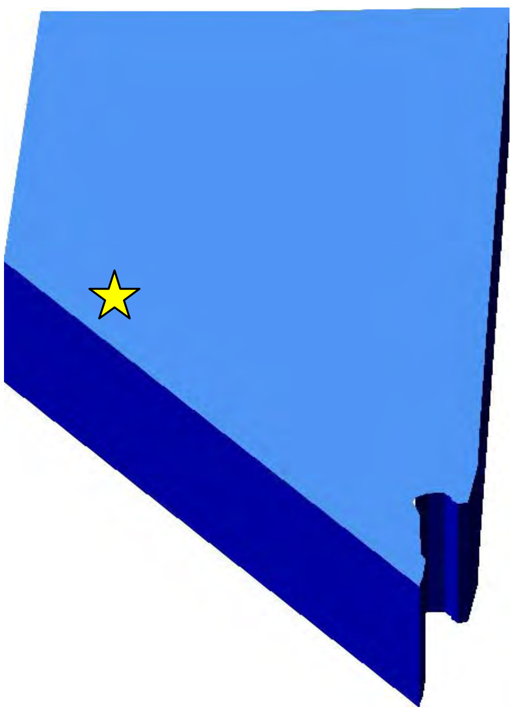
RCRA Part A &B Application
For

Main Base

Hawthorne Army Depot
Hawthorne, Nevada



Volume 1

JUNE 2012

PART B CERTIFICATION [*40 CFR 270.11*]

Part B applications must be accompanied by a certification as specified in 40 CFR 270.11(d). The certification must be signed as specified in 40 CFR 270.11(a). For a federal facility, the certification must be signed by either a principal executive officer or ranking elected official.

CERTIFICATION

I hereby 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 gathered and evaluated 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.

20130528

Kirk Bausman
Deputy to the Commander
U.S. Army

Date

5/29/13

George R. Gram
General Manager
SOC Nevada LLC

Date

Main Base
Revision: 0
Date: 06/21/12

Hawthorne Army Depot

ADDRESSES
Mailing
JMHW-_____/Name
Hawthorne Army Depot
1 South Maine Avenue, Bldg #___
Hawthorne, NV 89415-9404
DMS
(X.500 Distinguished Name): c=US/o=U.S. Government/ou=DoD/ou =Army/ou=Organizations/1=CONUS/1= HAWTHORNE ARMY DEPOT NV/ou= HWAD CDR(n)
DEPOT E-MAIL ADDRESS
CDRSITE-Hawthorne@conmail.mil

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***Bldg 1*, FAX: 7948 – TDA Para 001**

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LTC Craig M. Short 7001 -CO
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CELL: 775-945-0586

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CELL: 775-945-0587

SECRETARY (OA) -DC
Mrs. Rebecca Wright 7002
E-MAIL: rebecca.v.wright4.civ@mail.mil

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GUARD OPS	830-7555

1-800-471-0829 then the ext

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TDA Para 005

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ADMINISTRATIVE ASSISTANT (OA)
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E-MAIL:

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CELL: 775-316-7302
Mr. Jeff Schwab
E-MAIL: jeffery.w.schwab.civ@mail.mil

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SUPPLY MANAGEMENT 7119
TRUCK LOT 7927

Bldg 101-71
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Mrs. Debbie LaCroix, Logistics Management	debbie.lacroix@navy.mil	7213

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Ammo, Mrs. Emily Summerbell	emily.summerbell@navy.mil	7879

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11 August 2012

SOC NEVADA LLC

SOC Nevada LLC • Organization - 2012

- **General Manager** (4A1) — George R. Gram II — o: x7660 — George.Gram@dzhc.net — c: 316-6525
  - **Chief Operations Officer/Deputy GM** (4C1) — Ron Going — o: x7244 — ronald.w.going.ctr@mail.mil — c: 945.0301
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      - **Engineering, Facilities & Planning** (4G1) — Manager, Tom Fitzgerald — o: x7436 — thomas.r.fitzgerald8.ctr@mail.mil — c: 316.0676
      - **Maintenance & Utilities** (4E2) — Manager, Dave Musselman — o: x7720 — david.w.musselman2.ctr@mail.mil — c: 945.0343
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      - **Demil & Special Projects** (4C3) — Manager, Kirk Kyler — o: x7300 — kirk.h.kyler.ctr@mail.mil — c: 316.0707
      - **Process Improvement** (4C1) — Manager, Bobbi Luptak — o: x7201 — barbara.l.luptak.ctr@mail.mil — c: 316.0660
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    - **Contract Administration & Purchasing** (4B1) — Manager, Courtney Robinson — o: x7475 — Courtney.robinson@dzhc.net — c: 316.0735
    - **Human Resources** (4B4) — Manager, Nancy Rutherford — o: x7851 — Nancy.rutherford@dzhc.net — c: 316.0723
    - **Finance/Accounting** (4B3) — Manager, Kim Packard — o: x7364 — Kimberly.packard@dzhc.net
    - **Information Services** (4B2) — Manager, Crista Lenston — o: x7055 — Crista.lenston@dzhc.net — c: 316.0657
    - **Marketing** (4A2) — Manager, Rob Schleef — o: x7889 — Robert.schleef@soc-usa.com — c : 316.0680
  - **Performance Management Support Group** (4D1) — Director, Tom Erickson — o: x7587 — thomas.j.erickson18.ctr@mail.mil — c: 316.2717
    - **Environmental** (4D5) — Manager, Yvonne Downs — o: x7583 — yvonne.m.downs2.ctr@mail.mil — c: 945.0447
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    - **Quality Assurance** (4D3) — Manager, Suzy Berry — o: x7043 — suzanne.m.berry6.ctr@mail.mil — c: 316.0737
    - **Safety & Health** (4D2) — Manager, Patty Coen — o: x7931 — patricia.m.coen.ctr@mail.mil — c: 316.1949

2 South Maine Avenue, Hawthorne, NV 89415

MAIN BASE RCRA TABLE OF CONTENTS

PART A

OMB# 2050-0024; Expires 12/31/2014

SEND COMPLETED FORM TO: The Appropriate State or Regional Office.	United States Environmental Protection Agency **RCRA SUBTITLE C SITE IDENTIFICATION FORM**	
1. Reason for Submittal MARK ALL BOX(ES) THAT APPLY	**Reason for Submittal:** ☐ To provide an Initial Notification (first time submitting site identification information / to obtain an EPA ID number for this location) ☐ To provide a Subsequent Notification (to update site identification information for this location) ☐ As a component of a First RCRA Hazardous Waste Part A Permit Application ☒ As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment #________) ☐ As a component of the Hazardous Waste Report (If marked, see sub-bullet below) ☐ Site was a TSD facility and/or generator of ≥1,000 kg of hazardous waste, >1 kg of acute hazardous waste, or >100 kg of acute hazardous waste spill cleanup in one or more months of the report year (or State equivalent LQG regulations)	
2. Site EPA ID Number	**EPA ID Number** N V 1 2 1 0 0 9 0 0 0 6	
3. Site Name	**Name:** Hawthorne Army Depot	
4. Site Location Information	**Street Address:** 1 South Maine Ave	
	City, Town, or Village: Hawthorne	**County:** Mineral
	State: Nevada **Country:** USA	**Zip Code:** 89415
5. Site Land Type	☐ Private ☐ County ☐ District ☑ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other	
6. NAICS Code(s) for the Site (at least 5-digit codes)	**A.** 9 2 8 1 1 0	**C.** 3 3 2 9 9 5
	B. 4 9 3 1 9 0	**D.**
7. Site Mailing Address	**Street or P.O. Box:** 1 South Maine Ave	
	City, Town, or Village: Hawthorne	
	State: Nevada **Country:** USA	**Zip Code:** 89415
8. Site Contact Person	**First Name:** Bausman **MI:** **Last:** Kirk	
	Title: Deputy to the Commander	
	Street or P.O. Box: 1 South Maine Ave	
	City, Town or Village: Hawthorne	
	State: Nevada **Country:** USA	**Zip Code:** 89415
	Email: kirk.l.bausman.civ@mail.mil	
	Phone: 775-945-7002 **Ext.:**	**Fax:** 775-945-7948
9. Legal Owner and Operator of the Site	**A. Name of Site's Legal Owner:** U.S. Department of Army	**Date Became Owner:** 10/27/1926
	Owner Type: ☐ Private ☐ County ☐ District ☑ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other	
	Street or P.O. Box: 1 South Maine Ave	
	City, Town, or Village: Hawthorne	**Phone:** 775-945-7002
	State: Nevada **Country:** USA	**Zip Code:** 89415
	B. Name of Site's Operator: SOC Nevada LLC	**Date Became Operator:** 01/01/2011
	Operator Type: ☑ Private ☐ County ☐ District ☐ Federal ☐ Tribal ☐ Municipal ☐ State ☐ Other	

10. Type of Regulated Waste Activity (at your site)
Mark "Yes" or "No" for all current activities (as of the date submitting the form); complete any additional boxes as instructed.

A. Hazardous Waste Activities; Complete all parts 1-10.

Y ☑ N ☐ **1. Generator of Hazardous Waste**
If "Yes", mark only one of the following – a, b, or c.

☑ a. LQG: Generates, in any calendar month, 1,000 kg/mo (2,200 lbs./mo.) or more of hazardous waste; **or** Generates, in any calendar month, or accumulates at any time, more than 1 kg/mo (2.2 lbs./mo) of acute hazardous waste; **or** Generates, in any calendar month, **or** accumulates at any time, more than 100 kg/mo (220 lbs./mo) of acute hazardous spill cleanup material.

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

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

If "Yes" above, indicate other generator activities in 2-4.

Y ☐ N ☑ **2. Short-Term Generator** (generate from a short-term or one-time event and not from on-going processes). If "Yes", provide an explanation in the Comments section.

Y ☐ N ☑ **3. United States Importer of Hazardous Waste**

Y ☐ N ☑ **4. Mixed Waste (hazardous and radioactive) Generator**

Y ☑ N ☐ **5. Transporter of Hazardous Waste**
If "Yes", mark all that apply.

☑ a. Transporter

☐ b. Transfer Facility (at your site)

Y ☑ N ☐ **6. Treater, Storer, or Disposer of Hazardous Waste** Note: A hazardous waste Part B permit is required for these activities.

Y ☐ N ☑ **7. Recycler of Hazardous Waste**

Y ☐ N ☑ **8. Exempt Boiler and/or Industrial Furnace**
If "Yes", mark all that apply.

☐ a. Small Quantity On-site Burner Exemption

☐ b. Smelting, Melting, and Refining Furnace Exemption

Y ☐ N ☑ **9. Underground Injection Control**

Y ☐ N ☑ **10. Receives Hazardous Waste from Off-site**

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

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

- a. Batteries ☑
- b. Pesticides ☐
- c. Mercury containing equipment ☑
- d. Lamps ☑
- e. Other (specify) ____________ ☐
- f. Other (specify) ____________ ☐
- g. Other (specify) ____________ ☐

Y ☐ N ☑ **2. Destination Facility for Universal Waste**
Note: A hazardous waste permit may be required for this activity.

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

Y ☐ N ☑ **1. Used Oil Transporter**
If "Yes", mark all that apply.

☐ a. Transporter

☐ b. Transfer Facility (at your site)

Y ☐ N ☑ **2. Used Oil Processor and/or Re-refiner**
If "Yes", mark all that apply.

☐ a. Processor

☐ b. Re-refiner

Y ☐ N ☑ **3. Off-Specification Used Oil Burner**

Y ☐ N ☑ **4. Used Oil Fuel Marketer**
If "Yes", mark all that apply.

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

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

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

❖ You can **ONLY** Opt into Subpart K if:

- you are at least one of the following: a college or university; a teaching hospital that is owned by or has a formal affiliation agreement with a college or university; or a non-profit research institute that is owned by or has a formal affiliation agreement with a college or university; AND
- you have checked with your State to determine if 40 CFR Part 262 Subpart K is effective in your state

Y☐ N☐ 1. Opting into or currently operating under 40 CFR Part 262 Subpart K for the management of hazardous wastes in laboratories **See the item-by-item instructions for definitions of types of eligible academic entities. Mark all that apply:**

☐ a. College or University

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

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

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

11. Description of Hazardous Waste

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

D001	D002	D003	D004	D005	D006	D007
D008	D009	D010	D011	D018	D022	D027
D030	D035	D036	F002	F003	F004	F005
K044	K045	K047	P006	P022	P098	U002
U044	U080	U105	U109	U117	U121	U151
U154	U159	U165	U220	U226	U228	U239

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

12. Notification of Hazardous Secondary Material (HSM) Activity

Y ☐ N ☑ Are you notifying under 40 CFR 260.42 that you will begin managing, are managing, or will stop managing hazardous secondary material under 40 CFR 261.2(a)(2)(ii), 40 CFR 261.4(a)(23), (24), or (25)?

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

13. Comments

9A. Site Contact: Kirk Bausman, Deputy to the Commander

1 South Maine Ave

Hawthorne, NV 89415

(775) 945-7002

9:B SOC Nevada LLC Contact: George Gram II, General Manager

2 South Maine Ave

Hawthorne, NV 89415

775-945-7660

Technical Point of Contact - Yvonne Downs, Manager, Env Svcs SOC Nevada LLC

2 South Maine Ave Bldg 39

Hawthorne, NV 89415

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

Signature of legal owner, operator, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
[signature]	Kirk Bausman	20130423
[signature]	George Gram	4/22/13

United States Environmental Protection Agency

HARDOUS WASTE PERMIT INFORMATION FORM

1. Facility Permit Contact	**First Name:** Manolo	**MI:** B	**Last Name:** Bay
	Contact Title: Supervisory Environmental Protection Specialist		
	Phone: (775) 945-7340	**Ext.:**	**Email:** manolo.b.bay.civ@mail.mil
2. Facility Permit Contact Mailing Address	**Street or P.O. Box:** 1 South Maine Ave		
	City, Town, or Village: Hawthorne		
	State: Nevada		
	Country: USA	**Zip Code:** 89406	
3. Operator Mailing Address and Telephone Number	**Street or P.O. Box:** 2 South Maine Ave Bldg 2		
	City, Town, or Village: Hawthorne		
	State: Nevada	**Phone:** 775-945-7660	
	Country: USA	**Zip Code:** 89406	
4. Facility Existence Date	**Facility Existence Date (mm/dd/yyyy):** 10/27/1926		

5. Other Environmental Permits

A. Facility Type *(Enter code)*	**B. Permit Number**													**C. Description**
E	A	P	9	7	1	1	-	0	8	6	3	.	0	1 Title V Facility Wide Air Permit
N	N	E	V	0	0	2	1	9	4	6				WADF Process H20 Treatment Facility
N	N	E	V	2	0	0	4	5	2	4				Black Beauty Discharge Backwash H20
N	N	E	V	2	0	0	3	5	1	6				PODS Waste H20
N	N	V	R	0	5	0	0	0	0					General Storm Water Discharge Permit
E	M	I	-	0	3	5	7	-	1	2	C			Drinking Water System (State)
E	M	I	-	0	3	5	7	-	T	S	P	I	-	12C Black Beauty Surface Water Treatment Plant
E	M	I	-	0	3	5	7	-	T	P	A	S		Arsenic and Fluoride Treatment Plant
E	A	P	9	7	1	1	-	2	7	5	7			Class 1 OPTC

6. Nature of Business: The mission of Hawthorne Army Depot is to support the major military services (Army, Navy, Air Force, Marines) with facilities to receive, load, maintain, store and issue ammunition, explosives, and related items. HWAD also has the responsibility to renovate, demilitarize, or dispose of unserviceable ammunition and explosives.

7. Process Codes and Design Capacities – Enter information in the Section on Form Page 3

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

B. PROCESS DESIGN CAPACITY – For each code entered in item 7.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 item 7.B(1), enter the code in item 7.B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.**

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

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

Process Code	Process	Appropriate Unit of Measure for Process Design Capacity
	Treatment (Continued)	**(for T81 – T94)**
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; Liters Per Hour; Kilograms Per Hour; or Million BTU Per Hour
T82	Lime Kiln	
T83	Aggregate Kiln	
T84	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, or Refining Furnace	
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used in the Recovery of Sulfur Values from Spent Sulfuric Acid	
T92	Halogen Acid Furnaces	
T93	Other Industrial Furnaces Listed in 40 CFR 260.10	
T94	Containment Building Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; BTU Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million BTU Per Hour
	Miscellaneous (Subpart X)	
X01	Open Burning/Open Detonation	Any Unit of Measure 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; Gallons Per Hour; Liters Per Hour; or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; BTU Per Hour; or Million BTU Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

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

7. Process Codes and Design Capacities (Continued)

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

Line Number		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	(2) Unit of Measure	C. Process Total Number of Units	For Official Use Only
X	1	S	0	2	533.788	G	001	
	1	T	0	3	1.00	D	001	
	2	S	0	1	782051.00	G	028	
	3	X	0	1	10.00	N	001	
	4	T	0	3	240.0	J	001	
	5	T	0	3	550.00	J	001	
	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 line sequentially, taking into account any lines that will be used for "other" process (i.e., D99, S99, T04, and X99) in Item 8.

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

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

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

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

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

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

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

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

D. **PROCESSES**

1. **PROCESS CODES:**

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

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

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

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

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

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

1. Select one of the EPA Hazardous Waste Numbers and enter it in Item 9.A. On the same line complete Items 9.B, 9.C, and 9.D by estimating the total annual quantity of the waste and describing all the processes to be used to store, treat, and/or dispose of the waste.
2. In Item 9.A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In Item 9.D.2 on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.

