ATTACHMENT 1 FACILITY DESCRIPTION and MAPS of Facility Locations consisting of:

- Introduction of the INTEC Post-Closure Permit for the Volume 21 Waste Calcining Facility and CPP-601/627/640

- Part A Permit Application of the INTEC Post-Closure Permit for the Volume 21 Waste Calcining Facility and CPP-601/627/640

- Facility Description, Section A of the INTEC Post-Closure Permit for the Volume 21 Waste Calcining Facility and CPP-601/627/640

- Facility Location Information, Section F of the INTEC Post-Closure Permit for the Volume 21 Waste Calcining Facility and CPP-601/627/640

- Description of Topographic Maps, Section I, and Waste Calcining Facility and CPP-601/627/640 Topographic Map of the INTEC Post-Closure Permit for the Volume 21 Waste Calcining Facility and CPP-601/627/640

- Waste Calcining Facility and CPP-601/627/640 Closure Plans of the INTEC Post-Closure Permit for the Volume 21 Waste Calcining Facility and CPP-601/627/640

- Required Notices of the INTEC Post-Closure Permit for the Volume 21 Waste Calcining Facility and CPP-601/627/640

HWMA/RCRA INTEC POST-CLOSURE PERMIT
FOR THE
IDAHO NATIONAL LABORATORY

Volume 21
Waste Calcining Facility and CPP-601/627/640

Attachment 1
Introduction

Revision Date: August 25, 2011

Hazardous Waste Management Act/Resource Conservation and Recovery Act INTEC Post-Closure Permit

INTRODUCTION

This Hazardous Waste Management Act/Resource Conservation and Recovery Act Post-Closure Part B Permit is for the Waste Calcining Facility and CPP-601/627/640, located at the Idaho Nuclear Technology and Engineering Center of the U.S. Department of Energy's Idaho National Laboratory. The Department of Energy employs a variety of contractors to operate the Idaho National Laboratory's numerous facilities and operations. This permit consists of the following sections:

Attachment 1

- Introduction
- Part A Permit Application
- Facility Description
- Facility Location Information
- Topographic Map
- WCF Closure Plan
- Required Notices

Attachment 2

- Security Procedures and Equipment
- Preparedness and Prevention Waiver
- General and Specific Inspection Schedule
- Maintenance Activities
- Inspection Forms
- Sampling and Analysis Plan Table

Attachment 3

- Additional Information - Summary of Groundwater Monitoring Data Collected Under Interim Status
- Geologic and Hydrogeologic Characterization of the INEEL at INTEC

U.S. EPA Region 9 Preliminary Remediation Goals User Guide

Attachment 4

Permit Modification Log and Page Change Out List

BACKGROUND

The Waste Calcining Facility (WCF) is located within the Idaho Nuclear Technology and Engineering Center (INTEC) at the Department of Energy's Idaho National Laboratory (INL) Site. The WCF was used to calcine and evaporate aqueous wastes generated from the reprocessing of spent nuclear fuel (SNF). The WCF calciner operated from 1963 through 1981 and the evaporator system operated from 1983 until 1987. The WCF was closed under an approved Hazardous Waste Management Act (HWMA) closure plan. The WCF was closed with waste in place and covered with a low permeability concrete cap meeting the closure performance standards of Idaho Administrative Procedures Act (IDAPA) 58.01.05.009 [40 Code of Federal Regulations (CFR) §§ 265.111 and 265.310(a)]. The Idaho Department of Environmental Quality (DEQ)[1] approved the closure certification on November 2, 1999.

The CPP-601/627/640 Facility is located at the INTEC on the INL Site. The CPP-601/627/640 facility was part of the spent fuel reprocessing complex at the INTEC, which was used to recover enriched uranium for reuse. The facility included separation, chemical makeup and transfer, and liquid waste receiving processes in the waste collection system. The uranium processing mission for the facility started in mid-1950 and was terminated in 1992.

CPP-601/627/640 was closed under approved HWMA/RCRA closure plans. CPP-601/627/640 was closed with waste in place and covered with a low permeability concrete cap meeting the closure performance standards of IDAPA 58.01.05.008 [40 CFR §§ 264.111 and 264.310]. The DEQ determined that the Deep Tank System Landfill Closure – Phase 1 was completed in accordance with the approved closure plan, and the closure was approved by the DEQ on February 19, 2010. Therefore, the HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill became effective

[1] On July 1, 2000, the Division of Environmental Quality, a division of the Idaho Department of Health and Welfare, was elevated to the Idaho Department of Environmental Quality.

on February 19, 2010, and groundwater monitoring began in April 2010. The HWMA/RCRA Post-Closure Plan CPP-601/627/640 Landfill – Phase 2 was approved by the DEQ on September 30, 2010.

Regulatory Background

In accordance with IDAPA 58.01.05.012 [40 CFR § 270.1(c)], owners and operators of landfills that certify closure after July 26, 1982, must 1) have post-closure permits, 2) demonstrate closure by removal, or 3) receive enforceable documents in lieu of post-closure permits.

HWMA/RCRA Requirements

The approved HWMA Closure Plan for the Waste Calcining Facility at the Idaho National Laboratory (referred to as the HWMA WCF Closure Plan), dated June 1997, indicated that the post-closure requirements of the WCF would be integrated with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) post-Record of Decision (ROD) requirements and managed under the CERCLA program. The DEQ approved this provision to eliminate duplication of effort between the HWMA/RCRA and CERCLA programs and to minimize long-term maintenance costs.

In the November 2, 1999, approval of the WCF closure certification, DEQ restated that the HWMA/RCRA post-closure requirements would be addressed as applicable or relevant and appropriate requirements under the post-ROD monitoring plan. The DEQ also required that, in the interim, INL submit a plan addressing the cap maintenance and groundwater monitoring requirements of IDAPA 58.01.05.009 [40 CFR § 265.310(b)]. Between February 1, 2000, and December 8, 2000, INL submitted a revised interim post-closure plan and groundwater monitoring proposal. On February 13, 2001, DEQ rejected the interim WCF post-closure monitoring plan and indicated that allowing INL to address the post-closure monitoring requirements under the pending Federal Facilities Agreement and Consent Order (FFA/CO) actions at INTEC had not yielded the desired results. DEQ then requested submittal of a Part B permit application for post-closure care at the WCF. Therefore, language in the approved HWMA WCF Closure Plan allowing post-closure care under the FFA/CO was superceded and the requirements for post-closure care are performed in accordance with the HWMA/RCRA post-closure permit issued with an effective date of October 16, 2003.

Phase 2 of the HWMA/RCRA closure plan for CPP-601/627/640 is for landfill closure. The landfill results from the closure of the CPP-601 Deep Tanks System and the integration of this tank

system closure with the decommissioning of the CPP-601 Fuel Reprocessing Facility, CPP-627 Remote Analytical Facility, and CPP-640 Headend Processing Plant. Phase 1 landfill closure activities were completed and included decontamination and grouting of the CPP-601 Deep Tanks System. Building CPP-627 was decommissioned and removed to grade under a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) non-time-critical removal action. Buildings CPP-601 and -640 are being decommissioned under a separate non-time-critical removal action. During the Phase 1 post-closure period, under the CPP-601/640 non-time-critical removal action, Buildings CPP-601 and -640 were partially demolished, and grout was being used to fill interior void areas, creating a solid monolith. This, along with the concrete pad created near grade during the CPP-627 decommissioning, created an interim cover for the landfill. Phase 2 of the landfill closure is the installation of a sloped layer of grout over the horizontal surfaces of the CPP-601/640 monolith followed by an earthen weather protection barrier designed to cover the entire CPP-601/627/640 monolith. The final end state for the CPP/601/627/640 landfill is expected to be integrated with the final end state for the surrounding northern Idaho Nuclear Technology and Engineering Center facilities in approximately 2035 through coordination of the HWMA/RCRA and CERCLA programs.

This permit demonstrates how the INL complies with the IDAPA 58.01.05.008 (40 CFR § 264) post-closure requirements for permitted facilities. These include maintaining and monitoring the landfill cap, preventing run-on and runoff, protecting and maintaining surveyed benchmarks, identifying a post-closure point of contact, and post-closure certification.

FFA/CO Requirements

In 1991, the U.S. Environmental Protection Agency (EPA) Region 10, the Idaho Department of Health and Welfare, and the U.S. DOE entered into the FFA/CO (EPA et al. 1991). The general purpose of the FFA/CO was multifold:

- Ensure that the environmental impacts associated with releases of hazardous substances at INL were thoroughly investigated and that appropriate response actions were undertaken and completed as necessary to protect the public health, welfare, and the environment

- Establish a procedural framework and schedule for developing, prioritizing, implementing, and monitoring appropriate response actions at INL in accordance with CERCLA, RCRA, and HWMA requirements

- Facilitate cooperation, exchange of information, and participation of the parties in such actions
- Minimize duplication of analyses and documentation
- Expedite the cleanup process to the maximum extent practicable, consistent with protection of human health and the environment
- Supersede the Consent Order and Compliance Agreement, Docket No. 1086-05-16-3008/3013, issued pursuant to Section 3008 of RCRA, 42 U.S.C. § 6928, and executed on July 10, 1987.

The agreement integrated U.S. DOE's CERCLA response obligations and HWMA/RCRA corrective action obligations at the INL as related to releases covered under the agreement. The agreement covered releases that would be subject to corrective action under Sections 3004 (u) and (v) of RCRA, 42 U.S.C. § 6924(u) and (v), for a RCRA permit and CERCLA 42, U.S.C. § 9601 et seq.

The INTEC Waste Area Group (WAG) 3 is one of ten WAGs identified in the FFA/CO. Operable Unit (OU) 3-13, encompassing the entire INTEC facility, was investigated through a comprehensive remedial investigation/feasibility study (RI/FS) to identify potential contaminant releases and exposure pathways (DOE-ID 1997). Those with potential risks (46) were subdivided into groups (1 through 5) based on similar media, contaminant(s) of concern (COC), accessibility, or geographic proximity (DOE-ID 2000a, 2000b). Through the RI/FS, it was found that the footprint of the WCF landfill cap impacted one release site below the WCF building, three release sites existed external to the WCF building, and releases had occurred to the soils around the WCF building. In addition, eight historical release points were identified beneath the CPP-601/627/640 buildings.

In addition to the HWMA/RCRA post-closure activities conducted under this permit, characterization and monitoring activities occur under the CERCLA Monitoring System Implementation Plans for the perched water in the vadose zone below the INTEC (Group 4). Releases to the WCF and CPP-601/627/640 soils are being managed under "Group 2, Soils Under Buildings and Structures," and "Group 3, Other Surface Soils," under the WAG 3, OU 3-13 Record of Decision (DOE-ID 1999). A new OU, 3-14, has been established to specifically address releases at the Tank Farm Facility (TFF).

HWMA/RCRA INTEC POST-CLOSURE PERMIT
FOR THE
IDAHO NATIONAL LABORATORY

Volume 21
Waste Calcining Facility and CPP-604/627/640

Attachment 1
Part A Permit Application

Revision Date: August 25, 2011

OMB#: 2050-0034 Expires 11/30/2011

SEND COMPLETED FORM TO: The appropriate State or Regional Office.	United States Environmental Protection Agency **RCRA SUBTITLE C SITE IDENTIFICATION FORM**	
1. Reason for Submittal MARK ALL BOX(ES) THAT APPLY	**Reason for Submittal:** ❑ To provide an Initial Notification (first time submitting site identification information / to obtain an EPA ID number for this location). ❑ To provide Subsequent Notification of Regulated Waste Activity (to update site identification information for this location). ❑ As a component of a First RCRA Hazardous Waste Part A Permit Application. ☒ As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment # **HWMA/RCRA INTEC Post-Closure Permit, Modification Date: August 25, 2011**) ❑ As a component of the Hazardous Waste Report (If marked, see sub-bullet below)	
	❑ Site was a TSD facility and/or generator of ≥1,000 kg of hazardous waste, >1 kg of acute hazardous waste, or >100 kg of acute hazardous waste spill cleanup in one or more months of the report year (or State equivalent LQG regulations	
2. Site EPA ID Number	**EPA ID Number:** **ID4890008952**	
3. Site Name	**Name:** **IDAHO NATIONAL LABORATORY**	
4. Site Location Information	**Street Address:**	
	City, Town, or Village: **SCOVILLE**	**County:** **BUTTE. CLARK, JEFFERSON, BONNEVILLE, BINGHAM**
	State: **ID**	**Country:** **USA** / **Zip Code:** **83415**
5. Site Land Type	❑ Private ❑ County ❑ District ☒ Federal ❑ Tribal ❑ Municipal ❑ State ❑ Other	
6. NAICS Code(s) for the Site (at least 5-digit codes)	**A.** **92411**	**B.** **54171**
	C. **336992**	**D.** **Not Applicable**
7. Site Mailing Address	**Street or P. O. Box:** **1955 FREMONT AVENUE**	
	City, Town, or Village: **IDAHO FALLS**	
	State: **ID**	**Country:** **USA** / **Zip Code:** **83415**
8. Site Contact Person	**First Name:** **DONALD**	**MI:** **N** / **Last Name:** **RASCH**
	Title: **Team Lead, Compliance Team, Environmental Technical Support Division**	
	Street or P. O. Box: **1955 FREMONT AVENUE**	
	City, Town, or Village: **IDAHO FALLS**	
	State: **ID**	**Country:** **USA** / **Zip Code:** **83415**
	Email: **RASCHDN@ID.DOE.GOV**	
	Phone: **(208) 526-1511**	**Ext.:** **N/A** / **Fax:** **208-526-1926**
9. Legal Owner and Operator of the Site	**A. Name of Site's Legal Owner:** **US DEPARTMENT OF ENERGY IDAHO OPERATIONS OFFICE**	**Date Became Owner:** **01/01/1952**
	Owner Type: ❑ Private ❑ County ❑ District ☒ Federal ❑ Tribal ❑ Municipal ❑ State ❑ Other	
	Street or P. O. Box: **1955 FREMONT AVENUE**	**Phone:** **(208) 526-1511**
	State: **ID**	**Country:** **USA** / **Zip Code:** **83415**
	B. Name of Sites Operator: **CH2M-WG Idaho, LLC**	**Date Became Operator:** **05/01/2005**
	Operator Type: ☒ Private ❑ County ❑ District ❑ Federal ❑ Tribal ❑ Municipal ❑ State ❑ Other	

10. Type of Regulated Waste Activity (at your site)

Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities; Complete all parts 1-7.

Y ☒ N ❑ 1. Generator of Hazardous Waste

If "Yes" mark only one of the following - a,b, or c

☒ a. LQG: Generates, in any calendar month, 1,000 kg/mo kg/mo (2,200 lbs./mo) or more of hazardous waste; **or** Generates an any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lbs./mo) of acute hazardous waste **or** Generates, in any calendar month **or** accumulates at any time, more than 199 kg/mo (220 lbs./mo) of acute hazardous spill cleanup material.

❑ b. SQG: 100 to 1,000 kg/mo (220 - 2,200 lbs./mo.) of non-acute hazardous waste.

❑ c. CESQG: Less than 100 kg/mo (220 lbs./mo.) of non-acute hazardous waste

If "Yes" above, indicate other generator activities.

Y ❑ N ☒ d. Short-Term Generator (generate from a short term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section

Y ☒ N ❑ e. United States Importer of Hazardous Waste

Y ☒ N ❑ f. Mixed Waste (hazardous and radioactive) Generator

Y☒ N ❑ 2. Transporter of Hazardous Waste. If "Yes", mark all that apply

☒ a. Transporter

❑ b. Transfer Facility (at your site)

Y☒ N ❑ 3. Treater, Storer, or Disposer of Hazardous Waste: Note: A hazardous waste permit is required for these activities

Y☒ N ❑ 4. Recycler of Hazardous Waste

Y❑ N ☒ 5. Exempt Boiler and/or Industrial Furnace. If "Yes", mark all that apply.

❑ a. Small Quantity On-site Burner Exemption

❑ b. Smelting, Melting, and Refining Furnace Exemption

Y❑ N ☒ 6. Underground Injection Control

Y☒ N ❑ 7. Receives Hazardous Waste from Off-site

B. Universal Waste Activities; Complete all parts 1-2

Y☒ N ❑ 1. Large Quantity Handler of Universal Waste (you accumulate 5,000 kg or more) [refer to your State regulations to determine what is regulated]. Indicate types of universal waste managed at your site. If "Yes", mark all that apply

a. Batteries	☒
b. Pesticides	☒
c. Mercury containing equipment	☒
d. Lamps	☒
e. Other (specify)_____	❑
f. Other (specify)_____	❑
g. Other (specify)_____	❑

Y ☒ N ❑ 2. Destination Facility for Universal Waste

Note: A hazardous waspte permit may be required for this activity

C. Used Oil Activities; Complete all parts 1-4.

Y❑ N ☒ 1. Used Oil Transporter

If "Yes", mark all that apply.

❑ a. Transporter

❑ b. Transfer Facility

Y❑ N ☒ 2. Used Oil Processor and/or Re-refiner

If "Yes", mark each that applies

❑ a. Processor

❑ b. Re-refiner

Y❑ N ☒ 3. Off-Specification Used Oil Burner

Y❑ N ☒ 4. Used Oil Fuel Marketer

If "Yes", mark each that applies

❑ a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner

❑ b. Marketer Who First Claims the Used Oil Meets the Specifications

D. Eligible Academic Entities with Laboratories - Notification for opting into or witdrawing from managing laboratory hazardous wastes pursuant to 40 CFR Part 262 Subpart K.

♦ You must check with your State to determine if you are eligible to manage laboratory hazardous wastes pursuant to 40 CFR Part 262 Subpart K

❑ 1. Opting into or currently operating under 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories

See the item-by-item instructions for definitions of types of eligible academic entities. Mark all that apply:

❑a. College or University

❑b. Teaching Hospital that is owned by or has a formal written affilation agreement with a college or university

❑c. Non-profit Institute that is owned by or has a formal written affiliation agreement with a college or university

❑ 2. Withdrawing from 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories

11. Description of Hazardous Wastes

A. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more spaces are needed.

See Attached Form OMB#: 2050-0034, Item 9 page(s) 5 of 6

B. Waste Codes for State-Regulated (i.e., non-Federal) Hazardous Wastes. Please List the waste codes of the State-regulated hazardous wastes handled at your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed.

12. Notification of Hazardous Secondary Material (HSM) Activity

Y☐ N ☒ Are you notifying under 40 CFR 260.41 that you will begin managing, are managing or will stop managing hazardous secondary material under 40 CFR 261.2(2)(2)(ii), 40 CFR 261.4(2)(23), (24), or (25)?

If "Yes", you must fill out the Addendum to the Site Identification Form: Notification for Managing Hazardous Secondary Material.

13. Comments

14. Certification. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. For the RCRA Hazardous Part A Permit Application, all owner(s) and operator(s) must sign (se 40 CFR 270.10(b) and 270.11).

Signature of legal owner, operator, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
For Kevin Daniels	K. W. Daniels, Vice President, CH2M-WG, Idaho, LLC.	03/29/2011
	R. B. Provencher, Manager, Department of Energy Idaho Operations Office	4/27/2011

EPA ID NO: ID4890008952 OMB#: 2050-0034; Expires 7/31/2012

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT INFORMATION FORM

1. Facility Permit Contact	First Name: **DONALD**	MI: **N**	Last Name: **RASCH**
	Contact Title: **Team Lead, Compliance Team, Environmental Technical Support Division**		
	Phone: **(208) 526-1511**	Ext.: **N/A**	Email: **RASCHDN@ID.DOE.GOV**
2. Facility Permit Contact Mailing Address	Street or P.O. Box: **1955 FREMONT AVENUE**		
	City, Town, or Village: **IDAHO FALLS**		
	State: **ID**		
	Country: **USA**		Zip Code: **83415**
3. Operator Mailing Address and Telephone Number	Street or P.O. Box: **P.O. BOX 2010**		
	City, Town, or Village: **IDAHO FALLS**		
	State: **ID**		Phone: **(208) 533-3475**
	Country: **USA**		Zip Code: **83403-2010**
4. Facility Existence Date	Facility Existence Date (mm/dd/yyyy): **06/01/1949**		

5. Other Environmental Permits

A. Facility Type *(Enter code)*	B. Permit Number												C. Description
R	I	D	4	8	9	0	0	0	8	9	5	2	Final HWMA Storage & Treatment Permit for the INTEC on the INL (Volumes 14 and 18)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Part B Permit Application for the INL (Volume 3)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Part B Post-Closure Permit for the INL - Waste Calcining Facility (Volume 21)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Part B Storage Permit for the CSSF at the INTEC on the INL (Volume 22)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Part B Storage and Treatment Permit for the EBR-II located at the MFC on the INL (PER-120)
R	I	D	4	8	9	0	0	0	8	9	5	2	HWMA/RCRA Part A Permit Application for the INL (Volume 1)
P, E, U													See Additional Information Supplement to Item 5 - Other Permits List

6. Nature of Business

The Idaho National Laboratory (INL) was established in 1949, as a center where nuclear power reactors and support facilities could be built, tested, and operated. The INL site covers approximately 890 square miles and is 25 miles west of Idaho Falls, ID. For many years the INL was the site of the largest nuclear power research & development effort in the world. During the 1970's the INL's mission broadened to include such areas as biotechnology, energy and materials research, and conservation and renewable energy. At the end of the Cold War, waste treatment and cleanup of previously contaminated sites became a priority. Today the INL is a science-based, applied engineering national laboratory dedicated to completing its waste cleanup mission and meeting the nation's environmental, energy, nuclear science and technology, and national security needs. Additionally, in 2002, it was announced that the INL will serve as the nation's leading nuclear technology center.

Additional Information
Supplement to Item 5.
Other Environmental Permits

AIR PERMITS

(Permit Type P)

Idaho National Laboratory (INL)

- **Title V Operating Permit -** Permit Number T1-030520

Idaho Nuclear Technology and Engineering Center (INTEC)

PTC (Permit Number PTC-023-00001)
- New Waste Calcining Facility/Decontamination Area, CPP-659

PTC (Permit Number P-030505)
- CPP-606 Distillate Oil-Fired Boilers

PTC (Permit Number 060520)
- Integrated Waste Treatment Unit at the INL - Idaho Nuclear Technology and Engineering Center

PTC (Permit Number P-2007.0076)
- INL, INTEC Initial PTC for Standby Compressor (COM-UTI-606)

Critical Infrastructure Test Range Center (CITRC)

PTC (Permit Number P-020521)
- WROC/PBF boiler permitted under the INTEC Site-wide NOx permit - PER-620-023

WATER PERMITS

State of Idaho Monitoring Well Permit (IDWR)

(Permit Type U)

INL monitoring well permit applications are sent annually to the IDWR for wells (greater than 18 feet deep) to be constructed in the current calendar year. Permits are authorized by agreement between the DOE-ID and the IDWR.

State of Idaho Wastewater Land Application Permits (WLAP)

(Permit Type E)
- INTEC Service Waste System and Sewage Treatment Plant - Permit Number LA-000130-04

Ground Water Rights

(Permit Type E)

INL operations use water guaranteed by both a Federal Reserved Water Right and a water rights agreement with the State of Idaho

7. Process Codes and Design Capacities - Enter information in the Sections on Form Page 3.

A. PROCESS CODE - Enter the code from the list of process codes below that best describes each process to be used at the facility. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space proveded in Item 8.

B. PROCESS DESIGN CAPACITY - For each code entered in Item 7.A; enter the capacity of the process, enter the capacity of the process.

1. AMOUNT - Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.

2. UNIT OF MEASURE - For each amount entered in Section 7.B(1), enter the code in Section 7.B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.

C. PROCESS TOTAL NUMBER OF UNITS - Enter the total number of units for each corresponding process code.

Process Code	Process	Appropriate Unit of Measure for Process Design Capacity
	Disposal	
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet; Hectare-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure Listed Below
	Storage	
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Acres; Cubic Meters; Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure Listed Below
	Treatment	
T01	Tank Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; or Metric Tons Per Hour
T02	Surface Impoundment Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons per Day; Kilograms Per Hour; Metric Tons Per Day; or Metric Tons Per Hour
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTU Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million BTU Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Day; Liters Per Hour; or Million BTU Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; BTU Per Hour; or Million BTU Per Hour

Process Code	PROCESS	APPROPIRATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
	Treatment (continued)	**(for T81 - T94)**
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; Liters Per Hour; Kilograms Per Hour; or Million BTU Per Hour
T82	Lime Kiln	
T83	Aggregate Kiln	
T84	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, or Refining Furnace	
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used In the Recovery Of Sulfur Values From Spent Sulfuric Acid	
T-2	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed In 40 CFR §260.10	
T94	Containment Building - Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTU Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million BTU Per Hour
	Miscellaneous (Subpart X)	
X01	Open Burning/Open Detonation	Any Unit of Measure in Code Table Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour;Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Hour; Liters Per Hour, or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; or Million BTU Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

Unit of Measure	Unit of Measure Code	Unit of Measure	Unit of Measure Code	Unit of Measure	Unit of Measure Code
Gallons	**G**	**Short Tons Per Hour**	**D**	**Cubic Yards**	**Y**
Gallons Per Hour	**E**	**Short Tons Per Day**	**N**	**Cubic Meters**	**C**
Gallons Per Day	**U**	**Metric Tons Per Hour**	**W**	**Acres**	**B**
Liters	**L**	**Metric Tons Per Day**	**S**	**Acre-feet**	**A**
Liters Per Hour	**H**	**Pounds Per Hour**	**J**	**Hectares**	**Q**
Liters Per Day	**V**	**Kilograms Per Hour**	**X**	**Hectare-meter**	**F**
		Million Btu Per Hour	**X**	**Btu Per Hour**	**I**

7. Process Codes and Design Capacities (Continued)

EXAMPLE FOR COMPLETING Item 7 (shown in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons.

Line Number		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	B. PROCESS DESIGN CAPACITY (2) Unit of Measure	C. Process Total Number of Units	For Official Use Only
X	1	S	0	2	533.788	G	001	
	1	D	8	0	59.0	Y	003	
	2	D	8	0	22	Y	003	
	3							
	4							
	5							
	6							
	7							
	8							
	9							
1	0							
1	1							
1	2							
1	3							

NOTE: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for "other" processes (i.e., D99, S99, T04 and X99) in Item 8.

8. Other Processes (Follow instructions from Item 7 for D99, S99, T04 and X99 process codes)

Line Number (Enter #s in sequence with item 7)		A. Process Code (from list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	B. PROCESS DESIGN CAPACITY (2) Unit of Measure	C. Process Total Number of Units	For Official Use Only
X	2	T	0	4	100.00	U	001	

ITEM 7. PROCESS CODES AND DESIGN CAPACITIES SUPPLEMENT

LINE NUMBER	PROCESS TYPE UNIT NAME		PROCESS DESIGN CAPACITY
1	**D080 - INTEC WCF includes:** • CPP-633 Storage Tanks (WC-100, WC-101, WC-108, WC-119) • CPP-633 WCF HEPA Filter Storage • CPP-633 WCF Evaporator (EVAP-WC-114)		
		Line 1 Total:	**59 cubic yards**
2	**D080 - INTEC CPP-601/627/640 includes:** • CPP-601 • CPP-627 • CPP-640		
		Line 2 Total:	**22 cubic yards**

9. Description of Hazardous Wastes - **Enter information in the Sections on Form Page 5.**

A. EPA HAZARDOUS WASTE NUMBER - Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR Part 261, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY - For each listed waste entered in Item 9.A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in Item 9.A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE - For each quantity entered in Item 9.B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure, taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each listed hazardous waste entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the listed hazardous wastes.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in Item 9.A, select the code(s) from the list of process codes contained in Items 7.A and 8.A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. Enter the first two as described above.
2. Enter "000" in the extreme right box of Item 9.D(1).
3. Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 9.E.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in Item 9.D(2) or in Item 9.E(2).

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER - Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in Item 9.A. On the same line complete Items 9.B, 9.C, and 9.D by estimating the total annual quantity of the waste and describing all the processes to be used to store, treat, and/or dispose of the waste.

2. In Item 9.A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In Item 9.D.2 on that line enter "included with above" and make no other entries on that line.

3. Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING Item 9 (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))
X	1	K	0	5	4	900	P	T	0	3	D	8	0				
X	2	D	0	0	2	400	P	T	0	3	D	8	0				
X	3	D	0	0	1	100	P	T	0	3	D	8	0				
X	4	D	0	0	2												Included With Above

ITEM 9. DESCRIPTION OF HAZARDOUS WASTE
TABLE OF CONTENTS

TSD UNIT	Page Number
CPP-633 WCF Evaporator	5A of 6
CPP-633 WCF HEPA Filter Storage	5B of 6
CPP-633 WCF Storage Tanks	5C of 6
CPP-601/627/640	5D of 6

9. Description of Hazardous Wastes ***(Continued. Use the additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION (If a code is not entered in 9.D(1))
	1	D	0	0	4	59	Y	D	8	0							CPP-633 WCF EVAPORATOR
	2	D	0	0	5												INCLUDED WITH ABOVE
	3	D	0	0	7												INCLUDED WITH ABOVE
	4	D	0	0	8												INCLUDED WITH ABOVE
	5	D	0	0	9												INCLUDED WITH ABOVE
	6	D	0	1	0												INCLUDED WITH ABOVE
	7	F	0	0	1												INCLUDED WITH ABOVE
	8	F	0	0	2												INCLUDED WITH ABOVE
	9	U	1	3	4												INCLUDED WITH ABOVE
1	0																
1	1																
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3	6																

9. Description of Hazardous Wastes ***(Continued. Use the additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION (If a code is not entered in 9.D(1))
	1	D	0	0	4	59	Y	D	8	0							CPP-633 WCF HEPA FILTER STORAGE
	2	D	0	0	5												INCLUDED WITH ABOVE
	3	D	0	0	7												INCLUDED WITH ABOVE
	4	D	0	0	8												INCLUDED WITH ABOVE
	5	D	0	0	9												INCLUDED WITH ABOVE
	6	D	0	1	0												INCLUDED WITH ABOVE
	7	D	0	1	1												INCLUDED WITH ABOVE
	8	F	0	0	1												INCLUDED WITH ABOVE
	9	F	0	0	2												INCLUDED WITH ABOVE
1	0	U	1	3	4												INCLUDED WITH ABOVE
1	1																
1	2																
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9. Description of Hazardous Wastes ***(Continued. Use the additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION (If a code is not entered in 9.D(1))
	1	D	0	0	4	59	Y	D	8	0							CPP-633 WCF HEPA FILTER STORAGE
	2	D	0	0	5												INCLUDED WITH ABOVE
	3	D	0	0	7												INCLUDED WITH ABOVE
	4	D	0	0	8												INCLUDED WITH ABOVE
	5	D	0	0	9												INCLUDED WITH ABOVE
	6	D	0	1	0												INCLUDED WITH ABOVE
	7	D	0	1	1												INCLUDED WITH ABOVE
	8	F	0	0	1												INCLUDED WITH ABOVE
	9	F	0	0	2												INCLUDED WITH ABOVE
1	0	U	1	3	4												INCLUDED WITH ABOVE
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9. Description of Hazardous Wastes ***(Continued. Use the additional sheet(s) as necessary; number pages as 5a, etc.)***

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES									
								(1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION (If a code is not entered in 9.D(1))
	1	D	0	0	4	22	Y	D	8	0							CPP-601/627/640
	2	D	0	0	5												INCLUDED WITH ABOVE
	3	D	0	0	6												INCLUDED WITH ABOVE
	4	D	0	0	7												INCLUDED WITH ABOVE
	5	D	0	0	8												INCLUDED WITH ABOVE
	6	D	0	0	9												INCLUDED WITH ABOVE
	7	D	0	1	0												INCLUDED WITH ABOVE
	8	D	0	1	1												INCLUDED WITH ABOVE
	9	F	0	0	1												INCLUDED WITH ABOVE
1	0	F	0	0	2												INCLUDED WITH ABOVE
1	1	U	1	3	4												INCLUDED WITH ABOVE
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10. Map

Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in this map area. See instructions for precise requirements.

11. Facility Drawing

All existing facilities must include a scale drawing of the facility (see instructions for more detail).

12. Photographs

13. Comments

For a description of hazardous debris categories treated, stored, or disposed of at the facility, as required by IDAPA 58.01.05.012 [40 CFR 270.13(n)], please see attached information titled: "ITEM 13. ADDITIONAL INFORMATION HAZARDOUS WASTE DEBRIS CATEGORIES".

ITEM 13. ADDITIONAL INFORMATION
HAZARDOUS WASTE DEBRIS CATEGORIES

IDAPA 58.01.05.012 [40 CFR 270.13 (n)] requires a description of the debris categories treated, stored, or disposed of at a facility to be submitted in the Part A Permit Application. Debris defined by 40 CFR 268.2 means a solid material exceeding a 60 mm particle size that is intended for disposal and that is: a manufactured object; or plant or animal matter; or natural geologic material.

Category I - Manufactured Objects

Glass
Concrete
Masonry and refractory bricks
Paper
Plastic
Rubber
Cloth
Pavement
Metal Debris
- Pipes
- Valves
- Scrap Metal

Other Heterogeneous Debris
- Non-intact containers
- Tanks
- Appliances
- Industrial Equipment

Category II - Plant and Animal Matter

Biological Debris
- Plant Matter

Wood Debris
- Wood
- Plant Stumps

Category III - Natural Geologic Material

Rock
Cobbles
Boulders

HWMA/RCRA INTEC POST-CLOSURE PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

Volume 21

Waste Calcining Facility and CPP-601/627/640

Attachment 1

Section A, Facility Description

Revision Date: August 25, 2011

A. FACILITY DESCRIPTION
IDAPA 58.01.05.012 [40 CFR 270.14(b)(1)]

The INL site is owned by the DOE. The eastern boundary of the INL site is located 32 mi (52 km) west of Idaho Falls, Idaho. The INL site occupies approximately 890 mi^2 (2,305 km^2) of the northwestern portion of the Eastern Snake River Plain (ESRP) in southeast Idaho. The WCF and CPP-601/627/640 are located within the INTEC facility and is situated approximately 45 mi (72.5 km) from Idaho Falls, Idaho, in the south-central area of the INL site (see Figure A-1). In 1949, the INL site was established, as the National Reactor Testing Station, as a location where the DOE could safely build, test, and operate various types of nuclear reactor facilities. Strict security is maintained for all INL facilities in accordance with the INL's nuclear and defense missions. More detailed facility information on the INL is found in the *HWMA/RCRA Part B Permit Application for the Idaho National Engineering and Environmental Laboratory, Volume 3* (referred to as the *Volume 3 HWMA/RCRA Part B Permit Application*), "General Information for INL Waste Management Units".

A.1 INTEC Description

The INTEC (formerly the Idaho Chemical Processing Plant) occupies an enclosed and secured area of approximately 250 acres (101 ha) that is situated on the south-central portion of the INL site, northeast of the Central Facilities Area (CFA), as shown in Figure A-1. The INTEC was initially constructed in the 1950s to reprocess spent nuclear fuel (SNF) from government naval ship reactors and has undergone continuous additions and improvements since that time. The facility recovered more than $1 billion worth of highly enriched uranium over the years that was returned to the government fuel cycle. In addition, an innovative treatment process known as calcination was developed at INTEC. Calcination was first conducted in the WCF from 1963 until 1981 and then continued in the New Waste Calcining Facility (NWCF) until 1998. Calcination reduced the volume of liquid radioactive waste generated during fuel reprocessing, while placing the waste in a safer, more stable, granular-solid form. Current work at INTEC includes receiving and storing SNF, environmental restoration, decontamination and decommissioning activities, and waste management and technology development. Other HWMA/RCRA-regulated activities at the INTEC include storage in tanks, evaporative treatment, satellite accumulation, container storage, debris treatment, and tank treatment.

Additional information on the INTEC facilities can be found in *Volume 3 HWMA/RCRA Part B Permit Application*.

A.2 WCF Description

The WCF (Building CPP-633), located at the INTEC, calcined and evaporated aqueous wastes generated from reprocessing SNF (see Figure A-2). The interim status units at the WCF included the evaporator tank system (four storage tanks and an evaporator) and a HEPA filter waste pile. The calciner itself operated and closed before being subject to HWMA/RCRA regulations as an operating thermal treatment unit. The calciner began operations in 1963 and solidified over 4 M·gal (15 M·L) of aqueous waste before it was shut down in 1981. Liquid waste containing dissolved metals, radionuclides, and nitrates was transferred through underground pipelines to the WCF. There, the waste was sprayed into a hot fluidized bed of granular solids in the calciner. The calcined solids were then transferred to bin sets. Nine campaigns were conducted at the WCF; however, successive decontamination cycles led to progressive deterioration of the equipment. In 1981, the WCF calciner was replaced by the "new" calciner in the NWCF (Building CPP-659). The WCF evaporator system continued to operate from 1983 until 1987, concentrating high-activity aqueous waste.

In 1988, in anticipation of future system use, the DOE-ID requested and received interim status for the evaporator system. However, the system never operated after receiving interim status. Constructing a new evaporator system at the NWCF made the WCF evaporator system unnecessary and a decision was made to close the WCF units. The units covered by the closure were the evaporator tank system and the HEPA filter waste pile. The WCF was closed by knocking down the aboveground portion of the facility to the below-grade structure; grouting and capping the waste lines; grouting the tanks, cells, and vaults; and constructing a concrete cap over the WCF footprint.

The WCF is closed with mixed waste in place and meets the closure requirements applicable to HWMA/RCRA landfills with an engineered concrete cover (cap) over the grouted vessels, cells, tanks, and superstructure. The design of the WCF concrete cap complies with the performance standards of IDAPA 58.01.05.009 [40 CFR § 265.310(a)]. The cap is constructed of a low-permeability (3.9E-13 in./sec [1E-12 cm/sec]) reinforced concrete, a minimum of 12 in. (0.31 m) thick, with at least 1% slope from the center to the edges of the cap (Keck 1995). The concrete has a

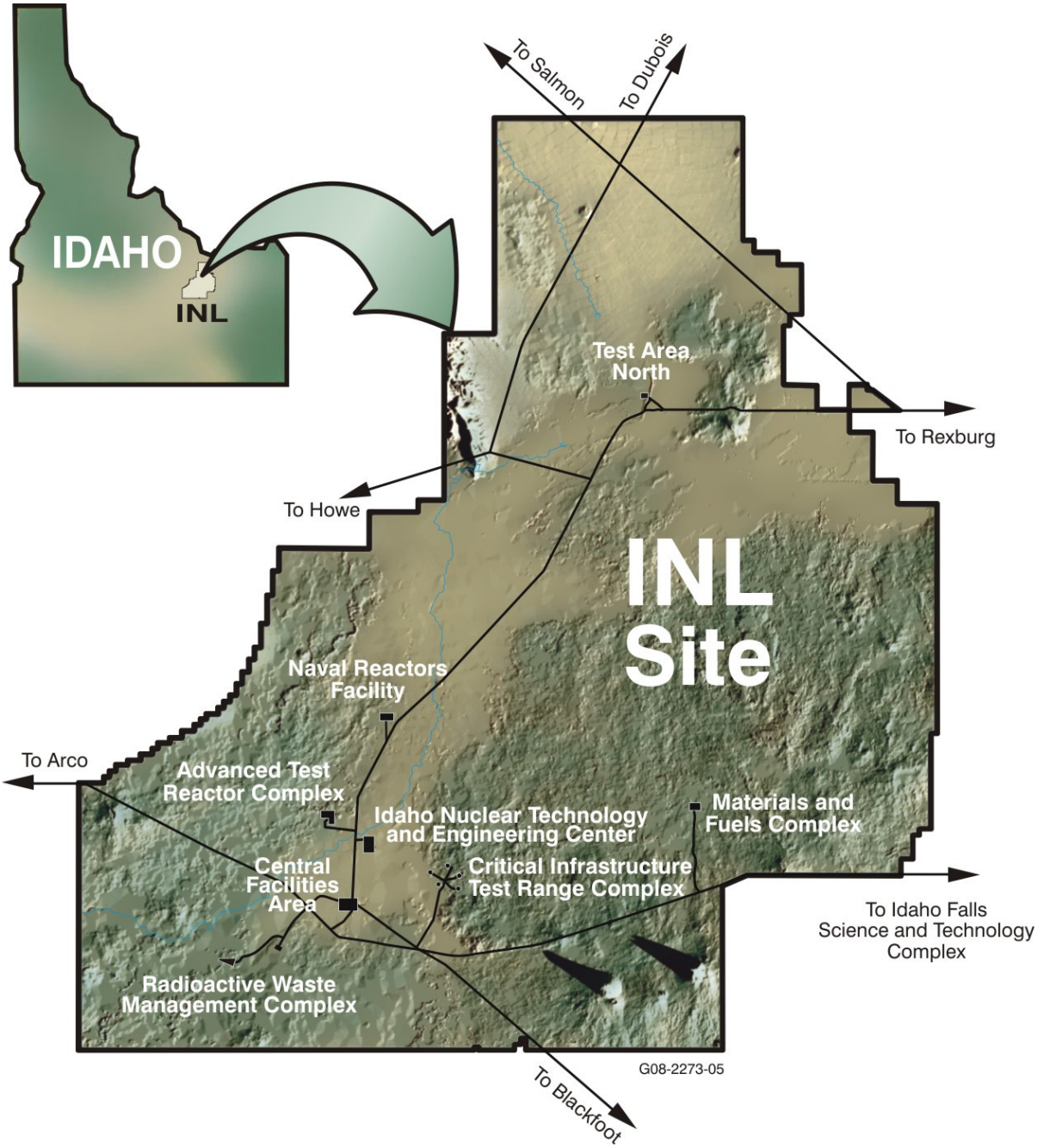

Figure A-1. Location of the INTEC at the INL and the surrounding area.

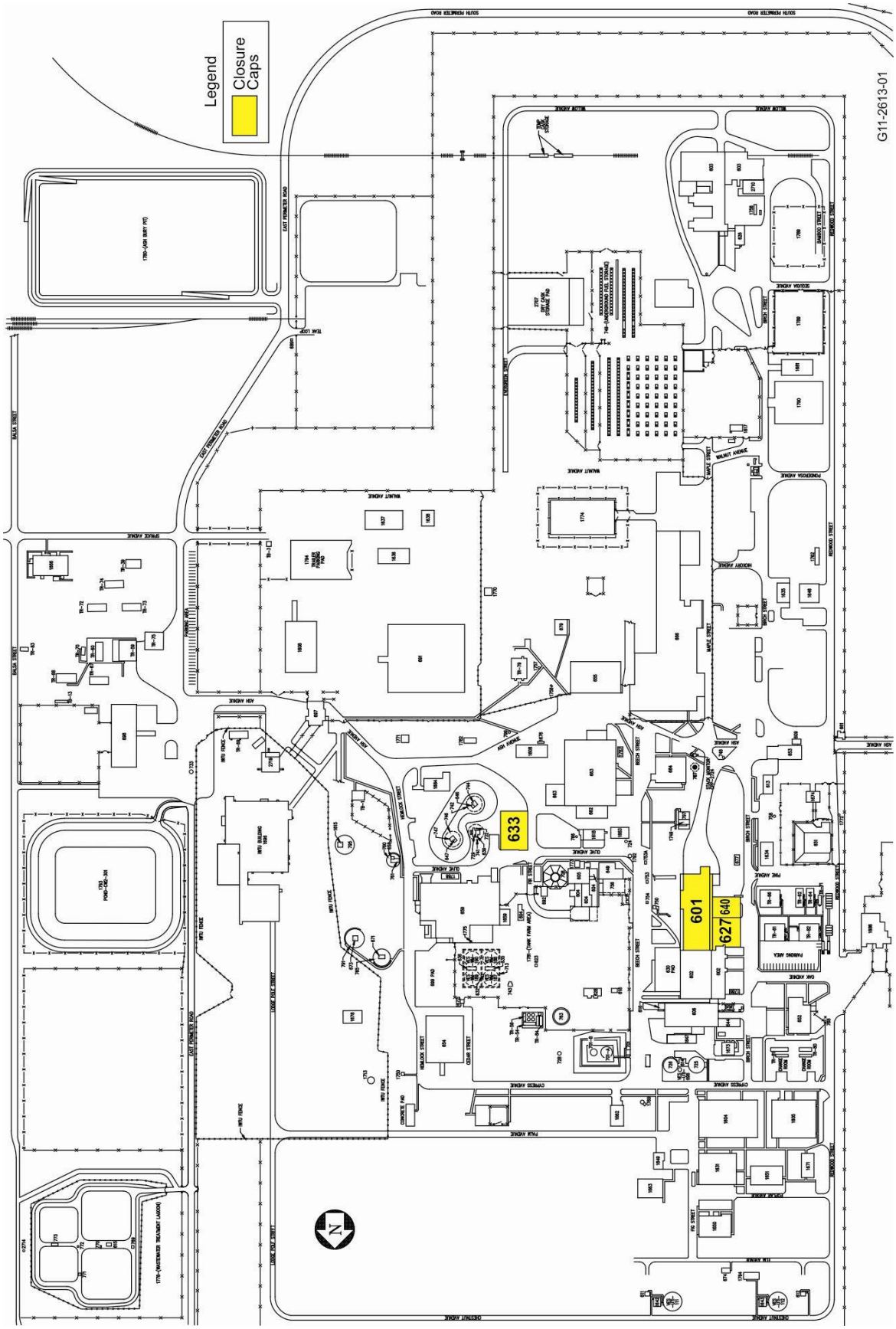

Figure A-2. Waste Calcining Facility and CPP-601/627/640.

minimum compressive strength of 4,500 psi. The cap extends approximately 5 ft (1.5 m) past the ground-level footprint of the WCF building. The size and configuration of the closure cap is restricted by the proximity of the WCF to other operating facilities at the INTEC. Expansion of the cap to the north, to cover the ancillary waste lines from the WCF to the process equipment waste evaporator (PEWE) and TFF, is limited by the presence of a utility tunnel that runs under Olive Street. The utility tunnel provides access for compressed air, water, steam, and other utilities to the operating facilities in the central portion of the INTEC, including the NWCF. Expansion of the cap to the east is severely limited by the proximity of the berms surrounding and shielding the Calcined Solids Storage Facility (CSSF) bin sets. Radiological controls and seismic criteria associated with the operating envelope for the CSSF prohibit extension of the closure cap to cover the calciner transfer lines.

However, the footprint of the WCF closure extends beyond the concrete cap and include lines PUA-3004 and PLA-101111 that were filled with grout from Valve Boxes B-4 and D-4 respectively.

An attempt was made to fill the calcine transfer line, TAA-3009, to the WCF with grout using an aqueous decontamination solution nipple about 75ft east of the WCF. Subsequently, a 30ft portion of the transfer line was found to be plugged and would not allow the grout to reach the WCF. The transfer line was grouted above the plug toward the calcined solids bin set and below the plug toward the WCF. The 30ft plugged section of pipe was then removed and placed in the WCF for disposal. The footprint of the WCF closure includes approximately 45ft of TAA-3009 from the WCF to where the line was grouted and cut.

The DEQ director will be notified prior to any soil disturbance that will affect lines PUA-3004, PLA-101111, or TAA-3009.

The concrete cap reduces erosion while requiring a minimum of maintenance. The grade of the surface promotes drainage away from the cap. To prevent subsidence and to maintain the integrity of the cap, the belowground voids created by the vessels, tanks and cells were filled with grout. Water that drains off or toward the cap is collected and routed away from the WCF by storm water drains and ditches.

A.3 CPP-601/627/640 FACILITY DESCRIPTION

Buildings CPP-601, -627, and -640 were part of the Fuel Reprocessing Complex at INTEC, which is located in the south-central area of the INL Site. These buildings are described briefly in the following subsections. Detailed descriptions of the buildings and the INL Site are provided in the CPP-601 Phase 1 closure plan (DOE-ID 2009a) and the action memoranda for the CPP-601/640 and CPP-627 NTCRAs (DOE-ID 2008; DOE-NE-ID 2004).

CPP-601 Fuel Reprocessing Facility

The CPP-601 Fuel Reprocessing Facility was a 244 × 102-ft building consisting of six levels, with the primary portion located below ground. The facility was used for reprocessing spent nuclear fuel. Operations included fuel dissolution, separation, chemical makeup and transfer, and liquid waste receiving processes. The top level, constructed of transite panels on post and beam, was above grade and contained an open area that was used for transferring fuel elements to the process equipment and for chemical storage, makeup, and transfer. The lower levels, constructed of steel-reinforced concrete, contained process cells, corridors, and auxiliary cells that housed equipment and controls. The CPP-601 Deep Tanks System was located in the lowest level of Building CPP-601 and consisted of four 4,500-gal stainless steel tanks located in two stainless-steel-lined concrete vaults. This system collected liquid waste generated from separations processes performed in CPP-601. Process systems in CPP-627 and CPP-640, as well as other facilities, also sent waste to these tanks.

Most of the floor, cell walls, and equipment were lined with, or consisted of, stainless steel. The processing equipment, which was designed for remote operations, was generally enclosed in the heavily shielded cells. Often, lead was used as the shielding material. A significant amount of lead shielding also was encased in the concrete structures (floors and walls) (DOE-ID 2009a).

Building CPP-601 was made up of heavily reinforced, 1.5-ft-thick exterior building walls and up to 5-ft-thick interior cell walls and was 80% underground. As part of the CPP-601/640 NTCRA, the interior vessels, large piping, and cells of CPP-601 were filled with grout, which solidified and is contained by the building structure. Because the grout was placed in lifts and allowed to harden, lateral displacement is not a concern. The majority of the facility was founded on approximately 10 ft of compacted engineered subgrade on basalt bedrock. The deep tanks area extended into the basalt about 7 ft. The weight of the building and grout applies a pressure to the subgrade that is less than the underlying bearing capacity. Long-term displacement or subsidence is not expected.

CPP-627 Remote Analytical Facility

The CPP-627 Remote Analytical Facility was a 14,727-ft^2 facility. The building was entirely above ground and was attached to CPP-601. Building CPP-627 was constructed in 1955 of reinforced concrete and masonry block. Waste collection piping in CPP-627 had been inactive since 1989, and the CPP-627 building was last used in 1995. The building housed analytical, experimental, and decontamination facilities, including the Hot Chemistry Laboratory, the Old Shift Laboratory, the Multi-Curie Cell, the Emission Spectroscopy Laboratory, and the Decontamination Development Laboratory. The custom fuel dissolution process was conducted in the Hot Chemistry Laboratory/Multi-Curie Cell until 1991. In 2005, CPP-627 was removed to grade as part of an NTCRA (ICP 2006). Some lines that were part of the drainage system were included in the CPP-601 Deep Tanks System closure because the lines drained to the CPP-601 tanks. These lines remain beneath the CPP-627 pad, and the building footprint is included as part of the CPP-601/627/640 landfill closure.

Building CPP-627 primarily was built as a slab on grade structure. The slab was supported by concrete-filled pipe pillars and, in some areas, deep concrete footings. The building structure was removed essentially to the slab at grade. Subgrade areas, such as the valve pits and Multi-Curie Cell well were filled with concrete. Buried piping was capped at the slab. A concrete pad was poured over the slab area to prevent water infiltration. This pad abuts CPP-601 on the east and CPP-640 on the south. The weight of the existing building floor slab and new concrete pad applies a pressure to the subgrade that is less than the underlying bearing capacity. Long-term displacement or subsidence is not expected.

CPP-640 Headend Processing Plant

The CPP-640 Headend Processing Plant was a 66 × 89-ft structure constructed in 1961 to support research and process development for the uranium reprocessing mission in CPP-601. Fuel processing at CPP-640 ended in June 1984 (DOE-ID 2008).The facility contained two shielded waste-collection tank vaults at the lowest level of the building, five shielded test cells at the mid-level of the building, and an open crane loft with space for chemical makeup equipment and access to the cells through roof hatches at the upper level (DOE-ID 2007a). A major modification in the late 1970s added the shielded mechanical handling cave within the crane loft. The CPP-640 Headend Storage Tank System received decontamination fluids generated in the plant. The tank system comprised two

radiological waste tanks and a nonradiological waste tank. The DEQ approved the certification for the CPP-640 Headend Storage Tank System closure on June 12, 2008 (Monson 2008).

Building CPP-640 was made up of heavily reinforced, 1.5-ft-thick exterior walls and 4.5-ft-thick cell walls and was mostly underground. As part of the CPP-601/640 NTCRA, the interior vessels, large piping, and cells of CPP-640 were filled with grout, which solidified and is contained by the building structure. Because the grout was being placed in lifts and allowed to harden, lateral displacement is not a concern. The majority of the facility was founded on approximately 15 ft of compacted engineered subgrade on basalt bedrock. The weight of the building and grout applies a pressure to the subgrade that is less than the underlying bearing capacity. Long-term displacement or subsidence is not expected.

HWMA/RCRA INTEC POST-CLOSURE PERMIT
FOR THE
IDAHO NATIONAL LABORATORY

Volume 21
Waste Calcining Facility and
CPP-601/627/640

Attachment 1
Section F, Facility Location

Revision Date: August 25, 2011

F. FACILITY LOCATION INFORMATION IDAPA 58.01.05.012 [40 CFR 270.14(b)(11)(i and iii)]

F.1 Seismic Standard

The WCF, CPP-601/627/640, and the entire INTEC are located in Butte County, Idaho, which is not listed in IDAPA 58.01.05.008 (Appendix V to 40 CFR 264) as requiring demonstration of compliance with the seismic standard. Additional seismic information for the INL site is available in the *Volume 3 HWMA/RCRA Part B Permit Application*.

F.2 Floodplain Determination

In January 2006, the DOE-ID provided the contractors with the "Big Lost River Flood Hazard Study, Idaho National Laboratory, Idaho, U.S. Bureau of Reclamation, 2005" by D. A. Ostenna and D. H. O'Connell, to be used for all Big Lost River flood hazard characterization and delineation efforts on the INL. A copy of this study is provided electronically in Appendix IV of the *Volume 3 HWMA/RCRA Part B Permit Application.*

This study will be used for determination of whether or not INTEC units are located within the 100-year floodplain of the Big Lost River. The WCF has been determined to be out of the 100-year floodplain for the Big Lost River. The southwest corner of the CPP-601/627/640 landfill appears to be in contact with the 100-year floodplain of the Big Lost River based on the topographic map (found in Section I of this permit). However, this landfill has no doorways or other openings that would allow floodwaters to enter the landfill. The CPP-601/6627/640 landfill side are sloped to prevent the accumulation of floodwaters and prevent entry of floodwaters into the landfill.

HWMA/RCRA INTEC POST-CLOSURE PERMIT
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IDAHO NATIONAL LABORATORY

Volume 21
Waste Calcining Facility and
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Attachment 1
Section I, Topographic Maps

Revision Date: August 25, 2011

I. TOPOGRAPHIC MAPS

IDAPA 58.01.05.012 [40 CFR 270.14(b)(19)]

This section presents topographic maps and supporting information on prevailing winds; injection, withdrawal, and monitoring wells; surrounding land use; access control; and other structures.

I.1 Topographic Maps

The topographic maps for INL and the INTEC are shown in the *Volume 3 HWMA/RCRA Part B Permit Application*. The topographic map for the INTEC is found in this section of the permit (see Figure I-1).

All of the following maps are found in the *Volume 3 HWMA/RCRA Part B Permit Application*,. Each map includes a date, scale, orientation, and the additional information as identified:

- Map #1—Dubois 1:250,000 (1 in. = 20,833 ft) shows the INL legal boundary and more than 1,000 ft (305 m) around the legal boundary. This map has 200-ft (61-m) contours and shows surface water, surrounding land usage, highways, and legal property boundaries. This map is used in conjunction with Map #2.

- Map #2—Idaho Falls 1:250,000 (1 in. = 20,833 ft) shows the INL legal boundary and more than 1,000 ft (305 m) around the legal boundary. This map has 200-ft (61-m) contours and shows surface water, surrounding land usage, highways, and legal property boundaries. This map is used in conjunction with Map #1.

- Map #3—United States Geological Survey (USGS) topographic map, Circular Butte 3 SW Quadrangle, 1:24,000 (1 in. = 2,000 ft) shows the boundary and more than 1,000 ft (305 m) around the INTEC. This map has 10-ft (3-m) contours and shows surrounding land usage, highways, and legal property boundaries.

The following maps are found in this section of the permit and provide the following information:

- A topographic INTEC map showing a date; map scale; orientation; location of waste management units; runoff control systems; access and entrance roads; lift stations; withdrawal, monitoring, and injection wells; floodplain boundaries, and the facility wind rose (see Figure I-1).

- INTEC map showing the storm and sanitary water systems (see Figures I-2 and I-3).

I.2 Wind Roses

As previously reported, the wind rose data for the INTEC is provided on the INTEC topographic map (see Figure I-1). The diagrams indicate a general southwest to northeast wind direction.

I.3 Injection, Withdrawal, and Monitoring Wells

As previously stated, the locations of injection, withdrawal, and monitoring wells at the INTEC are shown on the INTEC topographic map (see Figure I-1).

I.4 Surrounding Land Use

The federal government, the State of Idaho, and private parties own lands immediately surrounding the INL site. Land uses on federally owned land adjacent to the INL consist of grazing, wildlife management, mineral and energy production, and recreation. State-owned lands are used for grazing, wildlife management, and recreation. Private lands near the INL are used primarily for grazing and farming; irrigated farmlands make up approximately 25% of the land bordering the INL.

Land immediately outside the INL boundaries is used mainly for free-range livestock grazing. Within INL boundaries, approximately 60% of INL land area is open (by permit) to cattle or sheep grazing. Figure I-4 identifies the selected land of the INL and surrounding vicinity. Some irrigation farming occurs in areas near INL boundaries. Large areas of land are irrigated near the Snake River, approximately 20 mi (32 km) southeast of INL, and in the vicinity of Mud Lake.

The small rural communities of Howe, Mud Lake, Atomic City, Butte City, and Arco are scattered around the borders of the INL. The larger communities of Rexburg, Idaho Falls, Blackfoot, and Pocatello are located to the east and southeast of the INL site. The Fort Hall Indian Reservation is located southeast of the INL site.

The INL site and adjacent areas are not likely to experience large-scale residential and commercial development primarily because the INL is remotely located from most developed areas. However, recreation and agricultural uses are expected to increase in the surrounding area in response to greater demand for these types of land uses.

Other uses of the land are severely limited because of the climate, lava flows, and general desert soil characteristics. The only INL land suitable for farming is near the terminations of the Big Lost River, near the town of Howe, and the Little Lost River, approximately 8 mi (13 km) southeast of Howe. Arable land with a moderate irrigation limitation (gravity irrigation) is present on both sides of the Big Lost River and in the remains of the lake bed of prehistoric Lake Terreton (between Mud Lake and Howe). The remainder of the INL, approximately 65% of the surface area, has a low subsurface water-holding capacity, is rocky or covered with basalt, or is classified as having moderate-to-severe limitations for agricultural irrigation.

I.5 Access Control

The INL is a restricted area patrolled by armed security personnel. No unauthorized access is permitted. Access control to the INL is maintained by security personnel stationed in gatehouses on East Portland Avenue, just off U.S. Route 20; on Van Buren Boulevard, just off U.S. Route 20/26; and through an automated gatehouse on Lincoln Boulevard near Test Area North (TAN). Access badges are required to proceed beyond these points.

Access controls in the vicinity of waste management units are described further in Section B of this permit. Details on access controls and specific security features, such as fencing, are discussed in subsequent volumes of this permit as pertinent to specific waste management units.

