ATTACHMENT 1 FACILITY DESCRIPTION and Maps of Facility Locations, consisting of:

- Introduction of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.
- Part A Application of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.
- Facility Description, Section A of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.
- Facility Location Information, Section F of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.
- Description of Topographic Maps, Section I, and Waste Calcine Facility Topographic Map of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.
- Waste Calcine Facility Closure Plan, Appendix I of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.
- Engineering Design File, Appendix III of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility as last revised September 2002.
- Required Notices. Appendix III of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility as last revised September 2002.

- Introduction of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.

Waste Calcining Facility Hazardous Waste Management Act/Resource Conservation and Recovery Act Post-Closure Part B Permit Application

INTRODUCTION

This Hazardous Waste Management Act/Resource Conservation and Recovery Act Post-Closure Part B Permit Application is for the Waste Calcining Facility, located at the Idaho Nuclear Technology and Engineering Center of the U.S. Department of Energy's Idaho National Engineering and Environmental Laboratory. The Department of Energy employs a variety of contractors to operate the Idaho National Engineering and Environmental Laboratory's numerous facilities and operations. The Certification, as contained in Section L of this volume, reflects the current management and operating contractor. This application consists of the following sections:

A. Facility Description
B. Security Procedures and Equipment
C. Preparedness and Prevention
D. General and Specific Inspection Schedule
E. Maintenance Activities
F. Facility Location Information
G. Copy of the Closure and Post-Closure Plans
H. Required Notices
I. Topographic Maps
J. Additional Information
K. Solid Waste Management Units
L. Certification
M. References.

Supporting material is provided in the appendices, as follows:

I Closure Plan for the WCF
II Inspection Forms
III Engineering Design File for the WCF
IV Required Notices
V Maps and Drawings
VI Perched Groundwater Monitoring Results
VII Snake River Plain Aquifer Monitoring Results
VIII Geologic and Hydrogeologic Characterization of the INEEL and INTEC
IX Sampling and Analysis Plan Tables

BACKGROUND

The Waste Calcining Facility (WCF) is located within the Idaho Nuclear Technology and Engineering Center (INTEC) of the Department of Energy's Idaho National Engineering and Environmental Laboratory (INEEL). 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 (DOE Idaho Operations Office [DOE-ID] 1997). The WCF was closed under an approved Hazardous Waste Management Act (HWMA) closure plan (see Appendix I). 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 (IDEQ)[1] approved the closure certification on November 2, 1999.

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 Engineering and Environmental 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 (see Appendix I). The IDEQ 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, IDEQ 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 IDEQ also required that, in the interim, INEEL 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, INEEL submitted a revised interim post-closure plan and groundwater monitoring proposal. On February 13, 2001, IDEQ rejected the interim WCF post-closure monitoring plan and indicated that allowing INEEL 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. IDEQ 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 (see Appendix I) allowing post-closure care under the FFA/CO will be superceded and the requirements for post-closure care performed in accordance with the HWMA/RCRA post-closure permit issued pursuant to this application.

[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.

This application is intended to demonstrate how the INEEL will comply 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. Regarding groundwater monitoring requirements, the IDEQ has requested that in lieu of submitting a revised interim status groundwater monitoring plan the INEEL submit a RCRA Part B post-closure permit application. Therefore, the focus on developing and submitting a groundwater monitoring plan (submitted in the application only) has been to develop and submit a plan that meets the IDAPA 58.01.05.008 (40 CFR § 264 Subpart F) requirements for permitted facilities.

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 INEEL 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 INEEL 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 INEEL 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; Section 3008 (h) of RCRA, 42 U.S.C. § 6928 (h), for interim status facilities; 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.

- Part A Application of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.

Form Approved OMB No. 2050-0034 Expires 10/31/02
GSA No. 0248-EPA-OT

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

For EPA Regional Use Only

Date Received
Month Day Year

EPA

United States Environmental Protection Agency
Washington, DC 20460

Hazardous Waste Permit Application Part A

(Read the Instructions before starting)

I. Facility's EPA ID Number *(Mark 'X' in the appropriate box)*

[ ] **A. First Part A Submission**

[X] **B. Part A Submission for Volume 21 Post-Closure Permit Application-February 2002**

C. Facility's EPA ID Number	D. Secondary ID Number *(if applicable)*
ID4890008952	

II. Name of Facility

IDAHO NATIONAL ENGR & ENV LAB

III. Facility Location *(Physical address not P.O. Box or Route Number)*

A. Street

Street *(Continued)*

City or Town	State	Zip Code
SCOVILLE	ID	83415-

County Code *(if known)*	County Name
	BUTTE, CLARK, JEFFERSON, BONNEVILLE, BINGHAM

B. Land type (Enter code)	C. Geographic Location		D. Facility Existence Date
	LATITUDE (Degrees, minutes, & seconds)	*LONGITUDE (Degrees, minutes, & seconds)*	Month Day Year
F	43 31 44	112 56 31	06 01 1949

IV. Facility Mailing Address

Street or P.O. Box

850 ENERGY DRIVE

City or Town	State	Zip Code
IDAHO FALLS	ID	83401-

V. Facility Contact *(Person to be contacted regarding waste activities at facility)*

Name *(Last)*	*(First)*
RASCH	DONALD N

Job Title	Phone Number *(Area Code and Number)*
ENVIR. PROGRAMS	208-526-1511

VI. Facility Contact Address *(See instructions)*

A. Contact Address Location [X] Mailing [ ] Other [ ]

B. Street or P.O. Box

850 ENERGY DRIVE

City or Town	State	Zip Code
IDAHO FALLS	ID	83401-

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

EPA ID Number (Enter from page 1)	Secondary ID Number (Enter from page 1)
ID4890008952	

VII. Operator Information (See instructions)

A. Name of Operator: BECHTEL BWXT IDAHO LLC

Street *or P.O. Box*: PO BOX 16225

City or Town	State	Zip Code
IDAHO FALLS	ID	83415-

Phone Number *(Area Code and Number)*: 208-526-2926

B. Operator Type: O*

C. Change of Operator Indicator: Yes [ ] No [X]

Date Changed: Month / Day / Year

VIII. Facility Owner *(See instructions)*

A. Name of Facility's Legal Owner: US DOE IDAHO OPERATIONS OFFICE

Street *or P.O. Box*: 850 ENERGY DRIVE

City or Town	State	Zip Code
IDAHO FALLS	ID	83401-

Phone Number *(Area Code and Number)*: 208-526-5665

B. Owner Type: F

C. Change of Owner Indicator: Yes [ ] No [X]

Date Changed: Month / Day / Year

IX. NAICS Codes *(in order of significance; start in left box)*

First		Third	
541710	*(Description) Research & Development in the Physical, Engineering and Life Sciences*	336992	*(Description) Military Armored Vehicle, Tank and Tank Component Manufacturing*
Second		**Forth**	
924110	*(Description) Administration of Air & Water Resource and Solid Waste Management Programs*		*(Description)*

X. Other Environmental Permits *(See instructions)*

A. Permit Type (Enter Code)	B. Permit Number	C. Description
R	ID4890008952	Final HWMA Storage Permit for the RWMC on the INEEL
R	ID4890008952	Final Partial Permit for the WERF/WROC
R	ID4890008952	Final Partial Permit for the THWS
R	ID4890008952	HWMA/RCRA Part B Permit Application for the INEEL
P, E, N, F, U		See Item X. Supplement - pages 2a through 2f.

Supplement to Item X
'Other Environmental Permits'

AIR PERMITS

(Permit Type P)

Idaho National Engineering and Environmental Laboratory (INEEL)

- **Title V Operating Permit Application** (Permit Pending)

Central Facilities Area (CFA)

Permit to Construct (PTC) (Permit Number PTC-023-00001)

- Boiler for Space Heating at CFA 609 HQ/SRT Building
- CFA boilers permitted under the INTEC Site-wide NOx permit, dated 10/8/99:
  - CFA-650-007, CFA-662-011, CFA-662-027, CFA-668-002, CFA-671-007, CFA-671-008, CFA-688-043, CFA-688-044

Idaho Nuclear Technology and Engineering Center (INTEC)

PTC/Prevention of Significant Deterioration (PSD) (Permit Number PTC-023-00001)

- ICPP Coal Fired Steam Generation Facility (Permit Number EPA PSD-X81-11) - The request to cancel this PTC has been submitted to EPA, no response has been received.
- Idaho Nuclear Technology and Engineering Center, Nitrogen Oxide Sources
- Idaho Chemical Processing Plant Pilot Plants, CPP-637
- Fuel Storage Area-Rack Reconfiguration Project, CPP-737
- CPP-1619 Liquid Waste Storage Facility
- New Waste Calcining Facility/Decontamination Area, CPP-659
- CPP-606 Distillate Oil-Fired Boilers and INTEC Distillate Oil-fired Portable Boilers
- CPP TMI Fuel Storage (Storage is regulated under the NRC - not the state)

Radioactive Waste Management Complex (RWMC)

PTC/PSD (Permit Number PTC-023-00001)

- WMF-734, 810 Horsepower Generator

Test Area North (TAN)

PTC/PSD (Permit Number PTC-023-00001)

- SMC Consolidated Activities
- TAN-603 Boilers #4 and #5
- TAN-607 Fuel Dewatering/Drying

Supplement to Item X
'Other Environmental Permits'

AIR PERMITS (continued)

Test Reactor Area (TRA)

PTC (Permit Number PTC-023-00001)

- TRA-715 Evaporation Pond

PTC (Application submitted to DEQ January 2001)

- TRA-674-M-6 Generator (permit has not been issued yet)

Waste Reduction Operations Complex/Power Burst Facility (WROC/PBF)

- WROC/PBF boiler permitted under the INTEC Site-wide NOx permit, dated 10/8/99:
  - PER-620-023.

National Emission Standards for Hazardous Air Pollutants (NESHAPS)

(Permit Type E)

- SMC Project
- CFA Lab Complex #3, CFA-625
- Liquid Effluent Treatment and Disposal (LET&D), CPP-1618
- Bin Set #7, ICPP
- NWCF Filter Leach Facility, CPP-659
- Decontamination Support Facility, TAN
- Hazardous Chemical and Radioactive Waste Staging Facility, CPP-1619
- Waste Storage Area (RWMC)
- RWMC Drum Venting
- WERF Waste Compaction
- WERF Waste Stabilization
- SPERT II Waste Stabilization WEDF at PBF
- TSA Retrieval Enclosure/Waste Storage Facility
- TRA Warm Waste Evaporation Pond
- TRA Tritium Laboratory
- TRA-661 Laboratory Addition
- IRC Radiotracer Use
- TAN TMI 2 Independent Spent Fuel Storage Installation

Supplement to Item X
'Other Environmental Permits'

WATER PERMITS

Clean Water Act Notifications/Permits/Plans

(Permit Type N, E)

Idaho Falls Industrial Waste Acceptance (IWA) Form (permit) covers 15 facilities in Idaho Falls; 13 of these facilities are operated by the DOE-designated contractor and 2 are operated by the DOE-ID. These facilities have Industrial Pretreatment Disclosure Forms (IPDFs) submitted and are permitted with an effective date of November 7, 2000 and an expiration date of January 1, 2005. The IWA Forms (permits) are as follows:

- INEEL Research Complex: IF-601, IF-602, IF-603, IF-611, IF-627, IF-638, IF-655, IF-657, IF-658
- IF-604A,IF-604B Technical Support Annex and Technical Support Building
- IF-605 Electric Vehicle Building
- IF-606 DOE-ID South
- IF-608 INEEL Supercomputing Center
- IF-609 DOE-ID North
- IF-613 North Boulevard Annex
- IF-614 May Street North
- IF-615 May Street South
- IF-616 Willow Creek Building and IF-617 Willow Creek Mechanical Building
- IF-619 North Holmes Complex, Unit I (cancelled 10/15/01)
- IF-631 Bus Dispatch Building
- IF-639 North Holmes Laboratory
- IF-651 North Yellowstone Laboratory
- IF-654 Engineering Research Office Building

• NPDES General Permit for Storm Water Discharges from Construction Activities
- DOE-ID Permit No. - IDR10A339
- Bechtel BWXT Idaho, LLC Permit No. - IDR10A432

• NPDES Storm Water Multi-Sector General Permit for Industrial Activities
- DOE-ID Permit No. - IDR05A60F
- Bechtel BWXT Idaho, LLC (BBWI) Permit No. - IDR05A422

Supplement to Item X
'Other Environmental Permits'

Clean Water Act Notifications/Permits/Plans (continued)

- Spill Prevention Control and Countermeasures (SPCC) Plans (INTEC, RWMC, TAN facilities only - not required at any other INEEL facilities)
- Oil Pollution Prevention Act, "No Substantial Harm Certifications"

EPA 404 - Dredge or Fill Permits under Section 303 of the CWA

(Permit Type F)

- Spreading Area B, RWMC (Permit Number - NWP 930301750)

State of Idaho Underground Injection Well Permits [Idaho Department of Water Resources (IDWR)]

(Permit Type U)

- SPERT Disposal I, Well 34-W-3-1
- SPERT Disposal II, Well 34-W-3-2
- SPERT Disposal III, Well 34-W-3-3
- CFA Disposal, Well 34-W-3-4
- TAN Disposal I, Well 34-W-3-5
- TAN Disposal II, Well 34-W-3-6
- TAN Disposal III, Well 34-W-3-7
- IRC Closed-Loop Heat Pump Return, Well 25-W-62
- Annual INEEL Shallow Injection Well Inventory (permit by rule)

State of Idaho Monitoring Well Permits (IDWR)

(Permit Type U)

INEEL 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)

- Central Facilities Area - Sewage Treatment Plant -Permit Number LA-000141-01
- Idaho Nuclear Technology and Engineering Center Service Wastewater Discharge Facility Percolation Ponds - Permit Number LA-000130-02.
- Idaho Nuclear Technology and Engineering Center New Percolation Ponds – Permit Number LA-000130-03.

Supplement to Item X
'Other Environmental Permits'

State of Idaho WLAP Permits (continued)

- Idaho Nuclear Technology and Engineering Center - Sewage Treatment Plant - Permit Number LA-000115-02.
- TAN WRRTF STP - Application was submitted to the DEQ on May 26, 1996. Written authorization to operate while the permit application is being processed was received from the DEQ on January 19, 2001. The WRRTF is shut down and cancellation of the permit application was requested August 30, 2001.
- Test Area North Technical Support Facility Sewage Treatment Facility- Permit Number LA-000153-01.)
- TRA Cold Waste - Application was submitted to the DEQ on January 7, 1997. Written authorization to operate while the permit application is being processed was received from the DEQ on January 19, 2001.

Ground Water Rights

(Permit Type E)

INEEL operates under a Federal Reserved Water Right for groundwater use, as well as negotiated agreements with the State of Idaho.

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

EPA ID Number (Enter from page 1)	Secondary ID Number (Enter from page 1)
I D 4 8 9 0 0 0 8 9 5 2	

XI. Nature of Business (Provide a brief description)

The Idaho National Engineering and Environmental Laboratory was established in 1949, as a center where nuclear power reactors and support facilities could be built, tested, and operated. The INEEL Site covers approximately 890 square miles and is 25 miles west of Idaho Falls, ID. For many years the INEEL was the site of the largest nuclear power research & development effort in the world. During the 1970's the INEEL'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 INEEL is a science-based, applied engineering national laboratory dedicated to completing its waste cleanup mission and meeting the nations environmental, energy, nuclear science and technology, and national security needs.