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

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

EPA ID Number N V 1 2 1 0 0 9 0 0 0 6 OMB#: 2050-0024; Expires 12/31/2014

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

Line Number	A. EPA Hazardous Waste No. (Enter code)	B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter Code)	D. PROCESSES (2) PROCESS DESCRIPTION (If code is not entered in 9.D(1))
1	D001	10,000	P	S01	
2	D002	10,000	P	S01	
3	D003	400	T	S01	
4	D004	10,000	P	S01	
5	D005	5,000	P	S01	
6	D006	10,000	P	S01	
7	D007	5,000	P	S01	
8	D008	100	T	S01	
9	D009	10,000	P	S01	
10	D010	500	P	S01	
11	D011	1500	P	S01	
12	D018	1000	P	S01	
13	D022	10	P	S01	
14	D027	100	T	S01	
15	D030	150	P	S01	
16	D035	30	P	S01	
17	D036	1000	P	S01	
18	F002	5000	P	S01	
19	F003	2000	T	S01	
20	F004	2000	T	S01	
21	F005	2000	P	S01	
22	K044	5	P	S01	
23	K045	20	P	S01	
24	K047	10	P	S01	
25	P006	10	P	S01	
26	P022	25	P	S01	
27	P098	10	P	S01	
28	U002	500	P	S01	
29	U044	10	P	S01	
30	U080	30	P	S01	
31	U105	10	P	S01	
32	U109	10	P	S01	
33	U117	10	P	S01	
34	U121	10	P	S01	
35	U151	50	P	S01	
36	U154	100	P	S01	

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

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Qty of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter Code)									D. PROCESSES (2) PROCESS DESCRIPTION (If code is not entered in 9.D.1)
3	7	U	1	5	9	10	P	S	0	1							
3	8	U	1	6	5	10	P	S	0	1							
3	9	U	2	2	0	200	P	S	0	1							
4	0	U	2	2	6	10	P	S	0	1							
4	1	U	2	2	8	10	P	S	0	1							
4	2	U	2	3	9	50	P	S	0	1							
4	3	D	0	0	3	500	T	T	0	3							RF-9 Detonating Incinerator
4	4	D	0	0	5			T	0	3							weight Included line # 44
4	5	D	0	0	6			T	0	3							weight Included line # 44
4	6	D	0	0	7			T	0	3							weight Included line # 44
4	7	D	0	0	8			T	0	3							weight Included line # 44
4	8	D	0	0	9			T	0	3							weight Included line # 44
4	9	D	0	3	0			T	0	3							weight Included line # 44
5	0	D	0	0	3	1950	T	X	0	1							Open Burn
5	1	D	0	0	5			X	0	1							weight Included line # 50
5	2	D	0	0	8			X	0	1							weight Included line # 50
5	3	D	0	0	9			X	0	1							weight Included line # 50
5	4	D	0	3	0			X	0	1							weight Included line # 50
5	5	D	0	0	1	6240	T	T	0	3							PODS
5	6	D	0	0	3			T	0	3							weight Included line # 55
5	7	D	0	0	4			T	0	3							weight Included line # 55
5	8	D	0	0	5			T	0	3							weight Included line # 55
5	9	D	0	0	7			T	0	3							weight Included line # 55
6	0	D	0	0	8			T	0	3							weight Included line # 55
6	1	D	0	0	9			T	0	3							weight Included line # 55
6	2	D	0	3	0			T	0	3							weight Included line # 55
6	3	D	0	0	3	858	T	T	0	3							BEDS
6	4	D	0	0	8			T	0	3							weight Included line # 63

10.	**Map**
	Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all spring, rivers, and other surface water bodies in this map area. See instructions for precise requirements.
11.	**Facility Drawing**
	All existing facilities must include a scale drawing of the facility (see instructions for more detail).
12.	**Photographs**
	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).
13.	**Comments**

PART B - TABLE OF CONTENTS

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EXHIBITS

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REFERENCES

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ABBREVIATIONS AND DEFINITIONS

AADV	Annual Average Daily Volume
AAP	Army Ammunition Plant
ACGIH	American Conference of Governmental Industrial Hygienists
ADA	Army Depot Activity
ADNL	A-weighted DNL (day night level)
AEC	Atomic Energy Commission
Ag	Silver
AMC	Army Material Command
AMCCOM	U.S. Army Armament, Munitions and Chemical Command
APCS	Air Pollution Control System
APE	Ammunition Peculiar Equipment
ARDEC	U.S. Army Armament Research, Development and Engineering Center
As	Arsenic
A\\VFSO	Automatic waste feed shut-off
Ba	Barium
BACT	Best available control technology
CAA	Clean Air Act
Cd	Cadmium
CDNL	C-weighted DNL (day night level)
CE	Corps of Engineers
CEM	Continuous Emissions Monitoring
CFR	Code of Federal Regulations
Cl	Chlorine
CO	Carbon Monoxide
CPTP	Comprehensive Performance Test Plan
Cr	Chromium
dBA	A-weighted decibel
dBC	C-weighted decibel
dBP	Peak decibel
DCP	Disaster Control Plan
DESCOM	U.S. Army Depot System Command
DNL	Day night level
DNT	Dinitrotoluene
DOD	U.S. Department of Defense
DOT	U.S. Department of Transportation
DRE	Destruction and Removal Efficiency
EO	Executive Order
EOC	Emergency Operations Center
EPT	Extraction Procedure Toxicity Characteristic
ERC	Emergency Response Coordinator Emergency
ERT	Response Team
EWI	Explosive Waste Incinerator
FERD	Fugitive Emissions Return Ducts

g	Gram
gr	Grain (unit of gun powder measurement; 1 grain= 0.002285 ounces or 0.0648 grams)
GOC	Guard Operations Center
GOCO	Government Owned, Contracted Operated
GC/MS	Gas Chromatography/Mass Spectrophotometry
gpm	gallons per minute
HCL	Hydrogen Chloride
Hg	Mercury
HMX	Cyclotetramethylene Tetranitramine
HPLC	High Pressure Liquid Chromatography
HT	High Temperature Gas Coolers
HUD	U.S. Department of Housing and Urban Development
HW	Hazardous Waste
HWAD	Hawthorne Army Depot Hazardous
HWM	Waste Management Hazardous
HWCP	Waste Contingency Plan
IARC	International Agency for Research on Cancer
ICUZ	Installation of Compatible Use Zone
ID	Identification
Inc	Incorporated
IRI	Ignitable, Reactive, and Incompatible
IWWTP	Industrial Wastewater Treatment Plant
kV	Kilovolts
lb	pound
LT	Low Temperature Gas Coolers
mlg/1	Micrograms per liter; parts per billion
mg/1	Milligrams per liter; parts per million
ml	Milliliters
mm	Millimeter
MACT	Maximum achievable control technology
MSDS	Material Safety Data Sheet
MSL	Mean Sea Level
N	Nitrogen
NIA	Not available
NASA	National Aeronautics and Space Administration
NC	Nitrocellulose
ND	Not Detected
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NIOC	Naval Inshore Operations Center
NFA	No Further Action
NG	Nitroglycerin
NlPDWR	Nationallnterim Primary Drinking Water Regulations
NOAA	National Oceanic and Atmospheric Administration
NOD	Notice of Deficiency

OB	Open Burning Open
OD	Detonation On-the-
OJT	job training
OSHA	Occupational Safety and Health Administration
Pb	Lead
PCB	Polychlorinated Biphenyl
PEP	Pyrotechnics, explosives, and propellants
PETN	Pentaerythritol Tetranitrate
PL	Public Law
PLC	Programmable Logic Controller
PM	Particulate Matter
PO	Propylene oxide
PODS	Plasma Ordnance Demilitarization System
POHC	Principal Organic Hazardous Constituents
POL	Petroleum, oils, and lubricant
ppm	Parts per million
QA	Quality assurance
QC	Quality control
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act of 1976 (as amended)
RDX	Cyclotrimethylenetrinitramine
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RTP	Research Triangle Park
Se	Selenium
SCS	Soil Conservation Service
SDPDA	Special Defense Property Disposal Account
SOP	Standing Operating Procedure(s)
SPCCP	Spill Prevention Control and Countermeasure Plan
SWMU	Solid Waste Management Unit
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TECOM	U.S. Army Test and Evaluation Command
TEP	Toxic Extraction Procedure; synonymous with EP Toxicity
Tetryl	2,4,6-trinitrophenol-methylnitramine
TEP	Toxic extraction procedure
TKN	Total Kjeldahl nitrogen
TLV	Threshold Limit Value
TNT	Trinitrotoluene
TSDF	Treatment, Storage and Disposal Facility
TTCL	Total threshold concentration limit
USAEHA	U.S. Army Environmental Hygiene Agency

USAMBRDL	U.S. Army Medical Bioengineering Research and Development
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USC	United States Code
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USDA	U.S. Department of Agriculture
USGS	United States Geological Survey
UXO	Unexploded Ordnance
WADF	Western Area Demilitarization Facility
WFMS	Waste Feed Monitoring System
WW	Wastewater
WWTP	Wastewater Treatment Plant

GLOSSARY OF TERMS

AMMUNITION ANNULUS - A contrivance charged with explosives, propellants, pyrotechnics, and/or initiating compositions, which is used for military purposes.

APE 2210 (RF-9) Detonating Items Furnace - Area between the outside of the well casing and walls of the soil boring. Incinerator used for the thermal treatment of waste munitions and waste PEP: these items cannot be shipped offsite in untreated form for treatment or disposal.

AQUIFER - Any water-bearing (saturated) geologic stratum capable of yielding water to a well.

BACKGROUND WELL - A monitoring well so located as to yield ground-water samples, which represent native water quality rather than any leachate emanating from the facility under surveillance.

CARCINOGENIC - Capable of causing cancer.

COMPOSITE PROPELLANT - A propellant consisting of two or more energetic constituents.

DECIBEL DEFLAGRATION - A unit of air overpressure commonly used to measure sound level.

DEMILITARIZATION - A rapid chemical reaction in which the output of heat is sufficient to enable the reaction to proceed and be accelerated without input of heat from another source. It is a surface phenomenon with the reaction products flowing away from the un-reacted material along the surface at subsonic velocity. Confinement of the reaction increases pressure, the rate of reaction, and temperature, and may cause transition into detonation. Thus, the effect of a true deflagration under confinement is an explosion.

DETONATION - The rendering of propellants, explosives, pyrotechnics, ammunition. and other ordnance items harmless and ineffective for military use. A violent chemical reaction within a chemical compound or mechanical mixture evolving heat and pressure. The reaction proceeds through the reacted materials toward the un-reacted material at a supersonic velocity. A detonation, which occurs on or near the surface of the ground, normally forms a crater.

DISPOSAL - The discharge, deposit, injection, dumping, spilling, leaking or placing of any solid waste or hazardous waste into or on any land or water so that such solid or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

DOUBLE BASE PROPELLANT - A propellant composition whose principal explosive ingredients are nitroglycerin and nitrocellulose.

DOWNGRADIENT WELL - A monitoring well so located as to yield ground-water samples, which can reasonably be expected to characterize any contamination leaching from the facility under surveillance.

ENERGETIC MATERIALS - Any chemical compound(s) or mixture(s) of substances which, when initiated, result in the rapid evolution of energy. Such materials include propellants, explosives, pyrotechnics, and some of their ingredients, precursors, and byproducts.

EPHEMERAL DRAINAGE - Channelized runoff which occurs only in response to rainfall events.

EXCESS EVAPORATION - Mean annual precipitation; applicable only where evaporation exceeds precipitation.

FACILITY - All contiguous land and structures, other appurtenances, and improvements on the land used for treating, storing, or disposing of hazardous waste. For permitting purposes, a facility may consist of an entire installation or any part or combination of parts of that installation where treatment, storage, or disposal operations are located.

GROUNDWATER LAKE EVAPORATION LC50 - Water below the surface in a zone of saturation. A measure of free-water evaporation and a good index to potential evapotranspiration. Concentration of a contaminant, which is lethal to 50 percent of the organisms used in the toxicity test.

LEACHATE - Water, which freely drains through a waste treatment site and through the unsaturated soil horizons, picking up dissolved contamination as it percolates downward towards the water table.

MATERIAL MUTAGENIC OXIDIZER OR OXIDIZING MATERIAL - Military arms, ammunition, and equipment in general. Capable of causing mutation. A substance, such as nitrate, that readily yields oxygen or other oxidizing substances to simulate the combustion of organic matter or other fuel.

PEP - Propellants, explosives, or pyrotechnics (See WASTE PEP).

PERMEABILITY - Capacity of a soil or geologic stratum to transmit water.

PLASMA ORDNANCE DEMILITARIZATION SYSTEM (PODS) - Incinerator used for the thermal treatment (deactivation/destruction) of a variety of obsolete and unserviceable munitions not otherwise treatable in the RF-9 incinerator, in addition to contaminated soils, scrap metal, and other RCRA characteristic reactive wastes. Formerly referred to as plasma arc ordnance demilitarization system.

PROPELLANT - A high-energy material that normally functions by deflagration and is used for propulsion purposes. Specifically, it is an explosive charge for propelling a bullet, shell, or the like; also a fuel, either solid or liquid, for propelling a rocket or missile.

PYROTECHNIC REACTIVITY - Any combustible or explosive composition or manufactured articles designed and prepared for the purpose of producing audible or visible (smoke or light) effects. A characteristic of solid waste whereby the waste is: (1) Capable of detonation or explosion if subjected to a strong initiating source or if heated under confinement (2) Readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

REWORK - Work performed on ammunition, missiles, rockets, or other ordnance, to restore these items to a completely serviceable condition; it usually involves the replacement of unserviceable or outmoded parts.

SHELF LIFE SHOCK WAVE - The length of time of storage during which an energetic material retains adequate performance characteristics. A transient pressure pulse that propagates at supersonic velocity.

SINGLE-BASE PROPELLANT - A propellant composition whose principal explosive ingredient is nitrocellulose.

STANDING OPERATING PROCEDURES (SOP) - A document which prescribes operator instructions in a definite course of action for processing a work unit. A SOP includes specifications, safety instructions, and performance standards (i.e., environmental and engineering).

SUBSONIC SUPERSONIC TCLP TOXICITY - Less than the speed of sound. Greater than the speed of sound. An extraction test to evaluate the leachability of eight different metals from a hazardous waste. These metals are arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), lead (Pb), mercury (Hg), silver (Ag). and selenium (Se).

TILL TRANSPIRATION - Unsorted, non-stratified sediment, generally of low permeability, carried and deposited by a glacier. The process whereby plants absorb soil moisture and lose excess moisture from their leaves to the atmosphere.

TREATMENT - Any method, technique, or process design to change the chemical, physical or biological character or composition of any hazardous waste so as to recover energy or material resource from the waste, or to render such waste nonhazardous, or less hazardous, or safety to transport.

TSDF - Treatment/Storage/Disposal Facility (Resource Conservation and Recovery Act) Specific TSD facility.

WASTE MUNITIONS WASTE PEP - Consists of waste ordnance and waste PEP. Consists of propellants, explosives, or pyrotechnics (PEP) and other such energetic or hazardous materials, which do not or cannot be refined to meet the required military specifications. Such wastes consist of off-specification and scrap materials, which are generated from primary production, loading, rework, demilitarization, and resource recovery operations.

WATER TABLE - The upper surface of a zone of saturation; the focus of points in subsurface water at which the pressure is equal to atmospheric pressure.

SECTION A. FACILITY DESCRIPTION

GENERAL DESCRIPTION [*40 CFR 270.14(b)(1)*]

Hawthorne Army Ammunition Depot (HWAD) is 147,236 acres of federal land south of Walker Lake in Mineral County, Nevada (Section A, Figure A-1). HWAD is situated 135 miles southeast of Reno and lies in a basin bounded by the Wassuk Mountains to the west, the Gillis Range to the east, Walker Lake to the north, and the Excelsior Mountains to the south. The installation almost surrounds the town of Hawthorne which has an estimated population of 3,500. HWAD contains approximately 2877 buildings and over 1500 of these are explosive storage magazines.

HWAD MAIN BASE FACILITY IS LOCATED SOUTH OF WALKER LAKE, IN HYDROGRAPHIC BASINS (HA) 109, 110B, & 110C AND OCCUPIES SECTION 1, T7N, R28E; SECTIONS 5 & 6, T7N, R29E; SECTIONS 1, 2, & 3, ALL BUT 1/4 OF THE NORTHWEST 1/4 OF SECTION 4, SECTIONS 9-16, EASTERN 1/4 OF SECTION 21, SECTIONS 22-26, 3/4 OF SECTION 27, 3/4 OF SECTION 35, SECTION 36, T7N, R30E; SECTIONS 2-11, 14-23, 26-35, T7N, R31E; SECTIONS 1-3, EAST ½ OF SECTION 10, SECTIONS 11-14, 1/4 OF NORTHEAST 1/4 OF SECTION 15, SECTIONS 23-25, NORTHEAST 1/4 OF THE SOUTHEAST 1/4 OF SECTION 26, SECTION 36, T8N, R28E; SECTIONS 1-33, T8N, R29E; SECTIONS 1-14, EASTERN ½ OF SECTION 15, NORTHERN ½ OF SECTION 16, SECTIONS 17-20, 3/4 OF SECTION 21, NORTHEAST 1/4 OF SECTION 22, SECTIONS 23-25, 3/4 OF SECTION 26, SECTIONS 29 & 30, 3/4 OF SECTION 34, SECTIONS 35 & 36, T8N, R30E; SECTIONS 1-23, 26-35, T8N, R31E; SOUTH ½ OF SECTION 10, SECTIONS 11-15, 22-27, 34-36, T9N, R28E; SECTIONS 1-4, EASTERN ½ OF SECTION 5, SECTION 7, WESTERN ½ OF SECTION 8, SECTIONS 9-15, EASTERN ½ OF SECTION 16, SECTIONS 17-36, T9N, R29E; SECTIONS 25-36, T9N, R30E; SECTION 31, T9N, R31E.

The installation is a Government Owned, Contractor Operated (GOCO) installation. The agent for the facility is the Department of the Army. Routine facility operation and maintenance are performed by the HWAD contract operator SOC Nevada LLC. The installation was commissioned in 1930 as a Naval Ammunition Depot to store ammunition and ship conventional arms. In October

1977 the installation was transferred to the Army. The HWAD organizational structure, including both U.S. Army and contractor personnel, is presented in the beginning of this Volume.

The mission of HWAD is to support the major military services (Army, Air Force, and Navy). The HWAD mission includes the capability to: (1) receive, assemble, load and pack, issue, store, renovate, inspect, test, demilitarize, and R-3 (Recover, Recycle, Reclaim, and Component Reutilize) conventional ammunition; (2) thermally treat reactive conventional munitions, propellants, and explosives; (3) conduct special Research and Development (R&D) of high explosive casting, extruding and pressing, and support services to designate research and development activities; (4) provide storage of National Stockpile and Industrial Reserve material, act as principal storage facility for war reserve ammunition, and maintain designated ammunition in a state of readiness for mobilization including assembling or otherwise providing base unit materials; and (5) conduct testing of high explosive warheads, mechanical and electronic fuzes, cartridge cases, primers, rocket motors, and other ballistic devices.

A large variety of munition items are loaded, stored, and demilitarized at HWAD. A more detailed description of the wastes processed at HWAD facilities is included in Section B.