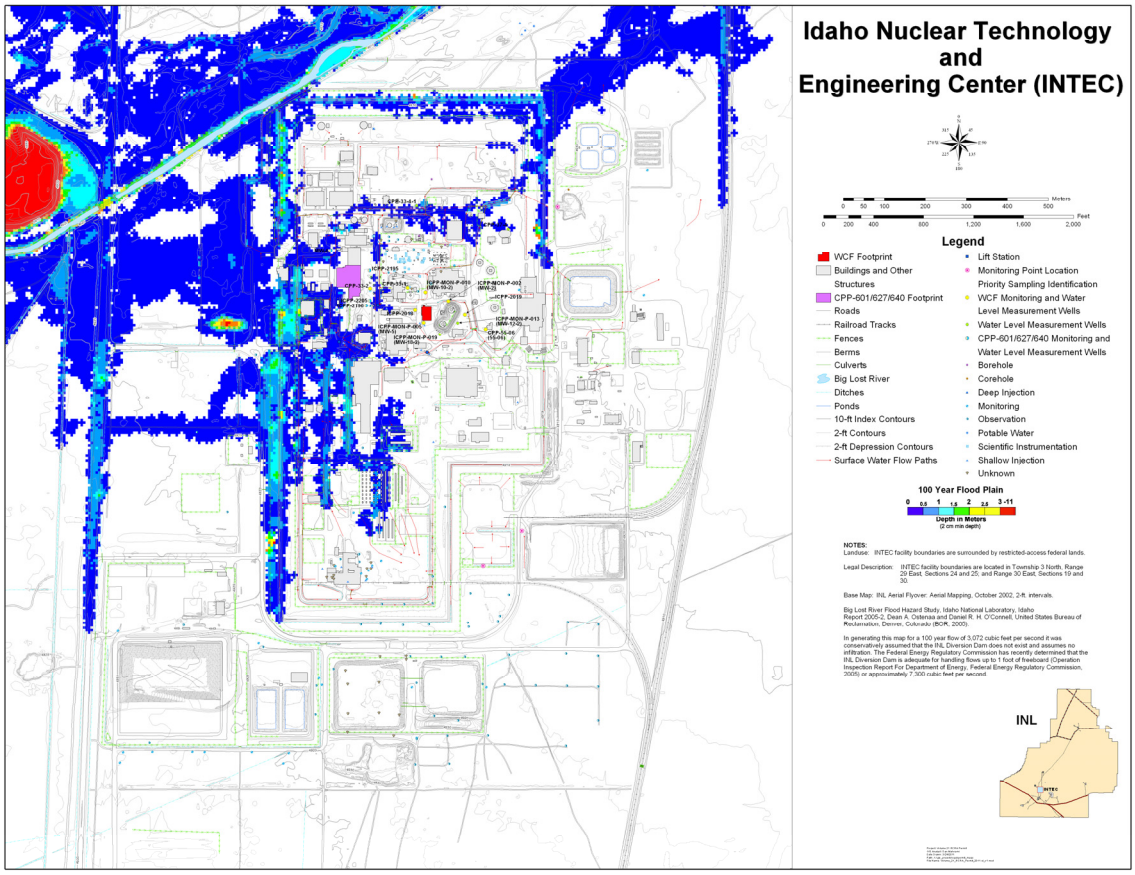

Figure I-1. Topographic map of the INTEC

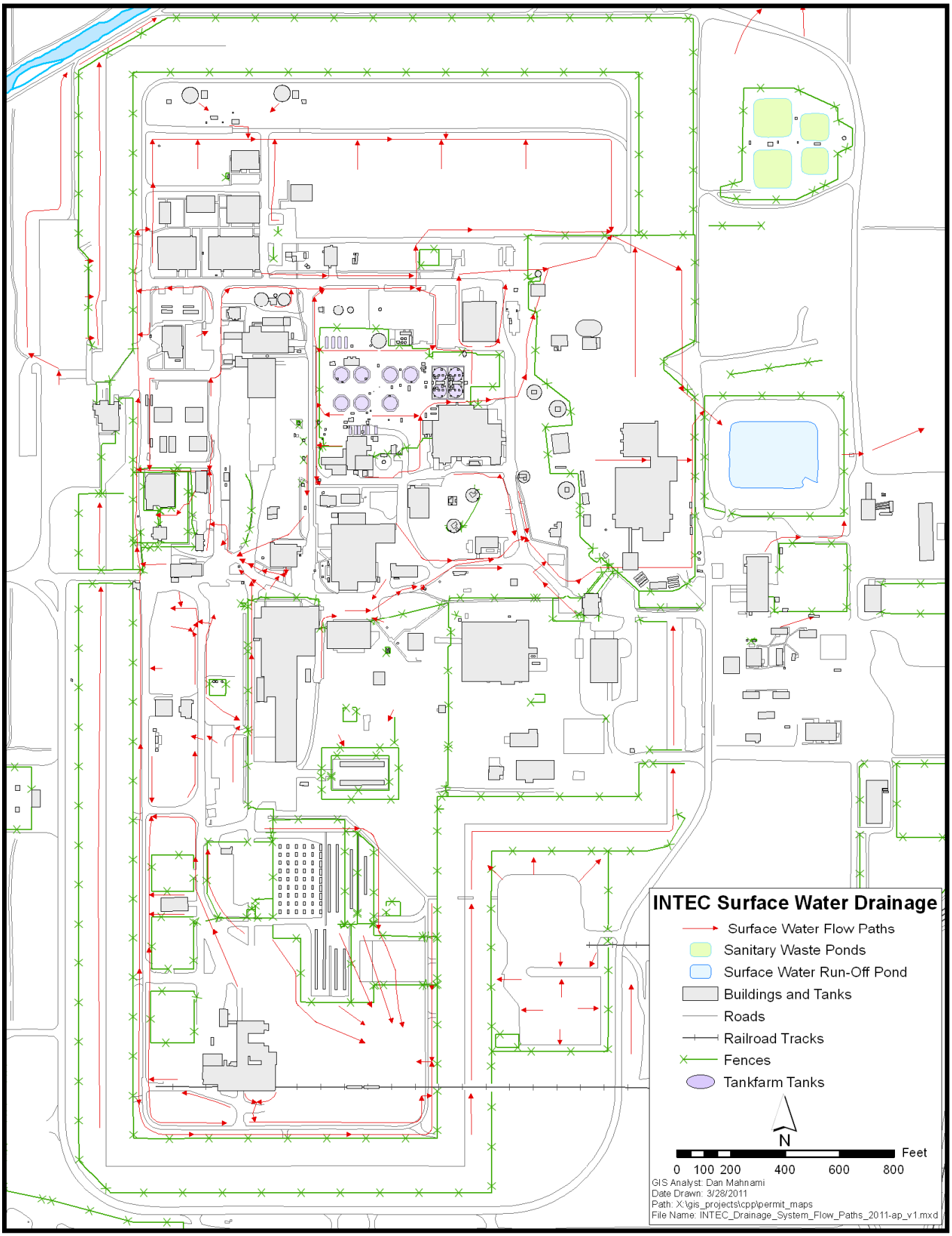

Figure I-2. Plant Drainage System at the INTEC

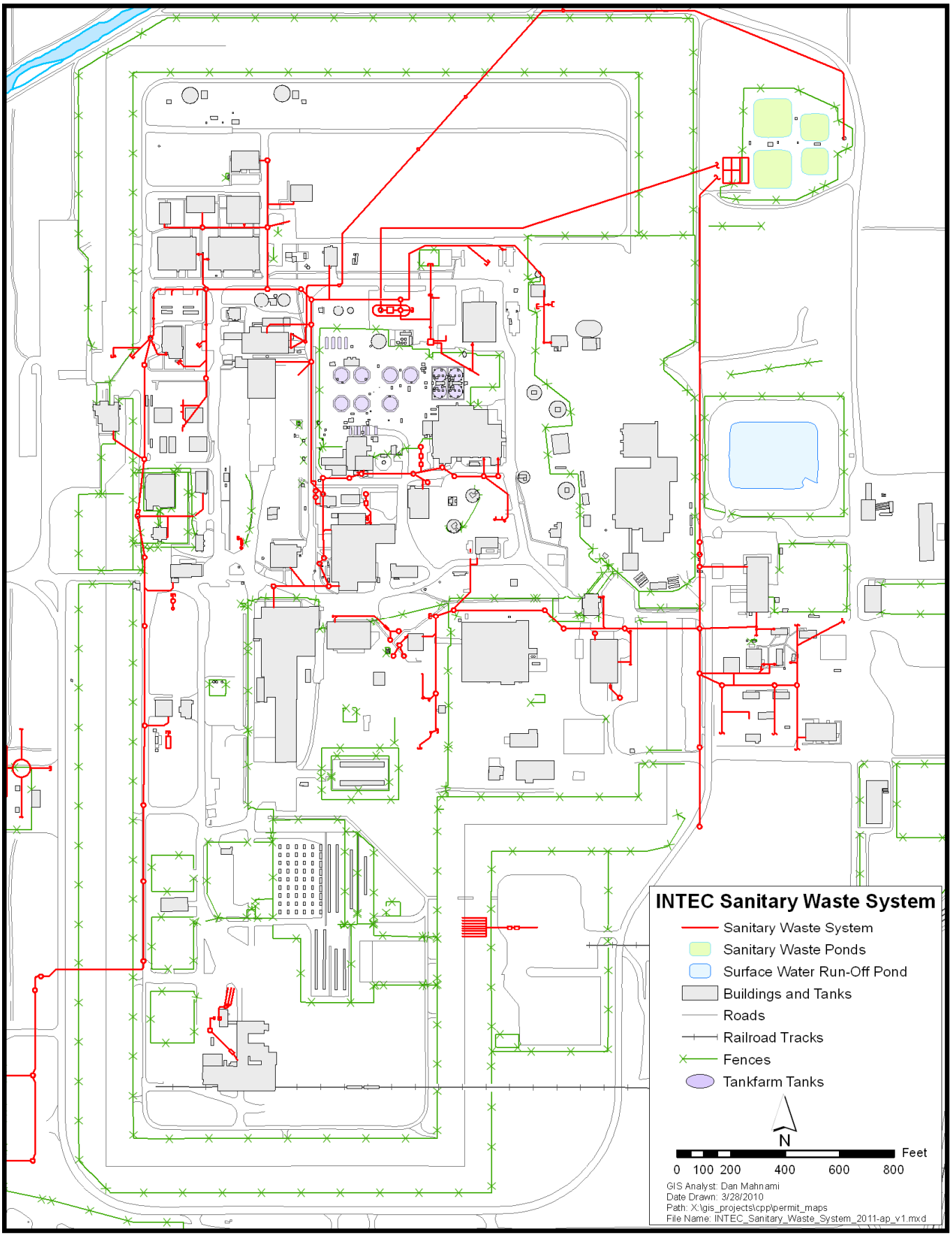

Figure I-3. Plant Sanitary Waste System at the INTEC

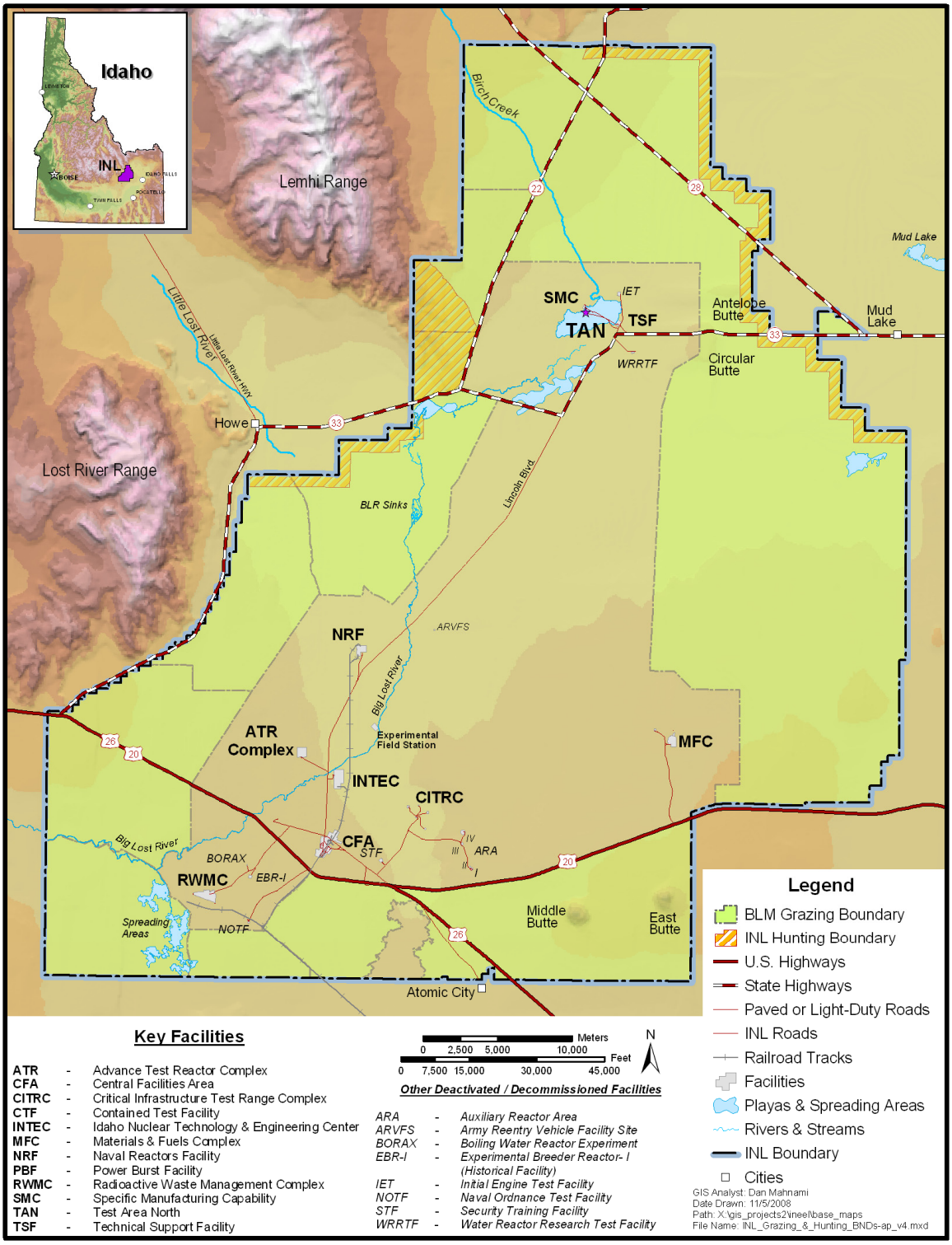

Figure I-4. Selected Land of the INL and Surrounding Vicinity.

I.6 Other Structures

The term "other structures" includes storm and sanitary water systems. These other structures are shown in Figures I-2 and I-3 of this section of the permit. The INL does not have intake or discharge structures.

HWMA/RCRA INTEC POST-CLOSURE PERMIT

FOR THE

IDAHO NATIONAL LABORATORY

Volume 21

Waste Calcining Facility and CPP-601/627/640

Attachment 1

CLOSURE PLANS

HWMA Closure Plan for the Waste Calcining Facility at the INEEL (Rev. 2 – June 1997)

HWMA/RCRA Closure Plan for the CPP-601/627/640 Landfill – Phase 2 (Rev. 2 – September 2010)

HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill (Rev. 1 – December 2009)

HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System – Phase 1 (Rev. 2 – January 2009)

Revision Date: August 25, 2011

Idaho
National
Engineering
Laboratory

INEEL-96/0189
REV 2

June 1997

HWMA Closure Plan for the Waste Calcining Facility at the Idaho National Engineering and Environmental Laboratory

LOCKHEED MARTIN

INEEL-96/0189
REV 2

HWMA Closure Plan for the Waste Calcining Facility at the Idaho National Engineering and Environmental Laboratory

Published June 1997

Idaho National Engineering and Environmental Laboratory
NEPA/Permitting Department
Lockheed Martin Idaho Technologies Company
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
Under DOE Idaho Operations Office
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ABSTRACT

The Waste Calcining Facility houses a group of Hazardous Waste Management Act/Resource Conservation and Recovery Act Treatment, Storage, and/or Disposal units having interim status. These units processed radioactive and hazardous mixed wastes from 1963 through 1987 and now require closure. The radioactive and hazardous mixed constituents cannot be safely, practically, or cost-effectively removed from the Waste Calcining Facility. Therefore, it will be capped and closed, using the closure standards in Subpart 40 of the Code of Federal Regulations Number 265.111 and the landfill closure and post-closure standards in 40 CFR 265.310, as incorporated by reference in 16.01.05.009 of the Idaho Administrative Procedures Act regulations. The Waste Calcining Facility will be closed by the installation of a concrete cap over the ground floor of the building. The post-closure care management of the Waste Calcining Facility will be assumed by the Comprehensive Environmental Response, Compensation, and Liability Act program at the Idaho Chemical Processing Plant. The footprint of the Waste Calcining Facility cap will impact one CERCLA release site below the Waste Calcining Facility building, three CERCLA release sites external to the building, and the soils around the Waste Calcining Facility. Implementing closure in place is not expected to preclude the final disposition of CERCLA release sites close to the Waste Calcining Facility. Standard construction and excavation practices will be followed at this site if excavation up to or under the cap is determined as the removal response of choice.

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ACRONYMS

ALARA	as low as reasonably achievable
APS	Atmospheric Protection System
ARAR	applicable or relevant, and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSSF	Calcined Solid Storage Facility
CPP	Chemical Processing Plant
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy, Idaho Operations Office
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
FFA/CO	Federal Facility Agreement/Consent Order
HWMA	Hazardous Waste Management Act
HEPA	high-efficiency particulate air
ICPP	Idaho Chemical Processing Plant
IDAPA	Idaho Administrative Procedures Act
IDHW	Idaho Department of Health and Welfare
INEEL	Idaho National Engineering and Environmental Laboratory
LMITCO	Lockheed Martin Idaho Technologies Company
NEPA	National Environmental Policy Act
NWCF	New Waste Calcining Facility
OU	Operable Unit
PEW	Process Equipment Waste

RCRA	Resource Conservation and Recovery Act
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
WAG	Waste Area Group
WCF	Waste Calcining Facility
WERF	Waste Experimental Reduction Facility

HWMA Closure Plan for the Waste Calcining Facility at the Idaho National Engineering and Environmental Laboratory

1. INTRODUCTION

The Waste Calcining Facility (WCF) calcined and evaporated aqueous wastes generated from the reprocessing of spent nuclear fuel. The calciner operated from 1963 to 1981, primarily processing high-level waste from the first cycle of spent nuclear fuel extraction. Following the calciner shutdown, the evaporator system concentrated high-activity aqueous waste from 1983 until 1987. In 1988, the U.S. Department of Energy Idaho Operations Office (DOE-ID) requested interim status for the evaporator system in anticipation of future system use. The evaporator system has not been operated since it received interim status. At the present time, DOE-ID has completed construction on a new evaporator at the New Waste Calcining Facility (NWCF), and the evaporator at the WCF is not needed. The decision to "not use" the WCF evaporator requires Lockheed Martin Idaho Technologies Company (LMITCO) and DOE-ID to close these units.

The WCF closure alternatives were evaluated and documented in an Environmental Assessment (EA) using the Department of Energy (DOE) National Environmental Policy Act of 1969 (NEPA) process. DOE has determined it is impractical to clean close the WCF units, due to the radiation fields in the cells. Removing the remaining waste, waste residues and contaminated structures and equipment does not meet as low as reasonably achievable (ALARA) worker radiation exposure and health and safety goals. Removing the remaining waste, waste residues and contaminated structures and equipment would generate large quantities of additional radioactive and mixed wastes. The time and cost to reduce the high radiation fields associated with the waste residues in the interim status units, calciner vessel and associated off-gas system, and containment cells are prohibitive. After a detailed evaluation of the closure options in the EA, the preferred and safest option is to close the regulated units by filling voids (grouting vessels, cells and waste piles) and capping the WCF to meet the requirements applicable to the closure of landfills under the Hazardous Waste Management Act (HWMA). This preferred alternative also includes closure of the calciner vessel and off-gas system and other contaminated structures and equipment. A risk assessment prepared to support the EA, using the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) methodologies, indicates closure of the WCF will not pose a significant risk to human health and the environment. CERCLA methodologies for the risk assessment were used to ensure consistency with the Federal Facility Agreement/Consent Order (FFA/CO) (CERCLA Process). The CERCLA process will determine how the WCF post-closure care and monitoring requirements will be implemented.

This closure plan, implements the preferred alternative for the closure of the WCF, including the regulated units, the calciner vessel and off-gas system, and contaminated structures and equipment. The WCF will be covered with a concrete cap that meets the closure standards identified in Idaho Administrative Procedures Act (IDAPA) 16.01.05.009 [40 Code of Federal Regulation (CFR) 265.111 and 265.310].

2. SITE DESCRIPTION

The Idaho National Engineering and Environmental Laboratory (INEEL.) is located approximately 29 miles (mi) west of Idaho Falls, Idaho. The Idaho Chemical Processing Plant (ICPP) is situated on the south-central portion of the INEEL site, as indicated in Figure 1 and occupies an enclosed and secured area of approximately 1 km^2 (250 acres). The WCF [Building Number Chemical Processing Plant (CPP)-633] is located near the center of the ICPP, as shown in Figure 2.

The ICPP primary mission is to safely and cost-effectively manage the radioactive and hazardous waste produced from past spent nuclear fuel processing activities. The WCF contains an evaporator tank system that includes several vessels contained in concrete vaults or cells, and the associated piping, pumps, and floor drains. The calcining process converted high-level radioactive liquid waste into a solid form for dry storage. The WCF converted more than 15.2 million liters (4 million gallons) of high-level liquid waste to less than 2,180 m^3 (77,000 ft^3) of calcine between 1963 and 1981. All of the calcined product was transferred to interim storage at the Calcined Solid Storage Facility (CSSF), pending further treatment and ultimate disposition in a geological repository. The liquid wastes processed in the WCF contained varied amounts of hazardous constituents, and radiological contaminants.

2.1 Description of the WCF

The WCF boundaries encompassed by the closure activities are the outside walls and floors of the underground portion; the aboveground structure; product transfer lines 23 m (77 ft) from the east wall; and the liquid waste, ventilation, and utility piping out to the first valve box, as indicated in Figure 3. The WCF is a heavily reinforced concrete structure with approximately 1600 m^2 (17,250 ft^2) total floor space made up of a ground level and two levels below grade, within a 21 $\times$ 33 m (70 $\times$ 108 ft) footprint, as pictured in Figures 4 through 9. As shown, processing levels are below grade in two banks of cells separated by common operating and access corridors. Nonradiation service areas are located in the aboveground superstructure, erected of concrete block and steel construction. Design and operation of the WCF utilized lead shielding in many of the below-ground cells; pipe corridors; and sample and monitoring stations, to protect workers from high-radiation fields. This shielding is located inside cell walls or in areas heavily contaminated with radioactive constituents.

The interim status regulated units in the WCF are the evaporator tank system and the high-efficiency particulate air (HEPA) filter waste pile, described in Table 1. The evaporator system is comprised of the blend and hold tanks (WC-100 and -101), scrubber tank (WC-108), evaporator (WC-114), and bottoms tank (WC-119), and associated piping. The waste hold tanks, WC-100 and -101 (Process Code S01 - Tank Storage), allowed blending feeds of different composition from the Tank Farm, provided a point for sampling the evaporator feed, and functioned as surge tanks to ensure continuous feed. The quench surge tank, WC-108 (Process Code S01 - Tank Storage), contained the scrubbing solution for quenching (cooling) of the off-gas and removal of the solids from the decomposition gases. The feed evaporator, WC-114 (Process Code T04 - Evaporation), was used to evaporate and concentrate high level waste as a Thermal Treatment Unit with a treatment capacity of 1,440 gallons per day. Vessel WC-119 (Process Code S01 - Tank Storage) is a sump tank located

in the lowest cell of the WCF. WC-119 is currently used to collect steam condensate from building heating and rainwater leaks in the roof that drip on the floor. This moisture is collected through open floor drains. The water collected in WC-119 may contain radionuclides and mercury slightly above 0.2 mg/L and is transferred to the Process Equipment Waste (PEW) facility for treatment. The HEPA filter waste pile (Process Code S03 - Waste Pile Storage) consists of five HEPA filter boxes in the filter cell.

WCF closure activities encompass additional equipment and tanks described in Table 2 that were not included on the INEEL HWMA Part A Application since operation of these tanks and equipment was never intended after promulgation of Resource Conservation and Recovery Act (RCRA) regulation. The calciner and off-gas system include vessels WC-102, -107, -110, -111, -112, -113, -130, -147, -148, and on-line HEPA filters and associated piping, as depicted in Figure 10. Figure 3 depicts the boundary of the closure activity and illustrates the piping that will be grouted from locations external to the WCF building. 3"-PLA-101111 PEW line is ancillary to VES-WC-119, Hot Sump Tank. 3" PLA-101111 will be grouted from valve box #D4 (see Figure 3), located approximately 23 m (129 ft) from the north wall of the WCF. The pipe line beyond #D4 to the PEW is the active discharge line from NWCF to the PEW. 3"-PUA-3004 and 3" PUA-3005, tank farm lines are ancillary to VES-WC-100/101, Waste Hold Tanks. These lines will be grouted from valve box #B4, located approximately 119 m (389 ft) from the north wall of the WCF. The waste line beyond #B4 is the active transfer line from the Tank Farm to the NWCF. The 3"-TAA-3001 and 3"-TAA-3009 product transport lines to the bin sets, are ancillary to VES-WC-102 the Calcine Vessel, a non-interim status hazardous waste unit. These lines will be grouted from an access point used to add decontamination solutions during operations. This access point is located 23 m (77 ft) from the east wall of the WCF. The line beyond the grout addition point is considered ancillary to the CSSF and will be closed when the CSSF is closed. The other lines to the bin sets were not considered for closure at this time because of the inability to prevent the grout from flowing back into the bin sets which would complicate removal of calcine from the bin sets in the future.

All of these lines lie outside the footprint of the closure cap and will be decontaminated by rinsing the hazardous constituents from the pipe back under the cap into their respective tanks or vessels with the grout solution. The highly dilute grout solution is as effective as water as a decontamination solution in the pipes. In addition, the grout offers the benefit of being abrasive in nature and tends to scour waste residue from the interior of the pipes. The closure of the WCF as proposed in this Closure Plan was the subject of a risk assessment prepared to fulfill NEPA requirements. This risk assessment considered the proposed closure configuration of the WCF using a protocol similar to that utilized by CERCLA. The WCF risk assessment will be considered in the CERCLA evaluation of the ICPP and the remedial investigation/feasibility study (RI/FS) to be used for the Waste Area Group (WAG) 3 Record of Decision (ROD).

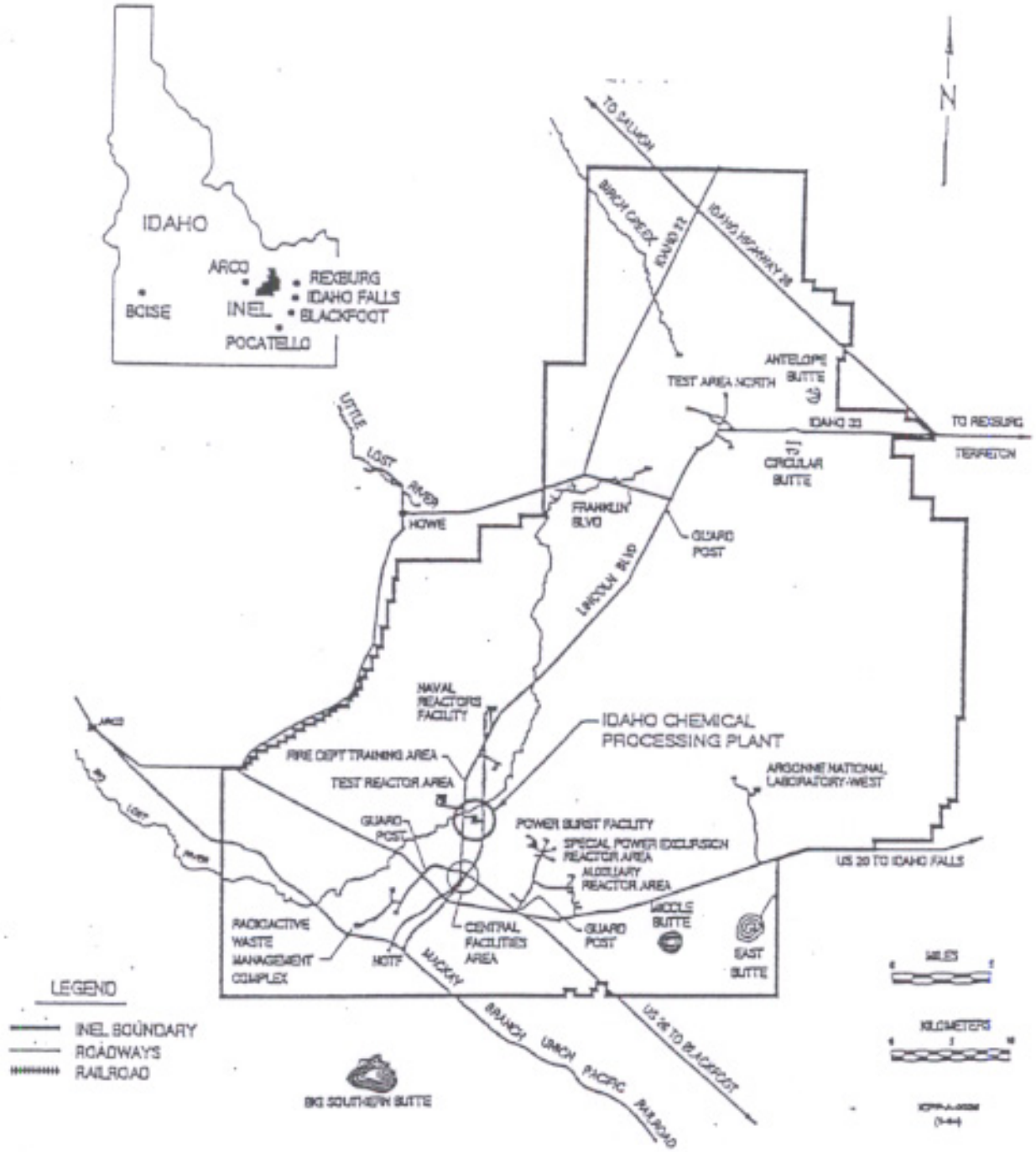


Figure 1. Map of the INEL depicting the location of the ICPP.

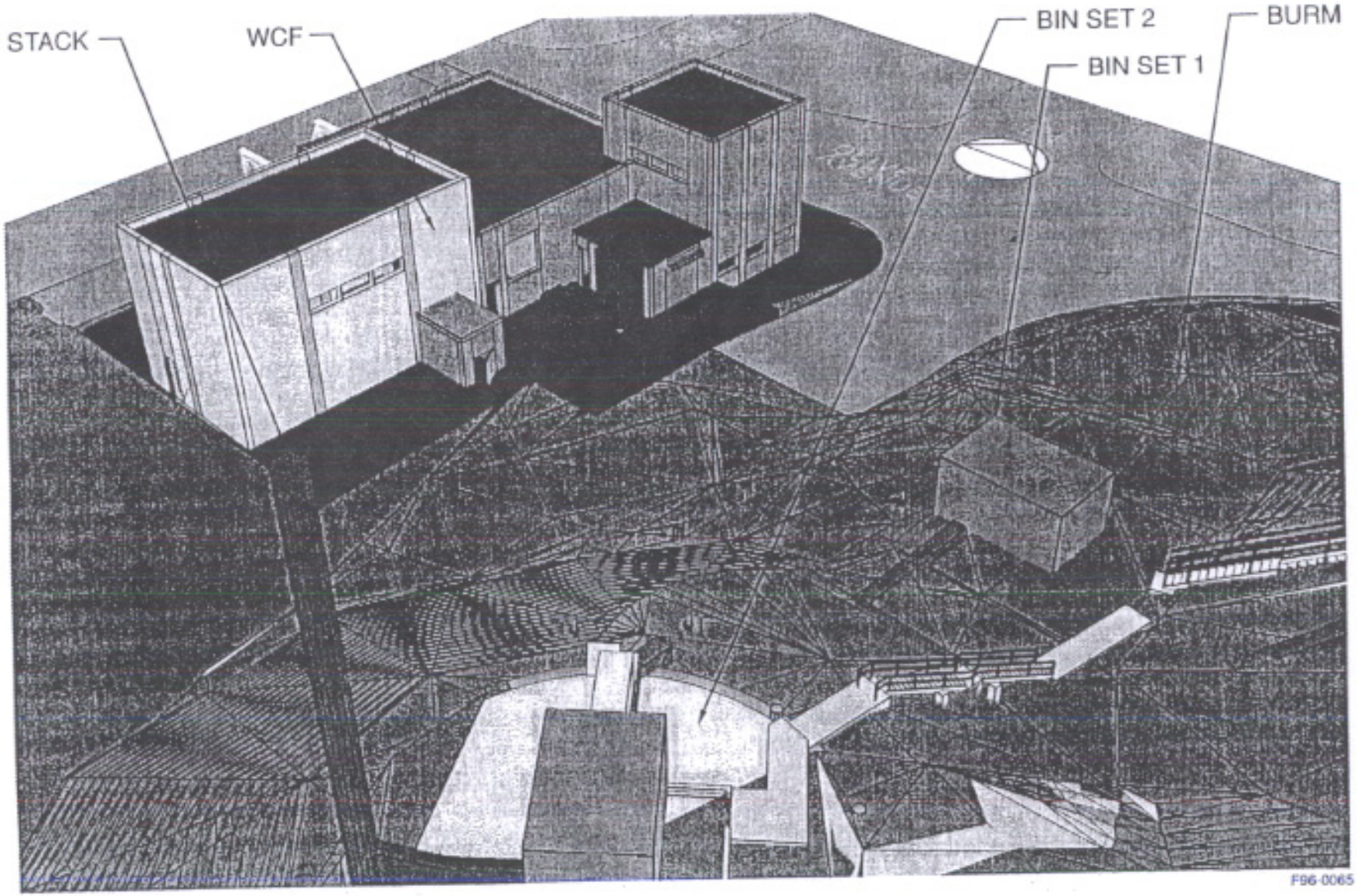
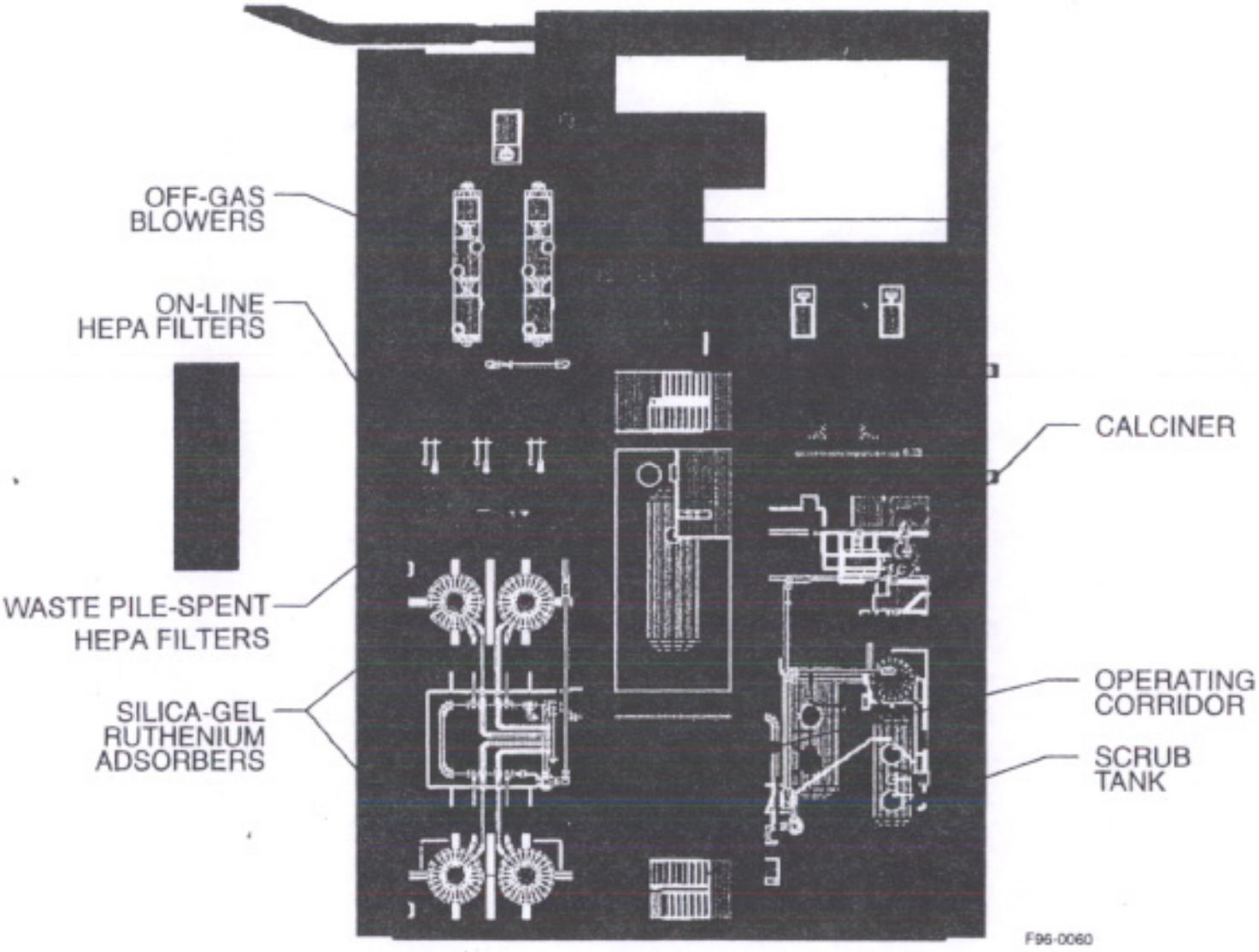


Figure 4. WCF-AS IS.



WASTE CALCINATION FACILITY PLAN

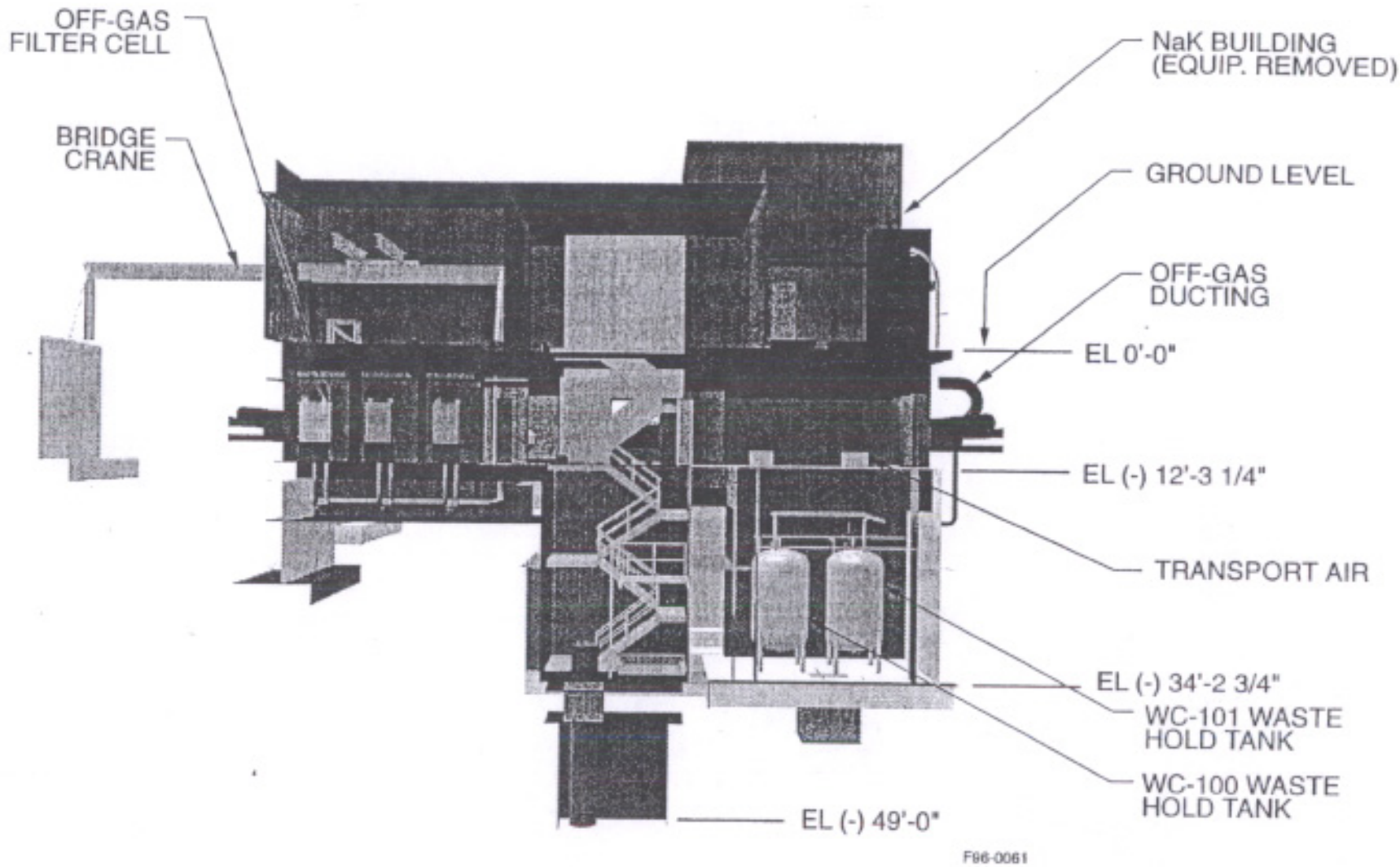


Figure 6. WCF—looking north.

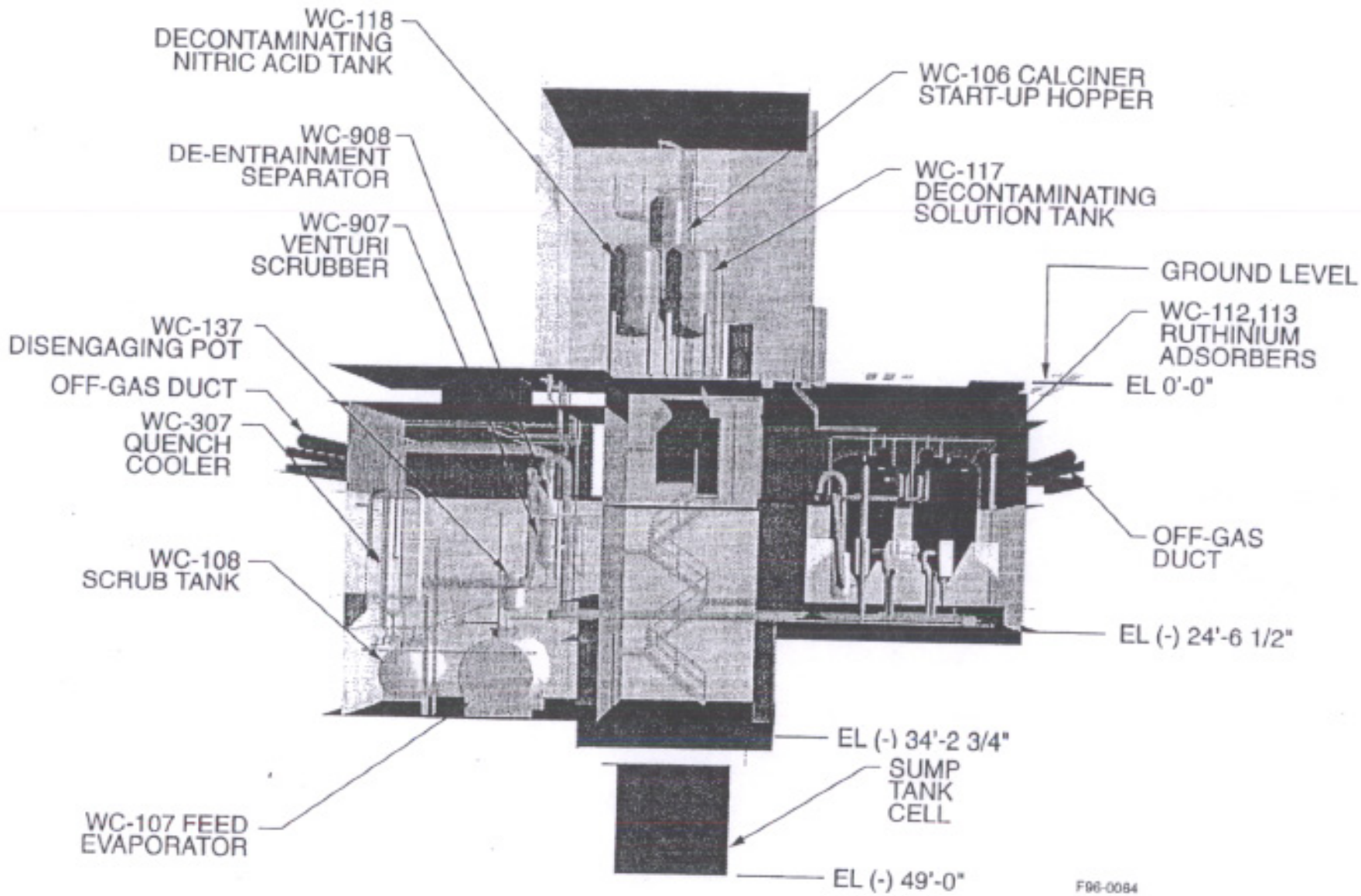


Figure 7. WCF—looking south.

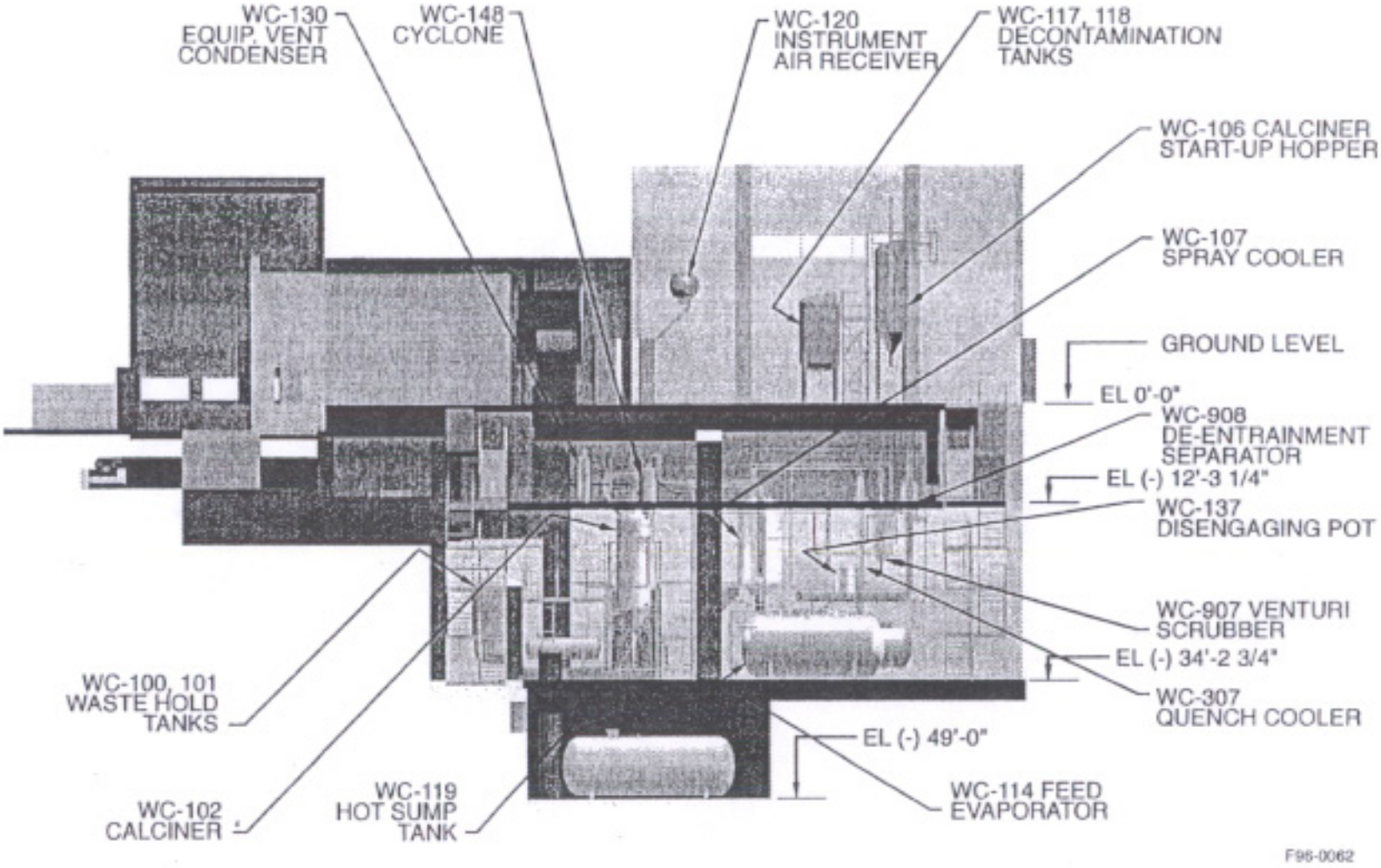


Figure 8. WCF—looking east.

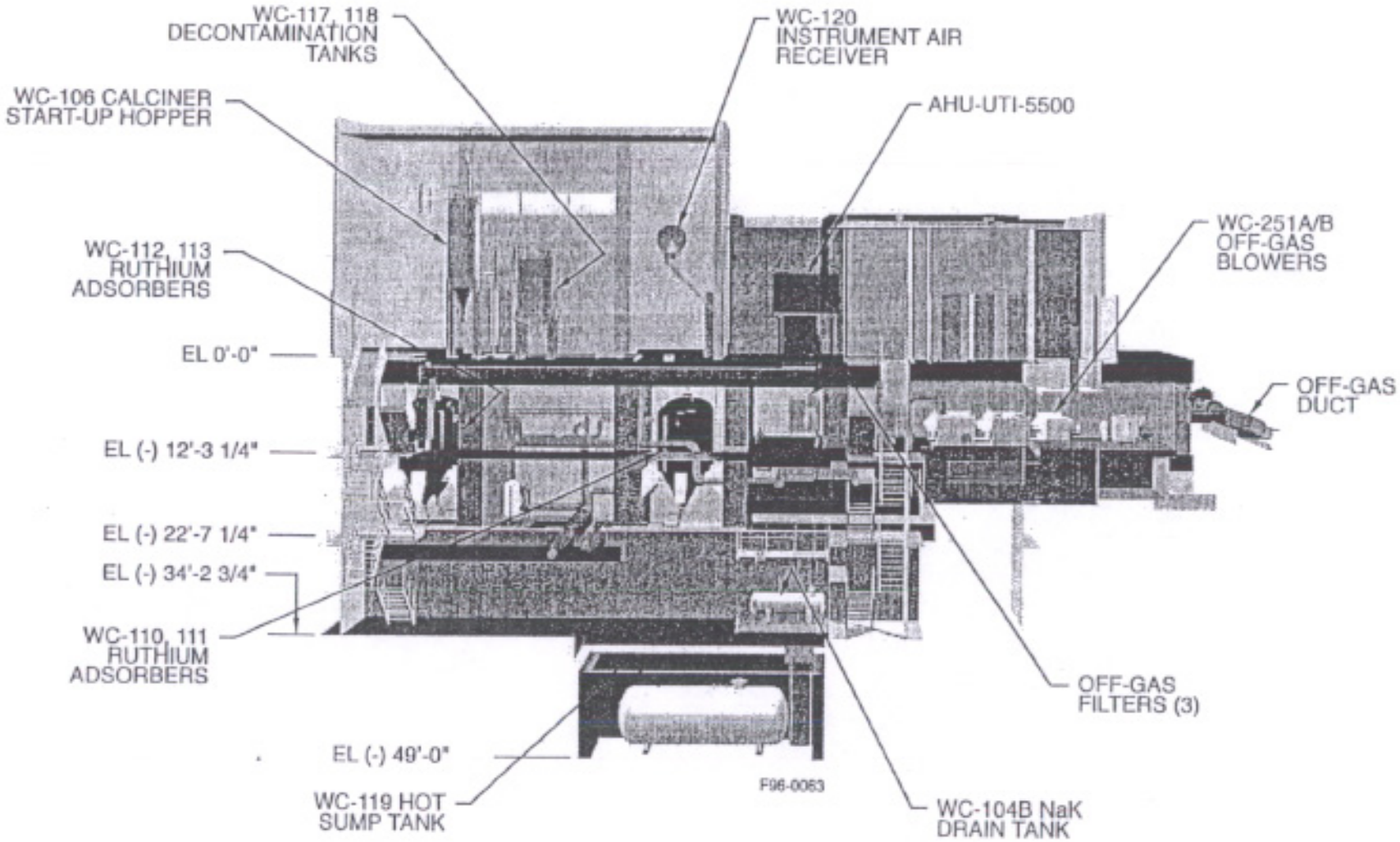


Figure 9. WCF—looking west.

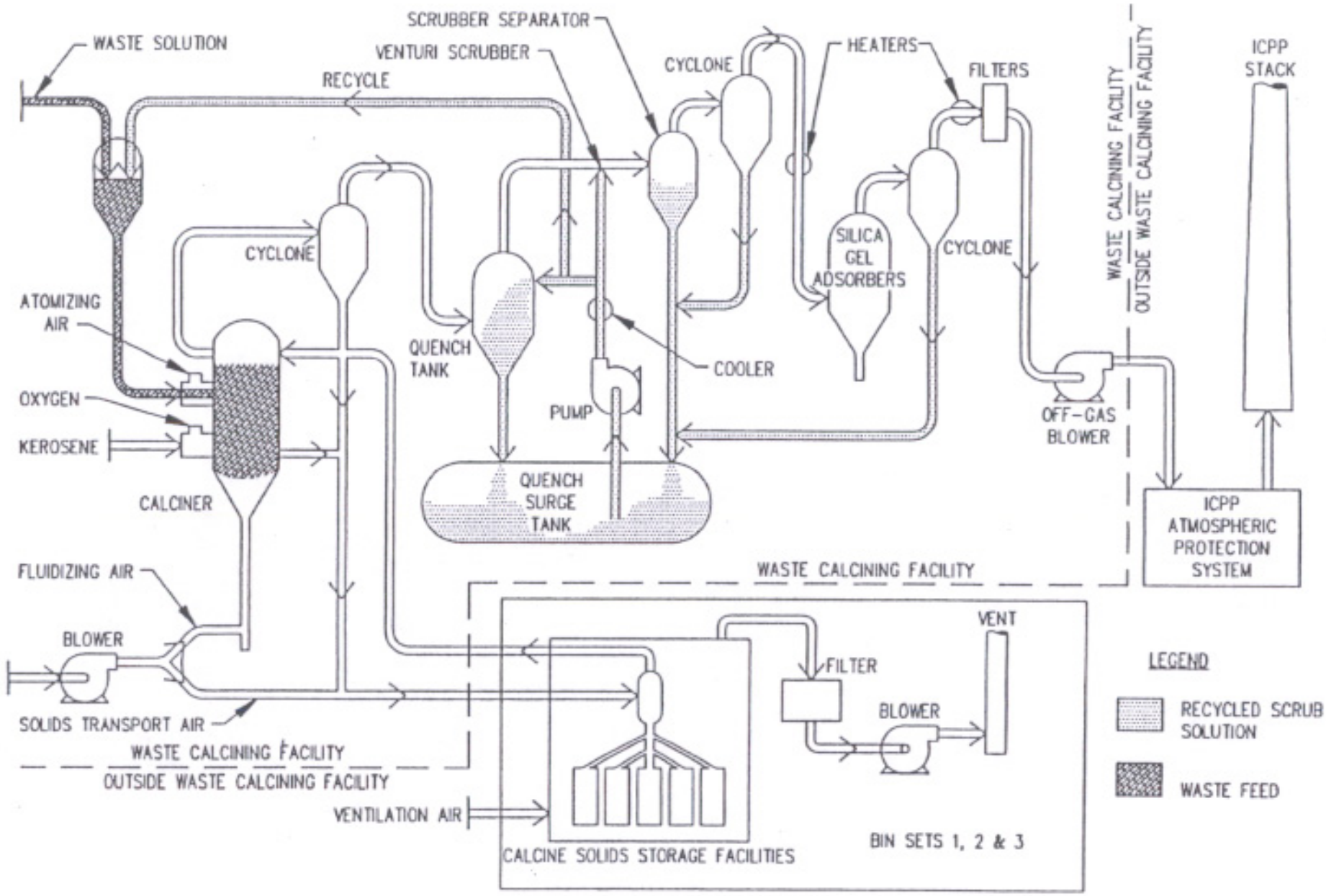


Figure 10. Schematic diagram depicting the calcining process.

The WCF tanks and vessels that will be filled with grout during the closure activities are listed in Table 1 and Table 2. Schematics of the ancillary equipment are included in Appendix B to the Closure Plan. Appendix A, B, and C include the WCF Closure Sequence Chart, the Grouting Schematic Sketches, and the RCRA Closure Room Cell Grouting, Placement Sequence (Table V-1), respectively, from the Comprehensive Work Plan for the Waste Calcining Facility RCRA Closure Project. The Appendices have been added to the Closure Plan to increase the understanding of how building CPP-633 in its entirety will be closed.

Table 1. Interim Status Permitted Hazardous Waste Units

Tank Number and Name	Operational Allowance under Interim Status	Appendix B Schematic Depicting the Unit	Tank Location	Waste Line(s) Ancillary to the Unit	Unit Capacity and Composition
WC-100 Waste Hold Tank	S02 - Tanks Storage	Page 181	Waste Hold Tanks Cell	3" PUA-3004 3" PUA-3005	280 ft^3 (2,090 gal) Stainless Steel
WC-101 Waste Hold Tank	S02 - Tank Storage	Page 185	Waste Hold Tank Cell	3" PUA-3004 3" PUA-3005	280 ft^3 (2,090 gal) Stainless Steel
WC-108 Quench Surge Tank	S02 - Tank Storage	Page 205	Off-gas Cell	No Waste Lines outside of CPP-633	272 ft^3 (2,035 gal) Stainless Steel
WC-114 Feed Evaporator	T04 - Evaporation	Page 186	Off-gas Cell	No Waste Lines outside of CPP-633	726 ft^3 (5,430 gal) Stainless Steel
WC-119 Hot Sump Tank	S02 - Tank Storage	Page 193	Hot Sump Tank Cell	3" PLA-101111	760 ft^3 (5,654 gal) Stainless Steel
HEPA Filter Waste Pile	S03 - Waste Pile Storage	Not Applicable	Filter Cell	Not Applicable	1 m^3 (35.3 ft^3) Stainless Steel

Table 2. Non-Interim Status Permitted Units

Tank Number and Name	Tank Location	Tank Size
WC-110 Ruthenium Adsorber	Adsorber Cell	384 ft^3 (2,870 gal)
WC-111 Ruthenium Adsorber	Adsorber Cell	384 ft^3 (2,870 gal)
WC-112 Ruthenium Adsorber	Adsorber Cell	384 ft^3 (2,870 gal)
WC-113 Ruthenium Adsorber	Adsorber Cell	384 ft^3 (2,870 gal)
WC-107 Quench Tower	Off-gas Cell	252 ft^3 (1,885 gal)
WC-102 Calciner Vessel	Calciner Cell	240 ft^3 (1,800 gal)
WC-908 De-entrainment Separator	Off-gas Cell	33 ft^3 (250 gal)
WC-130 Equipment Vent Condenser	Calciner Cell	30 ft^3 (225 gal)
WC-124/148 Calciner Cyclone	Calciner Cell	20 ft^3 (150 gal)
WC-147 Mist Eliminator	Off-gas Cell	16 ft^3 (118 gal)
WC-149 Vertical Demister	Adsorber Cell	13.4 ft^3 (100 gal)
WC-307 Quench Cooler	Off-gas Cell	10.2 ft^3 (77 gal)
WC-305 Off-Gas Heater	Off-gas Cell	10 ft^3 (75 gal)
WC-105 Calciner Feed Tank	Calciner Cell	8 ft^3 (57 gal)
WC-137 Disengaging Pot	Off-gas Cell	8 ft^3 (57 gal)

Table 3 follows and identifies the listed and characteristic hazardous wastes numbers assigned to the tank farm waste that was subsequently treated in the WCF processes. These hazardous waste numbers have been assigned to the mixed wastes since they are mixed with and/or derived from waste designated with these hazardous waste numbers. The waste that was actually treated in the WCF was comprised primarily of water and nitric acid with small amounts of metal contaminations and trace quantities of the chemical compounds in Table 3.

