and cesium-137 (140,000 pCi/g) were present as well. This sample also contained 1,500 pCi/g plutonium-239/240. The average concentration of plutonium-239/240 in the sand filter was reported to be about 20 pCi/g for the entire mass of potentially contaminated soil column. Sample analyses for the sand filter are presented in Table 3.4-7 (page 3-28, UNI-946) by Dorian and Richards. The site may have received contaminated wastes from the decontamination of dummy fuel elements on the wash pad. Americium-241 is another potential contaminant of concern.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive

Site Code: 116-C-2C**Site Reclassification Status: Interim Closed Out**

Page 2

Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

2. Dorian and Richards, 5/26/1978, Radiological Characterization of the Retired 100 Areas, UNI-946.

3. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

Dimensions:

Length:	12.65 Meters	41.50 Feet
Width:	5.49 Meters	18.00 Feet
Depth/Height:	5.49 Meters	18.00 Feet
Sq. Area:	34.19 Square Meters	368.00 Square Feet
Site Shape:	Not Specified	

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

2. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

3. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

Field Work:

Type: Analytical Sampling
Begin Date: 5/17/1999
End Date: 7/1/1999
Purpose: Cleanup Verification

Comment:

The cleanup verification package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, & 116-C-2C Sand Filter were combined into a single cleanup verification area and are hereinafter referred to as the 116-C-2ABC site. The overburden was removed from the 116-C-2ABC, 116-B-2, 116-B-3, 116-B-4, 116-B-9 and 116-B-12 waste sites located in the 100-BC-1 and 100-BC-2 Operable units.

The contaminants of concern for the site (116-C-2ABC) were americium-241, cesium-137, cobalt-60, europium-152, 154 & 155, plutonium 238 & 239/240, strontium-90, and uranium-238. For the overburden material, uranium 233/234 was also a contaminant of concern. For the overburden, eight samples (BOVFL1-6, BOVFM3, 4), plus one duplicate (BOVFM5), one split (BOVFL7) and one equipment blank (BOVFM4) were taken. For the shallow zone eight samples (BOVN26-29, BOVN31-34), plus one duplicate (BOVN30), one split (BOVN37) and one equipment blank (BOVN35) were taken. For the deep zone three samples (BOVHK5, 6, 8), plus one duplicate (BOVHK7), and one split (BOVHK9) were taken.

Results of the sampling, testing, and analyses for the 116-C-2ABC site and BC Overburden indicate that all remedial action objectives and goals for direct exposure, protection of groundwater, and protection of surface waters (including the Columbia River) have been met.

References:

1. 4/1/2000, Cleanup Verification Package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, 116-C-2C San Filter, and Overburden Soils from Group 3 Sites at the 100-B/C Area, CVP-99-00019, Rev 0.

Type: Geophysical Survey
Begin Date: 12/15/1998
End Date: 12/15/1998
Purpose: Map pipes and utilities associated with site

Comment:

Site Code: 116-C-2C**Site Reclassification Status: Interim Closed Out**

Page 3

Several linears (pipes/utilities) were detected within the survey area. At one point, an anomaly was detected that has the characteristics of a buried structure with a flat top.

References:

1. Kevin Bergstrom, Tom Mitchell, 12/15/1998, ERC Geophysical Investigation Summary, 116-C-2C Pluto Crib Sand Filter.

Type: GPS Surveys
Begin Date: 1/6/1999
End Date: 1/6/1999
Purpose: to map GPR stakes

Comment:

The post and chain barrier around this site was mapped. The reference for this task is an electronic file found under \\BHI002\hgis-gps\job-217. Also, the DIS CCN is 0510362.

Regulatory Information:**Programmatic Responsibility**

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit: No **TSD Number:**
RCRA Part A Permit: No **Closure Plan:** No
RCRA Permit Status: Not Specified
Septic Permit: No **216/218 Permit:**
Inert LandFill: No **NPDES:**
Air Operating Permit: No **State Waste Discharge Permit:**
Air Operating Permit Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Decision Document: Amendment to the Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1997)
Decision Document Status: Final
Closure Document: Cleanup Verification Package (CVP)
Closure Type: Not Specified

Site Code: 116-C-2C**Site Reclassification Status: Interim Closed Out**Page 4

Post Closure Requirments:

Revegetation; institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet))

Closure Group:

Closure Group Name: CG 116-C-2A, 116-C-2B and 116-C-2C
Type: Interim
Reclassification Status: Prepared **Reclassified On:** 3/15/2000

Remediation Action:

The cleanup verification package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, & 116-C-2C Sand Filter were combined into a single remediation area and are hereinafter referred to as the 116-C-2ABC site. The overburden was removed from the 116-C-2ABC, 116-B-2, 116-B-3, 116-B-4, 116-B-9 and 116-B-12 waste sites located in the 100-BC-1 and 100-BC-2 Operable units. Excavation of the 116-C-2ABC site began on March 3, 1999, by removing the overburden materials, contaminated structures, and underlying contaminated soil. Based on field screening, materials identified as potentially clean were placed in stockpiles for potential use as backfill. Materials that were found to be contaminated have been disposed of at ERDF. On May 7, 1999, the excavation had reached the design limit at El. 141.36 meters (464 ft). Cleanup verification sampling began on May 17, 1999 and was finished on July 1, 1999.

In accordance with the Interim Action Record of Decision for the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units (ROD) (EPA 1995), the remedial actions were performed so as to allow future land uses at the site that can be represented (or bounded) by a rural-residential exposure scenario. The scenario assumes multiple exposure pathways for shallow zone soils (e.g., ingestion and inhalation) and no contact with or exposure to deep zone soils (e.g., below 4.6 meters [15 feet]); institutional controls will be required to prevent drilling or excavation into the deep zone.

At the completion of the remedial action, the area of the excavation was approximately 2,516 square meters (27,728 square feet) at a maximum depth of approximately 9.15 meters (30 feet). Approximately 15,939 metric tons (17,570 tons) of material were disposed of at ERDF. Approximately 2,000 cubic meters (70,629 cubic feet) of overburden was set aside from the 116-C-2ABC site as potentially clean. The excavation will be backfilled in the near future (written April 6, 2000) with clean fill materials to the reference grade of El. 150.5 meters (494 feet).

Results of the sampling, testing, and analyses for the 116-C-2ABC site and BC Overburden indicate that all remedial action objectives and goals for direct exposure, protection of groundwater, and protection of surface waters (including the Columbia River) have been met.

Excavated Material:

Quantity: 15,939.00
Unit Type: Metric Tons
Disposition: Environmental Restoration Disposal Facility

Cleanup Verification:**Institutional Controls:**

Institutional controls will be required to prevent drilling or excavation into the deep zone without appropriate measures to protect human health and the environment.

Statement Of Protectiveness:

This verification package demonstrates that remedial action at the 116-C-2A,B,C sites have achieved the RAOs and corresponding RAGs established in the approved interim action ROD (EPA 1995) and RDR/RAWP (DOE-RL

1998b). The package also demonstrates that BC Overburden materials meet these same RAGs. Materials from the 116-C-2ABC site that contain COCs at concentrations exceeding the RAGs have been excavated and disposed of at the ERDF. The remaining soils have been sampled, analyzed, and modeled to show that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario. This scenario assumes multiple exposure pathways (e.g., ingestion, inhalation, direct exposure) for shallow zone soils and no contact with or exposure to deep zone soils (i.e., below 4.6 meters [15 ft]); therefore institutional controls will be required to prevent drilling or excavation into the deep zone without appropriate measures to protect human health and the environment. The evaluations also demonstrate that residual COC concentrations pose no threat to groundwater or the Columbia River. The 116-C-2ABC site is thus verified to be remediated and may be backfilled with BC Overburden or other clean materials.

Images:

Pathname: [//mapweb.ri.gov/widsimg/100c/0032/0032_01.jpg](http://mapweb.ri.gov/widsimg/100c/0032/0032_01.jpg)

Date Taken: 1/16/1997

Description:

Sand filter sampling.

Pathname: [//mapweb.ri.gov/widsimg/100c/0032/0032_02.jpg](http://mapweb.ri.gov/widsimg/100c/0032/0032_02.jpg)

Date Taken: 1/16/1997

Description:

Sand Filter Sampling.

Pathname: [//mapweb.ri.gov/widsimg/100c/0032/0032_03.jpg](http://mapweb.ri.gov/widsimg/100c/0032/0032_03.jpg)

Date Taken: 1/16/1997

Description:

View of Sand Filter feed pipe.

Pathname: [//mapweb.ri.gov/widsimg/100c/0032/0032_04.jpg](http://mapweb.ri.gov/widsimg/100c/0032/0032_04.jpg)

Date Taken: 1/6/1999

Description:

This photo was taken looking east towards the site.

References:

1. Kevin Bergstrom, Tom Mitchell, 12/15/1998, ERC Geophysical Investigation Summary, 116-C-2C Pluto Crib Sand Filter.
2. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
3. Dorian and Richards, 5/26/1978, Radiological Characterization of the Retired 100 Areas, UNI-946.
4. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
5. 4/1/2000, Cleanup Verification Package for the 116-C-2A Pluto Crib, 116-C-2B Pump Station, 116-C-2C Sand Filter, and Overburden Soils from Group 3 Sites at the 100-B/C Area, CVP-99-00019, Rev 0.
6. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.
7. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-C-3**Site Reclassification Status:** Interim Closed Out

Page 1

Site Names: 116-C-3; 105-C Chemical Waste Tanks**Site Type:** Storage Tank**Start Date:** 1/1/1964**Status:** Inactive**End Date:** 1/1/1969**Hanford Area:** 100C**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

The site has been remediated, backfilled, and revegetated. Before remediation the site consisted of two below-grade chemical waste storage tanks, designed to receive and store chemical waste from the 105-C Reactor Metals Examination Facility (MEF) dejacketing process.

Location Description:

The site was located approximately 100 m (330 ft) northeast of the 105-C Reactor safe storage enclosure, just outside the exclusion area fence.

Process Description:

The tanks were originally installed to receive liquid wastes from the 105-C Metal Examination Facility (MEF), which was part of the 105-C Reactor Building, and was used to examine and test irradiated fuel elements. Examination included chemical dejacketing of the fuel slugs, which consisted of two cycles of immersing the fuel slugs in a 50% sodium hydroxide solution, draining the resulting solution, and rinsing the dejacketed slugs with water. The slugs were then cleaned with a 10% nitric acid solution, followed with multiple water rinses. Each of the waste tanks was approximately 3.5 m (11.5 ft) in diameter, and approximately 10.9 m (36 ft) in length, with a nominal capacity of 102,200 L (27,000 gal). The long axis of each tank was oriented east-west on a horizontal plane, with one tank located north of the other. The crests of the tanks were located approximately 3.4 m (11 ft) below existing grade, with centerlines spaced approximately 6.2 m (20 ft) apart. Waste was discharged to the tanks from the 105-C MEF via a 5-cm (2-in.) stainless-steel pipeline connected to top-feed distribution piping at the tanks. This discharge line was included in the 100-C-6:1 subsite as Pipeline 31 and was removed up to a point immediately upstream of the discharge to the southern 116-C-3 tank (BHI 2004c). Multiple additional small-diameter pipelines were also connected to the tops of the tanks, including vent risers, overflow lines, and conduits for the cathodic protection system used for corrosion control.

Associated Structures:

The site is associated with the 105-C Reactor Building.

Site Comment:

In July 2000, the vent risers were sealed as a preventative measure for potential passive radioactive emissions. A valve bypass line connected the 105-C Metal Examination Facility to the chemical storage tanks. If the drainage system from the facility was to become over-pressurized, effluents would bypass the valve and be released to the tanks. As a result, the potential exists for chemical contaminants to be present in the chemical storage tanks.

Institutional Control (IC) requirements were revised by DOE letter 05-AMRC-0078 on 1/4/2005.

Dimensions:

Length:	10.97 Meters	36.00 Feet
Depth/Height:	3.35 Meters	11.00 Feet
Diameter:	3.51 Meters	11.50 Feet

Site Code: 116-C-3**Site Reclassification Status: Interim Closed Out**

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Sq. Area:	524.50	Square Meters	5645.67	Square Feet
Capacity:	102,206.13	Liters	27000.00	Gallons
Site Shape:	Square			

Comments:

Each of the waste tanks was approximately 3.5 m (11.5 ft) in diameter, and approximately 10.9 m (36 ft) in length, with a nominal capacity of 102,200 L (27,000 gal). The long axis of each tank was oriented east-west on a horizontal plane, with one tank located north of the other. The crests of the tanks were located approximately 3.4 m (11 ft) below existing grade, with centerlines spaced approximately 6.2 m (20 ft) apart.

Diameter:	3.66	Meters	12.00	Feet
Capacity:	51,103.06	Liters	13500.00	Gallons
Site Shape:	Not Specified			

Comments:

Each of the waste tanks was approximately 3.5 m (11.5 ft) in diameter, and approximately 10.9 m (36 ft) in length, with a nominal capacity of 102,200 L (27,000 gal). The long axis of each tank was oriented east-west on a horizontal plane, with one tank located north of the other. The crests of the tanks were located approximately 3.4 m (11 ft) below existing grade, with centerlines spaced approximately 6.2 m (20 ft) apart.

References:

1. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC-SD-EN-TI-220.

Field Work:

Type:	Geophysical Survey
Begin Date:	2/1/2003
End Date:	2/1/2003
Purpose:	Investigation

Comment:

Two parallel features and one anomalous zone were identified. It is believed these features represent the tank locations.

References:

1. Tom Mitchell, Kevin Bergstrom, 2/20/2003, Geophysical Site Investigation Forms for February 2003.

Type:	Site Walkdown
Begin Date:	3/21/2000
End Date:	3/21/2000
Purpose:	location verification

Comment:

Brief notes were taken during a GPS survey.

References:

1. K.A. Prosser, 6/30/1999, Field Logbook, EL-1388-1.

Type:	GPS Surveys
Begin Date:	3/21/2000
End Date:	3/21/2000
Purpose:	location verification

Site Code: 116-C-3

Site Reclassification Status: Interim Closed Out

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Comment:

The area surrounded by the yellow posts and labeled "116-C-3 Chemical Waste Tanks" was GPSed. The reference for this task is an electronic file found under \\BHI002\hgis-gps\job-332. The DIS CCN for this survey 0515437.

Type: Analytical Sampling
Begin Date: 3/28/2003
End Date: 3/28/2003
Purpose: Evaluation

Comment:

Sampling for Phase 2 indicate that the tanks were likely used, further evaluation of the tanks will need to be done. RCF sample results for J00K72, J00K73, J00NJ4, J00NJ6, J00NJ7 and J00NJ8 are in HEIS.

References:

1. 5/27/2003, Waste Site Evaluation for 116-C-3 Chemical Waste Tanks, 0100B-CA-V0120, Rev 1.

Regulatory Information:**Programmatic Responsibility**

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Other Storage Area

Permitting

RCRA Part B Permit: No **TSD Number:**
RCRA Part A Permit: No **Closure Plan:** No
RCRA Permit Status: Not Specified
Septic Permit: No **216/218 Permit:**
Inert LandFill: No **NPDES:**
Air Operating Permit: No **State Waste Discharge Permit:**
Air Operating Permit Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Decision Document: Interim Action Record of Decision, 100 Area Remaining Sites (1999)
Decision Document Status: Final
Closure Document: Remaining Sites Verification Package (RSVP)
Closure Type: Not Specified

Post Closure Requirements:

Institutional controls to prevent uncontrolled drilling or excavation into the deep zone of the site are required.

Closure Group:

Closure Group Name: CG 116-C-3

Type: Interim

Remediation Action:

The Remaining Sites Verification Package, (RSVP-2008-002) for the 116-C-3 waste site, has documented that the current site conditions have achieved the remedial action objectives (RAOs) and the corresponding remedial action goals (RAGs) as established in the Remedial Design Report/Remedial Action Work Plan (RDR/RAWP) for the 100 Area and the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, (Remaining Sites ROD).

The tanks were installed in 1955, conflicting reports existed as to their usage, for example, that the tanks were potentially unused. Remediation of the influent pipeline and confirmatory evaluation of the waste site in 2003 confirmed that the site had received radiological waste, and subsequent additional characterization in 2004 indicated that the southern tank was approximately one-third full of mixed waste consistent with the 105-C Reactor Metals Examination Facility (MEF) dejacketing process. The north tank was found to contain only a small volume of suspect condensate or residual water from pressure testing, as no significant radiological activity or metals concentrations were detected.

Remediation of the waste site was performed from February through December 2007. Initially, the overburden and surrounding soils were removed sufficiently to provide a sub-grade staging and operations area for waste treatment activities. During excavation, a small volume of radiologically-contaminated soil was encountered beneath the influent pipelines near the southern tank, and staged onsite in the waste staging pile area before disposal at the Environmental Restoration Disposal Facility (ERDF). A concrete pad unrelated to the 116-C-3 waste site was also partially demolished and removed from the northeastern corner of the operations area. Systematic global positioning system environmental radiological surveys (GPERS) were performed across each m (3 ft) lift of stockpiled overburden soil; no significant radiological activity was detected.

The COCs and COPCs for verification sampling were determined in consideration of process knowledge and characterization sampling results. Metals (including hexavalent chromium and mercury), nitrate, americium-241, carbon-14, plutonium-238, plutonium-239/240, strontium-90, tritium, uranium-233/234, uranium-235, uranium-238, cesium-137, cobalt-60, europium-152, europium-154, and europium-155 were considered COCs/COPCs for verification sampling.

Site remediation consisted of the removal and stockpiling of overburden material, followed by a proof-of-principle demonstration at the empty northern tank following the general treatment and remediation process planned for the southern tank. Subsequently, the southern tank was treated in accordance with an approved treatment plan, using chemical treatment to address the corrosivity characteristic of the waste and reduce hexavalent chromium to trivalent chromium, followed by physical treatment using in situ grout stabilization. Treatment verification sampling indicated that requirements had been met, and the treated tank was demolished and removed, along with approximately 1.5 m (5 ft) of underlying soil.

Treated material, demolition rubble, and approximately 1 m (3 ft) of soil underlying the tank was removed for disposal at ERDF. Initial soil samples from the tank footprint indicated residual hexavalent chromium concentrations above soil remedial action goals (RAGs) and elevated residual radiological activity. This information is in appendix A, Table A-2 of the RSVP. Therefore, an additional 0.7 m (2 ft) of soil was removed from the southern tank footprint and disposed at ERDF. Excavation at the site extended to a maximum depth of approximately 28 ft (8.5 m) below ground surface (bgs), and the footprints of the remediated waste tanks are entirely in the deep zone (greater than 4.6 m [15 ft] bgs). Approximately 3,767 metric tons (4,152 U.S. tons) of treated waste, debris, and soil was removed from the site and disposed at ERDF. Following verification of attainment of cleanup criteria, the site was backfilled and re-vegetated.

Remedial actions were performed so as to not preclude any future uses (as bounded by the rural-residential

scenario), and to allow unrestricted use of shallow-zone soils (i.e., surface to 4.6 m [15 ft] deep). Following site remediation, verification sampling of overburden material and soil within the remediation and waste staging pile area footprints was conducted in October and December 2007. The results indicated that the waste removal action achieved compliance with the remedial action objectives. The results of the verification sampling were used to make reclassification decisions for the site in accordance with the Tri-Party Agreement Handbook Management Procedures, TPA-MP-14 procedure.