This permit renewal application of RCRA Part B Permit No. NEV HW0017, EPA ID#1210090006 addresses the following facilities at HWAD: 4 hazardous waste storage buildings in 115-9, 106-22, 106-23, and 113-73A Buildings, 8 retrofitted magazines at 116-37, 116-38, 116-39, 116-41, 116-42, 116-43, 116-44, and 116-45, one open burning (OB) unit (Old Bomb), one APE 2210 (RF-9) Detonating Furnace located in Building 117-3, one Plasma Ordnance Demilitarization System (PODS) to be located in Building 117-2, one Bulk Energetic Demilitarization System (BEDS),

Hazardous Waste Management (HWM) facilities at HWAD are operated primarily in conjunction with loading and demilitarization activities. The Western Area Demilitarization Facility (WADF), also known as the 117 Area, consists of 9 production buildings and 8 support buildings used for the demilitarization of explosive loaded ammunition. The WADF, housing a portion of the HWM facilities, was under construction from 1974 to 1982. The location of WADF with several of the HWM facilities is shown in Section A, Figure A-3 Table A-2 summarizes the functions of the primary buildings within WADF.

The hazardous waste storage buildings and eight retrofitted magazines are addressed in this application are all located in North Magazine Area. The location of the buildings is shown in Section A, Figure A-2. They include:

> Building 106-22 and 106-23 which provides containerized storage of non-explosive contaminated waste such as ash from incinerators and open burning, waste oils, solvents, grit blast, and battery acid. A portion of Building 106-23 also stores polychlorinated biphenyls (PCBs).
>
> Building 115-9 which provides containerized storage of explosive contaminated waste such as sludge from the WADF process water treatment facility, explosives in water, contaminated rags, and personal protective equipment.
>
> Building 113-73A which provides containerized storage of explosive-contaminated solid waste such as contaminated soil from spills and grit blast.

The location of the eight retrofitted storage magazines is shown in Section A, Figure A-6. The buildings are existing facilities which were built during the 1940s and the 1950s. Buildings 106-22, 106-23, and 115-9 were renovated in 1991 to retrofit the areas with secondary containment berm's, sealed concrete floors, and eye wash facilities. These buildings are fully enclosed structures of reinforced concrete design. The floors consist of a 6-inch-thick reinforced concrete slab and are elevated four feet above the surrounding ground level.

Waste is received at the twelve buildings from several generation points on HWAD and stored until treated on-site or manifested to and disposed of through a permitted Treatment Storage and/or Disposal Facility (TSDF).

In addition to storage, HWAD treats hazardous waste at Open Burning (OB) area, Plasma Ordnance Demilitarization System (PODS), Retort Facility (RF-9), and Bulk Energetic Demilitarization System (BEDS). Open burning of unserviceable munitions has been conducted at HWAD since World War II. Prior to 1989, burning was accomplished either in pits or on the ground surface where the propellant was ignited. Since 1989, OB has been performed in metal pans. No liquid wastes have been documented as being burned at the OB unit.

OB operations are conducted in an area known as "Old Bomb" that is located within the boundaries of HWAD in the southern part of the installation in South Magazine Area. Old Bomb encompasses an area of 300 acres, the actual area where the OB unit is located and which this permit application is addressing is 6.5 acres. Section A, Figure A-2 shows the location of Old Bomb. Since 1980, OB activities have been performed by an on-site contractor, under the direction of the government staff assigned to quality assurance surveillance. Propellants/explosives are typically treated by OB.

OB takes place in burn pans which are 19'-11" feet long, 7'-11 ½"feet wide, and 1'-3" foot deep. The burning capacity of each burn pan is 1,000 pounds per pan. A total of four pads, each consisting of five burn pans, are available for OB, thereby allowing the burning a maximum of 20,000 pounds of propellants per day. The four pads are spaced a minimum of 150 feet apart. The OB treatment unit consists of the burn pans, the burn pan stand, and the burn pan cover. The burn pans are made from 1/4-inch thick and made of carbon steel plate and the stands are made of steel see Figure A-12

The RF-9 Rotary Furnace is used to demilitarize obsolete and/or unserviceable small arms munitions, detonators, fuses, primers not otherwise treatable in PODS, refer to Section O for a detailed description of the APE 2210 (Army Peculiar Equipment) aka RF-9 Detonating Furnace. RF-9 is equipped with a primary combustion chamber, baghouse, and continuous emissions monitoring equipment, and stack.

The Comprehensive Performance Test Plan Report (CPTP) Appendix E is included in Appendix E and describes a testing program which will demonstrate the RF-9 meets or exceeds all requirements of RCRA, CAA, and NDEP. The CPT is designed to meet the operating and emission limitations set forth in the National Standards for Hazardous Waste Combustors (Title 40 CFR Part 63, Subpart EEE) also known as the hazardous waste combustor maximum achievable control technology (HWC MACT) regulations.

The CPTP Report CD for RF-9 presents the details on the RF-9 operation, including the waste to be destroyed by RF-9, proposed waste feed rate limits, performance testing, sampling and monitoring requirements, and air pollution and emission controls.

The PODS unit will be used to demilitarize obsolete and/or unserviceable small arms munitions, detonators, fuses, primers, and smoke and incendiary munitions not otherwise treatable in the RF-9 Detonating Furnace, and contaminated soils, scrap metal and other RCRA wastes. Refer to Section S for a detailed description of the PODS. The PODS is equipped with a secondary combustion chamber (SCC), quench/absorber, scrubber, baghouse, nitrogen oxide (NO_x) control, Continuous Emission Monitoring (CEM) equipment and stack.

The Comprehensive Performance Test Plan (CPTP) document (Tetra Tech EM Inc., October 2004) is included in Appendix E and describes a testing program which will demonstrate that the proposed PODS meets or exceeds all the requirements of the RCRA, the Clean Air Act (CAA) and the Nevada Division of Environmental Protection (NDEP). The CPTP is designed to meet the operating and emission limitations set forth in the National Emission Standards for Hazardous Waste Combustors (Title 40 Code of Federal Regulations [CFR] Part 63, Subpart EEE), also known as the hazardous waste combustor maximum achievable control technology (HWC MACT) regulations.

The CPTP for PODS presents the details on the PODS operation, including the wastes to be destroyed by PODS, proposed waste feed rate limits, performance testing, sampling and monitoring requirements, and air pollution and emission controls.

Bulk Energetics Demilitarization System (BEDS) is discussed in detail in Vol 1 Section V through Z of this permit application.

The HWM facilities at HWAD can be classified into two generic categories: (1) incinerators; and (2) storage containers. The RF-9 and PODS are categorically included under incinerators. The permit modification for the PODS is based on the Part B permit application submitted for the RF-9 incinerator (IT/HAZWRAP, 1996). Figure A-6 illustrates the spatial and elevation relationships among the hazardous waste management facilities.

SURROUNDING AREA

HWAD is located in a valley floor over 4000 feet above mean sea level (MSL). The terrain in the vicinity of the plant site is generally flat to gently rolling, with little elevation change in the WADF area. The HWAD occupies a portion of the Great Basin Section of the Basin and Range physiographic province. Geologists characterize the Basin and Range as a series of discontinuous, roughly parallel fault block mountain ranges separated by intermontane valleys, plains, and bolsons. The intermontane plains vary in width from a few hundred feet to several miles, and their lengths may reach several of miles. Many of them contain lakes or playas (dry lake beds) in the low areas.

The installation fills a bolson that opens to the northwest. The valley floor of the bolson consists of a broad alluvial apron. The floor slopes from an elevation of 4,400 feet above MSL at the foot of the Garfield Hills in the southeast to less than 4,000 feet above MSL in the northwest at the edge of Walker Lake. Flanking the alluvial apron are alluvial fans with slopes up to 6 percent. The alluvial fans originate from sheet and channel erosion in the mountains, which circumscribes the valley, exacerbated by intense and local thunderstorms. Subsequent flash floods and debris flows deposit as an alluvial fan on the desert floor. A maximum relief of 7,283 feet occurs on the western boundary of the installation. Mount Grant, the highest point in the Wassuk Mountains on the installation reaches 11,239 feet above MSL. Walker Lake exhibits the lowest elevation of 3,956 feet above MSL. Surficial Quaternary and Tertiary unconsolidated sedimentary deposits compose the valley floor, alluvial fans, aprons, and the weathered parent material as overburden in the higher elevations. The surficial deposits on the installation have been divided into four broad depositional soil types based on topographic position. The first soil type occupies the mountains/hills, canyons, mountain slopes, and foothills. The deposits are characterized by silty sand, gravel, sand-silt mixtures, silt, and sand and gravel in a clay matrix. Cobbles and boulders are common. The depth of the overburden is very shallow and interrupted by rock outcrops. The second type consists of deposits forming the alluvial fans and aprons. These are silty sands and gravelly silt-sand mixtures, cobbles and boulders derived from weathering of the surrounding mountains. Later, the fluvial processes transport the detritus to the lower elevations. Geologists report the thicknesses of the units to be at least 850 feet in the installation area. Lacustrine deposits that are predominantly clays deposited from the Pleistocene Lake Lahontan compose the third soil type. Windblown silt and sand compose the final deposit. Dunes are evident on the eastern shore of Walker Lake. Extrusive Quaternary and Tertiary volcanic flows of trachybasalt and latite occur in the Garfield Hills to the southeast.

Cretaceous and Triassic formations crop out from the subsurface in the Wassuk Mountains and Garfield Hills on the installation. Intrusive Cretaceous rock occupies a large portion of the Wassuk Mountains. The rock is chiefly granitic and is similar to the batholithic rock of the Sierra Nevada Mountains to the west. In addition, a few intrusions crop out in the southeastern hills of the installation. The Triassic Excelsior formation crops out in the Wassuk Mountains and the southeastern hills. Its composition is chiefly intermediate to felsic, fine-grained, clastic and tufaceous rock. Geologists estimate this rock unit to attain a thickness of 12,000 feet. Isolated remnants of the Triassic Luning formation crop out in the southeast. This unit is chiefly limestone, dolomite and shale interspersed with some chert lenses. It may attain a thickness of 10,000 feet.

The mountain ranges and intermontane valley of the installation compose a fault block system typical of Basin and Range. The structures strike roughly northwesterly. The faults are characterized as steeply dipping normal faults. They exhibit a throw of several thousand feet.

GROUND WATER

Ground water is available in large quantities from various zones and depths below HWAD. The installation obtains production water largely from deeper wells. Section A, Table A-3 is a list of these production wells. Well No. 7 is the deepest. The driller installed screen in No. 7 at 10 ft intervals, beginning at 442 ft and ending at 695 ft. The installation reports the water level in this well to be at approximately 55 ft. This suggests that the deeper ground water regime is semi-confined and under artesian pressure. Depths to the shallow unconfined aquifer range from approximately 15 ft in the WADF to approximately 170 ft in the 101 Production Area. Depths to the water surface increase toward the apexes of the alluvial fans. The shallow groundwater regime flows northwest towards Walker Lake at an approximate seepage rate of 1 foot per year. Section A, Figure A-11 is a generalized groundwater map of the flow regime in the Hawthorne area as of 1999. Recharge occurs along the mountain front near the apex of the alluvial fans. The large negative water balance severely limits groundwater recharge to the aquifer. The amount of water reaching the aquifer equals the total infiltration minus the amount of water absorbed by the surficial deposits in the unsaturated zone. In arid regions such as HWAD, rainfall is rarely sufficient to exceed the storage capacity of the subsurface materials.

SOIL

Soil survey data normally collected through the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS), is currently unavailable for property within the boundaries of the HWAD. The SCS has completed a soil survey for all areas of Mineral County adjacent to the facility (USDA/SCS, 1991). Figure A-5 of these soils indicates approximately 75 soils mapping units occur within the installation boundaries. At least six of these mapping units would be expected to occur within the boundaries, given their landscape position in Walker Lake Valley and type of parent material. Basically, the periphery soils can be classed into four broad physiographic groups:

shorelines/sand-sheets and alluvial fans
fan piedmonts
mesas and plateaus
hills and mountain slopes

Most soils originated from alluvial parent material of mixed origin (usually granite, basalt, tuff, limestone or dolomite). However, colluvial or eolian materials may also be attributed to some soils, particularly those in the lowest and highest topographic positions.

Depths of these soils to bedrock range from greater than five feet in valley bottom areas to as little as 3 inches in mesa, plateau, and mountainous areas (southern and eastern portions of the facility). Permeabilities of the soils range from slow to moderate (less than 0.06 inches/hour to 2.0 inches/hour) in upland soils to rapid and very rapid (greater than 2.0 inches/hour) in the valley bottoms. Few soils are prone to flooding; however, in all cases, the permeability and water holding capacities of the periphery soils is a controlling factor. Depth to high water tables is generally greater than five feet. The pH values of all soils range from slightly acid to moderately alkaline. The organic matter content in these soils would be expected to be low, on the order of one to two percent.

Texture and slope are key soil characteristics affecting runoff and erosion rates. For example, the transport of potential contaminants through surface water runoff, or eolian transport would be greater from finer textured soils than from coarser textured ones. With the exception of the sandy loam units near Walker Lake, most soils contain a gravel/sand component, making the erosion hazard slight. Only those soils occurring on steeper slopes (greater than 30 percent) exhibit a high erosion hazard.

CLIMATE

HWAD is located in a semi-arid region with hot, dry summers, and cool moderate winters. According to the September 2004 Hawthorne Army Depot, NV, IDG, the normal temperatures range from a mean low of 36°F in January to a mean high of 79°F in July. The average annual temperature is 55.9°F. The highs in the area rarely exceed 100°F and lows rarely drop below 0°F. Skies are typically clear days and nights with prevailing winds from the north and west-northwest at a velocity of about 15 miles per hour. The area experiences occasional windstorms with velocities of up to 100 miles per hour. The average annual precipitation is 4.54 inches for the valley areas and an estimated 12 inches to 15 inches for the higher elevations. Precipitation tends to be heavier in the mountain areas, which can be covered by snow for six months of the year. Maximum rainfall occurs during the spring and fall seasons, with minimum rainfall occurring in July and August as shown in **Table A-1**

Table A-1 Climatologically Data for HWAD (1954-2005)

	Temperature (degrees F)			Precipitation (inches)
Month	**Average**	**Max. Average**	**Min. Average**	**Average**
January	36.1	47.9	24.3	0.40
February	40.6	53.4	27.8	0.51
March	47.9	62.3	33.4	0.42
April	52.7	67.9	37.4	0.38
May	61.3	76.4	46.1	0.78
June	69.6	85.7	53.4	0.47
July	78.8	96.1	61.4	0.33
August	76.9	94.0	59.8	0.18
September	68.2	85.1	51.3	0.27
October	57.4	73.1	41.7	0.17
November	43.8	57.1	30.5	0.39
December	37.7	49.7	25.7	0.25
Total				**4.54**

Highest temperature on record: 110°F
Lowest temperature on record: -10°F

Source: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?nvhawt

The potential evapotranspiration rate is approximately 48 inches. The potential net annual water loss calculated from the difference in precipitation and evapotranspiration is 44 inches. Prevailing winds are from the south to south-southwesterly direction averaging about 8 miles per hour (mph). This area is occasionally frequented by wind storms that sometimes reach velocities of over 100 mph.

Section A, Figure A-9 presents a wind rose depicting the best available wind speed and direction data regarding wind direction and velocity over time for the Hawthorne area. This wind rose is from a meteorological monitoring station located at WADF.

LOCATION INFORMATION [40 CFR 270.14(b)(11) and 264.18]

Seismic Standard [40 CFR 270.14(b)(11)(i)]

The owner or operator of new facilities for treatment, storage, or disposal of hazardous waste is required to demonstrate compliance with the seismic location standard, which states that no such facility is to be located within 61 meters (200 feet) of a fault that has had displacement in Holocene time (the past 10,000 years), in accordance with 40 CFR 270.14(b)(11) and 40 CFR 264.18(a). This is to avoid faults that could result in surface faulting that could exceed the design limits of waste management facilities and could potentially result in damage or failure. Because of its history of seismic activity, the state of Nevada is listed in Appendix VI of Part 264 as one of the areas requiring demonstration of compliance with the seismic standard.

This section presents the documentation required to demonstrate that the location selected for the facility is satisfactory with respect to seismic considerations.

HWAD is located in the Great Basin Section of the Basin and Range Physiographic Province. Geologists characterize the Basin and Range as a series of discontinuous, roughly parallel fault block mountain ranges separated by intermontane valleys, plains and bolsons. The mountain ranges and intermontane valley surrounding Hawthorne compose a fault block system typical of the Basin and Range. The structures strike northwesterly. The characters of the faults are steeply dipping normal faults and exhibit a throw of several thousand feet. A majority of these Front Range faults are seismically active.

Nearly all known instances of historical surface faulting in the Western United States have occurred along existing faults. Most of the faults associated with historical surface faulting have had previous displacement in Holocene time, and they could have been, or at sometimes have been recognized prior to the earthquake as a potential location of future activity. The current investigation presents the observations used to evaluate surface faulting and compliance with the seismic location standard for HWAD.

The study area includes the larger region around Hawthorne, Nevada, as well as the local area within five miles of the WADF.

There are very few publications available for this study. Those bulletins that exist are available as published and open file reports of the U.S. Geological Survey (USGS), and exist in public libraries. A map showing fault distribution was obtained from the USGS Map: "Map Showing Distribution of Altered Rocks, Faults, and Linear Features in the Walker Lake 1E X 2E Quadrangle, Nevada and California, By Terri L. Purdy and Lawrence C. Rowan, 1985 and overlaid by SOC to come up with Figure A-10:

The location of the WADF area and HWAD relative to known faults and linear features in western Nevada is shown on the seismic map referenced above. Linear features mapped on Landsat images represent linear or slightly curvilinear topographic features, such as stream valleys, ridges, and escarpments, or are tonal anomalies related to linear boundaries in bedrock or between vegetation types. Most of these features, particularly in areas consisting of crystalline rocks such as the Wassuk Range due west of HWAD, represent microfaults and fracture zones that control topography and the distribution of vegetation. These linear features generally trend northeast and northwest, consistent with the orientations of microfaults.