XII. Process Codes and Design Capacities

A. PROCESS CODE - *Enter the code from the list of process codes below that best describes each process to be used at the facility. Thirteen lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, TO4 and X99), describe the process (including its design capacity) in the space provided in item XIII.*

B. PROCESS DESIGN CAPACITY - *For each code entered in column A, 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 column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.*

C. PROCESS TOTAL NUMBER OF UNITS - *Enter the total number of units used with the corresponding process code .*

PROCESS CODE	PROCESS	APPROPRIATE UNITS 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 or 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 (Barrel, Drum, Etc.)	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; Cubic Meters; Hectares; or Cubic Yards
S06	Containment Building	Cubic Yards or Cubic Meters
S99	Other Disposal	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 or 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
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	
T83	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, or Refining Furnace	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 Hour; Liters Per Hour; or Million Btu Per Hour
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	
T92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed in 40 CFR 260.10	
T94	Containment Building - Treatmemt	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 Listed 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;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 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
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V

UNIT OF MEASURE	UNIT OF MEASURE CODE
Short Tons Per Hour	D
Metric Tons Per Hour	W
Short Tons Per Day	N
Metric Tons Per Day	S
Pounds Per Hour	J
Kilograms Per Hour	R
Million Btu Per Hour	X

UNIT OF MEASURE	UNIT OF MEASURE CODE
Cubic Yards	Y
Cubic Meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
Btu Per Hour	I

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

EPA ID Number (Enter from page 1)	Secondary ID Number (Enter from page 1)
I D 4 8 9 0 0 0 8 9 5 2	

XII. Process Codes and Design Capabilities *(continued)*

EXAMPLE FOR COMPLETING ITEM XII (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 (Enter code)	C. Process Total Number of Units	For Official Use Only
X	1	S	0	2	533.788	G	001	
	1	D	8	0	INTEC - WCF 59**	Y	003	
	2							
	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, TO4 and X99) in item XIII.

XIII. Other Processes *(Follow instructions from item XII for D99, S99, TO4 and X99 process codes)*

Line Number (Enter #s in seq w/XII)		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY 1. AMOUNT (Specify)	B. PROCESS DESIGN CAPACITY 2. Unit of Measure (Enter code)	C. Process Total Number of Units	D. Description of Process
X	1	T	O	4				In-situ Vitrification

**Radioactive Mixed Waste ***Hazardous and/or Radioactive Mixed Waste

Supplement A to Item XII
'Process Codes and Design Capacities'

LINE NUMBER	PROCESS TYPE UNIT NAME		PROCESS DESIGN CAPACITY
1	**D80 INTEC WCF includes:** • CPP-633 WCF 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**

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

EPA ID Number (Enter from page 1)	Secondary ID Number (Enter from page 1)
I D 4 8 9 0 0 0 8 9 5 2	

XIV. Description of Hazardous Wastes

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 column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column 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 column 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 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 column A select the code(s) from the list of process codes contained in item XII A. on page 3 to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in item XII 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 XIV-D(1).
3. Use additional sheet, enter line number from previous sheet, and enter additional code(s) in item XIV-E.

2. PROCESS DESCRIPTION: *If a code is not listed for a process that will be used, describe the process in the space* provided on the form (D.(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 column A. On the same line complete columns B, C and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.

2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column 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 XIV (shown in line number 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 operation. 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 QUANTITY OF WASTE*	*C. UNIT OF MEASURE (Enter code)*	*D. PROCESS (1) PROCESS CODES (Enter)*									*(2) PROCESS DESCRIPTION (if a code is not entered in 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 XIV. DESCRIPTION OF HAZARDOUS WASTE UNITS

Unit Name

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

EPA I.D. Number (Enter from page 1)											Secondary ID Number (Enter from page 1)											
I	D	4	8	9	0	0	0	8	9	5	2											

XIV. Description of Hazardous Wastes *(Continued)*

Line Number		A. EPA HAZARDOUS WASTE NO. (Enter Code)				B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)								(2) PROCESS DESCRIPTION (if a code is not enter in D(1))
	1	D	0	0	4	59	Y	D	8	0						CPP-633 WCF Evaporator
	2	D	0	0	5											Included with the above
	3	D	0	0	7											Included with the above
	4	D	0	0	8											Included with the above
	5	D	0	0	9											Included with the above
	6	D	0	1	0											Included with the above
	7	D	0	1	1											Included with the above
	8	F	0	0	1											Included with the above
	9	F	0	0	2											Included with the above
1	0	F	0	0	5											Included with the above
1	1	U	1	3	4											Included with the above
1	2															
1	3															
1	4															
1	5															
1	6															
1	7															
1	8															
1	9															
2	0															
2	1															
2	2															
2	3															
2	4															
2	5															
2	6															
2	7															
2	8															
2	9															
3	0															
3	1															
3	2															
3	3															

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

EPA I.D. Number (Enter from page 1)											Secondary ID Number (Enter from page 1)											
I	D	4	8	9	0	0	0	8	9	5	2											

XIV. Description of Hazardous Wastes *(Continued)*

Line Number		A. EPA HAZARDOUS WASTE NO. (Enter Code)				B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)								(2) PROCESS DESCRIPTION (if a code is not enter in 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 the above
	3	D	0	0	7											Included with the above
	4	D	0	0	8											Included with the above
	5	D	0	0	9											Included with the above
	6	D	0	1	0											Included with the above
	7	D	0	1	1											Included with the above
	8	F	0	0	1											Included with the above
	9	F	0	0	2											Included with the above
1	0	F	0	0	5											Included with the above
1	1	U	1	3	4											Included with the above
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3	0															
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3	3															

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

EPA I.D. Number (Enter from page 1)											Secondary ID Number (Enter from page 1)											
I	D	4	8	9	0	0	0	8	9	5	2											

XIV. Description of Hazardous Wastes *(Continued)*

Line Number		A. EPA HAZARDOUS WASTE NO. (Enter Code)				B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)								(2) PROCESS DESCRIPTION (if a code is not enter in D(1))
	1	D	0	0	4	59	Y	D	8	0						CPP-633 WCF Storage Tanks
	2	D	0	0	5											Included with the above
	3	D	0	0	7											Included with the above
	4	D	0	0	8											Included with the above
	5	D	0	0	9											Included with the above
	6	D	0	1	0											Included with the above
	7	D	0	1	1											Included with the above
	8	F	0	0	1											Included with the above
	9	F	0	0	2											Included with the above
1	0	F	0	0	5											Included with the above
1	1	U	1	3	4											Included with the above
1	2															
1	3															
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Item XVII Photographs

Waste Calcining Facility (WCF) - Looking West at the WCF Concrete Cap.

Waste Calcining Facility (WCF) - Looking East at the WCF Concrete Cap.

Please print or type with ELITE type (12 characters per inch) in the unshaded areas only

EPA ID Number (Enter from page 1)	Secondary ID Number (Enter from page 1)
I D 4 8 9 0 0 0 8 9 5 2	

XV. Map

Attach to this application a topographic 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. **See HWMA/RCRA Part B Post-Closure Permit Application for the INEEL - Volume 21, Book 1 Revision 0, August 2001, Appendix VI - Maps and Drawings.**

XVI. Facility Drawing

All existing facilities must include a scale drawing of the facility (see instructions for more detail). **See HWMA/RCRA Part B Post-Closure Permit Application for the INEEL - Volume 21, Book 1 Revision 0, August 2001, Section A - Facility Description.**

XVII. Photographs

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

XVIII. Certification(s)

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 Signature	Date Signed
[signature]	2/05/02
Name and Official Title (Type or print) **W. E. Bergholz, Acting Manager, DOE Idaho Operations Office**	
Owner Signature	Date Signed
Name and Official Title (Type or print)	
Operator Signature* [signature]	Date Signed Feb 15, 2002
Name and Official Title (Type or print) **E. L. Watkins, Vice President and Site Operations Director Nuclear Programs and Site Operations, Bechtel BWXT Idaho, LLC**	
Operator Signature	Date Signed
Name and Official Title (Type or print)	

XIX. Comments

*** Section VII.B. Operator information "O*" = Federal Management and Operations Contractor at a Federal Facility.**

Note: Mail completed form to the appropriate EPA Regional or State Office. (Refer to instructions for more information)

- Facility Description, Section A of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.

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

The INEEL is owned by the DOE. The eastern boundary of the INEEL is located 32 mi (52 km) west of Idaho Falls, Idaho. The INEEL 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 is 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 INEEL (see Figure A-1). In 1949, the INEEL 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 INEEL facilities in accordance with the INEEL's nuclear and defense missions. More detailed facility information on the INEEL 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 INEEL Waste Management Units" (DOE-ID 2001a).

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 INEEL site, northeast of the Central Facilities Area (CFA), as shown in Figure A-1. The INTEC was initially constructed in the 1950s to reprocess 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 high-level liquid waste (HLLW) 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, tank treatment, and calciner system closure.

Additional information on the INTEC facilities can be found in *Volume 3 HWMA/RCRA Part B Permit Application* (DOE-ID 2001a).

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. The facility primarily processed high-level waste (HLW) from the first cycle of SNF extraction. 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

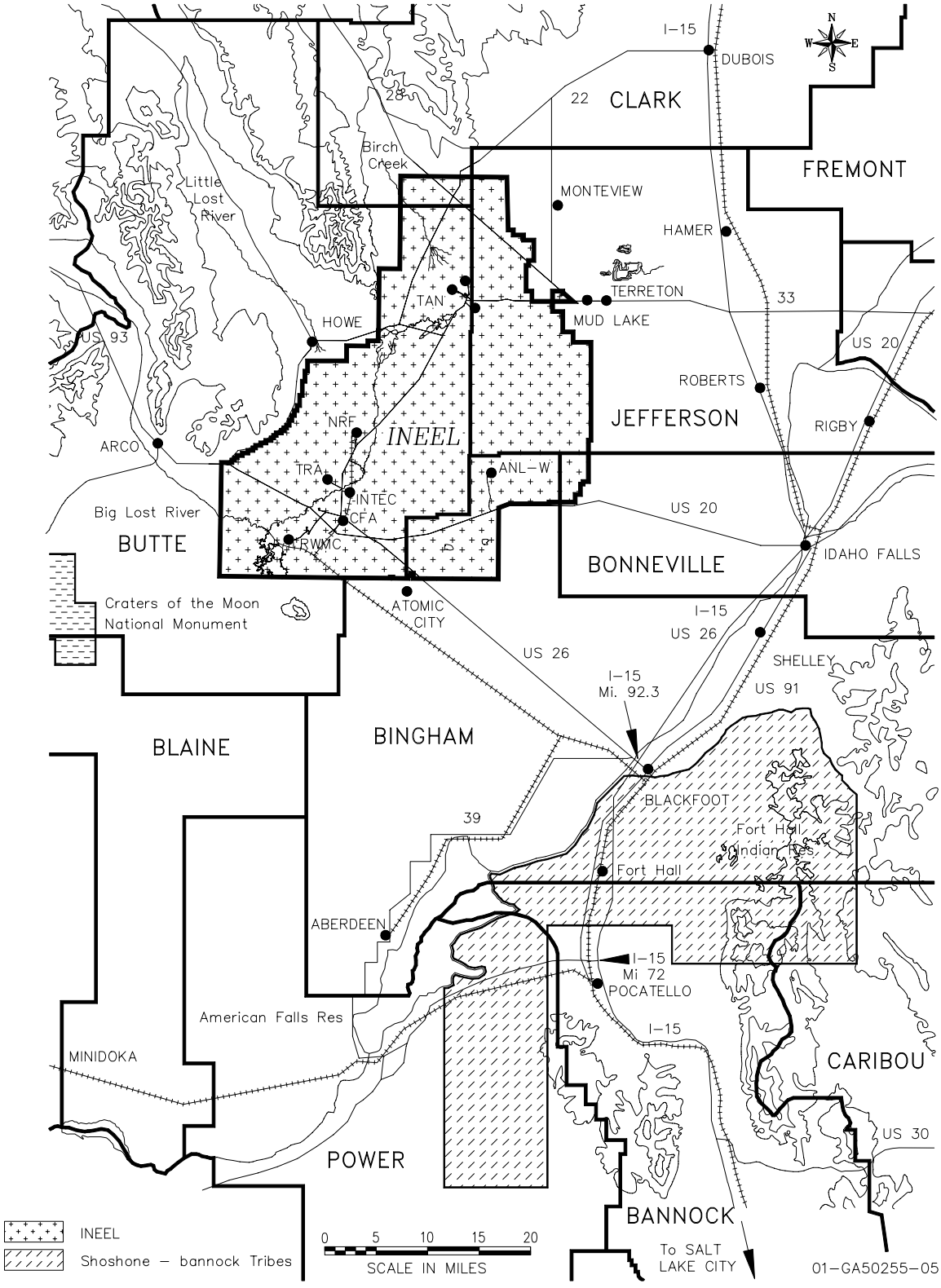
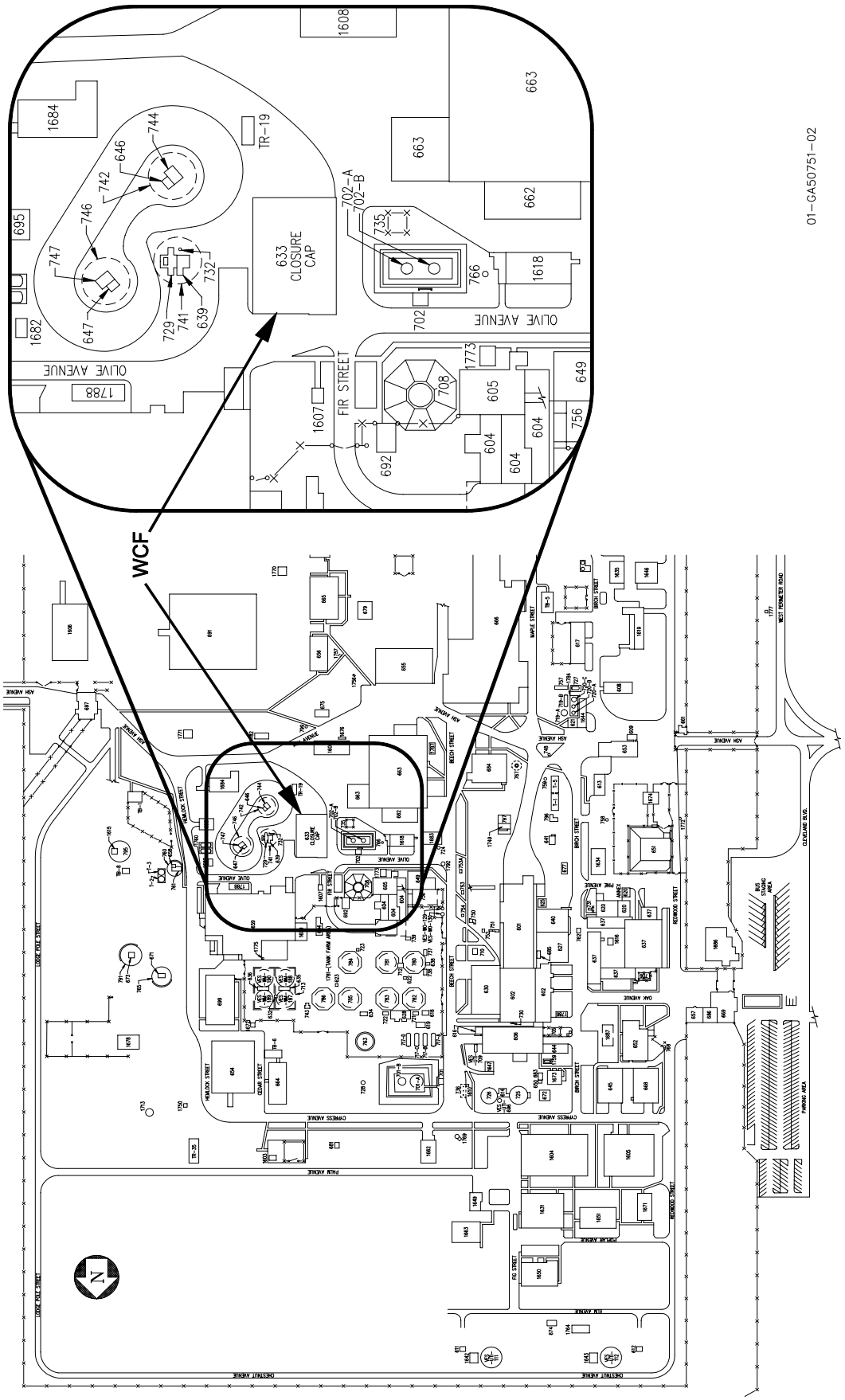


Figure A-1. Location of the INTEC at the INEEL and the surrounding area.