All characterization samples were analyzed at offsite commercial laboratories; results were stored in the Environmental Restoration (ENRE) project-specific database prior to being provided to the Hanford Environmental Information System (HEIS) and were provided in Appendix A of the RSVP-2008-022.

Verification samples were analyzed using U.S. Environmental Protection Agency-approved analytical methods. The results of verification sampling show that residual contaminant concentrations do not preclude any future uses (as bounded by the rural-residential scenario) and allow for unrestricted use of shallow-zone soils (i.e., surface to 4.6 m [15 ft] deep). The results also demonstrate that residual contaminant concentrations are protective of groundwater and the Columbia River. The verification sampling results support a reclassification to Interim Closed Out. The acceptability of direct exposure to residual deep-zone contamination has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone the site are required.

Institutional Controls:

Institutional controls to prevent uncontrolled drilling or excavation into the deep zone of the site are required.

Images:

Pathname: [//mapweb.ri.gov/widsimg/100c/0033/0033_01.jpg](http://mapweb.ri.gov/widsimg/100c/0033/0033_01.jpg)

Date Taken: 3/21/2000

Description:

Here's a view of the tank area looking east.

Pathname: [//mapweb.ri.gov/widsimg/100c/0033/0033_02.jpg](http://mapweb.ri.gov/widsimg/100c/0033/0033_02.jpg)

Date Taken: 3/21/2000

Description:

Here's another view of the risers in the tank area. This photo was taken looking northeast.

Pathname: [//mapweb.ri.gov/widsimg/100C/0033/0033_03.JPG](http://mapweb.ri.gov/widsimg/100C/0033/0033_03.JPG)

Date Taken: 3/1/2007

Description:

Chemical Tanks Following Removal of Overburden and Adjacent Soil, View to Southeast .

Pathname: [//mapweb.ri.gov/widsimg/100C/0033/0033_04.JPG](http://mapweb.ri.gov/widsimg/100C/0033/0033_04.JPG)

Date Taken: 3/1/2007

Description:

Chemical Tanks Following Removal of Overburden and Adjacent Soil, View to Southeast .

Pathname: [//mapweb.ri.gov/widsimg/100C/0033/0033_05.JPG](http://mapweb.ri.gov/widsimg/100C/0033/0033_05.JPG)

Date Taken: 12/1/2007

Description:

Demolition of the Treated 116-C-3 Southern Tank, View to Northeast .

Pathname: [//mapweb.ri.gov/widsimg/100C/0033/0033_06.JPG](http://mapweb.ri.gov/widsimg/100C/0033/0033_06.JPG)

Date Taken: 12/1/2007

Description:

Waste Site Following Backfill and Re-vegetation, View to Southwest.

References:

1. 5/27/2003, Waste Site Evaluation for 116-C-3 Chemical Waste Tanks, 0100B-CA-V0120, Rev 1.

2. WM Hayward, 8/1/2000, Final Report for Isolation of Potential Passive Vents at RARA Project Sites, BHI-01413.
3. Tom Mitchell, Kevin Bergstrom, 2/20/2003, Geophysical Site Investigation Forms for February 2003.
4. U. S. AEC: Safety and Quality Assurance Division, 7/1/1974, Historical Summary of Inventory of Hanford Radioactively Contaminated Waste Disposal Facilities.
5. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
6. Remaining Sites Verification Package for the 116-C-3, 105-C Chemical Waste Tanks, (Attachment to Waste Site Reclassification Form 2008-002), RSVP-2008-002, Rev 0.
7. K. A. Gano, 6/3/1987, Designation Numbers for UNC Controlled Waste Sites in the 100 Areas, UNI-4433.
8. K.A. Prosser, 6/30/1999, Field Logbook, EL-1388-1.
9. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
10. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.
11. 1/1/2004, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 4.
12. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 116-C-5

Site Reclassification Status: Interim Closed Out

Page 1

Site Names: 116-C-5; 116-C-5 Retention Basins; 107-C Retention Basins

Site Type: Retention Basin

Start Date: 1/1/1952

Status: Inactive

End Date: 1/1/1969

Hanford Area: 100C

Pipe Type: Not Specified

OU/WMA: 100-BC-1

Site Description:

The site has been remediated, backfilled, and revegetated.

Location Description:

The 116-C-5 Retention Basins were located approximately 1,040 meters (3,400 feet) north of the 105-C Reactor and southeast of 116-B-11 (107-B Retention Basin).

Process Description:

The 116-C-5 Retention Basins were constructed to hold cooling water effluent from the 105-C Reactor to allow for thermal cooling and radioactive decay prior to release to the Columbia River. When in operation, the retention basins were two circular, 3.8E+07 liter (1.0E+07 gallon), open-topped tanks. Each tank had a diameter of 100 meters (330 feet), a depth of 4.9 meters (16 feet), and had internal baffles to prevent water from channeling across the tanks into the discharge lines. The tanks were constructed of welded carbon steel and were set on a reinforced concrete foundation with a crushed rock subfloor.

Associated Structures:

The 116-C-5 Retention Basins are associated with the 105-C Reactor, 105-B Reactor, 116-C-1 Liquid Waste Disposal Trench, 132-B-6 (1904-B2) Outfall, and the 132-C-2 (1904-C) Outfall.

Site Comment:

This site is included in the Group 1 Remedial Action Sites, and was cleaned up under the Environmental Restoration Contract.

The 116-C-5 Retention Basins were originally constructed to receive cooling water effluent solely from the 105-C Reactor. After 1954, the effluent from the 105-B Reactor was diverted to the basins because the 116-B-11 Retention Basin had cracked and repair efforts were unsuccessful. Originally, only one tank was filled at a time allowing the option for cooling water contaminated by a ruptured fuel element to be diverted to the second tank. The practice of adding hot water to an empty, cold tank resulted in cracking of the tanks' welded seams. After a series of repair efforts extending into 1958, parallel operation of the tanks became common. Historical drawings and Ground Penetrating Radar analyses of the piping often did not correlate. A full analysis, complete with maps of the apparent piping can be found in the survey report, BHI-00716. Institutional Control (IC) requirements were revised by DOE letter 05-AMRC-0078 on 1/4/2005.

Waste Information:

Type: Process Effluent

Amount:

Category: Mixed

Units: Not Specified

Physical State: Liquid

Reported Date:

Start Date: 1/1/1952

End Date: 1/1/1969

Description:

The basins received cooling water effluent from the 105-B and 105-C Reactors for radioactive decays and thermal cooling prior to release to the Columbia River. The total radionuclide inventories in the vicinity of the

Site Code: 116-C-5**Site Reclassification Status: Interim Closed Out**Page 2

basins ranged from 5 to over 400 curies. Eighty percent of the total radionuclide inventory is contained within the soil adjacent to the basins. Approximately 10 curies leached into the basins' floors and walls.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Unplanned Release:**Release Name:****Reported Date:****Occurrence Report #:****Begin Date:****End Date:****Description:**

The unit and its approximate 1.5-meter (5-foot) diameter effluent line developed leaks during its operating life. The leaks could have been as much as 19,000 to 38,000 liters per minute (5,000 to 10,000 gallons per minute). The extent of contamination from these releases is well within the zone encompassed by the unit and is within the AC-5-40 permanent posting.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Unplanned Release:**Release Name:****Reported Date:****Occurrence Report #:****Begin Date:****End Date:****Description:**

Wind has caused surface contamination to spread from rust on the tank walls.

References:

1. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

Dimensions:

Diameter:	100.58	Meters	330.00	Feet
Sq. Area:	7,945.98	Square Meters	85529.78	Square Feet
Site Shape:	Not Specified			

Comments:

The dimensions provided above describe a single tank. The floor of the remedial excavation was 26,000 square meters (6.4 acres) at a depth of about 4.6 meters (15 feet).

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
2. Cleanup Verification Package for the 116-C-5 Retention Basin, CVP-99-00004, Rev 0.

Site Code: 116-C-5

Site Reclassification Status: Interim Closed Out

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Field Work:

Type: Analytical Sampling
Begin Date: 9/9/1998
End Date: 1/25/1999
Purpose: Cleanup verification sampling

Comment:

The Contaminants of Concern for this site are americium-241, cobalt-60, cesium-137, europium-152, 154, 155, nickel-63, plutonium-238, 239/240, strontium-90, uranium-238, total chromium, hexavalent chromium, mercury, and lead. For the shallow zone, samples B0JD52 through B0JD56, B0TKY3, B0PLV7, and B0JD72 were taken. Quality assurance samples were B0JD57, B0JD58, and B0PLV9. The Environmental Protection Agency took six split samples, numbered EPA-1 through EPA-6 (not in HEIS as of 1/18/00). Deep zone verification samples were B0JD28 through B0JD48, B0TL74 through B0TL78, and B0TL80. Quality assurance samples were B0JD2, B0JD27, B0JD49, and B0JD50. Initially, several of the deep zone samples showed levels of hexavalent chromium that did not meet the cleanup criteria, so additional excavation was done, and the deep zone re-sampled for hexavalent chromium. The second set of analyses (with the sample numbers above) met the cleanup criteria.

References:

1. Cleanup Verification Package for the 116-C-5 Retention Basin, CVP-99-00004, Rev 0.

Type: Geophysical Survey
Begin Date: 11/1/1995
End Date: 12/31/1995
Purpose: Evaluate remaining structures.

Comment:

The survey was conducted to evaluate the remaining floor structures and to identify associated subsurface piping. See BHI-00716 for full results.

Type: GPS Surveys
Begin Date: 6/25/1998
End Date: 6/25/1998
Purpose: Feature survey

Type: GPS Surveys
Begin Date: 4/14/1998
End Date: 4/14/1998
Purpose: Sample locations

Regulatory Information:**Programmatic Responsibility**

Responsible Contractor/Subcontractor:	WCH	Washington Closure Hanford
Reclassifying Contractor/Subcontractor:		None
Responsible Project:		Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Inactive Contaminated Structure

Site Code: 116-C-5

Site Reclassification Status: Interim Closed Out

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Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
		State Waste	
Air Operating Permit:	No	Discharge Permit:	
Air Operating Permit			
Number(s):			

Tri-Party Agreement

Lead Regulatory Agency:	EPA
Unit Category:	CERCLA Past Practice (CPP)
TPA Appendix :	C

Remediation and Closure

Decision Document:	Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)
Decision Document Status:	Final
Closure Document:	Cleanup Verification Package (CVP)
Closure Type:	Not Specified

Post Closure Requirments:

Revegetation; Institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4. meters (15 feet) are required.

Closure Group:

Closure Group Name:	CG 116-C-5		
Type:	Interim		
Reclassification Status:	Prepared	Reclassified On:	12/8/1999
Excavation Start Date:	9/21/96	Excavation Completed Date:	1/20/1999

Remediation Action:

The site has been excavated, remediated, and closed out. The material removed from the site was disposed of in the Environmental Restoration Disposal Facility (ERDF). Excavation of the 116-C-5 site began on September 21, 1996, by removing the overburden materials and underlying contaminated soil. Based on field screening, overburden materials that were identified as potentially clean were placed in stockpiles for potential use as backfill. Overburden materials that were found to be contaminated were disposed of at ERDF. On March 21, 1998, the excavation had reached the design limit at El. 129 meters (423 ft). Soils not meeting direct exposure RAGs based on field screening results were excavated, loaded into shipping containers, and disposed of at ERD. Cleanup verification sampling began on August 18, 1998, and was finished on January 20, 1999 (as stated, the adjacent pipeline areas will be addressed at a later date). Contaminated soil associated with the process effluent pipelines was partially removed; the rest remains for final remediation with pipelines and a separate cleanup verification package. The 100-BC process effluent pipelines are scheduled to be removed within the next few years. The 11 6-C-5 sidewall areas that are adjacent to future pipeline excavation areas were not sampled as part of this cleanup verification effort. These areas will be sampled and verified clean as part of the effluent pipeline remediation efforts.

In accordance with the Interim Action Record of Decision and Remedial Design Report/Remedial Action Work Plan, a rural residential exposure scenario was assumed in calculating cleanup levels. Results of the sampling, testing, and analyses for the 116-C-5 site cleanup indicate that all remedial action objectives and goals for dire

Site Code: 116-C-5

Site Reclassification Status: Interim Closed Out

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exposure, protection of groundwater, and protection of surface waters (including the Columbia River) have been met.

At the completion of the remedial action, the excavation floor area was approximately 26,000 square meters (6.4 acres) at a depth of 4.6 meters (15 feet), and approximately 224,709 metric tons (246,695 tons) of material from the site, including pipelines within the excavation footprint, were disposed of at the ERDF. The excavation to be backfilled to the reference grade of 133.5 meters (438 feet).

Excavated Material:

Quantity: 224,709.00
Unit Type: Metric Tons
Disposition: Environmental Restoration Disposal Facility

Cleanup Verification:

Institutional Controls:

Institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet)) are required.

Statement Of Protectiveness:

As demonstrated in this verification package, the RAGs for direct exposure, groundwater protection, and surface water protection have been achieved. Based on this, the RAOs that define the extent to which the waste sites require cleanup have also been met. Materials that contain COCs at concentrations that exceed the RAGs have been excavated, sampled, analyzed, and where required, the materials were removed and shipped to ERDF. The remaining soil has been sampled, analyzed, and modeled to show that no residual COC concentrations in vado zone soils pose a threat to human health, groundwater, or the Columbia River. The 116-C-5 site is thus verified to be remediated and no longer poses a threat to human health or the environment, and may be backfilled.

Images:

Pathname: [//mapweb.rl.gov/widsimg/100c/0034/0034_01.jpg](http://mapweb.rl.gov/widsimg/100c/0034/0034_01.jpg)

Date Taken: 6/25/1998

Description:

This figure shows the 116-C-5 site.

Pathname: [//mapweb.rl.gov/widsimg/100c/0034/0034_03.gif](http://mapweb.rl.gov/widsimg/100c/0034/0034_03.gif)

Date Taken: 5/24/2001

Description:

This is a copy of the fax from Mark Sturges to Steve Weiss. Pipeline falling in the shaded area has been sampled and removed. At 116-C-5, pipeline falling inside the hand-drawn bubble, but outside the shaded area has been removed but not sampled.

References:

1. Design Basis for the 100 B/C, 100 D, and 100 H Remediation Project Group 1 Sites, 0100X-DB-G0001, Rev 0.
2. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
3. Bergstrom, K.A, and T.H. Mitchell, Geophysical Investigation of the 116-C-5 Retention Basin 100-BC-1, Operable Unit, BHI-00716, Rev 0.
4. Alvin L. Langstaff, 2/8/1999, 100 Area Waste Site Excavations completed by 12-31-98.
5. M. H. Sturges, S. G. Weiss, 5/23/2001, Pipelines and 116-C-5; Correspondence Between Mark Sturges and Steve Weiss.
6. Carpenter, R. W., 1/1/1995, Process Knowledge Data of Specific 100-B Area Waste Sites.
7. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive

Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

8. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

9. U.S. Department of Energy, 1/1/1995, Proposed Plan for Interim Remedial Measures at the 100-BC-1 Operable Unit, DOE/RL-94-99.

10. Cleanup Verification Package for the 116-C-5 Retention Basin, CVP-99-00004, Rev 0.

11. U. S. Environmental Protection Agency, Interim Action Record of Decision for the 100-BC-1, 100-DR-1, 100-HR-1 Operable Units, Hanford Site, Benton County, Washington, EPA, 1995.

12. S.G. Weiss, 1/1/1996, Mitigation Action Plan for Liquid Waste Sites in the 100-BC-1, 100-DR-1, and 100-HR-1 Operable Units, DOR/RL-96-19.

13. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 118-B-1**Site Reclassification Status:** Interim Closed OutPage 1

Site Names: 118-B-1; Ext. to BG No. 1; Operations; Solid Waste Burial Ground; 105-B Burial Ground;
105-B Solid Waste Burial Ground; 108-B Burial Ground**Site Type:** Burial Ground**Start Date:** 1/1/1944**Status:** Inactive**End Date:** 1/1/1973**Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

This unit currently appears as a vegetation-free mound of cobbles raised 0.6 to 0.9 meters (2 to 3 feet) above the surrounding terrain. A 12 by 60-meter (40 by 200-foot) vegetation-covered extension near the northwest corner of the main burial ground, is raised 0.9 to 1.2 meters (3 to 4 feet) above the surrounding terrain. Part of the site is also bounded by permanent yellow markers. The site is now posted as a Soil Contamination Area, signs are required as an institutional control to prevent irrigation.

Location Description:

The site was located 914 meters (3,000 feet) due west of the 105-C Reactor Building

Process Description:

This waste site operated from 1944 to 1973, receiving general radioactive and non-radioactive wastes from the 105-B and 105-N Reactors, construction wastes from modification of the 105-B Reactor Building, and process wastes from the P-10 Tritium Separation Project. The original burial ground contained six to eight trenches that ran in a east-west direction, receiving general reactor waste from the B Reactor which included: aluminum tubes, lead bricks, thermocouples, vertical and horizontal aluminum thimbles, stainless-steel gun barrels and expendables (e.g., plastic, wood, and cardboard). Spline silos were also constructed at the burial ground, which were vertical metal culverts, 3 to 3.7 meters (10 to 12 feet) in diameter, built presumably to receive reactor poison splines and other metal wastes. One extension to the south side of the original burial ground was known as the 108-B Solid Waste Burial Ground, measuring 46 meters (150 feet) long by 73 meters (240 feet) wide by 6.1 meters (20 feet) deep. The burial ground contained three trenches oriented from east to west. This burial ground received contaminated tritium pots, irradiated process tubing (in 1952), contaminated fuel spacers (perfs), solid tritium wastes, and high-level liquid tritium wastes that were sealed in a 7.6-centimeter (3-inch)-diameter iron pipe. The second extension to the burial ground was added in 1956 and was referred to as the "extension to Burial Ground No. 1." It measured 61 meters (200 feet) long by 15 meters (50 feet) wide and ran in a north-south direction, adjacent to and at the midpoint of the original burial ground's west side. This extension contained two trenches that ran in a north-south direction and was used for the burial of contaminated yokes from B Reactor. The third extension was added to the north side of the original burial ground in the mid 1960s and measured 106 meters (350 feet) long by 91 meters (300 feet) wide, with trenches running in an east-west direction. Historical data on the contents of these trenches are not as detailed as with earlier extensions but are presumed to include "general" reactor and construction waste from modifications to B Reactor. Waste materials from the Tritium Separation (P-10) Project were also buried here, including lithium-aluminum alloy, lead, mercury, aluminum cladding, and palladium.

Site Comment:

The IU 2/6 Field Remediation Project is authorized to remove SCA and URMA postings associated with the 118-B-i waste site. The applicable CVP (CVP-2007-00006 Rev. 0) has been approved and all SCAs and URMAs associated with this waste site have been surveyed for direct contamination. These surveys have been documented on Radiological Survey Record RSR-600FR-1 1-0250.

In late 1994 and early 1995, this site was used for a treatability investigation. A total of 1,530 cubic meters (2,000 cubic yards) of waste was excavated, sorted, characterized and reburied.