The faulting in the Hawthorne area is predominantly restricted to the eastern front of the Wassuk Range, where tertiary and quaternary normal faults have, in part, blocked out this eastern front. Two structural trends seem to predominate; a northwesterly striking set in the eastern part of the country parallel to the zone of topographic discordance, and a northeast striking set in the southern part of Mineral County. The trend of the latter set swings to a northerly alignment south of the country. Normal faulting is still continuing in this area as shown by fault scarps, which have developed as recently as 1954, accompanied by earthquakes in the north part of the country. The eastern front of the Wassuk Range shows some excellent examples of front range faults. Prominent lineaments and scarps are found at a number of places, but are best developed south of Hawthorne where an almost continuous arcuate set of faults outlines the base of the range. Scarps in the alluvial fans near the mouths of canyons indicate that some of the movement has been relatively recent. Along much of the range, a single frontal fault is the only obvious break, but east of Powell Mountain, the movement has been distributed along several faults. Where, a volcanic flow has been stepped down 3,000 feet from the crest of the range to the valley floor. The faulting is not all simple step-faulting toward the valley, as some of the faults in this complex area have their down-thrown sides toward the range. The presence of both types of faults may indicate a combination of warping and faulting for this segment of the range front.

As previously stated, these faults are confined primarily to the eastern front of the Wassuk Range and do not extend to the WADF area. The WADF area is situated in a topographically flat intermontane valley; the nearest fault is two miles southwest of WADF at the base of the Wassuk Range. HWAD hazardous waste storage buildings and OB unit are not new facilities. The buildings were built between the 1940s and the 1960s. The Old Bomb area has been used for burning operations since World War II. Therefore, the seismic standard requirements do not apply although the facilities are located in the political jurisdiction listed in the regulations.

Based on a review of published data, and interpretation of a structural map of the Walker Lake Quadrangle, WADF at HWAD meets with the seismic location standard and is not located within 200 feet of a fault with Holocene displacement. The closest faults that may have experienced Holocene displacement are located 2 miles to the southwest of the WADF area, outlining the eastern front of the Wassuk Range.

Floodplain Standard [40 CFR 270.14(b)(11)(iii)]

HWAD is located in an area that occasionally experiences runoff from heavy rainfall and snow-melt in nearby higher elevations. To assess the potential impact of a 100-year flood on the HWM facilities, an assessment of USGS maps prepared for the Federal Insurance Administration and an evaluation of a 100-year flood study for the town of Hawthorne were conducted.

The special flood hazard areas inundated by the 100-year flood in the vicinity of the HWAD are shown in Figure A-4. The map was revised in July 2000 by the Federal Emergency Management Agency, in support of the National Flood Insurance Program. It should be noted that the flood classifications on Figure A-7 were made after recent levee and drainage ditch construction in the area around HWAD.

For the purposes of this evaluation, a "worst-case" flooding scenario has been assumed. The first assumption is that the available drainage system in and around HWAD is at bank-full stage due to the large amount of runoff from a heavy snowpack in the higher elevations to the south and west of Hawthorne. Available data for streams in the area show this occurring during May and early June. Next, it is assumed that a 100-year rainstorm with a 24-hour duration occurs over the southern end of Walker Lake and in the foothills adjacent to the Excelsior Mountains to the south. A storm of this magnitude and duration would generate from 2.4 to 3.0 total inches of precipitation, depending on the elevation. This rainfall event is also likely to occur during the same period of May and June, based on the average monthly precipitation records from the town of Hawthorne. If this added precipitation were to fall on already saturated or nearly saturated soil, a very large percentage would become runoff, and would flow in a northwesterly direction along the natural grade of the ground surface towards HWAD.

Based on a 100-year flood study done for the town of Hawthorne on a limited area southwest of the municipality (Section A, Figure A-7), the depth of water in areas designated as sheet flow will vary, depending on local contour variation, from 2 feet near the higher elevations in the south to less than 1 foot in the flats to the north. The surface topography of the WADF area indicates that runoff in the form of sheet flow would be expected to flow northwest towards Walker Lake (Section A, Figure A-7). In the WADF, Building 117-13 is located near a small-scale local wash, as determined by the contours, and may experience some elevated floodwater. The 2-foot-high berm surrounding the impoundment will be adequate to prevent washout, since the sheet flooding in this area will not exceed a depth of 1 foot for a 100-year event.

Demonstration of Compliance [270.14(b)(ll)(iv)]

Hazardous Waste Storage Buildings

Flooding problems that are normally associated with structures that house hazardous wastes are virtually nonexistent for the four containerized hazardous waste storage buildings and eight retrofitted magazines at HWAD. This is primarily due to the fact that the buildings are constructed with floors that are approximately 4 feet above the ground surface. Hazardous materials stored at this elevation would be safe from floods since the waters will not exceed 1 foot in depth for a 100-year event. This maximum depth is derived from the studies conducted by FEMA for the town of Hawthorne (see Section A, Figure A-7), since data for the area of interest is not available.

The buildings' ability to withstand an impulsive force of floodwaters traveling at a velocity of 7 feet/second (maximum velocity for Hawthorne) was evaluated. Calculations presented in Section A Exhibit I show that in a "worst-case" flooding scenario, the buildings may endure more than tenfold the forces generated by a flash flood. The assumptions for the "worst-case" scenario are as follows:

Buildings are simple, homogenous structures consisting of 10 feet high walls and floors, with earth fill under these floors. This is a conservative assumption. The additional weight of roofs, indoor walls / columns, loading docks, and materials stored inside are not considered. Walls are considered to be only 10 feet high above the ground surface. Evacuation corridors and earth that covers some buildings are also not considered in building weight calculations.

Specific Density of Concentration (Yc) = 150 lb/ft3
Specific Density of Earth Fill (Ye) = 110 lb/ft3
Specific Density of Water (Yw) = 62.4 lb/ft3

The specific weight of concrete ranges from 150-165 lb/ft3. The most conservative estimate is used for these calculations. The value of 110 lb/ft3 for earth fill is typical for sand with silt and 0.35 porosity after some years of compaction. The maximum specific weight of water is used.

Wall thickness = 5", 6",
Coefficient of Static Friction (us) = 0.1

These calculations do not consider the footings of the buildings which are typically 2-4 feet deep below the ground surface. If these are considered, the coefficient of static friction would surely increase by many factors since these footings not only support the buildings from settling, but also anchor them from lateral forces.

A 2-foot-high flash flood moving at 7 feet per second impacts on side of buildings, perpendicular to side reflecting the highest level and largest velocity of floodwaters in the adjacent town of Hawthorne, where floodplain information is available. The largest impulsive force is created when floodwaters impact perpendicularly to the wall surface. Also, the assumption is made that the water will hit the long side, whereby the greatest amount of water will impact the buildings.

The largest impulsive force is created when a 2 foot high flash flood moving at a speed of 7 ft/second impacts the perpendicular wall surface side of the building. (These numbers reflect the highest level and largest velocity of flood waters in the adjacent town of Hawthorne where flood plain information is available. The assumption is made that the water will hit the long side of the building whereby the greatest amount of water will impact the building creating the weakest impact point.

Old Bomb Unit

The probability that the OB unit will be affected by floodwaters or sheetflow is unlikely due to the lack of precipitation. Wastes are not stored at the unit and are treated the same day they are transferred to Old Bomb. Also, OB operations are halted during periods of precipitation and thunderstorms. Further, ash/residue is removed from the burn pans after each OB event. It is collected in 55 gallon drums, sealed with a ring and bolt with lock nut and moved to Building 106-22. Finally, precipitation covers are placed on the pans during non-operational periods.

Walker Lake

The possibility of a rising Walker Lake and its potential for flooding are minimal. Since 1985, Walker Lake has continued to decrease in elevation. To bring the Walker Lake elevation up to the approximate elevation of the hazardous waste storage buildings would require over 600 billion gallons of water. Also, the OB unit is located at approximately 5,000 feet, a much higher elevation than the hazardous waste storage buildings. Unless there is a sudden, long-term reversal in the general climatic conditions of the area, the areas of concern are secure from Walker Lake floodwaters.

TOPOGRAPHIC MAPS [40 CFR 270.14(b)(19)]

The maps presented as Figures A and A-2, illustrate the general topography of the HWAD area and each of the hazardous waste storage buildings and the OB unit. HWAD is located in mountainous areas, therefore, a large contour interval is used to adequately show topographic profiles of the facilities. As required by the various subparts of 40 CFR 270.14(b)(19), the figures illustrate the following features:

- Map Scale and Date
- 100-Year Floodplain Area, Section A, Figure A-7
- Surface Waters Including Intermittent Streams Section A, Figures A
- Surrounding Land Uses (residential, commercial, agricultural, recreational, and open land, Section A, Figure A-8
- Wind Rose, Section A, Figure A-9
- Orientation of the Map
- Legal Boundaries of the HWM Facility Sites: The hazardous waste storage buildings and the OB unit are located within the legal boundaries of HWAD. For HWAD boundaries, refer to Figure A-2.
- Access Control (fences, gates): Refer to Section A, Figures A for gates and fences at HWAD.
- Injection and Withdrawal Wells both On-Site and Off-Site: Section A, Figure A-11 shows the location of the water supply well. There are no injection wells associated with the hazardous waste storage facilities and the OB unit.
- Buildings; Treatment, Storage, or Disposal Operations; or Other Structure (recreation areas, runoff control systems, access and internal roads, storm, sanitary, and process sewage systems, loading and unloading areas, fire control facilities, etc). There are over 2877 buildings and structures at HWAD, of which approximately 1500 are explosive storage magazines. At Old Bomb, there are two shelter buildings and a shack located outside the main entrance gate to the OB unit. Access and internal roads to the HWM facilities are shown in the topographical maps. There are no sanitary or process sewerage lines at the OB unit and in the Magazine Areas. Stormwater flows along the pathways are shown as intermittent streams. Dikes and ditches are constructed for run-off control. Loading of

hazardous wastes occur throughout HWAD at virtually every industrial building (approximately 250) and are not shown on the topographic map. Unloading of hazardous wastes occurs at the four hazardous waste storage buildings as well as the 8 magazines in the 116 group and the OB unit, see Figure A-1.

- Barriers for Drainage or Flood Control: There are no barriers in South Magazine Area and at the OB unit since runoff associated with the hazardous waste storage building and the burn pans is not anticipated unless there is a major storm event with sufficient precipitation. The buildings are fully enclosed and stand 4 feet above ground on a concrete slab. OB is performed in burn pans that are kept closed during non-operational periods and is not conducted during storm events.
- Location of Operational Units within the HWM Facility Sites where hazardous waste is treated, stored, or disposed: All treatment activities associated with OB take place within the OB unit shown in Section A, Figure A-14. Hazardous waste generated on HWAD is stored in Building 106-22, 106-23, 115-9, and 113-73A in containers, and hazardous waste munition items in retrofitted magazines 116-37, 116-38, 116-39, 116-41, 116-42, 116-43, 116-44 and 116-45. The buildings are shown in Section A, Figure A-2 and A-6. Distances to these buildings are not shown on the topographic storage buildings. There are no passenger railroads within HWAD. Distances to buildings from the OB unit are shown in Figure Section A, Figure A .
- The location of solid waste management unit's current at HWAD is provided in Section AA, Figure AA-1.

Topography in the vicinity of the RF-9 and PODS detonating furnaces is shown in Section A, Figure A-6. The contour interval of 2 feet on this figure clearly shows a pattern of low surface relief in the area. The 100-year floodplain area is not located in the furnace vicinity, and hence is not shown on the topographic map. Similarly, surface waters are nonexistent in the furnace vicinity. The detonating furnaces are located in an area that has not been surveyed for land descriptions, but that corresponds approximately to Section 32 of Township 8 North, Range 30 East of the Mount Diablo Baseline and Meridian. A topographic map of HWAD, located in Section A, Figure A-6 depicts a portion of HWAD in the vicinity of WADF. This map also depicts infrastructure such as improved and unimproved roads, railroad tracks, and buildings in addition to topography, and is presented to show the location of, and access to WADF. Section A, Figure A-3 and A-6 are maps showing the location of the detonating furnaces site within WADF and depicting infrastructure such as roads, railroad tracks and buildings in greater detail. Surrounding land uses are military in nature. Section A, Figure A shows the locations of the nearest surface water body (Walker Lake) to WADF, RF-9, and PODS.

TRAFFIC PATTERNS [40 CFR 270.14(b)(10)]

This subsection contains information on traffic patterns at HWAD and meets the requirements of 40 CFR 270.14(b)(10). It includes descriptions of access routes, estimates of traffic volumes, traffic control measures, and typical road construction specifications.

The HWAD location map (Section A, Figure A-1) shows the major highways serving the Hawthorne area. U.S. Highway 95 runs roughly from the northwest to the southeast of HWAD. Within the immediate area of HWAD, this highway has four lanes with no center dividers. Posted speed limits are 45 mph outside the Hawthorne city limits and 25 mph within the city limits. State Highway 359 provides access to the base from the south.

Primary entry routes to HWAD facilities are by way of Thorne, Bonanza, and Mine Roads off U.S. Highway 95. Thorne Road acts as the major traffic corridor with Bonanza and Mine roads, intersecting them near the 103 area. All of these primary routes are two-lane with posted speed limits of 45 mph outside of production areas.

Thorne Road acts as a boundary between the North and Central Magazine Areas. Guard posts for entry control to these areas are located near the intersection of Thorne and Grant roads. Posted speed limits in this area are reduced to 25 mph. This intersection acts as a major security check point for traffic entering or exiting the North or Central Magazine Areas. Access to the southern portion of the Central Magazine Area and the South Magazine Area is at the intersection of Mine Road and U.S. Highway 95. Guard posts control entry at this intersection. Posted speed limits in this area are 25 mph on Mine road and 45 mph on U.S. Highway 95.

Arterial roads are constructed within the Magazine Areas to service production and storage facilities. These roads are of standard two-lane configuration with speed limits ranging from 10 mph to 45 mph depending upon congestion and road conditions (curves, surface, and visibility).

No traffic counts have been performed within the boundaries of HWAD. The State of Nevada Department of Transportation has performed Annual Average Daily Volume (AADV) counts along U.S. 95 in the vicinity of the Main Gate and along major roads in the Hawthorne area for the period 1998-2007. The pertinent traffic data for this period is presented in Section A, Table A-4. There has been an increase of traffic on the Route 362 bypass (Station 37) and a consequent decrease in the U.S. 95 traffic through downtown Hawthorne (Station 38).

During normal work day operations, most traffic at HWAD is due to contractor vehicles. Additionally, approximately 10 tractor trailers per day arrive or leave during receipt or shipment of munition items at HWAD. Generally, traffic at HWAD can be described as uncongested and free flowing with typical levels of service of "A" for most roads and conditions.

Stop, railroad crossing, curve, speed zone, and non-passing zone signs and signals are used as local situations require. Standardization and placement of these traffic control devices are in accordance with the current ANSI Standard D6.1, "Manual on Uniform Traffic Control Devices for Streets and Highways." The relatively heavily traveled gate entrances, such as the Main Gate and Guard Posts on Thorne and Grant Roads, have speed zone and stop signs or signals posted. Hazardous curves and blind intersections are appropriately posted.

The configuration of the major intersections used for access to HWAD is shown in Section A, Figure A-13. The intersection of Thorne Road and U.S. Highway 95 is the only intersection equipped with traffic control signals. These signals are operated such that traffic along U.S. 95 has primary right-of-way (flashing yellow). Traffic entering or crossing U.S. 95 from Thorne Road must stop (flashing red) and yield right-of-way to traffic on U.S. 95. A railroad crossing on U.S. 95 exists approximately 100 feet southeast of the intersection and is equipped with barricades and flashing red lights that activate automatically when necessary.

The intersection of U.S. 95 and the Bonanza bypass is within the town limits of Hawthorne. Traffic is controlled by stop signs and traffic islands. Right-of-way is given to north bound traffic on U.S. 95 turning left or crossing directly to the bypass, and southbound traffic on U.S. 95 turning right. All other traffic must stop and yield right-of-way.

All roads at HWAD are designed for a minimum bearing load capacity of 18,000 pounds per axle. Construction materials for road surfaces along the main access routes and arterial roads to the production and storage facilities are asphaltic-concrete. Road surfaces within the bunker areas have deteriorated and have been temporarily repaired using gravel.

TABLE A-2: WESTERN AREA DEMILITARIZATION FACILITY (117 AREA) BUILDINGS OF PRIMARY CONCERN

BUILDING NUMBER	NAME	FUNCTION
117-1	Service and Support	Quality Control Chemistry Laboratory.
117-2	Plasma Ordnance Demilitarization System (PODS)	NOT AN OPERATING UNIT. Used to destroy (or deactivate) a variety of obsolete and unserviceable munitions not otherwise treatable in the RF-9, and contaminated soils, scrap metal and other RCRA wastes
117-3	2210 Rotary Furnace (RF-9)	Demil small arms less than 50 caliber. Used for burning of small caliber ammunition, and flashing chamber for small contaminated projectiles or small munition items.
117-3	Flashing Furnace (FF-13)	Used for flashing explosive contaminated projectiles or small munition items.
117-4	Bulk Energetics Demilitarization (BEDS)	NOT AN OPERATING UNIT. Used for disposal of obsolete bulk propellants
117-5	Meltout Building	Used for explosive refining and material reclamation.
117-6	Steamout Facility (North Tower) High Pressure Washout Facility (South Tower)	Used for steam cleaning operations. Used for pressurized washing operations.
117-7	Process Water Treatment Facility	Recovering explosives residue from process water where the process water is recycled through WADF buildings and explosives are recovered.
117-16	Hot Gas Decontamination	Used for decontaminating large caliber munitions casings
117-17	Range Scrap	Processing range scrap.

Notes: All buildings of the 117 Area, except Building 117-1, may generate explosive contaminated wastes.
All buildings of the 117 Area may generate used/spent solvents.