Table 3. Listed and characteristic wastes determined to have been discharged into the Tank Farm at the ICPP

Constituent	Waste numbers	Constituent	Waste numbers
Arsenic	D004	Chloroform	U044
Barium	D0051,	4-dioxane	U108
Chromium	D007	Isobutyl alcohol	U140, and F005
Lead	D008	Lead acetate	U144
Mercury	D009	Mercury	U151
Selenium	D010	Methylene chloride	U080, and F002
Silver	D011	Methyl ethyl ketone	U159, and F005
Acetonitrile	U030	Methyl iodide	U138
Ammonium vanadate	P119	Phenol	U188
Carbon disulfide	F005	Potassium cyanide	P098
Formaldehyde	U122	Pyridine	U196, and F005
Formic acid	U123	Selenium dioxide	U204
Hydrazine	U133	Silver cyanide	P104
Hydrogen fluoride	U134	Sodium cyanide	P106
2-nitropropane	F005, and U171	Tetrachloroethylene	U210, and F002
Sodium azide	P105	Toluene	U220, and F005
Thiourea	U219	1,1,1-trichloroethane	U226, and F002
Vanadium oxide	P120	1,1,2-trichloroethane	U227, and F002
Aniline	U012	Trichloroethylene	U228, and F002
Benzene	U019, and F005		
Bromoform	U225		
Carbon tetrachloride	U211, and F002		
_____			

a. Documentation identifies these chemicals as being used, but to such a minor extent, that no documentation exists to estimate what the total volumes are.

2.2 Operating History

Nine calcination campaigns were completed at the WCF, beginning in 1963 and ending in 1981, when the WCF was replaced by the NWCF. The calcining process involved using high temperature to evaporate and oxidize the liquid high-level waste in a fluidized bed. Liquid waste was transferred from the ICPP tank farm to the WCF through underground pipelines. The liquid waste, which consisted of metals and nitrates in an aqueous solution, was injected into the calciner vessel, where it was heated. The original heat source was indirectly supplied by liquid sodium; a conversion was later made to in-bed combustion of kerosene and oxygen. As the water evaporated, nitrates were converted to nitrogen oxides (NO_x), and water and the dissolved metals formed oxides and salts at 500°C (932°F). Calcined solids were then pneumatically transferred through underground pipelines to Binsets 1, 2, and 3 in the CSSF.

Process off-gases, NO_x and water vapor, were quenched (cooled) using a nitric acid solution. Depleted quench solution was processed as calciner feed solution or transferred to the tank farm for storage. Cooled off-gas was passed through silica-gel adsorbers to capture radioactive ruthenium, a volatile contaminant. The off-gas also passed through a bank of HEPA filters before being discharged to the ICPP Atmospheric Protection System (APS). The APS has continued to maintain negative pressure on the WCF system since 1981.

2.3 Decontamination Efforts

When the WCF calciner stopped operations in 1981, the system was emptied and the calciner and off-gas cells were cleaned. A review of the WCF operations logbook indicates that when the final calcining campaign was completed on March 16, 1981, the remaining calcined product was transferred to the CSSF for storage, pending further treatment for final disposition in a geological repository. The fluidized bed was removed from the calciner; and the process and transfer lines were "dusted" out with high-pressure, high-volume compressed air on March 20, 1981. Cells containing the process vessels were flushed with fire hoses through the cell hatches on March 23, 1981, to remove waste residues that may have leaked from process line valves in the cells. The calciner vessel was later flushed on December 17, 1984, and the wash water transferred to the PEW for treatment. When the WCF evaporator system was placed on standby in 1987, tanks were drained and the waste was transferred to the PEW for treatment. The steam condensate and rainwater are collected in vessel WC-119 and transferred to the PEW approximately every 1 to 3 months, depending on the time of year.

The out-of-cell operating areas were not decontaminated at the time the facility was shut down. Since 1993, a concerted effort has been made to decontaminate (chemical, radioactive, and asbestos removal) the access areas (aboveground rooms and operating corridors) of the WCF. The cell floors were visually examined, using remote inspection video cameras in 1993 and 1994. The comprehensive inspection did not reveal any accumulation of calcine in the cells.

2.4 Regulatory Status

The WCF contains several interim status waste management units included in the INEEL. HWMA Part A Permit Application, subject to the requirements of IDAPA 16.01.05.009, *Interim*

Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, 16.01.05.009 (40 CFR 265 Subpart J: "Tanks") and IDAPA 16.01.05.009 (40 CFR 265 Subpart L: "Waste Piles"). The tank systems in the WCF do not comply with all requirements for secondary containment in IDAPA 16.01.05.009 (40 CFR 265 Subpart J), thus requiring the preparation and submission of a closure and post-closure plan. The Operating Permits Bureau stated in their letter dated March 27, 1995, if all contaminated system components, structures, and equipment cannot be decontaminated, the tank systems must be closed, in accordance with the closure and post-closure requirements that apply to landfills, IDAPA 16.01.05.009 (40 CFR 265 Subpart N). IDAPA 16.01.05.009 (40 CFR 265 Subpart J) requires that tank units be closed in accordance with the closure and post-closure requirements that apply to landfills, if the operator cannot practicably remove or decontaminate the soils. IDAPA 16.01.05.009 (40 CFR 265 Subpart L) regulations for waste piles also require preparation of closure and post-closure plans, if the operator cannot remove or decontaminate the subsoils.

Since it is not practical to remove all of the waste residues, decontaminate the equipment, and remove the HEPA filters in the waste pile, the WCF will be closed in accordance with the closure and post-closure requirements that apply to landfills. The potential for migration of hazardous waste from the residues in tanks, cells, and the waste pile is low, because they are completely contained within the WCF (Building CPP-633) and will be covered with a concrete cap. The potential for a post-closure release from the WCF as a capped landfill is addressed in the ROD for WAG 3 as part of the FFA/CO. The closure process and cap has been designed to minimize the exposure of workers, the public, and the environment to residual hazardous and radiological constituents remaining in place.

2.4.1 Related Issues—CERCLA

The ICPP includes CERCLA release sites and HWMA interim status and permitted units. In many cases an HWMA unit sits within or over a release site. Typically, an HWMA unit is bound by the building and waste piping to and from the building. The soil around and under the HWMA unit is covered by agreement in the FFA/CO by CERCLA as related to past contaminant releases. Release sites at the ICPP are grouped together and managed as WAG 3. Therefore, when the HWMA units are closed to landfill closure standards, the comprehensive RI/FS for the ICPP would consider any residual risk that may exist for a release from the closed WCF, including waste pipe lines closed outside the footprint of the closure cap (see Figure 3), and at release sites outside the WCF. The WCF is located within the CERCLA WAG 3, with four release sites associated with the cap footprint. These release sites, CPP-36, -48, -85, and -91 (see Figure 11), are part of the remedial investigation at ICPP. The ROD for the Operable Unit (OU) 3-13, WAG 3 Comprehensive RI/FS will address the remedial actions required for these release sites. The WCF closure and post-closure activities are not expected to preclude the selection of remedial actions for the CERCLA release sites in close proximity to the WCF. Since closure activities include grouting the off-gas duct (CPP-85), the CERCLA Program has reviewed this activity. A letter from the INEEL FFA/CO Project Managers approving the action is included as Figure 12.

The design features of the HWMA cap must be considered by OU 3-13 in the evaluation of remedial actions.

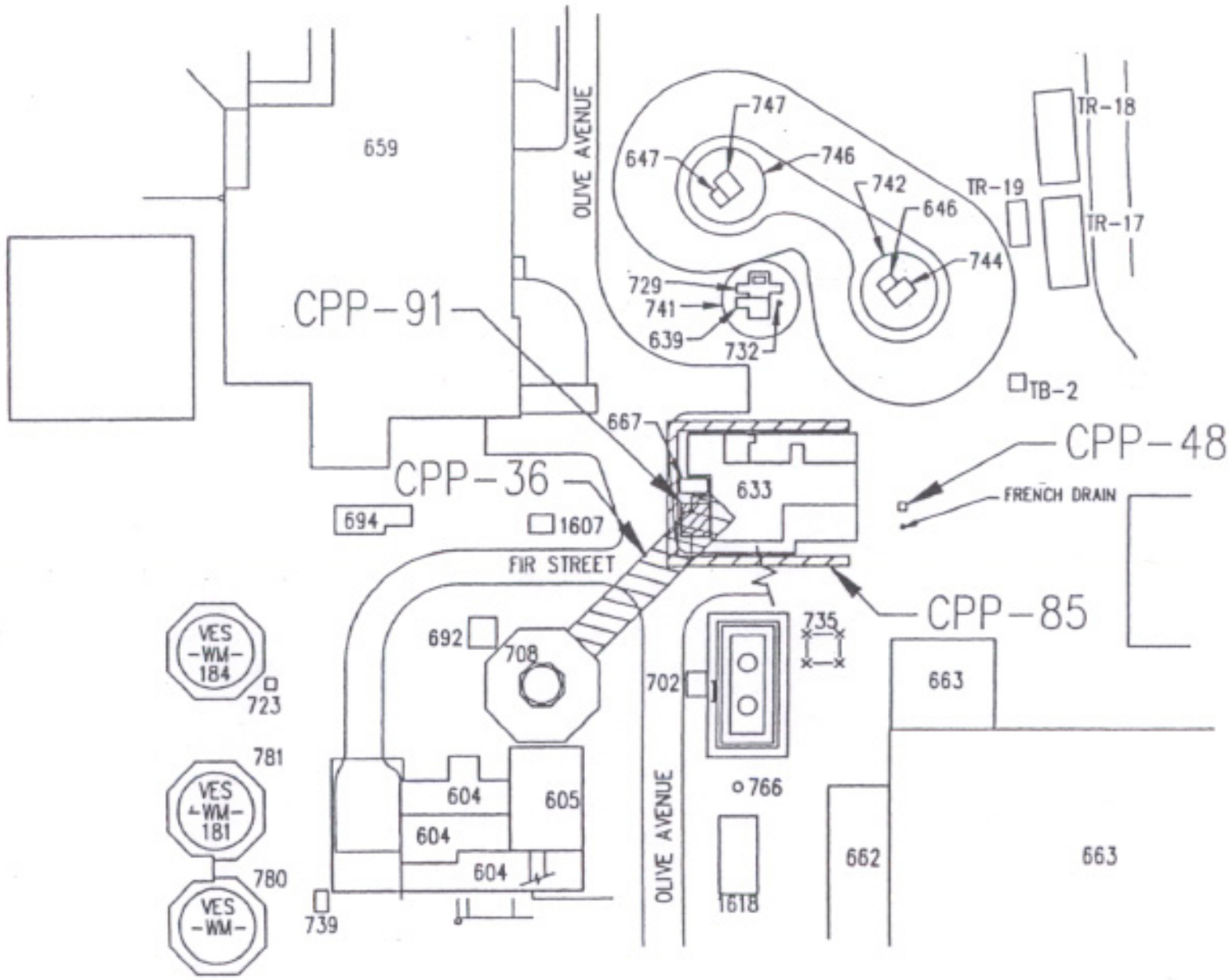


Figure 11. CERCLA release sites.

IDAHO DEPARTMENT
OF HEALTH AND WELFARE

DIVISION OF
ENVIRONMENTAL QUALITY

900 North Skyline, Idaho Falls, ID 83402-1718, (208) 528-2650

Philip E. Batt, Governor

April 3, 1997

Mr. Dave Wessman
DOE-Idaho Operations Office
850 Energy Drive
Idaho Falls, ID 83401

RE: **INCLUSION OF FFA/CO SITE CPP-85 INTO CLOSURE PLAN FOR THE OLD WASTE CALCINE FACILITY**

Dear Mr. Wessman:

Site CPP-85 is a new site that consists of the Waste Calcine Facility (WCF) Blower Corridor, at the Idaho Chemical Processing Plant. The corridor is an 18 to 24 in. vitrified clay pipeline surrounded by a 3 ft by 3.5 ft square concrete envelope. The investigation performed by DOE to support the Comprehensive Remedial Investigation for Waste Area Group 3 indicates that no release to the environment has occurred outside of the pipeline and envelope. DOE has recommended this site to no further action status under the Federal Facility Agreement and Consent Order (FFA/CO). Additionally, DOE has proposed grouting the pipeline during RCRA closure, consistent with the proposed method of closure for other ancillary equipment associated with the WCF.

Concurrence was reached with the IDHW/DEQ, USEPA, and DOE FFA/CO Project Managers on April 3, 1997 that the proposal to grout the pipeline in conjunction with RCRA closure of the WCF would not interfere with potential final remedies under the Waste Area Group 3 Record of Decision. If you should have any questions, please contact us at (208) 528-2650.

Sincerely,

Scott L. Reno

Scott L. Reno
Environmental Scientist
Remediation Bureau

Figure 12. Approval Letter for CPP-85.

Supporting the cap or repairing damage to the cap must be considered when evaluating future source control or removal response actions that include excavation at sites CPP-36 and CPP-91.

If an immediate soil removal action is required, it would be conducted under the FFA/CO, as described in the INEEL Consent Order.

2.5 Hydrology of the ICPP

The Big Lost River, located approximately 0.18 kilometers (km) (0.1 mi) from the northwest corner of the ICPP, is the main surface water feature at the INEEL. Stream flows are often depleted before reaching the INEEL by irrigation diversions and infiltration losses along the river. When flow in the Big Lost River actually reaches the INEEL, it is either diverted at the INEEL Diversion Dam or flows northward across the INEEL in a shallow, gravel-filled channel to the terminus at the Lost River sink, where the flow is lost to evaporation and infiltration.

The Snake River Plain Aquifer is the main body of ground water underlying the INEEL. The depth to the Snake River Plain Aquifer varies from 61 m (200 ft) in the northeast corner of the INEEL, to 270 m (900 ft) in the southeast corner. The depth to the aquifer at the ICPP is approximately 139 m (455 ft). Ground water in the aquifer flows generally to the southwest, although locally, the direction of flow is influenced by recharge from rivers, surface water spreading areas, and heterogeneities in the aquifer. At the ICPP, ground water flow is generally from north-northeast to south-southwest. Tracer studies at the INEEL indicate natural flow rates range from 5 to 20 ft per day (EG&G 1985). Discharges of approximately 8.7×10^6 acre-feet (ac-ft) occur annually through springs in the Hagerman, Idaho area and upstream from the American Falls Reservoir and through irrigation well withdrawals (EG&G 1985).

Perched water bodies originate beneath the Eastern Snake River Plain in areas, where sufficient quantities of water move downward, and sedimentary layers impede further infiltration. Several perched water zones have been identified at the ICPP. The upper and lower zones have been investigated and sampled. An upper perched water zone is located approximately 34 m (110 ft) below land surface, at the contact between surficial alluvium and the uppermost basalt layer. The lower perched zone is located in a sedimentary layer about 115 m (380 ft) deep.

Closure activities planned for the WCF, such as grouting the building in place, permanently blocking all piping (i.e., capping, grouting, or removal) exiting the building, and placement of a final cover over the grouted structure, will reduce the potential for contaminant migration from the WCF and protect the ground water. A water balance for the WCF indicates minimal infiltration rates, due to low precipitation rates, high evapotranspiration rates, and controlled runoff at the site. Characteristics of the unsaturated and saturated zones (e.g., presence of interbeds with lower permeability and higher adsorptive capacity than the basalt), and depth to ground water [142 m (464 ft) measured in WM-18 near the WCF] all indicate minimal adverse impacts to the ground water as a result of WCF closure.

The WCF is located outside the 100-yr floodplain for the Big Lost River. The 100-yr flood for the Big Lost River near Arco, a station 14 mi upstream from the INEEL diversion dam, has an estimated magnitude of approximately 3,700 cfs (Stone et al., 1992). The INEEL diversion dam controls flow onto the Site protecting downstream facilities. Gates placed on two large, corrugated

steel culverts control flow onto the site; less than 900 cfs of flow is permitted through the diversion dam downstream onto the INEEL (Lamke 1969). The INEEL diversion channel is capable of handling flows in excess of 9,000 cfs (Bennett 1986). A 100-yr flood on the Big Lost River would be contained within the natural channel and diversion channel, posing no flood threat to INEEL facilities.

3. WASTE INVENTORY

3.1 Characteristics of Residual Mixed Waste

The high-level mixed waste and the low-level mixed waste (sodium bearing) historically processed through the WCF had the following characteristic hazardous waste numbers: D002 (corrosive), D007 (chromium), D008 (lead), D009 (mercury), D011 (silver), and the listed hazardous waste numbers, as identified in the Listed Waste Determination Report (WINCO 1993) (see Table 3). The chemical compounds listed in Table 3 are unused or off-specification commercial chemical products and decontamination solutions identified in an inventory of ICPP facilities and laboratories as being discarded to the ICPP waste system. The additional hazardous waste numbers identified in the Part A of the INEEL HWMA Permit were a conservative filing to cover chemicals that may have been used, and to allow the future use of the WCF evaporator with waste that may contain these additional constituents. The WCF evaporator has not been used to treat waste containing these additional hazardous waste numbers. The hazardous waste numbers listed in the Listed Waste Determination Report have been concluded to have entered the ICPP waste stream, and applied to all mixed wastes treated in the WCF.

The majority of the listed hazardous waste numbers identified in Table 3 and associated with the WCF are from past practice of transferring off-specification or unused commercial chemical products (reagents) from laboratories and decontamination process solutions to the PEW evaporator and tank farm. These chemicals were primarily used by the laboratory for process control analyses, and were not discarded in large quantities.

These chemical compounds were dispersed from 1963 until 1988 in the 28.4 million liters (7.5 million gallons) of waste. The waste included 15.2 million liters (4 million gallons) processed through the WCF, 5.6 million liters (1.5 million gallons) processed through the NWCF, and 7.6 million liters (2 million gallons) still in storage in the tank farm. Liquid laboratory waste and decontamination wastes were transferred to the PEW evaporator, to remove part of the water, prior to storage in the tank farm. The strong nitric acid solutions and elevated temperatures in the PEW evaporator would have digested the majority of the organics, cyanides, and sulfides. The "listed" metal compounds would have been converted to nitrates and become indistinguishable from the other metal constituents from reprocessing or decontamination procedures. The temperature of the waste during storage in the tank farm also would promote evaporation of the volatile constituents. Organic compounds remaining in the waste would have been destroyed during calcination.

All WCF vessels except WC-119 have been emptied and ventilated since 1987 and are presently dry. Vessel WC-119, the bottoms tank, collects rainwater leaking through the roof and steam condensate from the heating system. The analytical result of the 1994 characterization and for the current liquid waste transfer from WC-119 to the PEW system is found in Appendices D and E, respectively. The calciner and off-gas cells were flushed with water, and the resulting solution was transferred to the PEW. Based on the above discussion, detectable concentrations of these organic constituents in the waste residues found in vessels and piping, or on the cell floors are not expected to be found. Consequently, any remaining residue of these chemicals would present no significant threat to human health or the environment.

3.2 Quantities of Residual Mixed Wastes

An investigation was conducted in 1995, to estimate the quantity of residual mixed waste that will remain in the WCF at closure. Since the radiation fields are too high to allow safe entry for visual inspections or hands-on measurements of the residues in the cells and vessels, a conservative engineering estimate has been made. This conservative estimate is based on a review of the operating records, design specifications, drawings, and safety analysis reports. The investigation identified an estimated quantity of mixed waste residue in WCF vessels, piping, and cells,including the HEPA filter waste pile and ruthenium scrubbers in the WCF, as 45.07 m^3 (58.95 yd^3).

A summary of the assumptions and findings from the 1995 investigation is presented in the following sections of this Closure Plan.

3.2.1 Evaporator and Associated Tanks

The evaporator system vessels were assumed to have a 25.4 mm (1 in.) layer of dry sludge on the bottom, and, due to rinsing, 5% of the original contaminants are still present in this layer. The estimated quantity of mixed waste residue in this system is 0.0005 m^3 (0.0007 yd^3).

3.2.2 HEPA Filters

Four HEPA filters in two filter boxes are stored in the WCF and make up the interim status waste pile. These filters were used during the last calcining run. Six additional HEPA filters stored in three filter boxes, are currently online. These filters were installed after calciner operations were concluded. These six filters contain only radioactive constituents. The estimated quantity of mixed waste, including all ten HEPA filters, is 0.25 m^3 (0.33 yd^3) per filter box, or a total of 1.25 m^3 (1.65 yd^3) mixed hazardous waste in the five filter boxes.

3.2.3 Calciner and Piping

The calciner system vessels, equipment, and piping are conservatively estimated to have a 0.35 mm (0.014 in.) layer of waste residue coating all internal surfaces. This assumption is based on a typical particle of residue having an average size of 0.35 mm (0.014 in.). In addition, it was assumed the process piping around the calciner (10.67 m in length), and the first 6 m (20 ft) of off-gas piping contained a layer of residue, 38.1 mm (1.5 in.) and 25.4 mm (1 in.) thick, respectively. The quantity of mixed waste residue remaining on the internal surfaces of the equipment after the waste was removed in 1981, is estimated at 0.15 m^3 (0.18 yd^3).

3.2.4 Off-Gas System

The pressure drop across the ruthenium adsorbers when the calciner operations were stopped indicated that the adsorbers were at the design pressure drop limit of 356 mm (14 in.) of water. Based on the pressure drop across the adsorbers, the estimated quantity of residual mixed waste in the ruthenium adsorbers, including the inert silica gel contained in the adsorbers, is 43.50 m^3 (56.89 yd^3).

3.2.5 Cell Floors

The cell floors (except absorber cell) were examined using remote inspection videos made in 1993 and 1994. These inspections of the secondary containment for the tanks show an accumulation of dust and rubble in the cells, but no accumulation of calcine. Therefore, it was conservatively assumed that the cells were contaminated with a single, 0.35 mm (0.014 in.) layer of waste residue. The amount of waste residues were adjusted for the following: (1) higher than average radiation fields in the sample blister and adsorber manifold, (2) lower than normal radiation fields in the hot sump and waste hold cells, and (3) documented washing of the calciner and off-gas cells. The estimated quantity of residual mixed waste in the secondary containment cell floors is 0.084 m^3 (0.11 yd^3).

3.2.6 Product Transfer Piping, Valves, and Off-Gas Ducts

Below are the assumptions made concerning the amount of waste residue remaining in the product transfer piping, valves, and off-gas ducts:

- 10.67 m (35 ft) of piping near the calciner has a 38.1 mm (1.5 in.) layer of waste residues on the bottom of the piping
- 11 valves are plugged with waste residues
- 10.67 m (35 ft) of off-gas duct has a 25.4 mm (1 in.) layer of waste residue on the bottom of the duct
- All other piping and ducts are coated with a 3.5 mm layer of waste residue.

Estimated quantity of residual mixed waste in the calciner transfer piping, valves, and ducts is 0.084 m^3 (0.11 yd^3).

3.3 Lead Shielding, Instruments Containing Mercury, and Equipment Oil

An engineering evaluation of other hazardous material that will remain in the WCF has been conducted by reviewing design drawing, equipment specifications, comparison to the NWCF, and personal knowledge of the WCF operation personnel. Based on this review, approximately 15.24 metric tons (15 tons) of lead shielding found structurally in cell walls, pipe corridors, sample blister, and doorways will be left in place. The quantity of mercury contained in the in-cell instruments is conservatively estimated to be 11.8 kg (26 lb). The quantity of oil contained in the in-cell equipment blowers and observation windows is estimated to be 75.7 and 1,022 liters (20 and 270 gallons), respectively. The blowers contain 40 wt. lubrication oil and the observation windows contain mineral oil. Due to the radiation fields and radioactive contamination, the WCF will be closed with these constituents in place.

4. CLOSURE ACTIVITIES

This section is divided into two parts: Section 4.1 discusses the activities necessary to prepare the WCF for closure, and Section 4.2 discusses the closure activities necessary for physical closure of the WCF.

Closure activities in the WCF consist of waste pipe plugging, cell and vessel grouting, and construction of the concrete cap cover over the footprint of the WCF. The WCF will be considered physically closed when these activities have been completed and certified by an independent, registered professional engineer.

Closure activities in the WCF will generate only a limited amount of waste to be disposed of outside the grouted facility. A maximum of 4,700 gallons of water will be transferred from vessel WC-119 to the PEW. The character of this water is low level liquid waste. A maximum of 10 m^3 of radioactively contaminated personal protective equipment may be sent to the Waste Experimental Reduction Facility (WERF) for incineration. All contaminated piping and equipment resulting from grout placement will remain in the WCF to be grouted in-place with the superstructure.

Closure activities will be considered complete upon submittal of Certification of Closure by an independent qualified Idaho-registered professional engineer, LMITCO, and DOE-ID to the director of the Idaho Department of Health and Welfare (IDHW). Certification of Closure will verify that the WCF unit has been closed in accordance with the specifications of the approved closure plan. Copies of the documentation supporting the independent, registered professional engineer's certification will remain at the ICPP in the event this information is requested by the IDHW director.

The WCF Closure Comprehensive Work Plan (Helms et al. 1996) is summarized in the following sections. The Plan includes activities necessary to prepare the WCF for closure and the activities needed to close the facility.

4.1 Activities Necessary to Prepare the WCF for Closure

4.1.1 Reroute Utilities

Utilities to the WCF are associated with other buildings and systems. The utilities will be rerouted to provide continued service to these other buildings and systems. The WCF will be isolated from plant utilities, and temporary service will be provided as required for closure activities. Isolating the WCF from the plant utilities will eliminate sources of water or steam under the cap.

4.1.2 Above grade Equipment Dismantlement and Grouting

Tanks and piping in the chemical makeup room will be dismantled to clear the room to make space for the equipment required for vessel grouting. Equipment currently in the room will be sized, placed on the ground floor, and grouted in place with the superstructure to provide space for grout pumping activities. Equipment in other locations on the ground floor will be dismantled and grouted at grade along with the WCF superstructure (see Section 4.3).

4.1.3 External Utility Pipe Capping

Utility lines will be cut and capped inside and/or outside the WCF. Utility and nonwaste piping will be capped or plugged to prevent water from entering the WCF.

4.2 Closure Activities for the WCF

4.2.1 Grouting (Void Filling)

Cells and operating corridors will be filled with grout to prevent the potential for future cap subsidence. Vessels will be grouted to reduce open voids within the grouted cells. Grouting was selected because it is pumpable, self-leveling, and has the capability to be formulated in a variety of compositions depending on the application, that fits the needs better than sand. Pipes encountered during closure that penetrate the external walls of the WCF will be filled with grout and/or capped to prevent moisture from entering the WCF.

The grout will be delivered to each room, corridor, or cell through a grout pump and hoses on the ground floor, and a delivery pipe extending into each room, corridor, or cell. After a lift has been placed, the delivery piping will be raised 2-4 ft and the upper 2-4 ft section of the pipe will be removed. The delivery piping may come in contact with airborne radiological contamination during grout placement; each section will be monitored for radiological contamination. Sections of radiological contaminated pipe or hoses will be grouted with the dismantled components of the superstructure.

The grouting equipment, other than the delivery piping, will not come in contact with the waste in the waste pile (containers of HEPA filter), mixed waste residues in vessels and piping or hazardous contamination of the floors of the rooms or cells. Therefore, decontamination for hazardous constituents on the grouting equipment will not be required.

Figure 13 shows the proposed grouting sequence for vessels and cells.

4.2.1.1 Capping of the Waste Piping. Waste piping penetrating the exterior walls of the WCF are contained in steel ducting or clay tile casing as illustrated in Figure 3. The annulus between the waste piping and the steel ducting or clay tile casing will be grouted and allowed to setup prior to flushing the waste piping. Waste piping penetrating the exterior walls of the WCF will be flushed by pumping high water content grout through the pipe into tanks in the WCF. The pipe will then be permanently capped. Waste piping will be grouted and capped from the nearest valve box outside the WCF back into a vessel in the WCF. The off-gas duct (CERCLA release site CPP-85) is 2 to 3 m (6.6 to 9.8 ft) below ground level, running around three sides of the WCF perimeter. The duct is constructed of clay pipe, encased in a concrete. The off-gas duct will be filled during cell grouting. The product transfer and return air lines are enclosed in a steel duct surrounded by a concrete encasement. The steel duct will be grouted by pumping grout through holes bored through the encasement and into the steel duct. The product transfer and return air lines will be flushed with grout and then grouted full from a decontamination drop, a point used during operation of the WCF to add aqueous decontamination solutions to the product transfer lines. This access point is located

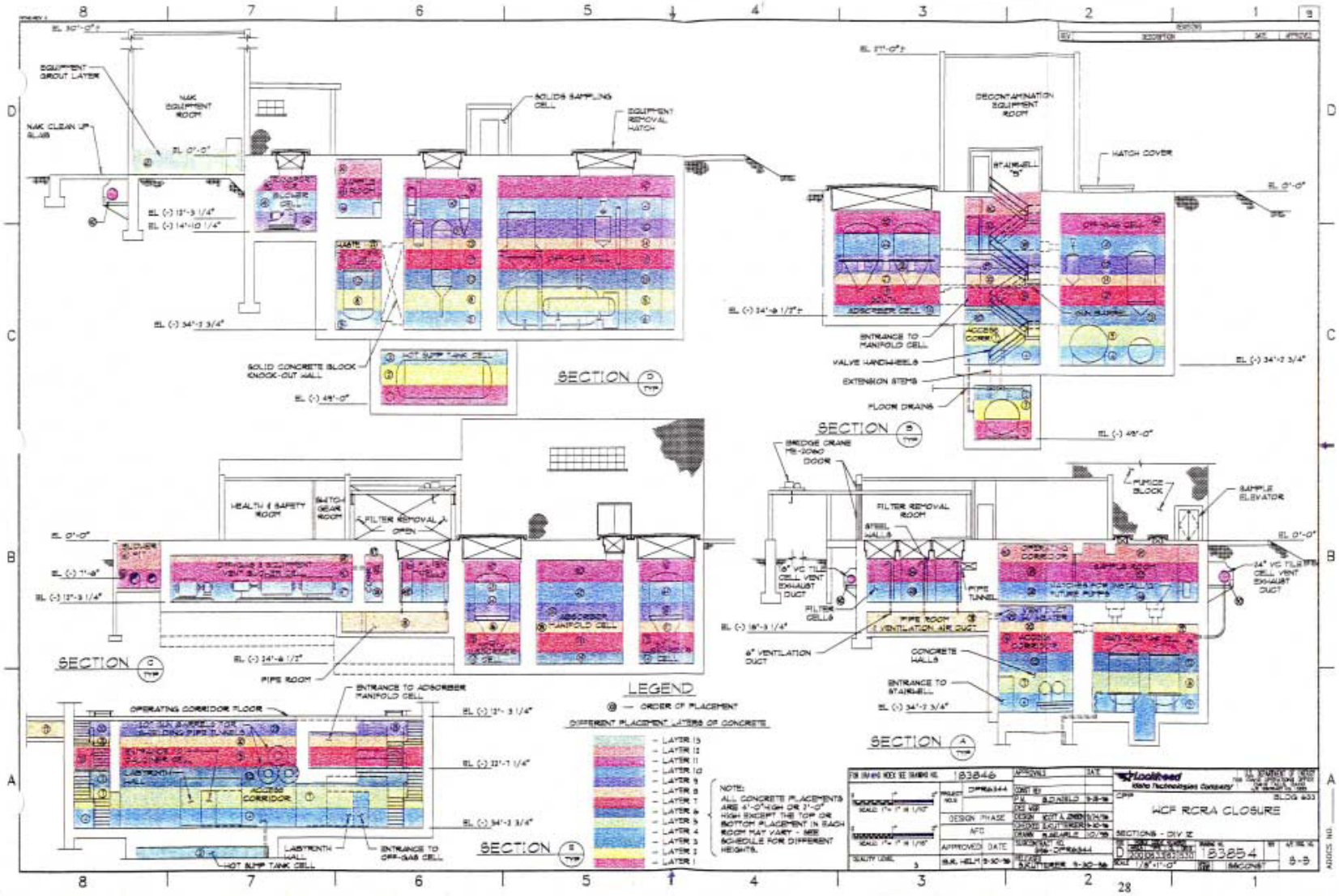


Figure 13. WCF HWMA/RCRA closure concrete placement sequence.

between the WCF and Binset 1, approximately 23 m (75 ft) east of the WCF. This will minimize the potential for additional soil contamination during flushing and grouting of the waste piping not under the cap.

4.2.1.2 Vessel Grouting. Vessels will be grouted to reduce the open voids within the WCF, but grouting is not critical for the structural support of the cap. Therefore, the major vessels (>55 gallons) will be filled with grout as full as is practical, using the existing piping from the chemical makeup area on the ground floor. If a pipe becomes plugged and there is not a backup, it may be necessary to bore a hole into the vessel from the floor above to place the grout. Vessel grouting will start with the vessels in the lower cells and proceed upward (WC-100, -101, and -114 are grouted before WC-119).

The vessels slated for grouting do not currently contain liquids, except vessel WC-119. The liquid content of WC-119 is condensate from the steam heating system in the WCF building, and rain and snow-melt finding its way into the building. This liquid is analyzed prior to treatment at the PEW system. Analytical results indicate it is routinely nonhazardous and only slightly radiologically contaminated. The final transfer of liquid from vessel WC-119 to the PEW will occur just prior initiation of grouting WC-119. The transfer jet in WC-119 is capable of removing all the liquid, except a 280 gallon heel (5% of the tank volume of 760 ft^3) that lies below the jet. This volume of water will be absorbed in an adequate volume of desiccant. Grout mixture will be placed in WC-119 to fill the vessel.

The WCF Closure Sequence Chart indicates VES-WC-119 will be emptied as step T-9 and grouted as step T-19. The WCF Closure Sequence Chart lists the preferred sequence of the activities.

4.2.1.3 Cell Grouting. Cells and operation corridors will be grouted in lifts, as depicted in Figure 12, to allow for curing and heat dissipation between pours. The lift thicknesses will vary, depending on the cell being filled, but typically will be 0.3 to 1.3 m (1 to 4 ft), as indicated in Figure 13. Grout will be pumped into cells and operating corridors through existing piping, where available, or through K-plugs or drill holes bored from the ground floor. Many of the cells and operating corridors will require multiple access points to maintain a level lift when filling. Cells and operating corridors will be considered full when grout becomes visible in the uppermost K-plugs or drill holes being used to fill that cell or corridor. Additionally, the cell or corridor ventilation will stop as the ceiling exhaust ventilation holes located near the top of the cells fill with grout.

The tank and cell closure activities will be conducted from the ground floor of the WCF to minimize the exposure of workers to radioactive contamination. It is not expected that personnel or equipment will be contaminated since the grout placement activities will be accomplished by using remote operations.

NOTE 1: K-plugs are removable access plugs through the roof of the cell.

NOTE 2: The cell roofs are constructed of reinforced concrete, measuring 3 ft thick.

4.2.1.4 Contamination Release Concerns. The potential of spreading contamination from either the radioactive or hazardous constituents to the environment from pipes, vessels, or cells during the placement of grout or concrete has been evaluated. The results are presented in the following sections.

4.2.1.4.1 Cell Filling—The WCF substructure is constructed of heavily reinforced concrete, with walls and floors measuring 2-ft thick. Cells have stainless steel liners covering the floor with a 4-in.-high containment lip at the walls. The calciner cell floor and walls are totally lined with stainless steel. The blend and hold cell does not have a stainless steel liner. During shutdown, several of the cells containing process vessels were washed down, with the flushed residues transported to the PEW system, as described in Section 2.3. Little, if any, free contamination is expected to be present in these areas.

The initial placement of 0.6 to 1.2 m (2 to 4 ft) high concrete lifts will cover and immobilize any contamination that may still be present on the stainless-steel lined floors. Subsequent lifts will lie upon the previous lifts, preventing the migration of liquids downward to the subsurface geology. Any micro cracks in the walls will be quickly filled and plugged by the concrete mixture. Mockup laboratory tests have determined that 1/8 in. diameter holes would plug with a thin slurry grout made up of only flyash and cement at 4.23 kg/cm^2 (60 psi) pressure if not filtered coming out of the delivery pump. The concrete formulation for cells consists of sand and aggregate, much thicker than the slurry grout. This mix will certainly not permeate any cracks to the environment, rather tending to plug and fill any discontinuities and asperities at the inner contact surface. The hydrostatic pressure exerted by a 1.2 m (4 ft) lift of uncured concrete is much lower than the measured 4.23 kg/cm^2 (60 psi) test condition, thus preventing the extrusion of concrete through the walls. The concrete has an initial set time of 2 hours, whereby in the process of hydration, the cement constituents in the concrete formulation will assimilate and tie up the water in the mixture, to complete the exothermic chemical reaction. Free water will not be available to transport any loose contamination to the environment.

4.2.1.4.2 Vessel and Pipe Filling—The facility's stainless-steel drain piping is encased in concrete as it extends from different locations in the facility through soil to the sump tank. All other exterior piping entering the facility is either encased in concrete, or sleeved, or both.

For pipe closure, the lines will either be cut and permanently capped under the footprint of the closure cap or flushed, with the grout being injected through the line back toward the facility. The thin, watery grout will both flush and scour the interior of the piping and ultimately ending up under the closure cap in vessels before it is allowed to cure and solidify. The nature of these tasks makes a release during grouting highly unlikely. Mockup testing of the grout indicates that if a leak were to occur, the grout would solidify when not in motion and quickly be immobilized.

The vessels have been analyzed statically and it has been determined that the supports will maintain integrity following placement of grout. Piping has been evaluated to ensure delivery pressures are within design capacity of specific pipes. In all cases, the capacity far exceeds the expected pressure exerted by the grout.

The following waste and utility pipe lines have been evaluated to determine if they provide a conduit for water to migrate under the cap. All pipe lines that penetrate the outer walls of the WCF are sealed into the wall for radiation shielding and to prohibit water from entering through the pipe penetrations.

Table 4. Waste Transfer Pipe Lines

PIPE LINES	REGULATORY STATUS	DESCRIPTION
3" TAA-3009	Ancillary to WC-102 Waste Calciner, a non-Interim Status Unit	Calcine Line to Bin Sets - Slopes toward the WCF: Line is encased in a 14-in sleeve; concrete was poured around piping at construction; no entry into WCF from exterior of concrete encasement; depth from surface is 9-ft 4-in..
3" TAA-3001	Ancillary to WC-102 Waste Calciner, a non-Interim Status Unit	Calcine Return Air Line From Bin Sets - Slopes toward the WCF; Line is encased in a 14-in sleeve (same sleeve as 3-in TAA-3009); concrete was poured around piping at construction, no entry into WCF from exterior of the concrete encasement; depth from surface is 9-ft 4-in..
1" PUA-3005	Ancillary to WC-100/101 Waste Hold Tanks, Interim Status Units	Drain From Valve Box B6 - Slopes toward the WCF; depth of pipe is 20-ft. Rainwater/snowmelt will not reach this depth. Concrete encased utility lines crossing over the waste lines in the Utility Tunnel are in operation and monitored.
3" PUA-3004	Ancillary to WC-100/101 Waste Hold Tanks, Interim Status Units	Feed Line From Valve Box B6 - Slopes toward the WCF; depth of pipe is 19-ft. Contained in metal sleeve. Rainwater/snowmelt will not reach this depth. Utility lines crossing over the waste lines in Utility Tunnel are in operation and monitored, will be flushed and grouted along with its sleeve.
3" PLA-101111	Ancillary to WC-119, Hot Sump Tank, an Interim Status Unit	Pipe From WCF To PEW - Will be grouted along with its sleeve.

Table 5. Non-waste Transfer Pipe Lines

PIPE LINES	REGULATORY STATUS	DESCRIPTION
3" VGA-3051	Vent line entirely under closure cap	Vent From Transport Air Blower Cell - Fill with grout from excavation, place grout block in line in Transport Air Blower Cell.
1½" DCN-3091	Utility, non-waste line entirely under closure cap	Flushed Nitric Acid Line (reagent) - Fill with grout from the Decon Room .
2" ONA-109721	Utility, non-waste line entirely under closure cap	Oxygen Line- Cut and weld cap on pipe under closure cap footprint from excavation to access cell vent lines.
2" CTN-100242	Utility, non-waste line, slopes away from WCF	Condensate Line - Slopes away from the WCF.
3" HAN-3001	Utility, non-waste line to be filled with grout	Air Line - Fill with grout.
1" HIN-3011	Utility, non-waste line to be capped under the closure cap	Instrument Air Line - Cut and capped line under cap footprint.
3" WRN-3001	Utility, non-waste line to be filled with grout	Cooling Water Line (Service Waste) - Fill with grout from manhole.
6" HSN-3002	Utility, non-waste line to be filled with grout	Steam Line - Fill with grout from manhole.
3" WSN-3011	Utility, non-waste line to be filled with grout	Cooling Water Line - Fill with grout from excavation.
4" WQN-100224	Utility, non-waste line to be filled with grout	Shower Drain Line - Fill with grout from shower drain.
3" SWA-3001	Utility, non-waste line to be filled with grout	Cooling Water Line (Service Waste) - Cut, fill with grout from corner of NaK Room.
¾" PSA-3081	Inactive, non-interim status Bin Set drain line to be filled with grout	Bin Set Vessel Drain Line - Slopes toward the WCF, is encased in 3-in PVA-105527. Depth of pipe is 11-ft. Rainwater/snowmelt will not reach this depth. This pipe is not in service and capped in the Transport Air Blower Cell. It will be encased in grout when filling line 3 inch PUA-105527.
3" PUA-105527	Inactive, non-interim status vent line to be filled with grout	Bin set #1 Vent Line - Slopes toward the WCF. Depth of the pipe is 11-ft. Rainwater/snowmelt will not reach this depth. Fill pipe with grout from an excavation to the WCF transport cell.
1" HIN-3010	Utility, non-waste that slopes away from the WCF	Instrument Air Line - Slopes away from the WCF.
24" CGN-101298	CERCLA Release Site CPP-85	Cell Vent Duct - The cut point and seal will be under the footprint of the cap.
10" PSA-100475	Utility vent line lying under the closure cap	Process Equipment Vent To APS - The cut point and seal will be under the footprint of the cap.

¾" PSA-3081 and 3" PUA-105527 are described in Table 5 above as being at a depth of 11 ft (3.4 m). This is critical because the undisturbed soils at ICPP consist of medium to course textured soils over gravel derived from alluvial deposits of the Big Lost River. Soil samples collected from boreholes drilled at ICPP and analyzed in the laboratory indicate the surface soil/alluvium has a permeability of 2 X 10^{-2} cm/sec. The effective evaporation zone depth for superficial sediments in this area is approximately 1.5 m. Soil moisture movement below this depth is greatly reduced. Infiltration rates in the ICPP area are conservatively estimated at 10 cm/yr. Modelling with the Environmental Protection Agency (EPA) code *Hydrological Evaluation of Landfill Performance* to estimate yearly infiltration of water through the closure cover indicates average annual leakage through a soil cover is 0.3 cm. This flux rate is very low and would not be sufficient to generate leachate. As a result of the semi-arid climate with relatively low annual precipitation (22 cm), high potential annual evapotranspiration (116 cm), and deep water table (137 m), vadose zone soils tend to be relatively dry during most of the year. Precipitation falling on soils around the closure cap would not be expected to penetrate through the evaporation zone depth of approximately 1.5 m.

In summary, the inherent barriers and the nature of the concrete, grout, and the process of delivery of the grout formulations makes the potential of a release of contamination to the environment highly improbable. Measures have been taken in the design to tightly control the procedures and sequence to safely achieve the desired filling of the piping, vessels, and subsurface structures of the WCF, as described in Sections 4.1 and 4.2 of this Closure Plan.

4.2.1.4.3 Waste Pile Grouting—The waste pile consists of four HEPA filters enclosed in two stainless steel HEPA filter housings setting on the floor at the back of the filter room. The currently used six HEPA filters, enclosed in three stainless-steel HEPA filter housings, will be left in place. Approximately, 2-ft of grout will be placed on the floor of the filter room and allowed to set up. The HEPA filter housing and filters weighs approximately 750 lb each, The weight of the housings will prevent the housings from floating on the grout when the first lift is placed in the filter room. Each lift will be allowed to set up before the next lift is placed. Figure 13, Sections A and C identify the lifts by number for the placement of the grout. Lifts 28, 38, 39, 43, 48, 50, 51, 52, 54, 57 and 60 will be used to grout the filter room and adjacent areas. This will completely surround the filter housings with grout.

The filter room and the surfaces of the HEPA filter housings are radiologically contaminated and in a high radiologically contaminated area. Removal of the filters would result in worker exposure to ionizing radiation, which is inconsistent with DOE ALARA goals.

4.2.1.5 Description of the Superstructure Removal and Placement. The superstructure consists of the aboveground portion of the WCF. The WCF above-grade walls are constructed of 12-in. concrete blocks. Following radiation surveys, radioactive "hot spots" will be stabilized with latex paint or an equivalent to control the airborne spread of radiological contamination during demolition. The radioactive hot spots are from airborne contamination, and not from direct contact with the mixed waste processed in the WCF. The roof and walls will be dismantled using a backhoe with a crushing and shear jaw attachment, or similar equipment. The walls and roof structure will then be further sized and placed on the floor over the grouted and cured below-grade structure. Suspension of radioactive or asbestos particles will be controlled by application of water mists, or other dust suppressants during dismantling and sizing processes. Track-mounted equipment, such as

bulldozers, will be used to level and compact the rubble. Grout will be applied to fill empty spaces and voids in the rubble. The entire structure will then be covered by a reinforced concrete cap.

4.2.2 Description of the Cap

The WCF is being closed with mixed waste in place, meeting the closure requirements applicable to landfills, by the construction of an engineered concrete cover or cap over the grouted cells, vessels, and superstructure. The landfill cover or cap requirements for design and construction are listed below. The cover or cap will:

- Minimize migration of liquids through the closed landfill
- Function with minimum maintenance
- Promote drainage and minimize cap erosion or abrasion
- Accommodate settling and subsidence, maintaining the cover's integrity
- Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

The design of the WCF concrete cap complies with the requirements identified above. The cap will be constructed of a low-permeability reinforced concrete, a minimum of 0.31 m (12 in.) thick, with at least 1% slope from the center to the edges of the cap. The cap will extend approximately 5 ft past the ground level footprint of the WCF building, as indicated in Figures 14 and 15. The size and configuration of the closure cap is restricted by the proximity of the WCF to other operating facilities at the ICPP. Expansion of the cap to the north to cover the ancillary waste lines from the WCF to the PEW (3" PLA-101111) and Tank Farm (3" PUA-3004 and 3" PUA-3005) is limited by the presence of a utility tunnel that runs under Olive Street. The utility tunnel provides access for utilities (compressed air, water, steam, etc.) to the operating facilities in the central portion of the ICPP, including the NWCF. Expansion of the cap to the east is severely limited by the proximity of the berms surrounding and shielding the CSSF bin sets. Radiological controls and seismic criteria associated with the operating envelope for the CSSF prohibit extension of the closure cap to cover the calcine transfer lines (3" TAA-3009 and 3" TAA-3001) any closer to the berms than is currently proposed in the Closure Plan.

Water stops will be installed in the joints on the cap, as presented in Figures 16 and 17. The concrete will have a permeability of approximately 1×10^{-12} cm/sec (3.9×10^{-13} in./sec) (Keck 1995). The concrete will have a minimum compressive strength of 4,500 psi after 28 days (WCF Closure Comprehensive Work Plan 1996). The surface soils have a permeability of 2×10^{-2} to 2×10^{-1} cm/sec (7.8×10^{-3} to 7.8×10^{-2} in./sec). The sedimentary interbed soils have a permeability of 1×10^{-3} to 9×10^{-5} cm/sec (3.9×10^{-4} to 3.5×10^{-5} in./sec) (Keck 1995).

The concrete cap will function with a minimum of maintenance and reduce erosion. The grade of the surface will promote drainage away from the cap. The below ground voids created by the vessels and cells will be filled with a grout, to prevent subsidence and to maintain the integrity of the

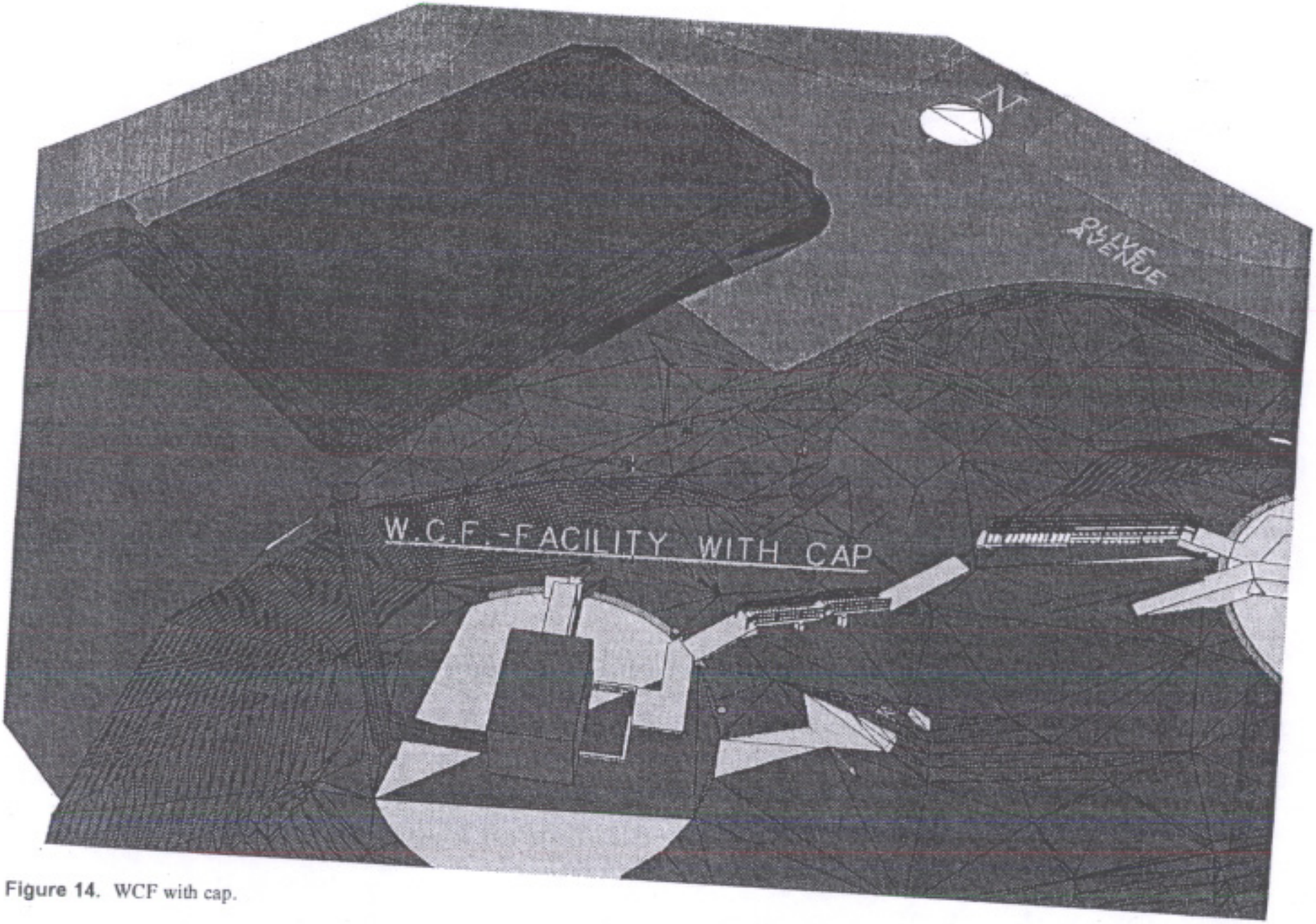


Figure 14. WCF with cap.

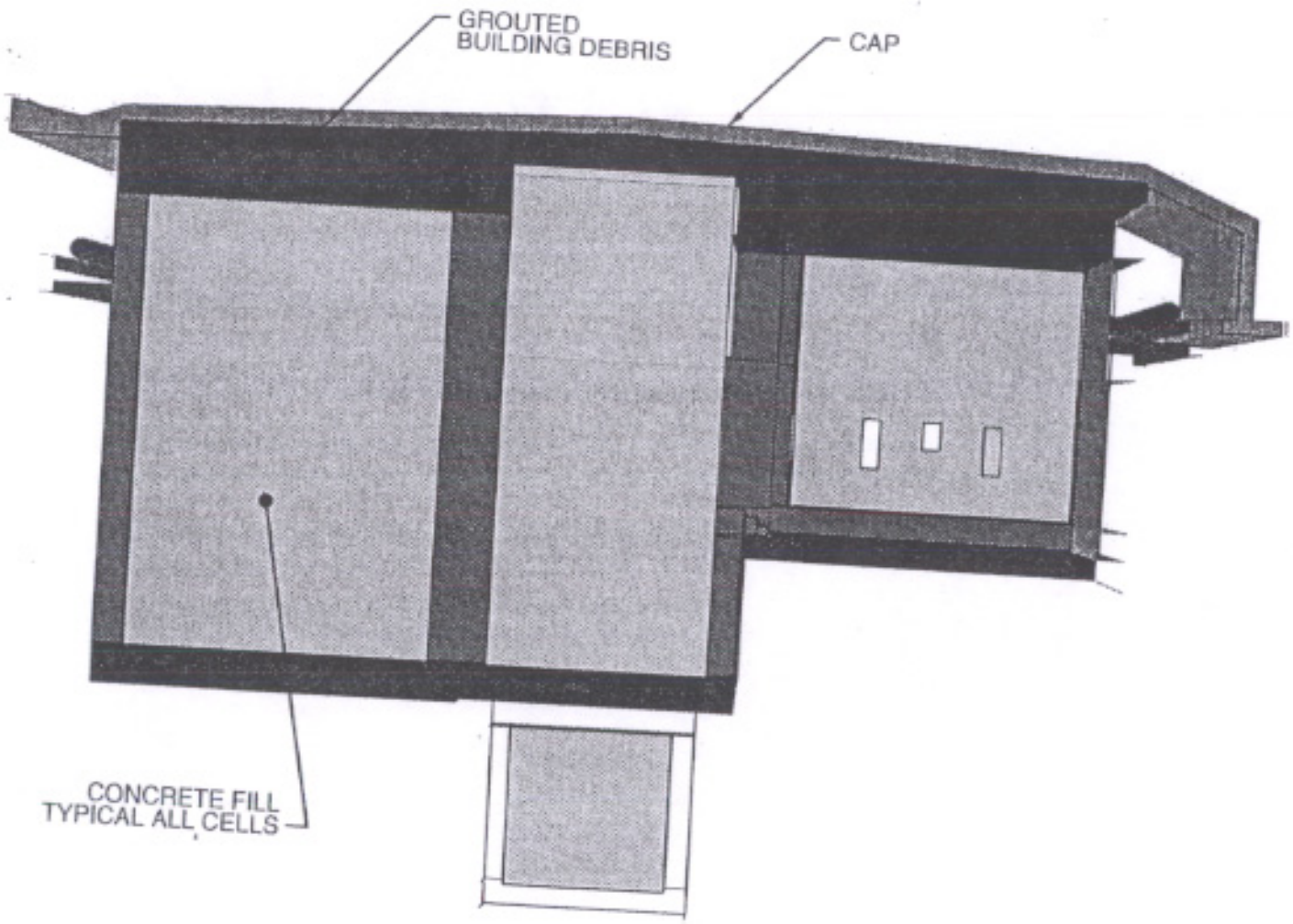


Figure 15. WCF—looking south.

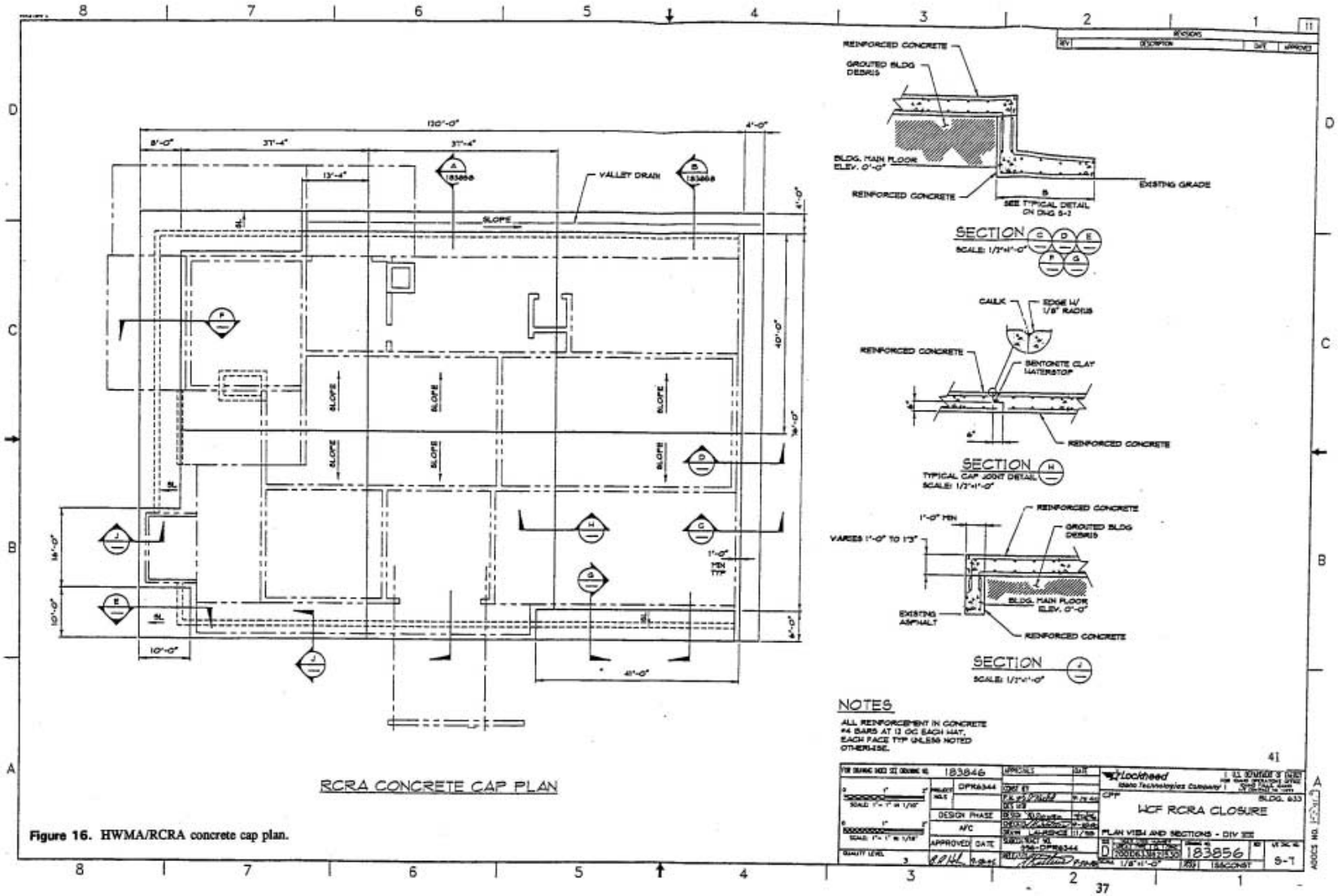


Figure 16. HWMA/RCRA concrete cap plan.