Site Code: 118-B-1**Site Reclassification Status: Interim Closed Out**

Page 2

After the 118-B-1 Burial Ground was removed from use, it was covered with at least 1.2 meters (4 feet) of soil and stabilized with gravel. The original 118-B-1 unit was 305 by 98 by 6.1 meters (1,000 by 321 by 20 feet) deep and ran in a north-south direction. It contained "21 trenches running east-west, 3 trenches running north-south, three spacer pits shored with railroad ties, and spline silos". The 118-B Burial Ground extension was added adjacent to and south of the original 118-B-1 site in 1950. It contained three trenches that are now covered with 1.8 meters (6 feet) of soil. Solid tritium wastes and high-level liquid tritium wastes were sealed in 7.6-centimeter (3-inch) diameter iron pipes and disposed of at this site. This burial ground also received contaminated tritium pots and irradiated process tubing in 1952, as well as contaminated fuel spacers or perfs. A second extension was added to 118-B-1 in 1956. It measured 61 by 15 meters (200 by 50 feet), and was located adjacent to and at the midpoint of the burial ground's west side. This extension was used for the burial of contaminated yokes from the 100-B Reactor.

According to the original logbook for the site, thousands of pieces of dummy materials were recovered from the burial ground in 1957 and 1958. The recovery system washed sand from the items by a pressurized water tank. The material was placed on steel grates for the washing (location not specified), then moved to the 105-B Building for decontamination. The pieces were returned to the reactor for use in operations.

Waste Information:

Type:	Equipment	Amount:	10,000.00
Category:	Mixed	Units:	Cubic Meters
Physical State:	Solid	Reported Date:	

Description:

The burial ground received general reactor waste from the 105B and 105N reactors, including the following: aluminum tubes, irradiated facilities, thermocouples, vertical and horizontal aluminum thimbles, stainless steel gun barrels, wastes from operation of the P-10 tritium separation project, and expendables such as plastic, wood, and cardboard. Waste materials were typically buried 6.1 meters (20 feet) below grade and were covered with a minimum of 1.2 meters (4 feet) of clean soil; actual soil cover ranged from 0.6 meters (2 feet) to greater than 4.3 meters (14 feet). Potential Contaminants include Ag-108m, C-14, Co-60, Cs-137, Eu-152, Eu-154, Eu-155, H-3, Ni-59, Ni-63, Sr-90, cadmium, Cr+6, lead, mercury, boron, graphite, PCBs, SVOAs, TPH, and VOAs. Permanent concrete markers surrounded the site, and "Caution: Underground Radioactive Material" signs were posted. Blue and green ground penetrating radar survey stakes had been placed around the perimeter and in lines crossing the site. A 12 by 4.6-meter (40 by 15-foot), vegetation-free, cobble-covered portion about 46 meters (50 yards) north of the southeast corner is bounded by steel posts and light-duty barricade chain; warning signs are posted on that section.

References:

1. R. G. Bauer, Data Quality Objectives Summary Report for the 100 Area and 300-FF-2 Burial Grounds, BHI-01501.
2. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
3. R. L. Miller, R. K. Wahlen, Estimates of Solid Waste Buried in 100 Area Burial Grounds Formerly UNI-3908, WHC-EP-0087.
4. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
5. U.S. Department of Energy, 100 Area Burial Ground Focused Feasibility Study, DOE/RL-98-18, Rev Draft A.

Dimensions:

Length:	304.80	Meters	1000.00	Feet
Width:	97.84	Meters	321.00	Feet
Depth/Height:	6.10	Meters	20.00	Feet
Sq. Area:	29,821.88	Square Meters	320999.68	Square Feet

Site Code: 118-B-1**Site Reclassification Status: Interim Closed Out**

Page 3

Site Shape: Not Specified**Comments:**

The original 118-B-1 Burial Ground measured 152 m (500 ft) long by 79 m (260 ft) wide by 6.1 m (20 ft) deep, and was oriented in a north-south direction. After approximately three extensions during its operating life from 1944 to 1973, the size of the 118-B-1 Burial Ground increased to 305 m (1,000 ft) long by 98 m (321 ft) wide by 6.1 m (20 ft) deep. These dimensions represent the radiologically posted area not the individual trenches.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.

Field Work:

Type: Geophysical Survey
Begin Date: 2/1/1993
End Date: 2/1/1993
Purpose: Map pits, trenches, and debris.

Comment:

A geophysical survey was performed over the Burial Ground in 1993 to locate and map subsurface anomalies, and was validated by limited exploratory excavation in March 2002. Multiple subsurface anomalous zones were observed, generally consistent with the historical trench layout.

Type: Geophysical Survey
Begin Date: 8/7/2002
End Date: 8/7/2002
Purpose: Geophysical Investigation

Comment:

Test pitting/trenching was conducted in areas that geophysics indicated had no buried waste. Test pitting/trenching confirmed that the ground was undisturbed below the cover material in the locations of the test pits/trenches. This indicates that there is no buried waste in these regions and generally confirms the geophysical data.

References:

1. 7/7/2002, Report on the Test Pitting/Trenching in the 118-B-1 and 118-B-3 Burial Grounds, CCN 101408.

Regulatory Information:**Programmatic Responsibility**

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit: No **TSD Number:**

Site Code: 118-B-1

Site Reclassification Status: Interim Closed Out

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RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
		State Waste	
Air Operating Permit:	No	Discharge Permit:	
Air Operating Permit Number(s):			

Tri-Party Agreement

Lead Regulatory Agency:	EPA
Unit Category:	CERCLA Past Practice (CPP)
TPA Appendix :	C

Remediation and Closure

Decision Document:	Interim Action Record of Decision, 100 Area Burial Grounds (2000)
Decision Document Status:	Final
Closure Document:	Cleanup Verification Package (CVP)
Closure Type:	Not Specified

Post Closure Requirments:

Institutional controls (postings) remain in place to prohibit future irrigation, Institutional controls to prevent uncontrolled drilling or excavation into the deep zone are required.

Closure Group:

Closure Group Name:	CG 118-B-1
Type:	Interim

Remediation Action:

The Cleanup Verification Package (CVP) for the 118-B-1 Burial Ground has documented that the site has met the remedial action objectives and goals as established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP), the Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units, Hanford Site (ROD), and the Explanation of Significant Difference for the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units, (ESD). Remedial action began on February 2, 2004, with overburden removal. Approximately 20,000 bank cubic meters (BCM) [26,200 bank cubic yards (BCY)] of overburden material was removed before beginning excavation and sorting of the burial ground on March 16, 2004. Suspected spent nuclear fuel (SNF) was discovered on September 15, 2004, and remedial activities suspended until the Authorization Basis could be assessed and revised to address spent nuclear fuel (SNF). Load-out operations resumed on April 11, 2005, for previously sorted and segregated material. All remedial activities (excavation, sorting, and load-out) resumed on August 24, 2005, and were completed on June 7, 2007, with the exception of characterization and dispositioning of the SNF and approximately 100 remaining anomalous containers. During remediation, it was discovered that 2 of the 23 trenches had not been used for waste disposal. The burial ground also consisted of several spline silos constructed from 3 to 3.7 meter (10 to 12 foot) diameter metal culvert piping and 3 spacer pits shored with railroad ties. The overall lateral footprint of the burial ground prior to remediation was approximately 225 meters by 90 meters (740 feet by 300 feet). Over 120,000 metric tons (132,300 tons) of debris and contaminated soil from the Burial Ground was removed and disposed at ERDF. At the conclusion of remediation activities, the excavated area was approximately 10 meters (33 feet) at its deepest, with a lateral footprint of approximately 21,600 meters squared (5.3 acres). Approximately 136,000 meters squared (33.6 acres) in total at the site were disturbed, including stockpiles and waste sorting and staging areas. The sampling and analysis plan (SAP) identified the contaminants of concerns (COCs) for burial grounds based on waste forms encountered. Additional waste site COCs/COPCs were identified for the 118-B-

Burial Ground based on process knowledge and results of in-process sampling. Based on the observed waste forms found during remediation activities and the results of waste characterization sampling, COCs/COPCs were identified for each decision unit in the Site Specific Instruction for Close-Out Approach for 118-B-1. The SSI documents the agreements between the Department of Energy Richland Operations Office (DOE-RL) and the EPA regarding interim waste site closeout for the 118-B-1 Burial Ground. The COCs/COPCs identified in the 118-B-1 SSI include americium-241, carbon-14, cesium-137, cobalt-60, europium-152, europium-154, europium-155, nickel-63, plutonium-238, plutonium-239/240, plutonium-241, silver-108m, strontium-90, tritium, uranium-233/234, uranium-235, uranium-238, the expanded list of inductively coupled plasma (ICP) metals (arsenic, antimony, barium, beryllium, boron, cadmium, total chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc), hexavalent chromium, mercury, polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), semi-volatile organic compounds, volatile organic compounds, herbicides, pesticides, and asbestos. Verification sampling was conducted in July 2006 and October through December 2006. Additional focused verification samples were collected from March to June 2007. Verification sampling is performed to collect data to determine if the remedial action goals (RAGs) have been met. RAGs are the specific numeric goals against which the verification data are evaluated to demonstrate attainment of the remedial action objectives as established in the Burial Ground ROD. The results of verification sampling show that residual concentrations of contaminants other than tritium do not preclude any other future uses (as bounded by the rural-residential scenario) of shallow zone soils (i.e., surface to 4.6 meters [15 feet] deep). The remaining soils at this site have been sampled, analyzed, and modeled. The results of verification sampling indicated that vadose zone soils beneath the burial ground contained residual tritium concentrations in excess of remedial action objectives for the protection of groundwater. Therefore, the Tri-Parties on consideration of balancing factors have required institutional controls (postings) remain in place to prohibit future irrigation. The acceptability of direct exposure to residual tritium contamination in the deep vadose zone has not been demonstrated; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are also required. In accordance with the CVP, the verification sampling and modeling results support a reclassification of the 118-B-1 Burial Ground to Interim Closed Out.

References:

1. J.A. Bienerth, 7/6/1993, WIDS Site Modification, sites 118-B-2, 118-B-3, 118-B-4, 118-B-6, 118-B-1, 118-C-1, 1607-B9.
2. R. G. Bauer, Data Quality Objectives Summary Report for the 100 Area and 300-FF-2 Burial Grounds, BHI-01501.
3. Cleanup Verification Package for the 118-B-1, 105-B Solid Waste Burial Ground, CVP-2007-00006, Rev 0.
4. 7/7/2002, Report on the Test Pitting/Trenching in the 118-B-1 and 118-B-3 Burial Grounds, CCN 101408.
5. Unknown, 3/2/1945, Various Pages Removed from Several Original Logbooks (118-B-1).
6. Various, 9/1/1946, Special Log of Material Taken to Burial Grounds (118-B-1).
7. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
8. R. L. Miller, R. K. Wahlen, Estimates of Solid Waste Buried in 100 Area Burial Grounds Formerly UNI-3908, WHC-EP-0087.
9. Dorian and Richards, 5/26/1978, Radiological Characterization of the Retired 100 Areas, UNI-946.
10. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
11. 1/1/2001, 100 Area Burial Grounds Remedial Action Sampling and Analysis Plan, DOE/RL-2001-35, Rev 0.
12. 1/1/2000, Interim Remedial Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units, EPA, 2000.
13. 1/1/2007, Explanation of Significant Difference for the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units (100 Area Burial Grounds), U. S. Environmental Protection Agency, Region 10, Seattle, Washington., EPA, 2007, Rev 0.
14. U.S. Department of Energy, 100 Area Burial Ground Focused Feasibility Study, DOE/RL-98-18, Rev

Draft A.

15. 118-B-1 Burial Ground Excavation Treatability Test Report, DOE/RL-95-34, Rev 0.
16. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.
17. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.
18. WCH, 4/18/2011, AUTHORIZATION TO DOWNPOST LEGACY WASTE SITES FOLLOWING, WCH CCN 157934.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 118-B-6**Site Reclassification Status:** Interim Closed Out

Page 1

Site Names: 118-B-6; 108-B Solid Waste Burial Ground; 108-B Solid Waste Burial Ground No. 2**Site Type:** Burial Ground**Start Date:** 1/1/1950**Status:** Inactive**End Date:** 1/1/1953**Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

The site has been remediated and interim closed. The site has been backfilled and leveled to grade. The unit consisted of two concrete caissons (pipes) 5.5 meters (18 feet) long by 1.8 meters (6 feet) in diameter, that were buried vertically in the ground and capped with a concrete pad. The concrete pad had two pear-shaped steel lids that provided access to the caissons.

Location Description:

This site was located approximately 107 meters (350 feet) northeast of the B Reactor.

Process Description:

This site was used for disposal of wastes from the "metal line" of the P-10 Tritium Separation Project. One of the vertical caissons was filled with waste and capped, the other was partially filled with waste and capped by a concrete pad. The pad measured about 4.6 by 3.0 meters (15 by 10 feet) with two pear-shaped steel lids that provided access to the caissons' burial chambers.

Site Comment:

The site was surrounded by light-duty steel posts and light-duty barricade chain, and was posted with "Caution: Underground Radioactive Material," signs.

Waste Information:**Type:** Equipment**Amount:** 10.00**Category:** Mixed**Units:** Cubic Meters**Physical State:** Solid**Reported Date:****Start Date:** 1/1/1950**End Date:** 1/1/1953**Description:**

The unit received the following types and amounts of wastes: 26,500 kilograms (58,500 pounds) of spent lithium-aluminum alloy, 21,300 kilograms (47,000 pounds) of lead from pots, 45 kilograms (100 pounds) of mercury from manometers and Toepler pumps, 1,720 kilograms (3,800 pounds) of aluminum cladding, and 1,360 kilograms (3,000 pounds) of palladium. Additionally, it contains a total of 21,200 kilograms (23.4 tons) of wastes generated as a result of the P-10 tritium production project in the 108-B Facility. Potential contaminants include: H-3, lead, mercury

References:

1. R. G. Bauer, Data Quality Objectives Summary Report for the 100 Area and 300-FF-2 Burial Grounds, BHI-01501.
2. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
3. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Site Code: 118-B-6

Site Reclassification Status: Interim Closed Out

Page 2

Dimensions:

Length:	4.57 Meters	15.00 Feet
Width:	3.05 Meters	10.00 Feet
Depth/Height:	6.10 Meters	20.00 Feet
Sq. Area:	13.94 Square Meters	150.00 Square Feet
Site Shape:	Irregular	

References:

1. Shearer, Jeffrey P. with Roger W. Carpenter, 4/4/1996, Depth of 100BC Sites.
2. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Field Work:

Type: Geophysical Survey
Begin Date: 3/1/2001
End Date: 3/1/2001
Purpose: Determine amount of buried debris

Comment:

Ground penetrating radar (GPR) and Electro-magnetic Induction (EM61) data indicate no buried debris immediately adjacent to the concrete pad overlying the burial ground. Scattered anomalies both to the west and east of the concrete pad are likely related to fill material containing construction and/or demolition debris. About 12 meters (40 feet) east of the concrete pad a series of north-south trending anomalies are probably related to cut-off metal fence posts or possibly a utility.

References:

1. K.A. Bergstrom, W. K. Hudson, T. H. Mitchell, 5/7/2001, Results of the Geophysical Investigations Conducted at 100 B/C Sites: 118-B-2, 118-B-4, 118-B-5, 118-B-6, 118-B-10, 118-C-1, and 600-33., 088954.

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
Air Operating Permit:	No	State Waste Discharge Permit:	

Site Code: 118-B-6

Site Reclassification Status: Interim Closed Out

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**Air Operating Permit
Number(s):****Tri-Party Agreement**

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Decision Document: Interim Action Record of Decision, 100 Area Burial Grounds (2000)
Decision Document Status: Final
Closure Document: Cleanup Verification Package (CVP)
Closure Type: Not Specified

Post Closure Requirments:

Institutional controls to prevent uncontrolled drilling or excavation into the deep zone are required.

Closure Group:

Closure Group Name: CG 118-B-6
Type: Interim

Remediation Action:

The cleanup verification package (CVP-2006-00002) documented that the site has achieved remedial action objectives and goals established in the Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units, Hanford Site (100 Area Burial Grounds) (ROD) and Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP). Remedial action at the sit began in November 2004. Excavation of the site involved removing the uncontaminated overburden, caissons, concrete pad, buried materials, and underlying contaminated soil. Waste site contaminants of concern (COCs) identified in the RDR consisted of tritium, lead, and mercury. Although the majority of the excavation was completed by December 2004, leach tests done on soil samples taken from the bottom of the excavation showed levels of tritium that required an additional 1.5 meters (5 feet) of soil removal. This additional excavation was completed in June 2005. At the conclusion of excavation activities, the elevation of the bottom of the excavation was at 136 meters (446 feet). The excavation was approximately 885 meters squared (9,523 square feet) in area with a depth of approximately 7 meters (23 feet). Nearly 577 metric tons (636 tons) of contaminate material was disposed at ERDF. Final cleanup verification samples (J10VP0 through J10VP9 and J10VN8 and J10VN9) were collected on January 9, 2006. The samples were submitted to offsite laboratories for analysis using approved EPA analytical methods, as required per the 100 Area Burial Grounds Remedial Action Sampling and Analysis Plan. The sample data were stored in the Environmental Restoration project-specific database for data evaluation prior to archiving in the Hanford Environmental Information System. These remedial action results also indicated that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario and that residual concentrations throughout the site pose no threat to groundwater or the Columbia River. Institutional controls are required for the site to prevent drilling or excavation into deep zone soils. The site has been verified to be remediated in accordance with the ROD and the RDR and may be backfilled.

Images:

Site Code: 118-B-6

Site Reclassification Status: Interim Closed Out

Page 4

Pathname: [//mapweb.rl.gov/widsimg/100b/0108/0108_01.jpg](http://mapweb.rl.gov/widsimg/100b/0108/0108_01.jpg)

Date Taken: 10/1/2000

Description:

The site is clearly marked in the field with a sign.

References:

1. K.A. Bergstrom, W. K. Hudson, T. H. Mitchell, 5/7/2001, Results of the Geophysical Investigations Conducted at 100 B/C Sites: 118-B-2, 118-B-4, 118-B-5, 118-B-6, 118-B-10, 118-C-1, and 600-33., 088954.
2. J.A. Bienerth, 7/6/1993, WIDS Site Modification, sites 118-B-2, 118-B-3, 118-B-4, 118-B-6, 118-B-1, 118-C-1, 1607-B9.
3. R. G. Bauer, Data Quality Objectives Summary Report for the 100 Area and 300-FF-2 Burial Grounds, BHI-01501.
4. Cleanup Verification Package for the 118-B-6, 108-B Solid Waste Burial Ground, CVP-2006-00002, Rev 0.
5. Shearer, Jeffrey P. with Roger W. Carpenter, 4/4/1996, Depth of 100BC Sites.
6. M. S. Kitts, 10/10/1991, WIDS Site Addition, 132-B-1.
7. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
8. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
9. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
10. 1/1/2001, 100 Area Burial Grounds Remedial Action Sampling and Analysis Plan, DOE/RL-2001-35, Rev 0.
11. 1/1/2000, Interim Remedial Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units, EPA, 2000.
12. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 118-B-8**Site Classification:** AcceptedPage 1

Site Names: 118-B-8; B Reactor; 105-B Reactor Building**Site Type:** Reactor**Start Date:** 1/1/1944**Status:** Inactive**End Date:** 1/1/1968**Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** TBD**Site Description:**

The waste site consists of the 105-B Reactor Building complex, which originally included the inactive plutonium production reactor block with associated shielding and controls, an irradiated fuel storage basin, and contaminated portions of the reactor building. See the subsites for detailed information.