TABLE A-3: PRODUCTION WELLS ON HWAD

WELL NUMBER	LOCATION	DEPTH (ft)	CAPACITY (gpm)
2 closed	Between Guard House No. 3 and Dock No. 4	423	230
3	Pamlico Area near Dock No. 5	452	230
4	Near Dock No. 6	620*	200
5	Near west industrial fence	500	820
7 closed	Near Bldg. 108-20	850	250
8 closed	340' NW OF Well 1Near 106 Area	500	400
11	340' NW OF Well 1	370	1130

ft - feet
gpm - gallons per minute
No. - Number
Bldg. - Building

* Well 4 was closed and a new Well 4 was drilled in 1998 +Well Number 6 was formerly a production well for HWAD, however, ownership of that property has been transferred to Mineral County.
+ Well Number 1, 9, and 10 were abandoned

Exhibit I

Engineering Analysis for Impact of a 100-Year Floodplain on Hazardous Waste Storage Building

Title: 100-Year Floodplain Force Analysis	Project Number: 931973	Page: 1
	Project Name: HWAAP Part B Permit Application	Of:

FORCE (F_j) EXERTED BY A JET ON A FLAT FIXED PLATE PERPENDICULAR TO JET :

- $F_j = \frac{A \gamma_w v^2}{g}$ pounds

FORCE REQ'D TO MOVE SOLID BODY FROM REST w/ COEFFICENT OF STATIC FRICTION = μ_s :

- $F_f = \mu_s N$ pounds

CONSTANTS :

- γ_C = CONCRETE SPECIFIC WEIGT = 150 lb/ft^3
- γ_E = EARTH-FILL SPECIFIC WT. = 110 lb/ft^3
- γ_W = WATER SPECIFIC WT. = 62.4 lb/ft^3
- μ_s = .1
- v = 7 ft/s
- g = 32.2 ft/s^2
- A = AREA of JET = 2ft * (length of broad side)
- N = $W_T = W_C + W_E$

By: JOHN KANG	Checked By: Sana Hamady	The Earth Technology Corporation
Date: 7/2/93	Date: 7/12/93	

Title: 100-Year Floodplain Force Analysis	Project Number: 931973	Page: 2
	Project Name: HWAAP Part B Permit Application	Of:

$$\therefore \blacktriangleright \; F_j = \frac{A \gamma_w v^2}{g}$$

$$= \frac{(2\text{ ft} * \text{length of broad side}_{(ft)}) * (62.4\ \text{lb/ft}^3) * (7\ \text{ft/s})^2}{32.2\ \text{ft/s}^2}$$

$$\Rightarrow F_j = [189.9 * \text{length of broad side (ft)}] \text{ pounds}$$

$$\blacktriangleright \; F_f = \mu_s N$$

$$= (.1) * (W_C + W_E)$$

$$\Rightarrow F_f = [(.1) W_T] \text{ pounds}$$

By: JOHN KANG	Checked By: Sana Hamady	The Earth Technology Corporation
Date: 7/2/93	Date: 7/12/93	

Title: 100-Year Floodplain Force Analysis	Project Number: 931973	Page: 3
	Project Name: HWAAP Part B Permit Application	Of:

FORCE (F_j) EXERTED BY A JET ON A FLAT FIXED PLATE PERPENDICULAR TO JET :

- $F_j = \frac{A \gamma_w v^2}{g}$ pounds

FORCE REQ'D TO MOVE SOLID BODY FROM REST w/ COEFFICENT OF STATIC FRICTION = μ_s :

- $F_f = \mu_s N$ pounds

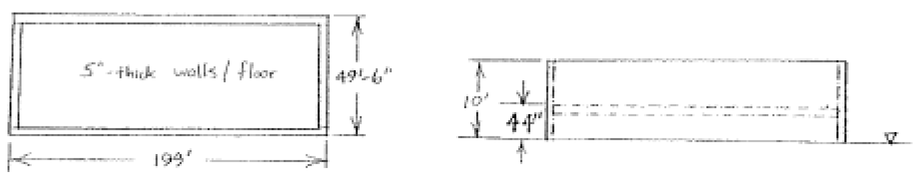
CONSTANTS :

- γ_C = CONCRETE SPECIFIC WEIGT = 150 lb/ft^3
- γ_E = EARTH-FILL SPECIFIC WT. = 110 lb/ft^3
- γ_W = WATER SPECIFIC WT. = 62.4 lb/ft^3
- μ_s = .1
- v = 7 ft/s
- g = 32.2 ft/s^2
- A = AREA of JET = 2 ft × (length of broad side)
- N = WT. = $W_C + W_E$

By: JOHN KANG	Checked By: Sana Hamady	The Earth Technology Corporation
Date: 7/2/93	Date: 7/12/93	

Title: 100-Year Floodplain Force Analysis	Project Number: 931973	Page: 4
	Project Name: HWAAP Part B Permit Application	Of:

BLDGS. 106-22 / 106-23



TOP SIDE

- Vol. CONCRETE WALLS :

$2\left(199 * 10 * \frac{5}{12}\right) = 1658.3 \ ft^3$

$2\left(48\frac{8}{12} * 10 * \frac{5}{12}\right) = 405.6 \ ft^3$

- Vol. Concrete Floor :

$198\frac{2}{12} * 48\frac{8}{12} * \frac{5}{12} = 4018.4 \ ft^3$

$\Sigma_c = 6082.3 \ ft^3$

$W_c = 6082.3 * 150$

$= 912,345 \ lb$

- VOL. FILL UNDER FLOOR :

$198\frac{2}{12} * 48\frac{8}{12} * \frac{39}{12} = 31,343.4 \ ft^3$

$W_F = 31,343.4 * 110$

$= 3,447,774 \ lb$

$W_T = 4,360,119 \ lb.$

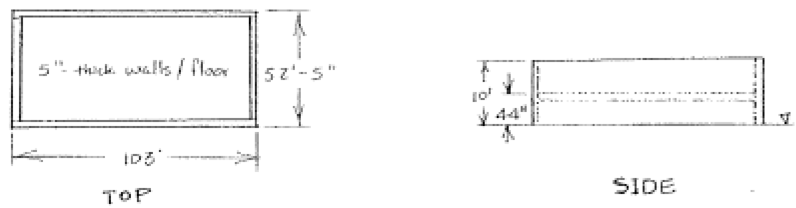
- $F_j = 189.9 * 199 = \underline{37,790.1 \ lb.}$

- $F_f = (.1) * 4,360,119 = \underline{436,011.9 \ lb}$

By: JOHN KANG	Checked By: Sana Hamady	The Earth Technology Corporation
Date: 7/2/93	Date: 7/12/93	

Title:	Project Number:	Page:
100-Year Floodplain Force Analysis	931973	5
	Project Name: HWAAP Part B Permit Application	Of:

BLDG. 115-9 :



• VOL. CONCRETE WALLS / FLOOR :

$2\left(103 * 10 * \frac{5}{12}\right) = 858.3 \text{ ft}^3$

$2\left(51\frac{7}{12} * 10 * \frac{5}{12}\right) = 429.9 \text{ ft}^3$

$102\frac{2}{12} * 51\frac{7}{12} * \frac{5}{12} = 2195.9 \text{ ft}^3$

$\Sigma_c = 3484.1 \text{ ft}^3$

$W_c = 3484.1 * 150 = 522,615 \text{ lb}$

• VOL. EARTH - FILL UNDER FLOOR :

$102\frac{2}{12} * 51\frac{7}{12} * \frac{39}{12} = 17127.8$

$W_E = 17,127.8 * 110 = 1,884,059.7 \text{ lb}$

$W_T = 2,406,674$

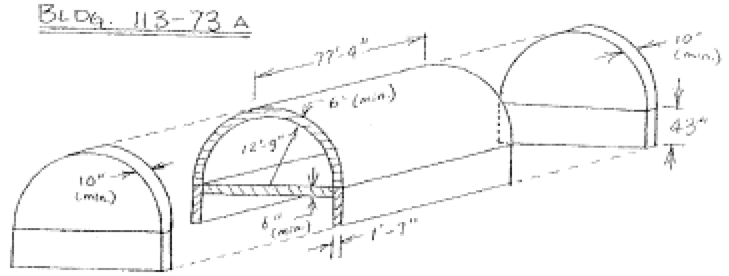
• $F_f = (.1)(2,406,674) = \underline{240667 \text{ lb}}$

• $F_j = 189.9 * 103 = \underline{19,559 \text{ lb.}}$

By:	Checked By:	The Earth Technology Corporation
JOHN KANG	Sana Hamady	
Date: 7/2/93	Date: 7/10/93	

Title: 100-Year Floodplain Force Analysis	Project Number: 931973	Page: 6
	Project Name: HWAAP Part B Permit Application	Of:

BLDG. 113-73 A



- Vol. Concrete Half-Cylinder:
  $\frac{1}{2}\pi\left[(13\tfrac{3}{12})^2-(12\tfrac{9}{12})^2\right] * 77\tfrac{4}{12} = 1578.4\ ft^3$
- Vol. Concrete Base Supports:
  $2(77\tfrac{4}{12} * \tfrac{43}{12} * 1\tfrac{7}{12}) = 877.5\ ft^3$
- Vol. Concrete Floor:
  $2(12\tfrac{9}{12}) * \tfrac{6}{12} * 77\tfrac{4}{12} = 986.0\ ft^3$
- Vol. Concrete - 2 Ends:
  $2\left[\frac{1}{2}\pi(13\tfrac{3}{12})^2 * \tfrac{10}{12}\right] + 2\left[26\tfrac{6}{12} * \tfrac{43}{12} * \tfrac{10}{12}\right] = 709.5\ ft^3$

$\Sigma_C = 3441.9\ ft^3$

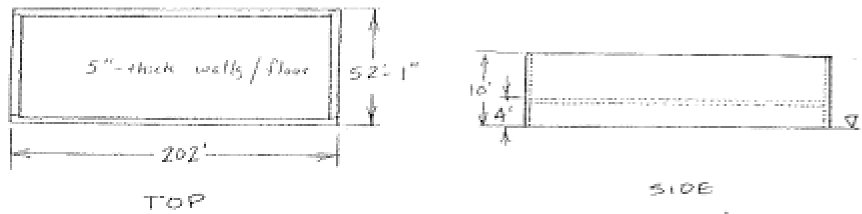
$W_C = 3441.9 * 150 = 516,285$ lb.

- Vol. Earth-Fill Under Floor:
  $77\tfrac{4}{12} * 2(12\tfrac{9}{12}) * \tfrac{37}{12} = 6080.3$ $\quad W_E = 6080.3 * 110 = 668,836$ lb
- $W_T = W_C + W_E = 516,285 + 668,836 = 1,185,121$ lb
- $F_f = (.1)\ 1,185,121 = $ <u>118512 lb</u>
- $F_j = 189.9 * 79 = $ <u>15,003 lb</u>

By: JOHN KANG	Checked By: Sana Hamady	The Earth Technology Corporation
Date: 7/2/93	Date: 7/12/93	

Title: 100-Year Floodplain Force Analysis	Project Number: 931973	Page: 7
	Project Name: HWAAP Part B Permit Application	Of:

BLDG. 108-3



- VOL. CONCRETE FLOORS / WALLS :

$2(202 * 10 * \frac{5}{12}) = 1683.3\ ft^3$

$2(51\frac{3}{12} * 10 * \frac{5}{12}) = 427.1\ ft^3$

$201\frac{2}{12} * 51\frac{3}{12} * \frac{5}{12} = 4295.7\ ft^3$

$\Sigma_C = 6406.1\ ft^3$

$W_C = 6406.1 * 150$

$= 960,922.0\ lb$

- VOL. EARTH - FILL UNDER FLOOR :

$201\frac{2}{12} * 51\frac{3}{12} * 3\frac{7}{12} = 36,943.4\ ft^3$

$W_E = 36,943.4 * 110$

$= 4,063,772.5\ lb$

$W_T = 5,024,694\ lb$

- $F_f = (.1) * 5,024,694 = \underline{502,469\ lb}$

- $F_j = (189.9) * 202 = \underline{38,360\ lb}$

By: JOHN KANG	Checked By: Sana Hamady	The Earth Technology Corporation
Date: 7/2/93	Date: 7/12/93	

Figure A

Site Plan

Figure A-1

Vicinity Map

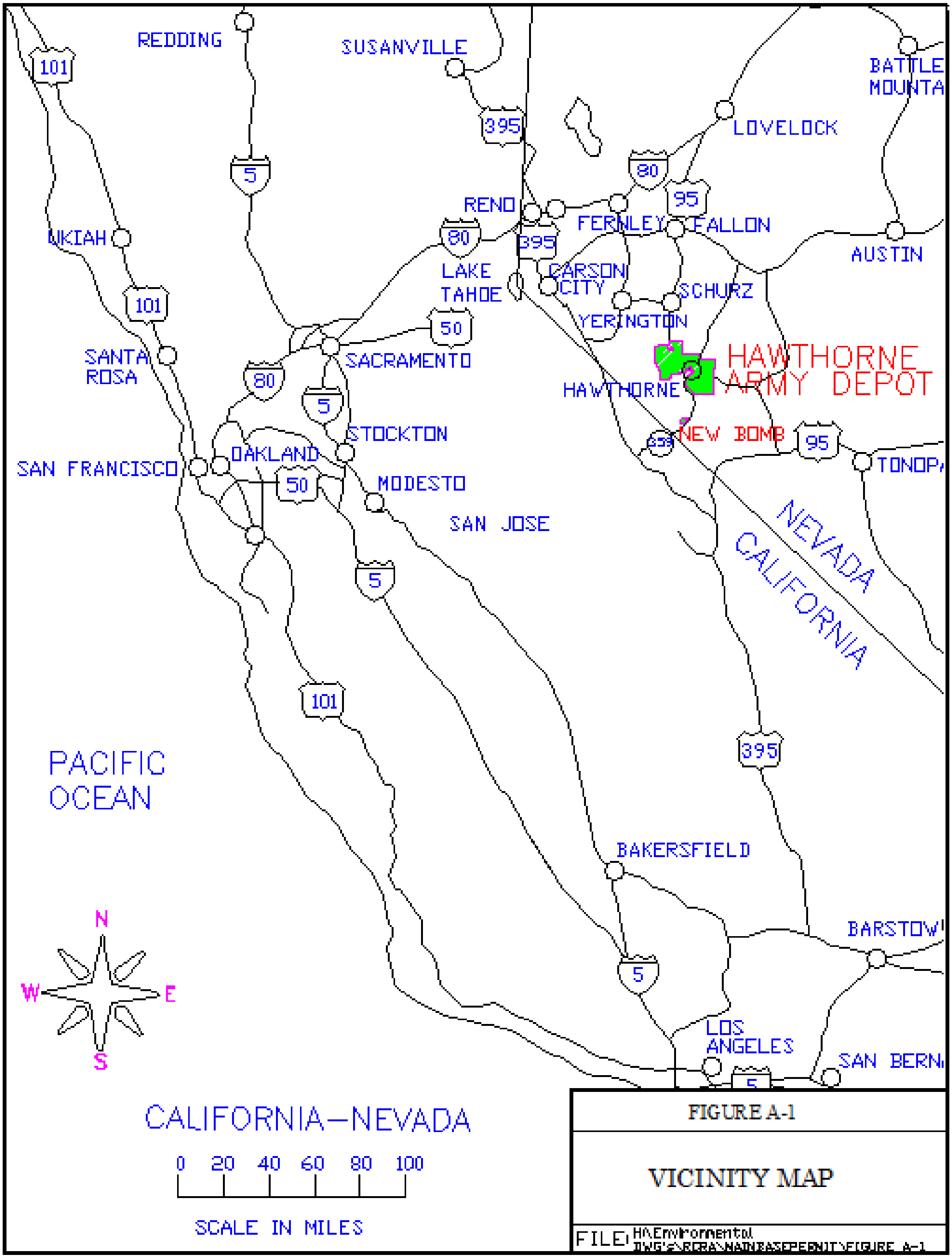
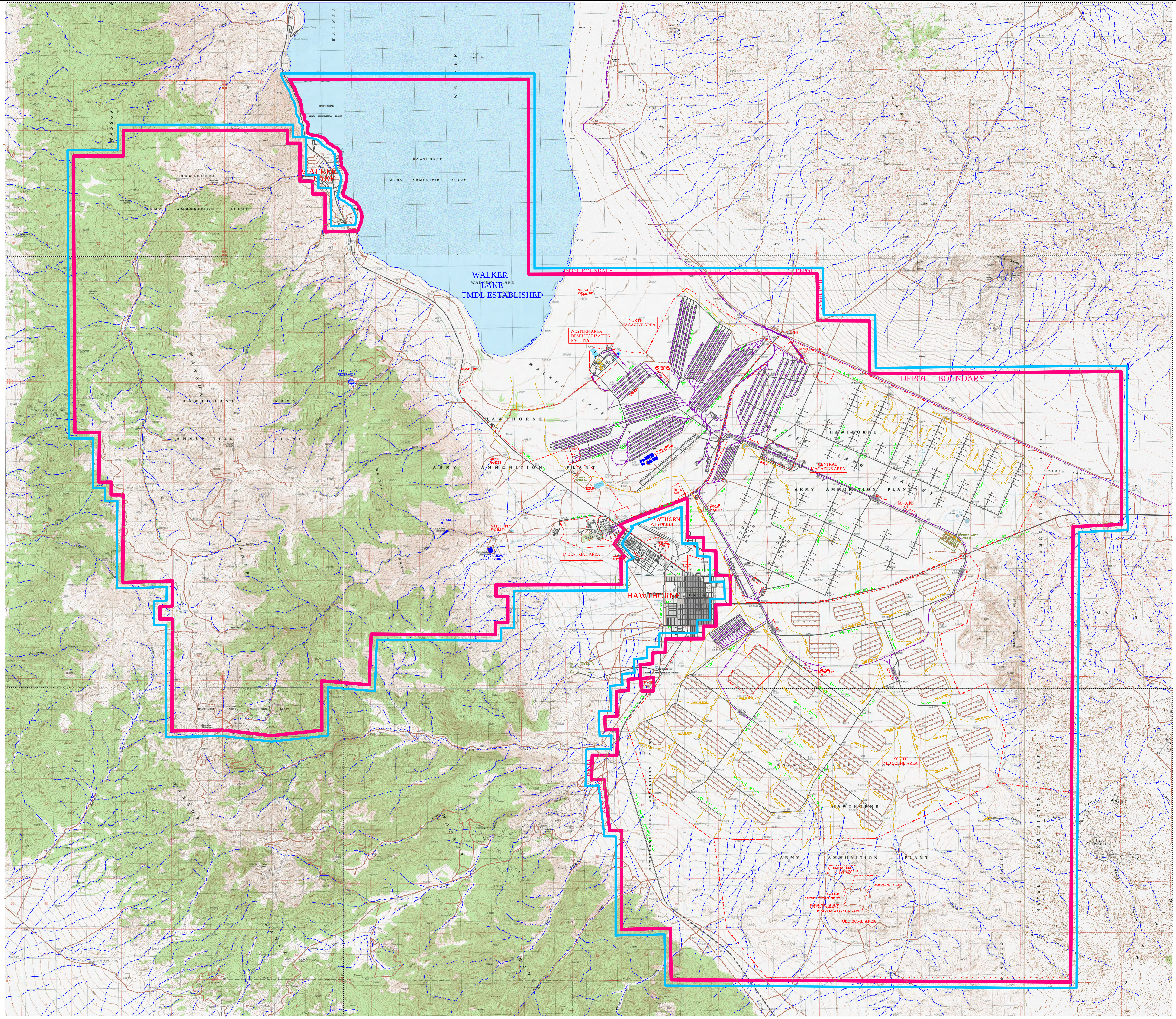