A-2. Waste Calcining Facility.

then transferred to bin sets. Nine campaigns were conducted at the WCF; however, successive decontamination cycles led to progressive deterioration of the equipment (see Appendix I). 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 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.

- Facility Location Information, Section F of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.

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

F.1 Seismic Standard

The WCF 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 INEEL is available in the *Volume 3 HWMA/RCRA Part B Permit Application* (DOE-ID 2001a).

F.2 Floodplain Determination

The determination of the 100-yr floodplain from the Big Lost River is currently based on a report entitled *Flood Routing Analysis for a Failure of Mackay Dam* (Koslow and Van Haaften 1986). This report presents estimated flow volumes and water surface elevations at the INEEL during a peak flow in the Big Lost River, which is considered to be the most likely source of flooding at the INEEL. This study assumes that a 100-yr peak flow and a failure of the Mackay Dam occur simultaneously. This is an extremely conservative assumption; however, it can be considered an upper bounding estimate of the hypothetical 100-yr flow rate of the Big Lost River (DOE-ID 2001b).

Based on elevation of the WCF concrete monolith, the WCF is within the floodplain boundaries as postulated in the Koslow and Van Haaften (1986) study. An Engineering Design File (EDF) discussing the various hydrodynamic and hydrostatic forces expected as a consequence of the 100-yr flood is provided in Appendix III of this permit application. The EDF also discusses how the structural and engineering studies show the design of the monolith and flood protection devices will prevent washout from a 100-yr flood event (see Appendix III). Additional information on the INEEL 100-yr floodplain determination can be found in *Volume 3 HWMA/RCRA Part B Permit Application* (DOE-ID 2001a).

- Description of Topographic Maps, Section I, and Waste Calcine Facility Topographic Map of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.

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 INEEL and the INTEC are shown in the *Volume 3 HWMA/RCRA Part B Permit Application* (DOE-ID 2001a), and in Appendix V of this application.

All of the following maps are found in the *Volume 3 HWMA/RCRA Part B Permit Application*, (DOE-ID 2001a). 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 INEEL 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 INEEL 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 Appendix V of this application and provide the following information:

- Map #1—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.

- Map #2—INTEC map showing the storm and sanitary water systems.

I.2 Wind Roses

As previously reported, the wind rose data for the INTEC is shown in Map #1 in Appendix V. 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 Map #1 (see Appendix V).

I.4 Surrounding Land Use

The federal government, the State of Idaho, and private parties own lands immediately surrounding the INEEL site. Land uses on federally owned land adjacent to the INEEL 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 INEEL are used primarily for grazing and farming; irrigated farmlands make up approximately 25% of the land bordering the INEEL.

Land immediately outside the INEEL boundaries is used mainly for free-range livestock grazing. Within INEEL boundaries, approximately 60% of INEEL land area is open (by permit) to cattle or sheep grazing. Figure I-1 identifies the selected land of the INEEL and surrounding vicinity. Some irrigation farming occurs in areas near INEEL boundaries. Large areas of land are irrigated near the Snake River, approximately 20 mi (32 km) southeast of INEEL, 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 INEEL. The larger communities of Rexburg, Idaho Falls, Blackfoot, and Pocatello are located to the east and southeast of the INEEL site. The Fort Hall Indian Reservation is located southeast of the INEEL site.

The INEEL site and adjacent areas are not likely to experience large-scale residential and commercial development primarily because the INEEL 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 INEEL 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 INEEL, 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 INEEL is a restricted area patrolled by armed security personnel. No unauthorized access is permitted. Access control to the INEEL 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 application. Details on access controls and specific security features, such as fencing, are discussed in subsequent volumes of this permit application as pertinent to specific waste management units.

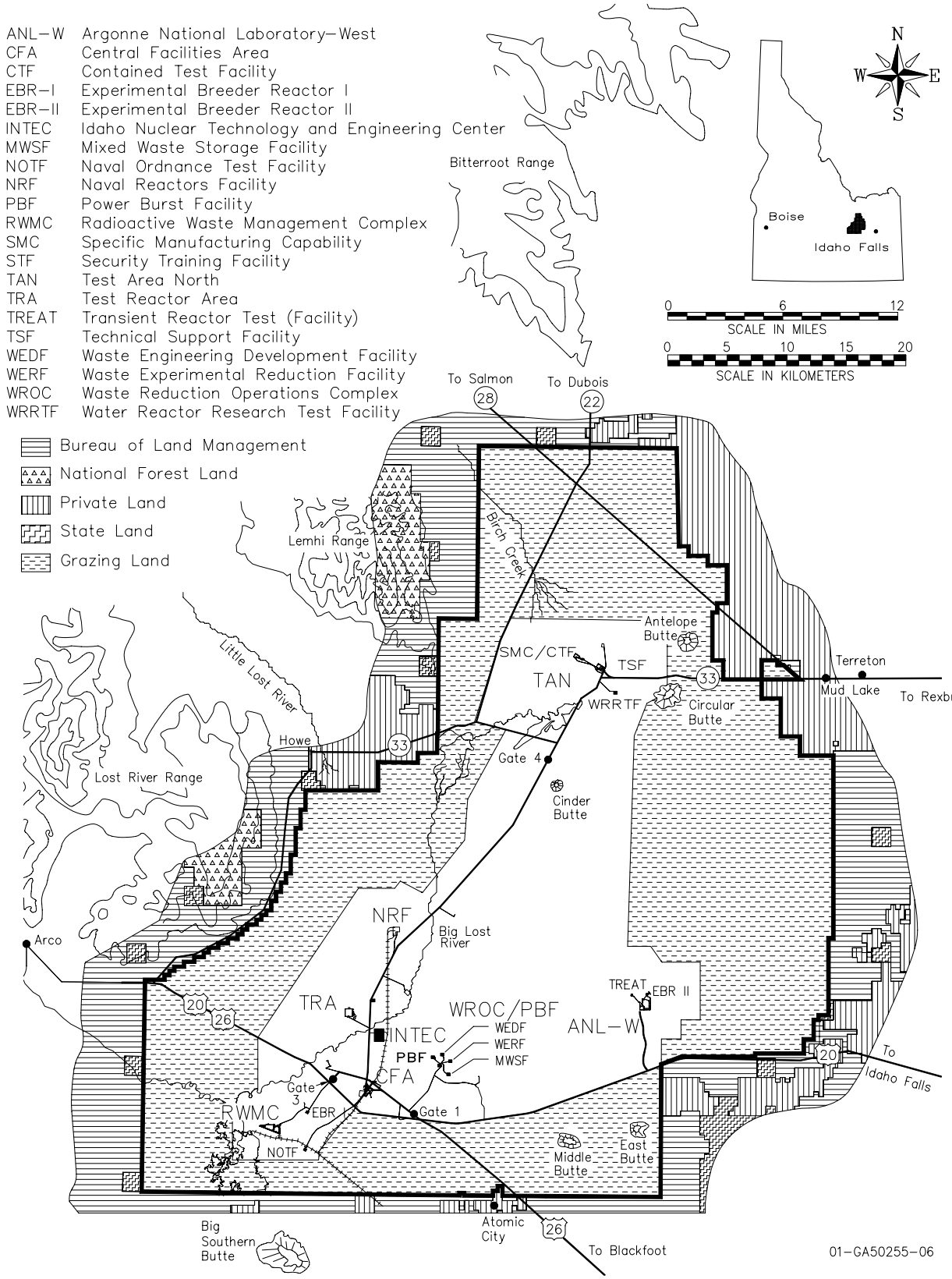


Figure I-1. Selected land of the INEEL and surrounding vicinity.

I.6 Other Structures

The term "other structures" includes storm and sanitary water systems. These other structures are shown on Map #3 (see Appendix V). The INEEL does not have intake or discharge structures.

- Waste Calcine Facility Closure Plan, Appendix I of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility, as last revised September 2002.

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
Contract DE-AC07-94ID13223

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.

CONTENTS

FIGURES

TABLES

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 × 33 m (70 × 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).

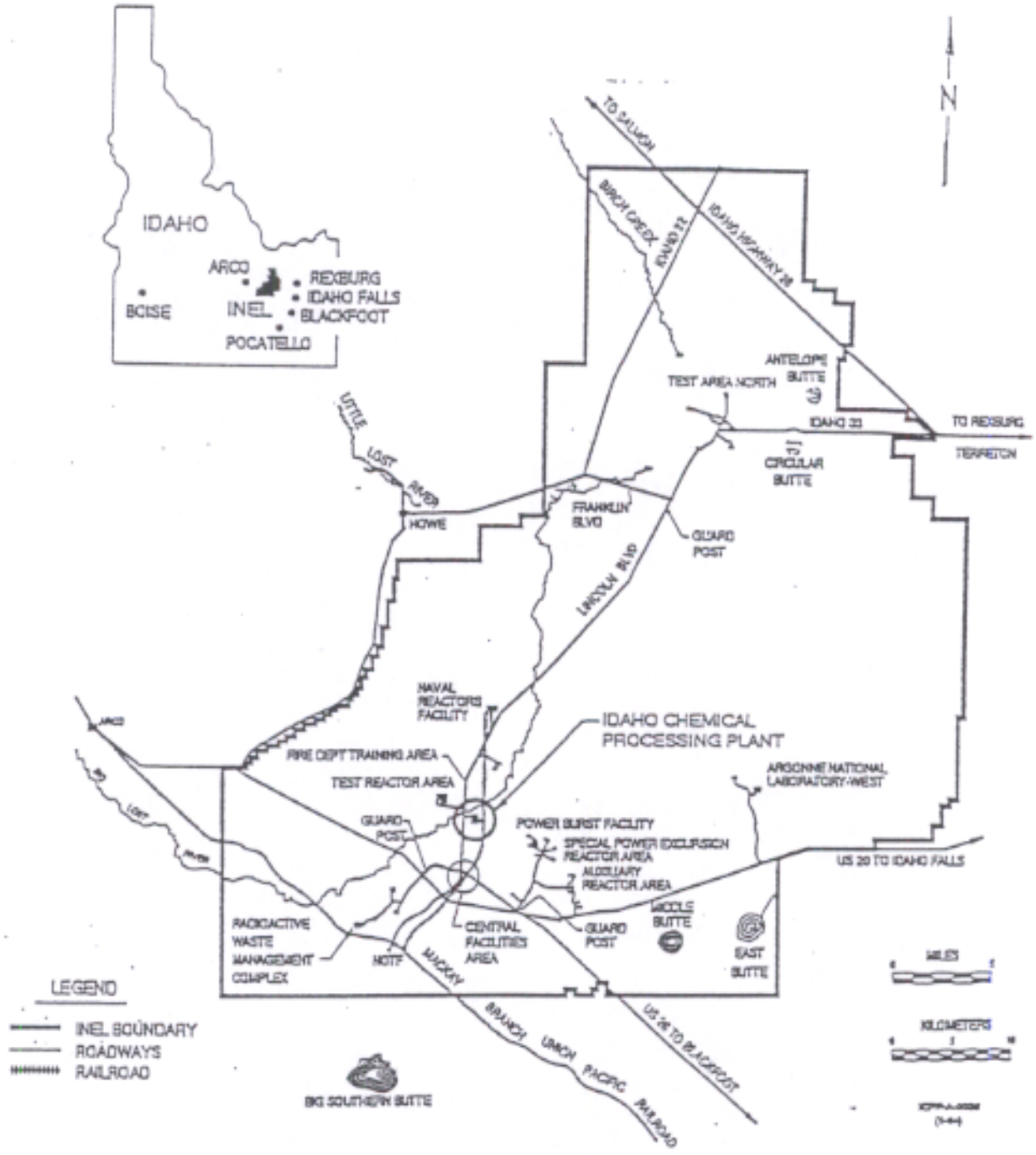


Figure 1. Map of the INEL depicting the location of the ICPP.