Process Description:

Water from the Columbia River was extensively treated before passing through the reactor. The water was then circulated in a single pass through the reactor process tubes, cooling tubes imbedded in the thermal shield, and reactor horizontal control rods. After exiting the reactor, the cooling water passed through a retention basin and was then discharged to the river. During reactor operations, fuel cladding failures sometimes occurred while the fuel element were in the process tubes. Over the operational lifetime of the reactor, there were several hundred such cladding failures. When fuel cladding failed, the cooling water in the affected process tubes became highly contaminated and elevated radiation levels were observed in the cooling water exiting the reactor core. This highly contaminated water was diverted to a trench for ground disposal rather than to the Columbia River. During reactor operations and reactor shutdowns, large quantities of decontamination solutions were used routinely to remove radionuclides from reactor equipment and facility surfaces. Decontamination activities took place at the dummy decontamination facility wash pad, which was adjacent to the fuel storage basin. Known decontamination solutions included chromic acid, citric acid, oxalic acid, nitric acid, sulfamic acid, sulfuric acid, and sodium fluoride. Other chemicals, including organic solvents were also used for some decontamination processes. The reactor had many safety and control mechanisms. The function of the horizontal control rods (HCRs) was to control the equilibrium and transient power levels of the reactor during routine operations and to maintain the desired neutron flux distribution. The HCRs were each about 11.0 meters (36 feet) long, with the poison (neutron absorbing) segment being about 8.96 meters (29.4 feet) long. Two of the rods were electrically driven and seven were hydraulically driven. The latter were known as shim rods and were used to achieve ongoing operation control and desired fluctuations. The vertical safety rods (VSRs) were 11.9 meter (39 foot) long, stainless steel sleeves with 0.74 millimeter (3/16 inch) thick boron stainless steel sleeves inside. Each VSR was inserted and withdrawn from the reactor via two separate cables wound around a winch located 12.2 meters (40 feet) above the top of the reactor. In cases of automatic shutdown ("scram") of the reactor, the electromagnetic clutch holding each rod would be deenergized (demagnetized), and the rods would free fall by gravity into channels penetrating the reactor. A "last ditch" safety system, a boric acid solution, was held in a large pedestal tank at the top of each reactor and connected to each of the 29 VSR channels via 1.27-centimeter (0.5-inch) pipes. The liquid boron system was later replaced by a system that used solid boron steel and carbon steel balls (Ball 3X System). The normal method for reactor refueling was displacement charge-discharge during reactor shutdown. During a refueling operation, the tubes to be discharged had their rear nozzle caps removed. New fuel elements were pushed into the process tube by a charging machine which caused the irradiated fuel elements in the tube to be displaced. The displaced irradiated fuel elements dropped into a water filled discharge chute and slid down into the metal pickup area at the end of the storage basin. The 6.1 meters (20 feet) of water in the chute area provided shielding as the elements accumulated and were sorted into buckets using long, hand-operated tongs. The buckets were then transferred by an overhead monorail system to the storage aisles where they were held for a time to allow the decay of short-lived radionuclides. Following the storage period, the buckets of fuel

elements were moved by the overhead monorail system to the transfer area. At the transfer area, the irradiated fuel was loaded into casks, then raised by a crane and placed in special railroad cars for shipment to the chemical reprocessing facilities in the 200 Area.

Site Comment:

B Reactor is currently a controlled-access museum. As the world's first full-scale nuclear reactor that has been placed on the National Register of Historic Places. There is support throughout the nuclear community to preserve the reactor as a museum. Preliminary steps have begun towards preservation through the installation of visitor displays and conducting controlled tours throughout portions of the reactor working areas. Areas of residual radioactive contamination are not accessible to the general public. The basin was drained, cleaned, and surface contamination was fixed. Two 750 KVA transformers and several pieces of miscellaneous switchgear have been removed, along with the building air compressors and receivers. Roof leaks have been repaired. No dichromate staining was found during a pre-demolition walkdown of the water tunnels to the 105-B Building. The tunnels were demolished to the 105-B Building security fence line. This included cracking the bottoms of the tunnels to prevent standing water, demolishing the tops of the tunnels into the tunnels themselves, and backfilling with clean gravel. The tunnels were sealed at the fence line with a combination of steel bracing and railroad ties (discussion with S. G. Marske, September 2004). The 105-B Reactor was transferred from Washington Closure Hanford (WCH) to Fluor Hanford (FH) on 3/16/2009. WCH is still responsible for managing nuclear materials within the transfer pit and reactor core.

Release Description:

It is suspected that the irradiated fuel storage basin leaked for a number of years prior to deactivation. The leak rate was small, and the location of the leak was never identified. The soil has not been characterized, but the radionuclide inventory is estimated to be low when compared to the total inventory in the reactor.

SubSites:

SubSite Code: 118-B-8:1
SubSite Names: 118-B-8:1; 105-B Reactor Building
Classification: Accepted
ReClassification: None

Description:

The reactor rests on a 7.0-meter (23-foot) thick concrete foundation topped with cast iron blocks that served as a thermal shield. The building walls consists of reinforced concrete in the lower portions and concrete blocks in the upper portions with thickness varying from 0.9 to 1.5 meters (3 to 5 feet). The roof is composed of precast concrete roof tiles, except for the discharge area enclosure and inner horizontal rod room where the roof was composed of 1.8-meter (6-foot) thick reinforced concrete.

The reactor core consisted of a graphite "stack" that measured 8.5 meters (28 feet) from front to rear, 11.0 meters (36 feet) from side to side, and 11.0 meters (36 feet) from top to bottom. The stack was pierced front to rear by 2,004 process channels that held the fuel elements. Nine horizontal channels for control rods entered from the left side and 29 vertical channels for safety rods entered from the top. Six test holes labeled A through F, leading from the right, existed for irradiation of experiments, foils, counters, ionization chambers, and special samples. The horizontal control rod (HCR) and vertical safety rod (VSR) channels, as well as the test holes, were lined with a thin sheet of aluminum known as a "thimble".

The graphite core is surrounded by a cast iron thermal shield layer. Cooling for the top, side, and bottom shield were provided by circulating water tubes imbedded in the blocks. The entire reactor block was then enclosed in a welded steel box that functioned to confine the inert gas atmosphere within the reactor. Expansion joints were placed on the corners of the block to allow for thermal expansion and expansion bellows were located at each process tube opening. The bellows served as gas seals as the process tubes expanded and contracted with temperature and with the distortions of the graphite.

The fuel storage basin is located at the rear of the reactor. The concrete basin area served as a collection, storage, and transfer facility for the irradiated fuel elements discharged from the reactor. The water in the basins served both as coolant and as shielding. The basin consisted of a discharge chute and fuel element pick-

Site Code: 118-B-8**Site Classification: Accepted**Page 3

area, a storage area, a transfer area, and a wash pad area.

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.
 2. Hanford B Reactor Building Hazard Assessment Report, BHI-01282, Rev 0.
 3. 105-B Reactor Facility Museum Phase I Feasibility Study Report, BHI-00076, Rev 01.
 4. 8/1/2000, Field Logbook for 100-F Orphan Sites Evaluation, EL-1583-1 through EL-1583-5.
-

SubSite Code: 118-B-8:2
SubSite Names: 118-B-8:2; 105-B French Drains
Classification: Accepted
ReClassification: None

Description:

The subsite consists of fourteen French drains around the periphery of the 105-B Reactor Building. During two walk downs in September 2004, the 14 suspect French drain locations were recorded using global positioning system (GPS) instrumentation and were photographed.

No information could be found to corroborate what liquid waste streams from the building were discharged to each of these suspect drains. Because B Reactor was a first-of-a-kind operation and a national priority, it is prudent to assume that any of these suspect drains could have received unplanned and/or unrecorded releases of both radioactive and nonradioactive CERCLA wastes. It should be noted that the soil associated with some of the French drains at both D Reactor and F Reactor have tested positive for heavy metals and fission products. (See sites 100-F-10, 116-D-6 and 116-F-11.)

French drains were designed to receive nonradioactive liquids from the 105-B Reactor Building, via over-ground and/or underground piping. The discharges included steam condensate and floor drain wastes. The liquids would percolate through the gravel/soil fill, and out the open end at the bottom of the drain into the native soil. Because of variables, each of the suspect drain sites will require further investigation prior to cleanup activities, including removal of covers and visual inspection and sampling of drain fill material and surrounding native soil. During walkdowns on 9/7/04 by M. R. Schwab and J. C. Womack and 9/13/04 by J. P. Kiesler and W. Coffin around the periphery of the 105-B Building, 14 suspect French drain locations were recorded using global positioning system (GPS) instrumentation and were photographed. Most of the suspect drains had protective covers, and no visual inspection was attempted beneath those covers. Some of the covers had been penetrated by over-ground piping, and others had holes that suggested previous discharge points. Other French drains may have received discharges from underground piping.

Contaminants of potential concern (COPCs) for the French Drains included gamma emission analysis (GEA), gross alpha, gross beta, hexavalent chrome, inductively coupled plasma (ICP) metals, and polychlorinated biphenyls (PCBs). Several of these are methods for determining general fission products; however, the statement is consistent with current cleanup practices as listed in the sampling and analysis plans (SAPs).

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.
-

SubSite Code: 118-B-8:3
SubSite Names: 118-B-8:3; 105-B Miscellaneous Pipeline Segments
Classification: Accepted
ReClassification: None

Description:

The subsite consists of pipeline segments (DS-100BC-013, 014, 017, and 018, 024, 025, 026, 027, 028, 035, 041 and 043), that were deferred from 100-B-21. Documentation states that the segments were within the 7.6 meter (25 foot) buffer zone, but had been identified during removal of effluent pipelines and site characterization in the 100-B/C Area. Pipelines that went toward the reactor were cut approximately 15.2 meters (50 feet) from the reactor footprint so as not to disturb the 105-B Reactor structure. The numbering system for the segments

Site Code: 118-B-8**Site Classification: Accepted**

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was created and assigned by the subcontractor as they were recorded in the field. There were two pipelines associated with the 120-B-1 Battery Acid Sump inlet and outlet pipelines that were also left in place. They were cut off and grouted at the edge of the 120-B-1 remediation footprint. These have been assigned to the 118-B-8:3 subsite (per RSVP-2006-057). Other pipelines in this subsite include the southern most part of the 1607-B2 septic system collection lines. They were not remediated with the 1607-B2 site because of their proximity to the reactor facility. They will be addressed with disposition of the 105-B facility (per RSVP-2006-055).

References:

1. 6/6/2007, Reconfiguration of pipeline discovery segments originally assigned to 100-B-21. Deferred segments went to 118-B-8, 100-B-14, and 100-B-7., 100-B-21 Pipeline segments.
2. 9/25/2006, REMAINING SITES VERIFICATION PACKAGE FOR THE 120-B-1, 105-B BATTERY ACID SUMMIT (Attachment to Waste Site Reclassification Form 2006-057), RSVP-2006-057, Rev 0.
3. REMAINING SITES VERIFICATION PACKAGE FOR THE 1607-B2 SEPTIC SYSTEM AND 100-B-14:2 SANITARY SEWER SYSTEM (Attachment to Waste Site Reclassification Form 2006-055), RSVP-2006-055, Rev 0.

Waste Information:

Type:	Equipment	Amount:	
Category:	Mixed	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

This Reactor building contained an estimated 23,500 curies of radionuclides, 79,800 kilograms (88 tons) of lead and 227 kilograms (500 pounds) of cadmium.

References:

1. KH Cramer, Hanford Site Waste Management Units Report, May 1987.

Type:	Asbestos (friable)	Amount:	
Category:	Hazardous/Dangerous	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

The Reactor Building is estimated to contain 85.0 cubic meters (3000 cubic feet) of asbestos.

References:

1. KH Cramer, Hanford Site Waste Management Units Report, May 1987.

Dimensions:

Sq. Area:	3,948.38 Square Meters	42499.96 Square Feet
Site Shape:	Not Specified	

Comments:

These dimensions are for the Reactor Building.

References:

1. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.

Site Code: 118-B-8

Site Classification: Accepted

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Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: MSA Mission Support Alliance
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: No
TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit: No **TSD Number:**
RCRA Part A Permit: No **Closure Plan:** No
RCRA Permit Status: Not Specified
Septic Permit: No **216/218 Permit:**
Inert LandFill: No **NPDES:**
Air Operating Permit: No **State Waste Discharge Permit:**
Air Operating Permit Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : None

Remediation and Closure

Decision Document: None
Decision Document Status: None
Closure Document: None
Closure Type: Not Specified

Post Closure Requirments:

Images:

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_01.gif](http://mapweb.rl.gov/widsimg/100b/0110/0110_01.gif) **Date Taken:** 4/1/1963

Description:

A figure from HW-74094 showing a cross-section of the reactor confinement system. The date provided is the date of the document. The figure also has a number of G-132-456.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_02.gif](http://mapweb.rl.gov/widsimg/100b/0110/0110_02.gif) **Date Taken:** 4/1/1963

Description:

A high resolution scan of the previous image. A figure from HW-74094 showing a cross-section of the reactor confinement system. The date provided is the date of the document. The figure also has a number of G-132-45

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Site Classification: Accepted

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Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_03.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_03.jpg)

Date Taken: 9/1/2004

Description:

Photo taken during walkdown is of Drain #1.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_04.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_04.jpg)

Date Taken: 9/1/2004

Description:

105-B French Drain #18 has a rusted metal cover.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_05.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_05.jpg)

Date Taken: 9/1/2004

Description:

French Drain #19 located along the west wall of the 105-B Building.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_06.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_06.jpg)

Date Taken: 9/1/2004

Description:

French Drain #20 located near southwest corner of the 105-B Building.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_07.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_07.jpg)

Date Taken: 9/1/2004

Description:

French Drain #21 located along south wall of 105-B Building.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_08.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_08.jpg)

Date Taken: 9/1/2004

Description:

French Drain labeled 22 by walkdown team located along south wall of 105-B Building.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_09.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_09.jpg)

Date Taken: 9/1/2004

Description:

French Drain identified as #23 is the white-painted, isolated pipe that directly enters the soil.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_10.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_10.jpg)

Date Taken: 9/1/2004

Description:

French Drain #4 is adjacent to the southeast corner of the 105-B Building.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_12.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_12.jpg)

Date Taken: 9/1/2004

Description:

This French Drain #11 is located about 5 meters from the northeast corner of the 105-B Building.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_13.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_13.jpg)

Date Taken: 9/1/2004

Description:

French Drain #12 is a confined space near a northeast corner of the 105-B Building.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_14.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_14.jpg)

Date Taken: 9/1/2004

Description:

French Drain #13 photo shows a clay or concrete pipe adjacent to a northeast corner of the 105-B Building.

Site Code: 118-B-8

Site Classification: Accepted

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Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_15.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_15.jpg)

Date Taken: 9/1/2004

Description:

French Drain #14 is located approximately 2.5 meters from the northeast corner of the 105-B Building.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_16.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_16.jpg)

Date Taken: 9/1/2004

Description:

French Drain #15 is a clay pipe on the northwest corner of the 105-B Building.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_17.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_17.jpg)

Date Taken: 9/1/2004

Description:

French Drain #16 is located near the northwest corner of the 105-B Building.

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_20.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_20.jpg)

Date Taken: 9/3/2003

Description:

Pipeline on left is a concrete pipeline that continues south and into the 105-B Reactor. DS-100BC-027, 118-B-8:3

Pathname: [//mapweb.rl.gov/widsimg/100b/0110/0110_21.jpg](http://mapweb.rl.gov/widsimg/100b/0110/0110_21.jpg)

Date Taken: 9/3/2003

Description:

Inside pipeline. DS-100BC-027 or 028, 118-B-8:3

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.
2. 6/6/2007, Reconfiguration of pipeline discovery segments originally assigned to 100-B-21. Deferred segments went to 118-B-8, 100-B-14, and 100-B-7., 100-B-21 Pipeline segments.
3. Hanford B Reactor Building Hazard Assessment Report, BHI-01282, Rev 0.
4. 105-B Reactor Facility Museum Phase I Feasibility Study Report, BHI-00076, Rev 01.
5. KH Cramer, Hanford Site Waste Management Units Report, May 1987.
6. Mike Hughes, 11/11/1991, Comments on the 1992 Hanford Site Waste Management Units Report Draft.
7. Linda Dietz, 1/21/2004, Subsite information for 100-B-14, 100-B Area Process and Sanitary Sewer Underground Pipelines.
8. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
9. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
10. 8/1/2000, Field Logbook for 100-F Orphan Sites Evaluation, EL-1583-1 through EL-1583-5.

5/22/2012

Waste Information Data System General Summary Report

Site Code: 118-C-1**Site Reclassification Status:** Interim Closed Out

Page 1

Site Names: 118-C-1; 118-C-1 Burial Ground; 105-C Burial Ground; 105-C Solid Waste Burial Ground**Site Type:** Burial Ground**Start Date:** 1/1/1953**Status:** Inactive**End Date:** 1/1/1969**Hanford Area:** 100C**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

The site was a burial ground that contained six small engineered disposal structures (rectangular pits with reinforced side walls) and many trenches running north and south. The site boundaries were permanently marked with concrete posts numbered C-70-1 through C-70-20.

Location Description:

The site was located approximately 152 meters (500 feet) southeast of the 105-C Building.

Process Description:

This site was the primary burial ground for general wastes from the operation of the 105-C Reactor. It received process tubes, aluminum fuel spacers, control rods, reactor hardware, and soft wastes.

Site Comment:

The IU 2/6 Field Remediation Project is authorized to remove SCA and URMA postings associated with the 118-C-1 waste site. The applicable Cleanup Verification Package (CVP-2006-000 11 Rev. 0) has been approved and all SCAs and URMAs associated with this waste site have been surveyed for direct contamination. These surveys have been documented on Radiological Survey Record RSR-600FR-1 1-0233.

The six pits had dimensions of 3.0 by 3.0 meters (10 by 10 feet). PNL-6456 (Stenner et al.) described the trenches as typically 91 by 61 by 6.1 meters (300 by 200 by 20 feet) with a 6.1-meter (20-foot) space between each trench. However, the bottom width of 61 meters (200 feet) was thought to be in error and should be 6.1 meters (20 feet).

Waste Information:**Type:** Equipment**Amount:** 10,000.00**Category:** Mixed**Units:** Cubic Meters**Physical State:** Solid**Reported Date:****Description:**

The unit was used for miscellaneous solid waste from 105-C Building that included process tubes, aluminum spacers, control rods, soft waste, and reactor hardware. The C Area Land Burial log (1962-1965) identified waste as trash, poison splines, dummies, hot laundry, fan filters, irradiated boron balls, ceramic samples, thimbles, gun barrels, and hoses. The Burial Ground ROD reported that an estimate of the waste was 86 metric tons (94 tons) of boron, 1.1 metric tons (1.2 tons) of graphite, 0.51 metric tons (0.56 tons) of lead, 21.6 metric tons (23.8 tons) of lead/cadmium, and 96 metric tons (105.9 tons) of other materials. Potential contaminants include: Ag-108m, C-14, Co-60, Cs-137, Eu-152, Eu-154, Eu-155, H-3, Ni-59, Ni-63, Sr-90, Ba-133, Ca-41, cadmium, Cr+6, lead, boron, mercury, PCBs, SVOAs, TPH, and VOAs.