FIGURE A-1

VICINITY MAP

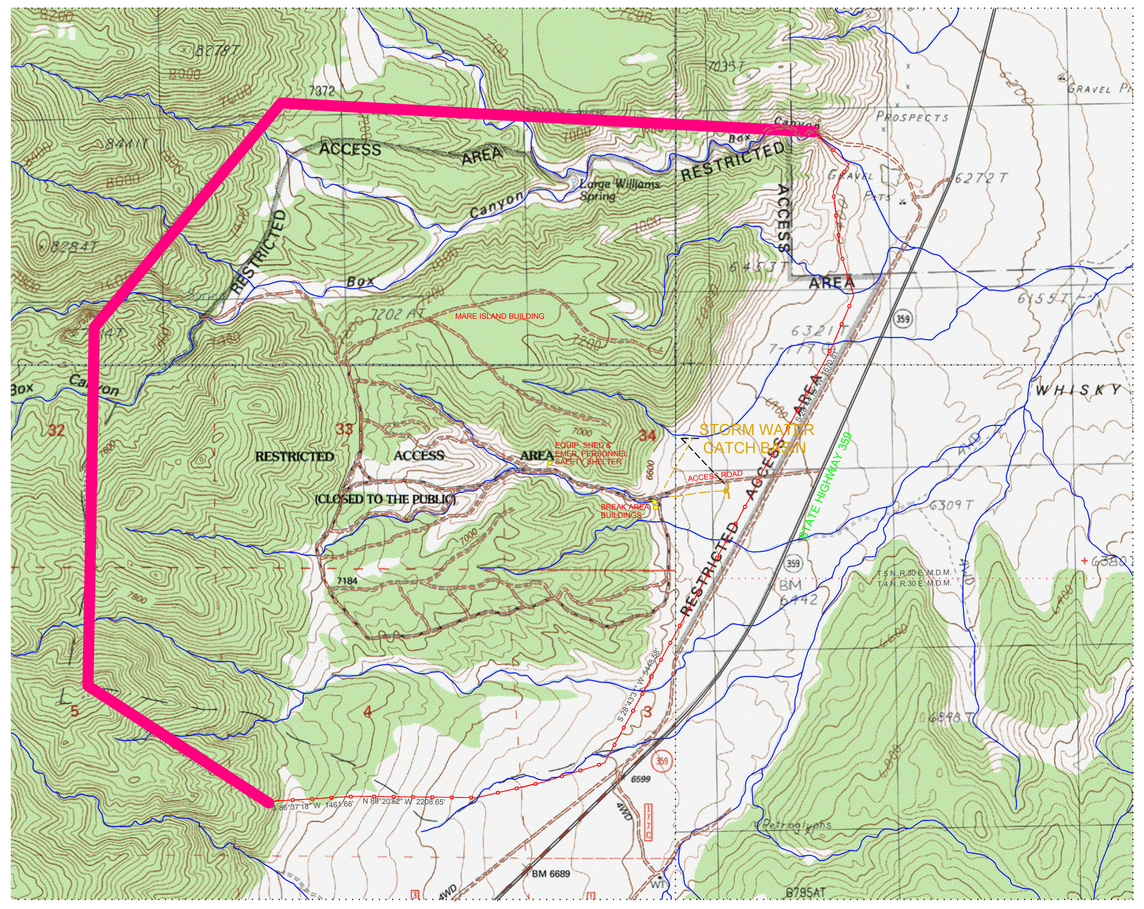


HAWTHORNE ARMY DEPOT (MAIN BASE)

147,236 ACRES TOTAL AREA

8000' 4000' 0 8000' 16000'

GRAPHIC SCALE IN FEET

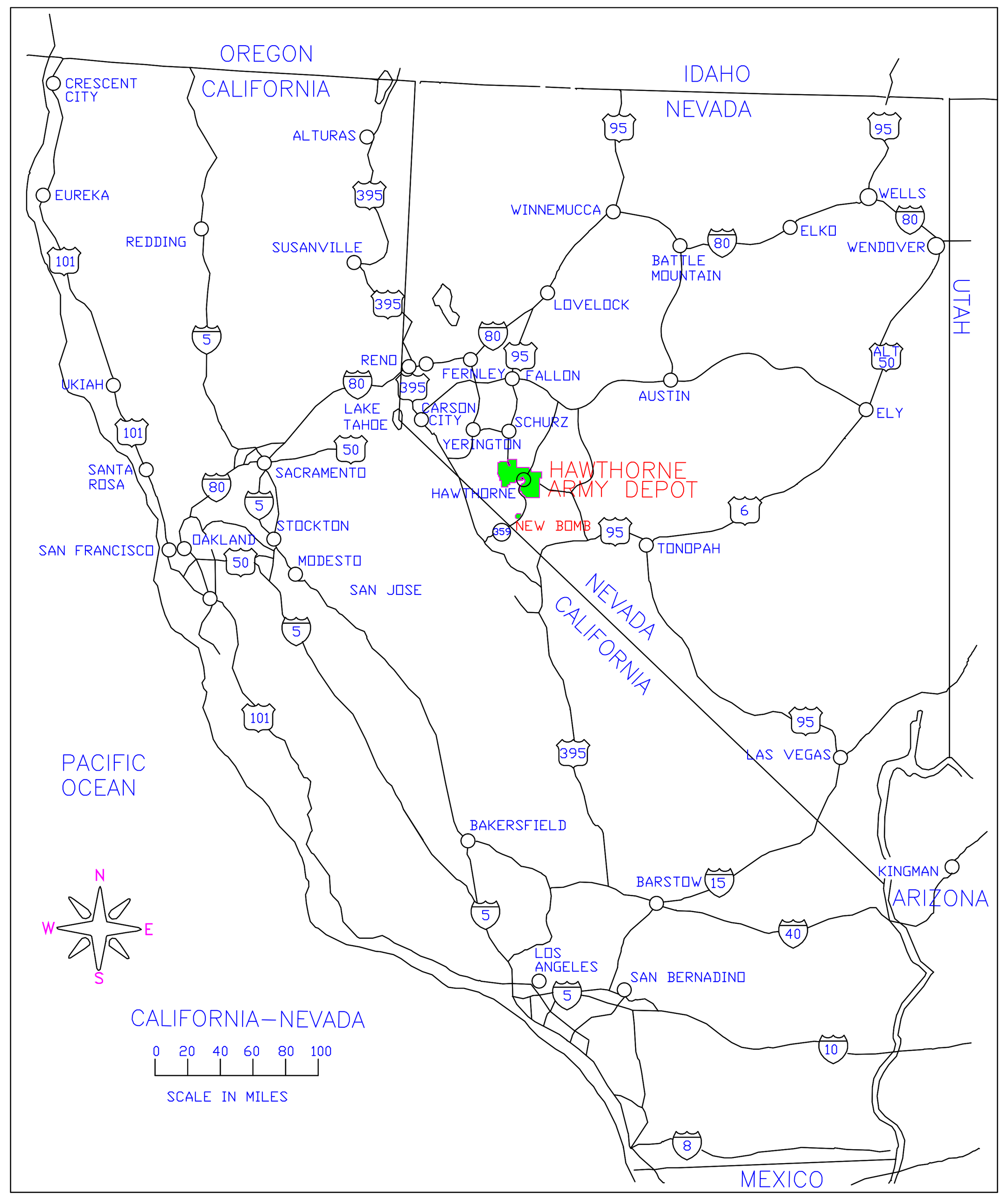


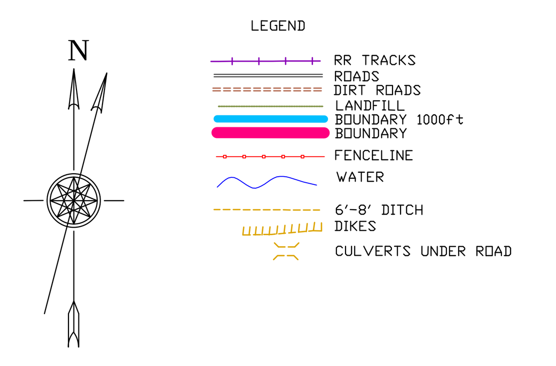
3183.418 ACRES TOTAL AREA SURVEYED

4000' 2000' 0 4000' 8000'

GRAPHIC SCALE IN FEET

NEW BOMB





REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA PERMIT		

REVISIONS

APPROVALS		
MGR. ENVIRONMENTAL		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTSPERSON	LONNIE BROWN	
FIRE INSP.		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

SOC Securing Our Country

CONTRACTOR / OPERATOR HAWTHORNE ARMY DEPOT

2 SO. MAINE HAWTHORNE, NV. 89415-0015

FIGURE A SITE PLAN

DRAWING NUMBER NUMBER

SCALE: N/A | FILE: Eng(H:)/Environmental DWG's/RCRA/MAINBASEPERMIT/FIGURE A | SHEET 1 OF 1

Figure A-2

Locations of Hazardous Waste Storage Buildings and Open Burn Unit

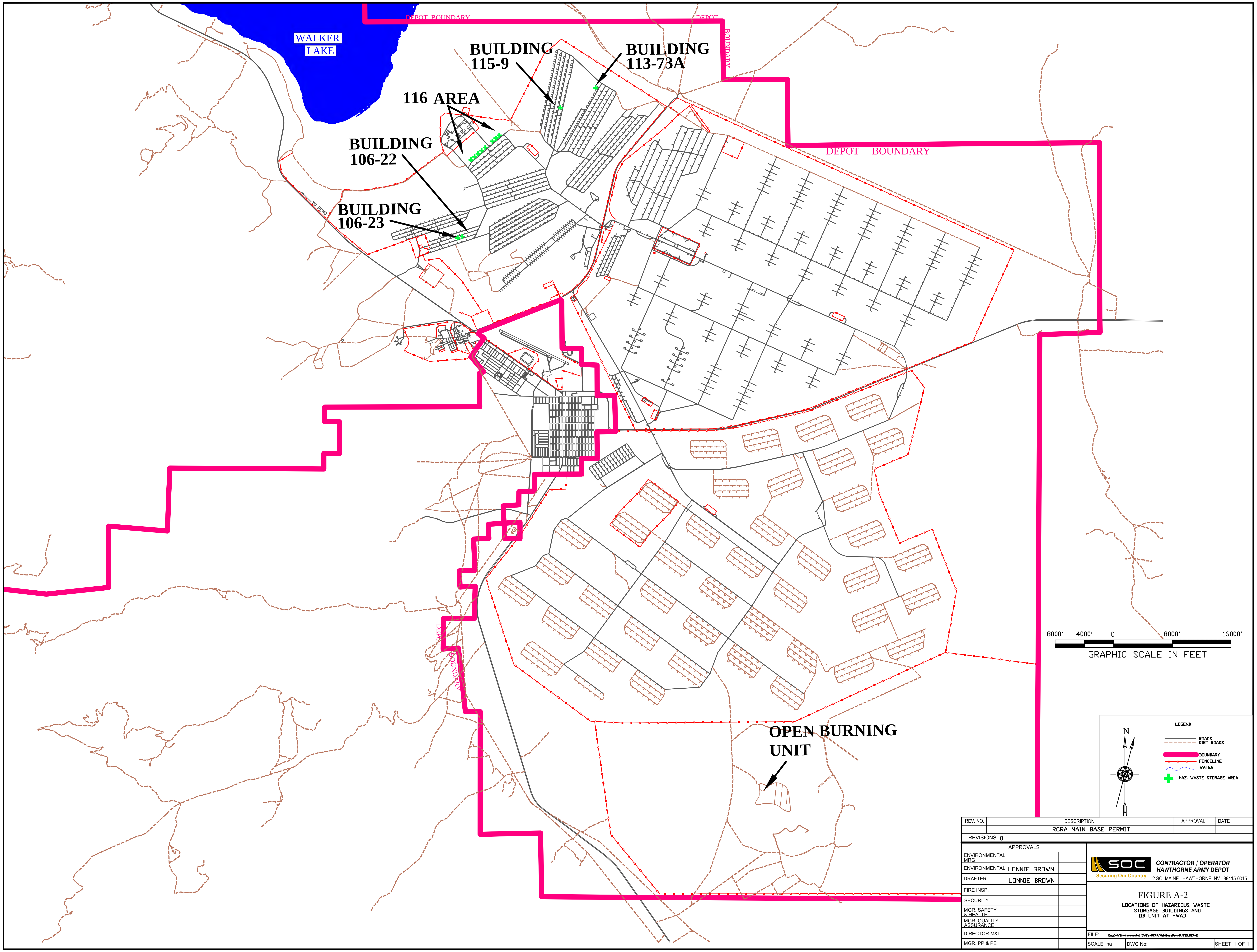
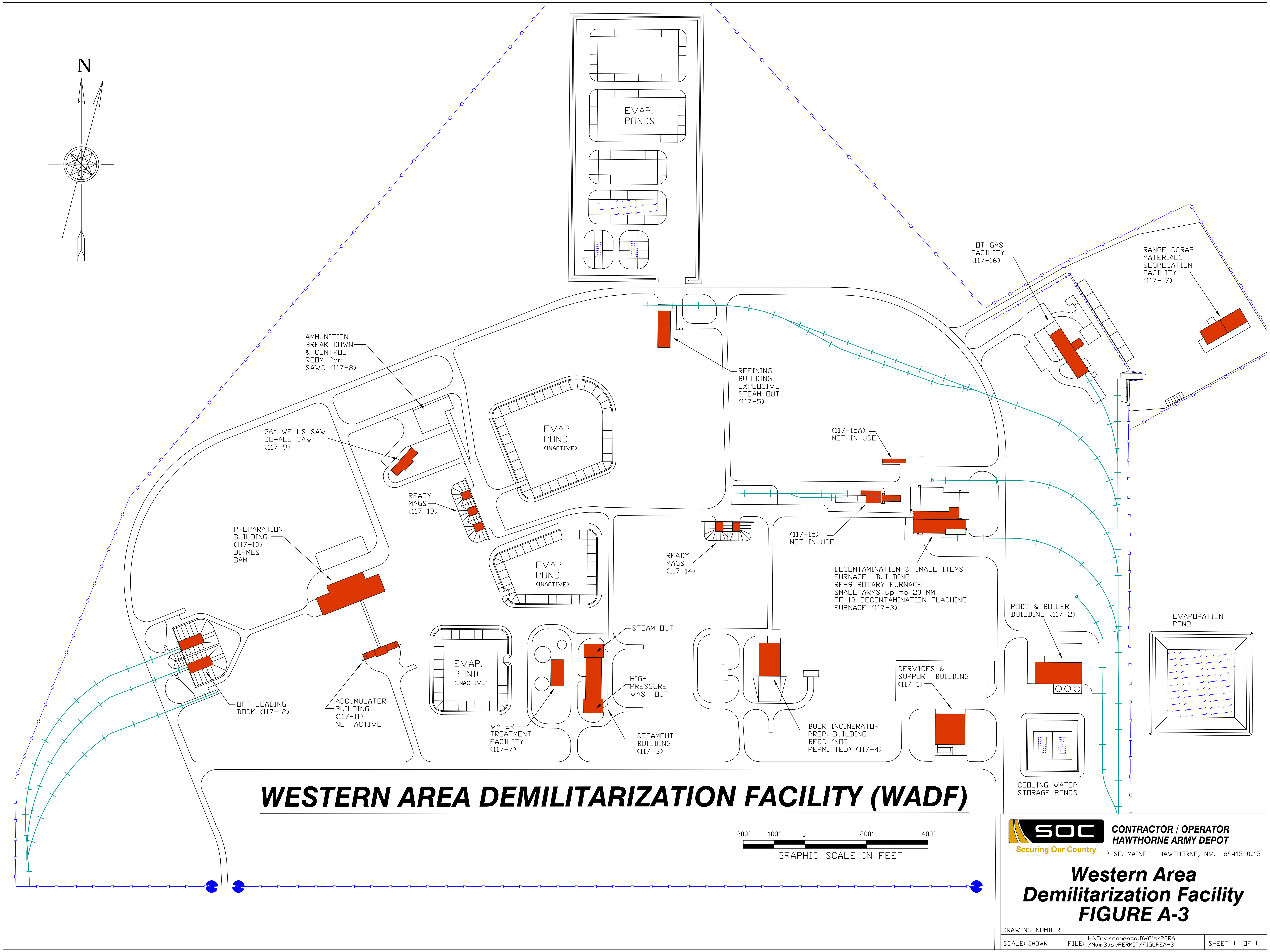

WALKER LAKE
DEPOT BOUNDARY
DEPOT
BOUNDARY
DEPOT BOUNDARY
BUILDING 115-9
BUILDING 113-73A
116 AREA
BUILDING 106-22
BUILDING 106-23
TO RENO
DEPOT
BOUNDARY
OPEN BURNING UNIT
8000' 4000' 0 8000' 16000'
GRAPHIC SCALE IN FEET
LEGEND
N
ROADS
DIRT ROADS
BOUNDARY
FENCELINE
WATER
HAZ. WASTE STORAGE AREA
REV. NO.
DESCRIPTION
APPROVAL
DATE
RCRA MAIN BASE PERMIT
REVISIONS 0
APPROVALS
ENVIRONMENTAL MRG
ENVIRONMENTAL
LONNIE BROWN
DRAFTER
LONNIE BROWN
FIRE INSP.
SECURITY
MGR. SAFETY & HEALTH
MGR. QUALITY ASSURANCE
DIRECTOR M&L
MGR. PP & PE
SOC
Securing Our Country
CONTRACTOR / OPERATOR
HAWTHORNE ARMY DEPOT
2 SO. MAINE HAWTHORNE, NV. 89415-0015
FIGURE A-2
LOCATIONS OF HAZARDOUS WASTE
STORGAGE BUILDINGS AND
OB UNIT AT HWAD
FILE: Eng(H)/Environmental DWG's/RCRA/MainBasePermit/FIGUREA-2
SCALE: na
DWG No:
SHEET 1 OF 1