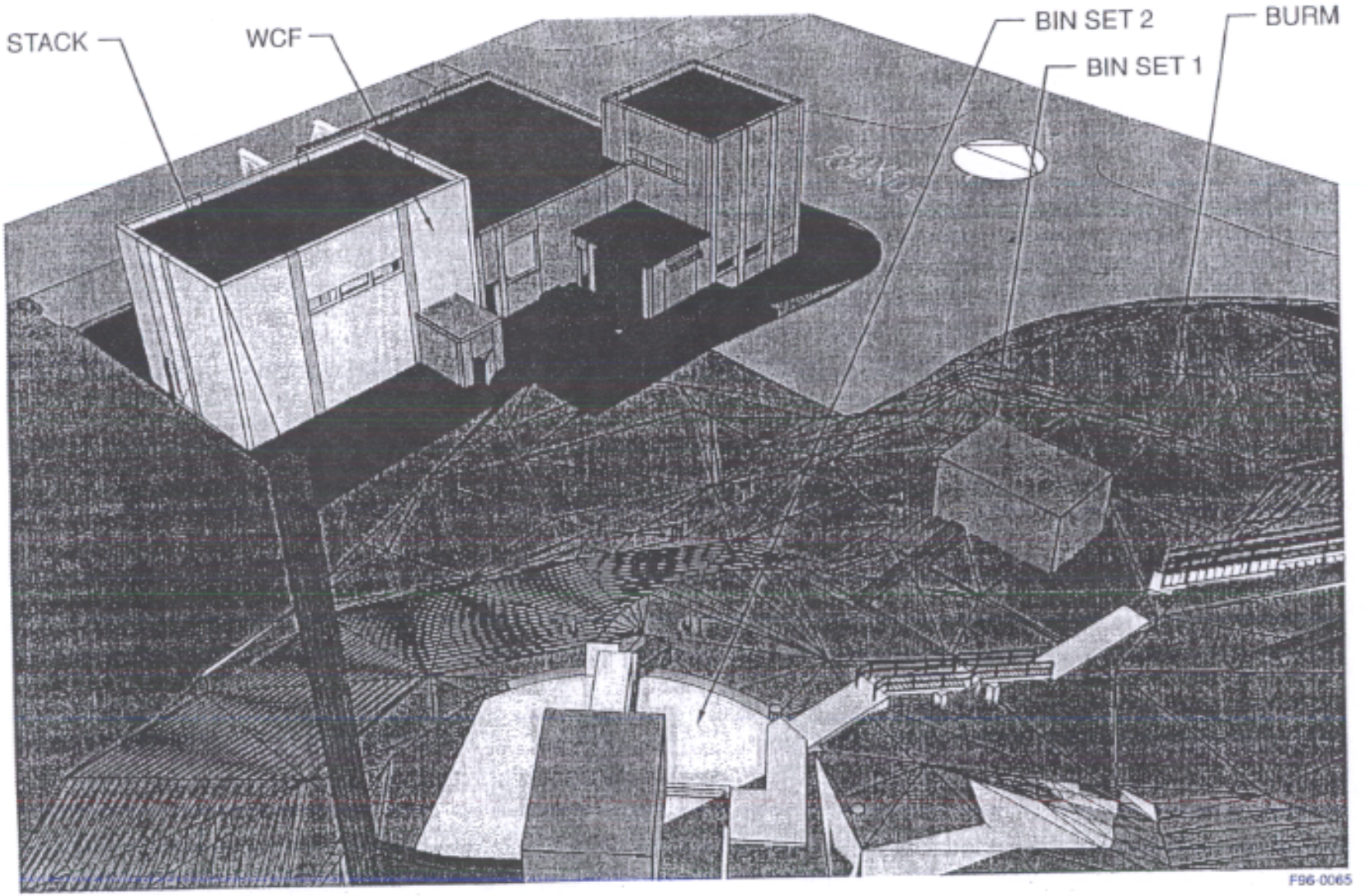
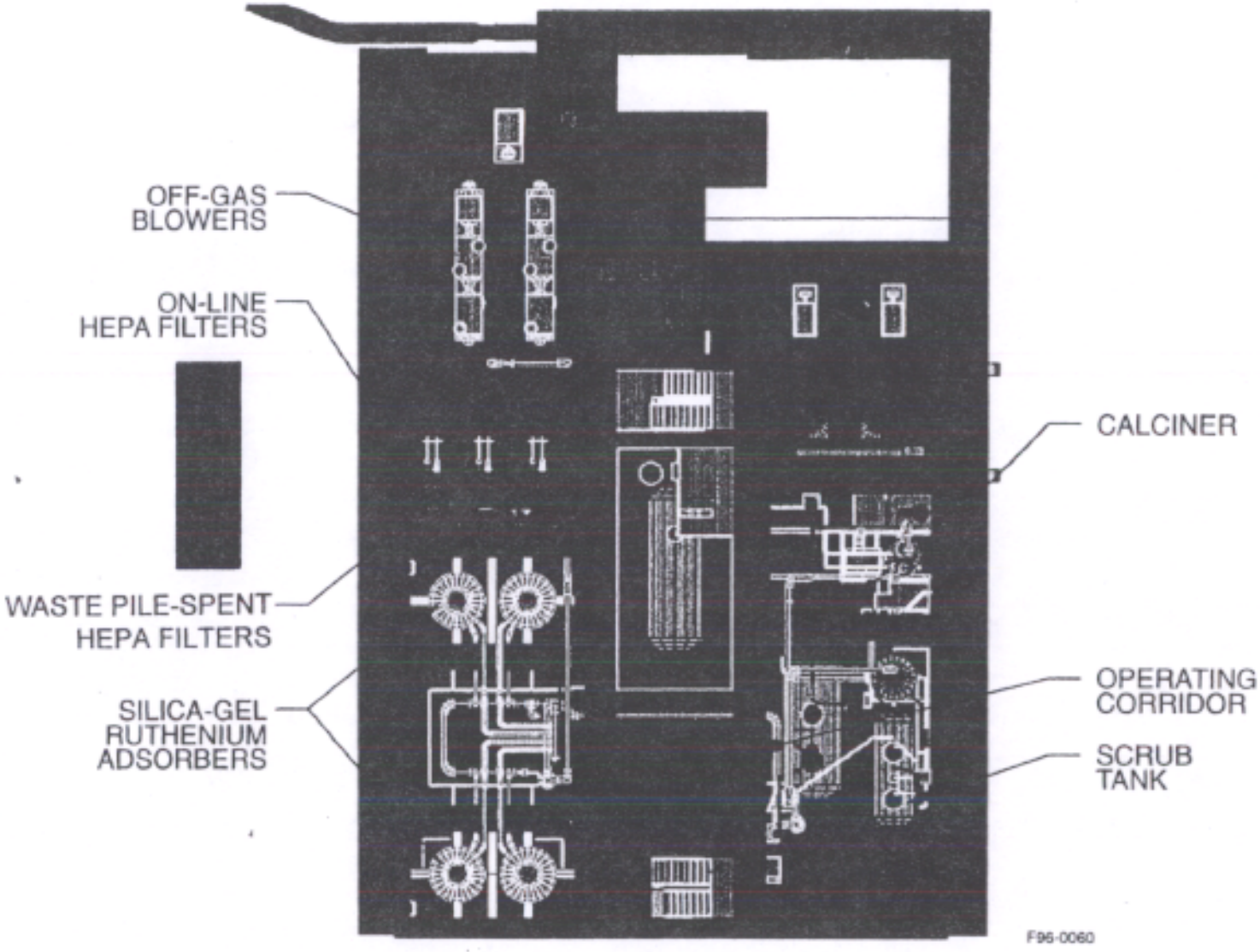


Figure 4. WCF-AS IS.



WASTE CALCINATION FACILITY PLAN

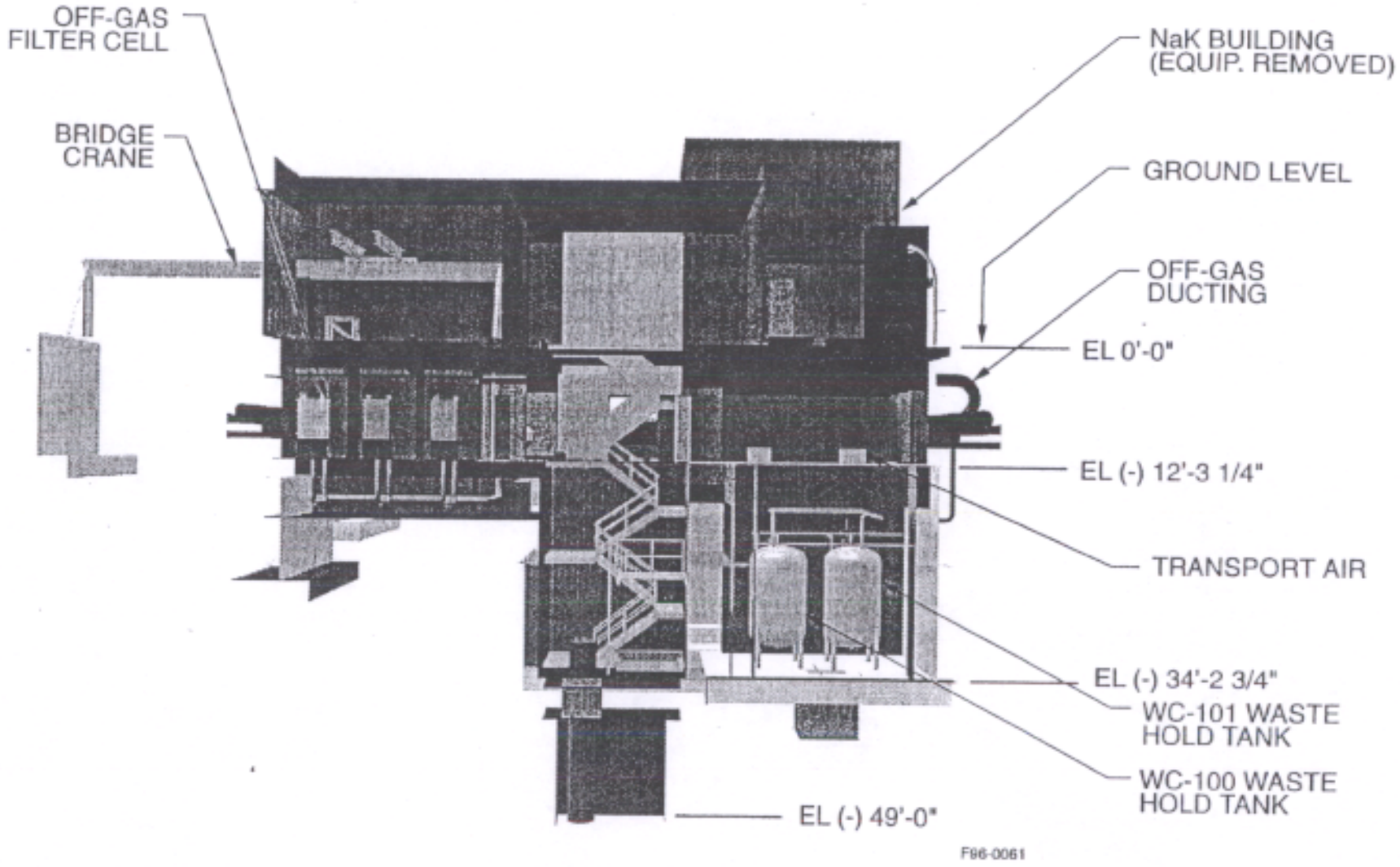


Figure 6. WCF—looking north.

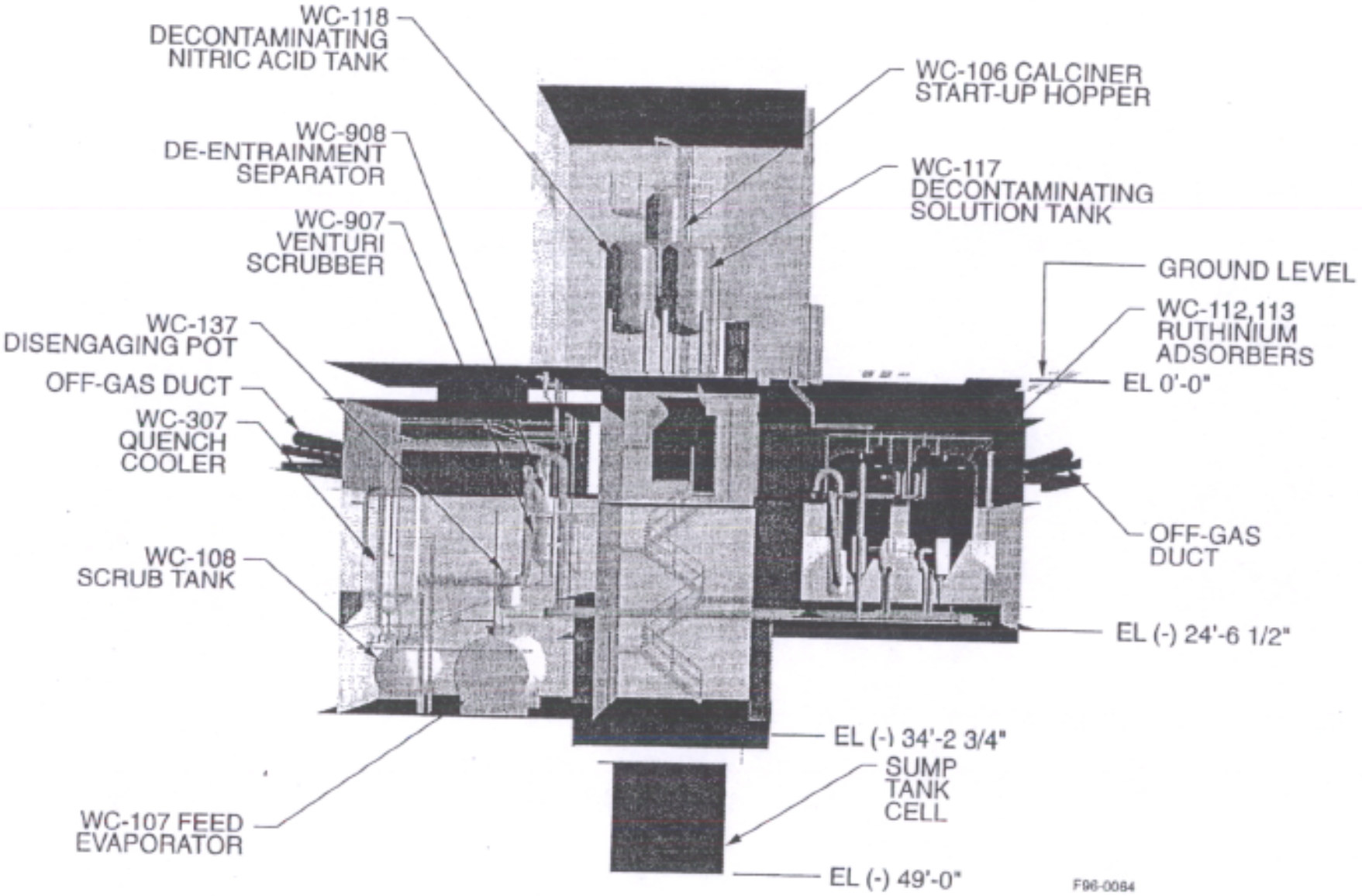


Figure 7. WCF—looking south.