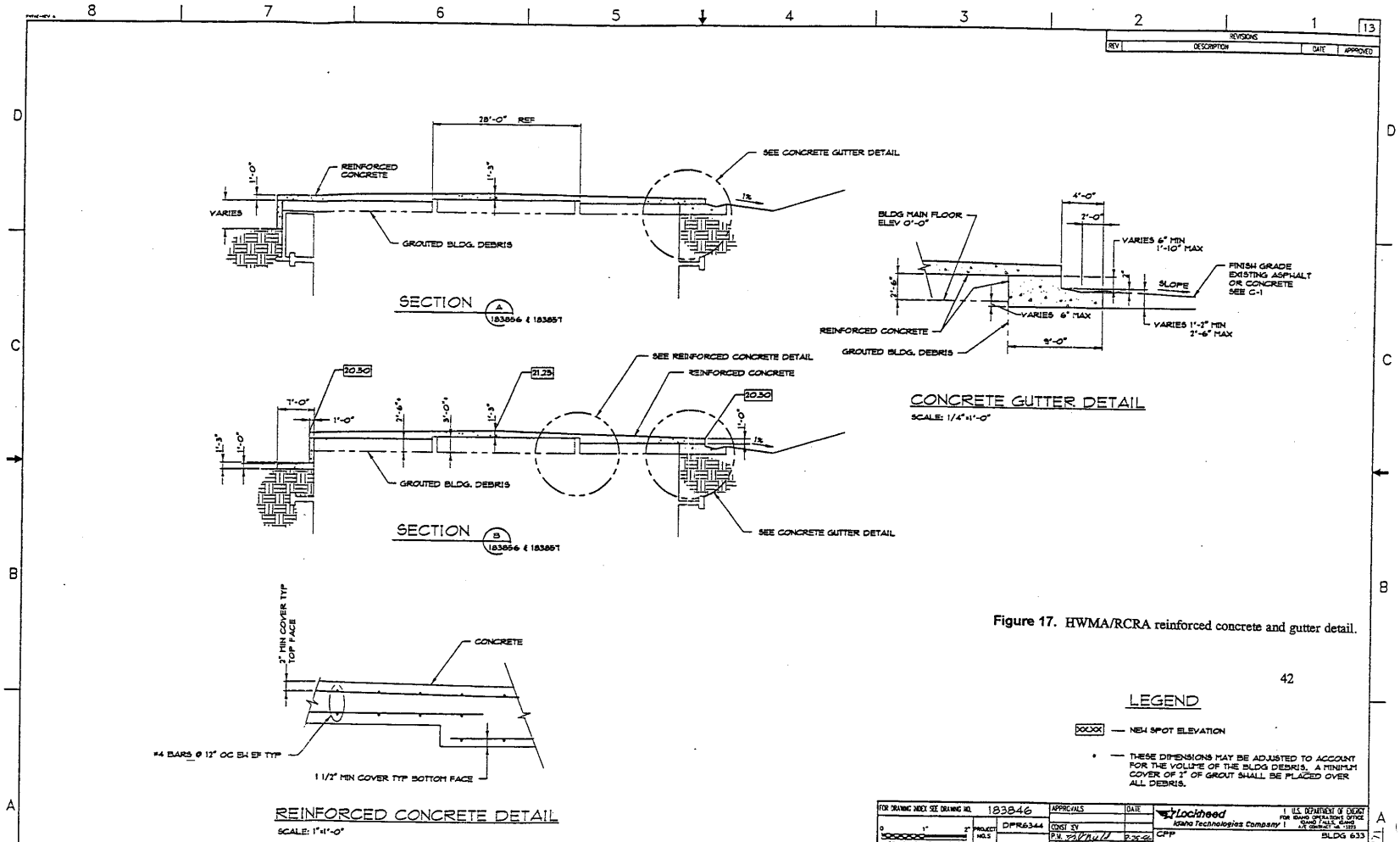


Figure 17. HWMA/RCRA reinforced concrete and gutter detail.

Figure 17. HWMA/RCRA reinforced concrete and gutter detail.

cap. Water that drains off or toward the cap will be collected and routed away from the WCF by the storm water drains and ditches, as shown in Figure 18.

4.2.3 Inspections and Monitoring During Pre-Closure and Closure

HWMA inspection and monitoring of the WCF will be maintained before and during closure activities. As parts of the WCF become inactive or emergency equipment is not needed, the inspection and monitoring requirements for those specific areas or emergency equipment will be terminated. Inspection requirements for vessels, cells, and equipment will be terminated when grouting begins, or when removed from service. Monitoring of the liquid level (steam condensate, rainwater, and snowmelt) in vessel WC-119 will continue as required under the HWMA/RCRA inspection schedule, until the final transfer of liquid to the PEW is accomplished and grouting is initiated. Vessels WC-100, -101, -114, and -108 will also be monitored to confirm no liquids have entered the vessels prior to grouting and are dry at the time of grouting. The waste pile in the filter cell will be monitored for deterioration until filling the cell with grout is started. The date and rationale for termination of the HWMA interim status monitoring and inspection requirements for each area of the WCF will be recorded in the WCF Operating Record. This Record will be maintained throughout HWMA closure. Portable safety showers and eyewash stations will be provided, maintained, and inspected before and during the closure activities. Voice paging, evacuation alarms, and telephones will be maintained and inspected monthly, until the cells are grouted, and building demolition is started. Portable fire extinguishers will be maintained and inspected until the WCF is closed. Spill cabinets will be removed from the WCF when grouting and/or demolition begins. Temporary lighting and emergency lighting will be maintained until building demolition begins. Emergency stretchers will be maintained in the WCF until building demolition begins. Emergency equipment is inspected and maintained by the emergency response organization at the INEEL.

4.3 Demonstration of Closure

4.3.1 Closure Performance Standards

The WCF will be closed in a manner that:

- Minimizes the need for further maintenance, by grouting the vessels and cells to prevent subsidence; and by the construction of a low-permeability concrete cap
- Controls, minimizes, or eliminates release of hazardous constituents
- Protects human health and the environment through the construction of a low-permeability cap and plugging of external pipelines
- Minimizes post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off; hazardous waste decomposition products to the ground or surface waters; or to the atmosphere, by the construction of a low-permeability sloped cap, plugged external piping, and a storm water drainage system to direct run-off away from the cap

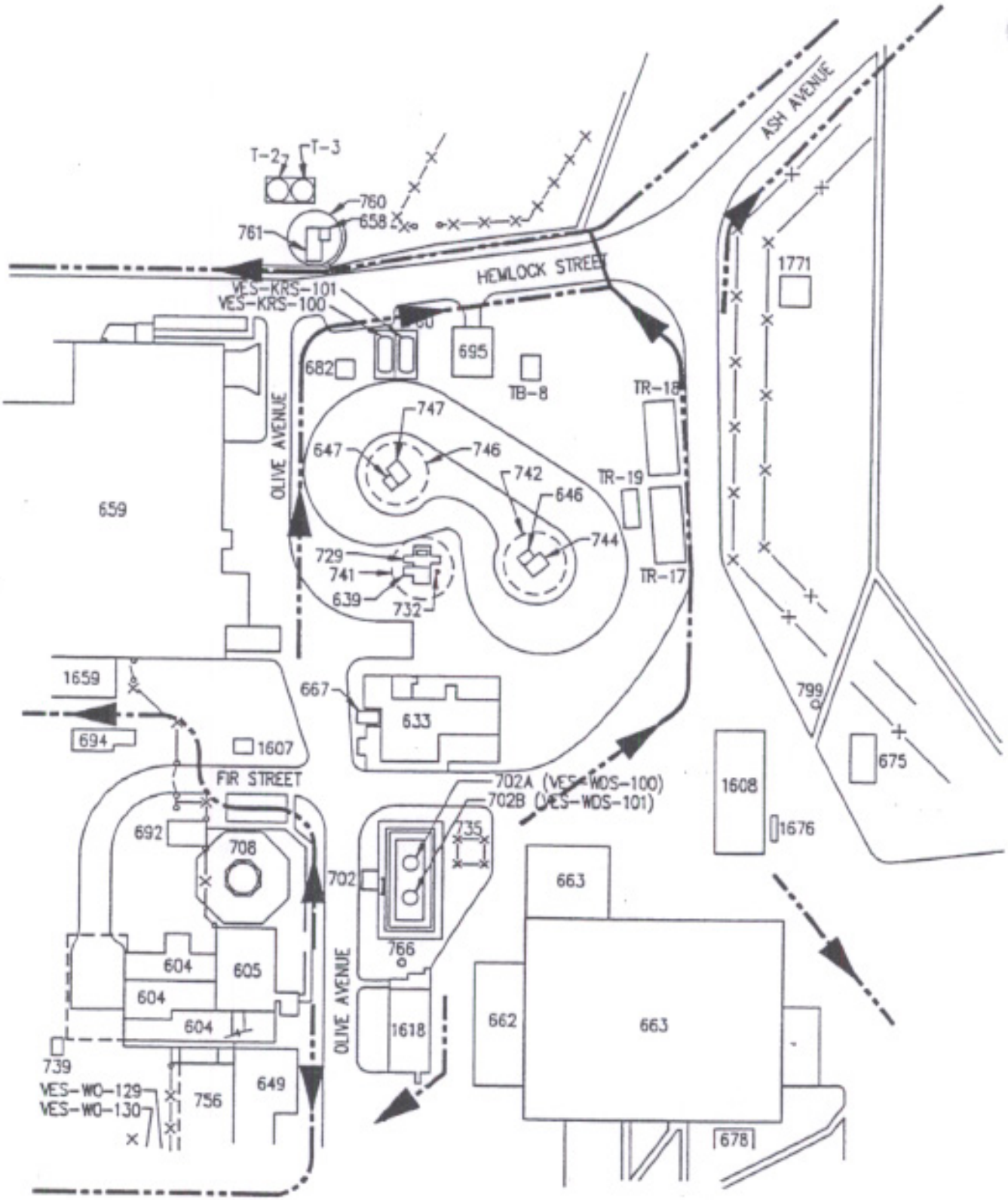


Figure 18. Storm water drains.

- Complies with IDAPA 16.01.05.009 (40 CFR 265.310) closure requirements, in addition to the above, by maintaining the integrity of the cap, ground water monitoring system, and storm water management system.

The closure certification will document the date, amount, and analytical results for the last batch transferred from VES-WC-119 to the PEW system. The certification will also document the volume of liquid in the heel and the placement of an adequate volume of desiccant to absorb this volume of liquid.

4.4 Schedule of Activities

4.4.1 WCF Unit Closure Schedule

Table 4 provides the schedule for WCF unit closure.

Table 6. Schedule for WCF unit closure [a]

Activity	To be completed
Initiate closure activities upon approval of the Closure Plan by HWPB	Month 0
Grout and cap waste piping	Month 13
Cap installation	Month 17
Survey plat	Month 19
Physical closure completed	Month 20
Certification of Closure submitted to the IDHW director	Month 22
Transmit to IDHW and Butte County the "Record of Waste," "Notice in Deed," and "Certification of Notice"	Month 24

a. This schedule assumes approval of the Closure Plan in August 1997. Delays beyond that time will require adjustments in the schedule to preclude completion of certain activities such as demolition of the superstructure and construction of the closure cap during inclement winter weather.

4.4.2 Request for Time Extension

IDAPA 16.01.05.009 (40 CFR 265.113) requires completion of closure activities within 180 days. Health and safety concerns associated with high radiation levels and the complexity of grouting and capping piping, grouting the ducts, and construction of the cap will require a longer timeframe for completion. Thus, an extension is being requested at this time, pursuant to IDAPA 16.01.05.009 (40 CFR 265.113), as it is apparent that closure cannot be completed within the

required timeframe. Subsequent amendments to this Closure Plan may be submitted, if additional time is required to complete closure because of problems encountered in grouting and/or capping the external waste piping and unexpected radioactive contamination.

4.4.3 Amendments to the Closure Plan

The conditions described in IDAPA 16.01.05.012 (40 CFR 270 Subpart D), "Hazardous Waste Permit Program, Changes to Permit" will be followed to implement any changes to this plan that exceed the magnitude of a Class 1 Modification. A written request will be submitted to the IDHW director detailing the proposed changes and the rationale for those changes. Minor changes (i.e., changes made within a work package such as the selection of a particular grout mix or technique) that do not compromise the closure requirements and/or performance standards identified in this plan, may be made without prior notification to the IDHW director. Any minor changes made without approval of the IDHW Director will be noted in documentation supporting the independent professional engineer's certification.

4.5 Certification of Closure

Within 60 days of the completion of physical closure, LMITCO and DOE-ID will submit to the IDHW director, by registered mail, a certification that the WCF, a hazardous waste management unit, has been closed in accordance with specifications in the approved closure plan. Certification of Closure will be provided by an independent Idaho-registered professional engineer, LMITCO, and DOE-ID. Because the WCF will be closed in accordance with requirements applicable to a landfill, a "Notice in Deed" and survey plat will be required in addition to the other requirements under IDAPA 16.01.05.009 (40 CFR 265), *Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*, IDAPA 16.01.05.009 (40 CFR 265 Subpart N: "Landfills").

4.6 Survey Plat and Certification by Professional Land Surveyor

A survey plat of the WCF and cap will be made and certified by a professional land surveyor. The outside wall of the WCF, the concrete closure cap, and location of all waste pipe lines ancillary to the WCF that remain outside of the closure cap footprint will be identified on the survey plat. A benchmark will be installed in the concrete cap and tied to ICPP permanent survey grid. The ICPP survey grid and the WCF benchmark will make it possible to accurately locate the WCF and ancillary waste pipe lines if it becomes necessary in the future. A copy of this plat will be filed at the Butte County Courthouse, a copy will also be kept in the ICPP operation record.

4.7 Notices

4.7.1 Notification of Partial Closure

LMITCO and DOE-ID will notify the IDHW director 60 days prior to the date on which they intend to begin partial closure of the WCF to meet requirements applicable to a landfill.

4.7.2 Record of Wastes

LMITCO and DOE-ID will submit to the IDHW director and Butte County commissioners, no later than 60 days after certification of closure, a record of the type, location, and quantity of hazardous wastes disposed within the WCF.

4.7.3 Notice in Deed

Within 60 days of certification, LMITCO and DOE-ID will, in accordance with Idaho law, file a notation on the deed to the property or other instrument used for title search, that will in perpetuity notify any potential purchaser of the property that:

- The land has been used to manage hazardous wastes
- Its use is restricted under IDAPA 16.01.05.009 (40 CFR Subpart G) regulations
- The survey plat and record of the type, location, and quantity of hazardous wastes disposed within each cell (including location of all waste pipe lines ancillary to the WCF that remain outside of the closure cap footprint) or other hazardous waste disposal unit of the facility as required by IDAPA 16.01.05.009 [40 CFR 265.116 and 265.119(a)] have been filed with Butte County commissioners and the IDHW director.

4.7.4 Certification of Notice

LMITCO and DOE-ID will submit, within 60 days of certification of closure, a signed certification that they have recorded the notation as specified in Section 4.7.3 of this plan and a copy of the document in which the notation has been placed, to the IDHW director.

4.8 Surveying and Record keeping

The following items will be maintained in the operating record for ICPP:

- A map containing the exact location and dimensions, including depth, of each cell and the all waste pipe lines ancillary to the WCF that remain outside of the closure cap footprint with respect to a permanently surveyed benchmark
- The contents of each cell and the approximate location of each hazardous waste type within each cell.

5. POST-CLOSURE CARE PLAN

The Environmental Restoration Department manages the FFA/CO (CERCLA program) at ICPP. The WCF is located approximately in the center of WAG 3. WAG 3 contains several known release sites, which may require maintenance and/or monitoring for many years in the future. Some of the older HWMA units at the INEEL have managed radioactive hazardous waste and may need to be closed with waste in place, which will require post-closure care into the future. In an effort to eliminate duplication of effort and minimize costs associated with the long-term maintenance and/or monitoring, the HWMA post-closure care requirements and the CERCLA post-ROD requirements will be integrated and managed under the CERCLA program.

HWMA surface impoundment, landfill, or land treatment units subject to IDAPA 16.01.05.009 (40 CFR 265.117–120) post-closure care will be managed under the CERCLA program. Prior to CERCLA assuming the post-closure care responsibility for the WCF, the HWMA units will be closed as required by the IDAPA 16.01.05.009 (40 CFR 265.110–116) closure requirements. WCF will be closed when the P.E. certifies that the waste lines have been grouted and capped and the concrete cap was installed as described in this closure plan. The WCF, including the waste pipe lines outside the footprint of the closure cap, will be included as a site in the OU 3-13 WAG 3 Comprehensive RI/FS. The post-closure considerations, required at IDAPA 16.01.05.009 [40 CFR §§ 265.117-120}, will be addressed within the CERCLA process and shall be subject to applicable or relevant, and appropriate requirements (ARAR) procedures under the FFA/CO

The most current schedule prepared for the CERCLA activities at WAG 3 by the DOE-ID ER Program indicates the following:

The current schedule for post-ROD activities indicates the following:

Final Program Plan	1/21/98
End of the Public Comment Period	4/19/98
Draft ROD	5/29/98
Final ROD	9/23/98

Post-ROD Monitoring Package

Develop the monitoring plan	6/1/98
Regulator review	7/14/98
Final version	8/17/98
First round of sampling	8/18-31/98

The latest the monitoring would be implemented would be the result of identifying significant concerns during the public review/comment period. This would potentially delay sampling into the first calendar quarter of 1999.

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Revision 2

HWMA/RCRA Closure Plan for the CPP-601/627/640 Landfill Phase 2

September 2010

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HWMA/RCRA Closure Plan for the CPP-601/627/640 Landfill Phase 2

September 2010

Prepared for the
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DOE Idaho Operations Office

ABSTRACT

This Hazardous Waste Management Act/Resource Conservation and Recovery Act (HWMA/RCRA) closure plan has been prepared for Phase 2 of the CPP-601/627/640 landfill closure. The landfill results from the closure of the CPP-601 Deep Tanks System and the integration of this tank system closure with the decommissioning of the CPP-601 Fuel Reprocessing Facility, CPP-627 Remote Analytical Facility, and CPP-640 Headend Processing Plant. Phase 1 landfill closure activities were completed and included decontamination and grouting of the CPP-601 Deep Tanks System. Building CPP-627 was decommissioned and removed to grade under a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) non-time-critical removal action. Buildings CPP-601 and -640 are being decommissioned under a separate non-time-critical removal action. During the Phase 1 post-closure period, under the CPP-601/640 non-time-critical removal action, Buildings CPP-601 and -640 are being partially demolished, and grout is being used to fill interior void areas, creating a solid monolith. This, along with the concrete pad created near grade during the CPP-627 decommissioning, will be an interim cover for the landfill. Phase 2 of the landfill closure is the installation of a sloped layer of grout over the horizontal surfaces of the CPP-601/640 monolith followed by an earthen weather protection barrier designed to cover the entire CPP-601/627/640 monolith. This plan describes the activities to be conducted for installing the grout layer and earthen weather protection barrier. The final end state for the CPP/601/627/640 landfill is expected to be integrated with the final end state for the surrounding northern Idaho Nuclear Technology and Engineering Center facilities in approximately 2035 through coordination of the HWMA/RCRA and CERCLA programs.

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ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DEQ	Idaho Department of Environmental Quality
DOE	U.S. Department of Energy
HWMA	Hazardous Waste Management Act
IDAPA	Idaho Administrative Procedures Act
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
NTCRA	non-time-critical removal action
RCRA	Resource Conservation and Recovery Act
USC	United States Code
WCF	Waste Calcining Facility

HWMA/RCRA Closure Plan for the CPP-601/627/640 Landfill Phase 2

1. INTRODUCTION

This closure plan has been prepared for Phase 2 of the CPP-601 Fuel Reprocessing Facility, CPP-627 Remote Analytical Facility, and CPP-640 Headend Processing Plant landfill closure at the Idaho Nuclear Technology and Engineering Center (INTEC) at the Idaho National Laboratory (INL) Site. Phase 1 of the CPP-601/627/640 landfill closure was addressed in the *HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1* (DOE-ID 2009a). The CPP-601 Deep Tanks System is being closed as a landfill in accordance with Hazardous Waste Management Act (HWMA) (State of Idaho 1983)/Resource Conservation and Recovery Act (RCRA) (42 *United States Code* [USC] 6901 et seq. 1976) regulations of the Idaho Administrative Procedures Act (IDAPA) 58.01.05.008 (40 *Code of Federal Regulations* [CFR] 264, Subparts G and J), which address tank system closure.

The CPP-601 Deep Tanks System is being closed as a landfill because of the presence of abandoned isolated piping runs that could not be flushed, waste remaining in the tank system at closure, and lead that was impracticable to remove. In addition, Buildings CPP-601, -627, and -640, which are part of the Fuel Reprocessing Complex at INTEC, have radionuclide contamination that will not be removed upon decommissioning. Buildings CPP-601 and -640 are being decommissioned in an ongoing Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601 et seq. 1980) non-time-critical removal action (NTCRA) (DOE-ID 2008). Building CPP-627 was demolished, and a protective layer of concrete was poured over the building footprint as part of a separate NTCRA (DOE-NE-ID 2004). Therefore, the CPP-601 HWMA/RCRA landfill closure is being integrated with the CPP-601/640 NTCRA and the completed CPP-627 NTCRA, resulting in a single CPP-601/627/640 landfill.

In coordination with the NTCRA, the CPP-601/627/640 HWMA/RCRA landfill closure is being completed in two phases. Activities for Phase 1 of the CPP-601 Deep Tanks System landfill closure were completed in accordance with the Phase 1 closure plan (DOE-ID 2009a), and the Idaho Department of Environmental Quality (DEQ) accepted the closure certification on February 19, 2010 (Monson 2010). Phase 1 post-closure activities are being conducted in accordance with the *HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill* (DOE-ID 2009b), which became effective upon DEQ's acceptance of the Phase 1 closure certification. During the Phase 1 post-closure period, NTCRA demolition and removal activities are being conducted on Buildings CPP-601 and -640. Grout is being used to fill piping, vessels, and other internal void areas, thus creating a solid monolith. Removing building superstructures during the partial demolition of Buildings CPP-601 and -640 will expose the concrete monolith. This exposed monolith, along with the concrete pad created earlier during the CPP-627 NTCRA, is an interim HWMA/RCRA cover for the CPP-601/627/640 landfill during the Phase 1 post-closure period. The Phase 1 post-closure period extends from DEQ acceptance of the Phase 1 closure certification until DEQ accepts the Phase 2 closure certification.

Phase 2 of the landfill closure is the installation of a layer of grout over the horizontal surfaces of the CPP-601/640 monolith. This grout layer will be sloped as necessary to provide drainage and, along with the CPP-627 pad, will serve as a precipitation-infiltration coating for the horizontal surfaces of the CPP-601/627/640 monolith. The earthen weather protection barrier to be placed over the entire monolith (CPP-601/627/640) after the grout layer is installed will enhance longevity by further promoting precipitation run-off and reducing the impact of freeze/thaw cycles to the monolith. Drainage off of the east side of the monolith will be coordinated with the Operable Unit 3-14 CERCLA program through the

installation of a low-permeability asphalt layer to prevent precipitation infiltration. The final end state for the CPP-601/627/640 landfill is expected to be integrated with final end states for the adjacent northern INTEC facilities in approximately 2035 through coordination of the HWMA/RCRA and CERCLA programs.

The purpose of this plan is to describe the activities to be conducted for installing the Phase 2 grout layer and earthen weather protection barrier over the monolith created in coordination with the CERCLA NTCRAs. Upon DEQ acceptance of Phase 2 closure certification, the HWMA/RCRA post-closure permit for the INTEC Waste Calcining Facility (WCF) (PER-112) will be modified to include the Phase 2 landfill post-closure activities.

2. FACILITY DESCRIPTION

Buildings CPP-601, -627, and -640 are part of the Fuel Reprocessing Complex at INTEC, which is located in the south-central area of the INL Site. These buildings are described briefly in the following subsections. Detailed descriptions of the buildings and the INL Site are provided in the CPP-601 Phase 1 closure plan (DOE-ID 2009a) and the action memoranda for the CPP-601/640 and CPP-627 NTCRAs (DOE-ID 2008; DOE-NE-ID 2004).

2.1 CPP-601 Fuel Reprocessing Facility

The CPP-601 Fuel Reprocessing Facility was a 244 × 102-ft building consisting of six levels, with the primary portion located below ground. The facility was used for reprocessing spent nuclear fuel. Operations included fuel dissolution, separation, chemical makeup and transfer, and liquid waste receiving processes. The top level, constructed of transite panels on post and beam, was above grade and contained an open area that was used for transferring fuel elements to the process equipment and for chemical storage, makeup, and transfer. The lower levels, constructed of steel-reinforced concrete, contained process cells, corridors, and auxiliary cells that housed equipment and controls. The CPP-601 Deep Tanks System was located in the lowest level of Building CPP-601 and consisted of four 4,500-gal stainless steel tanks located in two stainless-steel-lined concrete vaults. This system collected liquid waste generated from separations processes performed in CPP-601. Process systems in CPP-627 and CPP-640, as well as other facilities, also sent waste to these tanks.

Most of the floor, cell walls, and equipment were lined with, or consisted of, stainless steel. The processing equipment, which was designed for remote operations, was generally enclosed in the heavily shielded cells. Often, lead was used as the shielding material. A significant amount of lead shielding also was encased in the concrete structures (floors and walls) (DOE-ID 2009a).

Building CPP-601 was made up of heavily reinforced, 1.5-ft-thick exterior building walls and up to 5-ft-thick interior cell walls and was 80% underground. As part of the CPP-601/640 NTCRA, the interior vessels, large piping, and cells of CPP-601 are being filled with grout, which will solidify and will be contained by the building structure. Because the grout is being placed in lifts and allowed to harden, lateral displacement is not a concern. The majority of the facility was founded on approximately 10 ft of compacted engineered subgrade on basalt bedrock. The deep tanks area extended into the basalt about 7 ft. The weight of the building and grout applies a pressure to the subgrade that is less than the underlying bearing capacity. Long-term displacement or subsidence is not expected.

2.2 CPP-627 Remote Analytical Facility

The CPP-627 Remote Analytical Facility was a 14,727-ft^2 facility. The building was entirely above ground and was attached to CPP-601. Building CPP-627 was constructed in 1955 of reinforced concrete and masonry block. Waste collection piping in CPP-627 had been inactive since 1989, and the CPP-627 building was last used in 1995. The building housed analytical, experimental, and decontamination facilities, including the Hot Chemistry Laboratory, the Old Shift Laboratory, the Multi-Curie Cell, the Emission Spectroscopy Laboratory, and the Decontamination Development Laboratory. The custom fuel dissolution process was conducted in the Hot Chemistry Laboratory/Multi-Curie Cell until 1991. In 2005, CPP-627 was removed to grade as part of an NTCRA (ICP 2006). Some lines that were part of the drainage system were included in the CPP-601 Deep Tanks System closure because the lines drained to the CPP-601 tanks. These lines remain beneath the CPP-627 pad, and the building footprint is included as part of the CPP-601/627/640 landfill closure.

Building CPP-627 primarily was built as a slab on grade structure. The slab was supported by concrete-filled pipe pillars and, in some areas, deep concrete footings. The building structure was removed essentially to the slab at grade. Subgrade areas, such as the valve pits and Multi-Curie Cell well were filled with concrete. Buried piping was capped at the slab. A concrete pad was poured over the slab area to prevent water infiltration. This pad abuts CPP-601 on the east and CPP-640 on the south. The weight of the existing building floor slab and new concrete pad applies a pressure to the subgrade that is less than the underlying bearing capacity. Long-term displacement or subsidence is not expected.

2.3 CPP-640 Headend Processing Plant

The CPP-640 Headend Processing Plant was a 66 × 89-ft structure constructed in 1961 to support research and process development for the uranium reprocessing mission in CPP-601. Fuel processing at CPP-640 ended in June 1984 (DOE-ID 2008).The facility contained two shielded waste-collection tank vaults at the lowest level of the building, five shielded test cells at the mid-level of the building, and an open crane loft with space for chemical makeup equipment and access to the cells through roof hatches at the upper level (DOE-ID 2007a). A major modification in the late 1970s added the shielded mechanical handling cave within the crane loft. The CPP-640 Headend Storage Tank System received decontamination fluids generated in the plant. The tank system comprised two radiological waste tanks and a nonradiological waste tank. The DEQ approved the certification for the CPP-640 Headend Storage Tank System closure on June 12, 2008 (Monson 2008).

Building CPP-640 was made up of heavily reinforced, 1.5-ft-thick exterior walls and 4.5-ft-thick cell walls and was mostly underground. As part of the CPP-601/640 NTCRA, the interior vessels, large piping, and cells of CPP-640 are being filled with grout, which will solidify and will be contained by the building structure. Because the grout is being placed in lifts and allowed to harden, lateral displacement is not a concern. The majority of the facility was founded on approximately 15 ft of compacted engineered subgrade on basalt bedrock. The weight of the building and grout applies a pressure to the subgrade that is less than the underlying bearing capacity. Long-term displacement or subsidence is not expected.

3. LANDFILL CLOSURE APPROACH

The approach for the CPP-601/627/640 landfill closure consists of three steps: Phase 1, the Phase 1 post-closure period, and Phase 2 (DOE-ID 2009a). Upon DEQ acceptance of the Phase 2 closure certification, the WCF HWMA/RCRA post-closure permit (PER-112) will be modified to include the Phase 2 post-closure activities.

Phase 1 landfill closure activities were completed and included the decontamination and grouting of the CPP-601 Deep Tanks System components in accordance with the *HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1* (DOE-ID 2009a). The DEQ accepted the Phase 1 closure certification on February 19, 2010 (Monson 2010).

The Phase 1 post-closure period of the landfill closure includes the performance of HWMA/RCRA inspection, maintenance, and monitoring activities on the CPP-601/627/640 monolith, which will serve as an interim HWMA/RCRA cover over the landfill. These activities are being performed in accordance with the *HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill* (DOE-ID 2009b), which became effective upon DEQ's acceptance of the Phase 1 closure certification (Monson 2010). Phase 1 post-closure period activities are being integrated with the CPP-601/640 NTCRA activities. The CPP-601/640 portion of the monolith is being created and exposed as a result of the CPP-601/640 NTCRA activities specified in the *Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008). As part of the NTCRA (DOE-ID 2008), the remaining internal void areas of CPP-601 and -640, including vessels and piping, are being grouted to the Process Makeup/Hot Makeup deck level, thus creating the monolith. Building CPP-627 was demolished as part of the NTCRA performed in accordance with the *Action Memorandum for the Decontamination and Decommissioning of Building CPP-627, the Remote Analytical Facility* (DOE-NE-ID 2004). Under the NTCRA, a sloped concrete pad was poured over the CPP-627 building footprint and will become part of the CPP-601/627/640 landfill.

Phase 2 of the landfill closure is the installation of the Phase 2 HWMA/RCRA earthen weather protection barrier system over the concrete monolith. A grout layer will be installed over the horizontal surfaces of the CPP-601/640 monolith to promote drainage, and an earthen weather protection barrier will be placed over the entire monolith to protect the monolith from freeze/thaw cycling. Upon DEQ acceptance of the Phase 2 closure certification, the WCF HWMA/RCRA post-closure permit (PER-112) will be modified to include the Phase 2 landfill post-closure activities. The final end state for the CPP-601/627/640 landfill is expected to be integrated with final end states for the surrounding northern INTEC facilities in approximately 2035 through coordination of the HWMA/RCRA and CERCLA programs. These facilities potentially include the Tank Farm Facility, Calcine Bin Sets, New Waste Calcining Facility, Process Equipment Waste Evaporator, Integrated Waste Treatment Unit, and other miscellaneous facilities.

Table 1 shows the integration of the HWMA/RCRA activities with the CPP-601/640 NTCRA activities and lists the primary activities associated with each step in the phased landfill closure. Descriptions of the landfill closure boundary, Phase 1 closure, CPP-640 HWMA/RCRA closure, CPP-627 NTCRA, CPP-601/640 NTCRA, and Phase 1 post-closure are provided in the following subsections.

Table 1. Primary activities associated with the phased CPP-601/627/640 landfill closure.

Closure Phase	HWMA/RCRA Activities	CERCLA NTCRA Activities
Phase 1 CPP-601 Landfill Closure	*HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1* (DOE-ID 2009a) • Remove waste to extent practicable • Decontaminate piping and tanks to extent practicable • Sample and analyze rinsate and characterize wastes • Grout tanks for waste stabilization • DEQ Acceptance of Phase 1 landfill closure certification on February 19, 2010 (Monson 2010)	*Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008) CPP-601/640 decontamination and decommissioning • Remove accessible bulk lead, asbestos, and other materials that would increase risk • Fill remaining area, including vessels and piping, with grout, creating monolith
Phase 1 Post-Closure Care CPP-601/627/640 Landfill Interim Cover	*HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill* (DOE-ID 2009b) • Effective upon DEQ acceptance of Phase 1 closure certification on February 19, 2010 (Monson 2010) • Implement inspection, maintenance, and monitoring requirements for CPP-601/627/640 landfill • Install groundwater monitoring wells, and begin groundwater monitoring	*Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008) CPP-601/640 demolition • Remove building to the Process Makeup/ Hot Makeup deck level, exposing concrete monolith • Place layer of grout on horizontal surfaces of exposed monolith as appropriate to provide sloping and to serve as a precipitation-infiltration coating over the CPP-601/640 sections of the monolith • Implement institutional controls for monolith maintenance and precipitation run-off control
Phase 2 CPP-601/627/640 Phase 2 Grout Layer and Earthen Weather Protection Barrier Installation	Phase 2 HWMA/RCRA landfill closure plan (this document) • Install grout layer over horizontal surfaces of the CPP-601/640 monolith to provide sloping • Install earthen weather protection barrier over abovegrade sections of CPP-601/627/640 monolith • Continue groundwater monitoring, inspection, and maintenance under the Phase 1 post-closure plan (DOE-ID 2009b) • Certification of Phase 2 closure	
CPP-601/627/640 Permitted Post-Closure Care	• Post-closure permit modification (to be completed) • Continue groundwater monitoring, inspection, and maintenance	

CERCLA—Comprehensive Environmental Response, Compensation, and Liability Act
DEQ—Idaho Department of Environmental Quality
HWMA/RCRA—Hazardous Waste Management Act/Resource Conservation and Recovery Act
NTCRA—non-time-critical removal action

3.1 Landfill Closure Boundary

The boundary for the landfill closure is established in the CPP-601 Deep Tanks System Phase 1 landfill closure plan (DOE-ID 2009a). As stipulated in that plan, the landfill boundary encompasses the CPP-601 Deep Tanks System, as well as the entire footprint of Buildings CPP-601, -627, and -640, which shared common walls and utilities. Also included is the bottom of CPP-602 LC-107 sump, which contains two short sections (3 ft each) of the CPP-602 discharge drain lines. These line segments were replaced with HWMA/RCRA-compliant lines in approximately 1991. The line segments were cut, capped, and covered with grout. A stainless steel sump liner was installed above the lines and new lines installed. These lines extended from the CPP-602 LC-107 sump through the common wall of CPP-601 and CPP-602 into the CPP-601 header. The landfill does not include the rest of the CPP-602 laboratory, which is subject to a separate closure action (DOE-ID 2009a). Figure 1 provides an overview of the landfill boundaries shaded in green.

3.2 CPP-601 Deep Tanks System Phase 1 Landfill Closure

The CPP-601 Deep Tanks System Phase 1 landfill closure activities were completed in accordance with the Phase 1 closure plan (DOE-ID 2009a). Laboratory waste discharge piping from the laboratory hoods, sinks, and drains in CPP-602 and -684 that discharged to CPP-601 were clean-closed by decontamination to the site-specific action levels specified in the closure plan. One line from the Fluorinel Dissolution Process cell in CPP-666 was clean-closed under the Voluntary Consent Order, and a second line from Tanks FA-141 and FA-142 in CPP-666 was clean-closed under a previous RCRA closure activity. The remaining portions of the CPP-601 Deep Tanks System within the landfill closure boundaries of the outer walls of CPP-601/627/640 were flushed to the extent practicable. The CPP-601/627/640 components included in the landfill area were completely isolated from CPP-602, -666, and -684 and the INTEC Liquid Waste Management System waste handling systems (DOE-ID 2009a). The four deep tanks in CPP-601 were filled with grout. DEQ accepted the Phase 1 closure certification on February 19, 2010 (Monson 2010).

3.3 CPP-627 Remote Analytical Facility HWMA/RCRA Piping

The HWMA/RCRA regulated lines in the CPP-627 Remote Analytical Facility were addressed in the CPP-601 Deep Tanks System Phase 1 landfill closure plan (DOE-ID 2009a). DEQ accepted the Phase 1 closure certification covering these lines on February 19, 2010 (Monson 2010).

3.4 CPP-640 Headend Storage Tank System HWMA/RCRA Closure

The CPP-640 Headend Storage Tank System was clean-closed in accordance with HWMA/RCRA requirements. Tank system components, including tanks and ancillary equipment that managed hazardous waste, were decontaminated to the site-specific action levels specified in the *HWMA/RCRA Closure Plan for the CPP-640 Headend Storage Tank System* (DOE-ID 2007a). DEQ accepted the closure certification on June 12, 2008 (Monson 2008).

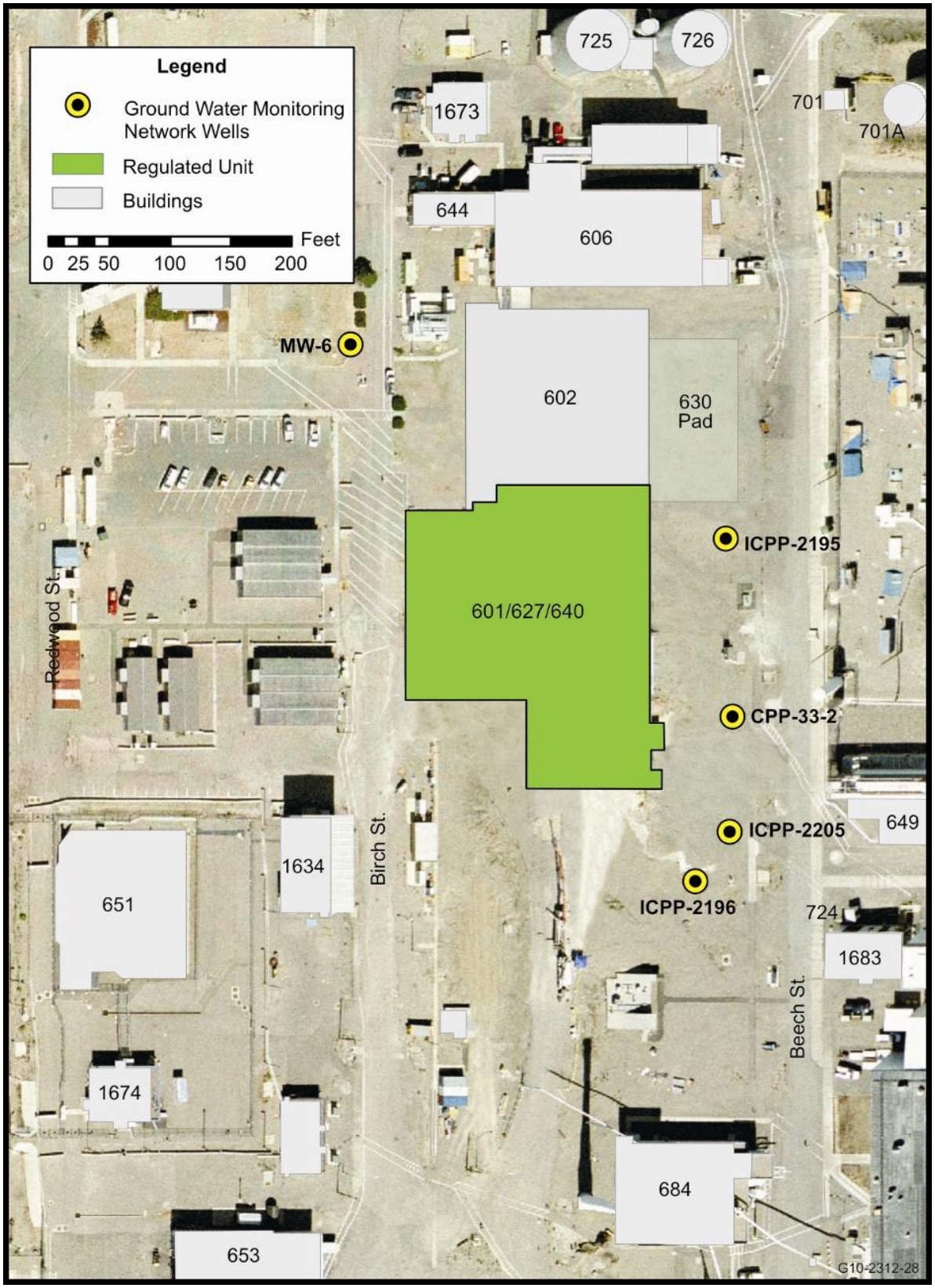

Figure 1. Idaho Nuclear Technology and Engineering Center building layout with landfill footprint shaded in green.

3.5 CPP-627 Non-Time-Critical Removal Action

The CPP-627 Remote Analytical Facility was decommissioned in 2005 (ICP 2006) in an NTCRA as specified in the *Action Memorandum for the Decontamination and Decommissioning of Building CPP-627, the Remote Analytical Facility* (DOE-NE-ID 2004). Abovegrade hazardous waste piping was removed and disposed of, and the CPP-627 facility was removed to grade. The remaining floor slab, which covered the remaining belowgrade inactive/abandoned lines that were inaccessible for decontamination, was washed down to remove loose contamination. A protective layer of concrete was then poured over the entire building footprint to prevent future infiltration of water (ICP 2006). The CPP-627 pad slopes down from approximately 20 in. on the east side adjacent to CPP-601 to approximately 10 in. on the west side (DOE-ID 2008; PWO-05-318).

3.6 CPP-601/640 Non-Time-Critical Removal Action

The CPP-601/640 facilities are being decommissioned in an NTCRA as specified in the *Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008). Activities preparatory to this NTCRA have been performed in accordance with the *Action Memorandum for General Decommissioning Activities under the Idaho Cleanup Project* (DOE-ID 2009c). These activities include isolating utilities; removing chemicals, piping, and equipment; and performing routine waste-management practices, such as removing lead, polychlorinated biphenyls, and asbestos (DOE-ID 2009c). Decommissioning activities currently being performed include:

- Waste stabilization through the grouting of larger system piping and vessels, as well as the remaining void spaces within the CPP-601/640 facilities.
- Removal of nonprocess areas, including building components and the upper portion of the mechanical handling cave with processing cells left intact. The top 8 ft of the P, Q, and R cells in CPP-601 and the bottom 2.5 ft of the mechanical handling cave will remain intact and are being grouted. Intact cells were decontaminated to the extent practicable before being grouted.

Grouting of void spaces within the building will effectively encapsulate the vessels and piping left in place. Pipe penetrations through exterior walls are being cut and sealed. Utilities to the building have been isolated. Bulkheads will be built where doors on the outer surface of the monolith have been removed. Openings between CPP-601 and -640 are being sealed by the formation of short wall sections to enclose short passageways that were exposed when the abovegrade nonprocess areas of CPP-640 were removed. Areas behind these bulkheads and new walls will be filled with grout to create a solid monolith.

Figures 2 and 3 show two views of the anticipated configuration of the CPP-601/627/640 monolith (prior to installation of the grout layer on the horizontal surfaces of CPP-601 and -640). The CPP-627 pad, poured at approximately 1 ft above grade, already covers the CPP-627 footprint as shown in the figures.

Figure 2. Anticipated southwest view of the CPP-601/627/640 monolith.

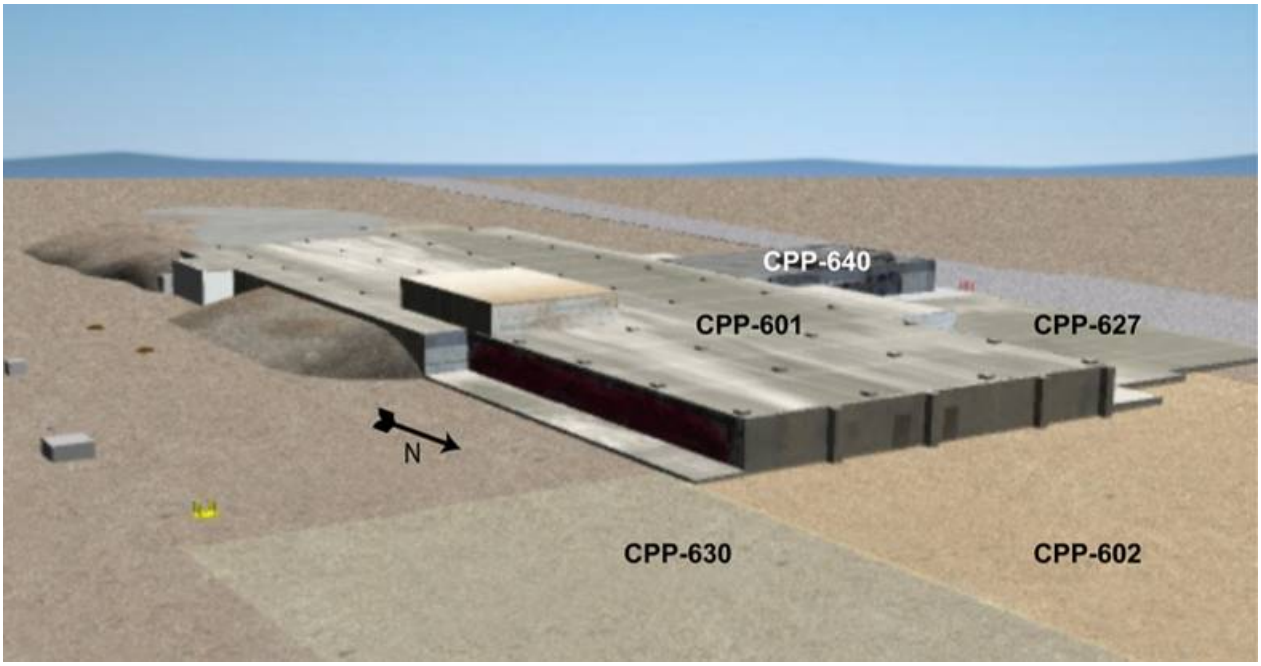

Figure 3. Anticipated northeast view of the CPP-601/627/640 monolith.

Buildings CPP-601 and -640 are being partially demolished to approximately 11 ft above grade in most areas, leaving process cells intact and exposing the concrete monolith in place. Building CPP-640 has been demolished to grade for the non-cell areas, to the Hot Makeup deck level for Cells 1–5, and to approximately 13 ft above grade for the mechanical handling cave. Building CPP-601 is being demolished to the Process Makeup deck level with the exception of the P, Q, and R process cells, which extend approximately 19 ft above grade. Sections of the sample corridor exterior walls on both the east and west sides of CPP-601 were removed to support the removal of lead sample blisters and a lead cave in those areas. Those areas (where sections of the sample corridor walls were removed) are essentially at grade. They will be considered part of the horizontal surfaces and will be covered with a layer of grout similar to the top of the Process Makeup deck. The CPP-601 and CPP-640 structures remaining after

completion of demolition will, along with the CPP-627 pad, form the interim CPP-601/627/640 concrete monolith.

The grout layer to be applied to the horizontal surfaces of that concrete monolith will not be applied to the outer walls (exterior vertical surfaces) of the monolith. Penetrations through these walls will be sealed. However the ends of pipes, conduits, rebar, beams, or other items will remain visible until the earthen weather protection barrier is installed. Wooden barricades were built to seal exterior doorways and other openings created during the demolition process. Some of these wooden barricades will not be removed and will remain visible until the earthen weather protection barrier is installed. The void areas behind these barricades have been filled with grout as part of the NTCRA.

Figures 4 and 5 show examples of the rough exterior of the monolith created under the NTCRA. Figure 4 shows the junction where the south wall of CPP-640 met the west wall of CPP-601. When the nonprocess cell area of CPP-640 was removed to grade, the area where CPP-601 and CPP-604 met was exposed. The barricades in this picture seal those former doorways. The hallways behind these barricades have been filled with grout. Figure 5 shows the north wall of CPP-640 process cells where equipment (lead-encased sample blisters) was removed from that wall. The openings through the 48 in.-thick wall have been sealed.

Figure 4. Junction of CPP-601 and CPP-640.

Figure 5. CPP-640 north wall showing rough exterior of interim monolith.

3.7 CPP-601 Deep Tanks System Phase 1 Landfill Post-Closure

The Phase 1 post-closure activities consist of inspection and maintenance of the CPP-601/627/640 monolith to the extent the monolith has been exposed and groundwater monitoring. The inspection, maintenance, and monitoring programs are being conducted in accordance with the Phase 1 post-closure plan (DOE-ID 2009b). The Phase 1 landfill post-closure activities are being conducted during the interim period from DEQ acceptance of the Phase 1 closure certification until DEQ accepts the Phase 2 closure certification.

During the Phase 1 post-closure period, the monolith is being inspected and maintained in accordance with the provisions of IDAPA 58.01.05.008 (40 CFR 264.15; 40 CFR 264.117). The integrity of the monolith is inspected semiannually on exposed portions of the monolith. The inspections are documented on the CPP-601/627/640 post-closure monitoring form (FRM-1095) and include inspection of the outer surface and surface drainage. Additionally, the following maintenance activities are being performed:

- Maintain the integrity and effectiveness of the interim monolith, including making repairs to the monolith as necessary to correct effects of subsidence, erosion, or other events and including repairs to the groundwater monitoring system and equipment
- Maintain the security of the facility in accordance with IDAPA 58.01.05.008 (40 CFR 264.14)
- Maintain and monitor the groundwater monitoring system, and comply with all other applicable requirements of IDAPA 58.01.05.008 (40 CFR 264, Subpart F)

- Prevent run-on and run-off from eroding or otherwise damaging the monolith.

Groundwater monitoring wells have been established to implement the groundwater monitoring programs. A combination of two existing wells and two new wells will be used to ensure compliance with IDAPA 58.01.05.008 (40 CFR 264, Subpart F). An initial period of quarterly sampling for 2 years will be completed to establish background levels for the four wells planned to be used for monitoring the CPP-601/627/640 monolith. Statistical analyses of the data collected during this period will be used to set background levels and detection monitoring criteria. After the background levels have been established, groundwater monitoring will continue semiannually until the WCF HWMA/RCRA post-closure permit (PER-112) is modified to include CPP-601/627/640.

4. WASTE INVENTORY AND CHARACTERISTICS

The waste remaining in the CPP-601/627/640 facilities has been characterized and quantified and is documented in Engineering Design File (EDF) -9367, "Nonradiological Material Inventory for CPP-601, CPP-627, and CPP-640 Landfill Closure." In addition, in March 2009, the U.S. Department of Energy (DOE) requested concurrence from DEQ and the U.S. Environmental Protection Agency to leave bulk lead in place because the lead had been evaluated and determined to be impracticable to remove. Lead totaling approximately 130 tons in CPP-601 and -640 is integral to the building structure or removal would significantly increase radiological or worker risk (Shaw 2009). DEQ and the Environmental Protection Agency concurred with this request (Monson 2009; Faulk 2009).

Table 2 shows the expected waste inventory remaining in the CPP-601/627/640 facilities of eight of the 19 hazardous constituents listed in the INL WCF post-closure permit (PER-112). These eight constituents are expected to be present in quantities greater than 1 g. The 11 constituents that are not expected to be present, or that are expected to be present in quantities of less than 1 g, are 1,1,1-trichloroethane, benzene, carbon disulfide, carbon tetrachloride, chloroform, methyl ethyl ketone, methylene chloride, pyridine, tetrachloroethene, trichloroethene, and toluene. The 19 constituents listed in PER-112 are considered because the WCF and the CPP-601/627/640 facilities handled similar waste streams generated from fuel processing activities, and they are the constituents being monitored under the WCF post-closure permit. Additional constituents will be added if necessary based on the sampling of chemicals listed in IDAPA 58.01.05.008 (40 CFR 264, Appendix IX) to be completed as a part of the establishment of background levels.

Table 2. Waste inventory expected in CPP-601/627/640 landfill.

Constituent	Total Waste (kg)
Arsenic	3.00E-02
Barium	1.63E+01
Cadmium	5.24E+01
Chromium	1.08E+05
Lead	1.18E+05
Mercury	2.00E-02
Selenium	2.00E-02
Silver	5.60E-01

5. CLOSURE PERFORMANCE STANDARDS

As required by IDAPA 58.01.05.008 (40 CFR 264.197), which addresses closure for tank systems, tank systems to be closed as landfills must meet the closure requirements for landfills specified in IDAPA 58.01.05.008 (40 CFR 264.310). This section describes the performance standards for the CPP-601/627/640 landfill closure under IDAPA 58.01.05.008 (40 CFR 264.111 and 264.310) and the activities that will be conducted to demonstrate that the landfill closure performance standards have been met as established in this closure plan.

5.1 Regulatory Closure Performance Standards

The closure performance standards identified in IDAPA 58.01.05.008 (40 CFR 264.111 and 264.310) applicable to the CPP-601/627/640 landfill closure are:

1. The owner or operator must close the facility in a manner that minimizes the need for further maintenance (IDAPA 58.01.05.008 [40 CFR 264.111(a)])
2. The owner or operator must close the facility in a manner that controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere (IDAPA 58.01.05.008 [40 CFR 264.111(b)])
3. The owner or operator must close the facility in a manner that complies with the closure requirements of IDAPA 58.01.05.008 (40 CFR 264, Subpart G), including, but not limited to, the requirements of 40 CFR 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, 264.601 though 264.603, and 264.1102 (IDAPA 58.01.05.008 [40 CFR 264.111(c)]).

5.2 Required Activities for Achieving Closure Performance Standards

The CPP-601/627/640 Phase 2 landfill closure activities to be conducted under this closure plan are described in detail in Section 6, "Closure Requirements." The following subsections describe the Phase 2 HWMA/RCRA landfill closure activities that will be performed to achieve the closure performance standards listed in Section 5.1. These Phase 2 closure activities will complement the Phase 1 post-closure activities, as well as those activities performed as part of the CPP-601/640 NTCRA. As discussed in the Phase 1 post-closure plan (DOE-ID 2009b), these NTCRA activities will result in an interim monolith that will substantively meet the technical requirements of IDAPA 58.01.05.008 (40 CFR 264.310).

5.2.1 Standard 1

The owner or operator must close the facility in a manner that minimizes the need for further maintenance (IDAPA 58.01.05.008 [40 CFR 264.111(a)]).

This closure performance standard will be achieved by (a) placing a layer of grout over the horizontal surfaces of the CPP-601/640 monolith and (b) placing an earthen weather protection barrier over the entire monolith. The grout layer will provide a low-permeability precipitation-infiltration coating and will be sloped as necessary to promote run-off. The existing sloped pad over the CPP-627 footprint already meets these requirements. The earthen weather protection barrier will reduce the impact of freeze/thaw cycling to the monolith, providing weather protection that will enhance the longevity of the monolith.

5.2.2 Standard 2

The owner or operator must close the facility in a manner that controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere (IDAPA 58.01.05.008 [40 CFR 264.111(b)]).

This closure performance standard will be achieved by (a) placing a layer of grout over the horizontal surfaces of the CPP-601/640 monolith and (b) placing an earthen weather protection barrier over the entire monolith. The grout layer will provide a low-permeability precipitation-infiltration coating and will be sloped as necessary to promote run-off. The existing sloped pad over the CPP-627 footprint already meets these requirements. The earthen weather protection barrier will reduce the impact of freeze/thaw cycling to the monolith, providing weather protection that will enhance the longevity of the monolith.

5.2.3 Standard 3

At closure of a tank system, if the owner or operator demonstrates that not all contaminated soils can be practicably removed or decontaminated as required in IDAPA 58.01.05.008 [40 CFR 264.197(a)], then the owner or operator must close the tank system and perform post-closure care in accordance with the closure and post-closure care requirements that apply to landfills (IDAPA 58.01.05.008 [40 CFR 264.310]). In addition, for the purposes of closure, post-closure, and financial responsibility, such a tank system is then considered to be a landfill, and the owner or operator must meet all of the requirements for landfills specified in Subparts G and H of 40 CFR 264 (IDAPA 58.01.05.008 [40 CFR 264.197(a) and (b)]).

To meet this closure standard, the CPP-601 Deep Tanks System is being closed as a landfill because of the presence of abandoned isolated piping runs that could not be flushed, waste remaining in the tank system at closure, and lead that was impracticable to remove. In addition, closure of the CPP-601 Deep Tanks System as a landfill is being integrated with the CPP-601/640 NTCRA, which is ongoing, and the CPP-627 NTCRA, which has been completed. These actions will result in a single CPP-601/627/640 landfill, which will be closed in accordance with this closure plan. The soils beneath the CPP-601/627/640 monolith are not addressed in this closure plan because they are being addressed under the CERCLA program as Sites CPP-80, CPP-117, CPP-118, CPP-119, CPP-120, CPP-121, CPP-122, and CPP-123.

6. CLOSURE REQUIREMENTS

This section describes the closure requirements and compliance strategy for Phase 2 of the CPP-601/627/640 landfill closure. The need to close the CPP-601 Deep Tanks System as a landfill and the integration of this tank system closure with the CPP-601/640 and CPP-627 NTCRAs are driven by the closure requirements for tank systems set forth in IDAPA 58.01.05.008 (40 CFR 264.197). These requirements specify that tank systems with waste that cannot be practicably removed or decontaminated as specified in IDAPA 58.01.05.008 [40 CFR 264.197(a)] must be closed in accordance with the closure and post-closure care requirements that apply to landfills (IDAPA 58.01.05.008 [40 CFR 264.310]). The CPP-601 Deep Tanks System, along with Buildings CPP-601, -627, and -640, will be closed as a landfill because of the presence of abandoned isolated piping runs that could not be flushed, waste remaining in the tank system at closure, and lead that was impracticable to remove, all resulting in HWMA/RCRA hazardous constituents left in place.

The concrete monolith for the CPP-601/627/640 landfill that will be created by NTCRA activities will serve as an interim HWMA/RCRA cover pending placement of the grout layer and earthen weather protection barrier for minimization of precipitation infiltration and protection from freeze/thaw cycling. The grout layer and earthen weather protection barrier will constitute the Phase 2 HWMA/RCRA cover. The performance standards are provided in IDAPA 58.01.05.008 (40 CFR 264.111), and the closure requirements are specified in IDAPA 58.01.05.008 (40 CFR 264.310), which addresses landfill closure and post-closure care. Table 3 summarizes these HWMA/RCRA requirements for Phase 2 of the CPP-601/627/640 landfill closure and post-closure and the strategy planned to meet each requirement. This strategy includes the monolith created by the NTCRA, which serves as an interim cover, the activities discussed in this closure plan, as well as post-closure activities. Only those actions specifically described in Section 8 of this document that implement this compliance strategy for Phase II will be subject to certification under this closure plan. Actions taken pursuant solely to either the CPP-627 or CPP-601/640 NTCRAs will not be subject to certification under this closure plan.

Table 3. HWMA/RCRA landfill closure and post-closure requirements and compliance strategy.

IDAPA 58.01.05.008 (40 CFR 264, Subpart G) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities—Closure and Post-Closure	
Regulatory Requirement Summary	Compliance Strategy
§ 264.111 Closure performance standard.	
(a) Facility must be closed in a manner that minimizes the need for further maintenance	A layer of grout will be placed over the horizontal surfaces of the CPP-601/640 monolith, and an earthen weather protection barrier will be placed over the entire monolith. The grout layer will provide a low-permeability precipitation-infiltration coating and will be sloped as necessary to promote run-off. The earthen weather protection barrier will provide weather protection that will enhance longevity by reducing the impact of freeze/thaw cycles to the monolith from.
(b) Facility must be closed in a manner that controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere	A layer of grout will be placed over the horizontal surfaces of the CPP-601/640 monolith, and an earthen weather protection barrier will be placed over the entire monolith. The grout layer will provide a low-permeability precipitation-infiltration coating and will be sloped as necessary to promote run-off. The earthen weather protection barrier will provide weather protection that will enhance longevity by reducing the impact of freeze/thaw cycles to the monolith. In addition, the isolation of the waste to be left in place by the placement of grout as part of the CPP-601/640 NTCRA activities will minimize or eliminate the possibility of post-closure escape of hazardous waste or constituents.
(c) Facility must be closed in a manner that complies with the closure requirements of this subpart, including § 264.197 (tank systems) and § 264.310 (landfills)	As stated in § 264.197(b), if not all contaminated wastes can be practicably removed or decontaminated, then the tank system must be closed in accordance with closure and post-closure care requirements that apply to landfills (§ 264.310). The CPP-601 Deep Tanks System, along with Buildings CPP-601/627/640, will be closed as a landfill because of the presence of abandoned isolated piping runs that could not be flushed, waste remaining in the tank system at closure, and lead that was impracticable to remove, all resulting in hazardous constituents left in place. See table entries for § 264.310.