Figure A-3

WADF


N
EVAP. PONDS
AMMUNITION BREAK DOWN & CONTROL ROOM for SAWS (117-8)
36" WELLS SAW DO-ALL SAW (117-9)
EVAP. POND (INACTIVE)
REFINING BUILDING EXPLOSIVE STEAM OUT (117-5)
HOT GAS FACILITY (117-16)
RANGE SCRAP MATERIALS SEGREGATION FACILITY (117-17)
(117-15A) NOT IN USE
READY MAGS (117-13)
PREPARATION BUILDING (117-10) DIHMES BAM
EVAP. POND (INACTIVE)
READY MAGS (117-14)
(117-15) NOT IN USE
DECONTAMINATION & SMALL ITEMS FURNACE BUILDING RF-9 ROTARY FURNACE SMALL ARMS up to 20 MM FF-13 DECONTAMINATION FLASHING FURNACE (117-3)
PODS & BOILER BUILDING (117-2)
EVAPORATION POND
STEAM OUT
EVAP. POND (INACTIVE)
HIGH PRESSURE WASH OUT
SERVICES & SUPPORT BUILDING (117-1)
OFF-LOADING DOCK (117-12)
ACCUMULATOR BUILDING (117-11) NOT ACTIVE
WATER TREATMENT FACILITY (117-7)
STEAMOUT BUILDING (117-6)
BULK INCINERATOR PREP. BUILDING BEDS (NOT PERMITTED) (117-4)
COOLING WATER STORAGE PONDS
WESTERN AREA DEMILITARIZATION FACILITY (WADF)
200' 100' 0 200' 400'
GRAPHIC SCALE IN FEET
SOC
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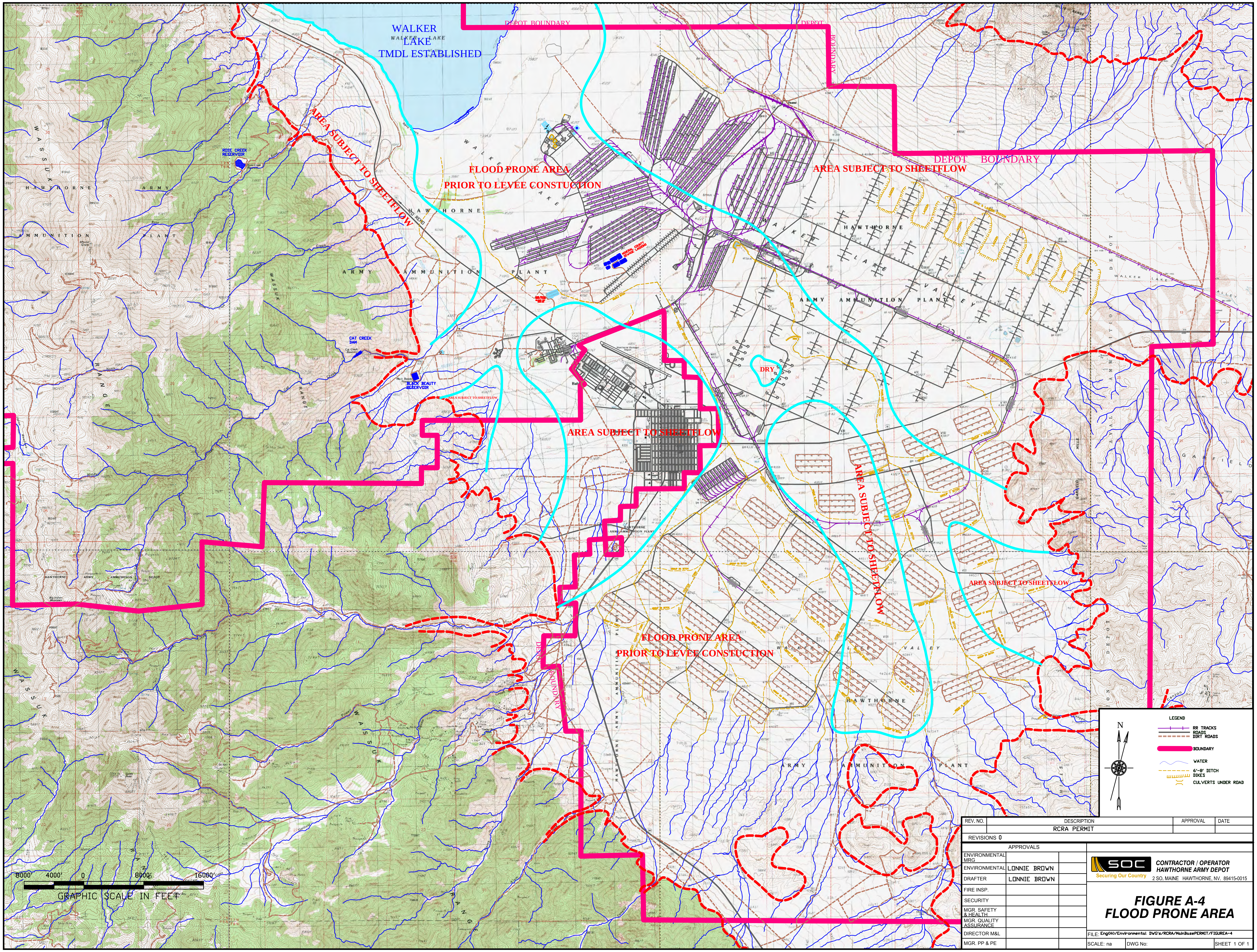
CONTRACTOR / OPERATOR
HAWTHORNE ARMY DEPOT
2 SO. MAINE HAWTHORNE, NV. 89415-0015
Western Area Demilitarization Facility
FIGURE A-3
DRAWING NUMBER
SCALE: SHOWN
FILE: H:\EnvironmentalDWG's/RCRA /MainBasePERMIT/FIGUREA-3
SHEET 1 OF 1

Figure A-4

Flood Prone Area



REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA PERMIT		

REVISIONS 0

APPROVALS		
ENVIRONMENTAL MRG		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTER	LONNIE BROWN	
FIRE INSP.		
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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CONTRACTOR / OPERATOR
HAWTHORNE ARMY DEPOT
2 SO. MAINE HAWTHORNE, NV. 89415-0015

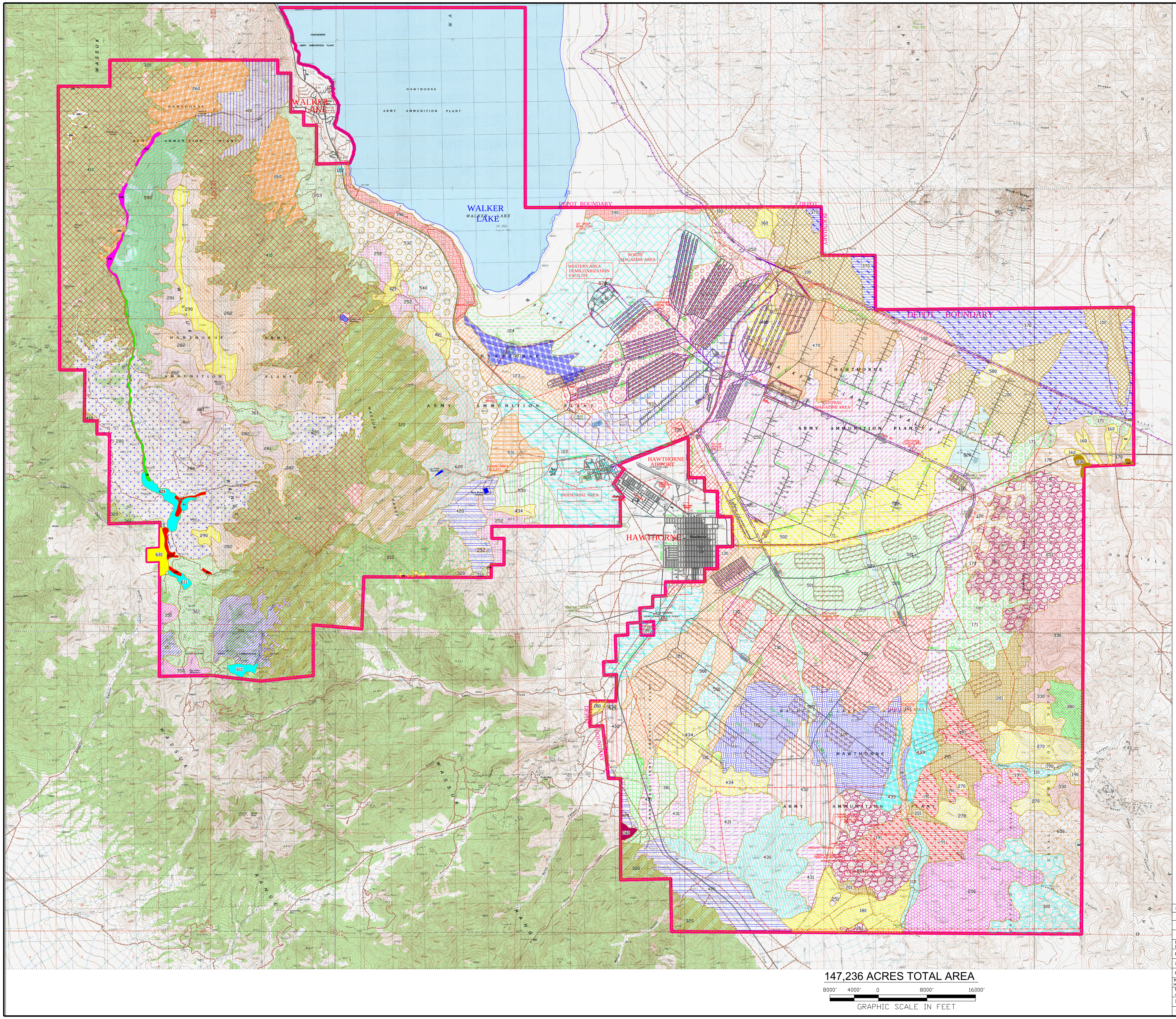
FIGURE A-4
FLOOD PRONE AREA

FILE: Eng(Hi)/Environmental DWG's/RCRA/MainBasePERMIT/FIGUREA-4

SCALE: na | DWG No: | SHEET 1 OF 1

Figure A-5

Soil Map



N

LEGEND

- RR TRACKS
- ROADS
- DIRT ROADS
- LANDFILL
- BOUNDARY
- FENCELINE
- WATER

100	Luning loamy sand, 2 to 4 percent slopes
102	Luning-Toulon complex, 2 to 4 percent slopes
110	Izo very gravelly sand, 2 to 4 percent slopes
120	Inmo very gravelly sand, 2 to 4 percent slopes
121	Inmo very gravelly loamy sand occasionally flooded, 2 to 4 percent slopes
122	Inmo association
123	Inmo very bouldery loamy sand, 2 to 4 percent slopes
124	Inmo-Orizaba-Louderback complex, 0 to 2 percent slopes
130	Sodaspring loamy sand, 0 to 4 percent slopes
160	Oricto very gravelly fine sandy loam, 2 to 4 percent slopes
170	Gynelle very gravelly loamy sand, 2 to 4 percent slopes
171	Gynelle gravelly loamy sand, 2 to 4 percent slopes
180	Breko-Wiskiflat association
181	Breko, dry-Wiskiflat association
190	Candelaria very gravelly sandy loam, 2 to 4 percent slopes
191	Candelaria very stony sandy loam, 2 to 4 percent slopes
201	Wardenot complex 2 to 4 percent slopes
210	Beelem-Wassit association
220	Bijorja-Petspring association
230	Blacktop-Rock outcrop association
240	Bouncer gravelly loamy fine sand, 15 to 50 percent slopes
250	Downeyville-Gabbvally association
251	Downeyville-Blacktop association
252	Downeyville, moist-Gabbvally association
253	Downeyville, moist-Blacktop association
260	Gabbvally-Tejabe association
270	Garhill-Blacktop association
280	Granmount-Kiote-Hiridge association
281	Granmount-Hiridge Rubble land association
282	Granmount-Kiote-Hiridge association, steep
290	Hiridge very gravelly sandy loam, 8 to 30 percent slopes
300	Jetcop-Gabbvally association
310	Lazan-Nupart association
320	Nupart-Lazan-Rock outcrop association
330	Pintwater-Blacktop-Rock outcrop association
340	Playas
350	Rockabin-Hiridge association
351	Rockabin-Fusuvar-Snopoc association
361	Snopoc-Rockabin-Hiridge association
370	Sundown loamy sand, 2 to 4 percent slopes
380	Theriot-Rock outcrop association
390	Typic Torriorthents very gravelly coarse sand, 4 to 15 percent slopes
400	Uripnes-Budihol-Rock outcrop association
410	Wassit-Ahchew association
420	Wiskiflat gravelly loamy sand, 2 to 4 percent slopes
421	Wiskiflat very bouldery loamy sand, 2 to 4 percent slopes
430	Terlco-Berko association
431	Terlco-Wiskiflat association
432	Terlco-Annaw association
433	Terlco very gravelly fine sandy loam, 2 to 4 percent slopes
434	Terlco-Itme association
460	Patna loamy sand, 0 to 2 percent slopes
470	Lakash-Demill complex, 0 to 2 percent slopes
480	Isolde fine sand, 2 to 8 percent slopes
500	Papoose gravelly loamy sand, 0 to 2 percent slopes
501	Papoose sandy loam, 0 to 2 percent slopes
502	Papoose-Patna complex, 0 to 2 percent slopes
510	Soda Lake-Cirac complex, 0 to 2 percent slopes
511	Soda Lake gravelly loamy sand, 0 to 2 percent slopes
520	Cirac fine sandy loam 0 to 2 percent slopes
530	Itme association
531	Itme association, bouldery
532	Itme association, steep
540	Bluckaroo very stoney fine loamy sand, 4 to 15 percent slopes
570	Mazuma complex, 0 to 2 percent slopes
571	Mazuma-Inmo complex
580	Nuahs gravelly loamy sand, 2 to 4 percent slope2
590	Ahchew-Rubble association
600	Welch complex, 2 to 8 percent slopes
601	Welch complex, 4 to 15 percent slopes
610	Squawval-Snopoc-Fusuvar association
611	Squawval sandy loam, 4 to 15 percent slopes
620	Petspring-Rock outcrop association
630	Holbrook gravelly fine sandy loam, 4 to 15 percent slopes
650	Stewval-Kyler association

REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA PERMIT		

REVISIONS

APPROVALS

MGR. ENVIRONMENTAL		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTSPERSON	LONNIE BROWN	
FIRE INSP.		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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2 SO. MAINE HAWTHORNE, NV. 89415-0015

FIGURE A-5
SOIL MAP

DRAWING NUMBER NUMBER

SCALE: N/A FILE: Eng(Hi)/Environmental DWG's/RCRA/MainBasePERMIT/FIGUREA-5 SHEET 1 OF 1