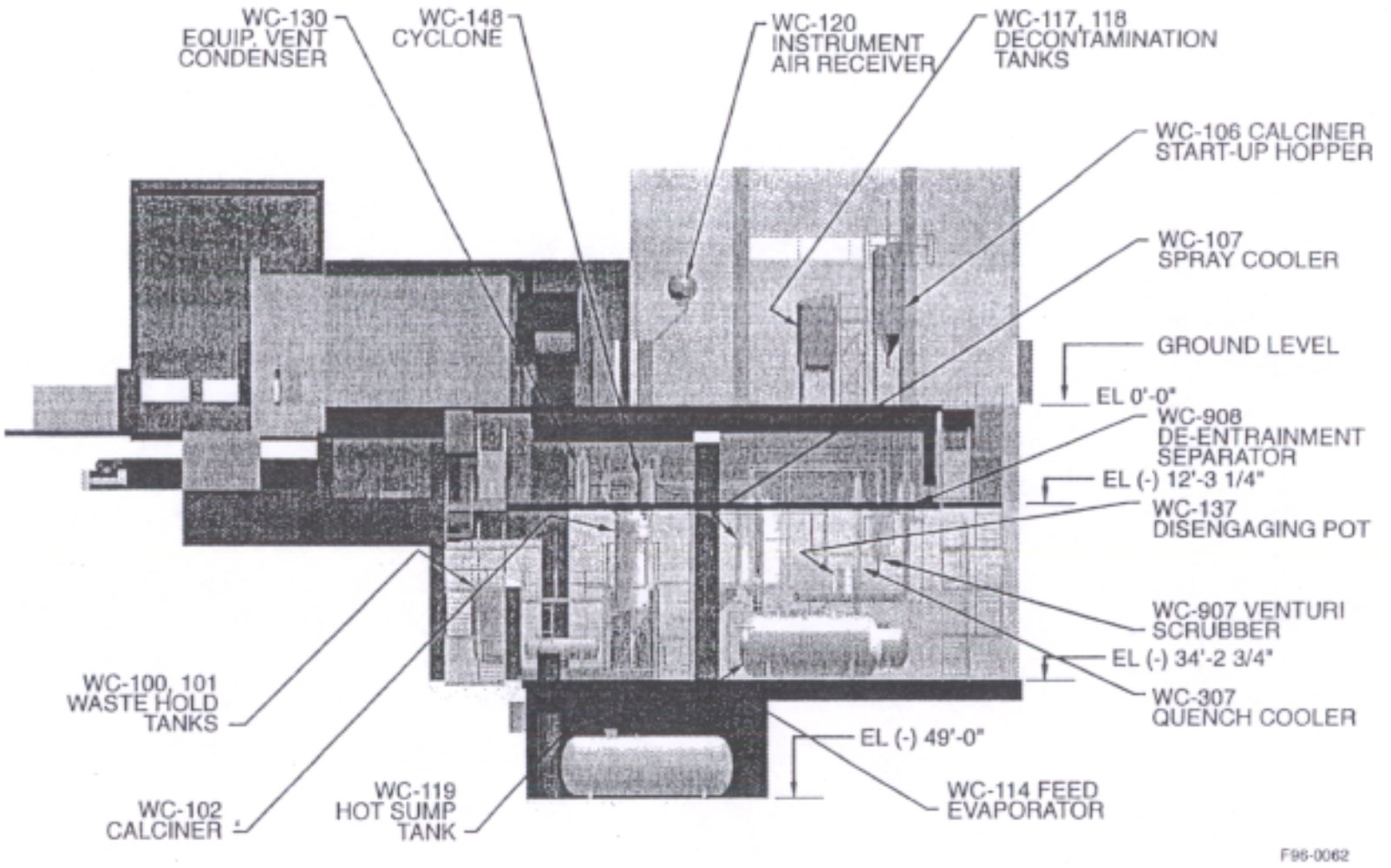


Figure 8. WCF—looking east.

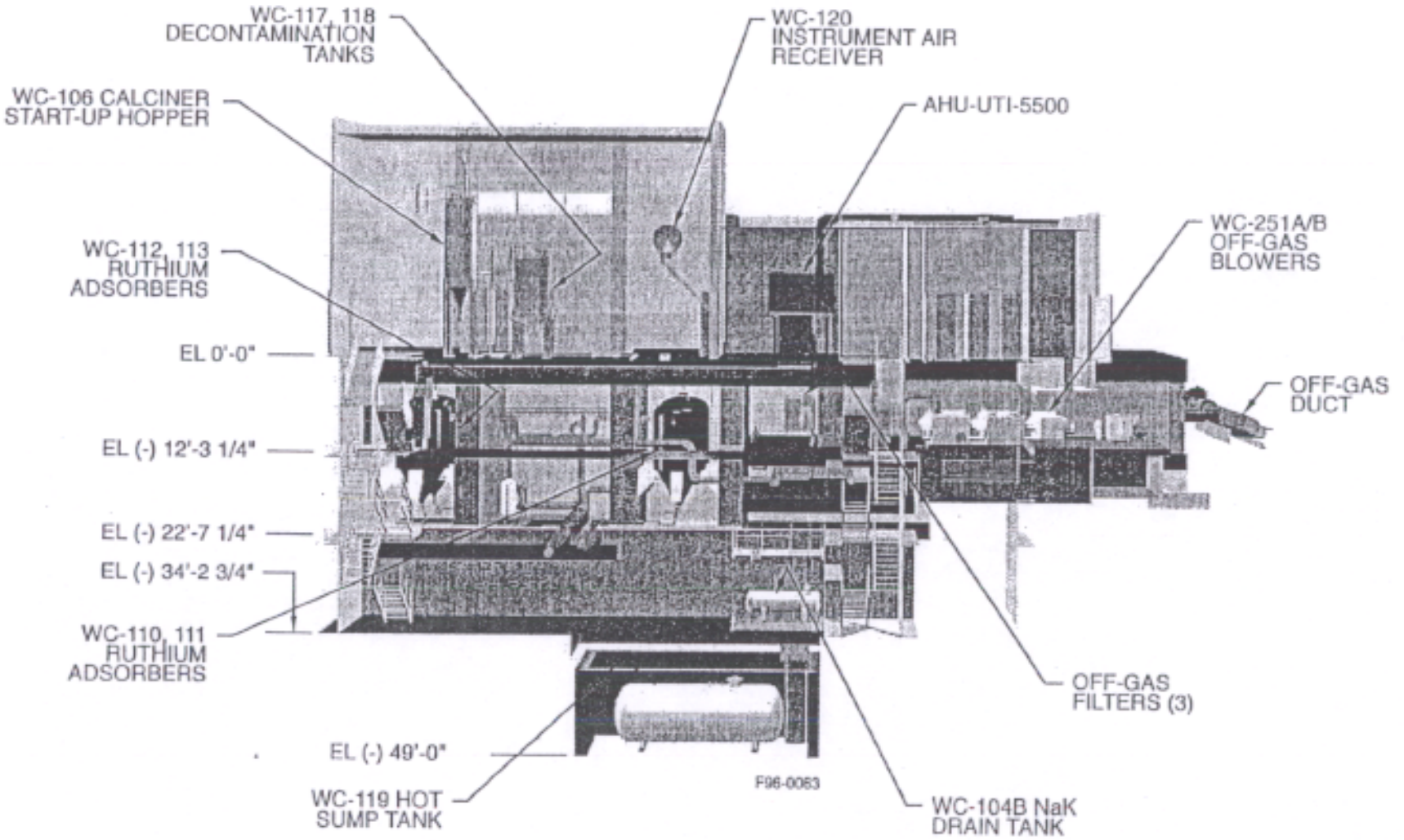


Figure 9. WCF—looking west.

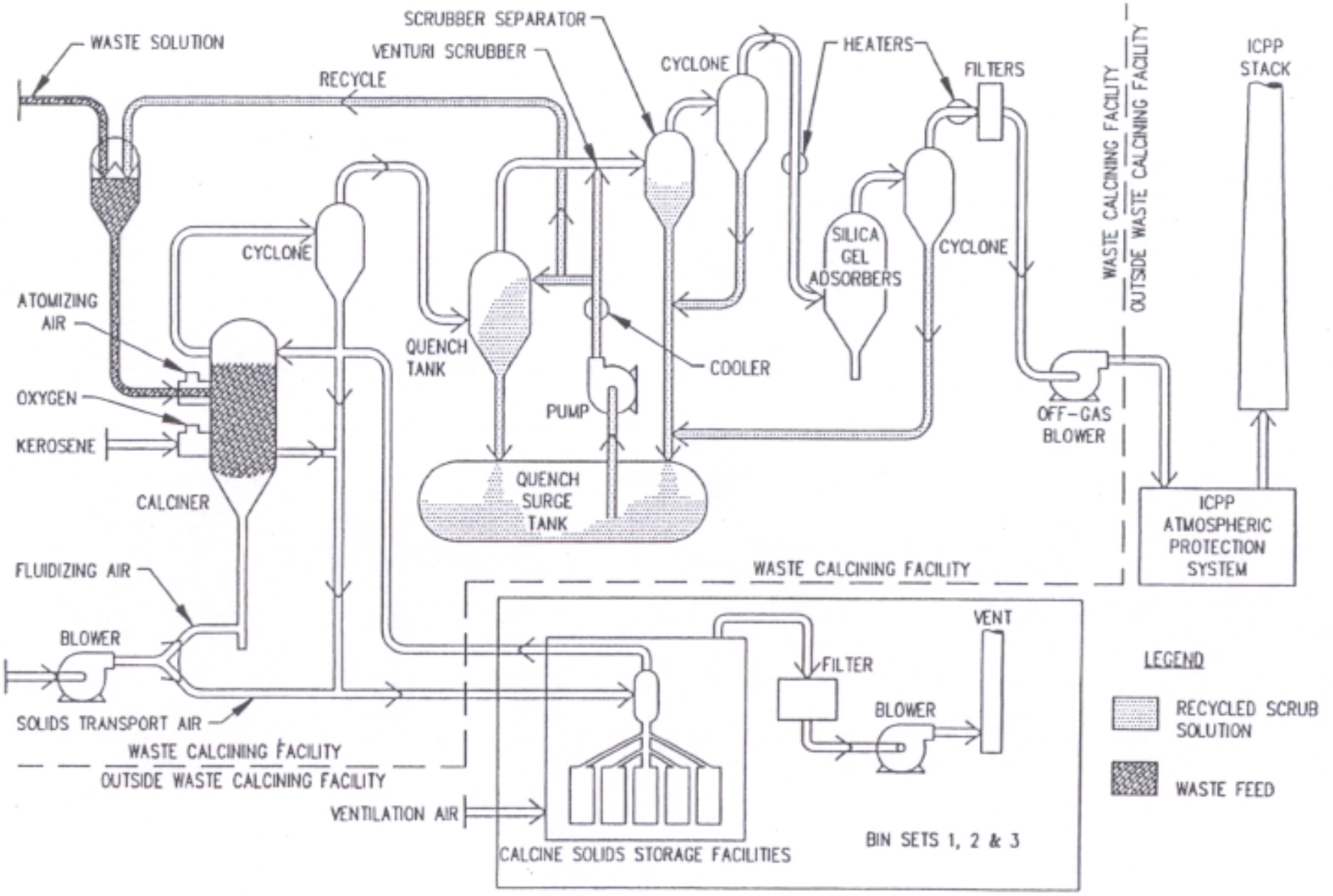


Figure 10. Schematic diagram depicting the calcining process.

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.

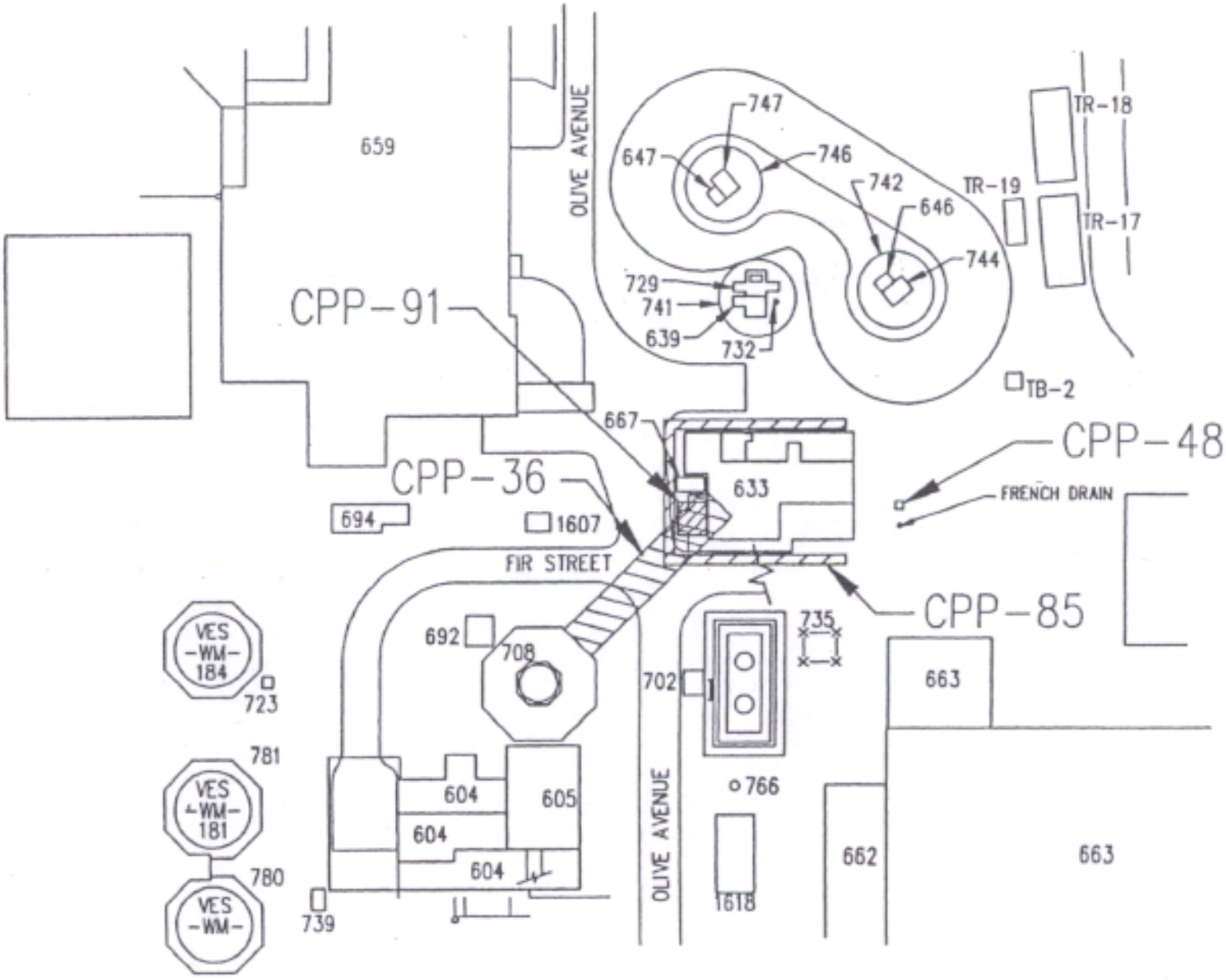


Figure 11. CERCLA release sites.