Table 3. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart G) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities—Closure and Post-Closure	
Regulatory Requirement Summary	Compliance Strategy
§ 264.117 Post-closure care and use of property.	
(a) This section specifies that post-closure care must begin after completion of closure of the unit and continue for 30 years after that date. The post-closure care must include monitoring and reporting in accordance with 40 CFR 264, Subparts F, K, L, M, N, and X. Post-closure care must also include maintenance and monitoring of waste containment systems in accordance with these subparts. The Regional Administrator may shorten or extend the post-closure care period as necessary to protect human health and the environment.	Phase 2 post-closure care activities will begin upon DEQ acceptance of the Phase 2 landfill closure certification. The WCF HWMA/RCRA post-closure permit (PER-112) will be modified to include the Phase 2 landfill post-closure activities.
(b) This section specifies when the Regional Administrator may require that security requirements of § 264.14 must remain in place.	The owner/operator will comply with changes made by the DEQ Director as required.
(c) This section specifies that post-closure use of the property must never be allowed to disturb the integrity of the containment and monitoring systems unless the Regional Administrator allows the disturbance under certain conditions.	Post-closure use of the property will be maintained as required by the post-closure requirements to be specified in the modification to the WCF HWMA/RCRA post-closure permit (PER-112).
(d) All post-closure care activities must be performed in accordance with an approved post-closure plan as specified in § 264.118.	Phase 2 post-closure care activities will be performed in accordance with the post-closure requirements to be specified in the modification to the WCF HWMA/RCRA post-closure permit (PER-112).

Table 3. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart G) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities—Closure and Post-Closure	
Regulatory Requirement Summary	Compliance Strategy
§ 264.118 Post-closure plan; amendment of plan.	
This section specifies when an owner or operator of a hazardous waste disposal unit must have a written post-closure plan, that the plan must be submitted with the permit application, and that the approved post-closure plan will become a condition of the permit. This section also specifies requirements for the contents of the post-closure plan, including planned monitoring activities and the frequency at which these activities will be performed to comply with Subparts F (Groundwater Monitoring) and N (Landfills). This section also specifies requirements for planned maintenance activities and the frequency at which they will be performed to ensure the integrity of the cap and final cover and the function of the monitoring equipment in accordance with Subparts F (Groundwater Monitoring) and N (Landfills). In addition, this section describes requirements for maintaining the plan, amending the post-closure plan, and modifying the plan and length of the post-closure care period.	Upon DEQ acceptance of the Phase 2 closure certification, the WCF HWMA/RCRA post-closure permit (PER-112) will be modified to include the Phase 2 landfill post-closure activities. The Phase 2 landfill post-closure requirements to be specified in the permit modification will address planned monitoring and maintenance activities, as required. The modified WCF HWMA/RCRA post-closure permit (PER-112) will be maintained as required. Any amendments to the post-closure activities will be made in accordance with requirements for permit modifications.
§ 264.119 Post-closure notices.	
(a) No later than 60 days after certification of closure of each hazardous waste disposal unit, the owner or operator must submit to the local zoning authority, or the authority with jurisdiction over local land use, and to the Regional Administrator a record of the type, location, and quantity of hazardous wastes disposed of within each cell or other disposal unit of the facility.	A record of the type, location, and quantity of hazardous wastes within the CPP-601/627/640 landfill will be submitted to the Butte County commissioners and DEQ within 60 days after closure certification.
(b) This section requires within 60 days of certification of closure	
(1) A notation on the deed to the facility property or other instrument normally examined during title search that will in perpetuity notify any potential purchaser of the property that the land has been used to manage hazardous wastes, the land's use is restricted under 40 CFR 264, Subpart G regulations, and the survey plat and record of wastes required by §§ 264.116 and 264.119(a) have been filed with the local zoning authority or the authority with jurisdiction over local land use and with the Regional Administrator.	Within 60 days of closure certification, the required notation on the deed to the property or other instrument used for title search will be filed in accordance with Idaho law.
(2) Submittal of a certification, signed by the owner or operator, that he has recorded the notation specified in Paragraph (b)(1) of this section, including a copy of the document in which the notation has been placed, to the Regional Administrator.	Within 60 days of closure certification, the required signed certification will be submitted to DEQ.

Table 3. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart G) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities—Closure and Post-Closure	
Regulatory Requirement Summary	Compliance Strategy
(c) This section specifies requirements for notices when the owner or operator or any subsequent owner or operator of the land upon which a hazardous waste disposal unit is located wishes to remove hazardous wastes and hazardous waste residues, the liner, if any, or contaminated soils.	Not applicable.
§ 264.120 Certification of completion of post-closure care.	
This section specifies that a certification that post-closure care was performed in accordance with the approved post-closure plan must be submitted no later than 60 days following the end of the post-closure care period.	This requirement will be met within 60 days of completion of the Phase 2 post-closure care period.
§ 264.310 Closure and post-closure care.	
(a) At final closure of the landfill, the owner or operator must cover the landfill with a final cover designed and constructed to (1) Provide long-term minimization of migration of liquids through the closed landfill (2) Function with minimum maintenance (3) Promote drainage and minimize erosion or abrasion of the cover (4) Accommodate settling and subsidence so that the cover's integrity is maintained	A grout layer will be placed on horizontal surfaces of the CPP-601/640 monolith and sloped. The existing sloped grout pad on the CPP-627 footprint already meets this requirement. The sloped grout layer will provide long-term minimization of migration of liquids through the closed landfill by providing a low-permeability surface and promoting drainage away from the structure. Approximately 3 ft of soil will be placed over the monolith and sloped to provide adequate drainage at no more than a 3:1 slope. The soil and grout layers will minimize the migration of liquids through the landfill and

Table 3. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart G) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities—Closure and Post-Closure	
Regulatory Requirement Summary	Compliance Strategy
(5) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.	will function with minimum maintenance. The earthen weather protection barrier will provide weather protection that will enhance longevity of the monolith by protecting the monolith from any freeze/thaw cycles. The slope will promote further drainage away from the structure and minimize erosion. The interim CPP-601/627/640 monolith is constructed of concrete, grout, and other inert material that fills void spaces in the remaining buildings, including vessels and large piping. As part of the CPP-601/640 NTCRA, drains, pipes, hatches, and other openings on the monolith surface are being sealed. Openings between CPP-601 and -640 are being sealed with short wall sections as necessary. Buildings CPP-601, -627, and -640 were constructed of reinforced walls, with void spaces in CPP-601/640 filled with grout. CPP-627 was demolished to grade, and a sloped concrete pad was placed over the foundation. Drilled piers support grade beams and the former building slab. Soil will be applied over the monolith in lifts as necessary to achieve the desired slope. Therefore, long-term lateral displacement and subsidence are not expected. The monolith's construction, the placement of grout, and the addition of overlying soil will result in permeability less than the soils and bedrock beneath the buildings.
(b) After final closure, the owner or operator must comply with all post-closure requirements contained in §§ 264.117 through 264.120, including maintenance and monitoring throughout the post-closure care period (specified in the permit under § 264.117). The owner or operator must	See table entries for §§ 264.117 through 264.120.
(1) Maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events;	The soil overlying the monolith is to be inspected periodically and resurfaced or have additional fill added as necessary and, to the extent practicable, to correct for the effects of subsidence, erosion, or other events.
(2) Continue to operate the leachate collection and removal system until leachate is no longer detected;	Not applicable.
(3) Maintain and monitor the leak detection system in accordance with §§ 264.301(c)(3)(iv) and (4) and 264.303(c), and comply with all other applicable leak detection system requirements of this part;	Not applicable.
(4) Maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of Subpart F of this part;	The groundwater monitoring system is to be maintained as required by the Phase 1 post-closure plan (DOE-ID 2009b) and will be addressed for the Phase 2 landfill closure in the modification to the WCF HWMA/RCRA post-closure permit (PER-112).

Table 3. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart G) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities—Closure and Post-Closure	
Regulatory Requirement Summary	Compliance Strategy
(5) Prevent run-on and run-off from eroding or otherwise damaging the final cover; and	The grout layer to be placed on horizontal surfaces of the CPP-601/640 monolith will be sloped to prevent run-on and run-off from eroding or otherwise damaging the monolith. The CPP-627 pad is already sloped. The overlying earthen weather protection barrier also will be sloped away from the landfill to further prevent run-on and run-off from eroding or otherwise damaging that barrier. The overlying earthen weather protection barrier will be inspected for precipitation pooling, erosion, and subsidence; if any of these conditions are found, the soil will be resurfaced and/or additional fill added by appropriate means to the extent practicable. The earthen weather protection barrier overlying and surrounding the monolith will be graded to provide adequate drainage at no more than a 3:1 slope so that the grade slopes away from the CPP-601/627/640 area. The precipitation run-off will be diverted to direct the water away from the monolith and earthen weather protection barrier. Drainage off of the east side will be coordinated with the Operable Unit 3-14 CERCLA program.
(6) Protect and maintain surveyed benchmarks used in complying with § 264.309.	Not applicable.

7. CLOSURE APPROACH

As noted earlier, the CPP-601/627/640 facilities are being closed as a RCRA landfill because clean closure requirements for the HWMA/RCRA tank system were not met and lead was left in place. In contrast with a typical landfill in which wastes are direct-buried, the wastes left in CPP-601/627/640 are encapsulated within a concrete and stainless steel monolith. As the decommissioning of these buildings progressed, void spaces were filled with grout, thereby creating one solid monolith. The monolith is constructed of 42,000 yd^3 of concrete and over 720 tons of stainless steel. This concrete and steel monolith meets the primary requirements for final closure of a landfill as identified in 40 CFR 264.310 though that cover is not expected to be installed for several years (until the final end state for northern INTEC has been determined).

The Operable Unit 3-14 Record of Decision (DOE-ID 2007b) establishes a recharge control zone for the Tank Farm Facility. This recharge control zone is centered over the Tank Farm Facility and extends to the eastern wall of CPP-601. The purpose of this recharge control zone is to collect precipitation to prevent it from recharging the northern INTEC shallow perched water zone. This is accomplished by installing low-permeability pavement over the recharge control zone up to the eastern wall of CPP-601. The low-permeability pavement adjacent to CPP-601 will be beneath the earthen weather protection barrier and will further reduce the potential of precipitation infiltration beneath the monolith.

The monolith with the grout layer on top and the earthen weather protection barrier effectively meet the primary landfill closure requirements of 40 CFR 264.310 (a–e) as described in the following paragraphs.

The concrete and steel layers effectively prevent migration of liquids through the monolith (40 CFR 264.310(a)). Also, adding a sloped grout layer on top of the monolith will effectively prevent pooling on top of the monolith, thereby minimizing the potential for water to move through the monolith. A weather protection barrier (sloped earthen berm) on top of the monolith will further minimize water reaching the monolith, thereby further reducing the potential for water to move through the monolith. The final design of the HWMA/RCRA cover (to be installed when the final end state for northern INTEC has been determined) will specify features that will further prevent migration of the liquids through the monolith. That design could include various barriers (evapotranspiration, capillary, or intrusion) and vegetation.

The existing concrete and steel monolith will function with minimum maintenance (40 CFR 264.310(b)) as is; however, adding the earthen weather protection barrier will further reduce the need for maintenance by minimizing the exposure of the monolith to weather, including freeze/thaw cycling. The only maintenance required will be that necessary to remediate erosion or subsidence issues identified in the semiannual inspections. The design of the final HWMA/RCRA cover also will be required to address the long-term aspects of minimizing maintenance of the final cover.

The concrete construction of the existing monolith promotes drainage away from the waste and minimizes erosion and abrasion (40 CFR 264.310(c)) in comparison to a standard HWMA/RCRA landfill cover. These features are enhanced by the sloped grout layer on top of the monolith that will prevent pooling of water. In addition, the compacted sloped earthen weather protection barrier on top of the monolith promotes drainage away from the monolith and will prevent most precipitation from reaching the monolith, therefore preventing erosion or abrasion of the upper grout layer. Limiting the slope of the earthen weather protection barrier to less than 33% (3:1) limits erosion of the soil until the final cover is

installed. The long-term aspect of drainage away from the monolith and minimizing cover erosion and abrasion will be addressed in the design of the final RCRA/HWMA cover.

The original design and construction of the Buildings CPP-601, -627, and -640 (that are now grouted and comprise the monolith) will minimize settling and subsidence of the earthen layer, thereby maintaining the integrity (40 CFR 264.310(d)) of the weather protection barrier. These buildings were built upon compacted engineered subgrade resting on bedrock or upon drilled concrete-filled pillars and footings. The buildings have been stable for 50 years, and subsidence beneath the buildings is not anticipated based on the foundation construction. The buildings have been filled with grout to form a single, solid monolith. Voids within the buildings with reinforced concrete walls (up to 5 ft thick) are filled with grout, essentially eliminating subsidence concerns within the monolith.

A simplified approach to placement and compaction of the earthen weather protection barrier is proposed based upon INL soil compaction field experience, the nature of the fill material, the earthen weather protection barrier to be installed over the concrete monolith, and the fact that the earthen weather protection barrier will be exposed to approximately 25 years of natural settling forces prior to the final cover being installed.

Various projects at the INL Site were reviewed to determine compaction methods used. Routinely, 95% compaction or better has been achieved with 1-ft lifts and two or more passes with heavy equipment when a reasonable moisture content was present. The soils to be used for backfill for this project are anticipated to come from the Monroe Pit on the INL Site. The Monroe Pit gravels are a mixture of well-graded and poorly graded gravels, with a maximum particle size of 3 to 4 in. This gravel source, like most INL Site alluvial gravel sources, is considered a clean, sandy gravel with few fines. This material readily compacts to 95% or greater. The potential for subsidence is greatly reduced by an earthen weather protection barrier installed over a solid concrete monolith. This solid concrete monolith does not present the potential for waste layer subsidence as would be present in a typical landfill. In the typical landfill, compaction to undisturbed soil densities is extremely important because the base must be stable before the final cover can be installed. However, in this case, where the final cover is not expected to be installed for 25 years, anomalies in the placement of the soils will become evident as subsidence during the semiannual inspection and will be repaired prior to the placement of the final cover. While this subsidence is not expected (because of the reasons delineated previously), the time interval between the installation of the weather protection barrier and the final HWMA/RCRA cover (along with any necessary maintenance activities) will ensure that the final HWMA/RCRA cover will not be subject to subsidence issues.

The simplified earthen weather protection barrier placement plan calls for the fill material to be placed over the monolith in lifts of 1 foot or less and field-compacted to achieve compaction equivalent to undisturbed soil. That field compaction will be done with multiple passes of a sheepsfoot roller. Special precautions for the initial lifts will be take for placement and compaction of fill over existing structures including the paved recharge control zone and portions of Birch Street, as well as over portions of the monolith including CPP-627 pad, CPP-601 and CPP-640. Sufficient moisture content to achieve “field compaction” will be evaluated by routinely taking a handful of fill soil and hand compressing that soil into a lump. If the “soil” lump stays together, then the moisture content is conducive to obtaining “field compaction” soil density. If the “soil” lump falls apart, water will be added to the soil sufficient to meet the requirement. Conversely, if water is expressed from the soil during squeezing, then too much moisture is present, and field activities will not continue until conditions are more conducive to compaction. This simplified approach for evaluating soil moisture content has proven effective over time at the INL Site.

The concrete and steel monolith meets the requirement to have a permeability less than or equal to the permeability of the natural subsoils present (40 CFR 264.310(e)). The contamination left within the

monolith primarily resides within vessels, pipes, or cells with stainless steel liners. The concrete and steel obviously have permeability less than natural subsoils in the area. The grout layer that will be added on top of the monolith will provide an additional layer of low-permeability material. The earthen layer will be compacted to field compaction levels at least equivalent to undisturbed soil. The design of the final HWMA/RCRA cover will ensure that the cover also has permeability equal to or less than the native subsoils.

The earthen weather protection barrier (with a minimum depth of 3 ft) will be sloped at least 2% but not more than 33%. The maximum slope of 33% (3:1) has proven stable using typical INL Site soils. In a few places, the toe of this earthen weather protection barrier could impact active utilities. These include an electrical manhole on the west side and possibly two service waste manholes on the east side. Until these utilities are appropriately abandoned, the toe of the earthen weather protection barrier will not impinge upon the utilities. This will be accomplished by using short barrier walls, or the manholes may be extended above that part of the soil weather protection barrier. The soil in the areas of disturbance would be less than 4 ft deep and would be at least 20 ft away from the monolith. Figure 6 shows the anticipated contours of the earthen weather protection barrier. Upon completion of the installation of this barrier, the landfill will be surveyed and a final contour map prepared documenting that the sloping requirements were achieved and identifying areas of interference as noted previously.

The earthen barrier layer will be inspected semiannually for subsidence or erosion. If erosion channels or subsidence deeper than 3 in. are found, the area will be backfilled and recompacted with several passes of a sheepsfoot roller.

Phase 2 post-closure care activities will begin upon DEQ acceptance of the Phase 2 landfill closure certification. The WCF HWMA/RCRA post-closure permit (PER-112) will be modified to include the Phase 2 landfill post-closure activities. The post-closure activities include:

1. Post-closure use of the property will be controlled to prevent damage to the earthen weather protection barrier and the underlying monolith.
2. A record of the type, location, and quantity of hazardous wastes within the CPP-601/627/640 landfill will be submitted to the Butte County commissioners and DEQ within 60 days after closure certification.
3. Within 60 days of closure certification, the required notation on the deed to the property or other instrument used for title search will be filed in accordance with Idaho law.
4. The earthen weather protection barrier overlying the monolith will be inspected semiannually for precipitation pooling, erosion, and subsidence. As necessary, additional fill material will be added and compacted to the extent practicable. These repairs or maintenance will be necessary when specific areas of subsidence, pooling, or erosion exceed 2 in. in depth with a surface area greater than 10 ft^2.
5. The groundwater monitoring system will be maintained as required by the Phase 1 post-closure plan (DOE-ID 2009b) and will be addressed in the modification to the WCF HWMA/RCRA post-closure permit (PER-112).

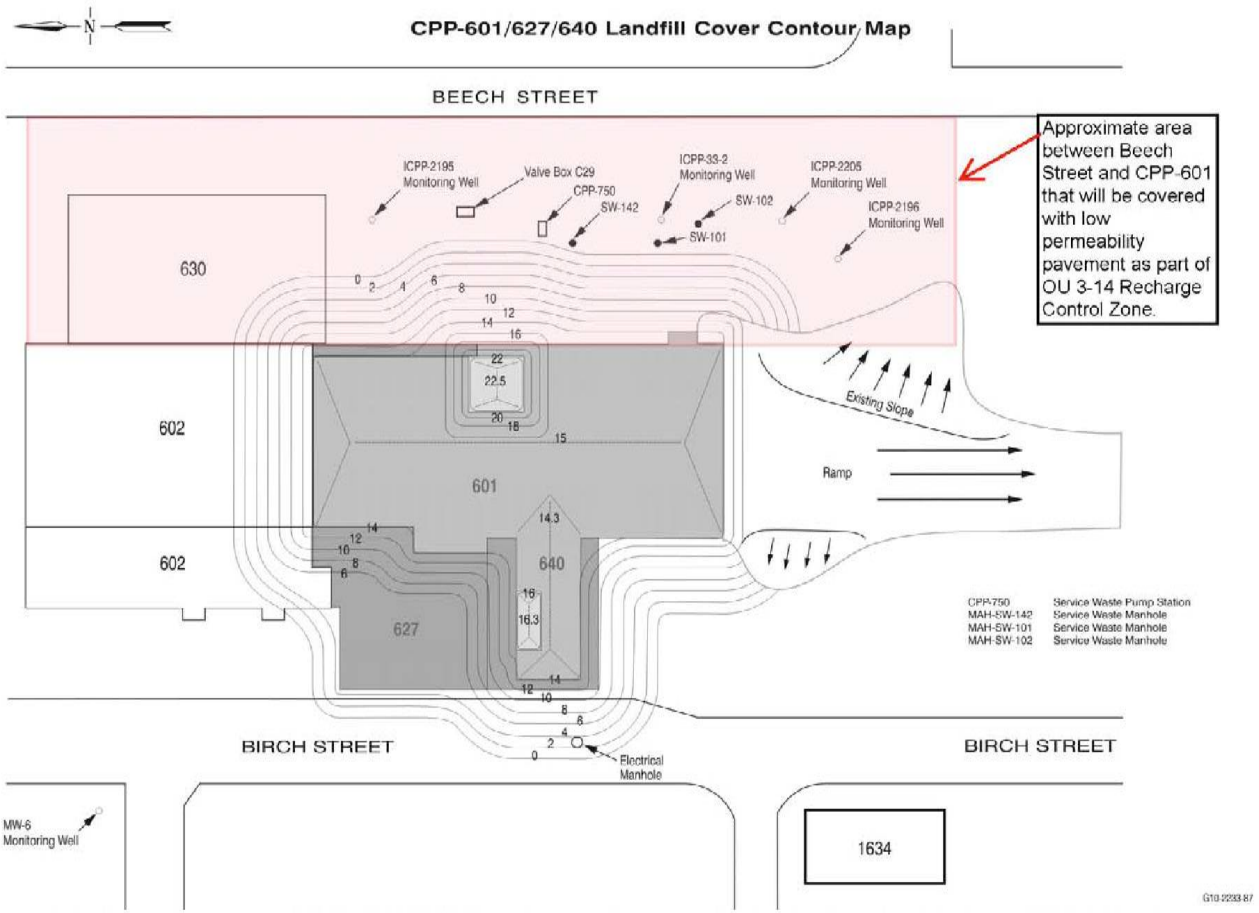

Figure 6. Anticipated contours of CPP-601/627/640 earthen weather protection barrier (area in pink shows Operable Unit 3-14 recharge control zone to be covered with low-permeability pavement at grade).

8. CLOSURE ACTIVITIES

Buildings CPP-601, -640, and -627 are being closed with waste in place and will meet the closure requirements applicable to landfills by the placement of a grout layer over the horizontal surfaces of the CPP-601/640 monolith. The CPP-627 footprint does not require addition of a grout layer because CPP-627 is already covered by an appropriate layer of concrete installed as part of the CPP-627 NTCRA. The addition of the grout layer will be followed by application of an earthen weather protection barrier, providing weather protection over the entire CPP-601/627/640 monolith. The design of the grout layer and soil barrier complies with the requirements identified in Section 6, "Closure Requirements." This section discusses the installation of the grout layer and earthen weather protection barrier and the precipitation infiltration controls for the landfill. The structural stability of the monolith is addressed in Section 3.

8.1 Grout Layer Placement

A grout layer will be applied over the exposed horizontal portions of the CPP-601/640 monolith and sloped to promote drainage off of the monolith. The sloped grout layer will minimize the potential for liquids to migrate through the closed landfill over the long term by preventing pooling and promoting drainage off of the structure. The existing pad over the CPP-627 footprint is sufficiently sloped to meet this requirement.

8.2 Earthen Weather Protection Barrier Placement

After the grout layer is applied, an earthen weather protection barrier will be placed over the entire CPP-601/627/640 monolith. Soil will be applied in lifts of 1 foot or less until an approximate 3-ft-thick earthen weather protection barrier covers all parts of the monolith. The earthen weather protection barrier will be sloped at least 2% from the approximate center to provide adequate drainage off the earthen weather protection barrier and underlying monolith, as well as to prevent pooling. The sides will be sloped at not more than a 3:1 ratio to provide a long-term stable slope, thereby minimizing erosion and subsidence. The earthen weather protection barrier is not intended to be the final cover over the CPP-601/627/640 landfill but rather to reduce the impact to the grouted monolith from freeze/thaw cycles to enhance the longevity of the structure. An artist's rendition of the expected appearance after the earthen weather protection barrier is completed is shown in Figure 7.

After the earthen weather protection barrier is installed, the landfill will be surveyed and a final contour map prepared documenting that the sloping requirements were achieved and identifying areas of interference with active infrastructure.

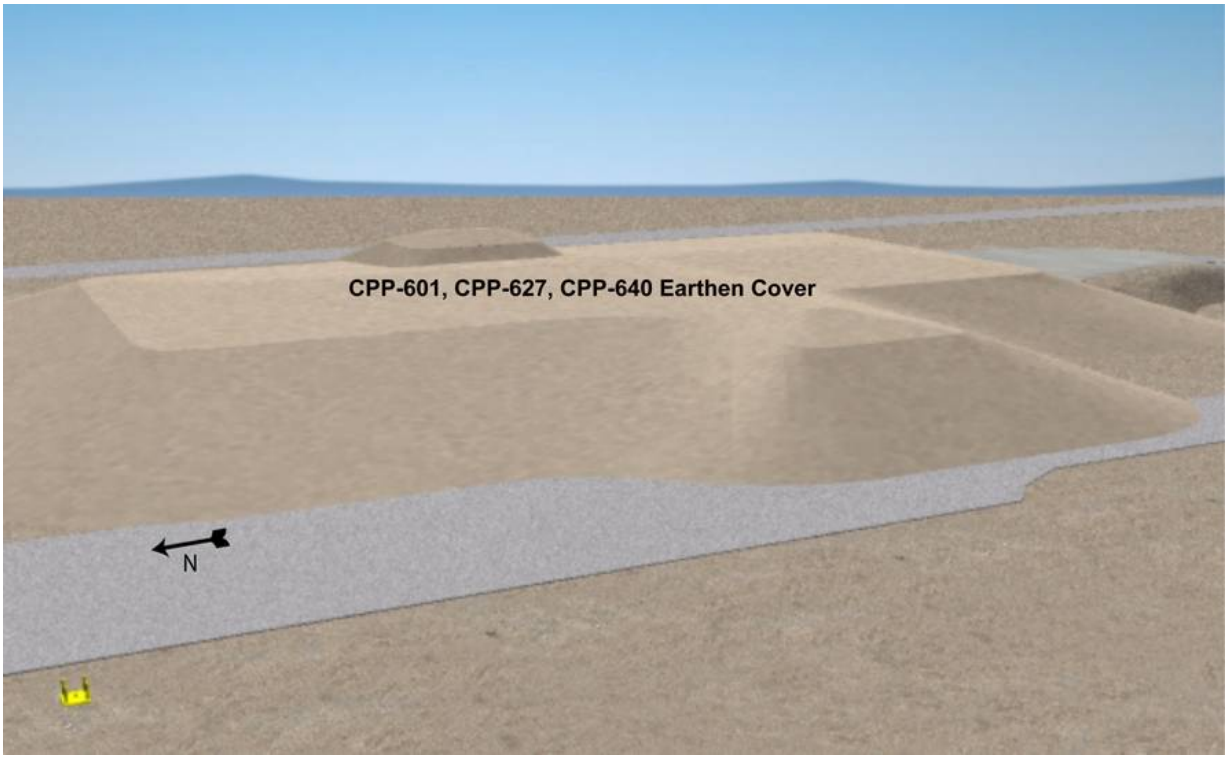

Figure 7. Expected configuration of earthen weather protection barrier overlying the CPP-601/627/640 monolith.

8.3 Run-on and Run-off Control

The grout layer (discussed in Section 8.1) covering the horizontal surfaces of CPP-601 and CPP-640, along with the CPP-627 pad, will promote run-off, prevent pooling of precipitation, and restrict the ability of water to move through the monolith and mobilizing contaminants. In addition the earthen weather protection barrier (discussed in Section 8.2) will be sloped to further reduce precipitation infiltration into the monolith by promoting run-off and eliminating pooling. The earthen weather protection barrier surrounding the monolith will minimize erosion and weather damage of the monolith. The grout layer and the earthen weather protection barrier together will minimize the possibility of precipitation infiltrating the monolith and greatly reduce the transport or migration of potential releases of contamination from the monolith to the environment.

9. EARTHEN WEATHER PROTECTION BARRIER INSPECTION

Until the earthen weather protection barrier is installed, the monolith will continue to be inspected in accordance with the HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill (DOE/ID 2009b). Those inspections are documented in FRM-1095, "CPP-601/627/640 Landfill Semiannual Inspection of Monolith for Integrity and Drainage" (see Figure 8). Upon installation of the earthen weather protection barrier, the monolith inspections described in the post-closure plan will cease, and the earthen weather protection barrier will be inspected for pooling, subsidence, and erosion using FRM-1203, "CPP-601/627/640 Landfill Berm Semiannual Inspection of Earthen Cover for Pooling, Subsidence, and Erosion" (see Figure 9).

Evidence of pooling, subsidence, or erosion in any specific area on the earthen weather protection barrier greater than 2 in. deep and covering an area greater than 10 ft^2 will be documented on the inspection form and a RCRA remedial opened to ensure that the issue is addressed in a timely manner.

The forms shown in Figures 8 and 9 are the current versions as of August 2010. These forms will be modified as appropriate. However, as specified in IDAPA 58.01.05.008 [40 CFR 264.15(d)], the forms will contain, at a minimum, the following information:

- The date and time of the inspection
- The name of the inspector
- A notation of the observations made, including any and all deficiencies identified
- The date, nature, and status of any needed repairs or other remedial actions (e.g., subsidence area filled September 10, 201X; work order submitted).

Documentation of inspection activities will be maintained at the facility, as required by IDAPA 58.01.05.008 [40 CFR 264.73(b)(5)], for at least 3 years from the inspection date.

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CPP-601/627/640 LANDFILL
SEMIANNUAL INSPECTION OF MONOLITH
FOR INTEGRITY AND DRAINAGE

This form is the current version per EDMS.

_____
Signature / Date

Notes:
1: Inspections should be performed in spring and fall of each year.
2: Obtain a functional means of communication prior to performing inspection.
3. Areas with active construction or D&D shall be marked NA with activity description in comment section.

Inspection Date:____/_____/_____ Previous inspection report reviewed:

Approximate Time of Inspection:_____ (Initials_____)

Inspection Items	Inspection Criteria	Issue/ Concern Yes	Issue/ Concern No	Observations/Comments (Location of issue or concern) (Use additional space below as needed)	Nature of Repairs or Remedial Actions Needed	Completion Date for Repairs or Remedial Actions
1. Concrete surface integrity	1a. Surface erosion					
	1b. Cracks (cracks greater than ½" wide need to be repaired)					
	1c. Subsidence					
	1d. Joint seal condition					
	1e. Other concrete surface maintenance issue					
2. Drainage away from monolith	2a. Surface pooling or ponding					
	2b. Run-on or run-off					
	2c. Other drainage maintenance issue					

/ /
Completion Date Time Printed Name of Inspector Inspector's Signature

Further Comments

Comment No.	Inspection Item No.	Remarks

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CPP-601/627/640 LANDFILL
SEMIANNUAL INSPECTION OF MONOLITH
FOR INTEGRITY AND DRAINAGE

CPP-601/627/640 Landfill monolith inspection date: _____/_____/_____

Open RCRA remedial on this form:

Issue No.	Tracking No.	Date Remedial was Identified	Deficiency Description/Comments

Inspector's Name: (Print)_____ Inspector's Signature: _____

Facility Manager's Name: (Print) _____ Facility Manager's Signature: _____

Remedial Actions Completed or Not Required:

Facility Manager's Signature: _____

NOTE: *Inspection criteria based upon* HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill, *DOE/ID-11408 Revision 1, December 2009, and the inspection criteria from Volume 21 "Hazardous Waste Management Act/Resource Conservation and Recovery Act Post-Closure Permit for the Idaho Nuclear Technology and Engineering Center Waste Calcine Facility," Permit Module IV.C, "Post Closure Care Inspection Plan," and Attachment 2 Section D, "Inspection Schedule," and Section E, "Maintenance Activities."*

Example

Figure 8. FRM-1095, "CPP-601/627/640 Landfill Semiannual Inspection of Monolith for Integrity and Drainage."

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CPP-601/627/640 LANDFILL
SEMIANNUAL INSPECTION OF EARTHEN COVER
FOR POOLING, SUBSIDENCE, AND EROSION

This form is the current version per EDMS.

_____
Signature / Date

Notes:
1: Inspections should be performed in spring and fall of each year.
2: Obtain a functional means of communication prior to performing inspection.
3. Areas with active construction or D&D shall be marked NA with activity description in comment section.

Inspection Date: ____/____/____
Approximate Time of Inspection: _____

Previous inspection report reviewed:
(Initials_____)

Inspection Items	Inspection Criteria	Issue/ Concern Yes	Issue/ Concern No	Observations/Comments (Location of issue or concern) (Use additional space below as needed)	Nature of Repairs or Remedial Actions Needed	Completion Date for Repairs or Remedial Actions
1. Surface Pooling	Pools of standing water greater than 2 inches deep and greater than 10 ft^2					
2. Subsidence	Areas of subsidence greater than 2 inches deep and greater than 10 ft^2					
3. Erosion	Erosion channels or runnels greater than 2 inches deep and greater than 10 ft^2					

____/____/____ Completion Date
_____ Time
_____ Printed Name of Inspector
_____ Inspector's Signature

Further Comments

Comment No.	Inspection Item No.	Remarks

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CPP-601/627/640 LANDFILL
SEMIANNUAL INSPECTION OF EARTHEN COVER
FOR POOLING, SUBSIDENCE, AND EROSION

CPP-601/627/640 Landfill Berm inspection date: ____/____/____

Open RCRA remedial on this form:

Issue No.	Tracking No.	Date Remedial Was Identified	Deficiency Description/Comments

Inspector's Name: (Print)_____ Inspector's Signature: _____

Facility Manager's Name: (Print) _____ Facility Manager's Signature: _____

Remedial Actions Completed or Not Required:

Facility Manager's Signature: _____

NOTE: *Inspection criteria based upon* HWMA/RCRA Closure Plan for the CPP-601/627/640 Landfill Phase 2, *DOE/ID-11431 Revision 1, August 2010.*

EXAMPLE

Figure 9. FRM-1203, "CPP-601/627/640 Landfill Semiannual Inspection of Earthen Cover for Pooling, Subsidence, and Erosion."

10. MAINTENANCE

Upon installation of the earthen weather protection barrier, that barrier will be maintained, as required by IDAPA 58.01.05.008 (40 CFR 264.117) under this closure plan until the post-closure permit is modified. The following maintenance activities will be performed:

- Maintain the integrity and effectiveness of the earthen weather protection barrier as necessary by adding fill material and recontouring
- Maintain the security of the facility in accordance with IDAPA 58.01.05.008 (40 CFR 265.14)
- Maintain and monitor the groundwater monitoring system, and comply with all other applicable requirements of IDAPA 58.01.05.008 (40 CFR 264, Subpart F) in accordance with the post-closure plan
- Prevent run-on and run-off from eroding or otherwise damaging the earthen weather protection barrier.

Documentation of maintenance activities will be maintained at the facility, as required by IDAPA 58.01.05.008 [40 CFR 264.73(b)(5)], for at least 3 years from the inspection date.

11. DOCUMENT MANAGEMENT AND REPORTING

Landfill maintenance and inspection activities to be performed under this closure plan will be properly recorded and maintained. Records may be maintained at INTEC or electronically in a readily retrievable manner. Records may be maintained using a solely electronic format as long as they are readily retrievable to obtain a printed copy.

11.1 Maintenance and Inspection Records

Maintenance and inspections will be recorded on inspection logs and inspection log sheets. At a minimum, the following information will be recorded:

- The date and time of the inspection
- The name of the inspector
- A notation of the observations made, including all deficiencies identified
- The date, nature, and status (e.g., maintenance performed, work order submitted, parts ordered) of any needed repairs or other remedial actions.

Documentation of the inspections and maintenance activities at the landfill will be retained, as required by IDAPA 58.01.05.008 [40 CFR 264.73(b)(5)], for at least 3 years from the inspection date.

11.2 Reporting to the Idaho Department of Environmental Quality

Inspection reports will be submitted to DEQ semiannually until Phase 2 certification or the approval of the Class 3 permit modification for the post-closure permit, whichever occurs last.

12. CLOSURE SCHEDULE

Table 4 shows the closure schedule that will be initiated following DEQ approval of this closure plan. This schedule reflects the time required for conducting closure activities and submitting information to the qualified professional engineer for certification. As specified in IDAPA 58.01.05.008 (40 CFR 264.113), closure is required to be completed within 180 days of the initiation of closure activities. An extension to this period is being requested pursuant to IDAPA 58.01.05.008 (40 CFR 264.113) to protect human health and the environment and to adequately perform closure activities. Closure activities cannot be completed within 180 days because of the need to coordinate closure activities with the CPP-601/640 NTCRA, the complexity of installing the grout layer during cold weather, and the integration with the demolition of the adjacent CPP-602/630 facilities.

Demolition of portions of the CPP-601/640 buildings to reveal the monolith is expected to be completed in Calendar Year 2010. The Phase 1 post-closure period is expected to last from approximately Calendar Year 2009 to 2012. Phase 2 closure activities are expected to be conducted during Calendar Year 2011 to 2012, followed by the permitted Phase 2 post-closure period.

Table 4. Phase 2 landfill closure schedule.

Planned Work Tasks	Day of Completion
DEQ approval of Phase 2 landfill closure plan	Day 0
Complete removal of CPP-601/640 superstructure	Day 365
Complete installation of sloped grout layer on horizontal surfaces of the CPP-601/640 monolith	Day 500
Complete installation of earthen weather protection barrier on CPP-601/627/640	Day 600
Closure activities complete	Day 660
Professional engineer and owner/operator certification submitted to DEQ	Day 720[a,b]

a. If closure activities are completed ahead of the proposed schedule, closure certification will be submitted to DEQ within 60 days of the completion of closure activities.

b. Upon DEQ acceptance of the Phase 2 closure certification, the Waste Calcining Facility HWMA/RCRA post-closure permit (PER-112) will be modified to include the Phase 2 landfill post-closure activities.

DEQ—Idaho Department of Environmental Quality

HWMA/RCRA— Hazardous Waste Management Act/Resource Conservation and Recovery Act

13. CLOSURE PLAN AMENDMENTS

Changes to the DEQ-approved closure plan will be implemented in accordance with IDAPA 58.01.05.008 (40 CFR 264.112). If during closure unexpected events require modification of the approved closure activities or closure schedule, the closure plan will be amended, or DEQ will be otherwise notified within 30 days of the unexpected event. If an amendment is necessary, a written request detailing the proposed changes and the rationale for those changes and a copy of the amended closure plan will be submitted to DEQ for approval. Minor changes to the approved closure plan that are equivalent to, or do not compromise, the closure requirements and performance standards identified in the approved closure plan may be made without prior notification to DEQ. Minor changes will be identified in the documentation supporting the qualified professional engineer certification.

14. CLOSURE CERTIFICATION

In accordance with IDAPA 58.01.05.008 (40 CFR 264.115), a certification of closure of the CPP-601/627/640 landfill will be submitted to DEQ within 60 days of completing the closure activities. This certification, to be signed by a qualified professional engineer and the DOE Idaho Operations Office, will document the completion of closure activities in accordance with the DEQ-approved closure plan and State of Idaho HWMA/RCRA requirements. The closure certification also may identify any minor changes to the closure plan made without prior DEQ approval. Closure of the CPP-601/627/640 landfill will be considered complete upon receipt of written acceptance issued by DEQ.

15. SURVEY PLAT

In accordance with IDAPA 58.01.05.008 (40 CFR 264.116), a survey plat will be filed at the Butte County Courthouse and submitted to DEQ no later than the submission of the closure certification. The survey plat indicating the location and dimensions of the CPP-601/627/640 landfill monolith will be prepared and certified by a professional land surveyor. A benchmark will be installed and tied to the INTEC permanent survey grid. The INTEC survey grid and the CPP-601/627/640 landfill monolith benchmark will allow the monolith to be located in the future, if necessary. The survey plat, filed at the Butte County Courthouse, will contain a prominently displayed note stating the INL's obligation to restrict disturbance of the landfill in accordance with the applicable IDAPA 58.01.05.008 (40 CFR 264, Subpart G) regulations.

16. COST AND LIABILITY REQUIREMENTS

In accordance with IDAPA 58.01.05.008 [40 CFR 264.140(c)], the federal government, as owner of the INL Site, is exempt from the financial requirements of IDAPA 58.01.05.008 (40 CFR Part 264, Subpart H). These provisions include requirements for providing cost estimates, financial assurance, and financial assurance mechanisms for closure; liability; the use of state-required mechanisms; and the state assumption of financial and liability requirements for the closure.

17. NOTICES

In accordance with IDAPA 58.01.05.008 (40 CFR 264.119), a record of wastes, notice in deed, and certification of notice will be submitted as described in the following subsections.

17.1 Record of Wastes

As specified in IDAPA 58.01.05.008 [40 CFR 264.119(a)], a record of the type, location, and quantity of hazardous wastes within the CPP-601/627/640 landfill will be submitted to the Butte County commissioners and DEQ within 60 days of closure certification.

17.2 Notice in Deed

Within 60 days of closure certification, a notation on the deed to the property or other instrument used for title search will be filed in accordance with Idaho law as required by IDAPA 58.01.05.008 [40 CFR 264.119(b)(1)]. The notation will in perpetuity notify any potential purchaser of the property that:

- The land has been used to manage hazardous wastes
- Its use is restricted under IDAPA 58.01.05.008 (40 CFR 264, Subpart G) regulations
- The survey plat and record of the type, location, and quantity of hazardous wastes disposed of within the CPP-601/627/640 landfill required by IDAPA 58.01.05.008 [40 CFR 264.116 and 264.119(a)] have been filed with the Butte County commissioners and DEQ.

17.3 Certification of Notice

As required by IDAPA 58.01.05.008 [40 CFR 264.119(b)(2)], a signed certification that the owner or operator has recorded the notice in deed described in Subsection 17.2 and a copy of the document in which the notice in deed has been placed will be submitted to DEQ within 60 days of closure certification.

18. POST-CLOSURE CARE

Tank systems to be closed as landfills must meet the closure requirements for landfills specified in IDAPA 58.01.05.008 (40 CFR 264.310), which includes compliance with post-closure requirements contained in IDAPA 58.01.05.008 (40 CFR 264.117 through 264.120), as well as groundwater monitoring and other applicable requirements of IDAPA 58.01.05.008 (40 CFR 264, Subpart F).

Upon DEQ acceptance of the Phase 2 closure certification, the WCF HWMA/RCRA post-closure permit (PER-112) will be modified to include landfill closure and post-closure inspection, maintenance, and groundwater monitoring. Phase 2 post-closure activities will include inspection of the earthen weather protection barrier for precipitation pooling, erosion, and subsidence. If any erosion or other penetrations of the overlying soil are observed during inspections, the soil will be resurfaced or additional fill will be added or both, as appropriate and to the extent practicable.

Until the Phase 2 closure certification is accepted, Phase 1 post-closure inspection, monitoring, and maintenance will be performed in accordance with the *HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill* (DOE-ID 2009b) and this closure plan.

19. REFERENCES

40 CFR 264, 2010, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, Office of the Federal Register.

42 USC 6901 et seq., 1976, "Resource Conservation and Recovery Act of 1976," *United States Code*, as amended.

42 USC 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation, and Liability Act of 1980," *United States Code*, as amended.

DOE-ID, 2007a, *HWMA/RCRA Closure Plan for the CPP-640 Headend Storage Tank System*, DOE/ID-11323, Rev. 1, U.S. Department of Energy Idaho Operations Office, July 2007.

DOE-ID, 2007b, *Record of Decision for Tank Farm Soil and INTEC Groundwater*, DOE/ID-11296, Rev. 0, U.S. Department of Energy Idaho Operations Office, U.S. Environmental Protection Agency, Idaho Division of Environmental Quality.

DOE-ID, 2008, *Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities*, DOE/ID-11360, Rev. 0, U.S. Department of Energy Idaho Operations Office, August 2008.

DOE-ID, 2009a, *HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1*, DOE/ID-11376, Rev. 2, U.S. Department of Energy Idaho Operations Office, January 2009.

DOE-ID, 2009b, *HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill*, DOE/ID-11408, Rev. 1, U.S. Department of Energy Idaho Operations Office, December 2009.

DOE-ID, 2009c, *Action Memorandum for General Decommissioning Activities under the Idaho Cleanup Project*, DOE/ID-11293, Rev. 1, U.S. Department of Energy Idaho Operations Office, January 2009.

DOE-NE-ID, 2004, *Action Memorandum for the Decontamination and Decommissioning of Building CPP-627, the Remote Analytical Facility*, DOE/NE-ID-11164, Rev. 0, U.S. Department of Energy, Idaho Operations Office, June 2004.

EDF-9367, 2009, "Nonradiological Material Inventory for CPP-601, CPP-627, and CPP-640 Landfill Closure," Rev. 0, Idaho Cleanup Project, September 24, 2009.

Faulk, D., EPA Region 10, to Mark Shaw, DOE-ID, March 25, 2009, "U.S. Environmental Protection Agency Concurrence on Leaving Additional Quantities of Lead in CPP-601/640 as Impracticable to Remove."

FRM-1095, 2010, "CPP-601/627/640 Landfill Semiannual Post-Closure Plan Inspection of Monolith for Integrity and Drainage," Idaho Cleanup Project.

FRM-1203, 2010, "CPP-601/627/640 Landfill Semiannual Inspection of Earthen Cover for Pooling, Subsidence, and Erosion," Idaho Cleanup Project.

ICP, 2006, *Final Report for the Decontamination and Decommissioning of CPP-627 Remote Analytical Facility*, ICP/EXT-06-01145, Rev. 0, Idaho Cleanup Project, February 2006.

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HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill

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ABSTRACT

This Hazardous Waste Management Act/Resource Conservation and Recovery Act post-closure plan has been prepared for the CPP-601/627/640 landfill closure. This closure is being integrated with the decommissioning of the CPP-601 Fuel Reprocessing Facility, CPP-627 Remote Analytical Facility, and CPP-640 Headend Processing Plant. The CPP-627 building has been decommissioned under a Comprehensive Environmental Response, Compensation, and Liability Act non-time-critical removal action. Buildings CPP-601 and -640 are being decommissioned under a separate non-time-critical removal action. In coordination with the action for CPP-601 and -640, the CPP-601/627/640 landfill will be closed in two phases. Phase 1 landfill closure activities have been completed and included the decontamination and grouting of the CPP-601 Deep Tanks System. During the Phase 1 post-closure period, CPP-601/640 will be demolished, and grout will be used to fill remaining void areas, creating a monolith. The monolith will be exposed after portions of the buildings are removed. This, along with the concrete monolith created during the CPP-627 decommissioning, will be an interim cover for the landfill. Phase 2 of the landfill closure will be the installation of the phase 2 cover, which will comprise a concrete layer and a precipitation infiltration coating over the monolith. This post-closure plan describes the inspection, maintenance, and monitoring activities to be conducted during the interim period from the Phase 1 post-closure period until the beginning of the Phase 2 post-closure period.

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ACRONYMS

CAMP	corrective action monitoring program
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMP	compliance monitoring program
CY	calendar year
DEQ	State of Idaho Department of Environmental Quality
DML	detection monitoring limits
DMP	detection monitoring program
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
EQL	estimated quantitation limit
GPS	groundwater protection standard
HWMA	Hazardous Waste Management Act
IDAPA	Idaho Administrative Procedures Act
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
NTCRA	non-time-critical removal action
RCRA	Resource Conservation and Recovery Act
WAC	waste acceptance criteria
WCF	Waste Calcining Facility

HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill

1. INTRODUCTION

This post-closure plan has been prepared for the CPP-601 Fuel Reprocessing Facility, CPP-627 Remote Analytical Facility, and CPP-640 Headend Processing Plant landfill as stipulated in *HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1* (DOE-ID 2009a). The CPP-601 Deep Tanks System is being closed as a landfill in accordance with Hazardous Waste Management Act (HWMA) (State of Idaho 1983)/Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq. 1976) regulations at Idaho Administrative Procedures Act (IDAPA) 58.01.05.008 (40 Code of Federal Regulations [CFR], Subparts G and J), which address tank system closure.

The CPP-601 Deep Tanks System is being closed as a landfill because of the presence of abandoned isolated piping runs that could not be flushed and lead that was impracticable to remove. In addition, Buildings CPP-601, -627, and -640, which are part of the Fuel Reprocessing Complex at the Idaho Nuclear Technology and Engineering Center (INTEC), have contamination that will not be removed upon decommissioning. Buildings CPP-601 and -640 are being decommissioned in an ongoing Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601 et seq. 1980) non-time-critical removal action (NTCRA) (DOE-ID 2008). Building CPP-627 has been demolished, and a protective layer of concrete was poured over the building footprint as part of a separate NTCRA. Therefore, the CPP-601 HWMA/RCRA landfill closure is being integrated with the CPP-601/640 NTCRA and the completed CPP-627 NTCRA, resulting in a single CPP-601/627/640 landfill.

In coordination with the NTCRA, the CPP-601/627/640 HWMA/RCRA landfill closure is being completed in two phases. Activities for Phase 1 of the CPP-601 Deep Tanks System landfill closure has been completed in accordance with the closure plan (DOE-ID 2009a) and included decontamination of specific tank system components to site-specific action levels, flushing and isolating portions of the lines and tanks and grouting the tanks. During the Phase 1 post-closure period, NTCRA demolition and removal activities will be conducted on CPP-601/640, and grout and other inert material will be used to fill remaining piping, vessels, and other void areas, thus creating a monolith. This, along with the concrete monolith created earlier during the CPP-627 NTCRA, will serve as an interim HWMA/RCRA cover for the CPP-601/627/640 landfill during the Phase 1 post-closure period. Phase 2 of the landfill closure will be the installation of a layer of concrete over the interim monolith, as necessary, to provide sloping. A precipitation infiltration coating will be applied over the entire CPP-601/627/604 monolith, including the concrete layer placed over the interim monolith. This concrete layer and coating will constitute the Phase 2 HWMA/RCRA covering. The Phase 2 post-closure period will begin after this phase 2 covering is installed.

The purpose of this plan is to describe the inspection, maintenance, and monitoring activities to be conducted during the Phase 1 post-closure period, which will last until the beginning of the Phase 2 post-closure period. The CPP-601 Deep Tanks System is included in the "Partial Permit for HWMA Storage and Treatment for the Liquid Waste Management System at the Idaho Nuclear Technology and Engineering Center on the Idaho National Laboratory" (State of Idaho 2007). Upon approval by the State of Idaho Department of Environmental Quality (DEQ), this post-closure plan will be incorporated as an attachment to the permit via the permit modification process. Phase 2 of the landfill closure is not addressed in this post-closure plan. A separate Phase 2 landfill closure plan will be prepared, and upon Phase 2 closure certification, the appropriate HWMA/RCRA permit will be modified to include the landfill closure and post-closure groundwater monitoring (DOE-ID 2009a).

2. FACILITY DESCRIPTION

Buildings CPP-601, -627, and -640 are part of the Fuel Reprocessing Complex at INTEC, located in the south-central area of the Idaho National Laboratory (INL). The CPP-601 Deep Tanks System is located in the lowest level of Building CPP-601. These buildings are described briefly in the following subsections. Detailed descriptions of the buildings and the INL are provided in the CPP-601 Phase 1 closure plan (DOE-ID 2009a) and the action memoranda for the CPP-601/640 and CPP-627 NTCRAs (DOE-ID 2008; DOE-NE-ID 2004).

2.1 CPP-601 Fuel Reprocessing Facility

The CPP-601 Fuel Reprocessing Facility is a 244- × 102-ft building consisting of five levels with the primary portion located below ground. The facility was used for reprocessing spent nuclear fuel. Operations included separation, chemical makeup and transfer, and liquid waste receiving processes. The top level, constructed of transite panels on post and beam, is above grade and contains an open area that was used for transferring fuel elements to the process equipment and for chemical storage, makeup, and transfer. The lower levels, constructed of steel-reinforced concrete, contain process cells, corridors, and auxiliary cells that house equipment and controls. The CPP-601 Deep Tanks System consists of four 4,500-gal stainless-steel tanks located in two concrete vaults in the lowest level of CPP-601. This system collected liquid waste generated from separations processes performed in CPP-601. Process systems in CPP-627 and -640 could also send waste to these tanks.

Most of the floor, cell walls, and equipment are lined with or consist of stainless steel. The processing equipment, which was designed for remote operations, is generally enclosed in the heavily shielded cells. Often, lead was used as the shielding material. A significant amount of lead shielding also is encased in the concrete structures (floors and walls) (DOE-ID 2009a).

2.2 CPP-627 Remote Analytical Facility

The CPP-627 Remote Analytical Facility was a 14,727-ft^2 facility. The building was entirely above ground and was adjacent and attached to CPP-601. Building CPP-627 was constructed in 1955 of reinforced concrete and masonry block and had been inactive since 1989. The building housed analytical, experimental, and decontamination facilities, including the Hot Chemistry Laboratory, the Old Shift Laboratory, the Multi-Curie Cell, the Emission Spectroscopy Laboratory, and the Decontamination Development Laboratory. In 2005, CPP-627 was removed to grade as part of a NTCRA (ICP 2006). Some lines that were part of the drainage system remain beneath the CPP-627 slab and are included as part of the landfill closure.

2.3 CPP-640 Headend Processing Plant

The CPP-640 Headend Processing Plant is a 66- × 89-ft structure constructed in 1961 to support research and process development for the uranium reprocessing mission in CPP-601. Fuel processing at CPP-640 ended in June 1984 (DOE-ID 2008).The facility contains two shielded waste collection tank vaults at the lowest level of the building, five shielded test cells at the mid-level of the building, and an open crane loft with space for chemical makeup equipment and access to the cells through roof hatches at the upper level (DOE-ID 2007). A major modification in the late 1970s added the shielded mechanical handling cave within the crane loft. The CPP-640 Headend Storage Tank System received decontamination fluids generated in the plant. The tank system comprised two radiological waste tanks and a nonradiological waste tank. The DEQ approved the certification for the CPP-640 Headend Storage Tank System closure on June 12, 2008 (Monson 2008).

3. OVERVIEW OF LANDFILL CLOSURE APPROACH

The approach for the CPP-601/627/640 landfill closure consists of three steps: Phase 1, the Phase 1 post-closure period, and Phase 2 (DOE-ID 2009a). Phase 1 landfill closure activities have been completed and included the decontamination and grouting of the CPP-601 Deep Tanks System components in accordance with *HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1* (DOE-ID 2009a).

The Phase 1 post-closure period of the landfill closure is the performance of HWMA/RCRA inspection, maintenance, and monitoring activities on the CPP-601/627/640 monolith, which will serve as an interim HWMA/RCRA cover over the landfill. The inspection, maintenance, and monitoring activities will be performed in accordance with this post-closure plan. The CPP-601/640 portion of the monolith will be created and exposed as a result of the CPP-601/640 demolition and grouting activities. Building CPP-627 has been demolished, and the remaining concrete slab will become part of the CPP-601/627/640 landfill. The CPP-601/640 NTCRA activities are specified in *Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008). The CPP-627 NTCRA was performed in accordance with *Action Memorandum for the Decontamination and Decommissioning of Building CPP-627, the Remote Analytical Facility* (DOE-NE-ID 2004). Demolition of portions of the CPP-601/640 building to reveal the monolith is expected to be completed in calendar year (CY) 2010. The Phase 1 post-closure period is expected to last from approximately CY 2009 to 2011.

Installation of the phase 2 HWMA/RCRA cover over the monolith will constitute Phase 2 of the landfill closure. A concrete layer and a precipitation infiltration coating is planned to be placed over the interim concrete monolith. This cover will be installed in accordance with a HWMA/RCRA Phase 2 landfill closure plan to be developed. Phase 2 activities are expected to be conducted during CY 2011 to 2012 followed by the permitted Phase 2 post-closure period. Table 1 lists the primary activities associated with each step in the phased landfill closure and the integration with CPP-601/640 NTCRA activities. Descriptions of the landfill closure boundary, Phase 1 closure actions, the CPP-601/640 NTCRA, and the CPP-627 NTCRA are provided in the following subsections.

3.1 Landfill Closure Boundary

The boundary for the landfill closure is established in the CPP-601 Deep Tanks System Phase 1 landfill closure plan (DOE-ID 2009a). As stipulated in that plan, the landfill boundary encompasses the CPP-601 Deep Tanks System as well as the entire footprint of the CPP-601, -627, and -640 buildings, which share common walls and utilities. Also included is a section of a CPP-602 discharge drain line extending from the CPP-601 header into the CPP-602 sump. The line was abandoned and grouted in place, with a stainless-steel liner atop the grouted-in piece of pipe. The landfill does not include the CPP-602 laboratory, which is subject to a separate closure action (DOE-ID 2009a). Figure 1 provides an overview of the landfill boundaries shaded in green.

Table 1. List of primary activities associated with the phased CPP-601/627/640 landfill closure.

Closure Phase	HWMA/RCRA Activities	CERCLA NTCRA Activities
Phase 1 CPP-601 Landfill Closure	*HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1* (DOE-ID 2009a) • Waste removed to extent practicable • Piping and tanks decontaminated to extent practicable • Rinsate sampled and analyzed and wastes characterized • Tanks grouted for waste stabilization • Phase 1 landfill closure certification	*Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008) CPP-601/640 decontamination and decommissioning • Remove accessible bulk lead, asbestos, and other materials that would increase risk • Fill remaining area, including vessels and piping, with grout or other inert material, creating monolith
Phase 1 Post-Closure Care CPP-601/627/640 Landfill Interim Cover	*HWMA/RCRA Post-Closure Plan for the CPP-601/627/640 Landfill* (this document) • Implement inspection, maintenance, and monitoring requirements for CPP-601/627/640 landfill • Install groundwater monitoring wells and begin groundwater monitoring	*Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008) CPP-601/640 demolition • Remove building to the Process Makeup/Hot Makeup deck level, exposing concrete monolith • Place layer of concrete on top of exposed monolith as appropriate to provide sloping • Install precipitation infiltration coating over abovegrade sections of CPP-601/627/640 monolith • Implement institutional controls for monolith maintenance and precipitation run-off control
Phase 2 CPP-601/627/640 Phase 2 Cover Installation	Phase 2 HWMA/RCRA landfill closure plan (to be developed) • Install concrete layer as appropriate over interim CPP-601/627/640 monolith to provide sloping • Install precipitation infiltration coating over abovegrade sections of CPP-601/627/640 monolith • Continue groundwater monitoring, inspection, and maintenance • Certification of Phase 2 closure	
CPP-601/627/640 Permitted Post-Closure Care	Post-closure plan and permit modification (to be developed) Continue groundwater monitoring, inspection, and maintenance	

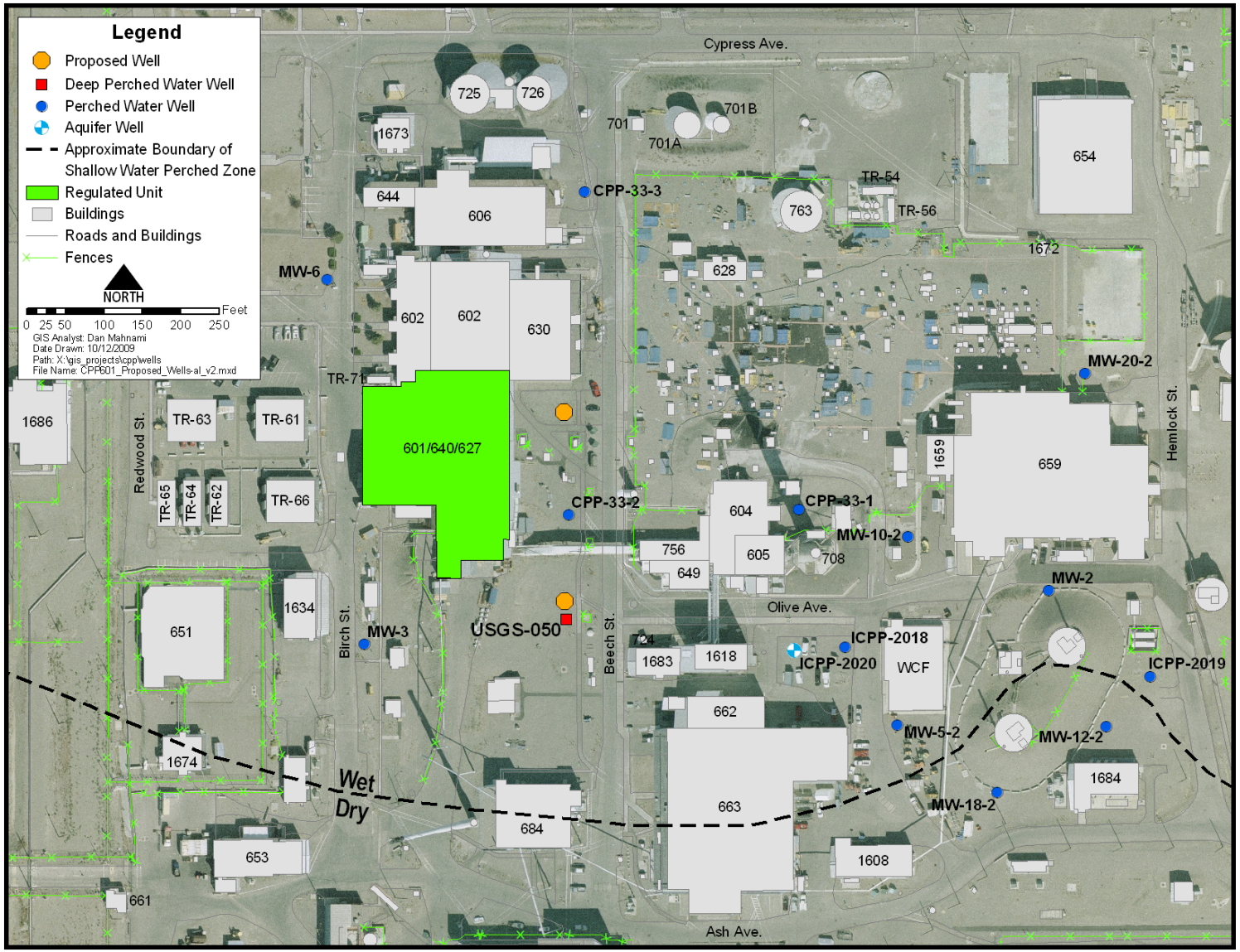

Figure 1. INTEC building layout with landfill footprint shaded in green.