References:

1. R. G. Bauer, Data Quality Objectives Summary Report for the 100 Area and 300-FF-2 Burial Grounds, BHI-01501.

Site Code: 118-C-1**Site Reclassification Status: Interim Closed Out**

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2. EPA, DOE, WA Dept. of Ecology, Declaration of the Record of Decision 100 Area Burial Grounds.
3. 4/4/1962, C Area Land Burial Log from 4-4-62 to 10-31-65.
4. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
5. R. L. Miller, R. K. Wahlen, Estimates of Solid Waste Buried in 100 Area Burial Grounds Formerly UNI-3908, WHC-EP-0087.
6. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Dimensions:

Length:	155.45 Meters	510.00 Feet
Width:	121.92 Meters	400.00 Feet
Depth/Height:	6.10 Meters	20.00 Feet
Sq. Area:	18,952.22 Square Meters	203999.81 Square Feet
Site Shape:	Trapezoid	

Comments:

The site was a trapezoid shape and measured approximately 155 meters (510 feet) long by 122 meters (400 feet) wide.

References:

1. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
2. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Field Work:

Type: Geophysical Survey
Begin Date: 3/1/2001
End Date: 3/1/2001
Purpose: Locate and map possible debris trench

Comment:

The ground penetrating radar and Electro-magnetic inductance surveys indicate no concentrations of buried debris west of the monuments marking the burial ground. The only concentrations of buried debris associated with detected anomalies were within the burial ground monuments, at the same locations as previously reported in a 1993 geophysical investigation of the 118-C-1 Burial Ground (WHC-SD-EN-TI-138).

References:

1. K.A. Bergstrom, W. K. Hudson, T. H. Mitchell, 5/7/2001, Results of the Geophysical Investigations Conducted at 100 B/C Sites: 118-B-2, 118-B-4, 118-B-5, 118-B-6, 118-B-10, 118-C-1, and 600-33., 088954.

Type: Geophysical Survey
Begin Date: 8/1/1993
End Date: 8/1/1993
Purpose: Map pits, trenches & debris

Comment:

Ten areas of concentrated anomalies were identified. See WHC-SD-EN-TI-138 for full results.

Regulatory Information:

Site Code: 118-C-1

Site Reclassification Status: Interim Closed Out

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Programmatic Responsibility**Responsible****Contractor/Subcontractor:** WCH Washington Closure Hanford**Reclassifying****Contractor/Subcontractor:** None**Responsible Project:** Not Specified**Site Evaluation****Solid Waste Management Unit:** Yes**TPA Waste Management Unit Type :** Waste Disposal Unit**Permitting****RCRA Part B Permit:** No**TSD Number:****RCRA Part A Permit:** No**Closure Plan:** No**RCRA Permit Status:** Not Specified**Septic Permit:** No**216/218 Permit:****Inert LandFill:** No**NPDES:****Air Operating Permit:** No**State Waste****Air Operating Permit****Discharge Permit:****Number(s):****Tri-Party Agreement****Lead Regulatory Agency:** EPA**Unit Category:** CERCLA Past Practice (CPP)**TPA Appendix :** C**Remediation and Closure****Decision Document:** Interim Action Record of Decision, 100 Area Burial Grounds (2000)**Decision Document Status:** Final**Closure Document:** Cleanup Verification Package (CVP)**Closure Type:** Not Specified**Post Closure Requirments:**

Unrestricted use of shallow zone soils permitted, residual contaminant concentrations are protective of groundwater and the Columbia River. However, institutional controls to prevent uncontrolled drilling or excavatic into the deep zone were required.

Closure Group:**Closure Group Name:** CG 118-C-1**Type:** Interim**Remediation Action:**

The cleanup verification package (CVP) CVP-2006-00011 documents that remedial action of the site has met the remedial action objectives (RAOs) and corresponding remedial action goals (RAGs) as established in the Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units, (ROD), and the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP). Remedial action began on February 2, 2004 and was completed on May 27, 2006. Excavation o the ten trenches, (eight oriented in a north-south direction and the other two oriented east to west) involved removing the uncontaminated overburden, the buried contaminated debris, and the underlying contaminated so Visual observations of the buried waste confirmed that the following items had been disposed in the Burial

Ground during its operation: several thousand perforated and non-perforated spacers, piping and tubing, vertical control rods, sheet metal, boron balls, boron ball vacuums, bismuth, paint, high-dose piping, wax, casks, tar, tar paper, miscellaneous metal, mercury tubes, lead items, reactor parts and hardware, Spent Nuclear Fuel (SNF), hydraulic hoses and parts, degraded drums, glassware, concrete, electrical components, and other miscellaneous debris. Photographs of the waste site debris and remediation activities were provided in Appendix B of the CVP. During remedial excavation and sorting, SNF was discovered on September 27, 2004. All remedial activities were suspended until the Authorization Basis could be properly assessed and revised to include the SNF. Load-out operations were re-established on April 11, 2005, for previously sorted and segregated material. All remedial activities (excavation, sorting, and load-out) resumed on October 25, 2005 and were completed on May 27, 2006. Over 75,300 metric tons (83,000 tons) of waste and contaminated soil from the Burial Ground was disposed at the Environmental Restoration Disposal Facility (ERDF). The SNF was transferred to the 100-K Basins for interim storage prior to final packaging and disposal. ERDF and approximately 9,300 bank cubic meters (BCM) of overburden soil was removed for subsequent backfill. At the conclusion of excavation activities, the elevation at the deepest part of the remedial excavation was 146 meters (480 feet) above sea level. The remediation excavation was approximately 20,500 meters squared (220,600 square feet) in area with a maximum depth of approximately 5 meters (17 feet). Waste site contaminants of concern (COCs) and contaminants of potential concern (COPCs) were identified in the RDR/RAWP and included tritium, carbon-14, cesium-137, cobalt-60, nickel-63, strontium-90, silver-108m, europium-152, europium-154, cadmium, lead and mercury. Additional waste site COCs/COPCs were identified for this site based on the observed waste forms found during remediation activities and the results of waste characterization sampling as documented in the Site Specific Instruction (SSI) for Close-Out Approach for 118-C-1. The SSI identified additional COCs/COPCs which included: americium-241, plutonium-238, plutonium-239/240, uranium-233/234, uranium-235, uranium-238, the expanded list of inductively coupled plasma (ICP) metals (arsenic, antimony, barium, beryllium, boron, cadmium, chromium, lead, cobalt, copper, manganese, molybdenum, nickel, selenium, silver, vanadium, and zinc), hexavalent chromium, polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), semi-volatile organic compounds, and volatile organic compounds. Final cleanup verification samples were collected in August and September, 2006 and May 2007 to confirm acceptability of residual contaminant concentrations in the soil. The verification samples were submitted to offsite laboratories for analysis using approved EPA analytical methods, as required per the 100 Area Burial Grounds Remedial Action Sampling and Analysis Plan (SAP). All analytical data were found to be acceptable for decision-making purposes. The evaluation verified that the sample design was sufficient for the purpose of clean site verification. The analytical data results were stored in the Environmental Restoration (ENRE) project-specific database for data evaluation prior to submittal for archival in the Hanford Environmental Information System (HEIS) and were summarized in Appendix A of the CVP. Screening levels were not exceeded for the site constituents, with the exception of barium, boron, copper, lead, and molybdenum. It was believed that the presence of these constituents did not pose a risk to ecological receptors. Concentrations of barium, copper, and lead were within the range of Hanford Site background levels and boron and molybdenum concentrations were consistent with those seen elsewhere at the Hanford Site (no established background value was available for boron or molybdenum). A baseline risk assessment for the river corridor portion of the Hanford Site began in 2004, which includes a more complete quantitative ecological risk assessment. That baseline risk assessment will be used as part of the final closeout decision for this site. The remaining soils at the site were sampled, analyzed, and modeled. The results of this effort indicated that the materials from the site containing COCs at concentrations exceeding RAGs have been excavated and disposed at the ERDF. These results also indicated that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario and that residual concentrations throughout the site pose no threat to groundwater or the Columbia River. Institutional controls are required for the site to prevent uncontrolled drilling or excavation into deep zone soils. The site was verified to be remediated in accordance with the ROD and may be backfilled.

Images:

Site Code: 118-C-1

Site Reclassification Status: Interim Closed Out

Page 5

Pathname: [//mapweb.ri.gov/widsimg/100c/0112/0112_01.jpg](http://mapweb.ri.gov/widsimg/100c/0112/0112_01.jpg)

Date Taken:

Description:

105-C Burial Ground is in foreground, 105-C Reactor in background.

Pathname: [//mapweb.ri.gov/widsimg/100c/0112/0112_02.jpg](http://mapweb.ri.gov/widsimg/100c/0112/0112_02.jpg)

Date Taken: 10/1/2000

Description:

This view is looking east from the center of the western edge of the site.

Pathname: [//mapweb.ri.gov/widsimg/100c/0112/0112_03.jpg](http://mapweb.ri.gov/widsimg/100c/0112/0112_03.jpg)

Date Taken: 12/5/2005

Description:

A piece of reactor hardware removed from the burial ground.

References:

1. K.A. Bergstrom, W. K. Hudson, T. H. Mitchell, 5/7/2001, Results of the Geophysical Investigations Conducted at 100 B/C Sites: 118-B-2, 118-B-4, 118-B-5, 118-B-6, 118-B-10, 118-C-1, and 600-33., 088954.
2. R. G. Bauer, Data Quality Objectives Summary Report for the 100 Area and 300-FF-2 Burial Grounds, BHI-01501.
3. Cleanup Verification Package for the 118-C-1, 105-C Solid Waste Burial Ground, CVP-2006-00011, Rev 0.
4. EPA, DOE, WA Dept. of Ecology, Declaration of the Record of Decision 100 Area Burial Grounds.
5. 4/4/1962, C Area Land Burial Log from 4-4-62 to 10-31-65.
6. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
7. RD Stenner, KH Cramer, DA Lamar, 10/1/1988, Hazard Ranking System Evaluation of CERCLA Inactive Waste Sites at Hanford, PNL-6456 Vol 1, 2, 3.
8. R. L. Miller, R. K. Wahlen, Estimates of Solid Waste Buried in 100 Area Burial Grounds Formerly UNI-3908, WHC-EP-0087.
9. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
10. 1/1/2001, 100 Area Burial Grounds Remedial Action Sampling and Analysis Plan, DOE/RL-2001-35, Rev 0.
11. 1/1/2000, Interim Remedial Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units, EPA, 2000.
12. 1/1/2004, Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev 5.
13. WCH, 3/24/2011, AUTHORIZATION TO DOWNPOST LEGACY WASTE SITES FOLLOWING, WCH CCN 157347.

5/22/2012

Waste Information Data System General Summary Report

Site Code: 118-C-3

Site Classification: Accepted

Page 1

Site Names: 118-C-3; 105-C Reactor Building

Site Type: Reactor

Start Date: 1/1/1952

Status: Inactive

End Date: 1/1/1969

Hanford Area: 100C

Pipe Type: Not Specified

OU/WMA: TBD

Site Description:

The site consists of three subsites: 1) the inactive plutonium production 105-C Reactor Core and ISS Project, 2) 105-C Reactor Building Below-Grade Structures and Underlying Soils, 3) 105-C French Drains.

Location Description:

The site is located in the 100 B/C Area, south of the 105-B reactor.

Process Description:

The facility was a water cooled, graphite moderated nuclear reactor that irradiated uranium fuel rods. The plutonium by-product was extracted from the irradiated rods in the 200 Area Fuel Separations plants. Before the reactor was placed into interim safe storage, the original facility consisted of the reactor block, which included the graphite core, biological and thermal shields, pressure tubes, and the safety and control systems. The irradiated fuel storage basin was constructed below grade. The reactor building was constructed with 0.9 to 1.5-meter (3 to 5-foot) thick concrete walls around the reactor core and corrugated asbestos/cement siding upper walls. The original roof construction was reinforced concrete over the inner rod room and the rear face enclosure and poured insulating concrete over the rest of the building.

Site Comment:

The 105-C Reactor was shut down on April 25, 1969. Deactivation of the reactor was completed in 1971. In 1983, the C Reactor exhaust stack was demolished. The fuel storage basin and metal examination facility basin had been drained and cleaned in 1985. The waste sludge was transferred to the fuel storage area transfer pit. The pit, containing approximately 50,000 kilograms (55 tons) of sludge, was sealed with plywood covers. Institutional control (IC) information has been revised as directed by the U. S. DOE letter, 05-AMRC-0078, 1/4/05, following a review of the Institutional Controls (ICs) in the WIDS. For some sites, including this one, WIDS had shown that no IC restrictions were required but the sites were remediated with deep zone criteria so that ICs actually were required. The ICs for this site have been revised accordingly.

Release Description:

There may have been some seepage from the fuel storage basins, in which case the soil column under the basins may be contaminated. The soil has not been characterized, but the radionuclide inventory is estimated to be low when compared to the total inventory in the reactor.

SubSites:

SubSite Code: 118-C-3:1

SubSite Names: 118-C-3:1; 105-C Reactor Core and ISS Project

Classification: Accepted

ReClassification: None

Description:

Beginning in 1996, decommission activities removed portions of the building, leaving only the reactor core and shield walls. The footprint of the building was reduced 81% during the Interim Safe Storage project from 5,528

Site Code: 118-C-3**Site Classification: Accepted**Page 2

square meters (59,500 square feet) to 1,059 square meters (11,400 square feet).

References:

1. J.F. Armatrout, 12/1/1998, 105-C Reactor Interim Safe Storage Project Final Report, BHI-01231.
-

SubSite Code: 118-C-3:2**SubSite Names:** 118-C-3:2; 105-C Reactor Building Below-Grade Structures and Underlying Soils**Classification:** Accepted**ReClassification:** Closed Out**Description:**

The remedial action involved the decommissioning and decontamination of associated structures and soils at the 105-C Reactor to the extent required leaving only the reactor core to be placed in Interim Safe Storage status. Remediation included the removal of hazardous and radiologically contaminated material from below grade rooms, tunnels and contaminated soils. Contaminated material was disposed of in the Environmental Restoration Disposal Facility (ERDF). The excavated areas were backfilled to grade with clean material.

References:

1. 8/10/2000, Cleanup Verification Package for the 105-C Reactor Building Below-Grade Structures and Underlying Soils, CVP-98-00009.
-

SubSite Code: 118-C-3:3**SubSite Names:** 118-C-3:3; 105-C French Drains**Classification:** Accepted**ReClassification:** Interim Closed Out**Description:**

The subsite is a collection of four french drains roughly located at the four corners of the 105-C Reactor Building. Each french drain was approximately 40.6 centimeters to 61 centimeters (16 inches to 24 inches) in diameter and had a 3.8 centimeter (1.5 inch) pipeline that ran to the french drain.

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.
2. J.F. Armatrout, 12/1/1998, 105-C Reactor Interim Safe Storage Project Final Report, BHI-01231.
3. Cleanup Verification Package for the 100-B-8:1 and 100-C-6:1 100-B/C South Effluent Pipelines, CVP-2003-00022, Rev 0.
4. Remaining Sites Verification Package for the 118-C-3:3 French Drains, (Attachment to Waste Site Reclassification Form 2006-016), RSVP-2006-016.
5. 8/10/2000, Cleanup Verification Package for the 105-C Reactor Building Below-Grade Structures and Underlying Soils, CVP-98-00009.
6. 1/1/2004, 100 Area Remedial Action Sampling and Analysis Plan, DOE/RL-96-22, Rev 4.

Waste Information:**Type:** Equipment**Amount:****Category:** Mixed**Units:** Not Specified**Physical State:** Solid and Liquid**Reported Date:****Description:**

In 1987, the facility was estimated to contain approximately 25,000 curies of radionuclides, 95,000 kilograms (105 tons) of lead, and 200 cubic meters (7000 cubic feet) of asbestos. During the Interim Safe Storage project, approximately 198 cubic meters (6600 cubic feet) of asbestos was removed along with 500 tons of interior and exterior transite panels. During 1996 through 1998, the total estimated inventory of lead was increased to 203

Site Code: 118-C-3

Site Classification: Accepted

Page 3

tons. Seventy tons of lead was removed. Material that was radioactively contaminated was take to the Environmental Restoration Disposal Facility (ERDF).

References:

1. J.F. Armatrou, 12/1/1998, 105-C Reactor Interim Safe Storage Project Final Report, BHI-01231.
2. KH Cramer, Hanford Site Waste Management Units Report, May 1987.

Dimensions:

Sq. Area: 5,527.73 Square Meters 59499.94 Square Feet
Site Shape: Not Specified

Comments:

After the Interim Safe Storage project removed ancillary structures, the total area was reduced to 1,059 cubic meters (11,400 cubic feet).

References:

1. J.F. Armatrou, 12/1/1998, 105-C Reactor Interim Safe Storage Project Final Report, BHI-01231.
2. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.

Field Work:

Type: Analytical Sampling
Begin Date: 3/1/1998
End Date: 9/1/1998
Purpose: Cleanup Verification Samples

Comment:

Seventy eight samples of concrete and soil were collected and analyzed for contaminants of concern that included americium-241, cobalt-60, cesium-137, europium-152, -154, and -155, nickel-63, plutonium-238, 239/240, strontium-90, technetium-99, uranium, hexavalent chromium, lead, mercury and PCBs. Samples were collected at 4.6 meters (15 feet) below ground surface. Sample numbers include B0N680 through B0N759, B0NVM6, B0NVM9, B0NVX6 through B0NVX9, B0NVR0 through B0NVR9, B0NVP0 through B0NVP6 and B0PJV1 through B0PJV9. Sample results showed that no residual contaminants of concern in vadose zone soils pose a threat to human health, groundwater, or the Columbia River.

References:

1. 8/10/2000, Cleanup Verification Package for the 105-C Reactor Building Below-Grade Structures and Underlying Soils, CVP-98-00009.

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: No

Site Code: 118-C-3

Site Classification: Accepted

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TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit :	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
		State Waste	
Air Operating Permit:	No	Discharge Permit:	
Air Operating Permit			
Number(s):			

Tri-Party Agreement

Lead Regulatory Agency:	EPA
Unit Category:	CERCLA Past Practice (CPP)
TPA Appendix :	None

Remediation and Closure

Decision Document:	Interim Remedial Action Record of Decision, 100-BC-1, 100-DR-1, 100-HR-1 (1995)
Decision Document Status:	Final
Closure Document:	None
Closure Type:	Not Specified

Post Closure Requirments:

Institutional controls to prevent uncontrolled drilling or excavations into the deep zone (below 4.6 meters (15 feet) are required.

Images:**Pathname:** [//mapweb.rl.gov/widsimg/100c/0114/0114_02.gif](http://mapweb.rl.gov/widsimg/100c/0114/0114_02.gif)**Date Taken:** 4/1/1963**Description:**

A figure from HW-74094 showing a cross-section of the reactor confinement system. The date provided is the date of the document. The figure also has a number of G-132-476.

Pathname: [//mapweb.rl.gov/widsimg/100c/0114/0114_03.jpg](http://mapweb.rl.gov/widsimg/100c/0114/0114_03.jpg)**Date Taken:** 5/18/1998**Description:**

105-C-Reactor Building looking southeast.