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

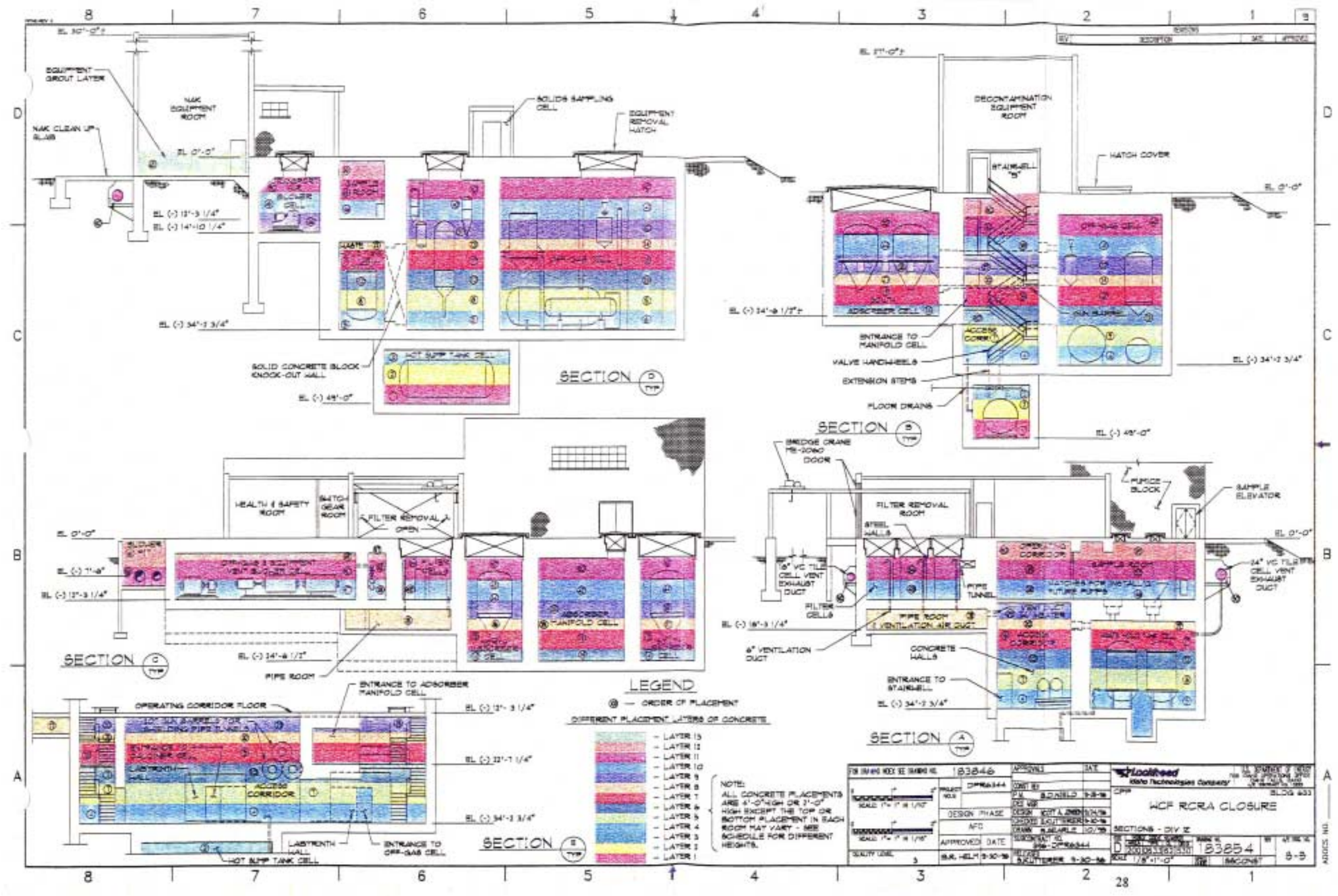


Figure 13. WCF HWMA/RCRA closure concrete placement sequence.

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

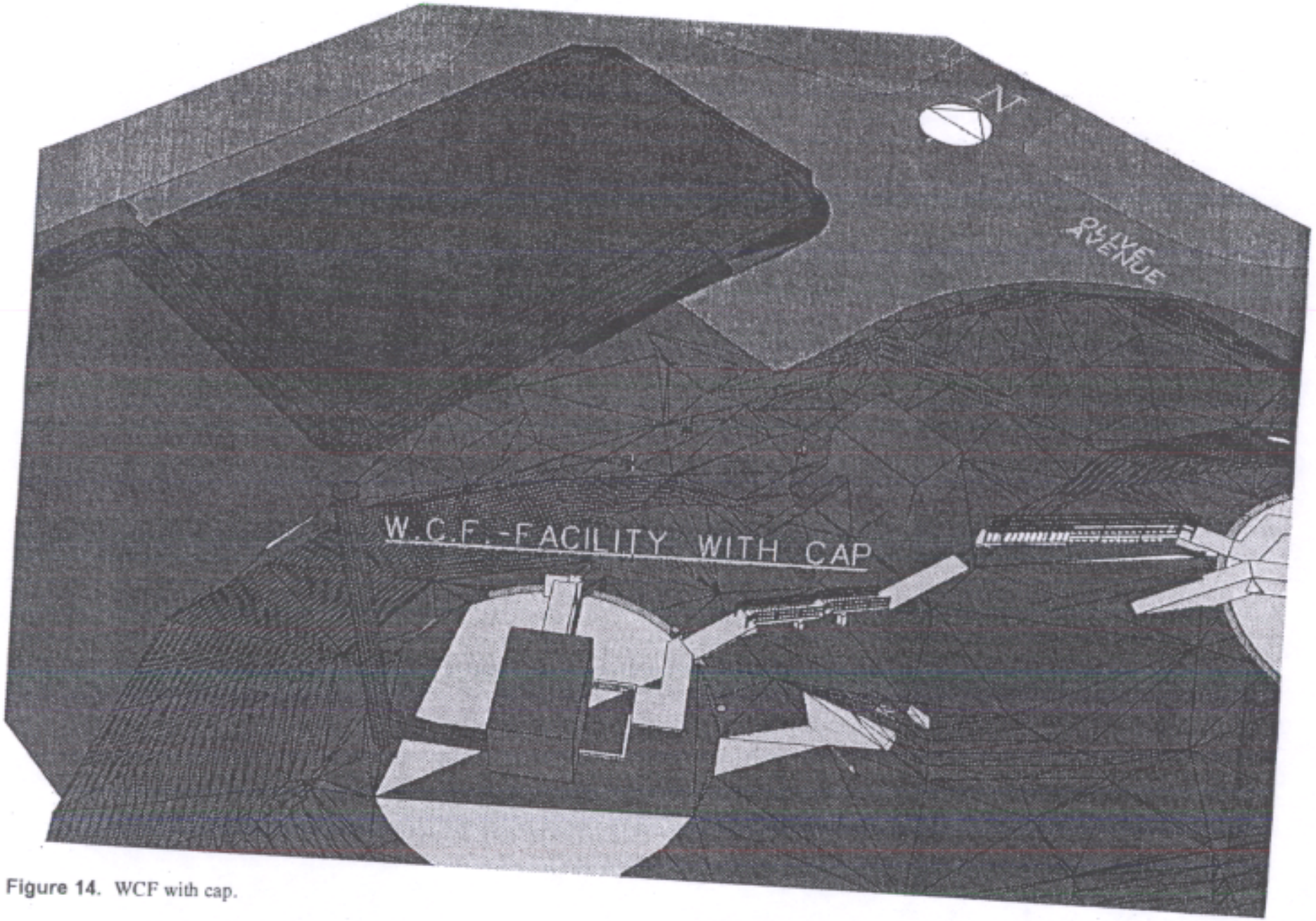


Figure 14. WCF with cap.

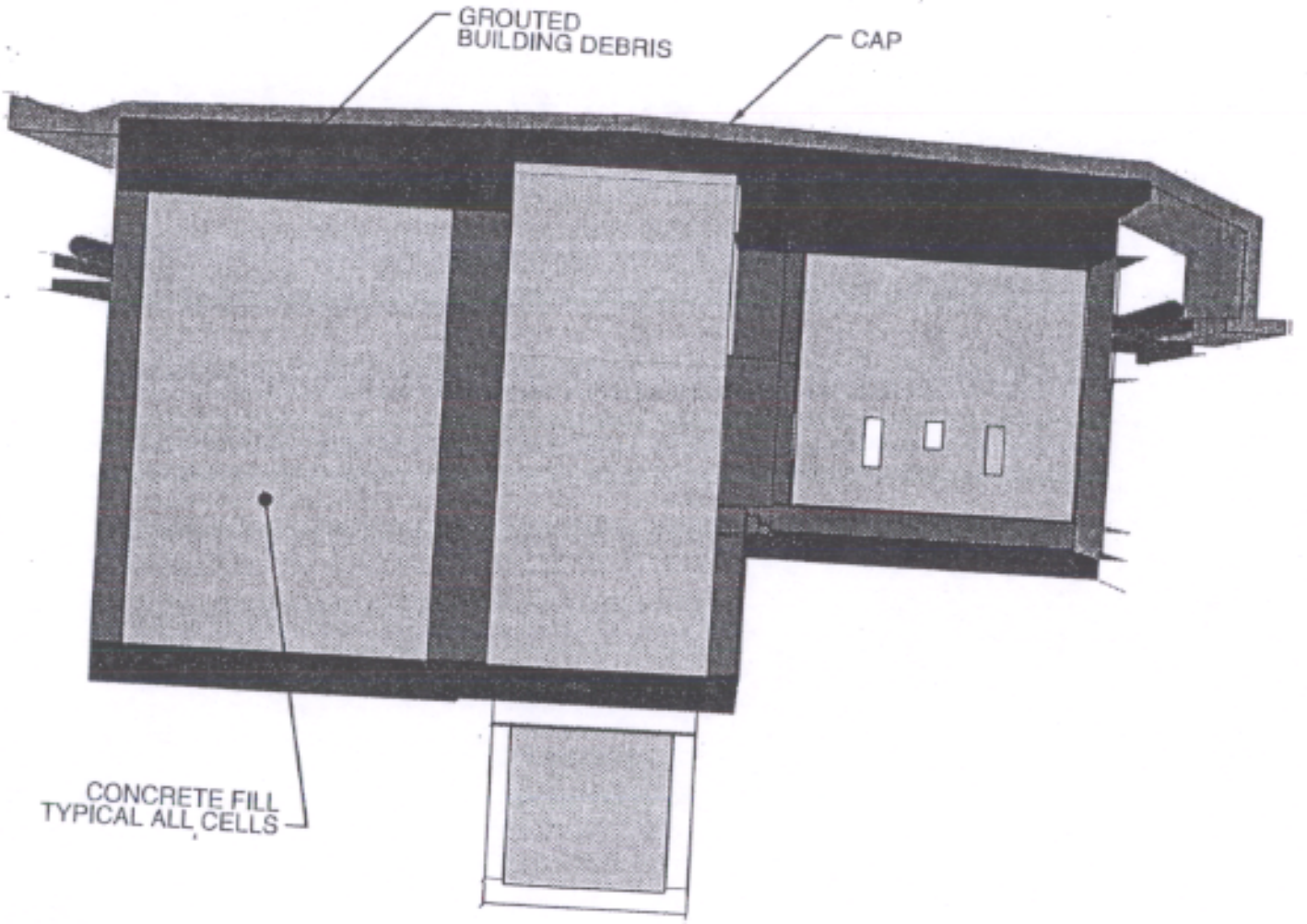


Figure 15. WCF—looking south.

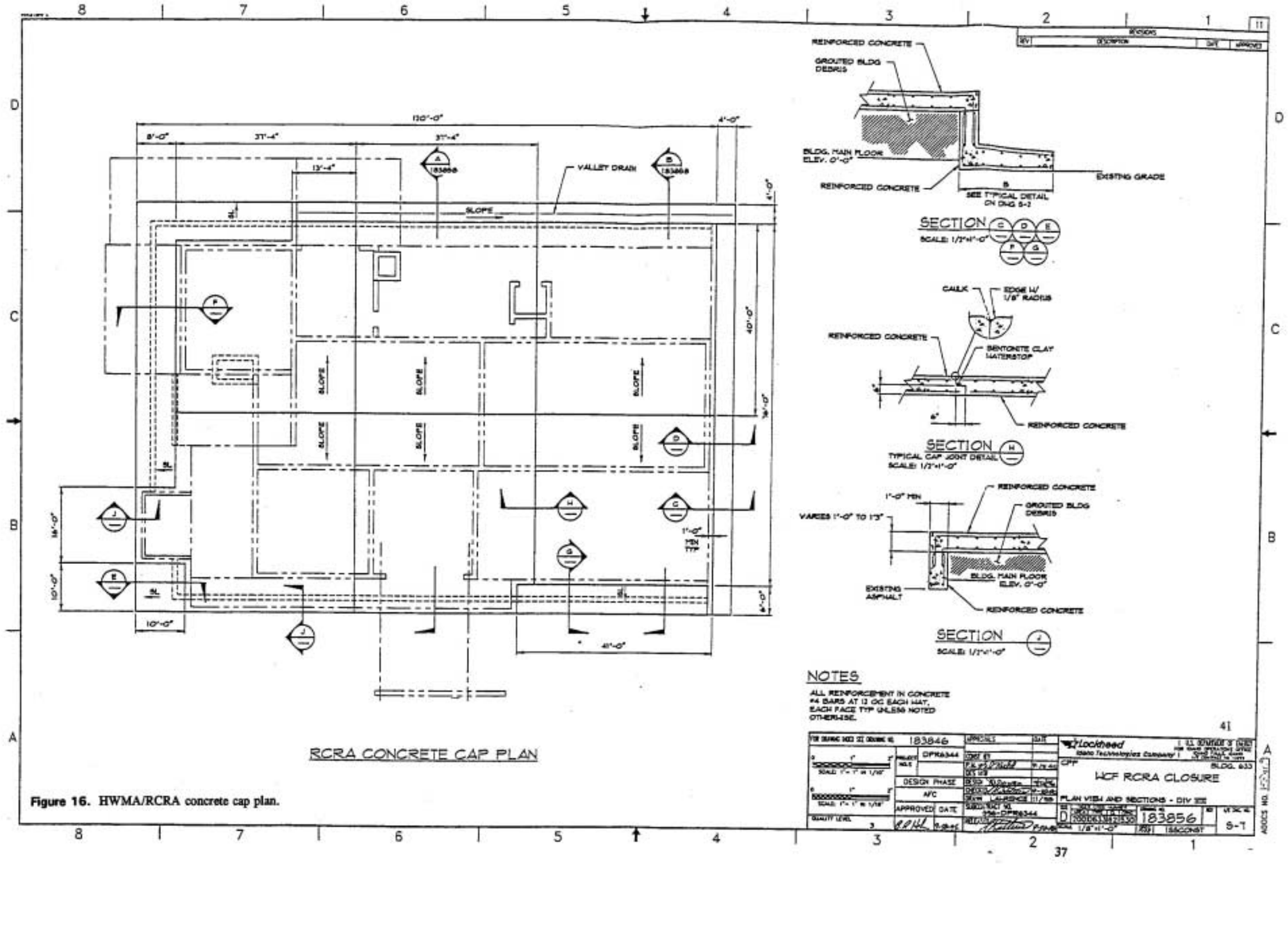
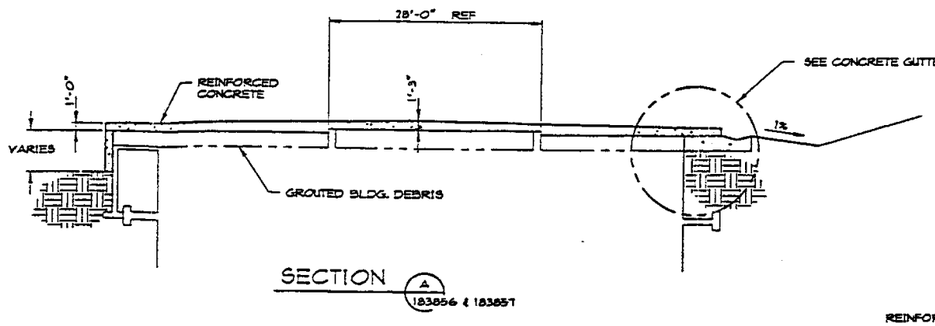
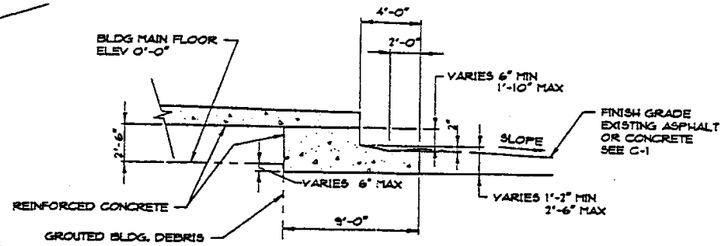


Figure 16. HWMA/RCRA concrete cap plan.