3.2 CPP-601 Deep Tanks System Phase 1 Landfill Closure

The CPP-601 Deep Tanks System Phase 1 landfill closure activities have been completed in accordance with the closure plan (DOE-ID 2009a). Under Phase 1 closure, laboratory waste discharge piping from the laboratory hoods, sinks, and drains in CPP-602 and -684 that discharged to CPP-601 were clean-closed by decontamination to the site-specific action levels specified in the closure plan. The remaining portions of the CPP-601 Deep Tanks System within the landfill closure boundaries of the outer walls of CPP-601/627/640 were flushed to the extent practicable. The CPP-601/627/640 components included in the landfill area were completely isolated from CPP-602, -666, and -684 and the INTEC Liquid Waste Management System waste handling systems (DOE-ID 2009a). The four deep tanks in CPP-601 have been filled with grout. Grouting of piping and the CPP-601 and -640 buildings is in progress and will be completed as part of the CPP-601/640 NTCRA.

3.3 CPP-601/640 NTCRA and CPP-640 Headend Storage Tank System Closure

The CPP-601/640 facilities are being decommissioned in a NTCRA as specified in the *Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008). Activities preparatory to this NTCRA have been performed in accordance with the *Action Memorandum for General Decommissioning Activities under the Idaho Cleanup Project* (DOE-ID 2009b). These activities include isolating utilities; removing chemicals, piping, and equipment; and routine waste management practices such as removing lead, polychlorinated biphenyls, and asbestos (DOE-ID 2009b). Decommissioning activities currently being performed include:

- Removal of non-process areas, including building components and the upper portion of the mechanical handling cave with processing cells left intact. The top 8 ft of the P, Q, and R cells in CPP-601 and the bottom 2.5 ft of the mechanical handling cave will remain intact and be grouted. Intact cells will be decontaminated before being grouted.

- Waste stabilization through the grouting of larger system piping and the remaining void spaces within the CPP-601/640 facilities.

In March 2009, the U.S. Department of Energy (DOE) requested concurrence from the DEQ and the U.S. Environmental Protection Agency (EPA) to leave additional bulk lead in place because the lead has been identified as impracticable to remove. Three areas in CPP-601 and -640 have lead totaling approximately 51.9 tons that is integral to the building structure, and removal would significantly increase radiological or worker risk (Shaw 2009). The DEQ and EPA have concurred with this request (Monson 2009; Faulk 2009). Approximately 129 tons of lead from CPP-601 and -640 are expected to remain in place (Shaw 2009).

The CPP-640 Headend Storage Tank System was clean-closed in accordance with HWMA/RCRA requirements as of June 12, 2008 (DOE-ID 2009a). Tank system components, including tanks and ancillary equipment that managed hazardous waste, were decontaminated to the site-specific action levels specified in the *HWMA/RCRA Closure Plan for the CPP-640 Headend Storage Tank System* (DOE-ID 2007). The DEQ approved the closure certification on June 12, 2008 (Monson 2008).

3.4 CPP-627 NTCRA

The CPP-627 Remote Analytical Facility was decommissioned in 2005 in a NTCRA as specified in the *Action Memorandum for the Decontamination and Decommissioning of Building CPP-627, the Remote Analytical Facility* (DOE-NE-ID 2004; ICP 2006). Abovegrade hazardous waste piping was removed and disposed of, and the CPP-627 facility was removed to grade. The remaining concrete slab, which covered the remaining belowgrade inactive/abandoned lines that were inaccessible for decontamination, was washed down to remove loose contamination. A protective layer of concrete was then poured over the entire building footprint to prevent future infiltration of water (ICP 2006).

4. HWMA/RCRA LANDFILL AND POST-CLOSURE REQUIREMENTS

As required by IDAPA 58.01.05.008 (40 CFR 264.197), tank systems to be closed as landfills must meet the closure requirements for landfills specified in IDAPA 58.01.05.008 (40 CFR 264.310). Section 264.310 also requires compliance with post-closure requirements contained in IDAPA 58.01.05.008 (40 CFR 264.117 through 264.120) as well as groundwater monitoring and other applicable requirements of IDAPA 58.01.05.008 (40 CFR 264, Subpart F). The concrete monolith for the CPP-601/627/640 landfill that will be created by NTCRA activities will serve as an interim HWMA/RCRA cover pending placement of the concrete layer for sloping and the application of the precipitation infiltration coating. This concrete layer and coating will constitute the Phase 2 HWMA/RCRA cover. Although the monolith is an interim measure, the technical requirements of IDAPA 58.01.05.008 (40 CFR 264.310) will be substantively met. The primary technical requirements are specified in IDAPA 58.01.05.008 (40 CFR 264.310), which addresses landfill closure and post-closure care, and IDAPA 58.01.05.008 (40 CFR Subpart F §§264.97–264.100), which addresses groundwater monitoring programs. Table 2 summarizes these HWMA/RCRA closure and post-closure technical requirements for Phase 1 of the CPP-601/627/640 landfill closure and post-closure period and the strategy planned to meet each requirement.

Table 2. HWMA/RCRA landfill closure and post-closure technical requirements and compliance strategy.

IDAPA 58.01.05.008 (40 CFR 264, Subpart N) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Landfills	
Regulatory Requirement	Compliance Strategy
§264.310 Closure and post-closure care.	
(a) At final closure of the landfill, the owner or operator must cover the landfill with a final cover designed and constructed to (1) Provide long-term minimization of migration of liquids through the closed landfill (2) Function with minimum maintenance (3) Promote drainage and minimize erosion or abrasion of the cover (4) Accommodate settling and subsidence so that the cover's integrity is maintained (5) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.	The interim CPP-601/627/640 monolith will be constructed of concrete and other inert material that will fill void spaces in the remaining buildings, including vessels and large piping. Drains, pipes, hatches, and other openings on the monolith surface will be capped and sealed. This construction will minimize migration of liquids through the landfill and function with minimum maintenance until the phase 2 HWMA/RCRA cover is placed. The CPP-627 portion of the monolith is sloped from east to west. The CPP-627 and CPP-601/640 portion will be inspected and maintained for precipitation ponding and pooling. Soil surrounding the monolith will be sloped away from the landfill, so drainage is promoted and erosion minimized. The monolith will be constructed on the footprint of CPP-601/627/640, which are constructed of heavy reinforced walls. Void spaces in CPP-601/640 will be filled with grout in lifts where appropriate. CPP-627 was demolished to grade, and a reinforced, sloping, concrete slab has been placed over the foundation. Drilled piers support grade beams and the former building slab. Therefore, long-term lateral displacement and subsidence are not expected. The monolith's construction results in a permeability less than the soils and bedrock beneath the buildings. If cracks or other penetrations are observed during inspections, repairs will be made as appropriate and to the extent practicable.

Table 2. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart N) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Landfills	
Regulatory Requirement	Compliance Strategy
(b) After final closure, the owner or operator must comply with all post-closure requirements contained in §§264.117 through 264.120, including maintenance and monitoring throughout the post-closure care period (specified in the permit under §264.117). The owner or operator must	Administrative and permit requirements specified in §§264.117 through 264.120 will be addressed during Phase 2 of this landfill closure.
(1) Maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events;	The interim concrete monolith is to be repaired as necessary to correct the effects of subsidence, erosion, or other events.
(2) Continue to operate the leachate collection and removal system until leachate is no longer detected;	Not applicable.
(3) Maintain and monitor the leak detection system in accordance with §§264.301(c)(3)(iv) and (4) and 264.303(c), and comply with all other applicable leak detection system requirements of this part;	Not applicable.
(4) Maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of Subpart F of this part;	The groundwater monitoring system is to be maintained as required. See requirements for Subpart F.
(5) Prevent run-on and run-off from eroding or otherwise damaging the final cover; and	The concrete pad over CPP-627 is sloped from east to west and is designed to prevent run-on and water infiltration at the former CPP-627 footprint. Drains, pipes, hatches, and other openings on the monolith surface will be capped and sealed. The monolith will be inspected for precipitation ponding or pooling; if found, the precipitation will be removed by appropriate means to the extent practicable. Soil surrounding the monolith will be graded so that the ground slopes away from the CPP-601/627/640 area. The precipitation run-off will be diverted to direct the water away from the monolith.
(6) Protect and maintain surveyed benchmarks used in complying with §264.309.	Not applicable.

Table 2. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart F) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Releases from Solid Waste Management Units	
Regulatory Requirement Summary	Compliance Strategy
§264.97 General Groundwater Monitoring Requirements.	
The owner or operator must comply with the following requirements for any groundwater monitoring program developed to satisfy §264.98, §264.99, or §264.100: (a) The groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer that represent the quality of background groundwater that has not been affected by leakage from a regulated unit, represent the quality of groundwater passing the point of compliance, and allow for the detection of contamination when hazardous waste or hazardous constituents have migrated from the waste management area to the uppermost aquifer.	A combination of two existing wells and two new wells will be used with locations as shown in Figure 1. The upgradient background well will be MW-6; well CPP-33-2 will be used as a point-of-compliance monitoring well for both water elevation and constituent monitoring. The two new wells will serve as the second and third point-of-compliance wells.
(b) This section specifies requirements for facilities that contain more than one regulated unit.	Not applicable.
(c) All monitoring wells must be cased in a manner that maintains the integrity of the monitoring-well bore hole.	Well construction detail, where known, is shown in Table 6.
(d) The groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide a reliable indication of groundwater quality below the waste management area. At a minimum, the program must include procedures and techniques for sample collection sample preservation and shipment, analytical procedures, chain of custody control.	Specific sampling and analysis plan techniques and procedures are included in Attachment 3 of the WCF post-closure permit (PER-112). Laboratory quality assurance/quality control data from each sampling event will be completed within 35 days of receipt of final results from sample analyses, and analytical results will be submitted to DEQ as discussed in Section 9.
(e) The groundwater monitoring program must include sampling and analytical methods that are appropriate for groundwater sampling and that accurately measure hazardous constituents in groundwater samples.	Current SW-846 methods (EPA 2008) for metals, volatile organic compounds, and semi-volatile organic compounds will be used when analyzing groundwater samples collected during implementation of the detection monitoring, compliance monitoring, and corrective action monitoring programs. The specific constituents to be analyzed are listed in Table 5. Equivalent or superior analytical methods may be substituted.
(f) The groundwater monitoring program must include a determination of the groundwater surface elevation each time groundwater is sampled.	Water elevation measurements will be collected semi-annually and used to calculate the semi-annual groundwater flow rate and flow direction for the entire groundwater monitoring network within a 24-hour period. The measurements, flow rate, and direction will be reported as described in Section 9.

Table 2. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart F) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Releases from Solid Waste Management Units	
Regulatory Requirement Summary	Compliance Strategy
(g) In detection monitoring or where appropriate in compliance monitoring, data on each hazardous constituent specified in the permit will be collected from background wells and wells at the compliance point(s). This section also specifies requirements for the number and kinds of samples to be collected, the sample size, the sampling procedure, and the sampling interval.	Monitoring wells will be sampled semi-annually throughout the Phase 1 post-closure period. Quarterly sampling will be performed until DEQ has approved background concentrations. (Compliance monitoring will not be triggered until the background levels have been established even if detection monitoring limits are exceeded.)
(h) This section specifies the statistical methods to be used in evaluating groundwater monitoring data for each hazardous constituent which, upon approval by the Regional Administrator, will be specified in the unit permit.	The following statistical procedures will be used to determine background concentrations. For detected constituents, the Mann-Kendall Test will be used for trend analysis. If no trend is observed, normality and log normality will be assessed using the Shapiro-Wilk Test. Limits will be set using the following methods: • If no trend is present and data are normal – parametric 95% upper tolerance limit using normal data arithmetic mean and standard deviation. • If no trend is present and data are log-normal – parametric tolerance limit using log-normal data arithmetic mean and standard deviation. • If no trend is present and data are non-parametric – non-parametric tolerance limit at certain confidence limit. • If data show a trend – limits must be re-evaluated using the same method provided a statistical steady state (no trend) is established. • If, after additional data are analyzed, the background shows no trend and variability remains similar, then limits will be re-evaluated. When sampling includes non-detects , the following methods will be used: • Less than 15% of samples are non-detects – ½ the estimated quantitation limit (EQL) will be used in place of the non-detect. • Non-detects equate to 15 to 60% of samples collected – non-parametric parametric Wilcoxon Rank-Sum procedure adjusted for ties will be used to compare data collected from upgradient and downgradient monitoring wells. • Non-detects are greater than 60% – Poisson tolerance limits will be used. • All sampling events are non-detects – EQLs will be used as the limit.

Table 2. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart F) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Releases from Solid Waste Management Units	
Regulatory Requirement Summary	Compliance Strategy
(i) This section stipulates requirements for the chosen statistical method.	See (h) above.
(j) Groundwater monitoring data must be maintained in the facility operating record. The Regional Administrator will specify in the permit when the data must be submitted for review.	Data will be maintained in the operating record as required.
§264.98 Detection monitoring program.	
This section specifies the minimum requirements for establishing a detection monitoring program. (a) The owner or operator must monitor for indicator parameters (e.g., specific conductance, total organic carbon, or total organic halogen), waste constituents, or reaction products that provide a reliable indication of the presence of hazardous constituents in groundwater.	The constituents of concern for this post-closure period are listed in Table 5. Samples from each detection monitoring and background well listed in Table 6 will be analyzed for these constituents.
(b) The owner or operator must install a groundwater monitoring system at the compliance point as specified under §264.95.	Well CPP-33-2 and two new wells will be used as point-of-compliance monitoring wells.
(c) The owner or operator must conduct a groundwater monitoring program for each chemical parameter and hazardous constituent specified in the permit and maintain a record of groundwater analytical data as measured and in a form necessary for the determination of statistical significance.	See §264.97
(d) The Regional Administrator will specify the frequencies for collecting samples and conducting statistical tests.	See §264.97
(e) The owner or operator must determine the groundwater flow rate and direction in the uppermost aquifer at least annually.	See §264.97
(f) The owner or operator must determine whether there is statistically significant evidence of contamination for any chemical parameter of hazardous constituent specified in the permit.	Once background levels have been established, data from each detection monitoring sampling event will be compared to the detection monitoring criteria in Table 4. Upon detection of any constituent(s) that exceeds the monitoring criteria, DEQ will be notified in writing within 7 calendar days after completion of data validation. At the INL's discretion, within 15 days, two verification samples from all affected well(s) will be collected, purging the well(s) between samples, and both samples will be analyzed for the constituents listed in Table 5. If the INL demonstrates to the DEQ that a source other than a regulated unit caused the exceedance or that the exceedance resulted from an error in sampling, analysis, or evaluation, DEQ will notify the INL to remain in the

Table 2. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart F) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Releases from Solid Waste Management Units	
Regulatory Requirement Summary	Compliance Strategy
	detection monitoring program. Otherwise, DEQ will instruct the INL to implement the compliance monitoring program. If the verification samples do not confirm the detection of parameter(s) from Table 5 in concentrations that exceed the detection monitoring criteria, the detection monitoring program will be re-established and the DEQ will be notified of the resumption of the detection monitoring program.
(g) If the owner or operator determines that there is statistically significant evidence of contamination for chemical parameters or specified hazardous constituents, then the Regional Administrator must be notified, the groundwater in all monitoring wells must be sampled to determine whether constituents in the 40 CFR 264 Appendix IX are present, and if so, in what concentration. Requirements to establish compliance monitoring are also specified.	If the results from either verification sample confirm the detection of constituents in concentrations that exceed the detection monitoring criteria, the affected well(s) will be sampled within 15 calendar days. Within 60 calendar days of this sampling event, the INL will implement the compliance monitoring program. (The compliance monitoring program addresses Appendix IX constituents.)
(h) If the detection monitoring program no longer satisfies the requirements of this section, an application for a permit modification must be submitted.	For this post-closure period, the post-closure plan would be modified.
§264.99 Compliance monitoring program.	
This section specifies minimum requirements for establishing a compliance monitoring program. (a) The owner or operator must monitor the groundwater to determine whether regulated units are in compliance with the groundwater protection standard under §264.92.	Compliance monitoring wells will be determined by exceedance of detection monitoring criteria in Table 4 after background values have been established.
(b) The owner or operator must install a groundwater monitoring system at the compliance point as specified under §264.95.	Well CPP-33-2 and two new wells will be used as point of compliance monitoring wells.
(c) The Regional Administrator will specify the sampling procedures and statistical methods appropriate for the constituents and the facility. The owner or operator must conduct a sampling program for each specified chemical parameter or hazardous constituent, and the owner or operator must record groundwater analytical data as measured and in a form necessary for the determination of statistical significance.	Samples will be collected as described in Attachment 3 of the WCF post-closure permit (PER-112). The analyte list will include constituents listed in Table 5 and all additional constituents identified from IDAPA 58.01.05.008 (40 CFR 264, Appendix IX) sampling.
(d) The owner or operator must determine whether there is statistically significant evidence of increased contamination for any specified chemical parameter or hazardous constituent at a specified frequency.	Data will be compared to the compliance monitoring criteria in Table 4. If the analytical results for constituent(s) listed in Table 5 are less than or equal to the compliance monitoring criteria in Table 4, sampling will continue until the criteria for transition to the detection monitoring program are met.

Table 2. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart F) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Releases from Solid Waste Management Units	
Regulatory Requirement Summary	Compliance Strategy
(e) The owner or operator must determine the groundwater flow rate and direction in the uppermost aquifer at least annually.	See §264.97
(f) The Regional Administrator will specify the frequencies for collecting samples and conducting statistical tests to determine statistically significant evidence of increased contamination.	See §264.97
(g) Annually, the owner or operator must determine whether additional hazardous constituents from 40 CFR 264 Appendix IX could possibly be present but are not on the detection monitoring list in the permit, are actually present in the uppermost aquifer and, if so, at what concentration.	On an annual basis, any/all monitoring wells will be analyzed for all constituents listed in IDAPA 58.01.05.008 (40 CFR 264, Appendix IX). Any newly identified compounds will be added to the list of analytes in Table 5.
(h) This section specifies actions required if the owner or operator determines that any concentration limits under §264.94 are being exceeded at any monitoring well at the point of compliance.	If analytical results from any well listed in Table 6 exceed the compliance monitoring criteria in Table 4, the corrective action monitoring program (see requirements for §264.100) will be implemented. The DEQ will be notified in writing within 7 calendar days after completion of data validation. Within 15 days of sample validation, two verification samples will be collected from the affected well(s), purging the well(s) between samples, and both samples will be analyzed for all parameters listed in Table 5. If analytical results from either of the verification samples confirm the detection of parameters in concentrations that exceed the groundwater protection standard in Table 5, the INL will notify DEQ in writing within 7 days of making this finding. Within 60 calendar days of sampling, the INL must establish a corrective action monitoring program and submit a revision to this post-closure plan.
(j) If the compliance monitoring program no longer satisfies the requirements of this section, an application for a permit modification must be submitted.	For this post-closure period, the post-closure plan would be modified.
§264.100 Corrective action program.	
This section specifies minimum requirements for establishing a corrective action program. (a) The owner or operator must take corrective action to ensure that regulated units are in compliance with the groundwater protection standard under §264.92. (b) The owner or operator must implement a corrective action program that prevents hazardous constituents from exceeding their respective concentration limits at the compliance point by removing the hazardous waste constituents or treating them in place. The permit will specify the specific measures that will be taken.	A corrective action monitoring program will be implemented if the compliance monitoring criteria in Table 4 are exceeded. The program will remain in effect until the Table 4 compliance monitoring criteria are not exceeded during four consecutive corrective action monitoring program events. At such time, the compliance monitoring program will be reactivated.

Table 2. (continued).

IDAPA 58.01.05.008 (40 CFR 264, Subpart F) Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – Releases from Solid Waste Management Units	
Regulatory Requirement Summary	Compliance Strategy
(c) The owner or operator must begin corrective action within a reasonable time period after the groundwater protection standard is exceeded. The Regional Administrator will specify that time period in the facility permit. (d) The owner or operator must establish and implement a groundwater monitoring program to demonstrate the effectiveness of the corrective action program. (e) The owner or operator must conduct a corrective action program to remove or treat in place any hazardous constituents under §264.93 that exceed concentration limits under §264.94 in groundwater between the compliance point under §264.95 and the downgradient property boundary, and beyond the facility boundary, where necessary to protect human health and the environment. (f) The owner or operator must continue corrective action measures during the compliance period to the extent necessary to ensure that the groundwater protection standard is not exceeded. (g) The owner or operator must report in writing annually to the Regional Administrator on the effectiveness of the corrective action program. (h) If the corrective action program no longer satisfies the requirements of this section, an application for a permit modification must be submitted.	

5. CONCRETE MONOLITH DESCRIPTION

The interim CPP-601/627/640 concrete monolith will be situated over the footprints of buildings CPP-601, -627, and -640, which share common walls and utilities. The CPP-601/640 portion of the monolith will be created and exposed as a result of the CPP-601/640 demolition and grouting activities. Building CPP-627 has been demolished, and the remaining concrete slab will become part of the CPP-601/627/640 landfill. This section describes the concrete monolith, run-on and run-off controls, and characterization of the waste to be left in place.

The concrete monolith for CPP-601/640 will result from the NTCRA demolition and grouting activities. As part of the NTCRA, buildings CPP-601 and -640 will be partially demolished. To minimize void space to the extent practicable, vessels and larger piping will be filled with grout, and grout will be placed in the buildings' void spaces to encapsulate vessels and piping to be left in place. Where appropriate, the grout will be placed in lifts and allowed to solidify. Grouting for each building will be completed prior to removal of portions of that building. The grouted portions remaining after the buildings are demolished will form the concrete monolith. Thus, the monolith will be exposed as the buildings are removed. Buildings CPP-601 and -640 will be partially demolished to 11 ft above grade in most areas, leaving process cells intact, and exposing the concrete monolith in place as shown in Figure 2. Building CPP-601 will be demolished to the Process Makeup deck level with the exception of the P, Q, and R cells, which will extend approximately 19 ft above grade. Building CPP-640 will be demolished to the Hot Makeup deck level with the exception of the mechanical handling cave (which will extend approximately 14 ft above grade) and the operating area surrounding the process cells (which will extend about 1 ft above grade).

Building CPP-627 was removed to grade, and a reinforced-concrete slab was placed on the foundation footprint to reduce infiltration. The concrete slab slopes down from approximately 20 in. on the east side adjacent to CPP-601 to approximately 10 in. on the west side (DOE-ID 2008; PWO-05-318).

The CPP-601/627/640 interim monolith will be approximately 11 ft above grade in most areas. The monolith dimensions will be approximately 102 × 245 ft over CPP-601 and approximately 90 × 154 ft over the CPP-627 and -640 footprints as shown in Figure 2.

5.1 Structural Stability

Building CPP-601 is made up of heavily reinforced, 1.5-ft exterior building walls and 5-ft-thick cell walls and is 80% underground. The interior vessels, large piping, and cells of CPP-601 will be filled with grout, which will solidify and will be contained by the building structure. Because the grout will be placed in lifts and allowed to harden, lateral displacement is not a concern. The majority of the facility is founded on approximately 10 ft of compacted engineered subgrade on basalt bedrock. The deep tanks area extends into the basalt about 7 ft. The weight of the building and grout applies a pressure to the subgrade that is less than the underlying bearing capacity. Long-term displacement or subsidence is not expected.

Building CPP-640 is made up of heavily reinforced, 1.5-ft exterior walls and 4.5-ft-thick cell walls and is mostly underground. The interior vessels, large piping, and cells of CPP-640 will be filled with grout, which will solidify and will be contained by the building structure. Because the grout will be placed in lifts and allowed to harden, lateral displacement is not a concern. The majority of the facility is founded on approximately 15 ft of compacted engineered subgrade on basalt bedrock. The weight of the building and grout applies a pressure to the subgrade that is less than the underlying bearing capacity. Long-term displacement or subsidence is not expected.

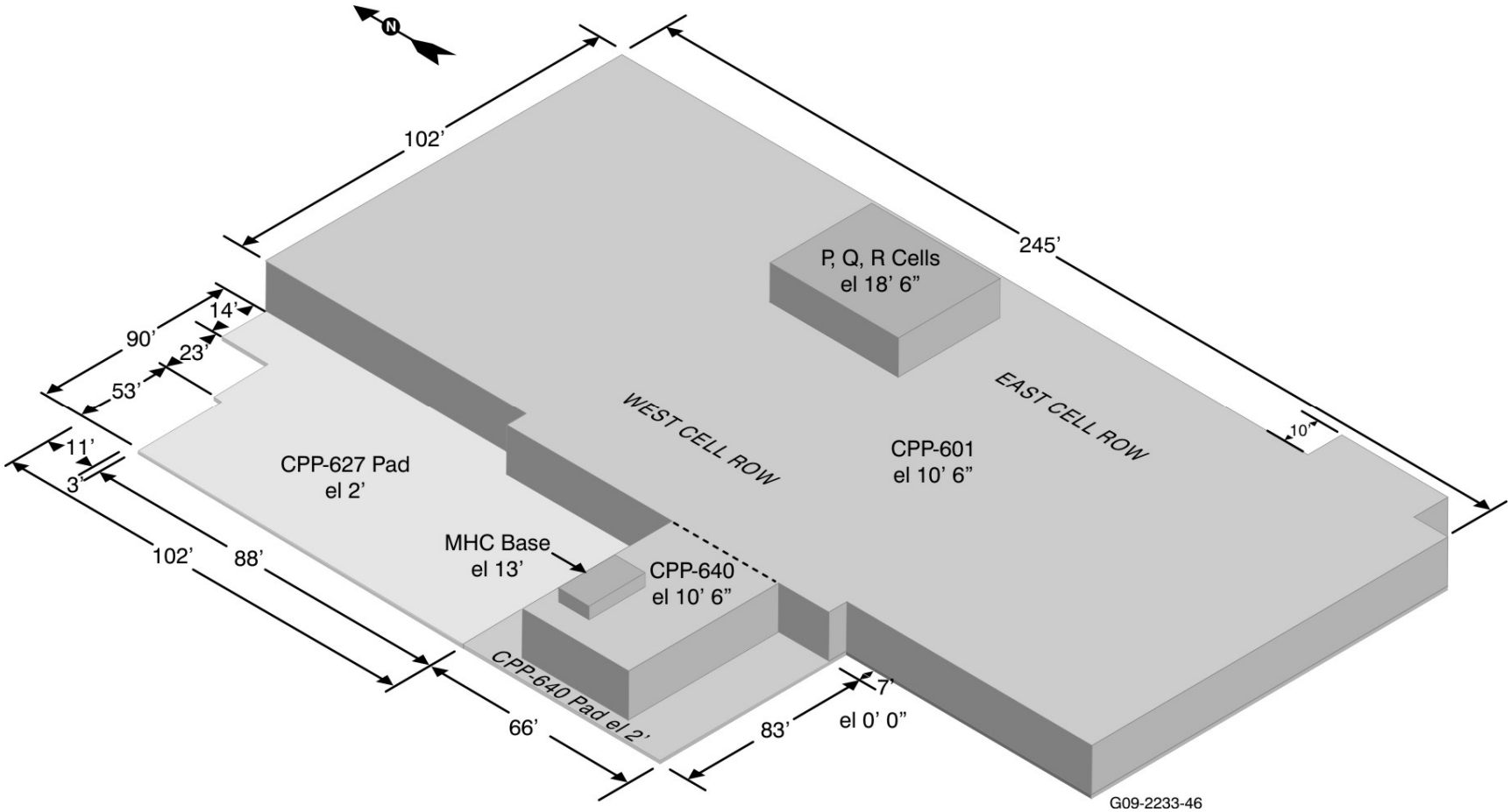

Figure 2. Expected monolith configuration.

Building CPP-627 was demolished to grade, and a reinforced-concrete slab was placed over the remaining foundation in 2005. The underlying foundation is made up of drilled piers supporting grade beams and the former building slab. Some nonstructural cracks have formed on the concrete slab over time, and the seal to adjacent walls of CPP-601 and -640 is sound.

The interim monolith will be inspected and maintained as described in Sections 7 and 8. If cracks or other penetrations are observed, repairs will be made as appropriate to the extent practicable.

5.2 Run-on and Run-off Controls

The interim concrete monolith will be in place to reduce precipitation infiltration into the soil below the building footprints, thereby minimizing potential releases of contamination to the groundwater. The concrete pad over CPP-627 is sloped from east to west at approximately 20 in. above grade next to CPP-601 to approximately 10 in. above grade on the west (PWO-05-318). This sloping was designed to prevent run-on and water infiltration at the former footprint of CPP-627. Before the CPP-601 and -640 buildings are partially demolished and the concrete monolith exposed, drains, pipes, hatches, and any other openings in the concrete will be capped and sealed. The monolith will be inspected as described in Section 7. If precipitation ponding or pooling is observed on the surface, the precipitation will be removed by appropriate means to the extent practicable. The soil surrounding the CPP-601/627/640 monolith will be graded so that the ground slopes away from the CPP-601/627/640 area. The precipitation run-off will be diverted to direct water away from the monolith.

5.3 Waste Characterization Information

The waste remaining in the CPP-601, -627, and -640 facilities has been characterized and quantified in EDF-9367, "Nonradiological Material Inventory for CPP-601, CPP-627, and CPP-640 Landfill Closure." Table 3 shows the expected waste inventory remaining in the CPP-601, -627, and -640 facilities of the 19 hazardous constituents listed in the "INL WCF Post-Closure Permit" (PER-112). Eight of the 19 constituents are expected to be present in quantities greater than 1 g. The 11 constituents that are not expected to be present, or that are expected to be present in quantities of less than 1 g, are 1,1,1-trichloroethane; benzene; carbon disulfide; carbon tetrachloride; chloroform; methyl ethyl ketone; methylene chloride; pyridine; tetrachloroethene; trichloroethene; and toluene. The 19 constituents listed in PER-112 are considered because the Waste Calcining Facility (WCF) and the CPP-601/627/640 facilities handled similar waste streams generated from fuel processing activities, and they are the constituents being monitored under the WCF post-closure permit. Additional constituents will be added if necessary based on the sampling of chemicals listed in IDAPA 58.01.05.008 (40 CFR 264, Appendix IX) to be completed as a part of the establishment of background levels.

Table 3. Waste inventory expected in CPP-601/627/640 landfill.

Constituent	Total Waste (kg)
Arsenic	3.00E-02
Barium	1.63E+01
Cadmium	5.24E+01
Chromium	1.08E+05
Lead	1.18E+05
Mercury	2.00E-02
Selenium	2.00E-02
Silver	5.60E-01

6. POST-CLOSURE MONITORING AND MAINTENANCE

Post-closure monitoring and maintenance will be conducted under this post-closure plan during the period between approval of this post-closure plan and the approval of the post-closure permit for CPP-601/627/640. Monitoring and maintenance of specific landfill components (e.g., monitoring wells) will begin upon installation of the component. A schedule for installation and subsequent post-closure monitoring and maintenance is included in Section 11. Consistent with the waste management approach described in the *Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008) and the *HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1* (DOE-ID 2009a) waste generated in support of the monitoring and maintenance for this facility will be managed as CERCLA waste in compliance with the substantive requirements of IDAPA. These wastes may be disposed of at the Idaho CERCLA Disposal Facility provided they meet the waste acceptance criteria for that facility. Waste that fails to meet the WAC will be sent to a RCRA-permitted treatment, storage, and disposal facility for appropriate treatment or disposal.

6.1 Groundwater Monitoring

Groundwater monitoring will be conducted in accordance with this post-closure plan from completion of installation of the identified monitoring wells until a post-closure permit is in place to address the CPP-601/627/640 landfill.

6.1.1 Groundwater Monitoring Programs

Groundwater monitoring programs will be implemented in accordance with this plan to meet the requirements of IDAPA 58.01.05.008 (40 CFR 264.97, 264.98, 264.99, and 264.100). The groundwater monitoring programs described below are substantively equivalent to those specified in the WCF post-closure permit (PER-112). The groundwater monitoring programs will consist of and be instituted as follows.

An initial period of quarterly sampling for 2 years will be completed to establish background levels for the four wells planned to be used for monitoring the CPP-601/627/640 monolith. Statistical analyses of the data collected during this period will be used to set background levels and detection monitoring criteria.

A detection monitoring program (DMP) will be put into effect upon completion of the monitoring well installation and remain in effect under this post-closure plan until the approval of the post-closure permit for CPP-601/627/640 or the detection monitoring criteria are exceeded as described in Table 4. At the time of the exceedance, a compliance monitoring program (CMP) and/or a corrective action monitoring program (CAMP) will be put into effect. However, the CMP will not be triggered until the background levels have been established even if detection monitoring limits (DMLs) are exceeded.

After the background levels have been established, a CMP will be put into effect when the detection monitoring criteria are demonstrated to have been exceeded as defined in Table 4. The CMP will remain in effect until the detection monitoring criteria have not been exceeded during six consecutive CMP sampling events, at which time the DMP will be re-activated; or the CMP monitoring criteria as defined in Table 4 are exceeded, at which time the CAMP will be put into effect.

A CAMP will be put into effect when the compliance monitoring criteria as defined in Table 4 are exceeded. The CAMP will remain in effect until the Table 4 compliance monitoring criteria are not exceeded during four consecutive CAMP events. At such time, the CMP will be reactivated.

Table 4. Groundwater monitoring criteria for detection, compliance, and corrective action monitoring

Program	Initiation	Monitoring Criteria
Detection Monitoring	Upon completion of monitoring well installation or when compliance monitoring shows DMP criteria have not been exceeded for six consecutive CMP sampling events.	Analytical results for all constituents below the DML as defined in Table 5. Exceedance of DMLs listed in Table 5 will not trigger compliance monitoring until after background values have been established.
Compliance Monitoring	When the detection monitoring criteria are exceeded, or when corrective action monitoring shows CMP criteria have not been exceeded for four consecutive CAMP sampling events.	Analytical results for all constituents below the groundwater protection standard (GPS) but exceed DML for any constituent as defined in Table 5.
Corrective Action Monitoring	When the compliance monitoring criteria are exceeded.	Exceedance of GPS for any constituent as defined in Table 5.

Additional detection monitoring, compliance monitoring, or corrective action wells and/or programs may be added to the detection monitoring, compliance monitoring, or corrective action programs as the need arises, based on future groundwater sampling results.

Detection monitoring limits and groundwater protection standard (GPS) values are provided in Table 5. These limits are typically established as estimated quantitation limits (EQLs) plus established background concentrations. Groundwater protection standards are typically established as the maximum contaminant levels promulgated under the Safe Drinking Water Act plus established background concentrations. Because background concentrations have not yet been established for CPP-601/627/640 landfill post-closure monitoring, initial DMLs and GPSs were taken from the WCF post-closure permit (PER-112). Samples will be collected quarterly for 2 years to establish background levels, which will be calculated using the statistical requirements set out in Subsection 6.1.4.5. Upon establishment of site-specific background values, the DMLs and GPSs included in Table 5 will be modified to account for site-specific background values. During the 2-year period in which background levels are being established, exceedance of a DML will not trigger compliance monitoring, because the exceedence may be a result of a higher background concentration.

Table 5. CPP-601/627/640 post-closure analyte list, quantitation limits, DMLs, and GPSs.[a]

Constituent	EQL (ug/L)	DML (ug/L)	GPS (ug/L)
Arsenic	5	5	20
Barium	20	1,821	4,000
Cadmium	1	1	10
Chromium	10	12	200
Lead	3	3	30
Mercury	0.2	0.7	4
Selenium	20	20	100
Silver	10	10	200
1,1,1-trichloroethane	1	1	400

Table 5. (continued).

Constituent	EQL (ug/L)	DML (ug/L)	GPS (ug/L)
Benzene	1	1	10
Carbon disulfide	1	2	2,000
Carbon tetrachloride	1	1	10
Chloroform	1	1	200
Methyl ethyl ketone	5	5	38,000
Methylene chloride	1	1	86
Pyridine	5	5	720
Tetrachloroethene	1	4.8	10
Trichloroethene	1	2	10
Toluene	1	146	2,000

a. Values taken from the post-closure permit for the INL WCF (PER-112). Upon completion of background sampling, DMLs and GPSs will be corrected to reflect site-specific background levels for the CPP-601/627/640 landfill. Exceedance of DMLs will not trigger compliance monitoring during the background level establishment period.

6.1.2 Groundwater Description

Groundwater beneath CPP-601/627/640 includes a variety of perched water zones and the Snake River Plan Aquifer. A detailed description of the groundwater is included in the WCF post-closure permit (PER-112).

6.1.3 Groundwater Monitoring Wells

A network of monitoring wells will be established to implement the groundwater monitoring programs. A combination of two existing wells and two new wells will be used to ensure compliance with IDAPA 58.01.05.008 (40 CFR 264, Subpart F).

6.1.3.1 Well Location. Well locations are shown on Figure 1. The upgradient background well will be MW-6. Well CPP-33-2 will be used as a point-of-compliance monitoring well for both water-elevation and constituent monitoring. Similarly, two new wells (shown as orange dots) will be installed as second and third point-of-compliance wells.

6.1.3.2 Well Construction. Well construction details, where known, are shown in Table 6.

6.1.3.3 Well Inspection and Maintenance. Monitoring wells identified in Table 6 will be inspected and maintained from the time well installation activities are complete until the post-closure permit for the facility is approved. The need for maintenance will not constitute grounds for missing a sampling event without prior approval from DEQ. Under no circumstances will a well remain out of commission for two consecutive sampling periods.

Examples of possible problems at monitoring wells are:

- Well identification
- Inoperable locks

Table 6. Groundwater monitoring network (elevations are in referenced to NGVD29 datum).

Name	Designation	Type	Monitoring Frequency	Brass Cap Elevation (ft asl)	Measuring Point Elevation (ft asl)	Depth to Screen Top and Bottom (ft bgs)	Elevation Screen Bottom (ft asl)	Well Depth from Measuring Point (ft)
MW-6	Upgradient Background	Water Elevation/ Monitoring	Semi-annually	4,915.73	4,917.31	117-137	4,778.73	139
TBD-01	Point of Compliance	Water Elevation/ Monitoring	Semi-annually	TBD	TBD	TBD	TBD	TBD
CPP-33-2	Point of Compliance	Water Elevation/ Monitoring	Semi-annually	4,913.22	4,915.11	85.8-105.8	4,807.49	107.90
TBD-02	Point of Compliance	Water Elevation/ Monitoring	Semi-annually	TBD	TBD	TBD	TBD	TBD

asl = above sea level
bgs = below ground surface
TBD = to be determined

- Cracked surface casing
- Damaged cement pads
- Compromised impingement protection
- Well head description.

The frequency and location of well maintenance activities are subject to changing well conditions. As a general rule, the overall condition of each well will be inspected visually at each visit to the well. Formal inspection of the wells will be completed and documented on a semi-annual basis.

6.1.4 Groundwater Sampling and Analysis

All monitoring wells listed in Table 6 will be sampled semi-annually throughout the period addressed by this plan. These wells will undergo quarterly sampling until DEQ has approved background concentrations. Specific sampling and analysis plan techniques and procedures are included in Attachment 3 (Section J5) of the WCF post-closure permit (PER-112). These procedures for collecting, preserving, shipping, tracking, controlling, and analyzing groundwater samples will be followed for all sampling conducted under this plan.

Evaluation of the laboratory quality assurance/quality control data from each sampling event will be completed within 35 days of receipt of final results from sample analyses. Analytical results will be submitted to DEQ in accordance with the schedule provided in Section 9.

Current SW-846 (EPA 2008) methods for metals, volatile organic compounds, and semi-volatile organic compounds will be used when analyzing groundwater samples collected during implementation of the DMP, CMP, and CAMP. The specific constituents to be analyzed are listed in Table 5. The analyses must achieve the reporting limits (EQLs) in Table 5. Equivalent or superior analytical methods may be substituted.

The INL will manage purge/development water and returned excess unaltered water samples in a manner protective of human health and the environment as CERCLA waste in compliance with the substantive requirements of IDAPA. This water may be disposed of at the Idaho CERCLA Disposal Facility Evaporation Pond, provided the water meets the waste acceptance criteria (WAC) for that facility. All water associated with the sampling events will be properly stored until the analytical data are received to determine compliance with the above WAC. If the water is found to contain a constituent(s) that exceeds the WAC for that facility, then that water will be sent to a RCRA-permitted treatment, storage, and disposal facility for appropriate treatment or disposal.

6.1.4.1 Groundwater Elevation and Well Depth. Water elevation measurements will be collected semi-annually to be used in calculating the semi-annual groundwater flow rate and flow direction for the entire groundwater monitoring network within a 24-hour period. Semiannual water elevation measurements and the groundwater flow rate and direction will be reported as noted in Section 9. All water elevations will be collected within a 24-hour period.

Prior to initiation of sampling, all groundwater elevations will be measured using an electronic water-level indicator, weighted measuring tape, or continuous recorder method from the reference marker. Measurement of all groundwater levels will be recorded relative to mean sea level and to an accuracy of ± 0.01 ft (0.003 m). The water-level data obtained from the wells in this monitoring program will be combined with water-level measurements obtained from other waste area groups or

U.S. Geological Survey data to determine groundwater flow gradients, determine the direction and rate of annual groundwater flow, and generate potentiometric maps.

6.1.4.2 Detection Monitoring Program. Table 5 indicates the constituents of concern associated with this post-closure plan. Samples from each detection monitoring and background well listed in Table 6 will be collected and analyzed for these constituents. The samples will be collected and analyzed in accordance with Subsection 6.1.4.

The criteria for evaluating data from each detection monitoring sampling event will be to compare the sample analytical results with the detection monitoring criteria in Table 4 of this plan, as follows:

- Upon detection of any constituent(s) that exceeds the detection monitoring criteria specified in Table 4, DEQ will be notified of this finding, in writing, within 7 calendar days after completion of data validation; and (at the discretion of the INL), within 15 calendar days, the INL will collect two verification samples from all affected well(s), purging the well(s) between samples, and reanalyze both samples for all constituents listed in Table 5.

- If analytical results from either verification sample confirm the detection of constituents in concentrations that exceed the detection monitoring criteria given in Table 4, the affected well(s) will be sampled within 15 calendar days and the collected samples must be analyzed for the constituents identified in IDAPA 58.01.05.008 (40 CFR 264, Appendix IX). DEQ will be notified in writing within 7 days of making this finding. Within 60 calendar days of this sampling event, the CMP will be implemented.

However, these actions will not be triggered until the background levels have been established even if detection monitoring criteria are exceeded.

The INL may demonstrate, in accordance with IDAPA 58.01.05.008 [40 CFR 264.98(g)(6)], that a source other than the regulated unit caused the contamination, or that the increased contamination resulted from an error in sampling, analysis, or evaluation. If the INL successfully demonstrates to the DEQ that a source other than a regulated unit caused the exceedance or that the exceedance resulted from an error in sampling, analysis, or evaluation, DEQ will notify the INL to remain in the DMP. Otherwise, the Director of the DEQ will instruct the owner/operator to implement the compliance monitoring program within the timeframe established by the Director. This period will not be less than 45 calendar days.

If analytical results from both verification samples described fail to confirm the detection of parameter(s) from Table 5 in concentrations that exceed the detection monitoring criteria, the detection monitoring program will be re-established and DEQ notified that the DMP has been resumed.

6.1.4.3 Compliance Monitoring Program. Compliance monitoring wells will be determined through exceedance of the detection monitoring criteria in Table 4.

During the CMP, the samples will be collected in accordance with Subsection 6.1.4. The analyte list will include the constituents listed in Table 5 of this plan plus all additional constituents identified from Appendix IX sampling performed during DMP sampling.

On an annual basis, all monitoring wells in the CMP will be analyzed for all constituents listed in IDAPA 58.01.05.008 (40 CFR 264, Appendix IX). As a result of this sampling, any newly identified compounds will be added to the existing list of analytes in Table 5, in accordance with IDAPA 58.01.05.008 [40 CFR 264.99(g)].

The criteria for evaluating data from each compliance monitoring sampling event will be to compare the sample analytical results with the compliance monitoring criteria in Table 4 of this plan, as follows:

- If the analytical results for any constituent(s) listed in Table 5 of this permit are less than or equal to the compliance monitoring criteria in Table 4, sampling under the CMP will continue until the criteria for transition to DMP are met; or if the analytical results from any well listed in Table 6 of this permit exceed the compliance monitoring criteria in Table 4, the CAMP will be implemented.

- If the analytical results of samples taken from any well listed in Table 6 exceed the compliance monitoring criteria in Table 4, the CAMP will be implemented for the monitoring well network and DEQ notified of this finding, in writing, within 7 calendar days after completion of data validation. Within 15 days of sample validation, two verification samples will be collected from all affected well(s), purging the well(s) between samples, and both samples for all parameters listed in Table 5 will be reanalyzed.

- If analytical results from either of the verification samples confirm the detection of parameters in concentrations that exceed the GPS as defined in Table 5, the INL will notify DEQ in writing within 7 days of making this finding. Within 60 calendar days of sampling, the INL will establish a CAMP and submit the CAMP in a revision to this post-closure plan.

6.1.4.4 Data Reporting. While in DMP(s) or CMP(s) after background levels have been established, semi-annual reports will be submitted to the DEQ as described in Section 9. These reports will include, at a minimum:

- A narrative summary of groundwater monitoring data that have been collected to date and a detailed listing of the monitoring and analytical data obtained but not included in the previous report, including laboratory quality assurance/quality control information and all newly identified compounds from any required Appendix IX testing.

- Analytical results from sampling and analysis and a narrative summary of sampling data, including laboratory quality assurance/quality control information.

- A table summary of the groundwater elevation and well depth data collected, the results of groundwater flow rate and direction calculations, and parameters used to calculate groundwater flow velocities and direction for the perched aquifer shall be submitted annually. The table summary will include a summary/statement that either the monitoring well network as described in this plan is still valid for the purpose of satisfying IDAPA 58.01.05.008 [40 CFR 264.97(a)] requirements or an in-depth evaluation of the monitoring well network is warranted. If an in-depth evaluation is needed, a proposal, including a schedule, will be submitted to DEQ within 10 calendar days of the submittal of this summary.

- Field sampling data, including:

  - Sample collection procedures

  - Amount of purge water collected at each well

  - Sample preservation methods

  - Observations of temperature, turbidity, pH, and specific conductance

- Chain-of-custody information
- Any anomalies that may have occurred during sampling and analysis
- Field parameters.

- A summary of maintenance work done on groundwater monitoring equipment.
- A summary of deficiencies identified during the inspections of the monitoring wells' surveyed benchmarks.

6.1.4.5 Data Analysis. The statistical procedures outlined in this section will be used for determining background concentrations. Results of these analyses will be submitted as noted in Section 9.

For detected constituents, the Mann-Kendall Test will be used for trend analysis. If no trend is observed, the Shapiro-Wilk Test will be used to test for normality and log normality.

Limits will be set using the following methods:

- The parametric 95% upper tolerance limit using normal data arithmetic mean and standard deviation will be used if no trend is present and data are normal
- The parametric tolerance limit using log-normal data arithmetic mean and standard deviation will be used if no trend is present and data are log-normal
- The arithmetic mean ($\bar{x}$) and standard deviation(s) for log-normal data will be calculated using the following equations:

$$x_y = \frac{1}{N}\sum_{i=1}^{N} \ln(x_i);\ s_y^2 = \frac{1}{N}\sum_{i=1}^{N}[\ln(x_i) - x_y]^2 \quad (1)$$

$$\bar{x} = \exp(x_y + s_y^2/2);\ s = \sqrt{\exp(2x_y + s_y^2)[\exp(s_y^2) - 1]} \quad (2)$$

- The non-parametric tolerance limit (highest measured value) at certain confidence limit (based on number of data) will be used there is no trend and the data are non-parametric
- If the data show a trend, the limits must be re-evaluated using the same method provided a statistical steady state (no trend) is established
- If, after additional data are analyzed, the background shows no trend and the variability remains similar, then limits will be re-evaluated.

When sampling includes non-detects, the following methods will be used (EPA 1992; Gibbons 1994):

- When less than 15% of samples result in non-detects, –½ the EQL will be used in place of the non-detect.

- When non-detects equate to 15 to 60% of samples collected, the non-parametric parametric Wilcoxon Rank-Sum procedure adjusted for ties (Helsel and Hirsch 1995) will be used for comparison of data collected from upgradient and downgradient monitoring wells. For this procedure to be used, at least three samples worth of data must be collected from downgradient wells.

- When non-detects are greater than 60%, the Poisson tolerance limits will be used.

- The EQLs will be used as the limit whenever all sampling events are nondetects.

The following references will be used for conducting statistical analysis:

- Gibbons, R. D., 1987, "Statistical Models for the Analysis of Volatile Organic Compounds in Waste Disposal Sites," *Groundwater*, Vol. 25, pp. 572–580.

- Gibbons, R. D., 1994, *Statistical Methods for Groundwater Monitoring*, New York: John Wiley & Sons, 286 p.

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- EPA, 1992, "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Addendum to Interim Final Guidance," U.S. Environmental Protection Agency, EPA/530-R-93-003.

- Zacks, S., 1970, "Uniformly most accurate upper tolerance limits for monotone likelihood ratio families of discrete distributions," *Journal of the American Statistical Association*, Vol. 65, pp. 307–316.

7. INSPECTION

The monolith will be inspected in accordance with the provisions of IDAPA 58.01.05.008 (40 CFR 264.15). The integrity of the monolith will be inspected on a semi-annual basis on exposed portions of the monolith. The inspections will be documented on the CPP-601/627/640 post-closure monitoring form. The form will be used to document the inspection and the findings of the following:

- Concrete surface (for surface erosion, cracks, spalling, subsidence, joint seal condition)
- Surface drainage (for run-off drainage maintained away from the monolith).

Various surface coatings may be applied for the purposes of testing for weather degradation, adhesion, durability, inspectability, reparability, and other factors. Monolith areas covered by these surface coatings will be inspected by examining the surface coating in a manner similar to the inspection of the bare concrete surface; for example, if cracks or crevices are not visible and the deterioration is not visible, then the area will be determined to meet inspection requirements. The inspection frequency may be modified based on information obtained from the monitoring.

Any deterioration or malfunction discovered by an inspection will be remedied as required by IDAPA 58.01.05.008 [40 CFR 264.15(c)].

Inspections will be recorded on the inspection logs and inspection log sheets, as specified in IDAPA 58.01.05.008 [40 CFR 264.15(d)]. At a minimum, the following information will be recorded:

- The date and time of the inspection
- The name of the inspector
- A notation of the observations made, including any/all deficiencies identified
- The date, nature, and status of any needed repairs or other remedial actions (e.g., lock replaced September 10, 200X, work order submitted – parts ordered).

Documentation of inspection activities will be maintained at the facility as required by IDAPA 58.01.05.008 [40 CFR 264.73(b)(5)] for at least 3 years from the inspection date.

8. MAINTENANCE

The facility will be maintained, as required by IDAPA 58.01.05.008 (40 CFR 264.117) during the post-closure period. The following maintenance activities will be completed:

- Maintain the integrity and effectiveness of the interim monolith, including making repairs to the monolith as necessary to correct the effects of subsidence, erosion, or other events and including repairs to the groundwater monitoring system and equipment

- Maintain the security of the facility in accordance with IDAPA 58.01.05.008 (40 CFR 265.14)

- Maintain and monitor the groundwater monitoring system, and comply with all other applicable requirements of IDAPA 58.01.05.008 (40 CFR 264, Subpart F)

- Prevent run-on and run-off from eroding or otherwise damaging the monolith.

Documentation of maintenance activities will be maintained at the facility, as required by IDAPA 58.01.05.008 [40 CFR 264.73(b)(5)], for at least 3 years from the inspection date.

9. DOCUMENT MANAGEMENT AND REPORTING

Groundwater monitoring and landfill maintenance and inspection activities to be performed under this post-closure plan will be properly recorded and maintained. Records may be maintained at INTEC or electronically in a readily retrievable manner. Records may be maintained using a solely electronic format as long as they are readily retrievable to obtain a printed copy.

9.1 Monitoring Records

A groundwater monitoring checklist will be used to record the routine groundwater monitoring events. Documentation of the groundwater monitoring must be maintained in the operating record until post-closure of the HWMA/RCRA cover is completed and certified, as required by 40 CFR 264.73(b)(6).

9.2 Maintenance and Inspection Records

Maintenance and inspections will be recorded on inspection logs and inspection log sheets. At a minimum, the following information will be recorded:

- The date and time of the inspection
- The name of the inspector
- A notation of the observations made, including all deficiencies identified
- The date, nature, and status (e.g., maintenance performed, work order submitted, parts ordered) of any needed repairs or other remedial actions.

Documentation of the inspections and maintenance activities at the landfill will be retained, as required by IDAPA 58.01.05.008 [40 CFR 264.73(b)(5)] for at least 3 years from the inspection date.

9.3 Reporting to DEQ

Groundwater monitoring reports will be submitted to DEQ on a quarterly basis for the first 2 years and semi-annually thereafter until Phase 2 certification and/or the approval of the Class 3 permit modification for the post-closure permit. Inspection reports will be submitted to DEQ on a semi-annual basis until Phase 2 certification and/or the approval of the Class 3 permit modification for the post-closure permit.

10. AMENDMENTS TO POST-CLOSURE PLAN

The conditions described in IDAPA 58.01.05.008 (40 CFR 264.118), "Post-Closure Plan; Amendment of Plan," will be followed to implement changes to the approved post-closure plan. If unexpected events during the post-closure period require modification of the approved post-closure activities, the post-closure plan will be amended within 60 days of the unexpected event or the DEQ will be otherwise notified. If any amendment becomes necessary, a written request detailing the proposed changes, the rationale for those changes, and a copy of the amended post-closure plan will be submitted to DEQ for approval. Minor changes to the approved post-closure plan, which are equivalent to, or do not compromise, the post-closure requirements and performance standards identified in the approved post-closure plan may be made without prior notification to DEQ.

11. IMPLEMENTATION SCHEDULE

Table 7 identifies the post-closure schedule that will be initiated following DEQ approval of this post-closure plan and certification of Phase 1. This schedule reflects the time required for conducting post-closure activities. For the first 2 years, groundwater monitoring will be conducted quarterly (every 90 days). After 2 years, background levels will be established, and groundwater monitoring will be conducted on a semi-annual basis (every 180 days). Inspection of the landfill will be conducted semi-annually (every 180 days).

Table 7. Post-closure schedule.

Planned Work Tasks	Day of Completion[a]
DEQ approval of post-closure plan	Day 0
Install monitoring wells	End of 2009
Initiate groundwater monitoring	Immediately after installation of wells; every 90 days for the first 2 years; every 180 days thereafter until post-closure permit is approved for CPP-601/627/640
Landfill inspection	Each October and April, starting after this post-closure plan is approved; landfill inspection will be performed and reported every 180 days.
Submittal of Phase 2 closure plan	2010

a. Day of completion for installation of monitoring wells and submittal of closure plan are estimates and may change if new conditions arise or unexpected events occur.

12. CONTACT INFORMATION

The name, address, and telephone number of the person to contact during the post-closure care period, in accordance with IDAPA 58.01.05.008 [40 CFR 264.118(b)(3)], is:

Dave Eaton
INTEC TR-61 104
Phone number: (208) 533-0621

13. REFERENCES

40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, Office of the Federal Register, as amended.

42 USC 6901 et seq., 1976, "Resource Conservation and Recovery Act of 1976," United States Code, as amended.

42 USC 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation, and Liability Act of 1980," as amended. (NOTE: The 1986 amendment is cited as "Superfund Amendments and Reauthorization Act of 1986" [SARA].)

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DOE-ID, 2009a, *HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1*, DOE/ID-11376, Rev. 2, U.S. Department of Energy, Idaho Operations Office, January 2009.

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IDAPA 58.01.05.008, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities," Idaho Administrative Procedures Act, Idaho Department of Environmental Quality Rules, as amended.

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State of Idaho, 1983, "Hazardous Waste Management," Idaho Statute, Title 39, "Health and Safety," Chapter 44, "Hazardous Waste Management" (also known as the Hazardous Waste Management Act of 1983).

State of Idaho, 2007, "Partial Permit for HWMA Storage and Treatment for the Liquid Waste Management System at the Idaho Nuclear Technology and Engineering Center on the Idaho National Laboratory," EPA ID No. ID4890008952, Effective Date: October 18, 2004, Revision Date: December 28, 2007.

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DOE/ID-11376
Revision 2

HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1

January 2009

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Revision 2

HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1

January 2009

Prepared for the
U.S. Department of Energy
DOE Idaho Operations Office

ABSTRACT

This Hazardous Waste Management Act/Resource Conservation and Recovery Act landfill closure plan for the CPP-601 Deep Tanks System was developed to meet the tank system closure requirements of IDAPA 58.01.05.008 and 40 CFR 264. Per IDAPA 58.01.05.008 (40 CFR 264.197), for a tank system that does not meet the closure standards in accordance with 40 CFR 264.197(a) through (c), the U.S. Department of Energy must provide to the State of Idaho Department of Environmental Quality a plan for closing the unit as a landfill. Post-closure care will be required as stipulated in 40 CFR 264.310 and 264.117 through 264.120. While the objective of a Hazardous Waste Management Act/ Resource Conservation and Recovery Act closure is to meet clean-closure criteria, meeting the performance standards for clean closure is not expected to be practical due to the presence of abandoned isolated piping runs and bulk lead solids that have been identified in areas where, due to unsafe radiological and industrial hazards for workers, lead is impractical to remove. A landfill closure plan and post-closure plan will be implemented in a three-step approach for CPP-601 and the adjacent CPP-640 and CPP-627 facilities and will be integrated with Comprehensive Environmental Response, Compensation, and Liability Act actions. The first step is the landfill closure for the CPP-601 Deep Tanks System Phase 1, which involves identifying and isolating the CPP-601/627/640 landfill boundaries, and a post-closure plan submittal; step two is the Comprehensive Environmental Response, Compensation, and Liability Act non-time-critical removal action, which includes grouting tank system components, grouting the CPP-601/627/640 facilities, and interim precipitation controls; step three will be the landfill closure for CPP-601/627/640, the CPP-601 Deep Tanks System Closure Plan Phase 2 to include all remaining landfill closure requirements. This document addresses Phase 1 of the landfill closure. The CPP-601 Deep Tanks System (VES-WG-100, VES-WG-101, VES-WH-100, and VES-WH-101) is permitted for tank storage and treatment of hazardous waste in the partial permit for the Idaho Nuclear Technology and Engineering Center Liquid Waste Management System, located at the Idaho Nuclear Technology and Engineering Center, Idaho National Laboratory Site. Portions of this tank system that are immediately adjacent to, but outside the actual CPP-601/627/640 footprint, are addressed in this closure and will be “clean closed” in accordance with the applicable closure performance standards via decontamination or removal of tank system components. As part of Phase 1, the tank system components within the CPP-601/627/640 landfill footprint will be decontaminated to the extent practicable and isolated from all waste discharge systems to meet the landfill requirements in 40 CFR 264.310(a)(1) and (2) until the Comprehensive Environmental Response, Compensation, and Liability Act activities and decontamination and decommissioning of the CPP-601 facility are complete. At that time, Phase 2 of the landfill closure will be implemented in accordance with the final end state selected for these facilities under the Comprehensive Environmental Response, Compensation, and Liability Act.