Pathname: [//mapweb.rl.gov/widsimg/100c/0114/0114_04.jpg](http://mapweb.rl.gov/widsimg/100c/0114/0114_04.jpg)**Date Taken:** 5/18/1998**Description:**

105-C Reactor Building looking northeast.

Pathname: [//mapweb.rl.gov/widsimg/100c/0114/0114_05.jpg](http://mapweb.rl.gov/widsimg/100c/0114/0114_05.jpg)**Date Taken:** 5/18/1998**Description:**

105-C Reactor Building looking northwest.

Site Code: 118-C-3

Site Classification: Accepted

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Pathname: [//mapweb.rl.gov/widsimg/100c/0114/0114_06.jpg](http://mapweb.rl.gov/widsimg/100c/0114/0114_06.jpg)

Date Taken: 5/18/1998

Description:

105-C Reactor Building looking west, southwest.

Pathname: [//mapweb.rl.gov/widsimg/100c/0114/0114_07.jpg](http://mapweb.rl.gov/widsimg/100c/0114/0114_07.jpg)

Date Taken: 5/18/1998

Description:

105-C Reactor Building looking west, southwest.

Pathname: [//mapweb.rl.gov/widsimg/100c/0114/0114_08.jpg](http://mapweb.rl.gov/widsimg/100c/0114/0114_08.jpg)

Date Taken: 5/30/1998

Description:

The C Reactor with the safe storage enclosure nearly complete.

Pathname: [//mapweb.rl.gov/widsimg/100c/0114/0114_09.jpg](http://mapweb.rl.gov/widsimg/100c/0114/0114_09.jpg)

Date Taken: 5/30/1998

Description:

105-C Interim Safe Storage (ISS) demolition of the fuel storage basin and metal exam facility.

Pathname: [//mapweb.rl.gov/widsimg/100c/0114/0114_10.jpg](http://mapweb.rl.gov/widsimg/100c/0114/0114_10.jpg)

Date Taken: 1/6/1999

Description:

East side of C Reactor.

References:

1. 1/4/2005, Institutional Controls Data Revisions in WIDS, 05-AMRC-0078.
2. Dennis Faulk, EPA, 1/29/1997, Approved Action Memorandum for the 100 B/C Area Ancillary Facilities and the 108-F Building Removal Action, CCN 042276.
3. 2/1/1997, Data Quality Objectives Summary Report for the Release of 105-C Below-Grade Structures and Underlying Soil, BHI-01035.
4. J.F. Armatrout, 12/1/1998, 105-C Reactor Interim Safe Storage Project Final Report, BHI-01231.
5. KH Cramer, Hanford Site Waste Management Units Report, May 1987.
6. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
7. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
8. R. L. Miller & J. M. Steffes, 7/18/1986, Fuel Storage Basins Cleanup and Stabilization Project Report., UNI-3958.
9. 8/10/2000, Cleanup Verification Package for the 105-C Reactor Building Below-Grade Structures and Underlying Soils, CVP-98-00009.
10. 1/1/1997, Sampling and Analysis Plan for the Release of the 105-C Below Grade Structures and Underlying Soil, DOE/RL-97-37.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 132-B-1

Site Reclassification Status: No Action

Page 1

Site Names: 132-B-1; 108-B Tritium Separation Facility

Site Type: Process Unit/Plant

Start Date: 1/1/1944

Status: Inactive

End Date: 1/1/1975

Hanford Area: 100B

Pipe Type: Not Specified

OU/WMA: 100-BC-1

Site Description:

The 108-B building has been demolished. The decommissioning was completed in May 1985. This site has been evaluated and determined to meet remedial action objectives. The evaluation and sampling results support the reclassification to No Action. The site is now a flat cobble field.

Location Description:

The building was located north of 105-B.

Associated Structures:

The 108-B Dry Well was left undisturbed. The drain line to the 108-B Crib was removed to a point south of the entrance road and capped.

Site Comment:

The 108-B building has been demolished. The decommissioning was completed in May 1985. All the above-grade portions of the building were demolished to a minimum of 3 meters (10 feet) below grade. The clean rubble and debris were disposed in the 184-B Coal Pit. The radiological waste, consisted of lab equipment, cells, drains, and exhaust ducts, were disposed in a 200 Area Burial Ground. The rest of the facility was demolished in situ. The site was covered with at least 1 meter (3 feet) of clean fill and graded to match existing terrain.

The building was composed of a steel frame and concrete block structure with a reinforced concrete foundation and floors. The interior was laid out into many individual rooms that were used for laboratories, office, and change rooms. The original building was 12.5 meters (41 feet) above grade and 3.7 meters (12 feet) below grade. It was 40 meters (132 feet) long, with a 4.9-meter (16-foot) extension for an additional ventilation supply fan. Also, an annex 18 meters (60 feet) long by 9.8 meters (32 feet) wide was added to the southwest corner of the original building.

The intended use of this facility was to provide facilities for the mixing and addition of chemicals used in the treatment of the reactor cooling water. Shortly after the reactor began operation, it was determined that the chemical mixing and addition function could be better performed elsewhere in the cooling water supply system. The 108-B Building was then converted to a tritium recovery processing facility and was utilized as such until 1954. After the tritium processing facility was closed down, operational activity was limited to the first floor. The tube examination hot cell and laboratory rooms located there were utilized until the early 1970's.

Waste Information:

Type: Demolition and Inert Waste

Amount:

Category: Nondangerous/nonradioactive

Units: Not Specified

Physical State: Solid

Reported Date:

Description:

The main radionuclide present at the site is tritium.

References:

Site Code: 132-B-1

Site Reclassification Status: No Action

Page 2

1. M. S. Kitts, 10/10/1991, WIDS Site Addition, 132-B-1.

Dimensions:

Length: 45.11 Meters 148.00 Feet
 Width: 9.75 Meters 32.00 Feet
 Site Shape: Not Specified

References:

1. M. S. Kitts, 10/10/1991, WIDS Site Addition, 132-B-1.

Field Work:

Type: Analytical Sampling
 Begin Date: 6/17/2003
 End Date: 6/17/2003
 Purpose: Calc Brief evaluation

Comment:

During the sampling event selected samples of paint, floor tile, and concrete were analyzed to determine gross alpha, gross beta, and gamma activity. Samples were analyzed on a multi-channel analyzer at the 100-N facility. All results were less than 20 pCi/g beta/gamma and less than 1 pCi/g alpha. Summary results are in Attachment D of Calculation Number 0100--CA-V0126, Rev. 0.

References:

1. 6/17/2003, Waste Site Evaluation for 132-B-1, 108-B Tritium Separation Facility, 0100B-CA-V0126, Rev 0.

Type: Site Walkdown
 Begin Date: 3/18/1998
 End Date: 3/18/1998
 Purpose: Surveillance

Regulatory Information:**Programmatic Responsibility**

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
 Reclassifying Contractor/Subcontractor: None
 Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
 TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit: No TSD Number:
 RCRA Part A Permit: No Closure Plan: No
 RCRA Permit Status: Not Specified
 Septic Permit: No 216/218 Permit:

Site Code: 132-B-1

Site Reclassification Status: No Action

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Inert LandFill: No

NPDES:

Air Operating Permit: No

State Waste

Discharge Permit:

Air Operating Permit
Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA

Unit Category: CERCLA Past Practice (CPP)

TPA Appendix : C

Remediation and Closure

Decision Document: Interim Action Record of Decision, 100 Area Remaining Sites (1999)

Decision Document Status: Final

Closure Document: None

Closure Type: Not Specified

Post Closure Requirments:

Closure Group:

Closure Group Name: CG 132-B-1

Type: Interim

Remediation Action:

Any residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario, and that based on RESidual RADioactivity (RESRAD) modeling, residual concentration at the site pose no threat to groundwater or the Columbia River.

Cleanup Verification:

Verification samples of paint, floor tile, and concrete were collected and analyzed in June 16, 2003. All results were less than 20 pCi/g beta/gamma and less than 1pCi/g alpha.

Statement Of Protectiveness:

The Waste Site Evaluation for 132-B-1, 108-B Tritium Separation Facility (Calculation No. 0100B-CA-V0126) (BI 2003), demonstrated that historical data was of sufficient quality and quantity to support a no action reclassification of the 132-B-1 site. The site achieved the remedial action objectives and the corresponding remedial action goals established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP) (DOE-RL 2002), and the Interim Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 100-CW-3 Operable Units (Remaining Sites ROD) (EPA 1999).

Images:

Pathname: [//mapweb.rl.gov/widsimg/100b/0222/0222_01.jpg](http://mapweb.rl.gov/widsimg/100b/0222/0222_01.jpg)

Date Taken: 3/18/1998

Description:

Photo shows the cobble field where the building once stood.

References:

1. 6/17/2003, Waste Site Evaluation for 132-B-1, 108-B Tritium Separation Facility, 0100B-CA-V0126, Rev 0.
2. M. S. Kitts, 10/10/1991, WIDS Site Addition, 132-B-1.

3. 3/17/2004, Transmittal of Approved Waste Site Reclassification Forms and Supporting Documentation Packages for 12 Waste Sites.
4. J. F. Beckstrom, 5/13/1986, Radiological Release Report for the 108-B Building, UNI-3745.
5. D. G. Kachele, 5/13/1986, 108-B Tritium Separation Facility Decontamination and Decommissioning Project Hanford Site, Individual Facility Report, UNI-3753.
6. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
7. Sampling and Analysis Plan for the 100 Area Remaining Sites,, DOE/RL-99-58, Rev 0.

5/21/2012

Waste Information Data System General Summary Report

Site Code: 132-B-2

Site Classification: Accepted

Page 1

Site Names: 132-B-2; 132-B-2 Stack; 116-B Reactor Exhaust Stack

Site Type: Stack

Start Date: 1/1/1944

Status: Inactive

End Date: 1/1/1968

Hanford Area: 100B

Pipe Type: Not Specified

OU/WMA: Not Applicable

Site Description:

The unit is part of the 105-B Reactor Gas and Exhaust Air System. The unit is still standing and constructed of reinforced concrete with a base diameter of approximately 4.9 meters (16 feet).

Location Description:

The unit is located on the south side of 105-B.

Associated Structures:

Following completion of the confinement project in 1960, the air was diverted via an above-ground aluminum duct and an underground, reinforced concrete duct to the 117-B Filter Building. After flowing through the filters, the air went through a below-grade concrete duct and an above-grade aluminum duct into the exhaust stack.

Waste Information:

Type: Demolition and Inert Waste

Amount:

Category: Radioactive

Units: Not Specified

Physical State: Solid

Reported Date:

Description:

Until the 117 Filter Building was built in 1960, air moving from the least contaminated zones through increasingly contaminated zones was discharged to the unit unfiltered. The unit received low-level contamination from the reactor.

References:

1. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
2. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

Dimensions:

Length: 60.96 Meters 200.00 Feet

Diameter: 5.05 Meters 16.58 Feet

Site Shape: Not Specified

References:

1. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
2. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

Regulatory Information:

Site Code: 132-B-2

Site Classification: Accepted

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Programmatic Responsibility

Responsible Contractor/Subcontractor: MSA Mission Support Alliance
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: No
TPA Waste Management Unit Type : Inactive Contaminated Structure

Permitting

RCRA Part B Permit: No **TSD Number:**
RCRA Part A Permit: No **Closure Plan:** No
RCRA Permit Status: Not Specified
Septic Permit: No **216/218 Permit:**
Inert LandFill: No **NPDES:**
Air Operating Permit: No **State Waste Discharge Permit:**
Air Operating Permit Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: Decontamination & Decommissioning (D&D)
TPA Appendix : None

Remediation and Closure

Decision Document: None
Decision Document Status: None
Closure Document: None
Closure Type: Not Specified

Post Closure Requirments:

Images:

Pathname: [//mapweb.rl.gov/widsimg/100b/0223/0223_01.jpg](http://mapweb.rl.gov/widsimg/100b/0223/0223_01.jpg)

Date Taken: 3/18/1998

Description:

Photo shows the B Reactor main exhaust stack.

References:

1. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
2. Dorian and Richards, 5/26/1978, Radiological Characterization of the Retired 100 Areas, UNI-946.
3. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

Site Code: 132-B-3

Site Reclassification Status: No Action

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Description:

The 91-meter (300-foot) stack was demolished in 1983 and buried at this site. The stack was built of reinforced concrete and had a stainless steel liner. The total radionuclide inventory of the buried stack rubble is 21 millicuries.

References:

1. M. S. Kitts, 10/11/1991, WIDS Site Addition, 132-B-3.
2. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Dimensions:

Length:	76.20 Meters	250.00 Feet
Width:	9.14 Meters	30.00 Feet
Depth/Height:	5.49 Meters	18.00 Feet
Site Shape:	Not Specified	

References:

1. J. F. Beckstrom, M. E. Thurman, 4/7/1986, ARCL Calculations for Decommissioning the 108-B Exhaust Ventilation Stack, UNI-3721.

Field Work:

Type: Site Walkdown
Begin Date: 3/18/1998
End Date: 3/18/1998
Purpose: Surveillance

Regulatory Information:**Programmatic Responsibility**

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified	216/218 Permit:	
Septic Permit:	No	NPDES:	
Inert LandFill:	No	State Waste Discharge Permit:	
Air Operating Permit:	No		

Site Code: 132-B-3

Site Reclassification Status: No Action

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**Air Operating Permit
Number(s):****Tri-Party Agreement**

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Decision Document: Interim Action Record of Decision, 100 Area Remaining Sites (1999)
Decision Document Status: Final
Closure Document: None
Closure Type: Not Specified

Post Closure Requirments:**Closure Group:**

Closure Group Name: CG 132-B-3
Type: Interim

Remediation Action:

Prior to demolition, surveys were conducted in the void beneath the liner and in the area inside the stack from the bottom of the liner to the 16 foot level. After removal of a layer of dust and dirt from an area around the liner floor drain, direct beta-gamma readings were <100 cpm/probe area inside the stack up to the 16 foot level. Alpha radiation was not detected with portable survey instruments. To determine the depth of penetration, concrete cores were collected from the inner stack surface to a depth of 3/8 inches at the 32-ft and 64-ft levels and submitted for analysis. The stack was demolished with explosives on September 9, 1983, under the allowable residual contamination level (ARCL) method in conjunction with in-situ decommissioning for permanent disposal. A valve and a drain line had been removed by the time the stack was demolished. Some rubble from the stack fell across the perimeter road and was pushed into the 132-B-3 Trench with heavy earth moving equipment. Most of the rubble, however, fell directly into the trench. After the stack was destroyed and buried, the foundation was demolished in place. The entire area was covered with clean fill material. The uncontaminated stack foundation was demolished separately in place.

Statement Of Protectiveness:

In 2003, a waste site evaluation (0100B-CA-V0127) was done. The evaluation and historical data support reclassification to "No Action" as documented in the attached reclass form, control number 2003-11. It was determined that the site had achieved the remedial action objectives and the corresponding remedial action goals established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP) (DOE-RL 2002) and the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 100-CW-3 Operable Units (EPA 1999). Residual soil concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario and pose no threat to groundwater or the Columbia River based on RESidual RADioactivity (RESRAD) modeling.

Images:

Site Code: 132-B-3

Site Reclassification Status: No Action

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Pathname: [//mapweb.rl.gov/widsimg/100b/0224/0224_01.jpg](http://mapweb.rl.gov/widsimg/100b/0224/0224_01.jpg)

Date Taken: 3/18/1998

Description:

Photo shows the field where the felled stack was buried. The location is not marked.

References:

1. 6/1/2003, Waste Site Evaluation for 132-B-3, 108-B Ventilation Exhaust Stack Site, 0100B-CA-V0127, Rev 2.
2. M. S. Kitts, 10/11/1991, WIDS Site Addition, 132-B-3.
3. 3/17/2004, Transmittal of Approved Waste Site Reclassification Forms and Supporting Documentation Packages for 12 Waste Sites.
4. Dorian and Richards, 5/26/1978, Radiological Characterization of the Retired 100 Areas, UNI-946.
5. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
6. J. F. Beckstrom, M. E. Thurman, 4/7/1986, ARCL Calculations for Decommissioning the 108-B Exhaust Ventilation Stack, UNI-3721.
7. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 132-B-4

Site Reclassification Status: No Action

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Site Names: 132-B-4; 117-B Filter Building

Site Type: Process Unit/Plant

Start Date: 1/1/1961

Status: Inactive

End Date: 1/1/1968

Hanford Area: 100B

Pipe Type: Not Specified

OU/WMA: 100-BC-1

Site Description:

Historical data compiled for the Calculation Brief 0100B-CA-V0128 was of sufficient quality and quantity to support reclassification of the waste site to No Action.

The ventilation exhaust filter building housed blowers and particulate filters used to treat the ventilation exhausted from the B Reactor Building. Included in this site were the 117-B Building, the intake ventilation duct from the 105-D Reactor Building, and the exhaust ventilation ducts to the 116-B Reactor Exhaust Stack.

Location Description:

The site was located south of the 105-B Reactor, southwest of the 116-B Stack (132-B-2).

Process Description:

The building and below grade duct work were made of reinforced concrete, 0.3 to 0.6 meters (1 to 2 feet) thick; above grade ducts were constructed of 10 gauge black steel. The building was 16.76 meters (55 feet) long, 7.01 meters (23 feet) wide, and 11.0 meters (36 feet) high with 2.4 meters (8 feet) above grade. A soil berm was built up around the building from grade level to the top of the structure. The building was divided into two large filter cells with a smaller operating area between them. The filter cells each held six filter frames (two wide and three deep). The filter frames were designed to hold twenty-eight filters that were 0.6 meters (2 feet) square by 0.3 meters (1 foot) thick. There were spaces between the frames to allow access for filter maintenance. The operating area between the two cells was divided into two levels. The upper level, called the access gallery had ten doors that lead from it. Four doors opened into each of the filter cells and the two other doors provided access to the intake and exhaust ducts. The operating gallery was located below the access gallery. A sump was located at each end of the operating gallery to collect incidental drainage from above. A large open area extended the full length of the structure above the access gallery and the filter cells. It ranged in height between 2.5 and 2.4 meters (8.1 and 7.8 feet) due to the structure's sloping roof. The space provided access to the cement cover blocks that were positioned over each of the filter frames. Before the filter building was used, unfiltered ventilation was exhausted directly from the reactor to the atmosphere. The reactor confinement system diverted the exhaust just before the stack and routed it to the filter building where it passed through a series of filters. The filtered exhaust was then routed back to the ventilation exhaust stack where it was discharged to the atmosphere. Sealwells within the filter building provided the ability to direct the exhaust into one or both of the filter cells.

Associated Structures:

The site was associated with the 105-B Reactor (118-B-8), the 116-B Stack (132-B-2), the 119-B Sample Building, and the 117-B Seal Pit Crib (116-B-12).

Site Comment:

During investigation of the site for the 100-B Area Technical Baseline Report (WHC-SD-EN-TI-220), a small subsidence area at the site was barricaded with light duty post and chain fencing. The subsidence was posted with "Danger" warning signs. The 117-B Building was constructed as part of the Reactor Confinement Project (Project CGI-791). During the project filter buildings were installed at the eight original Hanford area reactors. The project included construction of the filter buildings and the exhaust air sample buildings. The filter buildings were designed and situated to allow space for a second filter building and a halogen scrubber building. The

Site Code: 132-B-4**Site Reclassification Status: No Action**

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additional structures were never built. The design criteria for the Reactor Confinement Project are documented in HW-5765 2. The site was decommissioned using Allowable Residual Contamination Level (ARCL) methodology. Demolition and final site grading were completed January 1988. The building and ducts were excavated and demolished in situ. The contaminated rubble was buried at least 1 meter (3.3 feet) deep, except for rubble from the seal pits, which was buried under a minimum of 5 meters (16 feet) of clean earth.