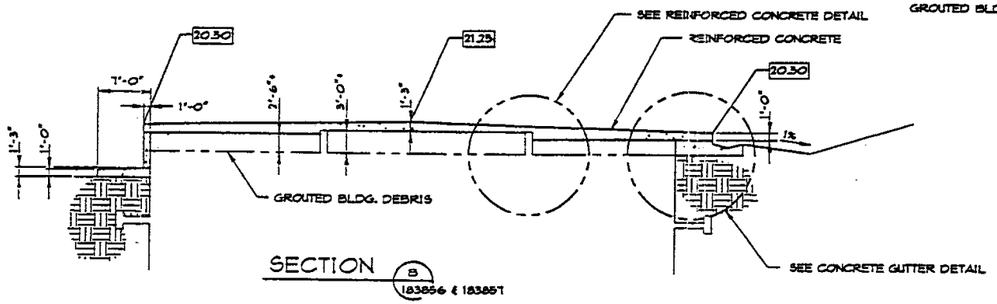


SECTION A 183856 & 183857

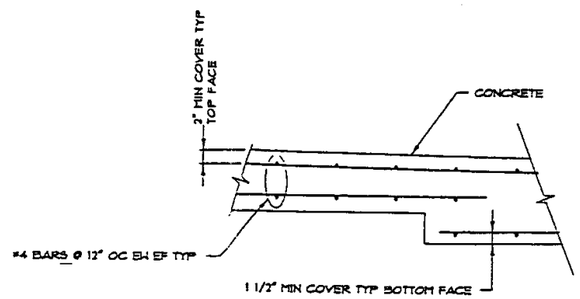


CONCRETE GUTTER DETAIL

SCALE: 1/4"=1'-0"



SECTION B 183856 & 183857



REINFORCED CONCRETE DETAIL

SCALE: 1"=1'-0"

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

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

42

LEGEND

XXXX — NEW SPOT ELEVATION

* — THESE DIMENSIONS MAY BE ADJUSTED TO ACCOUNT FOR THE VOLUME OF THE BLDG DEBRIS. A MINIMUM COVER OF 2" OF GROUT SHALL BE PLACED OVER ALL DEBRIS.

FOR DRAWING INDEX SEE DRAWING NO. 183846	APPROVALS	DATE	Lockheed Idaho Technologies Company / U.S. DEPARTMENT OF ENERGY FOR IDAHO OPERATIONS OFFICE IDAHO FALLS, IDAHO A/E CONTRACT NO. 13273
PROJECT NO.S DPR6344	CONST REP		CPP BLDG 633
DESIGN PHASE AFC	P.M.		WCF RCRA CLOSURE
APPROVED DATE APRIL 9-10-96	DES MGR		SECTIONS & VIEWS - XXIII
QUALITY LEVEL 3	DESIGN		SIZE D; DRAWING NO. 183858; REV; A/E DWG NO. S-9
	CHECKED		SCALE 1/8"=1'-0"; ISSCONST
	DRAWN LAURENCE 11/95		
	SUBCONTRACT NO. 996-DPR6344		
	RELEASED		

ADOCS NO. 1-5-1171

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

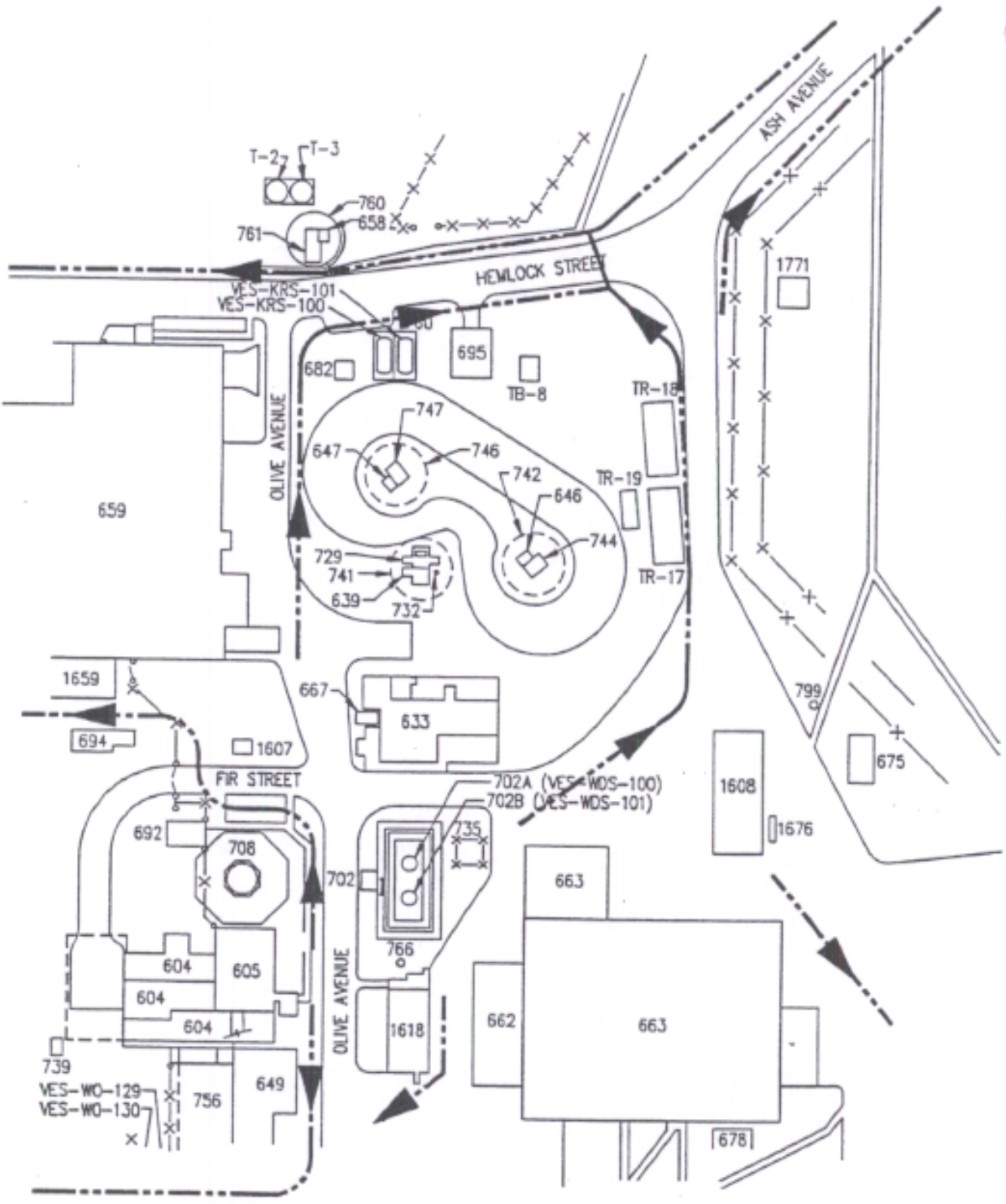


Figure 18. Storm water drains.

- 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.

6. REFERENCES

WINCO, 1993, *Listed Waste Determination Report*, Environmental Characterization, WINCO-1132, June 1993.

Demmer, R. L., and K. E. Archibald, 1995, *Waste Calcine Facility Heel Volume Investigation and Calculation*, September 1995.

Helms, B. R., T. F. Borschel, et al., 1996, *WCF Closure Comprehensive Work Plan*, 1996.

Keck, K. N., 1995, *Conceptual Cover Design for RCRA Closure of ICPP Waste Calcine Facility CPP-633 at the INEEL.*, INEEL.-95/0515, September 1995.

Rood, S. M., C. S. Smith, and A. S. Rood, 1996, *Risk Assessment for the RCRA Closure of the Waste Calcining Facility*, INEEL.-96-0041, February 1996.

DOE-ID, 1996, *INEEL. Comprehensive Facility and Land Use Plan*, DOE/ID-10514, March 1996.

- Engineering Design File, Appendix III of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility as last revised September 2002.

Document ID: EDF-2701
Revision ID: 0
Effective Date: 06/01/01

ENGINEERING DESIGN FILE

Hydrodynamic and Structural Analyses of Flood Hazards at CPP-633 During a Peak Flow in the Big Lost River

Prepared for:
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho

INEEL
Idaho National Engineering & Environmental Laboratory
BECHTEL BWXT IDAHO, LLC

Form 412.14
10/05/99
Rev. 02

HYDRODYNAMIC AND STRUCTURAL ANALYSES OF FLOOD HAZARDS AT CPP-633 DURING A PEAK FLOW IN THE BIG LOST RIVER

The following Engineering Design File (EDF) was prepared under the responsible charge of the Professional Engineer as indicated by the seal and signature provided on this page. The Professional Engineer is registered in the State of Idaho to practice Civil and Structural Engineering.

1. Project File No.: _____ 2. Project/Task: RCRA Permitting of CPP-633

3. Subtask: Hydrodynamic and Structural Analyses of Flood Hazards at CPP-633

4. Title: Hydrodynamic and Structural Analyses of Flood Hazards at CPP-633 During a Peak Flow in the Big Lost River

5. Summary: This summary briefly defines the problem to be addressed, gives a summary of the analyses performed in addressing the problem, and states the results, conclusions, and recommendations.

A post-closure permit application is currently being developed for the Waste Calcining Facility at the INEEL. A study is needed to ensure compliance with RCRA regulations that require an engineering analysis to indicate the various hydrodynamic and hydrostatic forces expected to result at the site as a consequence of a 100-year flood, and structural or other engineering studies showing the design of operational units and flood protection devices at the facility and how these will prevent washout. In RCRA regulations, "washout" is defined as the movement of hazardous waste from the active portion of a facility as a result of flooding. The objective of this study is to compute the hydrodynamic and hydrostatic forces expected to occur during a 100-year flood. If the structure can withstand these forces, the waste will be protected from washout during a 100-year flood.

The flood information is obtained from a study by Koslow and Van Haaften, who examined four probable flood scenarios that included (1) a 25-year flood and simultaneous seismic failure of Mackay Dam, (2) a 100-year flood and simultaneous piping failure of Mackay Dam, (3) a 500-year flood and simultaneous piping failure of Mackay Dam, and (4) overtopping of Mackay Dam caused by the probable maximum flood. Recent discussions with the Idaho DEQ resulted in the decision to use scenario (2) as a conservative estimate of the 100-year flood for the purpose of RCRA permitting. In the following analysis, this particular scenario is referred to as the *maximum credible flood*.

Koslow and Van Haaften performed a hydraulic analysis to determine the extent of the flood plain at the INEEL site. The maximum credible flood leads to a breach of Mackay Dam, overtopping of the INEEL diversion dam, and flooding of the INEEL site. A hydraulic model was used to compute the flow volumes and water elevations within an 18 mile reach downstream of the diversion dam. The Waste Calcining Facility (CPP-633) lies within the flood plain boundary that is based on computed water elevations.

A structural analysis of the concrete cap enclosing CPP-633 led to the following results:

(1) The top of the concrete cap is approximately 5 ft above the floodwater level, and so flood water will not exert pressure on the top of the cap. Only the wall surrounding the cap will be acted on by floodwater forces. The floodwater level is estimated to be approximately 4 ft above the base of the wall located at the northwest corner of the cap. Therefore, significant forces due to stationary floodwater and wind-generated water waves will act on the wall.

(2) The construction of the concrete cap follows many of the standard practices used to assure a watertight structure and to provide adequate drainage during a flood. These include filling the below-grade structure with grout, grouting and capping the pipes entering the building, placing a concrete cap on top of the debris, limiting the concrete permeability to preclude water infiltration, including a gutter to allow drainage of rain and snowmelt, and installing water stops at all joints.

1. Project File No.: _____ 2. Project/Task: RCRA Permitting of CPP-633

3. Subtask: Hydrodynamic and Structural Analyses of Flood Hazards at CPP-633

(3) An important consideration regarding flood protection is the ability of the retaining walls to withstand floodwater forces. The wall of the concrete cap enclosing CPP-633 must withstand the hydrostatic force due to stationary floodwater and the hydrodynamic force due to wind-generated waves. A structural analysis of the retaining wall demonstrates that the wall can withstand floodwater forces caused by the maximum credible flooding event. Since the floodwater forces caused by the maximum credible flood are a conservative estimate of the floodwater forces caused by the 100-year flood, the enclosed waste will be protected from washout during a 100-year flood.

6. Distribution (complete package): P. E. Murray, MS 3760; N. C. Hutten, MS 3428; S. A. Davies, MS 3650; S. A. Jensen, MS 3650; S. L. Austad, MS 3650
Distribution (summary package only):

7. Review (R) and Approval (A) Signatures:
(Minimum reviews and approvals are listed. Additional reviews/approvals may be added.)

	R/A	Printed Name/Organization	Signature	Date
Author	R	P. E. Murray/6790	P. E. Murray	6/06/01
Reviewer	R	S. A. Jensen/6780	S. A. Jensen	6/06/01
Project Engineer	A	S. A. Davies/6710	S. A. Davies	6/06/01
Project Manager	A	N. C. Hutten/7312	N. C. Hutten	6/07/01
Engineering Supervisor	A	S. L. Austad/6780	S. L. Austad	6/6/01

Introduction

A post-closure permit application is being developed for the INEEL Waste Calcining Facility (INTEC Building CPP-633). Building closure was accomplished by draining all tanks, filling the vessels, cells, corridors, and piping with grout, grouting and capping the pipes entering the building, demolishing the above-grade structure, leaving the debris in place, and placing a concrete cap on top. Details may be found in the HWMA closure plan for the WCF (1). The closure plan includes a limit on concrete permeability in order to preclude water infiltration and reduce the extent of liquid transport through the grouted structure. This requirement ensures that the concrete enclosure is essentially impermeable. Since the permeability of soil is much larger than the permeability of concrete, surface water will preferentially drain through the underlying soil. Furthermore, the concrete cap includes a gutter to allow drainage of rain and snowmelt, and water stops were installed at all joints. The issue of permeability was independently examined during PE certification of closure (2), when it was determined that the concrete cap satisfies the requirements stated in the closure plan. However, the ability of the concrete cap to withstand floodwater forces has not been previously considered. The post-closure permit application includes the need to satisfy RCRA regulations (3) regarding the ability of the structure to withstand a 100-year flood and measures to preclude washout of waste. The objective of this analysis is to compute the hydrodynamic and hydrostatic forces expected to occur during a 100-year flood. If the concrete cap can withstand these forces, the enclosed waste will be protected from washout during a 100-year flood.