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ACRONYMS

AL	action level
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
D&D	decontamination and decommissioning
DEQ	State of Idaho Department of Environmental Quality
DOE	U.S. Department of Energy
EDF	engineering design file
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
HWMA	Hazardous Waste Management Act
ILWMS	INTEC Liquid Waste Management System
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
NTCRA	non-time-critical removal action
OU	operable unit
PEWE	Process Equipment Waste Evaporator
RCRA	Resource Conservation and Recovery Act
ROD	record of decision
TFF	Tank Farm Facility
VCO	Voluntary Consent Order

HWMA/RCRA Landfill Closure Plan for the CPP-601 Deep Tanks System Phase 1

1. INTRODUCTION

This Hazardous Waste Management Act (HWMA) (State of Idaho 1983)/Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq. 1976) phased landfill closure plan has been prepared to address closure of the CPP-601 Deep Tanks System located at the Idaho Nuclear Technology and Engineering Center (INTEC), Idaho National Laboratory (INL) Site. The CPP-601 Deep Tanks System includes Tanks VES-WG-100, VES-WG-101, VES-WH-100, and VES-WH-101, and associated ancillary piping and equipment, which is included in the *Partial Permit for HWMA Storage and Treatment for the Liquid Waste Management System at the Idaho Nuclear Technology and Engineering Center on the Idaho National Laboratory* (State of Idaho 2007) for tank storage and treatment of hazardous wastes.

While the objective of a HWMA/RCRA closure is to meet clean-closure criteria, meeting the performance standards for clean closure is not expected to be practical for CPP-601 tank system due to the presence of abandoned isolated piping runs that are no longer connected to the currently active system. In addition, Subsection 2.5.3 of the *Engineering Evaluation/Cost Analysis for Decommissioning of the CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008a) describes bulk lead solids identified in areas where it is expected that it will be impractical to remove due to high levels of radioactive contamination and difficult working conditions. In addition, the removal of this shielding lead would cause radiation levels and subsequent worker exposures to rise significantly. Therefore, this bulk lead has been determined to be impractical to remove and is to be left in place within the building. As such, a landfill closure plan and post-closure plan for the facilities are required. The landfill closure will be implemented in coordination with a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601 et seq. 1980) non-time-critical removal action (NTCRA) in a three-step approach (described below). The first step is the landfill closure for the CPP-601 Deep Tanks System Phase 1, the second step will be the CERCLA NTCRA decontamination and decommissioning (D&D) of the buildings, and the third step will be the final landfill closure for the CPP-601 Deep Tanks System Phase 2.

1. **Step 1 (HWMA/RCRA Closure Phase 1)—**During this phase of the landfill closure, an attempt will be made to clean close portions of the discharge lines from CPP-602 and CPP-684 to CPP-601, and from CPP-601 to a valve box outside the Process Equipment Waste Evaporator in accordance with the tank system closure requirements of IDAPA 58.01.05.008 and 40 CFR 264, Subparts G and J. These lines will be closed via decontamination of tank system components to the site-specific action levels (ALs) specified in this closure plan or removal. The remaining portions of the tank system within the landfill closure boundaries (i.e., the outer walls of CPP-601/627/640) will be flushed and isolated to minimize the potential for release of RCRA contaminants and to meet the requirements in 40 CFR 264.111(a) and (b) by minimizing the liquid waste and waste residues in the remaining tank system and isolating the facility from all waste discharge systems. Upon completion of the activities identified in this plan, closure certification and a post-closure plan will be submitted to DEQ. The Phase 1 landfill closure will be considered complete when the certification is accepted by the State of Idaho Department of Environmental Quality (DEQ).

2. **Step 2 (Integration with CERCLA NTCRA)—**Following the completion of Phase 1 of the landfill closure plan, the CPP-601 facility will continue to be decontaminated and decommissioned in accordance with the NTCRA specified in the *Action Memorandum for General Decommissioning Activities under the Idaho Cleanup Project* (DOE-ID 2006) and, when complete, the *Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities* (DOE-ID 2008b). Decommissioning activities will include waste stabilization through the grouting of the tanks and larger system piping and the general CPP-601/640 facilities, and will provide precipitation infiltration control until the subsequent HWMA/RCRA final landfill closure plan has been completed. Decommissioning activities to be completed under the action memorandum that include CPP-601 tank system landfill closure components will be documented and addressed in the Phase 2 CPP-601 landfill closure and post-closure plan.

3. **Step 3 (RCRA Closure Phase 2)—**Upon completion of the NTCRA, the appropriate HWMA/RCRA permit will be modified to include Phase 2 of the landfill closure, which will include the installation of a RCRA cap over the CPP-601/627/640 monolith (IDAPA 58.01.05.008 [40 CFR 264.310]). Upon certification of the Phase 2 landfill closure plan, the permit will be modified to provide for the post-closure groundwater monitoring (IDAPA 58.01.05.008 [40 CFR 264.118]).

As the tank system being closed is included in the partial permit for the INTEC Liquid Waste Management System (ILWMS) (State of Idaho 2007), upon approval by the DEQ, this landfill closure plan (Phase 1) will be incorporated as an attachment to the permit via the permit modification process.

2. FACILITY DESCRIPTION

2.1 Site Description

The INL Site encompasses approximately 890 mi^2 on the Eastern Snake River Plain in southeastern Idaho, west of Idaho Falls. Within the laboratory complex are eight major applied engineering, interim storage, and research and development facilities. Established in 1949 as the National Reactor Testing Station, the INL continues to allow the U.S. Government to safely build, test, and operate various types of nuclear reactor facilities.

The INTEC facility is situated on the south-central portion of the INL Site (Figure 1) and occupies an enclosed and secured area of approximately 250 acres. Current work at the INTEC includes receiving and storing spent nuclear fuel, environmental restoration, radiological decontamination and decommissioning (D&D) activities, mixed waste treatment, and technology development (DOE-ID 1995).

Figure 1. Map of the INL Site.

2.2 CPP-601 Building Description and Operational History

The CPP-601 facility is rectangular (244 by 102 ft) and consists of five levels with the primary portion located below ground (see Figure 2). The top level is above grade and contains an open area that was utilized for transfer of the fuel elements to the process equipment and for chemical storage, makeup, and transfer. It is constructed of transite panels. The lower levels, constructed of steel-reinforced concrete, contain 25 process cells, corridors, and auxiliary cells that house various equipment and controls. Most of the floor, walls of each cell, and equipment are lined or comprised of stainless steel. Most of the processing equipment in the building, which was designed for remote operations, is enclosed in the heavily shielded cells that often utilized lead as a shielding material. A significant amount of lead shielding is encased in the concrete structures (floors and walls) of CPP-601.

The CPP-601 Fuel Reprocessing Facility at INTEC was used for reprocessing spent nuclear fuel for the purpose of recovering enriched uranium for reuse. The CPP-601 facility included separation, chemical makeup and transfer, and liquid waste receiving processes in the CPP-601 deep tanks waste collection system. The uranium processing mission for CPP-601 started in mid-1950 and was terminated in 1992. After that time, no more uranium was introduced into the processing system.

After the fuel processing ceased, extensive cleanup of the process equipment and cells was conducted. At the end of the last process campaigns (late 1980s and early 1990s), process equipment was flushed with dilute nitric acid and water to recover uranium for purposes of nuclear material accountability. Starting in 1993, process vessels and transfer lines were further flushed, once with nitric acid and three times with water, to remove possible HWMA/RCRA-regulated hazardous material. Starting in 1998, the first-cycle cells (E-, F-, G-, and H-cells, plus U-cell) were subjected to extensive chemical decontamination to lower radiation fields for hands-on maintenance.

Stainless steel was used to line most cell walls (to varying heights) and cell floors. The cell floors were flushed with water and were inspected with black light (ultraviolet illumination provides a very sensitive means of detecting small quantities of uranium by fluorescence) for any residual uranium. Process cell floors were sloped to drain to geometrically safe sumps located at the low point in each cell. The drains in these process cells led to the deep tanks. The drain piping from the process cells to the deep tanks were determined to have contained HWMA/RCRA-hazardous materials and, therefore, are subject to closure under this plan. The equipment and piping in the individual process cells have been determined to be process/product-related equipment and piping that was not a part of the tank waste system, and therefore, are not subject to closure under this plan.

Currently, decommissioning actions at CPP-601 preparatory to the NTCRA are being performed in accordance with *Action Memorandum for General Decommissioning Activities under the Idaho Cleanup Project* (DOE-ID 2006). These decommissioning preparatory activities include isolating utilities; removing chemicals, piping, and equipment; and routine waste management practices such as removing lead, polychlorinated biphenyls, and asbestos.

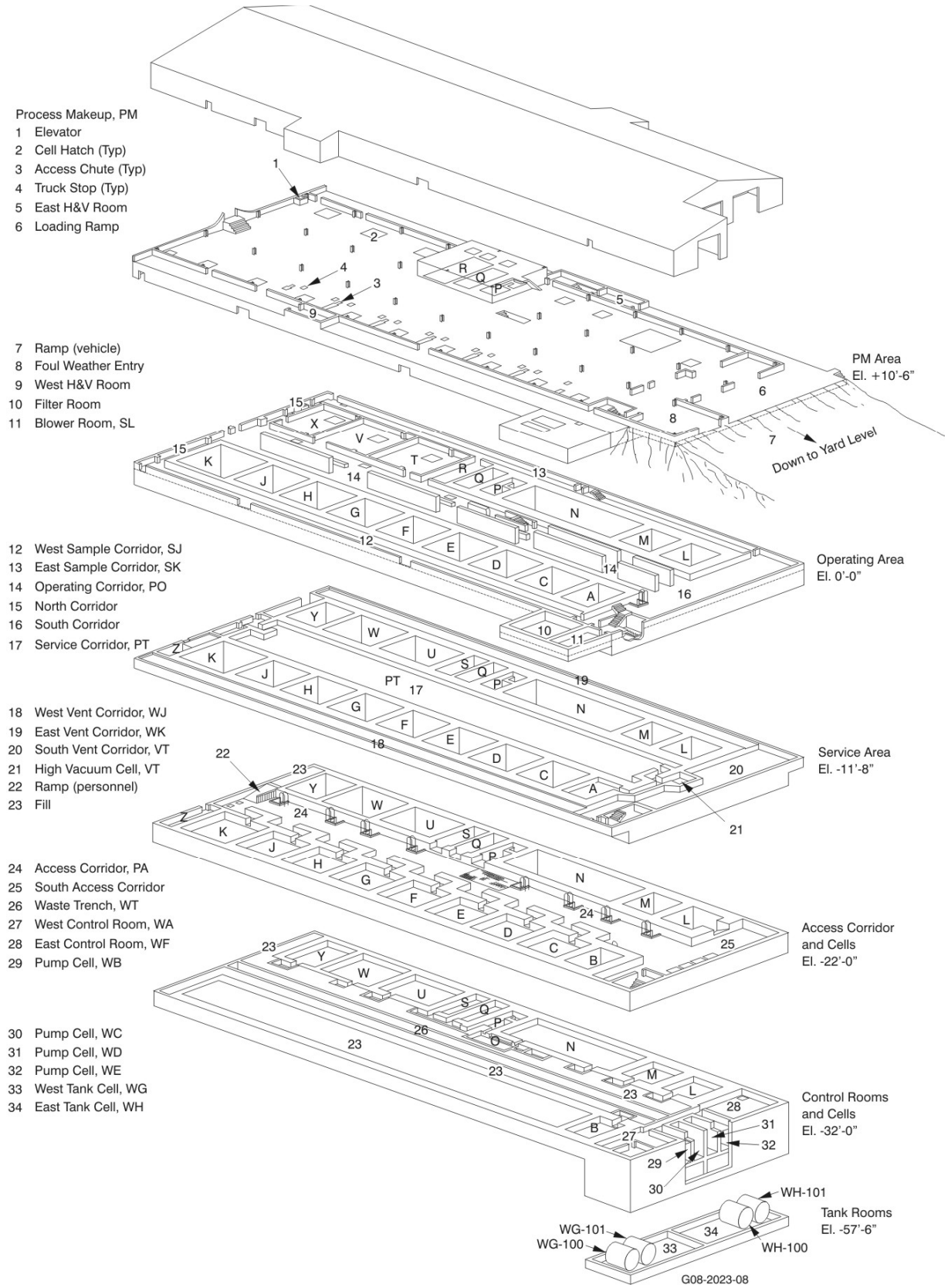

Figure 2. Isometric view of the Fuel Reprocessing Facility (CPP-601).

2.3 CPP-601 Deep Tanks System Description

The CPP-601 Deep Tanks System consists of four 4,500-gal capacity stainless steel tanks (VES-WG-100, VES-WG-101, VES-WH-100, and VES-WH-101), located in two concrete vaults at the lowest level of the building (see Figure 2), ancillary equipment, and piping (see Schematics P-CLOS-CPP-601-1 through -7 and Tables A-1 through -7 in Appendix A). The tanks collected liquid waste generated during fuel reprocessing from the CPP-601 separations processes. The drain piping from the process cells to the deep tanks was determined to have contained HWMA/RCRA-hazardous materials, and therefore, is subject to closure under this plan.

Over the 40 years of fuel reprocessing in CPP-601, modifications were made to the CPP-601 deep tanks waste collection system. The primary modification (1990–1991) was to replace portions of the original piping system, much of which was partially buried under CPP-601, with new piping that met the HWMA/RCRA requirements for a hazardous waste collection system (40 CFR 265.193). In most cases, the original (or pre-HWMA/RCRA) piping was isolated, taken out of service, and abandoned in place. Much of the abandoned CPP-601 deep tanks piping that is buried beneath the CPP-601 concrete structure is inaccessible without demolishing parts of the building structure.

Other sources that sent waste to these tanks included chemistry laboratories in CPP-602, CPP-627, and CPP-684 (see Figure 3). Process systems in CPP-627, CPP-640, and CPP-666 could also send waste to the deep tanks. While waste could be transferred from CPP-640 to CPP-601, no RCRA-regulated wastes were ever transferred through this connection. The line connecting CPP-666 to CPP-601 is being closed under the Voluntary Consent Order (VCO) Program and currently awaits certification. The laboratories and process systems in CPP-602, CPP-640, CPP-666, and CPP-684 have been or will be closed under separate closure actions with the exception of those segments of CPP-602 and CPP-684 discharge lines that directly connect with the CPP-601 system.

The CPP-627 Remote Analytical Facility was removed to grade as part of a NTCRA in 2005 in accordance with the *Action Memorandum for the Decontamination and Decommissioning of Building CPP-627, the Remote Analytical Facility* (DOE-ID 2004). This included removal and disposal of the active RCRA hazardous waste piping. The concrete slab at grade, covering inactive/abandoned lines, was capped with an engineered barrier to reduce infiltration. The inactive/abandoned lines that previously managed RCRA waste are included in the CPP-601/627/640 landfill closure.

The CPP-640 Headend Storage Tanks System has been HWMA/RCRA closed as of June 12, 2008 (Monson 2008). The VCO actions to close the transfer line from the Fluorinel Dissolution Process and Fuel Storage Facility (CPP-666) to CPP-601 and flush and close the raffinate lines from CPP-601 to the Tank Farm Facility (TFF) were completed under the *HWMA/RCRA Closure Plan for the CPP-601 Waste Transfer Lines to the Tank Farm Facility* (DOE-ID 2008c). Closure activities associated with these CPP-601 waste transfer lines will be completed after DEQ acceptance of a certified professional engineer closure certification for the system.

The INTEC analytical laboratory (CPP-602) and remote analytical laboratory (CPP-684) provide a full range of routine analytical capability including inorganic, organic, and radioanalytical analyses in support of process and waste characterization. The CPP-602 and CPP-684 laboratory waste piping from the laboratory hoods, sinks, and drains discharged to the CPP-601 deep tanks. These components were isolated and will be identified in the Volume 14 HWMA/RCRA permit (State of Idaho 2007) via a permit modification for closure at the time of the D&D of each facility.

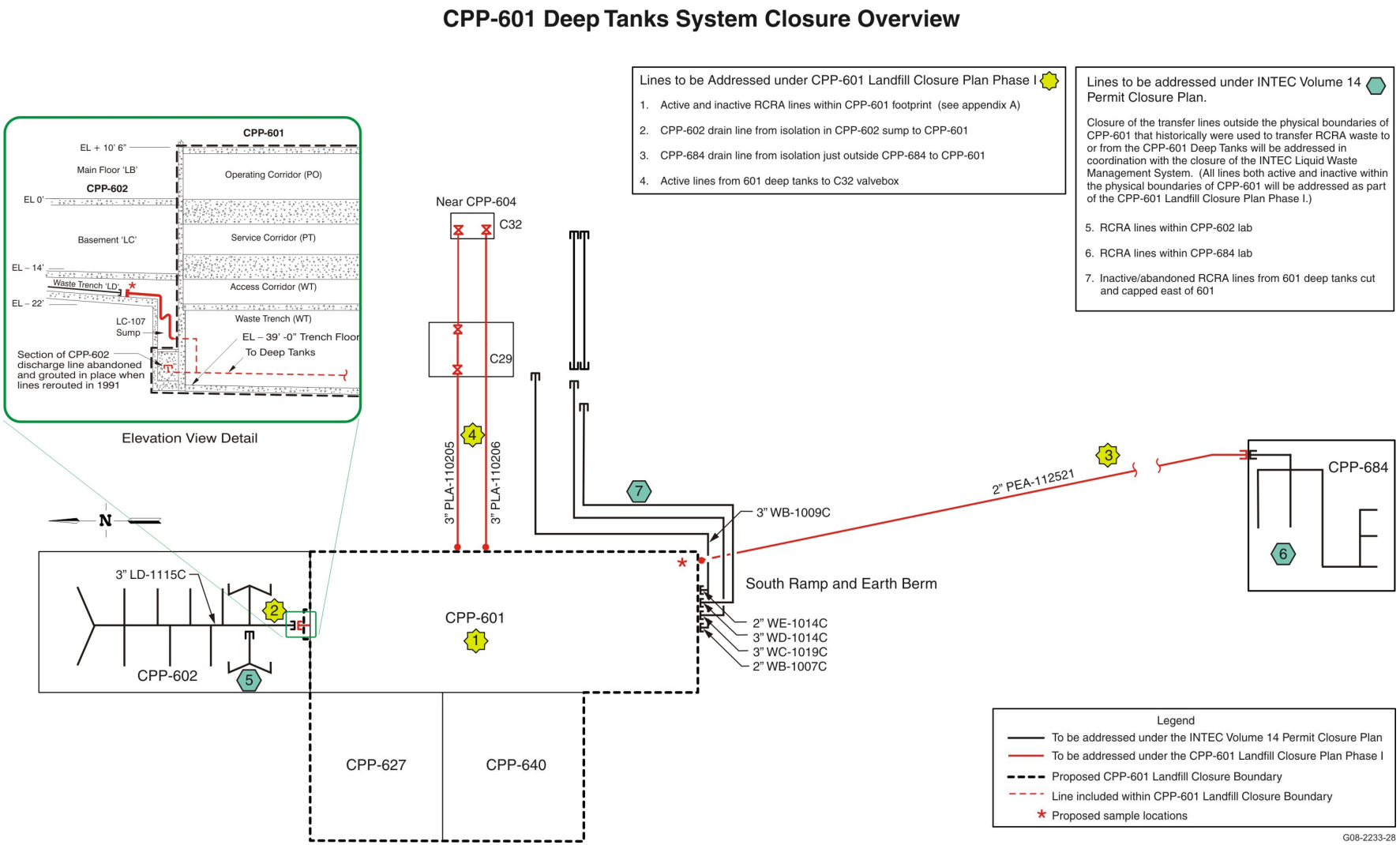

Figure 3. Location of the CPP-601 Deep Tanks System and proposed landfill boundaries.

The CPP-601 Deep Tanks System is included in the *Partial Permit for HWMA Storage and Treatment for the Liquid Waste Management System at the Idaho Nuclear Technology and Engineering Center on the Idaho National Laboratory* (State of Idaho 2007) and is permitted for tank storage and treatment of hazardous wastes. A general description and a detailed process description of the ILWMS (and associated subsystems, including the CPP-601 Deep Tanks System) are included in Attachment 1, Appendixes B and D, respectively, of the partial permit [State of Idaho 2007]).

2.4 RCRA/CERCLA Integration

An engineering evaluation/cost analysis (EE/CA) for decommissioning the Fuel Reprocessing Facilities (DOE-ID 2008a) was prepared to assist the U.S. Department of Energy (DOE) Idaho Operations Office with identifying the most effective approach for the final decommissioning of CPP-601/640, of which the mission has been completed. The process to accomplish this decommissioning and to determine the final end state for CPP-601/640 is to perform a NTCRA under CERCLA (42 USC 9601 et seq. 1980). The approach satisfies environmental review requirements and provides for stakeholder involvement while providing a framework for selecting the appropriate decommissioning alternative. The approach also establishes an administrative record for documentation of the removal action.

The selected NTCRA will place CPP-601/640 in a final configuration that will be protective of human health and the environment. The selected NTCRA will remove non-process areas including building components and the upper portion of the mechanical handling cave leaving the processing cells intact. The intact cells, process vessels, and lines will be decontaminated to remove the radiological and hazardous source terms as necessary to meet the remedial action objectives. Large void spaces without significant piping or vessels may be filled with grout or other inert material. The remaining void spaces within the buildings will be filled with flowable grout to minimize void spaces leaving a grouted monolith approximately 11 ft above grade in most areas, roughly similar to the Waste Calcining Facility. The top surface of the monolith will be sloped to facilitate integration of precipitation control with the operable unit (OU) 3-14 remedial action to the extent practical wherein the collected precipitation will be directed toward lined ditches, which will divert the water to evaporation ponds. The concrete monolith will require routine maintenance, monitoring, and other institutional controls to ensure that future environmental and worker risk remains acceptable until such time as the earthen cap is installed to complete the NTCRA in approximately 2035 when the remaining INTEC facilities have ceased operations.

Decommissioning of the CPP-601/640 facilities is consistent with the joint DOE and U.S. Environmental Protection Agency (EPA) *Policy on Decommissioning of Department of Energy Facilities under the Comprehensive Environmental Response, Compensation, and Liability Act* (DOE and EPA 1995), which establishes the CERCLA NTCRA process as the preferred approach for decommissioning surplus DOE facilities.

Under this policy, a NTCRA may be taken when DOE determines that the action will prevent, minimize, stabilize, or eliminate a risk to human health and/or the environment. When it is determined that a CERCLA NTCRA is necessary, DOE is authorized to evaluate, select, and implement the removal action that DOE determines is most appropriate to address the potential risk posed by the release or threat of release. This action is taken in accordance with applicable authorities and in conjunction with EPA and the State of Idaho pursuant to Subsection 5.3 of the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory and Action Plan* (DOE-ID 1991).

The CERCLA remedial actions adjacent to CPP-601/627/640 have occurred or will occur in accordance with the records of decision (RODs) (DOE-ID 1999, 2007a) for OUs 3-13 and 3-14. The primary CERCLA remedial action that will interface with the CPP-601/627/640 buildings is the TFF soil and INTEC groundwater remedial action (OU 3-14). The industrial-use area established by the OU 3-14 ROD encompasses the CPP-601/627/640 buildings. Coordination with the OU 3-14 remedial actions will be required to minimize the precipitation infiltration within the recharge control zone (immediately east of CPP-601) that is located within the industrial-use area.

There have been seven release points identified beneath CPP-601, but no releases have been identified beneath CPP-627/640. These releases are described in the Engineering Design File (EDF) -8192, "Nonradiological Material Inventory for CPP-601 and CPP-640," and EDF-8293, "Radioactive Material Inventory for the CPP-601/640 Fuel Reprocessing Complex Engineering Evaluation/Cost Analysis." The releases were mainly acidic liquids primarily contaminated with radionuclides and metals from the dissolution of spent fuel. As part of the CERCLA process, New Site Identification forms were completed and submitted to the CERCLA agencies. The OU 3-13 ROD (DOE-ID 1999) initially determined that release point CPP-80 would be addressed as part of the Group 2 soils. The OU 3-14 ROD (DOE-ID 2007a) dispositioned the other six releases beneath CPP-601 (CPP-118, -119, -120, -121, -122, and -123) to the OU 3-13 Group 2 sites. The OU 3-14 ROD states that the release sites beneath CPP-601 will be addressed under OU 3-13 in accordance with the process identified in the *Operable Unit 3-13 Group 2 Closure Evaluation Criteria and Checklist* (DOE-ID 2000) using the OU 3-14 remediation goals for soil in the industrial use area. The EE/CA for decommissioning the CPP-601/640 fuel reprocessing facilities included these releases in its evaluation of the potential risk and dose to the public from the various NTCRA alternatives. The alternative selected meets the appropriate risk and dose requirements while in addition further reducing the potential risk and dose to the public by placing the buildings in a stable configuration by filling them with grout or other inert material to be followed by the earthen cap as the final action taken under the CERCLA NTCRA in approximately 2035.

3. MAXIMUM WASTE INVENTORIES AND CHARACTERISTICS

3.1 CPP-601 Deep Tanks Waste Inventory

Maximum waste inventory and waste characteristics for the CPP-601 deep tanks (VES-WG-100, VES-WG-101, VES-WH-100, and VES-WH-101), as required per 40 CFR 264.112(b)(3), are provided in the Volume 14 permit (State of Idaho 2007). The maximum waste inventory for the CPP-601 Deep Tanks System (including the gravity-drained discharge piping from CPP-602, CPP-627, CPP-640, CPP-666, and CPP-684) would not have exceeded the capacity of the four deep tanks, which is 18,000 gal.

The CPP-601 tank system is permitted to manage the following wastes and associated EPA hazardous waste numbers:

- Wastes exhibiting the characteristic of ignitability (D001)
- Wastes exhibiting the characteristic of corrosivity (D002)
- Wastes exhibiting the toxicity characteristic for arsenic (D004), barium (D005), cadmium (D006), chromium (D007), lead (D008), mercury (D009), selenium (D010), silver (D011), benzene (D018), carbon tetrachloride (D019), chlorobenzene (D021), chloroform (D022), cresol (D026), 1,2-dichloroethane (D028), hexachlorobenzene (D032), hexachloroethane (D034), methyl ethyl ketone (D035) nitrobenzene (D036), pyridine (D038), tetrachloroethylene (D039), or trichloroethylene (D040)
- Spent halogenated and non-halogenated solvent wastes assigned EPA-listed hazardous waste numbers F001, F002, F003, or F005
- Discarded commercial chemical products, off-specification species, container residues, and spill residues assigned EPA-listed hazardous waste number U134.

3.2 System Boundaries

3.2.1 Tank System Boundaries

The CPP-601 Deep Tanks System includes four tanks (VES-WG-100, VES-WG-101, VES-WH-100, and VES-WH-101) and associated ancillary piping and equipment. The four tanks, ancillary equipment, and piping are located in the CPP-601 tank vaults, pump vault, waste trench, service corridor, vent corridors, and process cells (see Schematics P-CLOS-CPP-601-1 through -8 and Tables A-1 through -8 in Appendix A). Closure boundaries were determined by reviewing the partial permit for the ILWMS (State of Idaho 2007), piping and instrumentation diagrams, and other relevant documents, as well as interviewing cognizant INL personnel.

3.2.2 Equipment Addressed under this Closure Plan

The following tank system components are addressed in Phase 1 of the CPP-601 landfill closure:

- **CPP-601 Deep Tanks, Ancillary Equipment, and Discharge Piping and Secondary Containment.** Tanks, piping, ancillary equipment, and secondary containment structures associated with the CPP-601 tank system included in this closure plan are shown in Schematics P-CLOS-CPP-601-1 through -8 and Tables A-1 through -8 in Appendix A.

3.2.3 Equipment Not Addressed under this Closure Plan

The following tank system components are not addressed in this landfill closure:

- **VCO Components in CPP-601.** The CPP-601 components previously addressed under closure by the VCO Program.

- **CPP-601 Process/Product Equipment.** The vessels, ancillary equipment, and piping in the CPP-601 fuel reprocessing cells are considered process/product components and were emptied using common industrial practices. The materials/liquids processed through the cells were considered product until they were disposed of via the cell sumps and sump discharge lines; therefore, the CPP-601 cell closure boundaries are determined to be the cell sumps and sump discharge lines. Based on historical and process knowledge, two exceptions are the K-cell floor liner and the discharge line from vessels F-107 and F-108 in the F-cell (see Schematic P-CLOS-CPP-601-5 in Appendix A).

- **CPP-602 and CPP-684 Laboratory Drain Lines and Structures.** The CPP-602 and CPP-684 laboratory drain lines will be transferred to an applicable HMWA/RCRA permit and closed when the CPP-602 and CPP-684 buildings undergo D&D.

- **Abandoned Lines Outside the Physical Boundaries of CPP-601/627/640.** Abandoned waste discharge lines to the Process Equipment Waste Evaporator (PEWE) that are outside the CPP-601/627/640 landfill boundary will be included in a future closure plan, or other regulatory actions addressing abandoned and inactive ILWMS lines.

- **Vent, Instrument, Steam, and Air Lines Associated with the Tank System.** These lines did not manage hazardous waste and are not addressed in this closure.

3.2.4 Landfill Boundaries

The CPP-601 and CPP-640 facilities are both included within the landfill boundaries as both facilities are being decommissioned together under one CERCLA NTCRA. These facilities along with CPP-627 will be part of the same concrete monolith, and will be covered by the same earthen cover when the NTCRA is complete. The boundaries of the landfill have been developed to encompass the components of the tank system defined above as well as the entire footprint of the CPP-601, CPP-627, and 640 buildings which share common walls and utilities. The landfill does not include the CPP-602 laboratory, which is adjacent to the CPP-601/627/640 buildings but is subject to separate closure action. The full extent of the landfill boundary is provided on Figure 3. Portions of lines 2” PLA-110205, 2” PLA-110206, 3” LD-1115C, and 2” PEA-112521, while included in this landfill closure plan, are not included within the landfill boundaries because they are outside the physical boundaries of CPP-601/627/640 and will be clean closed.

4. CLOSURE PERFORMANCE STANDARDS

This section describes the performance standards for clean closure of the CPP-601 Deep Tanks System components under IDAPA 58.01.05.008 and 40 CFR 264.111 and 264.197, and the performance standards for landfill closure under IDAPA 58.01.05.008 and 40 CFR 264.111 and 264.310 for the remaining components, and the activities that will be conducted to demonstrate that the closure and landfill closure performance standards have been met as established in this closure plan.

4.1 Regulatory Closure Performance Standards

The closure performance standards identified in IDAPA 58.01.05.008 (40 CFR 264.111 and 264.197) applicable to the CPP-601 Deep Tanks System closure are:

1. The owner or operator must close the facility in a manner that minimizes the need for further maintenance (IDAPA 58.01.05.008 [40 CFR 264.111(a)]).

2. The owner or operator must close the facility in a manner that controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere (IDAPA 58.01.05.008 [40 CFR 264.111(b)]).

3. The owner or operator must close the facility in a manner that complies with the closure requirements of this subpart, including, but not limited to, the requirements of 40 CFR 264.197, 264.228, 264.258, 264.280, 264.310, 264.351, and 264.1102 (IDAPA 58.01.05.008 [40 CFR 264.111(c)]).

4.2 Required Activities for Achieving Closure Performance Standards

The CPP-601 Deep Tanks System closure and waste management activities to be conducted under HWMA/RCRA landfill closure are described in detail in Section 5 of this closure plan. The closure performance standards will be achieved as described in the following subsections.

4.2.1 Standard 1

The owner or operator must close the facility in a manner that minimizes the need for further maintenance (IDAPA 58.01.05.008 [40 CFR 264.111(a)]).

This closure performance standard will be achieved by the following measures:

- Residual hazardous waste inventory will be removed and disposed of to meet RCRA standards

- Tank system components outside the physical boundaries of CPP-601/627/640 undergoing HWMA/RCRA closure will be decontaminated to the site-specific ALs specified in this HWMA/RCRA closure plan or removed

- Isolation of the CPP-601 system will prevent future accumulation of hazardous wastes

- Components within the physical boundaries of CPP-601/627/640 (including both active and inactive systems) will not be clean closed. These components are identified in Schematics P-CLOS-CPP-601-1 through -8 and Tables A-1 through -8 in Appendix A. These components will be rinsed and/or drained to the extent practicable to remove liquid waste and waste residue.

4.2.2 Standard 2

The owner or operator must close the facility in a manner that controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere (IDAPA 58.01.05.008 [40 CFR 264.111(b)]).

This closure performance standard will be achieved by the following measures:

- Residual hazardous waste inventory will be removed and disposed of to meet RCRA standards

- Tank system components outside the physical boundaries of CPP-601/627/640 undergoing HWMA/RCRA closure will be decontaminated to the site-specific ALs specified in this HWMA/RCRA closure plan or removed

- Isolation of the CPP-601 system will prevent future accumulation of hazardous wastes

- Components within the physical boundaries of CPP/601/627/640 (including both active and inactive systems) will not be clean closed. These components are identified in Schematics P-CLOS-CPP-601-1 through -8 and Tables A-1 through -8 in Appendix A. These components will be rinsed and/or drained to the extent practicable to remove liquid waste and waste residue.

4.2.3 Standard 3

At closure of a tank system, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated soils, and structures and equipment contaminated with waste, and manage them as hazardous waste, unless §261.3(d) of this Chapter (CFR Title 40) applies. The closure plan, closure activities, cost estimates for closure, and financial responsibility for the tank systems must meet all of the requirements specified in subparts G and H of this part (IDAPA 58.01.05.008 [40 CFR 264.197(a) and (b)]).

This closure performance standard will be achieved by the following measures:

- Residual hazardous waste inventory will be removed and disposed of to meet RCRA standards.

- Tank system components outside the physical boundaries of CPP-601/627/640 undergoing HWMA/RCRA closure will be decontaminated to the site-specific ALs specified in this HWMA/RCRA closure plan or removed.

- Isolation of the CPP-601 system will prevent future accumulation of hazardous wastes.

- Components within the physical boundaries of CPP-601/627/640 (including both active and inactive systems) will not be clean closed. These components are identified in Schematics P-CLOS-CPP-601-1 through -8 and Tables A-1 through -8 in Appendix A. These components will be rinsed and/or drained to the extent practicable to remove liquid waste and waste residue.

- Contaminated soils associated with CPP-601/627/640 will be addressed as part of the NTCRA/D&D of the buildings. Newly identified sites beneath the building will be addressed under the INL CERCLA program.

5. CLOSURE ACTIVITIES

5.1 Tank System Landfill Closure Phase 1 Activities

This closure plan describes the methods for closing the CPP-601 Deep Tanks System per the tank system closure performance standard requirements of IDAPA 58.01.05.008 (40 CFR 264, Subparts G and J). The approach for clean closure of the CPP-601 Deep Tanks System components outside the physical boundaries of CPP-601/640 will be decontamination to the site-specific ALs specified in Table 1 of this HWMA/RCRA closure plan, or removal and disposal. The approach for closure of the CPP-601 Deep Tanks System components physically located within the CPP-601/627/640 boundaries and included in the CPP-601 landfill will be to flush/drain and isolate the components to minimize the potential for release of RCRA contaminants and to meet the requirements in 40 CFR 264.111(a) and (b) by minimizing the liquid waste and waste residues in the remaining tank system and isolating the facility from all waste discharge systems. The following subsections describe closure activities, waste management activities, and required closure documentation to satisfy the tank system closure and landfill closure performance standards for those units and associated ancillary equipment for which closure activities will be performed, as identified in Subsection 4.2.

5.2 Identification and Removal of Hazardous Waste

No specific waste removal activities are anticipated to be necessary as part of closure activities. If bulk solids are identified, the solids will not be removed, but will be sampled and will be included as part of the CPP-601 landfill. The tanks will be emptied of liquids to the maximum extent practicable by the existing transfer pumps.

Tanks VES-WG-100, VES-WG-101, VES-WH-100, and VES-WH-101 and associated ancillary piping and equipment, and secondary containment structures for which landfill closure activities will be conducted (see Schematics P-CLOS-CPP-601-1 through -8 in Appendix A) will be flushed and/or drained to the extent possible to remove the presence of HWMA/RCRA contaminants. The tank system was designed to manage aqueous solutions and primarily managed aqueous decontamination solutions, aqueous laboratory wastes, and water infiltration; therefore, water is an appropriate flushing/rinsing agent for the tank system. A minimum of three line volumes will be used to flush the ancillary piping. The solutions from flushing efforts will be collected in the deep tanks and sampled to determine the level of HMWA/RCRA constituents and characterization of remaining waste in the CPP-601 system components.

Waste and/or waste residues to be left in place in the landfill, including the CPP-627 abandoned piping, will be characterized as required by 40 CFR 264.309. Samples generated during tank system closure and landfill closure activities will provide characterization data for the waste residuals contained within the system. During decontamination of the tank system under this closure plan, rinsate samples will be collected to demonstrate compliance with the contaminant of concern-specific ALs. The rinsate sample results will be used, where applicable, to document the nature and extent of waste and/or waste residues left in place.

5.3 Decontamination Activities

The CPP-601 waste lines to be closed under HWMA/RCRA by iterative decontamination are lines 2” PLA-110205, 2” PLA-110206, 3” LD-1115C, and 2” PEA-112521, detailed on Schematics P-CLOS-CPP-601-2, -6, and -7 in Appendix A, which are outside the physical boundaries of CPP-601/640. Compliance with the closure performance standards will be demonstrated by sampling the final rinsate solution from the decontamination efforts and comparing the resulting analytical data with

the site-specific ALs provided in Table 1. The final rinsate solutions from decontamination efforts will be collected in accordance with the "Sampling Procedure for HWMA/RCRA Closure of the CPP-601 Deep Tanks System" (SPR-185). In lieu of decontamination, any line subject to decontamination may be removed and disposed of per HMWA/RCRA regulations. If rinsates from a pipe do not meet the site-specific ALs provided in Table 1, and the pipe is not removed, the closure of that pipe will be addressed in appropriate closure plan for either the CPP-602 or CPP-684 laboratory or the ILWMS.

The tank system was designed to manage aqueous solutions and primarily managed aqueous decontamination solutions, aqueous laboratory wastes, and water infiltration; therefore, water is an appropriate decontamination agent for the tank system. The final rinsate solutions from 3" LD-1115C and 2" PEA-112521 which are lines that conveyed waste from CPP-602 and CPP-684 to the CPP-601 will be sampled near where these lines enter CPP-601. Alternative sample locations may be used, in which case the location of the sample event and the system components undergoing decontamination will be recorded and documentation provided for the Phase 1 closure certification.

There is no practical means of safely collecting rinsate samples from the two discharge lines (2" PLA-110205 and 2" PLA-110206), which convey waste from CPP-601 to the Process Equipment Waste Evaporator system. The most convenient location would be the C-32 valve box; however, the C-32 valve box presents a high radiological exposure environment, as well as a cramped work space with minimal access in and around the pipes to be sampled. Meeting the closure performance standards for these lines will be based upon the aqueous nature of the waste that has passed through these lines; the lines 2" PLA-110205, 2" PLA-110206, 3" LD-1115C, and 2" PEA-112521 are all stainless steel lines that discharge similar wastes; that the lines 3" LD-1115C and 2" PEA-112521 can be successfully clean closed by flushing with waste; and that the lines 2" PLA-110205 and 2" PLA-110206 will meet the flushing schedule used to clean close lines 3" LD-1115C and 2" PEA-112521 as well as additional final flushes of a minimum of 20 line volumes of clean water after completing transfers of all other pumpable waste from the system.

The list of contaminants of concern (COCs) was developed based on COCs identified in the closure plan for CPP-641 Westside Waste Holdup Tanks System (DOE-ID 2007b), the closure plan for the CPP-601 waste transfer lines to the TFF (DOE-ID 2008d), *Partial Permit for HWMA Storage and Treatment for the Liquid Waste Management System at the Idaho Nuclear Technology and Engineering Center on the Idaho National Laboratory* (State of Idaho 2007), and COCs identified in *A Regulatory Analysis and Reassessment of U.S. Environmental Protection Agency Listed Hazardous Waste Numbers for Applicability to the INTEC Liquid Waste System* (INEEL 1999).

The ALs were developed by defining the acceptable excess cancer risk and hazard quotient thresholds, and calculating corresponding ALs based upon these risk and hazard thresholds. These ALs were developed to ensure that the units and ancillary equipment, subsequent to completion of closure activities, will be left in a state that is protective of human health and the environment. Because of the wide nature of COCs (metals, semivolatile organic compounds, and volatile organic compounds), final rinsate samples will be analyzed for EPA Contract Laboratory Program metals, semivolatile organic compounds via EPA SW-846 Method 8270C (or equivalent), volatile organic compounds via EPA SW-846 Method 8260B (or equivalent), and hydrogen fluoride via EPA SW-846 Method 9056 (or equivalent) (EPA 2008). If additional HWMA/RCRA COCs are identified during closure, ALs may be revised, as necessary, to account for these additional COCs.

Liquids will be removed to the extent practical using the existing transfer equipment, but some liquids may remain within the CPP-601 Deep Tanks System at the completion of closure. Liquids in the CPP-601 deep tanks will be rendered non-liquid in accordance with this closure plan.

Table 1. Contaminants of concern and corresponding site-specific AL.

COC	Action Level (mg/L rinsate)	COC	Action Level (mg/L rinsate)
Antimony	2.8E+01	Chloromethane	2.8E+01
Arsenic	6.1E–01	Cresol	2.8E+01
Barium	2.8E+01	Cyclohexanone	2.8E+01
Beryllium	2.8E+01	1,2-Dichloroethane	3.0E–01
Cadmium	6.0E–01	Ethyl acetate	2.8E+01
Chromium	3.0E+00	Ethylbenzene	2.8E+01
Lead	3.0E+00	Hexachlorobenzene	7.8E–02
Mercury	1.2E–01	Hexachloroethane	6.1E–01
Nickel	2.8E+01	Hydrogen Fluoride	2.8E+01
Selenium	6.0E–01	Methanol	2.8E+01
Silver	3.0E+00	4-Methyl-2-Pentanone (MIBK)	2.8E+01
Thallium	2.8E+01	Methylene chloride	6.1E–01
Vanadium	2.8E+01	n-nitro-di-n-butylamine	5.8E–02
Zinc	2.8E+01	Nitrobenzene	1.2E+00
Acetone	2.8E+01	Phenol	2.8E+01
Benzene	3.0E–01	Pyridine	3.0E+00
Bis(2-ethylhexyl) phthalate	6.1E–01	Tetrachloroethylene	4.2E–01
Bromomethane	1.3E+01	Toluene	2.8E+01
2-Butanone (MEK)	2.8E+01	1,1,1-Trichloroethane	2.8E+01
Carbon Disulfide	2.8E+01	Trichlorofluoromethane	2.8E+01
Carbon Tetrachloride	3.0E–01	Trichloroethylene	3.0E–01
Chlorobenzene	2.8E+01	Xylenes	2.8E+01
Chloroform	3.6E+00	Aroclor-1260	6.1E–01

5.4 CPP-601 Tank System Isolation

To minimize the need for further maintenance and control the post-closure escape of hazardous waste and/or waste residues, as stipulated by 40 CFR 264.111(a) and (b), respectively, the CPP-601/627/640 deep tanks components included in the landfill area will be completely isolated from CPP-602, CPP-666, and CPP-684, and ILWMS wastewater handling systems before certification of closure as a landfill.

Isolation of the system will include line 2” PEA-112521 from CPP-684 (see Schematic P-CLOS-CPP-601-2), line 1” PE-AF-128433 from CPP-666 (see Schematic P-CLOS-CPP-601-2), line 3” LD-1115C from CPP-602 (see Schematic P-CLOS-CPP-601-6), and lines 3” PLA-110205 and 3” PLA-110206 to CPP-604 (via valve box DVB-WM-PW-C32; see Schematic P-CLOS-CPP-601-7).

5.5 Waste Management

All waste generated within CPP-601/627/640 will be managed as CERCLA waste in accordance with the *Action Memorandum for Decommissioning CPP-601/640 Fuel Reprocessing Facilities CPP-601/640* (DOE/ID 2008d). All closure-derived waste generated during the landfill closure of CPP-601/627/640 will undergo a hazardous waste determination and if hazardous will be managed in substantive compliance with the applicable HWMA/RCRA regulations. As an example, closure-derived hazardous waste will not be subjected to the HWMA/RCRA 90-day storage limit under 40 CFR 262. Closure-derived waste may be subject to generator treatment, debris treatment, or packaging activities. Closure-derived waste determined to be hazardous will be transferred to a RCRA-permitted treatment, storage, and disposal facility for ultimate disposition.

5.6 Closure Documentation

Closure methods and attainment of the closure and landfill closure performance standards for the CPP-601/627/640 landfill closure will be documented by performing the following:

- Closure activities will be monitored and reviewed by a registered professional engineer. Following successful completion of the landfill closure activities, the professional engineer will certify that closure was performed in accordance with the approved closure plan.

- Information related to successful implementation of closure activities, including but not limited to sample collection, analytical data, and management of closure-derived waste will be recorded or documented, and provided to the professional engineer, as requested, to support closure certification.

6. PHASE 1 LANDFILL CLOSURE SCHEDULE

Table 2 identifies the closure schedule that will be initiated following DEQ approval of this closure plan. This schedule reflects the time required for conducting closure activities and submitting information to the registered professional engineer for certification. IDAPA 58.01.05.008 (40 CFR 264.113) requires waste removal activities to be completed 90 days from the approval of the closure plan and closure to be completed within 180 days from the initiation of closure activities. An extension to these time periods is being requested at this time, pursuant to IDAPA 58.01.05.008 (40 CFR 264.113), to ensure that data of adequate quality are collected to show compliance with the closure performance standard. An extension is requested for the 180-day closure period to protect human health and the environment and to adequately perform closure activities. Waste removal, decontamination, and closure activities cannot be completed within these timeframes due to several factors including, but not limited to, the following:

- The need to provide radiological contamination controls to prevent the possible spread of contamination
- All work related to management of radioactive mixed waste requires additional time due to the requirements for care in work planning, including radiological work permits
- Pipe flushing and decontamination activities and other closure activities will require coordination with ongoing CPP-602 and CPP-684 operations, CPP-601 deep tank closure activities, and ILWMS operations
- The time necessary for the analytical laboratories to complete analysis of samples and data validation, receive analytical results, and complete data quality assessment, as specified in the sampling procedure associated with this closure plan (SPR-185), to determine if the closure performance standards have been met.

Table 2. Phase 1 Landfill closure schedule.

Planned Work Tasks	Day of Completion
DEQ approval of phase landfill closure plan	Day 0
Rinse, flush, and drain components to be included in CPP-601/627/640 landfill	Day 180
Complete decontamination and closure certification sampling of external CPP-601/627/640 lines	Day 270
Complete isolate of components to be included in CPP-601/627/640 landfill	Day 360
Closure activities complete	Day 420
Professional engineer and owner/operator certification submitted	Day 480[a,b]

a. If closure activities are completed ahead of the proposed schedule, closure certification will be submitted to DEQ within 60 days of the completion of closure activities.

b. A post-closure plan will be submitted commensurate with the closure certification.

7. CLOSURE PLAN AMENDMENTS

The conditions described in IDAPA 58.01.05.008 (40 CFR 264.112), "Closure Plan; Amendment of Plan," will be followed to implement changes to the approved closure plan. Should unexpected events during the closure period require modification of the approved closure activities, the closure plan will be amended within 30 days of the unexpected event or the DEQ will be otherwise notified. Should decontamination or removal activities for a component outside the landfill boundary but inside the tank system boundary prove impracticable, the closure plan may be amended to revise the system boundaries to exclude the component. Should any amendment become necessary, a written request detailing the proposed changes and the rationale for those changes and a copy of the amended closure plan will be submitted to DEQ for approval. Minor changes to the approved closure plan, which are equivalent to, or do not compromise the closure requirements and performance standards identified in the approved closure plan, may be made without prior notification to DEQ. Minor changes will be identified in the documentation supporting the independent professional engineer's certification.

8. CERTIFICATION OF CLOSURE FOR PHASE 1

Within 60 days of completing the closure activities, a certification of Phase 1 of the CPP-601 landfill closure will be provided to the DEQ, in accordance with IDAPA 58.01.05.008 (40 CFR 264.115), by an Idaho-registered professional engineer. The professional engineer and owner/operator signatures on the closure certification, which is submitted to the DEQ, will document the completion of closure activities in accordance with the approved landfill closure plan and State of Idaho HWMA/RCRA requirements. The closure certification may also identify any minor changes to the closure plan made without prior approval of the DEQ. The Phase 1 closure of these units will be considered complete upon receipt of written acceptance issued by the DEQ. Copies of documentation supporting the closure of the CPP-601 system will remain in the INTEC project files in the event that additional information is requested by DEQ.

9. COST AND LIABILITY REQUIREMENTS

The federal government, as owner of the INL Site, is exempt from the requirements to provide cost estimates for closure, to provide a financial assurance mechanism for closure, and regarding state-required mechanism and state assumption of responsibility per IDAPA 58.01.05.008 [40 CFR 264.140(c)]. The federal government, as owner of the INL Site, is also exempt from liability requirements.

10. REFERENCES

40 CFR 261, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, Office of the Federal Register, as amended.

40 CFR 262, "Standards Applicable to Generators of Hazardous Waste," *Code of Federal Regulations*, Office of the Federal Register, as amended.

40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, Office of the Federal Register, as amended.

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, Office of the Federal Register, as amended.

42 USC 6901 et seq., 1976, "Resource Conservation and Recovery Act of 1976," as amended.

42 USC 9601 et seq., "Comprehensive Environmental Response, Compensation, and Liability Act of 1980," (CERCLA).

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DOE-ID, 2008d, *HWMA/RCRA Closure Plan for the CPP-601 Waste Transfer Lines to the Tank Farm Facility*, DOE/ID-11325, Rev. 0, March 2008.

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EDF-8192, 2007, "Nonradiological Material Inventory for CPP-601 and CPP-640," Rev. 0, Idaho National Laboratory, Idaho Cleanup Project, September 2007.

EDF-8293, 2007, "Radioactive Material Inventory for the CPP-601/640 Fuel Reprocessing Complex Engineering Evaluation/Cost Analysis," Rev. 1, Idaho National Laboratory, Idaho Cleanup Project, September 2007.

EPA, 2008, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods,* SW-846, 3rd Edition, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, http://www.epa.gov/epaoswer/hazwaste/test/main.htm, Web page updated January 7, 2008, Web page visited May 14, 2008.

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Appendix A

Schematics and Line Tables

Appendix A

Schematics and Line Tables

Appendix A includes line tables and schematics identifying the CPP-601 Deep Tanks System components that are included as part of this landfill closure. Tables A-1 through -8 list the system boundaries for the CPP-601 Deep Tanks System and Schematics P-CLOS-CPP-601-1 through -8 are piping diagrams for the CPP-601 Deep Tanks System.

Table A-1. CPP-601 system boundaries for the vent tunnel.

Line Identification Number	Start Point	End Point	Comments
East Vent Header			
3” SK-AR-1076	East Vent North Sample Corridor Drain	3” PE-AR-151880	SHEET 1 (A-2)
1/2” AA-AR-151853	OTA Vent	3” PE-AR-151880	SHEET 1 (A-2)
3” SK-AR-1077	East Vent Middle Sample Corridor Drain	3” PE-AR-151880	SHEET 1 (A-4)
3” SK-AR-1078	East Vent South Sample Corridor Drain	3” PE-AR-151880	SHEET 1 (A-6)
3” PE-AR-151880	Blind Flange ahead of 1/2” AA-AR-151853	3” PW-AR-151713	SHEET 1 (A-2)
1” PVT-11651C	VES-VT-103	3” PW-AR-151713	SHEET 1 (A-7)
1” PWA-202	RCV-VT-1	3” PW-AR-151713	SHEET 1 (A-7)
3” SJ-AR-1070	West Vent South Sample Corridor Drain	3” PE-AR-151890	SHEET 1 (C-6)
3” SJ-AR-1069	West Vent Middle Sample Corridor Drain	3” PE-AR-151890	SHEET 1 (C-4)
3” SJ-AR-1068	West Vent North Sample Corridor Drain	3” PE-AR-151890	SHEET 1 (C-2)
1/2” AA-AR-151852	OTA Vent	3” PE-AR-151890	SHEET 1 (C-2)

Table A-2. CPP-601 system boundaries for the service corridor.

Line Identification Number	Start Point	End Point	Comments
3” PPM-40016C	Standpipe on Roof	3” PE-AR-151787	Sheet 2 (A-2)
3/4” LAA-110218	JV-22	1” LAA-110218	Sheet 2 (A-3)
1” LAA-110218	3/4” LAA-110218	1” LSU-O-4002H	Sheet 2 (B-3)
1” LSU-O-4002H	1” LAA-110218	1 1/2” LSU-O-4001H	Sheet 2 (B-3)
2” LSU-O-4003H	*UVS2-1	1 1/2” LSU-O-4001H	Sheet 2 (B-3)
1/2” LSU-O-4004H	*UVS2-2	1 1/2” LSU-O-4001H	Sheet 2 (B-3)
3/4” LSU-O-4005H	JV-18	1 1/2” LSU-O-4001H	Sheet 2 (B-3)
*ULS2-1	UVV-PO-3	1 1/2” LSU-O-4001H	Sheet 2 (B-4)
1/2” LSU-O-4006H	*UVS2-3	1 1/2” LSU-O-4001H	Sheet 2 (B-4)
1 1/2” LSU-AR-4007	1 1/2” LSU-O-4001H	3” PE-AR-151787	Sheet 2 (B-3)
2” PWA-206	Drip Pan	2” PWA-207	Sheet 2 (A-2)
1” PQ-50311Y	Drip Pan	1” PQ-6081Y	Sheet 2 (A-4)
1” PQ-6081Y	1” PQ-50311Y	1” TQ-6083Y	Sheet 2 (A-4)
1” TQ-6083Y	1” PQ-6081Y	1” TQ-6083Y	Sheet 2 (A-4)
3/4” PQ-60812Y	Loadout Door Drain	1” PS-50813Y	Sheet 2 (A-4)
1” PS-50813Y	Drip Pan	1” PQ-6081Y	Sheet 2 (A-5)
3/4” PP-60914Y	Loadout Door Drain	1” PP-60915Y	Sheet 2 (A-6)
1” PP-60915Y	Drip Pan	1” TP-60917Y	Sheet 2 (A-5)
3/4” PC-2091Y	Hot Sink Drain	2” PL-AR-113573	Sheet 2 (A-7)
2” PL-AR-113573	3/4” PC-2091Y	1 1/2” PE-AR-151820	Sheet 2 (A-7)
1” PE-AR-151802	Sump SU-PT-101	JET-PT-503	Sheet 2 (C-6)
1” PE-AR-151790	JET-PT-503	3” PE-AR-151787	Sheet 2 (C-6)
1” PE-AR-151803	Sump SU-PT-102	JET-PT-504	Sheet 2 (C-4)
1” PE-AR-151794	JET-PT-504	3” PE-AR-151787	Sheet 2 (C-4)
1” PE-AR-151804	Sump SU-PT-103	JET-PT-505	Sheet 2 (C-3)
1” PE-AR-151800	JET-PT-505	3” PE-AR-151787	Sheet 2 (C-3)
3/4” PK-O-11217C	ASV-PA-253-4	Access Corridor Floor Drain	Sheet 2 (D-3)
3/4” PK-O-11216C	Drip Pan	3/4” PK-O-11217C	Sheet 2 (D-3)
1” PE-AR-152505	Drip Pan	1/2” ASA-100148	Sheet 2 (D-6)
2” F1055C	2” PE-AR-151872	VES-WG-101	Sheet 2 (D-4)
3” PE-AR-151787	1 1/2” PE-AR-151900 & 1” PE-AR-151800	3” PW-AR-151713	Sheet 2 (B-2) & (C-3)
1/2” ASA-100148	PEV-PA-240/241-1	Access Corridor Floor Drain	Sheet 2 (D-6)
* Denotes a temporary line or valve number given for the purposes of this closure plan only.			

Table A-3. CPP-601 system boundaries for the sample corridor.

Line Identification Number	Start Point	End Point	Comments
3/4” PY-30218Y	Drip Pan	1” PY-30218Y	Sheet 3 (A-2)
1” PY-30218Y	Drip Pan	1” PY-30219	Sheet 3 (A-2)
1” PY-30219Y	1” PY-30218	1” PY-30221Y	Sheet 3 (A-2)
1” PY-51213	Drip Pan	1” PY-30223Y	Sheet 3 (A-3)
1” PU-40825Y	Drip Pan	1” PU-40826Y	Sheet 3 (A-3)
1” PU-40826Y	1” PU-40825Y	1” PU-40324Y	Sheet 3 (A-3)
1” PE-AR-112682	Cup Sink Drain	OTA Gallery 5 Drip Pan	Sheet 3 (A-4)
3/4” PU-52813Y	Drip Pan	1” PU-52814Y	Sheet 3 (A-5)
1” PU-52814Y	Drip Pan	1” PU-52817Y	Sheet 3 (A-4)
1” PJ-52014Y	Drip Pan	1” PJ-52015Y	Sheet 3 (D-3)
1” PJ-52015Y	1” PJ-52014Y	1” TJ-52017Y	Sheet 3 (D-3)
1” PE-AR-112683	Drip Pan	1” PWA-321	Sheet 3 (D-4)
1/2” PE-AR-108419	Drain	1/2” PE-AR-108420	Sheet 3 (C-5)
1” PC-50616Y	Drip Pan	1” PC-50617Y	Sheet 3 (C-7)
1” PC-50617Y	1” PC-50616Y	1” PC-50612Y	Sheet 3 (C-7)
1” PN-65711Y	Drip Pan	1” PN-65712Y	Sheet 3 (A-6)
1” PQ-51613Y	Drip Pan	1” TQ-51615Y	Sheet 3 (A-6)
1” PK-50613Y	Drip Pan	1” PK-50614Y	Sheet 3 (D-2)
1” PE-AR-108420	1/2” PE-AR-108419	1” PWA-34	Sheet 3 (D-5)
1” PA-51717Y	Drip Pan	3” PE-AR-151787	Sheet 3 (D-6)
1” PC-50612Y	Drip Pan	1” TC-50619Y	Sheet 3 (D-7)

Table A-4. CPP-601 system boundaries for the east cell row.