Waste Information:

Type:	Demolition and Inert Waste	Amount:	
Category:	Radioactive	Units:	Not Specified
Physical State:	Solid	Reported Date:	

Description:

The site contained radiologically contaminated debris. Total radionuclide inventory in this unit was estimated to be 92 nanocuries. The radionuclides comprising this inventory were tritium, carbon-14, cesium-137, strontium-90, and plutonium-239/240. Of these radionuclides, strontium-90 was the most restrictive in the allowable residual contamination level (ARCL) calculations. Cobalt-60, europium-152, europium-153, and europium-155 were not identified in any of the samples analyzed.

References:

1. 2/8/1991, WIDS Site Addition, 132-B-4.
2. D. E. Smoot, 10/18/1989, Facility Decommissioning Report for the 117-B Exhaust Filter Building, WHC-SD-DD-TI-045.

Dimensions:

Length:	16.76 Meters	55.00 Feet
Width:	7.01 Meters	23.00 Feet
Site Shape:	Rectangle	

Comments:

The width increases to 11.99 meters (39.33 feet) if the ducts are included.

References:

1. General Electric, 8/14/1964, PLAN COVER SLAB & DETAILS FILTER BUILDING, H-1-19836, Rev 4.

Field Work:

Type:	Geophysical Survey
Begin Date:	2/1/2003
End Date:	2/1/2003
Purpose:	Investigation

Comment:

The building was located within an area with a high concentration of subsurface debris.

References:

1. Bergstrom and Mitchell, 6/25/2003, Geophysical Site Investigation, 100-B-1, 100-B-3, 126-B-3, 128-B-2, 132-B-4, 132-B-5, 100-C-3, 116-C-3, 128-C-1, 132-C-1, 132-C-3, 128-K-1, 128-D-1, 128-D-2, 600-30, 628-3, 128-F-1, 128-F-3, 600-52, 600-139,-600-176, 600-201, 600-107, and 600-204, IOM 108137.

Site Code: 132-B-4

Site Reclassification Status: No Action

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Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit: No **TSD Number:**
RCRA Part A Permit: No **Closure Plan:** No
RCRA Permit Status: Not Specified
Septic Permit: No **216/218 Permit:**
Inert LandFill: No **NPDES:**
Air Operating Permit: No **State Waste Discharge Permit:**
Air Operating Permit Number(s):

Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Decision Document: Interim Action Record of Decision, 100 Area Remaining Sites (1999)
Decision Document Status: Final
Closure Document: Cleanup Verification Package (CVP)
Closure Type: Not Specified

Post Closure Requirments:

Closure Group:

Closure Group Name: CG 132-B-4
Type: Interim
Reclassification Status: **Reclassified On:** 4/2/2003

Remediation Action:

The Waste Site Evaluation for 132-B-4, 117-B Filter Building (Calculation No. 0100B-CA-V0128) (BHI 2003), demonstrates that the historical data available is of sufficient quality and quantity to support the no action inter closure. The site achieved the remedial action objectives and the corresponding remedial action goals established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP) (DOE-RL 2002), implemented for the Interim Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 100-CW-3 Operable Units (Remaining Sites ROD) (EPA 1999).

The 117-B Filter Building and associated below-grade ductwork were demolished in two phases beginning in March 1985 and continuing through January 1988. Phase I included work necessary prior to demolition activities and included extensive radiological surveying and sampling, the removal of assorted equipment (e.g., HEPA filters) for disposal in the 200 West Area burial grounds, and decontamination and/or fixing contamination. As part of Phase I activities, a calculation methodology known as Allowable Residual Contamination Level (ARCL) was used to evaluate the potential radiological dose to a hypothetical, maximally exposed site resident if the site were released for unrestricted use after the demolition and burial in situ of the facility. The ARCL calculations were prepared in accordance with Allowable Residual Contamination Levels for Decommissioning Facilities in the 100 Areas of the Hanford Site (UNC 1983) and authorized by the U.S. Department of Energy, Richland Operations Office. The radionuclide inventories in the 117-B Filter Building and the inlet/outlet ducts were determined from radiological surveys, isotopic analyses, and from previously collected data that are discussed in UNC (1978).

It has been determined that any residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario, and that based on RESRAD modeling, residual concentrations at the site pose no threat to groundwater or the Columbia River.

References:

1. V.R. Dronen, 9/29/2003, Transmittal of Approved Waste Site Reclassification Forms and Supporting Documentation Packages, CCN 109878.
2. 2/8/1991, WIDS Site Addition, 132-B-4.
3. Bergstrom and Mitchell, 6/25/2003, Geophysical Site Investigation, 100-B-1, 100-B-3, 126-B-3, 128-B-2, 132-B-4, 132-B-5, 100-C-3, 116-C-3, 128-C-1, 132-C-1, 132-C-3, 128-K-1, 128-D-1, 128-D-2, 600-30, 628-3, 128-F-1, 128-F-3, 600-52, 600-139, 600-176, 600-201, 600-107, and 600-204, IOM 108137.
4. Walker, R. C., 4/13/1959, Project CGI-791 - Reactor Confinement Design Criteria for Phase II Filter Building Facility, HW-57665 2.
5. 4/2/2003, Waste Site Reclassification Form with Calculation Brief attachment, control # 2003-10, WSRF-2003-10.
6. S. K. Kiser, Hanford Surplus Facilities Programs Facilities Listings and Descriptions, WHC-SP-0331.
7. D. E. Smoot, 10/18/1989, Facility Decommissioning Report for the 117-B Exhaust Filter Building, WHC-SD-DD-TI-045.
8. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
9. M. G. Isaacson, 6/10/1987, ARCL Calculations for Decommissioning the 117-B Filter Building, UNI-4042.
10. General Electric, 7/8/1962, PLOT PLAN 117-B FILTER BUILDING, H-1-19801, Rev 4.
11. General Electric, 4/14/1960, VENTILATION SECOND STAGE FILTER BANK ASSEMBLY, H -1-19869, Rev 3.
12. General Electric, 3/18/1963, STRUCTURAL CONCRETE SECTIONS & DETAILS FILTER BUILDING, H-1-19838, Rev 4.
13. General Electric, 8/14/1964, PLAN COVER SLAB & DETAILS FILTER BUILDING, H-1-19836, Rev 4.
14. General Electric, 6/25/1962, FOUNDATION PLAN & DETAILS FILTER BUILDING, H -1-19835, Rev 6.
15. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
16. Sampling and Analysis Plan for the 100 Area Remaining Sites,, DOE/RL-99-58, Rev 0.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 132-B-5**Site Reclassification Status:** No Action

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Site Names: 132-B-5; 115-B/C Gas Recirculation Facility**Site Type:** Process Unit/Plant**Start Date:** 1/1/1944**Status:** Inactive**End Date:** 1/1/1968**Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-1**Site Description:**

The building was demolished in 1989. This waste site has been evaluated and determined to meet remedial action objectives. The evaluation supports reclassification to "No Action".

The waste site was a single-story reinforced concrete structure with a basement. It was 6.1 meters (20 feet) above and 3.4 meters (11 feet) below grade, and the width ranged from 22 meters (72 feet) to 30 meters (98 feet). It included vacuum and pressure seal pit and tunnels.

Location Description:

The site was located south of 105-B.

Associated Structures:

100-B-11, 115-B/C Caisson Site

Site Comment:

The building was demolished in situ, in 1989 in two phases, using ARCL methodology. Ninety-seven concrete samples and 20 gas recirculation pipe samples were taken throughout the 115-B/C Recirculation Facility. The at- and below-grade structures (floor slab, walls, footing pedestals, tunnel roof and walls, pipes and other structures) were exposed by excavating and demolishing to at least 1 meter (3.3 feet) below grade. The resulting rubble was placed in the basement and tunnels for in situ disposal. Tunnel demolition was restricted due to a suspected radioactive waste burial site 100-B-11 (115-B/C Caisson) located directly over the tunnel about 23 meters (75 feet) north of the unit. The 115-B/C Caisson was removed and disposed of as hazardous waste. The ground around the caisson was sampled for metals and found to be below EP Toxic Metal limits. A highly contaminated thimble from the 105-B Reactor Building had been buried in a trench just west of this site. Phase 1 demolition included extensive radiological characterization, removal of process equipment (e.g. HEPA filters) for disposal in the 200 Area and facility decontamination. The Phase II demolition and grading were performed using conventional heavy equipment and completed in 1989. RESRAD modeling was performed in 2003 to provide another data point. The RESRAD modeling accounts for radioactive decay from 1989 (the year of the building demolition), and predicts that none of the contaminants detected will reach groundwater within 1,000 years.

Waste Information:**Type:** Demolition and Inert Waste**Amount:****Category:** Radioactive**Units:** Not Specified**Physical State:** Solid**Reported Date:****Description:**

The resident radionuclides are tritium, carbon-14, cobalt-60, strontium-90, cesium-137, europium-152, and plutonium-239.

References:

- 11/30/1990, WIDS Site Addition, 132-B-5.

Site Code: 132-B-5

Site Reclassification Status: No Action

Page 2

2. P. W. Griffin, 9/28/1989, Facility Decommissioning Report for the 115-B/C Gas Recirculation Facility, WHC-SD-DD-TI-042.

Dimensions:

Length:	51.21 Meters	168.00 Feet
Width:	29.87 Meters	98.00 Feet
Depth/Height:	3.35 Meters	11.00 Feet
Site Shape:	Not Specified	

References:

1. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
2. 6/2/1989, Dose Assessment for the 115-B/C Gas Recirculation Facility, SD-DD-TI-035.

Field Work:

Type: Geophysical Survey
Begin Date: 2/1/2003
End Date: 2/1/2003
Purpose: Investigation

Comment:

The building foundation was located within an area with a large amount of detected debris.

References:

1. Tom Mitchell, Kevin Bergstrom, 2/20/2003, Geophysical Site Investigation Forms for February 2003.

Regulatory Information:**Programmatic Responsibility**

Responsible Contractor/Subcontractor:	WCH	Washington Closure Hanford
Reclassifying Contractor/Subcontractor:		None
Responsible Project:		Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit :	No	Closure Plan:	No
RCRA Permit Status:	Not Specified	216/218 Permit:	
Septic Permit:	No	NPDES:	
Inert LandFill:	No	State Waste Discharge Permit:	
Air Operating Permit Number(s):	No		

Site Code: 132-B-5

Site Reclassification Status: No Action

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Tri-Party Agreement

Lead Regulatory Agency: EPA
Unit Category: CERCLA Past Practice (CPP)
TPA Appendix : C

Remediation and Closure

Decision Document: Interim Action Record of Decision, 100 Area Remaining Sites (1999)
Decision Document Status: Final
Closure Document: None
Closure Type: Not Specified

Post Closure Requirments:**Closure Group:**

Closure Group Name: CG 132-B-5
Type: Interim

Remediation Action:

As part of Phase I Decommissioning activities, a calculation methodology known as "allowable residual contamination level" (ARCL) was used to evaluate the potential radiological dose to a hypothetical, maximally exposed site resident, if the site was released for unrestricted use after the demolition and burial in situ of the facility. The ARCL calculation results indicated that the facility was ready for demolition activities. The Phase I demolition and grading were performed using conventional heavy equipment and completed in 1989. The above-grade structure was demolished to within a foot or two of the protective concrete cap (added during Phase I)on the process cell floors. The rubble and remaining clean equipment were removed for disposal in the area landfill. The at- and below-grade structure (floor slabs, foundation walls, footing pedestal, tunnel roof and walls, and piping) was demolished to at least 1 m (3.3 ft) below grade, and the resulting rubble was placed in the basement for in situ disposal. The area was backfilled to grade with clean fill material from a nearby borrow pit at the Hanford Site. The project decommissioned in situ the tunnel from the 115-B/C Building north for approximately 15.2 meters(50 ft).Tunnel demolition was restricted due to a suspected burial site of radioactive waste (100-B-11) located directly over directly over the tunnel about 28.9 meters (75 ft) north of the 115-B/C Building. The 115-B/C Building below grade piping connecting the gas facility with the 105-B and 105-C reactor are internally contaminated. In general, the levels of radiation are relatively low, less than 1mR/hr. Ten pipeline samples were taken from each of the "B" and "C" pipeline loops and were radiologically characterized.

Institutional Controls:

All contamination was in the shallow zone (above 4.6 meters [15 ft]), thus no institutional controls are required.

Statement Of Protectiveness:

In 2003 the Waste Site Evaluation for 132-B-5, 115-B/C Gas Recirculation Facility (Calculation No. 0100B-CA-V0129) (BHI 2003) demonstrated that the site evaluation and historical data supported reclassification to "No Action" of the site. The site had achieved the remedial action objectives and the corresponding remedial action goals established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP) (DOE-RL 2002) and the Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units (EPA 1999). Residual soil concentrations support future land uses that can be represented (or bounded) by a rural-residential scenario and pose no threat to groundwater or the Columbia River based on RESidual RADioactivity (RESRAD) modeling.

Site Code: 132-B-5

Site Reclassification Status: No Action

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Images:

Pathname: [//mapweb.ri.gov/widsimg/100b/0226/0226_04.jpg](http://mapweb.ri.gov/widsimg/100b/0226/0226_04.jpg)

Date Taken: 1/3/1990

Description:

Demolished site.

Pathname: [//mapweb.ri.gov/widsimg/100b/0226/0226_05.jpg](http://mapweb.ri.gov/widsimg/100b/0226/0226_05.jpg)

Date Taken: 1/3/1990

Description:

Demolished site.

Pathname: [//mapweb.ri.gov/widsimg/100b/0226/0226_06.jpg](http://mapweb.ri.gov/widsimg/100b/0226/0226_06.jpg)

Date Taken: 4/24/1989

Description:

Gas circulation facility is being demolished.

References:

1. 6/10/2003, Waste Site Evaluation for 132-B-5, 115 B/C Gas Recirculation Facility, 0100B-CA-V0129, Rev 2.
2. Tom Mitchell, Kevin Bergstrom, 2/20/2003, Geophysical Site Investigation Forms for February 2003.
3. 11/30/1990, WIDS Site Addition, 132-B-5.
4. 3/17/2004, Transmittal of Approved Waste Site Reclassification Forms and Supporting Documentation Packages for 12 Waste Sites.
5. P. W. Griffin, 9/28/1989, Facility Decommissioning Report for the 115-B/C Gas Recirculation Facility, WHC-SD-DD-TI-042.
6. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
7. 6/2/1989, Dose Assessment for the 115-B/C Gas Recirculation Facility, SD-DD-TI-035.
8. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 132-C-1**Site Reclassification Status:** No Action

Page 1

Site Names: 132-C-1; 105-C Reactor Stack Site; 116-C Reactor Exhaust Stack Site**Site Type:** Burial Ground**Start Date:** 1/1/1952**Status:** Inactive**End Date:** 1/1/1969**Hanford Area:** 100C**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

The site has been reclassified to "No Action". The stack was demolished with explosives in September 1983. The rubble was pushed into a trench. This waste site is the burial area that contains the rubble from the 105-C Reactor Stack, also known as the 116-C Reactor Exhaust Stack. The reactor stack was 5.1 meters (16.6 feet) in diameter and 61 meters (200 feet) high. It operated from 1952 through 1969, exhausting confinement air from the work areas in the reactor. The site currently appears as a vegetation-free, cobble-covered field adjacent to the 100-C Reactor. There are no markings or posts to identify it.

Process Description:

Exhaust air flowed through concrete ducts from the 105-C Building directly out the exhaust stack. Following completion of the confinement project in the 1950's, the air was diverted via underground, reinforced concrete ducts to the 117-C Filter Building. After flowing through the filters, the air went through below-grade and above-grade concrete ducts into the exhaust stack.

Associated Structures:

Air was exhausted from the 105-C Reactor Building and the 117-C Filter Building.

Site Comment:

Prior to the early 1950's, the stack had been connected to the 105-C Reactor building by an above ground concrete structure, and was connected to the 117-C Building by two tunnels. Initially, exhaust air flowed through concrete ducts and was released directly to the atmosphere through the stack. Unfiltered radioactive materials were thus allowed to pass through the reactor stack. In 1983, the unit was demolished and buried in-situ between the 117-C Building and the 105-C Reactor Building. The 116-C stack, also identified as the 132-C-1 site in the Waste Information Data System, was used to dispose of exhaust air that originated from work areas within the 105-C Reactor Building beginning in 1952. Operation of the stack was shut down in 1969. Extensive survey and sampling activities were performed to characterize residual radiological contamination on the accessible internal surface areas of the 117-C Facility in preparation for demolition decisions. The 116-C stack and foundation were demolished by explosives in September 1983. The trench containing the stack rubble and the foundation base were covered with clean fill to a depth of at least 1 meter (3.3 feet) and the area was graded to conform with the natural area topography. RESRAD modeling was performed in 2003 to provide another data point. The contaminated material was modeled as a 0.013 meter (0.5 inches) thick layer as buried in the 61 meter (200 foot) by 9.1 meter (30 feet) waste site beneath 1 meter (3.3 feet) of clean soil fill and above two uncontaminated, unsaturated zone layers of concrete and soil, respectively. The RESRAD modeling accounts for radioactive decay from 1983 (the year of demolition) to 2003 and predicts that none of the contaminants will reach groundwater within 1,000 years.

Waste Information:**Type:** Demolition and Inert Waste**Amount:****Category:** Radioactive**Units:** Not Specified**Physical State:** Solid**Reported Date:**

Site Code: 132-C-1

Site Reclassification Status: No Action

Page 2

Description:

Sampling of the stack inlet was performed in 1976, using standard smear techniques. Low-level beta and gamma radiation was detected in the stack. It was estimated that the interior of the unit contained approximately 2.8 millicuries of radioactive materials. At the time of demolition (1983), the interior of the reactor stack contained approximately 2 millicuries of radioactive materials.

References:

1. K. A. Gano to N. A. Homan, 10/21/1988, WHC Mem.: Comments on the Hanford Site Waste Management Units Report.
2. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Dimensions:

Length:	60.96 Meters	200.00 Feet
Width:	9.14 Meters	30.00 Feet
Depth/Height:	5.49 Meters	18.00 Feet
Site Shape:	Rectangle	

Comments:

These are approximations of the trench dimensions.

References:

1. E. W. Powers and J. M. Steffes, 7/24/1986, 116-C, -F, and -H REACTOR EXHAUST VENTILATION STACK DEMOLITION HANFORD SITE INDIVIDUAL FACILITY REPORT, UNI-3855.

Field Work:

Type: Geophysical Survey
Begin Date: 2/1/2003
End Date: 2/1/2003
Purpose: Investigation

Comment:

The GPR anomalies characteristic of a buried stack are located slightly south of the mapped location.