Maximum Credible Flood

In 1986, Koslow and Van Haaften (4) published a report containing calculated flow volumes and water-surface elevations which occur during a peak flow in the Big Lost River at INEEL. This study included four probable flood scenarios: (1) a 25-year flood and simultaneous seismic failure of Mackay Dam, (2) a 100-year flood and simultaneous piping failure of Mackay Dam, (3) a 500-year flood and simultaneous piping failure of Mackay Dam, and (4) overtopping of Mackay Dam caused by the probable maximum flood. Recent discussions with the Idaho DEQ resulted in the decision to use scenario (2) as a conservative estimate of the 100-year flood for the purpose of RCRA permitting, and thereby identified the *maximum credible flood* associated with a 100-year peak flow in the Big Lost River. Although there are conflicting scientific opinions regarding the magnitude of the 100-year flood in the Big Lost River and the extent of the floodplain at the INEEL site, the water surface profile obtained from Koslow and Van Haaften (4) is considered to be an upper bound on potential flooding at the site. This particular water surface profile is used as a basis for the present analysis.

The maximum credible flood results in a peak flow released from Mackay Dam that is equal to 57,740 ft^3/s. The flow between Mackay Dam and the INEEL site is attenuated by storage, agricultural diversion, and channel infiltration. The calculated flow at the INEEL diversion dam located in the southwestern part of the INEEL is equal to 28,500 ft^3/s. The diversion dam is assumed to be unable to retain the peak flow, and so most of the floodwater flows onto the site. The remaining water flows through the diversion channel and into spreading areas. The leading edge of the floodwater wave is estimated to arrive at INTEC approximately 17.1 hours after breach of the dam. The peak flow is attenuated to 24,870 ft^3/s, and the peak water velocity is estimated to be 2.2 ft/s. The elevation of the stream bed is 4911 feet and the calculated water

elevation is 4916 feet, in reference to the National Geodetic Vertical Datum of 1929 (NGVD29). Since the area surrounding INTEC is very flat, floodwater will spread easily and so the flood plain is wide and shallow.

Description of Structure

Since the concrete cap is essentially impermeable and all pathways for water infiltration have been grouted and capped, this study concerns only the wall of the concrete cap enclosing CPP-633 and its ability to withstand hydrodynamic and hydrostatic forces due to floodwater. The exact elevation of the cap and footing are needed to determine the height of the wall and the water level. According to the drawings, the reference elevation is equal to 4917 ft and coincides with the first level finished floor elevation. However, CPP-633 was built at a time when the datum was not NGVD29. The actual first level finished floor elevation in reference to NGVD29 is approximately equal to 4916 ft and coincides with the floodwater elevation. The highest wall is located at the northwest corner of the building where the ground elevation is lowest. The base of the wall is 3 ft 9 in. below the floodwater level, and the top of the wall is at least 2 ft 6 in. above the floodwater level. During fabrication, the cap was raised approximately 1 ft 6 in. because the building debris resulting from demolishing the above-grade structure was higher than originally expected (2). This means that the top of the wall is 4 ft above the floodwater level instead of 2 ft 6 in. above the floodwater level. Therefore, the height of the wall is 3 ft 9 in. + 4 ft = 7 ft 9 in. above the footing. In the following sections, hydrostatic and hydrodynamic analyses will be used to compute the pressure exerted on the wall by stationary floodwater and wind-generated waves.

Hydrostatic Forces

The hydrostatic pressure at the base of a retaining wall is

$$P_{water} = \gamma_{water}\, d = \left(62.4 \frac{lb}{ft^3}\right) d,$$

where γ_{water} is the weight of water, and d is the water depth. The water depth is equal to 3 ¾ feet, as determined in the previous section. The resultant force per unit width of retaining wall is

$$F_{water} = \frac{1}{2}\gamma_{water}\, d^2 = \frac{1}{2}\left(62.4 \frac{lb}{ft^3}\right)(3.75\,ft)^2 = 438.8 \frac{lb}{ft},$$

and occurs at a height equal to 1.25 ft above the base of the retaining wall, as is shown in Fig. 1.

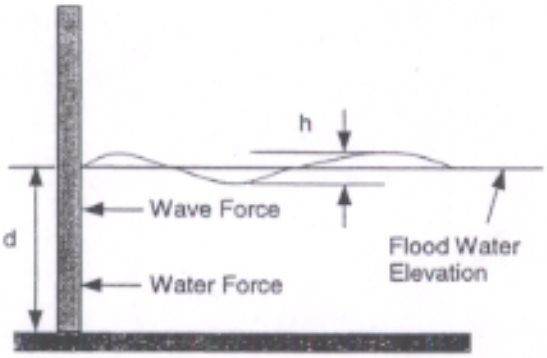


Fig. 1. Various forces acting on a retaining wall during a flood.

Hydrodynamic Forces

The force of moving flood water is calculated by considering the impact of shallow water waves caused by a high wind. A graph that shows the relation between wind velocity, water depth, wave height, and wave period is given in Fig. 10-16 on page 10-36 in Brater and King (5). Assuming a wind velocity equal to 60 mph and using a water depth equal to 3.75 feet, the graph in Brater and King (5) shows that the wave height is 2.0 feet and the wave period is 3.4 seconds. The relation between wave period and wavelength of shallow water waves is

$$\frac{L}{T} = \sqrt{g\,d},$$

where L is the wavelength, T is the wave period, d is the water depth, and g is the gravitational acceleration. Using a water depth equal to 3.75 feet and a wave period equal to 3.4 seconds, the wavelength is

$$L = T\sqrt{g\,d} = 3.4\,s\sqrt{\left(32.2\frac{ft}{s^2}\right)3.75\,ft} = 37.4\,ft,$$

and the wave velocity is

$$\frac{L}{T} = \frac{37.4\,ft}{3.4\,s} = 11.0\frac{ft}{s}.$$

In comparison, the velocity of flood water as estimated by Koslow and Van Haaften (4) is 2.2 ft/sec. Therefore, the velocity of moving flood water is small in comparison to the velocity of wind-generated waves.

The resultant force per unit width of retaining wall, which is caused by wind-generated waves, is calculated from an empirical relation described on page 10-41 in Brater and King (5). Assuming a wave height equal to 2.0 feet, the pressure exerted by the wave is

$$P_{wave} = \gamma_{water}\,h = \left(62.4\frac{lb}{ft^3}\right)2.0\,ft = 124.8\frac{lb}{ft^2},$$

where h is the wave height. According to Fig. 10-21 on page 10-42 in Brater and King (5), the pressure distribution is uniform from the ground to the still-water height, and hydrostatic from the still-water height to a height above still water equal to $1.66 \times h$. This particular distribution represents the pressure that is produced by a non-breaking wave reflected from a vertical wall. Superposition of approaching and reflecting waves lead to standing waves that have a height approximately equal to $2 \times h$. Using a water depth equal to 3.75 feet, the force of the wave is

$$F_{wave} = P_{wave}\left(d + \frac{1}{2}1.66\,h\right) = 124.8\frac{lb}{ft^2}\left(3.75\,ft + \frac{1}{2}1.66 \cdot 2.0\,ft\right) = 675.2\frac{lb}{ft},$$

and occurs at a height equal to 2.8 feet above the base of the retaining wall, as is shown in Fig. 1.

Structural Analysis

An important consideration regarding flood protection is the ability of the retaining walls to withstand floodwater forces. In this section, structural analysis is used to determine whether the wall of the concrete cap enclosing CPP-633 can withstand the forces due to stationary floodwater and wind-generated waves. The following structural analysis of a concrete retaining wall assumes the maximum wall height at the northwest corner of the concrete cap to demonstrate that the cap can withstand the forces caused by the maximum credible flood.

The height of the concrete cap retaining wall is 7 ¾ ft and the floodwater level is 3 ¾ ft above the base of the wall, as previously shown. The thickness of the wall is 1 ft. The enclosed grout and building debris exerts a force on the wall opposite to the force of floodwater. In the following analysis, the force due to the building debris is neglected, which leads to a conservative estimate of the total force on the wall.

Consider a concrete beam pinned at both ends and acted on by the resultant hydrostatic and hydrodynamic forces, as is shown in Fig. 2. This particular beam loading represents the static water pressure and wave force acting on a section of retaining wall. Simple supports are assumed since a rotation may occur at the ends of the beam where the wall is anchored to the slab and footing.

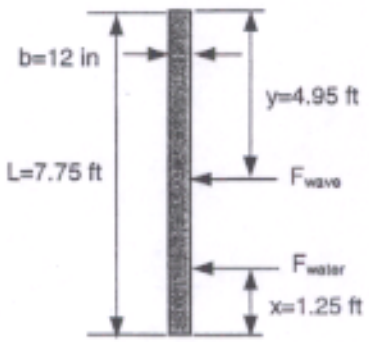


Fig. 2. Hydrostatic and hydrodynamic forces acting on a retaining wall.

The length of the beam is equal to 7 ¾ ft and the thickness of the beam is equal to 12 in. The hydrostatic force acts a distance $x = 1.25$ ft from the base of the wall, and the hydrodynamic force acts a distance $y = 4.95$ ft from the top of the wall. The maximum shear force occurs at the base of the beam, and the maximum bending moment occurs where the hydrodynamic force acts. The shear force and bending moment are obtained from superposition of the formulas found in Roark and Young (6), Table 3, Case 1e:

$$M = \frac{F_{water}\ x + F_{wave}\ (L - y)}{L}\ y = 1558 \frac{\text{ft} - \text{lbs}}{\text{ft}},$$

$$V = \frac{F_{water}\ (L - x) + F_{wave}\ y}{L} = 799 \frac{\text{lbs}}{\text{ft}}.$$

The actual force and moment are multiplied by a load factor equal to 1.7, as specified in ACI 318 (7), to give $M_u = 2649$ lb ft and $V_u = 1358$ lb per 1 foot width of beam.

To compute the allowable shear and moment capacity of the concrete beam, assume that the beam includes vertical reinforcement only and neglect the presence of horizontal reinforcement. The vertical reinforcement consists of top and bottom layers of #4 bar spaced 12 inches center to center. This meets the requirement that the area of vertical reinforcement shall not be less than 0.0015 times the wall area, as described in Section 14.3.2 of ACI 318 (7). The minimum top and bottom covers of the bar are equal to 1 ½ in. to 2 in., and so the cover is assumed to be equal to 2 inches. During PE certification of closure (2), testing was used to determine that the compressive strength of the concrete cap at 28 days exceeds 5000 psi (1). In this analysis, the concrete compressive strength is conservatively assumed to be equal to 3000 psi. Furthermore, the yield strength of the reinforcement bar is conservatively assumed to be equal to 40,000 psi.

The computation of moment and shear capacity are based on ACI 318 (7) and the CRSI Design Handbook (8). The shear capacity is obtained from Section 11.3.1.1 of ACI 318 (7):

$$V_c = 0.85\ 2\sqrt{f_c'}\ b\ d,$$

where f_c' is the compressive strength of concrete, b is the width of the beam, and d is the distance from the extreme compression fiber to the center of mass of the tension reinforcement. The moment capacity for a single layer of tension reinforcement is obtained from page 5-7 in the CRSI Design Handbook (8):

$$M_n = 0.90\ A_s\ f_y\ (d - a/2),$$

where A_s is the area of tension reinforcement, f_y is the yield strength of the reinforcement, and a is the depth of the concrete compression block which is obtained from a balance of concrete compression and bar tension:

$$A_s\ f_y = 0.85\ f_c'\ b\ a.$$

The moment capacity of the concrete beam is $M_n = 5{,}920$ lb ft per 1 foot width of beam, which exceeds the factored moment computed above. The shear capacity of the beam is $V_c = 11{,}170$ lb per 1 foot width of beam, which exceeds the factored shear computed above. In fact, the factored shear and moment in the retaining wall are less than this simple example indicates, owing to the presence of grout and building debris exerting opposing reactions at the inside of the wall.

Conclusions

An engineering analysis was used to calculate the hydrodynamic and hydrostatic forces expected to occur at the concrete cap enclosing CPP-633 during a 100-year flood coinciding with a failure of Mackay Dam. A structural analysis was used to examine the design of the cap and its flood protection devices and how these will prevent washout of hazardous waste. The following results were obtained.

(1) The top of the concrete cap is approximately 5 ft above the floodwater level, and so flood water will not exert pressure on the top of the cap. Only the wall surrounding the cap will be acted on by floodwater forces. The floodwater level is estimated to be approximately 4 ft above the base of the wall located at the northwest corner of the cap. Therefore, significant forces due to stationary floodwater and wind-generated water waves will act on the wall.

(2) The construction of the concrete cap follows many of the standard practices used to assure a watertight structure and to provide adequate drainage during a flood (9). These include filling the below-grade structure with grout, grouting and capping the pipes entering the building, placing a concrete cap on top of the debris, limiting the concrete permeability to preclude water infiltration, including a gutter to allow drainage of rain and snowmelt, and installing water stops at all joints. The issue of permeability was independently examined during PE certification of closure (2), when it was determined that the concrete cap satisfies the requirements stated in the closure plan, which ensures that the concrete enclosure is essentially impermeable.

(3) An important consideration regarding flood protection is the ability of the retaining walls to withstand floodwater forces. The wall of the concrete cap enclosing CPP-633 must withstand the hydrostatic force due to stationary floodwater and the hydrodynamic force due to wind-generated waves. A structural analysis of the retaining wall demonstrates that the wall can withstand floodwater forces caused by the maximum credible flooding event. Therefore, the enclosed waste will be protected from washout during the maximum credible flood. Since the floodwater forces caused by the maximum credible flood are a conservative estimate of the floodwater forces caused by the 100-year flood, the enclosed waste will be protected from washout during a 100-year flood.

References

1. *HWMA Closure Plan for the Waste Calcining Facility at the Idaho National Engineering and Environmental Laboratory*, INEEL-96/0189, Rev. 2, June, 1997.
2. *Supporting Documentation for HWMA/RCRA Closure Certification of the Waste Calcining Facility*, Jason Associates Corp., June 1999.
3. *Code of Federal Regulations*, 40 CFR Ch. 1, Sect. 270.14(b), Para. 11(iv) A, August 1, 2000.
4. K. N. Koslow and D. H. Van Haaften, *Flood Routing Analysis for a Failure of Mackay Dam*, EGG-EP-7184, June, 1986.
5. E. F. Brater and H. W. King, *Handbook of Hydraulics*, 6th Edition, McGraw-Hill, NY, 1976.
6. R. J. Roark and W. C. Young, *Formulas for Stress and Strain*, 5th Edition, McGraw-Hill, NY, 1975.
7. *Building Code Requirements for Reinforced Concrete*, ACI 318-99, American Concrete Institute, 1999.
8. *CRSI Design Handbook*, 3rd Edition, Concrete Reinforcing Steel Institute, 1978.
9. *Environmental Engineering Concrete Structures*, ACI 350.2R-97, American Concrete Institute, 2000.

- Required Notices. Appendix III of the Post-Closure Permit Application for the Volume 21 Waste Calcine Facility as last revised September 2002.

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. Conner Jr.

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. Conner

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

END-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

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