Line Identification Number	Start Point	End Point	Comments
1 1/2” PE-AR-152457	Hood X-600	1 1/2” PE-AR-151908	Sheet 4 (B-1)
1 1/2” PE-AR-151907	Glove Box Drains	1 1/2” PE-AR-151908	Sheet 4 (A-1)
1 1/2” PE-AR-151908	1 1/2” PE-AR-151907	1 1/2” PE-AR-151904	Sheet 4 (B-2)
1 1/2” PE-AR-151904	1 1/2” PE-AR-151908	VES-Y-119	Sheet 4 (C-2)
1” PE-AR-151901	Sump SU-Y-142	JET-Y-501	Sheet 4 (C-2)
1” PE-AR-151903	JET-Y-501	VES-Y-119	Sheet 4 (C-2)
1” PE-AR-151898	JET-Y-505	VES-Y-119	Sheet 4 (C-2)
3/4” TY-13112Y	JET-Y-508	RCV-Y-23	Sheet 4 (D-2)
1” PE-AR-151897	RCV-Y-23	VES-Y-119	Sheet 4 (D-2)
1 1/2” PE-AR-151900	VES-Y-119	3” PE-AR-151787	Sheet 4 (D-2)
1” PE-AR-151910	Sump SU-U-132	JET-U-512	Sheet 4 (A-3)
1” PE-AR-151911	JET-U-512	3” PE-AR-151787	Sheet 4 (A-3)
1” TW-129	VES-W-129	JET-W-504	Sheet 4 (C-3)
1” PE-AM-151816	JET-W-504	3” PE-AR-151787	Sheet 4 (C-3)
1” PE-AR-151860	Sump SU-W-131	JET-W-507	Sheet 4 (C-3)
1” PE-AR-151858	JET-W-507	3” PE-AR-151787	Sheet 4 (C-3)
3/4” PE-AR-151913	Sump SU-S-113	JET-S-504	Sheet 4 (C-4)
1” PE-AR-151913	JET-S-504	3” PE-AR-151787	Sheet 4 (C-3)
2” PE-AR-113575	VES-L-105	3” PE-AR-151787	Sheet 4 (C-6)
1” PQ-O-2131Y	Sump SU-Q-113	JET-Q-507	Sheet 4 (A-4)
1” PQ-O-2132Y	JET-Q-507	VES-Q-119	Sheet 4 (A-4)
3/4” TQ-2164Y	JET-Q-504	VES-Q-119	Sheet 4 (A-4)
3/4” TQ-3101Y	HE-Q-301	3/4” PQ-2101Y	Sheet 4 (B-4)
3/4” PQ-2101Y	3/4” TQ-3101Y	1 1/2” PE-AR-151843	Sheet 4 (B-4)
1 1/2” PE-AR-151843	VES-Q-119	3” PE-AR-151787	Sheet 4 (B-4)
1” TQ-6083Y	1” TQ-51615Y	VES-Q-119	Sheet 4 (B-4)
1” TQ-51615Y	1” PQ-51613Y	1” TQ-6083Y	Sheet 4 (B-4)
3/4” PP-O-2131Y	Sump SU-P-113	JET-P-505	Sheet 4 (A-5)
3/4” PP-O-2132Y	JET-P-505	VES-P-119	Sheet 4 (A-5)
3/4” TP-1109Y	HE-P-301	1 1/2” PE-AR-151840	Sheet 4 (B-5)
1 1/2” PE-AR-151840	VES-P-119	3” PE-AR-151787	Sheet 4 (B-5)
1” TP-60917Y	1” PP-60915Y	VES-P-119	Sheet 4 (B-5)
1” TN-65713Y	1” PN-65712Y	2” N-1147C	Sheet 4 (B-6)
1” PN-65712Y	1” PN-65711Y	1” TN-65713Y	Sheet 4 (B-6)
2” N-1147C	1” TN-65713Y	2” M-1146C	Sheet 4 (A-6)
3/4” PE-AR-151829	Sump SU-PA-111	JET-PA-501	Sheet 4 (D-7)
3/4” PE-AR-151827	JET-PA-501	6” WT-1165C	Sheet 4 (D-7)

Table A-5. CPP-601 system boundaries for the west cell row.

Line Identification Number	Start Point	End Point	Comments
1/2” PJ-V-2346Y	RCV-J-29	JET-J-535	Sheet 5 (A-1)
1/2” PJ-O-2347Y	JET-J-535	VES-J-119	Sheet 5 (A-1)
1” PJ-2212Y	Sump SU-J-121	JET-J-524	Sheet 5 (A-1)
1” PE-AR-151922	JET-J-524	1” PE-AR-151920	Sheet 5 (A-2)
1/2” PJ-V-2355Y	RCV-J-9	JET-J-525	Sheet 5 (A-2)
1/2” PJ-V-2356Y	JET-J-525	VES-J-119	Sheet 5 (A-2)
3/4” PJ-O-2276Y	RCV-J-19	JET-J-527	Sheet 5 (B-1)
1” PE-AR-151789	JET-J-527	VES-J-119	Sheet 5 (B-1)
1” PE-AR-151799	VES-J-119	1 1/2” PE-AR-151799	Sheet 5 (A-2)
1” PJ-O-2015Y	RCV-J-21	1” PJ-O-2023Y	Sheet 5 (B-2)
1” PJ-O-2023Y	RCV-J-20	1” PE-AR-151799	Sheet 5 (B-2)
1” TJ-52017Y	1” PJ-52015Y	1” PE-AR-151920	Sheet 5 (B-2)
1” PE-AR-151920	1” TJ-52017Y	1 1/2” PE-AR-151799	Sheet 5 (A-2)
1 1/2” PE-AR-151799	1” PE-AR-151920	3” PE-AR-151787	Sheet 5 (A-2)
1” PSA-382	VES-H-108	JET-H-507	Sheet 5 (A-3)
3/4” PWA-301	HE-H-300	1” PE-AR-151866	Sheet 5 (B-2)
1” PE-AR-151866	3/4” PWA-301	1” PWA-320	Sheet 5 (B-3)
1” PWA-320	1” PE-AR-151866	2” PWA-302	Sheet 5 (B-3)
3/4” PWA-302	VES-H-117	RCV-H-6	Sheet 5 (B-3)
2” PWA-302	RCV-H-6	3” PE-AR-151865	Sheet 5 (B-3)
3/4” PSA-577	Sump SU-H-121	JET-H-529	Sheet 5 (B-3)
1” PE-AR-151797	JET-H-529	3” PE-AR-151787	Sheet 5 (A-3)
1” PWA-208	Sump SU-G-117	JET-G-541	Sheet 5 (A-4)
1” PE-AR-151796	JET-G-541	3” PE-AR-151787	Sheet 5 (A-4)
*ULS5-1	VES-G-108	JET-G-520	Sheet 5 (A-4)
2” PWA-308	JET-G-520	2” PWA-310	Sheet 5 (B-4)
*ULS5-2	VES-G-116	JET-G-532	Sheet 5 (A-4)
2” PWA-312	JET-G-532	2” PWA-310	Sheet 5 (A-4)
*ULS5-3	VES-G-115	JET-G-528	Sheet 5 (B-4)
2” PWA-310	JET-G-528	3” PE-AR-151865	Sheet 5 (B-4)
3” PE-AR-151865	2” PWA-302 & 2” PWA-310	6” WT-1165C	Sheet 5 (B-3) & (B-4)
2” PWA-207	2” PWA-206	Drip Pan	Sheet 5 (A-4)
1” PWA-207	Drip Pan	2” PWA-306	Sheet 5 (B-4)
2” PWA-306	1” PWA-207	1” PE-AR-151868	Sheet 5 (B-4)
1” PWA-321	1” PE-AR-112683	1” PE-AR-151868	Sheet 5 (B-4)
1” PE-AR-151868	1” PWA-321	3” PE-AR-151787	Sheet 5 (B-4)
1” PLA-110914	Sump SU-C-112	JET-C-517	Sheet 5 (B-5)

Table A-5. (continued).

Line Identification Number	Start Point	End Point	Comments
1” PLA-110913	JET-C-517	VES-C-103	Sheet 5 (B-5)
1” PE-AR-105604	VES-C-101	JET-C-514	Sheet 5 (B-6)
1” PE-AR-105604	JET-C-514	VES-C-103	Sheet 5 (B-6)
3/4” TC-2091Y	Cap in PM Area	VES-C-103	Sheet 5 (A-5)
1” TC-50619Y	1” PC-50612Y	VES-C-103	Sheet 5 (B-5)
1 1/2” PL-AR-151820	VES-C-103	3” PE-AR-151787	Sheet 5 (A-5)
1” TK-1044Y	EVP-K-104	2” PE-AR-151864	Sheet 5 (C-1)
*ULS5-4	EVP-K-104	JET-K-501	Sheet 5 (C-1)
2” PE-AR-151864	JET-K-501	6” WT-1165C	Sheet 5 (C-1)
1” PK-50614Y	1” PK-50613Y	1” TK-50615Y	Sheet 5 (D-1)
1” TK-50615Y	1” PK-50614Y	2” PE-AR-151864	Sheet 5 (D-1)
*ULS5-5	Sump SU-F-120	JET-F-522	Sheet 5 (C-3)
1” PE-AR-151793	JET-F-522	3” PE-AR-151787	Sheet 5 (C-3)
*ULS5-6	VES-F-105	JET-F-504	Sheet 5 (C-3)
1” PSA-106751	JET-F-504	VES-F-119	Sheet 5 (C-3)
*ULS5-7	VES-F-106	JET-F-515	Sheet 5 (C-3)
1” PSA-106705	JET-F-515	VES-F-119	Sheet 5 (C-3)
1 1/2” PE-AR-151873	VES-F-119	2” PE-AR-151872	Sheet 5 (C-3)
1” PSA-104969	1” PSA-106762	1”PSA-106763	Sheet 5 (D-3)
1” PSA-106762	2” PSAR-108107	2” PE-AR-151872	Sheet 5 (D-3)
1” PSA-106763	2” PSAR-108107	2” PE-AR-151872	Sheet 5 (D-3)
2” PE-AR-151872	1” PSA-106762	2” F1055C	Sheet 5 (D-3)
3/4” PWA-40	Cap by Sump SU-E-111	1” PWA-34	Sheet 5 (C-4)
1” PWA-34	1” PE-AR-108420	6” WT-1067C	Sheet 5 (D-4)
1” PLA-110917	Sump SU-B-108	JET-B-502	Sheet 5 (C-6)
1” PLA-110916	JET-B-502	3” PE-AR-151787	Sheet 5 (C-6)
K-cell liner	K-cell liner	Sump SU-K-107	Sheet 5 (C-2)
1” PK-O-2075Y	Sump SU-K-107	JET-K-505	Sheet 5 (C-2)
1” PE-AR-151923	JET-K-505	2” PE-AR-151864	Sheet 5 (C-2)
* Denotes a temporary line number given for the purposes of this closure plan only.			

Table A-6. CPP-601 system boundaries for the waste trench.

Line Identification Number	Start Point	End Point	Comments
3” PA-1088C	Access Corridor Floor Drain	6” WT-1067C	Sheet 6 (B-5)
3” PA-1087C	Access Corridor Floor Drain	6” WT-1067C	Sheet 6 (B-5)
4” PW-AR-151713	3” PW-AR-151713	6” WT-1067C	Sheet 6 (B-6)
6” WT-1067C	Cap in Waste Trench	VES-WH-120	Sheet 6 (B-4)
3” PA-1116C	Access Corridor Floor Drain	6” WT-1165C	Sheet 6 (C-2)
3” PA-1117C	Access Corridor Floor Drain	6” WT-1165C	Sheet 6 (C-3)
3” PA-1118C	Access Corridor Floor Drain	6” WT-1165C	Sheet 6 (C-4)
3” PA-1119C	Access Corridor Floor Drain	6” WT-1165C	Sheet 6 (C-4)
3” PA-1120C	Access Corridor Floor Drain	6” WT-1165C	Sheet 6 (C-5)
2” M-1146C	2” N-1147C	6” WT-1165C	Sheet 6 (C-5)
6” WT-O-1068C	6” WT-1067C	6” WT-1165C	Sheet 6 (C-6)
6” WT-1165C	Cap in CPP-602 Waste Trench	VES-WG-120	Sheet 6 (C-1)
* ULS6-1	Sump SU-WT-101	JET-WT-501	Sheet 6 (B-6)
* Denotes a temporary line number given for the purposes of this closure plan only.			

Table A-7. CPP-601 system boundaries for the deep tanks vaults.

Line Identification Number	Start Point	End Point	Comments
1/4” TWH1013Y	VES-WH-101	SAM-WH-601	Sheet 7 (D-1)
2 1/2” PWH-1011C	VES-WH-101	P-WE-200	Sheet 7 (D-2)
2” PL-AR-110205	P-WE-200	3” PLA-110205	Sheet 7 (B-3)
3” PLA-110205	2” PL-AR-110205	HV-WM-38	Sheet 7 (A-4)
*ULS7-1	RCV-WE-2	2” PL-AR-110205	Sheet 7 (B-3)
*ULS7-2	RCV-WD-2	2” PL-AR-110211	Sheet 7 (B-3)
3” PLA-110206	2” PL-AR-110205	HV-WM-39	Sheet 7 (A-4)
2” PLA-110207	3” PLA-110206	PLV-YDA-22	Sheet 7 (A-3)
3” PLA-110559	RCV-WM-191	3” PLA-110206	Sheet 7 (A-2)
6” PWH-1019C	VES-WH-120	VES-WH-101	Sheet 7 (C-2)
1 1/2” PWH-2012C	VES-WH-101	JET-WH-501	Sheet 7 (D-2)
1 1/2” PWH-2011C	JET-WH-501	VES-WH-100	Sheet 7 (D-3)
6” PWG-1001C	VES-WH-120	VES-WG-100	Sheet 7 (C-2)
1/4” TWH-2002Y	VES-WH-100	SAM-WH-600	Sheet 7 (D-3)
3/4” PWF-1009C	Drip Pan	1” PWF-1007C	Sheet 7 (B-1)
1” PWF-1007C	Drip Pan	1” PWE-1029C	Sheet 7 (B-1)
1” PWE-1029C	1” PWF-1007C	Pump Pit Floor Drain	Sheet 7 (B-2)
2” PWE-1011C	Pump Pit Floor Drain	2” PW-AR-151608	Sheet 7 (C-3)
2” PW-AR-151608	2” PWE-1011C	VES-WH-100	Sheet 7 (C-3)
2 1/2” PWH-1001C	VES-WH-100	P-WD-200	Sheet 7 (D-3)
2” PL-AR-110211	P-WD-200	2” PL-AR-110205	Sheet 7 (B-4)
6” PWH-1005C	VES-WG-120	VES-WH-100	Sheet 7 (C-3)
1 1/2” PWH-1006C	VES-WH-100	JET-WH-500	Sheet 7 (D-3)
1 1/2” PWH-1007C	JET-WH-500	VES-WG-101	Sheet 7 (D-3)
1 1/2” PWG-2013C	JET-WG-501	VES-WH-100	Sheet 7 (C-5)
1” PWH-1008C	Sump SU-WH-102	JET-WH-502	Sheet 7 (D-4)
1” PWH-1009C	JET-WH-502	VES-WH-100	Sheet 7 (D-4)
1” PWG-2014C	Sump SU-WG-102	JET-WG-502	Sheet 7 (D-5)
1” PWG-2015C	JET-WG-502	VES-WG-101	Sheet 7 (D-5)
1 1/2” PWG-2012C	VES-WG-101	JET-WG-501	Sheet 7 (D-5)
6” PWG-1014C	VES-WG-120	VES-WG-101	Sheet 7 (C-6)
2 1/2” PWG-1016C	VES-WG-101	P-WC-200	Sheet 7 (D-5)
2” PL-AR-110210	P-WC-200	2” PL-AR-110209	Sheet 7 (B-5)
*ULS7-5	DMV-WA-5	Pump Pit Floor Drain	Sheet 7 (B-5)

Table A-7. (continued).

Line Identification Number	Start Point	End Point	Comments
*ULS7-6	DMV-WA-6	Pump Pit Floor Drain	Sheet 7 (B-5)
2” PW-AR-151608	Pump Pit Floor Drain	2” PWE-1011C	Sheet 7 (C-4)
2” PWC-1011C	Pump Pit Floor Drain	2” PWG-1007C	Sheet 7 (C-5)
2” PWG-1007C	2” PWC-1011C	VES-WG-101	Sheet 7 (C-5)
2” PWB-1001C	Pump Pit Floor Drain	2” PWG-1007C	Sheet 7 (C-6)
1/4” TWG-2016Y	VES-WG-101	SAM-WG-601	Sheet 7 (C-6)
1 1/2” PWG-2007C	JET-WG-500	VES-WG-101	Sheet 7 (D-6)
1 1/2” PWG-2006C	VES-WG-100	JET-WG-500	Sheet 7 (D-6)
2 1/2” PWG-1002C	VES-WG-100	P-WB-200	Sheet 7 (D-7)
2” PL-AR-110209	P-WB-200	2” PL-AR-110205	Sheet 7 (B-5)
2” PL-AR-110209 (By-Pass)	2” PL-AR-110209	2” PL-AR-110205	Sheet 7 (B-4)
1” WD-O-1001C	RCV-WE-5	2” PL-AR-110209	Sheet 7 (B-4)
*ULS7-3	RCV-WC-2	2” PL-AR-110210	Sheet 7 (B-5)
*ULS7-4	RCV-WB-2	2” PL-AR-110209	Sheet 7 (B-5)
3/4” PWA-1008C	Drip Pan	1” PWA-1014C	Sheet 7 (C-7)
1” PWA-1014C	Drip Pan	1” PWB-1019C	Sheet 7 (C-7)
1” PWB-1019C	1” PWA-1014C	Pump Pit Floor Drain	Sheet 7 (C-7)
1” WG-2004C	JET-WT-501	2” WG-2004C	Sheet 7 (C-7)
2” WG-2004C	1” WG-2004C	VES-WG-100	Sheet 7 (C-7)
1/4” TWG-1005Y	VES-WG-100	SAM-WG-600	Sheet 7 (C-7)
* Denotes a temporary line number given for the purposes of this closure plan only.			

Table A-8. CPP-627 PEWE Drain System.

Line Identification Number	Start Point	End Point	Comments
3” PWA-204	Capped drains in RAF glove boxes, OSL and HCL	Capped in 601 West Vent Tunnel	Sheet 8 (A-3)
3” WRN-202	Floor drains from RAF, and DDL	Capped in 601 West Vent Tunnel	Sheet 8 (A-3)
2” PE-AR-154109	DDL to PEWE in CPP-601 H-cell. Stainless steel secondary containment.	2005, isolation of CPP-627	Capped at West and east walls of CPP-601 West Vent Tunnel, and at floor level in CPP-627. Flushed during D&D of CPP-627. Sheet 8 (A-5)
2” PE-AR-154097	RAF to PEWE in CPP-601 West Vent Tunnel. Stainless steel secondary containment.	2005, isolation of CPP-627	Capped at west wall of CPP-601 West Vent Tunnel, and floor level in CPP-627. Flushed during D&D of CPP-627. Sheet 8 (A-4)
2” PE-AR-154101	Connects to 2” PE-AR-154097 in floor trench in CPP-627. Stainless steel secondary containment.	2005, isolation of CPP-627	Capped at floor in CPP-627. Flushed during D&D of CPP-627. Sheet 8 (A-4)
2” PE-AR-154073	Connects to 2” PE-AR-154097 in floor trench in CPP-627. Stainless steel secondary containment.	2005, isolation of CPP-627	Capped at floor in CPP-627. Flushed during D&D of CPP-627. Sheet 8 (A-4)
1” PLA-100096	Capped Anteroom Drains	3” PWA-204	Sheet 8 (D-5)

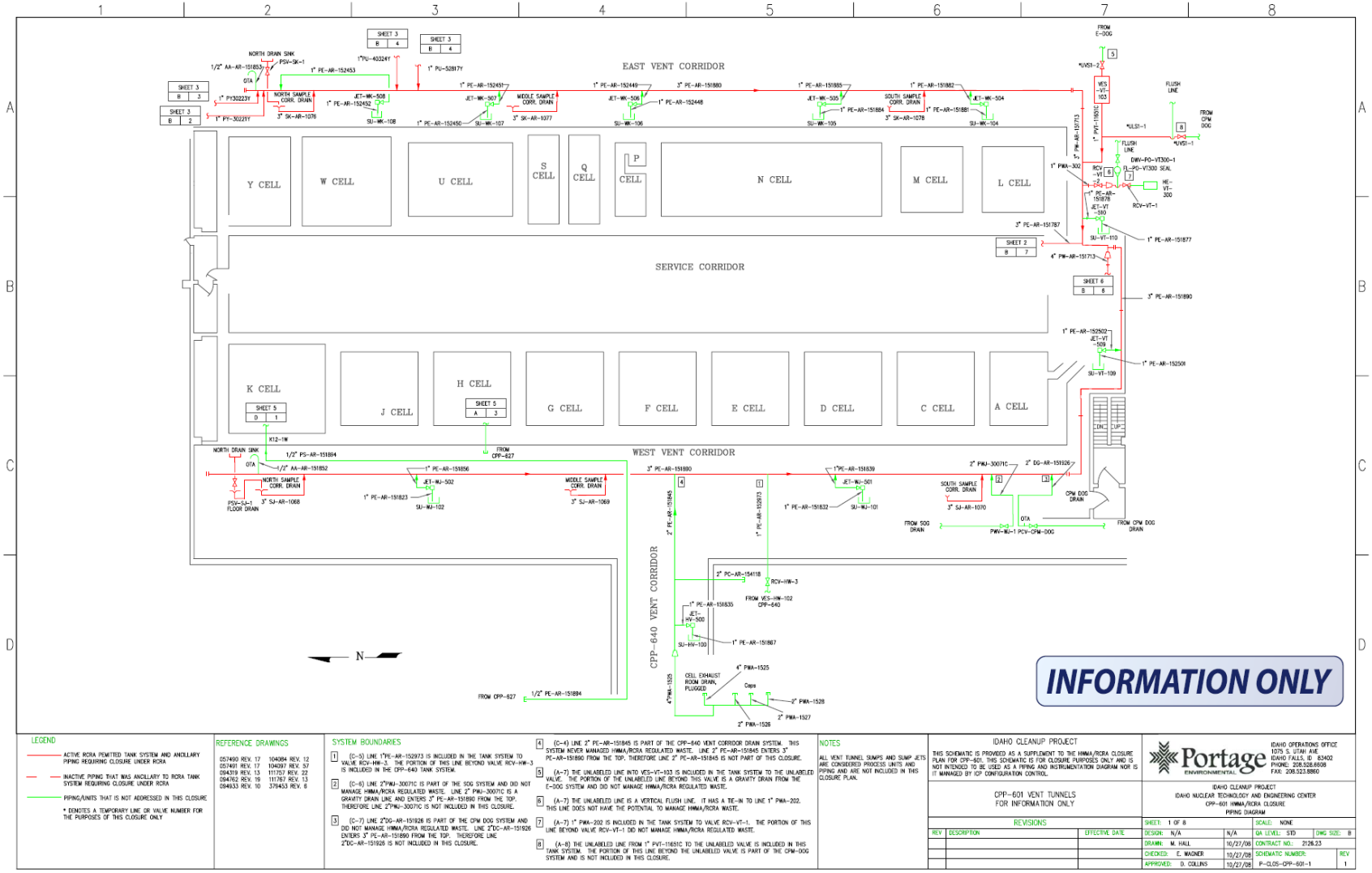

Figure A-1. Schematic P-CLOS-CPP-601-1. CPP-601 HWMA/RCRA closure piping diagram.

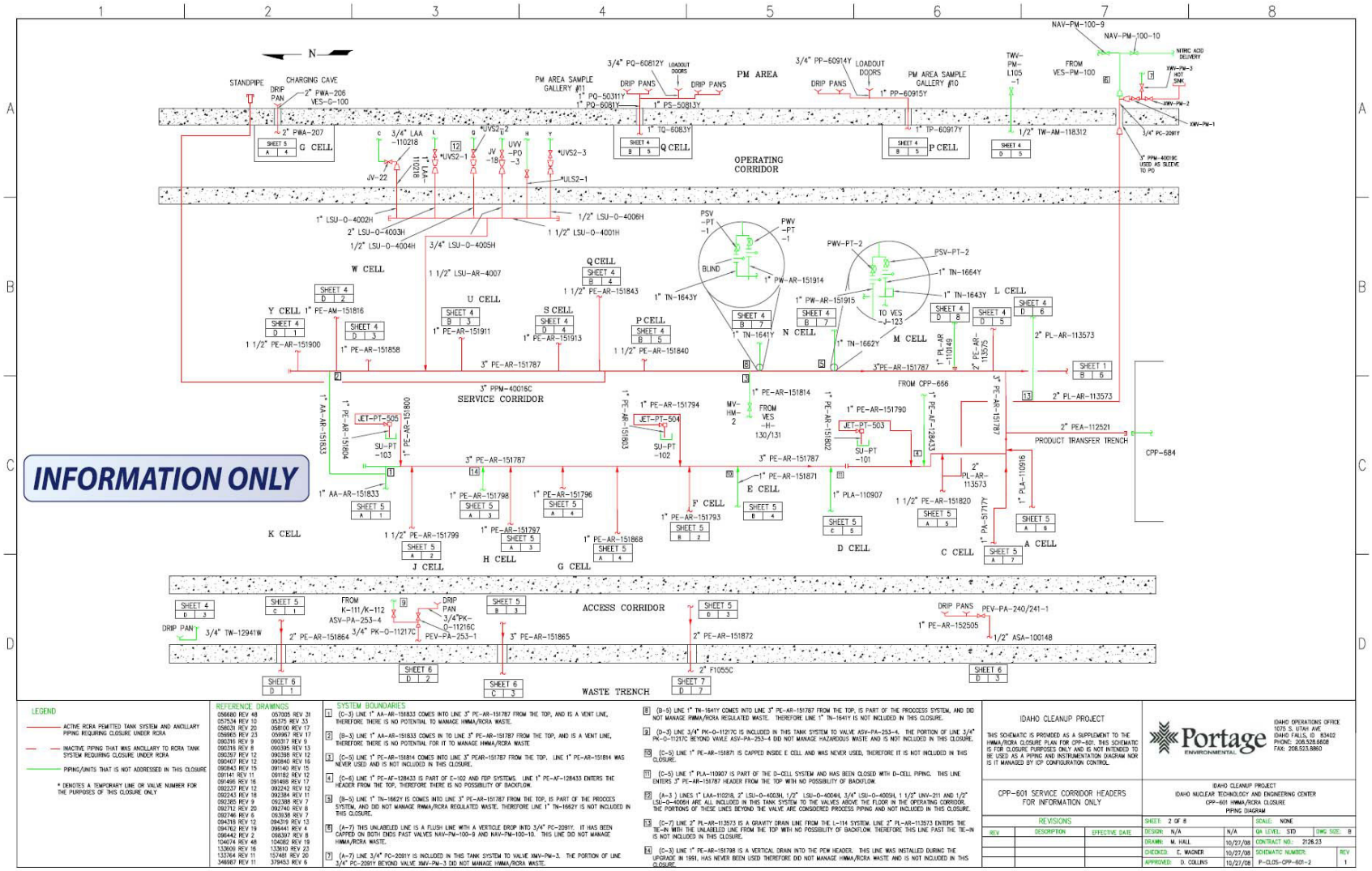

Figure A-2. Schematic P-CLOS-CPP-601-2. CPP-601 HWMA/RCRA closure piping diagram.

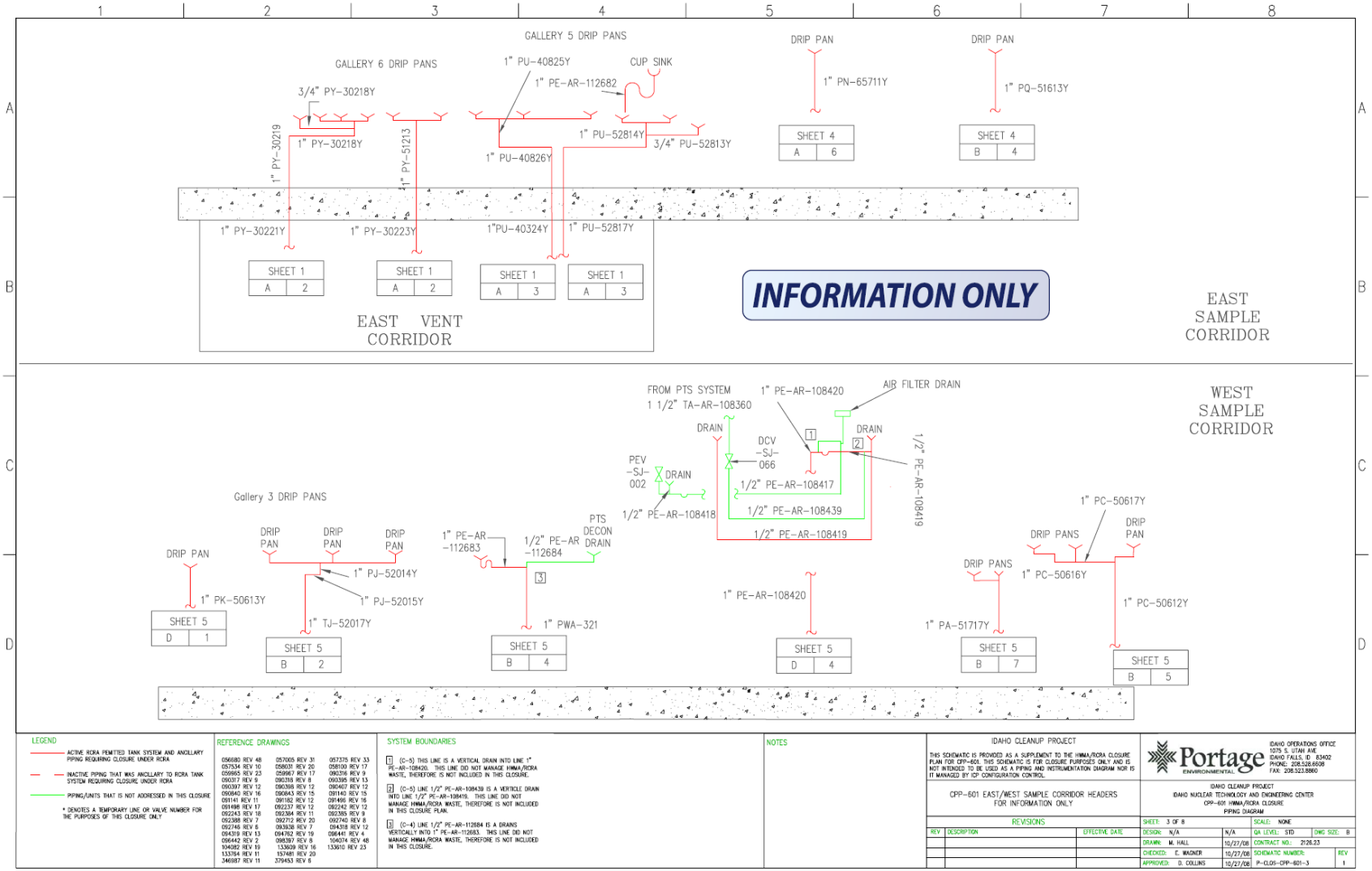

Figure A-3. Schematic P-CLOS-CPP-601-3. CPP-601 HWMA/RCRA closure piping diagram.

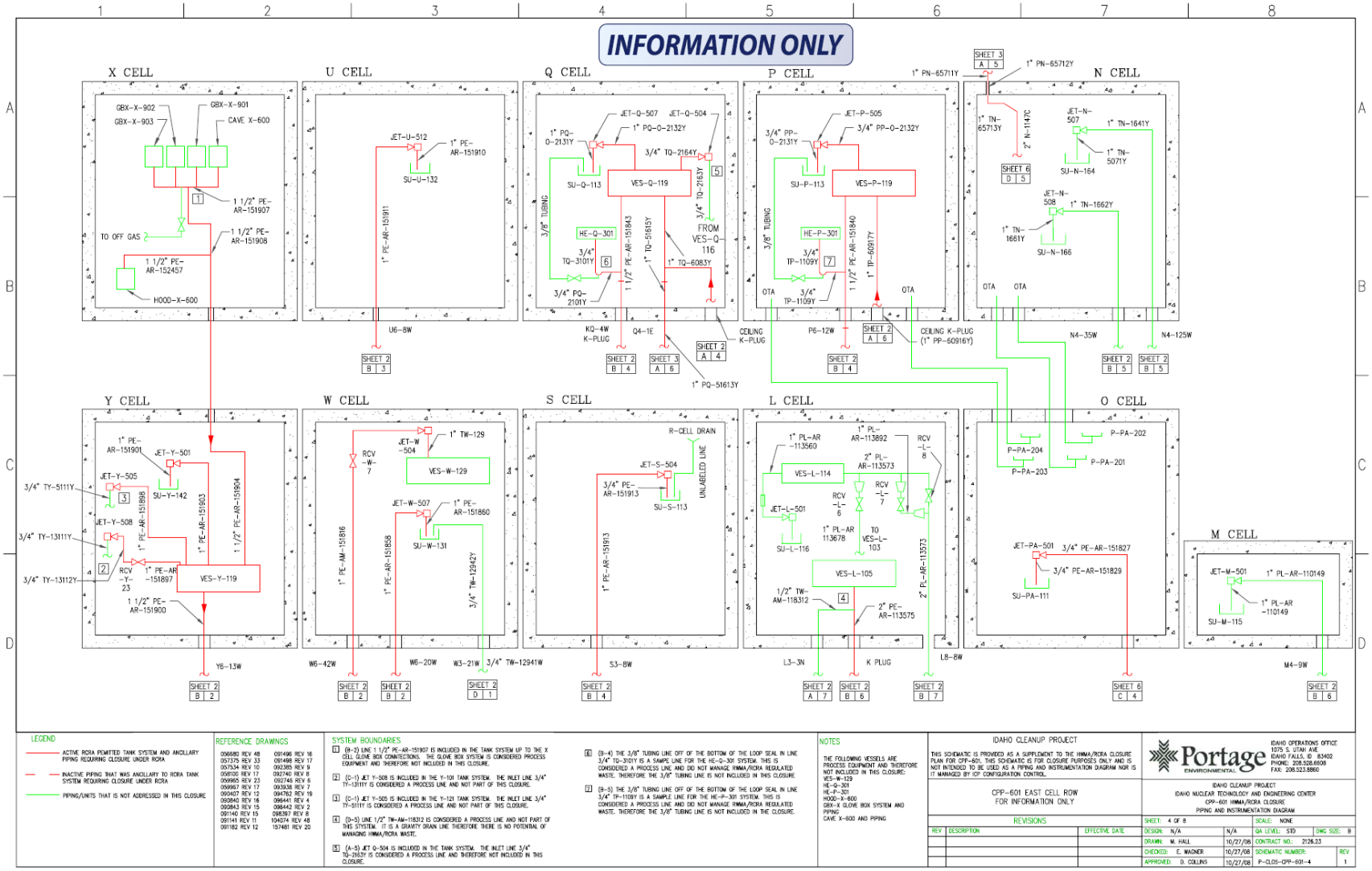

Figure A-4. Schematic P-CLOS-CPP-601-4. CPP-601 HWMA/RCRA closure piping diagram.

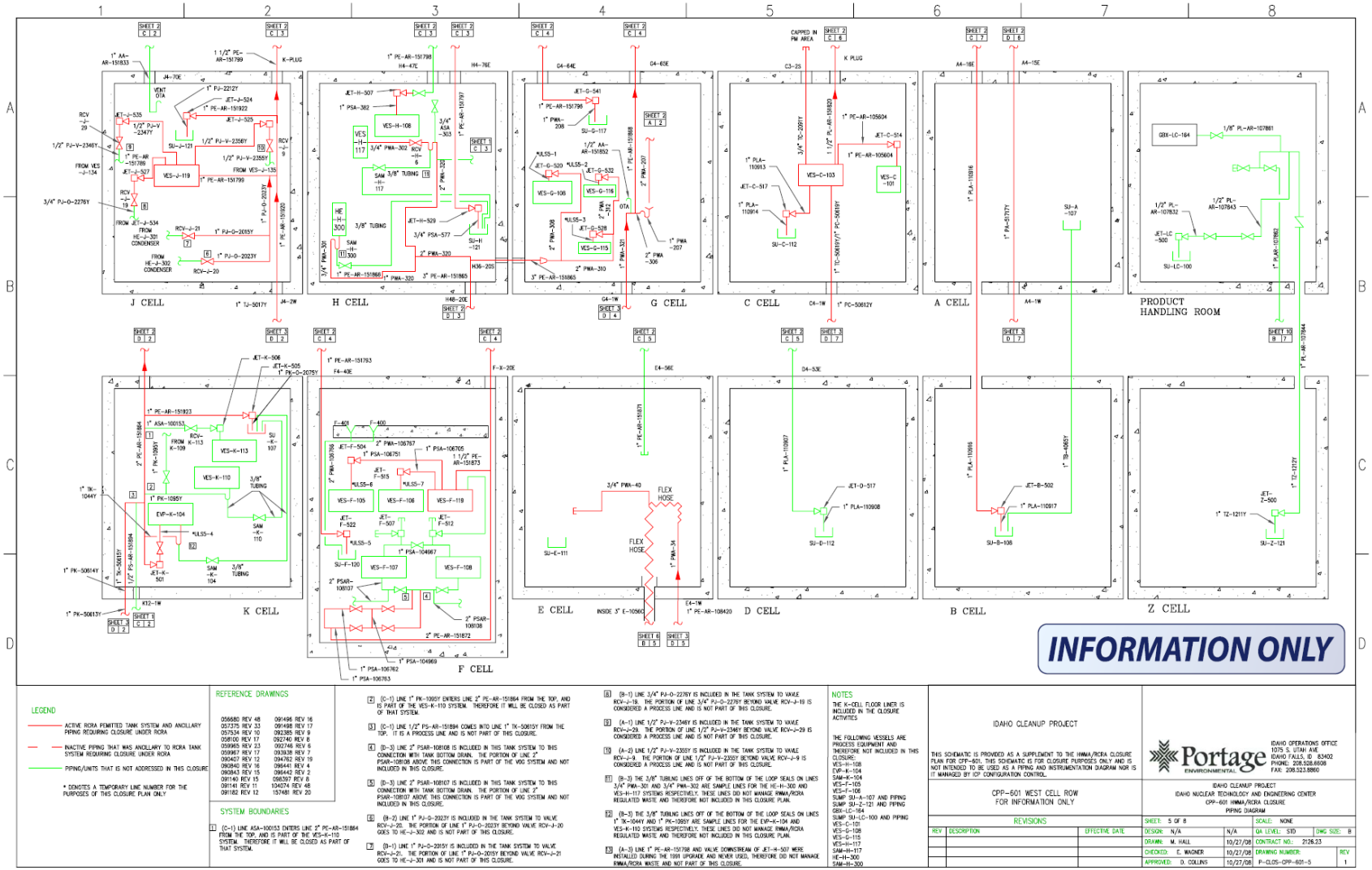

Figure A-5. Schematic P-CLOS-CPP-601-5. CPP-601 HWMA/RCRA closure piping diagram.

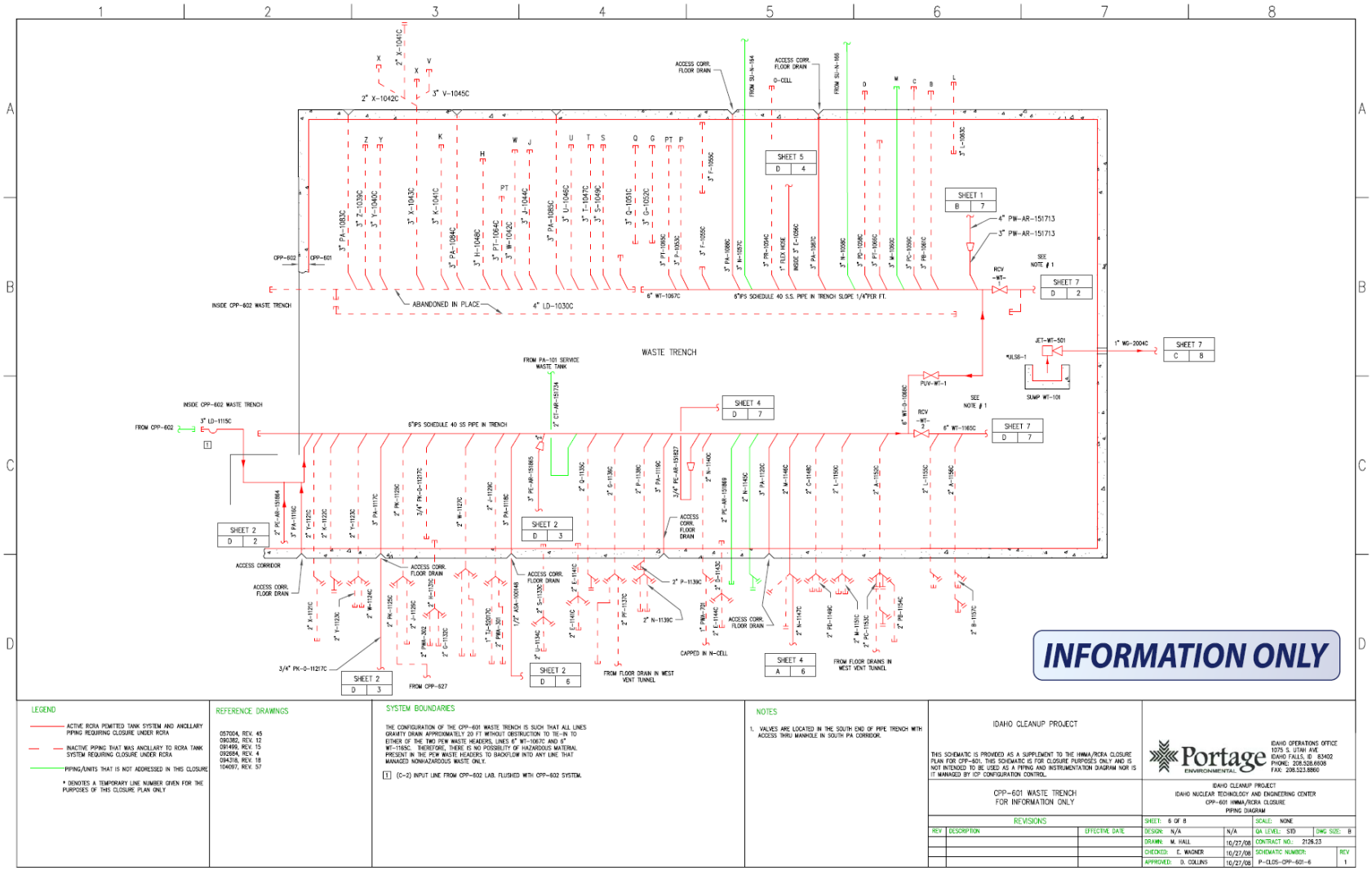

Figure A-6. Schematic P-CLOS-CPP-601-6. CPP-601 HWMA/RCRA closure piping diagram.

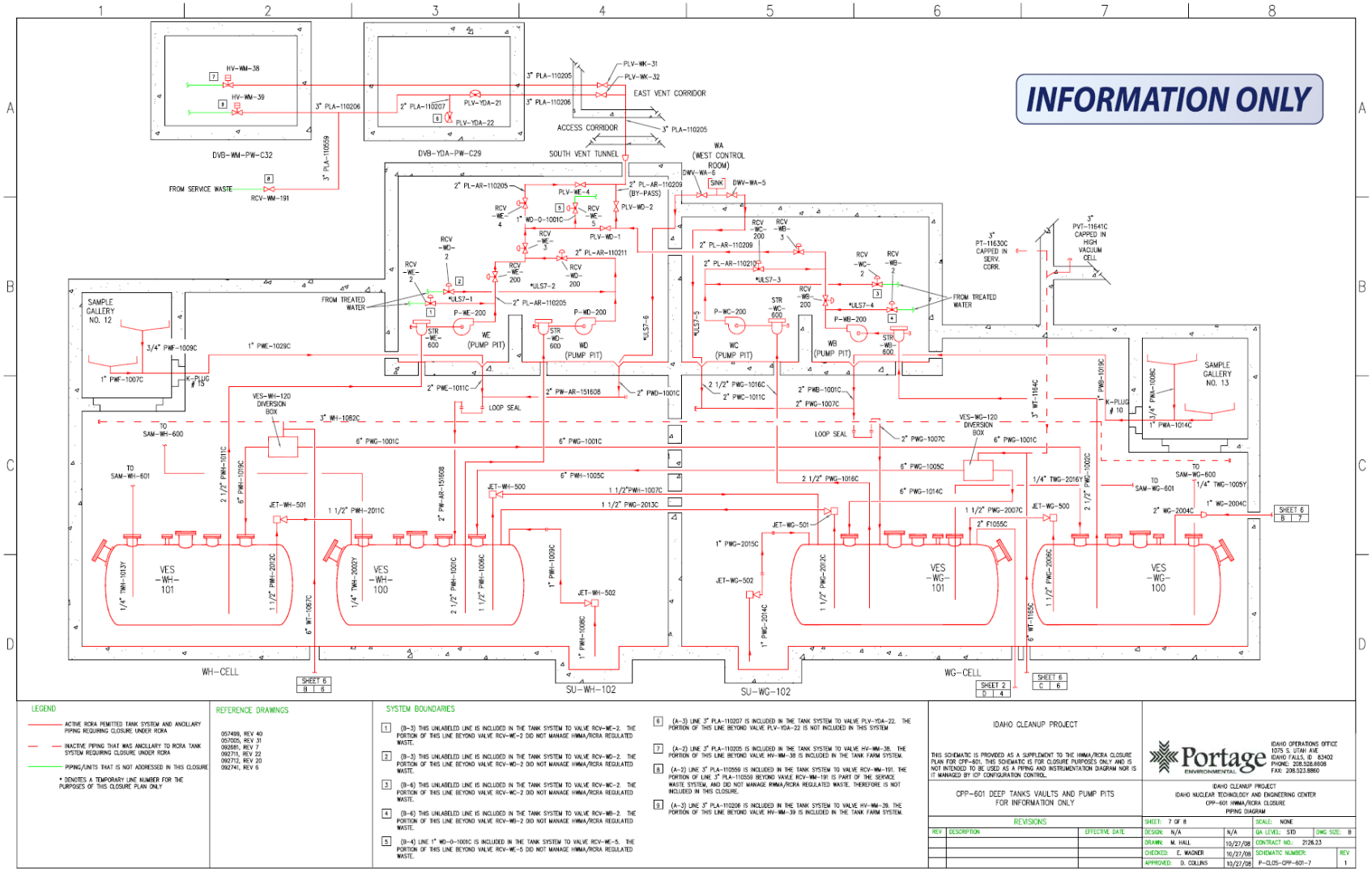

Figure A-7. Schematic P-CLOS-CPP-601-7. CPP-601 HWMA/RCRA closure piping diagram.

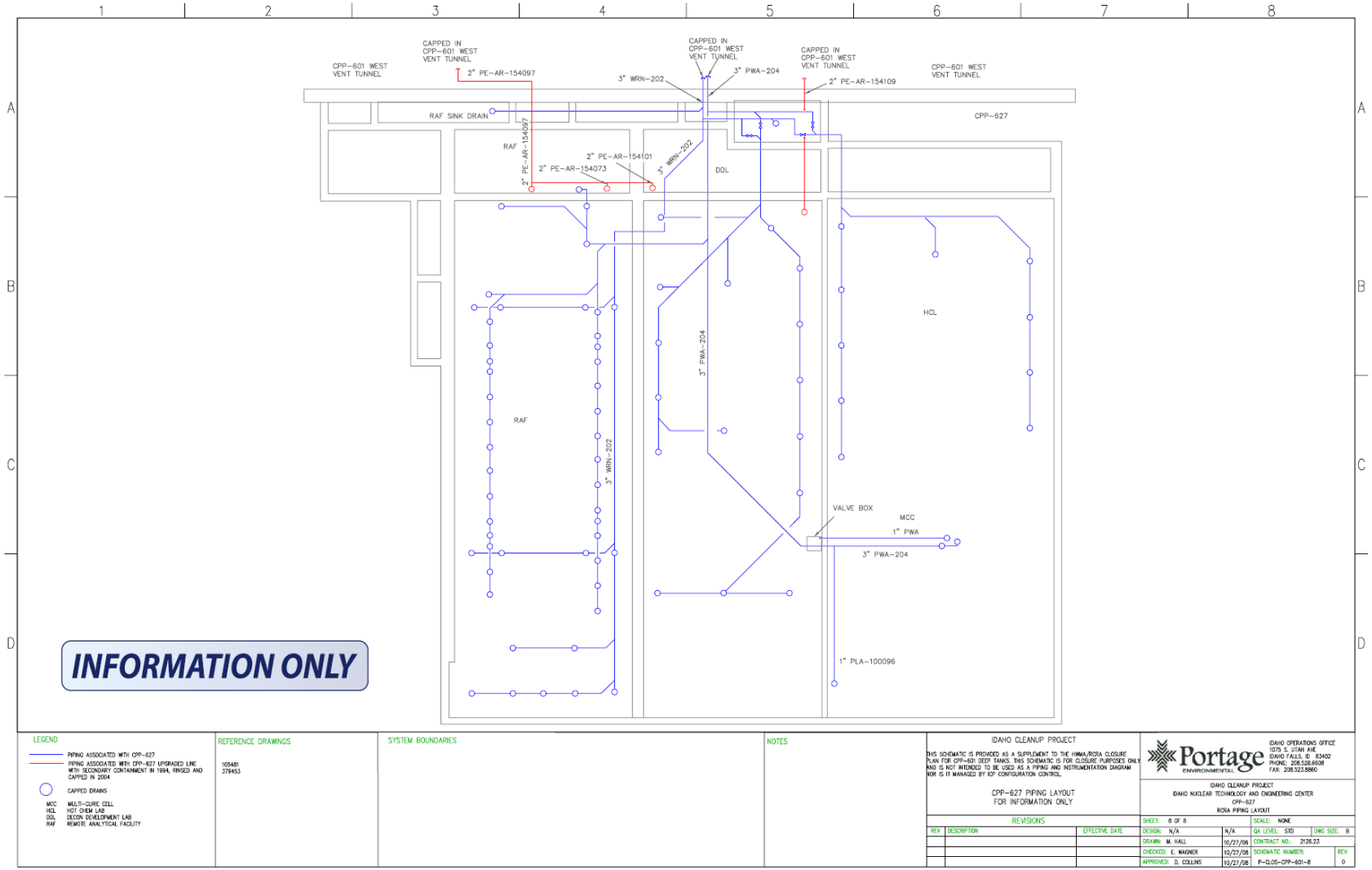

Figure A-8. Schematic P-CLOS-CPP-601-8. CPP-601 HWMA/RCRA closure piping diagram.

HWMA/RCRA INTEC POST-CLOSURE PERMIT
FOR THE
IDAHO NATIONAL LABORATORY

Volume 21
Waste Calcining Facility and CPP-601/627/640

Attachment 1
Required Notices

Revision Date: August 25, 2011

INEEL
IDAHO NATIONAL ENGINEERING & ENVIRONMENTAL LABORATORY

LOCKHEED MARTIN

Lockheed Martin Idaho Technologies Company
P.O. Box 1625 Idaho Falls, ID 83415

June 10, 1999

Mr. D. L. Wessman
U.S. Department of Energy
Idaho Operations Office
850 Energy Drive, MS 1146
Idaho Falls, ID 83401-1563

WASTE CALCINING FACILITY (CPP-633) CLOSURE PLAT - KM-52-99

Dear Mr. Wessman:

Attached are 4 mylars of the closure plat and record of waste for the Waste Calcining Facility (WCF) for DOE-ID sign-off. The survey plat and record of waste is required to be prepared and filed in accordance with Sections 4.6 and 4.7.2 of the WCF Closure Plan, respectively. The mylars will be managed in the following manner:

1. 1 copy to be transmitted by DOE-ID to the Idaho Division of Health and Welfare (IDHW) Director (Section 4.7.2 of the closure plan).
2. The remaining copies will be submitted to the Butte County Clerk and Recorder for recordation. On behalf of DOE-ID, LMITCO will submit these documents to the Clerk and Recorder. 1 copy will remain in Butte County for permanent record, while the remaining 2 copies, with the County filing information, will be returned to DOE-ID and LMITCO for recording in the closure file.

After these documents are filed with the Clerk and Recorder, the Professional Engineer (PE) will be provided a copy to include in the PE closure certification supporting documents. LMITCO will also provide a copy to the Bureau of Land Management for inclusion in their government land records.

At this time, it is proposed that a "Certification of Notice" to comply with Section 4.7.4 of the WCF Closure Plan will be prepared to identify recordation of the documents with Butte County and the IDHW Director. This notice will be included in the Owner/Operator Certification package.

If additional information or clarification is needed concerning this plat, please feel free to contact Lee Tuott at 526-7990.

Sincerely,

Kliss McNeel, Manager
RCRA/TSCA Policy and Permitting Department

LCT:kd

Attachment:

cc: w/ attachment
K. Davis, Jason Assoc.
M. E. Davis, LMITCO, MS 5218
K. L. Falconer, LMITCO, MS 3940
B. J. Frazee, LMITCO, MS 3921
J. E. Hovinga, LMITCO, MS 5108
J. M. Jackson, LMITCO, MS 3428
K. O. Kingsford, LMITCO, MS 3650
D. A. Love, LMITCO, MS 3899
K. L. Miller, LMITCO, MS 5117
B. D. Nield, LMITCO, MS 5304
J. J. Saye, LMITCO, MS 3428
L. C. Tuott, LMITCO, MS 3428
M. Vorachek, LMITCO, MS 5240
RCRA Closure File
K. McNeel File

Department of Energy
Idaho Operations Office
850 Energy Drive
Idaho Falls, Idaho 83401-1563

July 1, 1999

CERTIFIED MAIL P 298 171 963
RETURN RECEIPT REQUESTED

Regional Administrator
c/o Mr. Brian Monson, Program Manager
Hazardous Waste Program Office
Idaho Division of Environmental Quality
1410 North Hilton
Boise, Idaho 83706-1255

SUBJECT: Owner/Operator Certification, Certification of Notice and the Professional Engineer's Certification of the Waste Calcining Facility (OPE-EP&SA-112-99)

Dear Mr. Monson:

Enclosed are one original and one copy of the Owner/Operator Certification and the Certification of Notice of the Hazardous Waste Management Act closure of the Waste Calcining Facility. Included with the enclosure are the *Supporting Documentation for the HWMA/RCRA Closure Certification of the Waste Calcining Facility*, the Professional Engineer Certification and mylars of the CPP-633 HWMA/RCRA Closure Plats recorded by Butte County.

If you have any questions on this matter, please contact me at (208) 526-0082

Sincerely,

D. L. Wessman

David L Wessman
Environmental Specialist

Enclosures

cc w/encl:
Roberta Hedeen, EPA Region 10, Seattle, Washington

Certification of Notice

The undersigned hereby certify that the notation and information, as specified in Section 4.7.3 of the June, 1997 "*HWMA Closure Plat for the Waste Calcining Facility at the Idaho National Engineering and Environmental Laboratory,*" has been performed. A copy of the recorded plat, entitled the "*CPP-633 HWMA/RCRA Closure Plat, Waste Calcining Facility, INEEL*" and the attached "*Record of Waste*" is provided to the IDHW Director for filing and to document compliance with the requirements of the closure plan.

The information required by Section 4.7.3 is prominently displayed on the face of the plat under the title "*Property Restrictions and Notations.*" This serves to notify any potential purchaser that hazardous wastes remain on the property and identify the restrictions associated with the future use of the property.

On June 21, 1999, the plat was recorded by the Butte County Clerk and Recorder. In accordance with Idaho law, the recording of the plat establishes a permanent document in the land records of Butte County. Prior to the submittal to the Clerk and Recorder, the plat was submitted to the Butte County Commissioners for approval of the plat. The Butte County Attorney determined that the "*Acceptance*" of the plat by the Butte County Commissioners and the "*Treasurer's Certificate*" was not required. Based on this determination, the plat was filed by the Clerk and Recorder with these sections marked "Not Required."

Owner/Operator Signature: Beverly A Cook

Owner/Operator Name: Beverly A. Cook

Title: Manager, DOE Idaho Operations Office

Date: 7/1/99

Co-Operator Signature: William W. Gm

Co-Operator Name: Harold T. Conner, Jr.

Title: Executive Vice President of Operations and Chief Operating Officer, Lockheed Martin Idaho Technologies Company

Date: JULY 1, 1999

Attachment: "*CPP-633 HWMA/RCRA Closure Plat, Waste Calcining Facility, INEEL*" *and includes the "Record of Waste."*

OWNER/OPERATOR CERTIFICATION

Hazardous Waste Management Act (HWMA)/Resource Conservation and Recovery Act (RCRA) Closure Certification of the Waste Calcining Facility (CPP-633) at the Idaho National Engineering and Environmental Laboratory

The undersigned certify as required per IDAPA 16.05.01.012 [40 CFR 270.11 (d) and 270.30 (k)] as follows:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations.

Owner/Operator Signature: Beverly A Cook

Owner/Operator Name: Beverly A. Cook

Title: Manager, DOE Idaho Operations Office

Date: 7/1/99

Co-Operator Signature: William W. Lim

Co-Operator Name: Harold T. Conner, Jr.

Title: Executive Vice President of Operations and Chief Operating Officer, Lockheed Martin Idaho Technologies Company

Date: JULY 1, 1999

Attachments:

- "Supporting Documentation for HWMA/RCRA Closure Certification of the Waste Calcining Facility" June 1999
- "Professional Engineer Certification" June 28, 1999
- "Certification of Notice"

INEEL
IDAHO NATIONAL ENGINEERING & ENVIRONMENTAL LABORATORY

LOCKHEED MARTIN

Lockheed Martin Idaho Technologies Company
P.O. Box 1625 Idaho Falls, ID 83415

July 19, 1999

Mr. Bruce Bass
Bureau of Land Management
1405 Hollipark Dr.
Idaho Falls, Idaho 83401

TRANSMITTAL OF THE RECORDED PLAT FOR THE HAZARDOUS WASTE MANAGEMENT ACT (HWMA)/RESOURCE, CONSERVATION, AND RECOVERY ACT (RCRA) CLOSURE OF THE WASTE CALCINING FACILITY (CPP-633) UNIT - KM-69-99

Dear Mr. Bass:

Attached for the Bureau of Land Management land records is the mylar of the plat and record of waste for the Waste Calcining Facility (CPP-633) closure. The Waste Calcining Facility (WCF) is located at the Idaho Nuclear Technology and Engineering Center (INTEC) at the Idaho National Engineering and Environmental Laboratory (INEEL). The plat and record of waste were filed with Butte County to comply with the requirements identified in the State of Idaho-approved Hazardous Waste Management Act (HWMA)/Resource Conservation and Recovery Act (RCRA) Closure Plan for the Waste Calcining Facility.

These documents support the closure of the WCF to a landfill standard. The plat identifies pertinent information supporting the closure such as the footprint of the building and cap, coordinates of the cap, and restrictions for future use of the property. The record of waste identifies the approximate location and volume of waste that remains in the WCF.

If you have any questions relating to activities associated with this closure action, please contact Lee Tuott at 526-7990.

Sincerely,

JM Jackson for

K. McNeel, Manager
RCRA/TSCA Policy and Permitting

LCT:kd

Attachment

STATE OF IDAHO
DIVISION OF
ENVIRONMENTAL QUALITY

ENV-00229

1410 North Hilton • Boise, Idaho 83706-1255 • (208) 373-0502

Dirk Kempthorne, Governor
C. Stephen Allred, Administrator

November 2, 1999

CERTIFIED MAIL # P 241 839 649

RECEIVED
NOV 04 1999
Office of Program Execution

Dave Wessman
DOE - Idaho Operations Office
850 Energy Drive
Idaho Falls, ID 83401-1563

Dear Mr. Wessman:

Re: June 1999 Closure Certification (Certification) for the 1997 Hazardous Waste Management Act Closure Plan of the Waste Calcine Facility (WCF) at the Idaho National Engineering and Environmental Laboratory, EPA ID No. ID4890008952

DEQ has reviewed the Certification and supporting documents and conducted an inspection of the WCF. Based upon this review and unit inspection, DEQ hereby acknowledges completion of the activities specified in the approved Closure Plan.

In accordance with Section 5 of the approved Closure Plan, the substantive post-closure care requirements of IDAPA 16.01.05.009 [40 CFR §265.310] for the WCF will be addressed under CERCLA as Applicable or Relevant and Appropriate Requirements (ARARs) under the Final Record of Decision and Post-Record of Decision Monitoring Plan for Operable Unit 3-13.

During the preparation of the Post-Record of Decision Monitoring Plan, DEQ requests DOE to preform quarterly monitoring to meet the substantive requirements of IDAPA 16.01.05.009 [40 CFR §265.310(b)]. The Monitoring Plan shall include the following:

- Maintain and monitor the effectiveness of the closure cap.
- Ensure proper run on and runoff of the cover cap.
- Protect and maintain surveyed benchmarks.
- Perform quarterly groundwater monitoring events or adequately describe how a current groundwater monitoring system will sufficiently monitor any contamination from the WCF.

The interim Inspection Schedule shall be submitted within 90 days of receipt of this letter, in accordance with IDAPA 16.01.05.009 [40 CFR §265.118].

If you have any questions or comments, please contact Dinah Little at 208/373-0426.

Sincerely,

Robert E. Bullock
Hazardous Waste Permit Coordinator
State Waste Management & Remediation Program Office

REB/DEL/ra INEEL99\WCFCERT.LTR

cc: Jeff Hunt, EPA Region 10
Rensay Owen, IFRO
INipwc
COF