References:

1. Tom Mitchell, Kevin Bergstrom, 2/20/2003, Geophysical Site Investigation Forms for February 2003.

Regulatory Information:**Programmatic Responsibility**

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

Site Code: 132-C-1

Site Reclassification Status: No Action

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RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	
		State Waste	
Air Operating Permit:	No	Discharge Permit:	
Air Operating Permit Number(s):			

Tri-Party Agreement

Lead Regulatory Agency:	EPA
Unit Category:	CERCLA Past Practice (CPP)
TPA Appendix :	C

Remediation and Closure

Decision Document:	Interim Action Record of Decision, 100 Area Remaining Sites (1999)
Decision Document Status:	Final
Closure Document:	Cleanup Verification Package (CVP)
Closure Type:	Not Specified

Post Closure Requirments:**Closure Group:**

Closure Group Name:	CG 132-C-1
Type:	Interim

Remediation Action:

The stack and foundation were demolished with explosives in September 1983. Rubble from the stack foundation was pushed into the trench using heavy equipment. The remainder of the stack was buried in place. The trench containing the stack rubble and the foundation base were covered with clean fill to a depth of at least 1 meter (3.3 ft). The area was graded to conform with the natural area topography. Five concrete core samples were collected from the stack to establish the radionuclide inventory and depth of contaminant penetration. Samples were collected at elevations above, below, and approximately equal to the inlet duct.

An evaluation of the historical data and RESRAD models supports no action interim closure of the 132-C-1 site. The site achieved the remedial action objectives and the corresponding remedial action goals established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP) (DOE/RL-96-17) and the Interim Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 100-CW-3 Operable Units (Remaining Sites ROD) (EPA/1999). Residual soil concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario and pose no threat to groundwater or the Columbia River based on RESRAD modeling.

References:

1. 6/10/2003, Waste Site Evaluation for 132-C-1, 116-C Reactor Exhaust Stack Site, 0100B-CA-V0130, Rev 2.
2. V.R. Dronen, 9/29/2003, Transmittal of Approved Waste Site Reclassification Forms and Supporting Documentation Packages, CCN 109878.

3. Tom Mitchell, Kevin Bergstrom, 2/20/2003, Geophysical Site Investigation Forms for February 2003.
4. K. A. Gano to N. A. Homan, 10/21/1988, WHC Mem.: Comments on the Hanford Site Waste Management Units Report.
5. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
6. 9/1/2003, Waste Site Reclassification Form with attachment, Control # 2003-26, WSRF-2003-26.
7. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
8. E. W. Powers and J. M. Steffes, 7/24/1986, 116-C, -F, and -H REACTOR EXHAUST VENTILATION STACK DEMOLITION HANFORD SITE INDIVIDUAL FACILITY REPORT, UNI -3855.
9. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.
10. Scott Kitts to Nancy Homan, 4/17/1990, 100N updates for WIDS, DSI.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 132-C-3**Site Reclassification Status:** No Action

Page 1

Site Names: 132-C-3; 117-C Filter Building**Site Type:** Process Unit/Plant**Start Date:** 1/1/1961**Status:** Inactive**End Date:** 1/1/1969**Hanford Area:** 100C**Pipe Type:** Not Specified**OU/WMA:** 100-BC-2**Site Description:**

The waste site has been evaluated and reclassified to "No Action". Facility demolition and site grading were performed in October and November 1988. The site now resembles a gravel parking lot.

Location Description:

The site was located east of the southeast corner of the 105-C Reactor Building.

Process Description:

The 117-C building was a reinforced concrete structure that was 10.7 meters (35 feet) high, and was constructed such that approximately 8.2 meters (27 feet) was below-grade, and 2.4 meters (8 feet) was above grade. The maximum thickness of the walls and floors was 0.6 meters (2 feet), while the majority was 0.3 meters (1 foot) thick or less. The ducts were made of reinforced concrete with a maximum wall thickness of 30 centimeters (12 inches). The inlet tunnel was approximately 12 meters (40 feet) long, and the exhaust tunnel was approximately 18 meters (60 feet) long.

Associated Structures:

The building received exhaust fan discharge through an inlet duct from the 105-C Reactor Building and discharged the filtered air through a discharge duct and out the 116-C Stack.

Site Comment:

The 117-C Filter Building began operation in 1961 to filter 105-C Reactor exhaust air before its routing to the 116-C Exhaust Stack. The 117-C Filter Building was shut down in 1969. Phase I decommissioning of the 117-C Filter Building and associated below-grade ductwork work was completed in 1984. Contaminated equipment (e.g., high-efficiency particulate air filters, pumps, frames) removed from the facility was packaged and shipped to the 200 West Area burial grounds for disposal as low-level radioactive waste. No asbestos, mercury, or other nonradioactive hazardous materials were found in the 117-C Facility. Following equipment removal, decontamination consisted mainly of using Masslin cloth to wipe down the vinyl-based coating on the exposed surfaces and, in some cases, by application of a sweeping compound and vacuum cleaner.

The site was decommissioned using Allowable Residual Contamination Level (ARCL) methodology. Demolition and site grading were performed in October and November 1988. The building and ducts were excavated and demolished in situ. The contaminated rubble was buried at least 1 meter (3.3 feet) deep, except for the rubble from the seal pits which were buried under a minimum of 5 meters (16 feet) of clean earth.

RESRAD modeling was performed in 2003 to provide another data point and reported in a Calc brief (0100B-CA-V0131, Rev. 2). The RESRAD modeling accounts for radioactive decay from 1988 (the year of building demolition) to 2003, and predicts that none of the contaminants detected in the paint will reach groundwater within 1,000 years.

Waste Information:**Type:** Demolition and Inert Waste**Amount:****Category:** Radioactive**Units:**

Not Specified

Site Code: 132-C-3

Site Reclassification Status: No Action

Page 2

Physical State: Solid

Reported Date:

Description:

Total radionuclide inventory in this unit is estimated to be 0.84 millicuries. The radionuclides comprising this inventory are tritium, carbon-14, cobalt-60, cesium-137, strontium-90, europium-154, plutonium-152, and plutonium-239/240. Of these radionuclides, strontium-90 is the most restrictive in the Allowable Residual Contamination Level (ARCL) calculations.

References:

1. 2/8/1991, WIDS Site Addition, 132-C-3.
2. P. W. Griffin, 7/13/1989, 117-C Exhaust Filter Building, Facility Decommissioning Report, SD-DD-TI-038.

Dimensions:

Length:	16.86 Meters	55.33 Feet
Width:	7.01 Meters	23.00 Feet
Site Shape:	Rectangle	

Comments:

The width increases to 12.09 meters (39.67 feet) if the ducts are included.

References:

1. General Electric, 8/14/1964, PLAN COVER SLAB & DETAILS FILTER BUILDING, H-1-19836, Rev 4.

Field Work:

Type: Geophysical Survey
Begin Date: 2/1/2003
End Date: 2/1/2003
Purpose: Investigation

Comment:

A high concentration of buried debris and rubble were identified where the 132-C building had been located.

References:

1. Tom Mitchell, Kevin Bergstrom, 2/20/2003, Geophysical Site Investigation Forms for February 2003.

Regulatory Information:**Programmatic Responsibility**

Responsible Contractor/Subcontractor:	WCH	Washington Closure Hanford
Reclassifying Contractor/Subcontractor:		None
Responsible Project:		Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Waste Disposal Unit

Permitting

RCRA Part B Permit: No **TSD Number:**

Statement Of Protectiveness:

Based on this evaluation, the historical data supports No Action Interim Closure of 132-C-3. The site achieves the remedial action objectives and the corresponding remedial action goals established in the Remedial Design Report/Remedial Action Work Plan for the 100 Area (RDR/RAWP) (DOE-RL 2002), implemented for the Interim Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 100-CW-3 Operable Units (Remaining Sites ROD) (EPA 1999). Air residual concentrations will support future land uses that can be represented (or bounded) by a rural -resident scenario, and that based on RESRAD modeling, residual concentrations at the site pose no threat to groundwater or the Columbia River.

References:

1. 6/10/2003, Waste Site Evaluation for 132-C-3, 117-C Filter Building, 0100B-CA-V0131, Rev 2.
2. V.R. Dronen, 9/29/2003, Transmittal of Approved Waste Site Reclassification Forms and Supporting Documentation Packages, CCN 109878.
3. Tom Mitchell, Kevin Bergstrom, 2/20/2003, Geophysical Site Investigation Forms for February 2003.
4. 2/8/1991, WIDS Site Addition, 132-C-3.
5. 9/11/2003, Waste Site Reclassification Form with attachment, Control # 2003-24, WSRF-2003-24.
6. S. K. Kiser, Hanford Surplus Facilities Programs Facilities Listings and Descriptions, WHC-SP-0331.
7. J. F. Beckstrom, 4/25/1985, ARCL Calculations for Decommissioning the 117-C Filter Building, UNI-3415.
8. P. W. Griffin, 7/13/1989, 117-C Exhaust Filter Building, Facility Decommissioning Report, SD-DD-TI-038.
9. 6/12/1959, Plot Plan 117-C Filter Building, H-1-19806, Rev 3.
10. General Electric, 8/14/1964, PLAN COVER SLAB & DETAILS FILTER BUILDING, H-1-19836, Rev 4.
11. Interim Action Record of Decision for the 100-BC-1 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington (Remaining Sites ROD), EPA, 1999.

5/17/2012

Waste Information Data System General Summary Report

Site Code: 1607-B5**Site Classification:** Accepted

Page 1

Site Names: 1607-B5; 1607-B5 Septic Tank System; 124-B-4; 1607-B4; 1607-B4 Sanitary Sewer System; 1607-B4 Septic Tank System

Site Type: Septic Tank**Start Date:** 1/1/1944**Status:** Inactive**End Date:****Hanford Area:** 100B**Pipe Type:** Not Specified**OU/WMA:** 100-BC-1**Site Description:**

The septic tank can be identified by a 20 centimeter (8 inch) capped steel vent pipe. The cap is stamped with the words septic tank. It is surrounded by a vegetation-free graveled parking lot. The pipe extends above grad about 0.76 meters (2.5 feet). The drain field runs southeast of the tank. The residue in the tank was sampled in January 2001. Elevated levels of cesium resulted in the tank being posted with Underground Radioactive Material signs. The tank was not backfilled. In 2007, analysis of additional samples of tank contents found no radiological constituents above background in either the liquid or sludge waste in the tank. For this reason, the site was down posted from URMA status. HEIS numbers for the 2007 sampling effort are: liquid--J14XJ3, J14XJ4, J14XJ5, and J14XJ6; sludge--J14XH9, J14XJ0, J14XJ1, and J14XJ2.

Location Description:

The site is located southeast of the 181-B/C Pump House.

Process Description:

The unit received sanitary sewage from the 181 B/C Pumphouse.

Associated Structures:

The site is associated with the 181-B pump house building.

Site Comment:

The residue in the tank was sampled in January 2001. Elevated levels of cesium resulted in the tank being posted with Underground Radioactive Material signs. The tank was not backfilled. The discrepancy between the site name and aliases reflects the fact that an incorrect name was used to identify this site for several years. The 1607-B4, 1607-B5, and 1607-B6 septic tanks had all been misnamed. This problem was discovered through a review of the M-1904-B drawings, and the site names were correctly reassigned in 1991. DOE/RL-94-61, Appendix N, designated the cleanup action of this site to be regulated under other authorities, which for uncontaminated septic systems is the Washington Department of Health.

Waste Information:**Type:** Sanitary Sewage**Amount:** 35.00**Category:** Radioactive**Units:** Gallons Per Day**Physical State:** Liquid**Reported Date:****Start Date:** 1/1/1944**End Date:****Description:**

This unit received sanitary sewage from 181-B/C River Pumphouse. The flow rate to the unit was estimated at approximately 35 gal/day (130 L/day). In January 2001, the tank was sampled and analyzed for radionuclides. All radionuclides were undetected except for cesium-137, which was 38.3 picocuries per liter and gross beta, which was 1.8 picocuries per liter.

Site Code: 1607-B5

Site Classification: Accepted

Page 2

References:

1. KH Cramer, Hanford Site Waste Management Units Report, May 1987.
2. Curt Clement, 1/31/2002, Sample Results, 600-152 & 1607-B5.

Dimensions:

Length:	1.22 Meters	4.00 Feet
Width:	0.61 Meters	2.00 Feet
Depth/Height:	2.54 Meters	8.33 Feet
Site Shape:	Not Specified	

References:

1. Septic Tanks Plan and Sections, W-71192, Rev 31.
2. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.

Field Work:

Type: Analytical Sampling
Begin Date: 1/29/2001
End Date: 1/29/2001
Purpose: Sample residue in septic tank

Comment:

The residue in the tank was analyzed for radionuclides. The residue looked like rainwater. All radionuclides were undetected except for cesium-137, which was 38.3 picocuries per liter and gross beta, which was 1.8 picocuries per liter.

References:

1. 2/6/2001, WSCF Analytical Laboratory Report, Site 1607-B5, 20010148.
2. Curt Clement, 1/31/2002, Sample Results, 600-152 & 1607-B5.

Regulatory Information:

Programmatic Responsibility

Responsible Contractor/Subcontractor: WCH Washington Closure Hanford
Reclassifying Contractor/Subcontractor: None
Responsible Project: Not Specified

Site Evaluation

Solid Waste Management Unit: Yes
TPA Waste Management Unit Type : Not Specified

Permitting

RCRA Part B Permit:	No	TSD Number:	
RCRA Part A Permit:	No	Closure Plan:	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	216/218 Permit:	
Inert LandFill:	No	NPDES:	

Site Code: 1607-B5

Site Classification: Accepted

Page 3

Air Operating Permit: No
Air Operating Permit Number(s):
State Waste Discharge Permit:
Tri-Party Agreement

Lead Regulatory Agency: Not Specified
Unit Category: Septic
TPA Appendix : C

Remediation and Closure

Decision Document: Explanation of Significant Difference for the 100 Area Remaining Sites Interim ROD (8/2009)
Decision Document Status: Final
Closure Document: None
Closure Type: Not Specified

Post Closure Requirments:

Images:

Pathname: [//mapweb.rl.gov/widsimg/100b/0252/0252_01.jpg](http://mapweb.rl.gov/widsimg/100b/0252/0252_01.jpg) Date Taken: 10/31/2001

Description:

This photo, provided by Curt Clement (Fluor Hanford) shows the access port to 1607-B5.

Pathname: [//mapweb.rl.gov/widsimg/100b/0252/0252_02.jpg](http://mapweb.rl.gov/widsimg/100b/0252/0252_02.jpg) Date Taken: 7/31/2002

Description:

Photo shows access port of the septic posted "Underground Radioactive Material Area".

References:

1. 2/6/2001, WSCF Analytical Laboratory Report, Site 1607-B5, 20010148.
2. KH Cramer, Hanford Site Waste Management Units Report, May 1987.
3. Curt J. Clement, 5/1/2000, Updates to WIDS.
4. Curt Clement, 1/31/2002, Sample Results, 600-152 & 1607-B5.
5. 8/31/1955, Outside Sewer Lines, M-1904-B SHTS 2,3,4,5,8,9.
6. Septic Tanks Plan and Sections, W-71192, Rev 31.
7. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC -SD-EN-TI-220.
8. Remedy Selection Process for Remaining Source Operable Unit Waste Sites, DOE/RL-94-61, Appendix N, Rev 0.

- 1 WD-WSEB-3-9, 2006, *Nitrate/Nitrite in Drinking Water*, Environmental Fact Sheet, New Hampshire
2 Department of Environmental Services, Concord, New Hampshire, Available at:
3 <http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-3-9.pdf>.
- 4 WHC-EP-0878, 1995, *Coordination of Groundwater Activities in the 100 N Area*, Westinghouse Hanford
5 Company, Richland, Washington. Available at:
6 [http://www.osti.gov/bridge/purl.cover.jsp;jsessionid=8AF50C7A5552B76CCD2E7CC7D328](http://www.osti.gov/bridge/purl.cover.jsp;jsessionid=8AF50C7A5552B76CCD2E7CC7D328D3C0?purl=/152001-9tLMGf/webviewable/)
7 [D3C0?purl=/152001-9tLMGf/webviewable/](http://www.osti.gov/bridge/purl.cover.jsp;jsessionid=8AF50C7A5552B76CCD2E7CC7D328D3C0?purl=/152001-9tLMGf/webviewable/).
- 8 WHC-SA-2755-FP, 1994, *Testing of a Benchscale Reverse Osmosis/Coupled Transport System for*
9 *Treating Contaminated Groundwater*, Westinghouse Hanford Company, Richland,
10 Washington. Available at: [http://www.osti.gov/bridge/purl.cover.jsp?purl=/39792-](http://www.osti.gov/bridge/purl.cover.jsp?purl=/39792-4V6qxY/webviewable/)
11 [4V6qxY/webviewable/](http://www.osti.gov/bridge/purl.cover.jsp?purl=/39792-4V6qxY/webviewable/).
- 12 WHC-SD-EN-TI-268, 1994, *100 Area Soil Washing: Bench-Scale Tests on 116-F-4 Pluto Crib Soil*,
13 Rev. 0, Westinghouse Hanford Company, Richland, Washington. Available at:
14 <http://www5.hanford.gov/arpir/?content=findpage&AKey=D196076370>.
- 15 Wielinga, Bruce, Midori M. Mizuba, Colleen M. Hansel, and Scott Fendorf, 2001 “Iron Promoted
16 Reduction of Chromate by Dissimilatory Iron-Reducing Bacteria,” *Environ. Sci.*
17 *Technol.* 35(3):522-527.
- 18 WMP-27397, 2006, *Evaluation of Vadose Zone Treatment Technologies to Immobilize Technetium-99*,
19 Rev. 1, Fluor Hanford, Inc., Richland, Washington. Available at:
20 <http://www.osti.gov/bridge/servlets/purl/881671-UJgKGO/>.
- 21 WSRC-RP-97-849, *Groundwater Treatment at SRS: An Innovative Approach*, Rev. 2, Westinghouse
22 Savannah River Company, Savannah, South Carolina. Available at:
23 <http://www.osti.gov/bridge/purl.cover.jsp?purl=/606063-xoBGs8/webviewable/>.
- 24 WSRC-RP-97-854, 1999, *Corrective Measures Implementation/Remedial Design Report/Remedial*
25 *Action Work Plan (CMI/RDR/RAWP) for the F-Area Seepage Basin (904-49G) (U)*, Rev. 1,
26 U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho.
- 27 WSRC-TR-2005-00198, *Enhanced Attenuation: A Reference Guide on Approaches to Increase the*
28 *Natural Treatment Capacity of a System*, Rev. 0., Westinghouse Savannah River Company,
29 Aiken, South Carolina. Available at: [http://www.clu-](http://www.clu-in.org/download/contaminantfocus/tce/DOE_EA_doc.pdf)
30 [in.org/download/contaminantfocus/tce/DOE_EA_doc.pdf](http://www.clu-in.org/download/contaminantfocus/tce/DOE_EA_doc.pdf).
- 31 Wu, Youxian and Baolin Deng, 2006, “Inhibition of FeS on Chromium (III) Oxidation by Biogenic
32 Manganese Oxides,” *Environmental Engineering Science* 23(3):552-560.
- 33 Zhong, Lirong, Nikolla P. Qafoku, James E. Szecsody, P. Evan Dresel, and Zhuanfang F. Zhang, 2009,
34 “Foam Delivery of Calcium Polysulfide to Vadose Zone for Chromium(VI) Immobilization:
35 A Laboratory Evaluation,” *Vadose Zone Journal* 8(4):976-985. Available at:
36 <https://www.soils.org/publications/vzj/pdfs/8/4/976>.

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