Figure A-6

116 Storage Magazine Locations

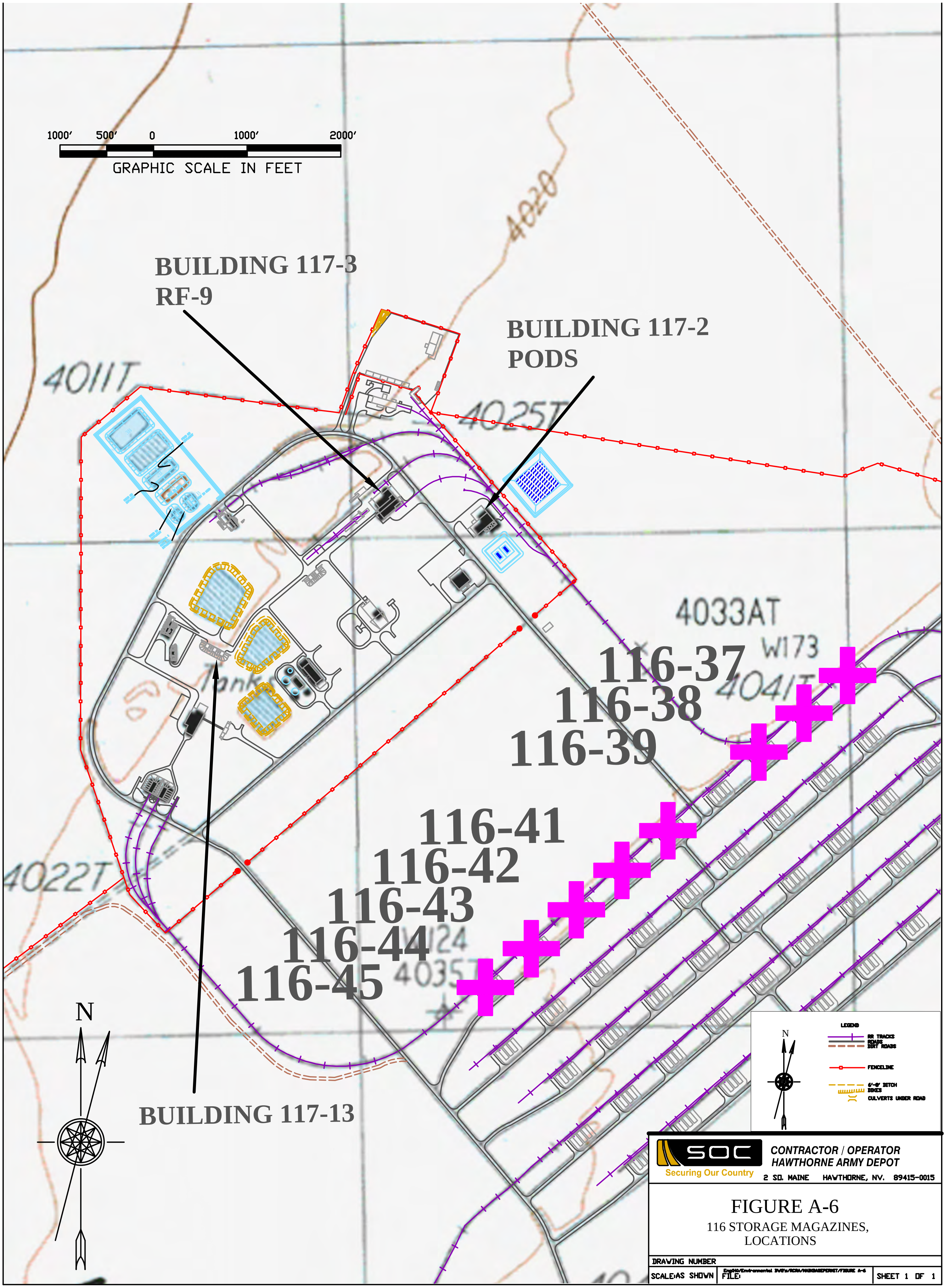

FIGURE A-6
116 STORAGE MAGAZINES, LOCATIONS

Figure A-7

100 Year Flood

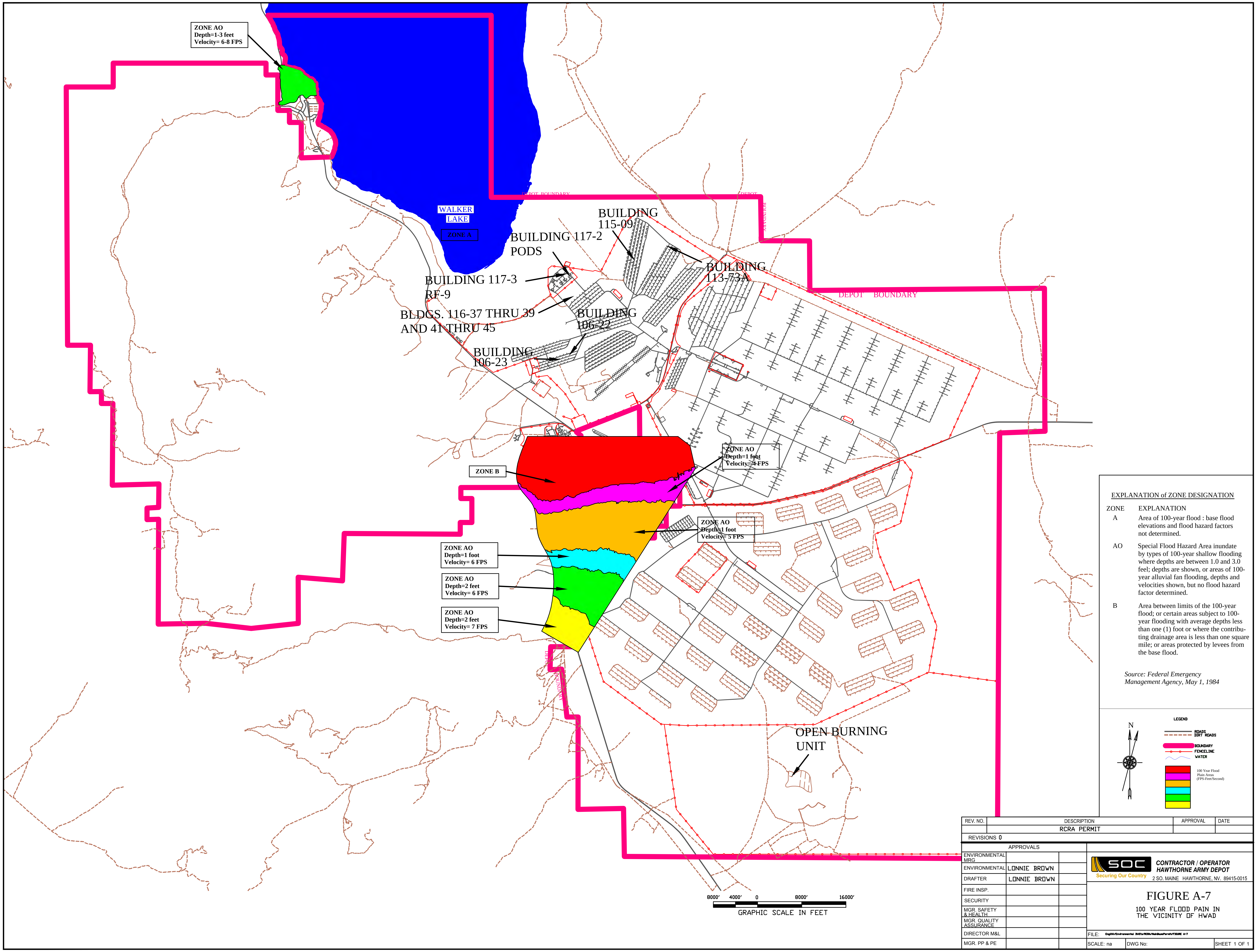
ZONE AO
Depth=1-3 feet
Velocity= 6-8 FPS
WALKER
LAKE
ZONE A
DEPOT BOUNDARY
BUILDING
115-09
BUILDING 117-2
PODS
BUILDING 117-3
RF-9
BUILDING
113-73A
BLDGS. 116-37 THRU 39
AND 41 THRU 45
BUILDING
106-22
BUILDING
106-23
DEPOT BOUNDARY
ZONE AO
Depth=1 foot
Velocity= 4 FPS
ZONE B
ZONE AO
Depth=1 foot
Velocity= 5 FPS
ZONE AO
Depth=1 foot
Velocity= 6 FPS
ZONE AO
Depth=2 feet
Velocity= 6 FPS
ZONE AO
Depth=2 feet
Velocity= 7 FPS
OPEN BURNING
UNIT
EXPLANATION of ZONE DESIGNATION
ZONE EXPLANATION
A Area of 100-year flood : base flood elevations and flood hazard factors not determined.
AO Special Flood Hazard Area inundate by types of 100-year shallow flooding where depths are between 1.0 and 3.0 feel; depths are shown, or areas of 100-year alluvial fan flooding, depths and velocities shown, but no flood hazard factor determined.
B Area between limits of the 100-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood.
Source: Federal Emergency Management Agency, May 1, 1984
LEGEND
N
ROADS
DIRT ROADS
BOUNDARY
FENCELINE
WATER
100 Year Flood Plain Areas (FPS-Feet/Second)
8000' 4000' 0 8000' 16000'
GRAPHIC SCALE IN FEET
REV. NO.
DESCRIPTION
APPROVAL
DATE
RCRA PERMIT
REVISIONS 0
APPROVALS
ENVIRONMENTAL MRG
ENVIRONMENTAL LONNIE BROWN
DRAFTER LONNIE BROWN
FIRE INSP.
SECURITY
MGR. SAFETY & HEALTH
MGR. QUALITY ASSURANCE
DIRECTOR M&L
MGR. PP & PE
SOC
Securing Our Country
CONTRACTOR / OPERATOR
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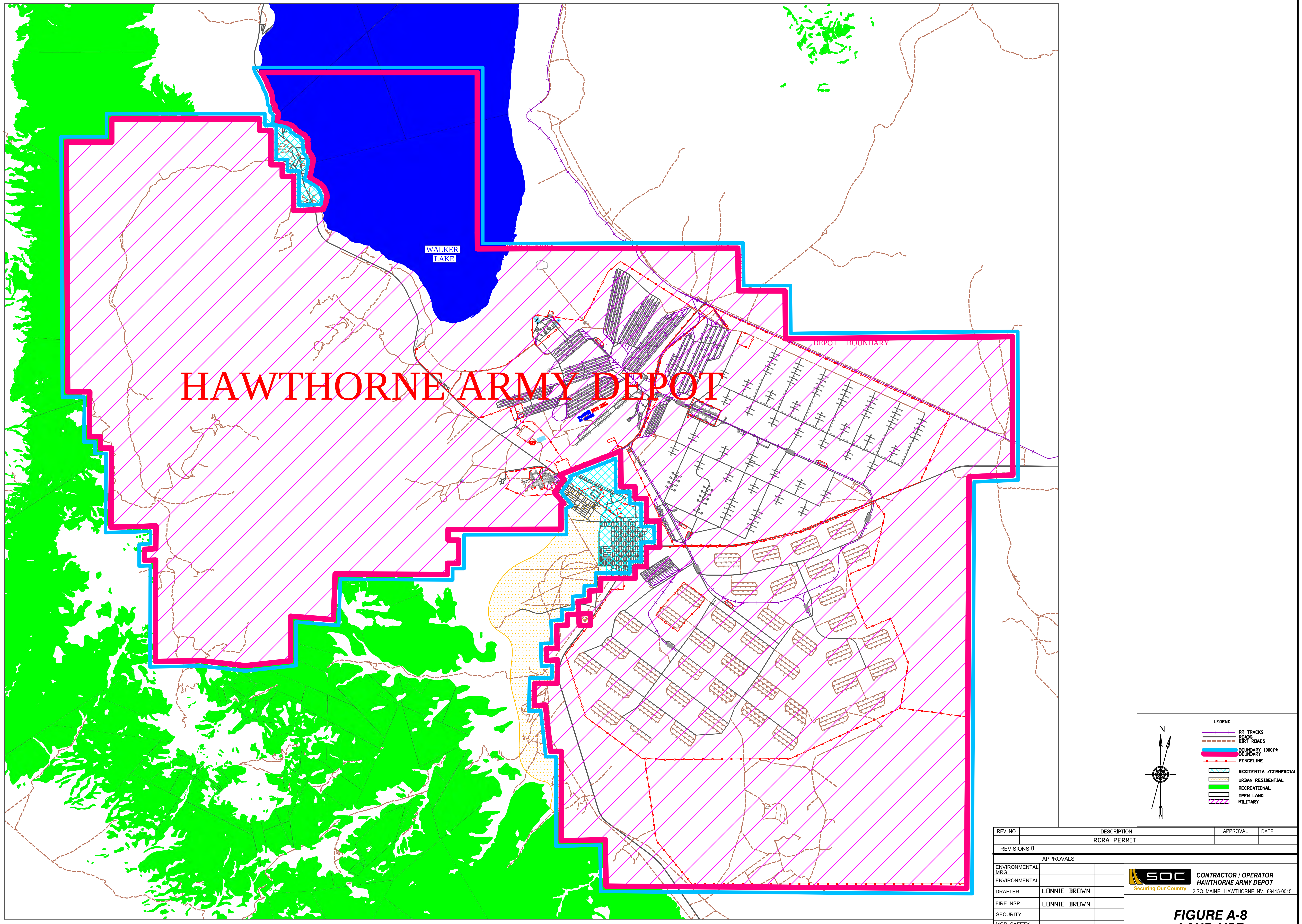
FIGURE A-7
100 YEAR FLOOD PAIN IN
THE VICINITY OF HWAD
FILE: Eng(H)/Environmental DWG's/RCRA/MainBasePermit/FIGURE A-7
SCALE: na
DWG No:
SHEET 1 OF 1

Figure A-8

Land Use

Figure A-9

Annual Windrose for WADF



8000' 4000' 0 8000' 16000'
GRAPHIC SCALE IN FEET

REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA PERMIT		

REVISIONS 0

APPROVALS		
ENVIRONMENTAL MRG		
ENVIRONMENTAL		
DRAFTER	LONNIE BROWN	
FIRE INSP.	LONNIE BROWN	
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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CONTRACTOR / OPERATOR
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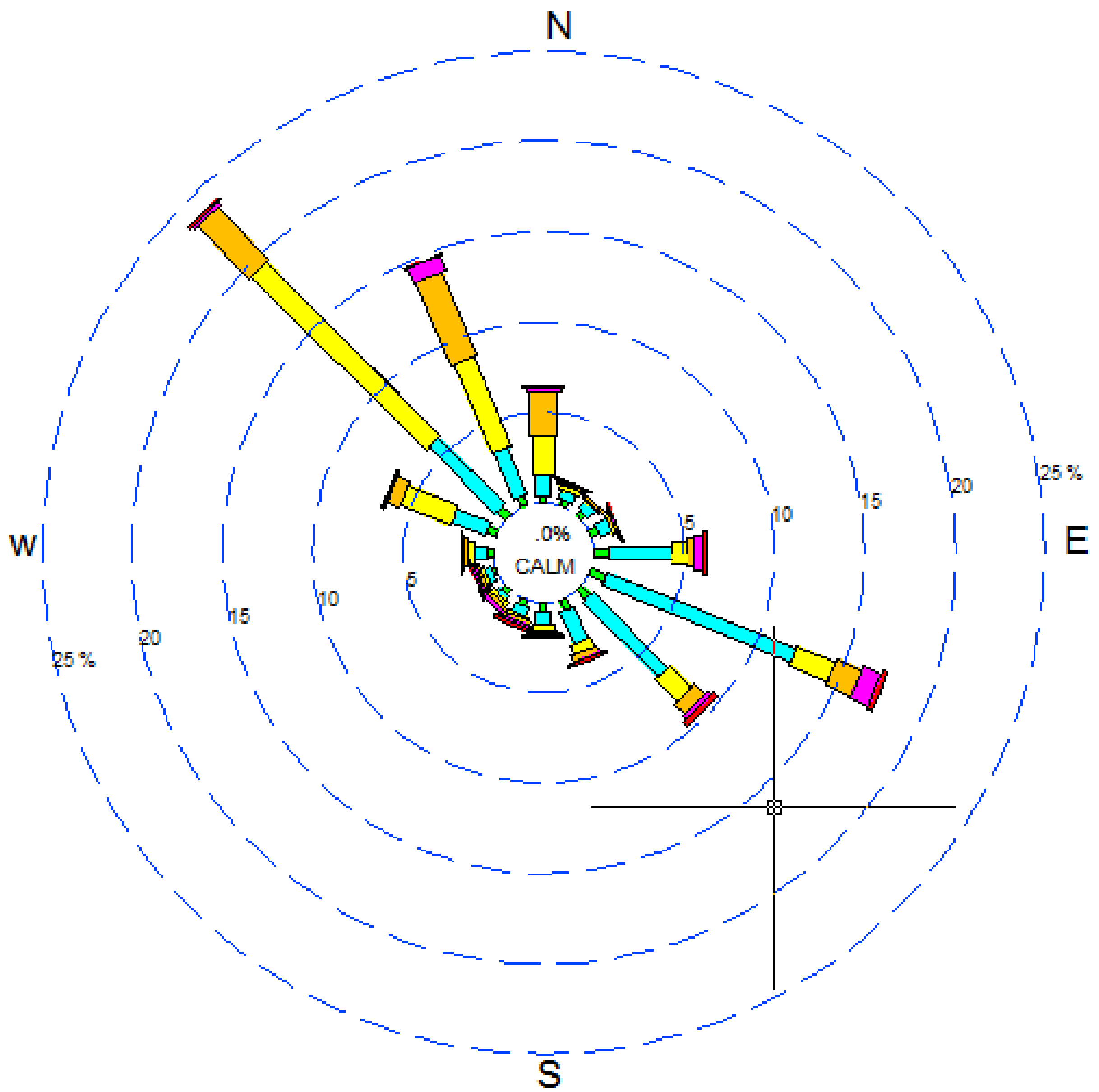
FIGURE A-8
LAND USE

FILE: Eng(H:)/Environmental DWG's/RCRA/MainBasePermit/FIGURE A-8

SCALE: na | DWG No: | SHEET 1 OF 1



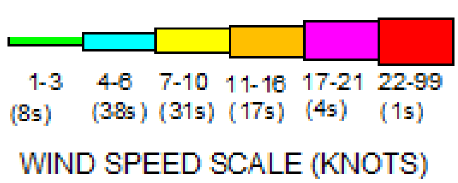


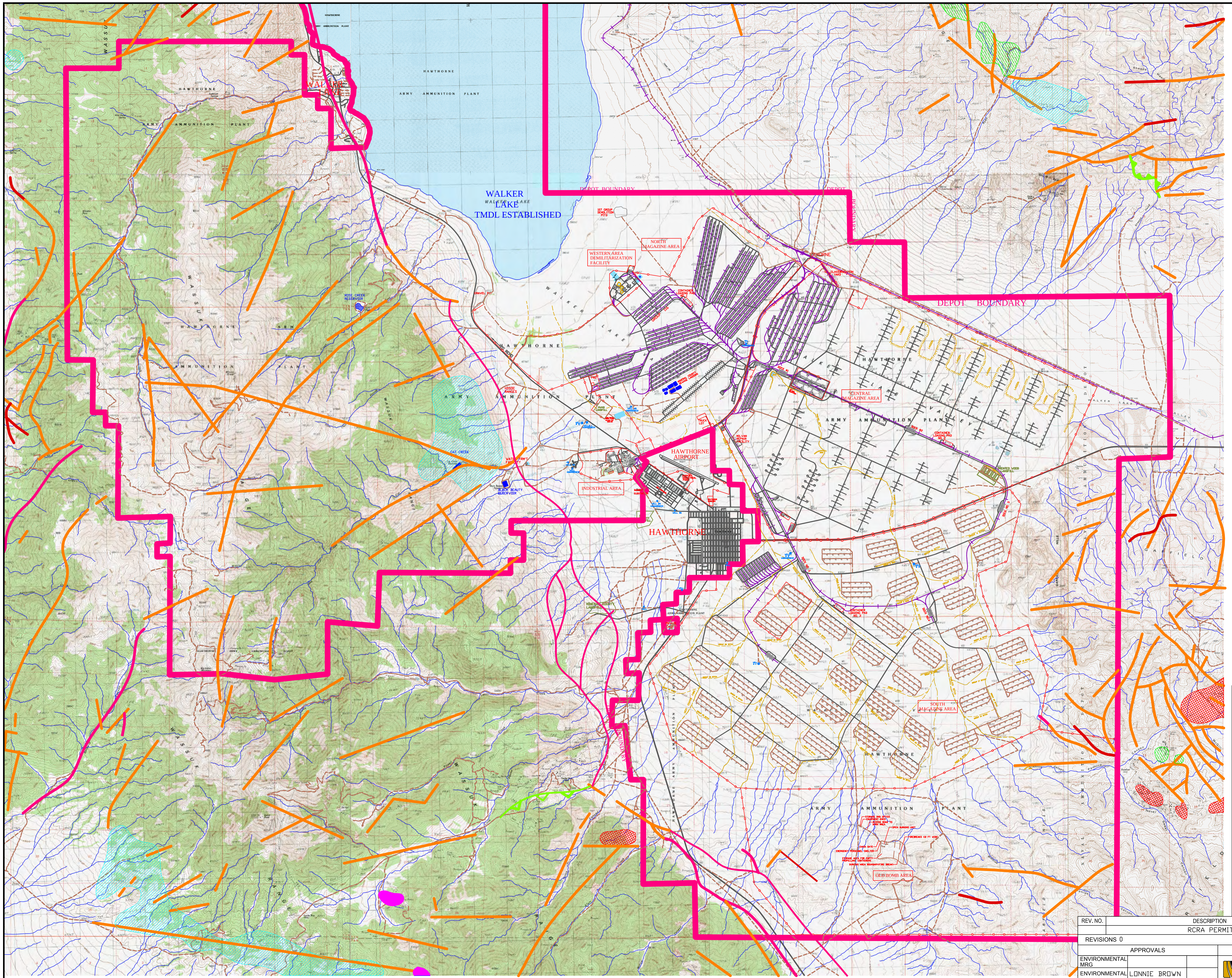
FIGURE A-9

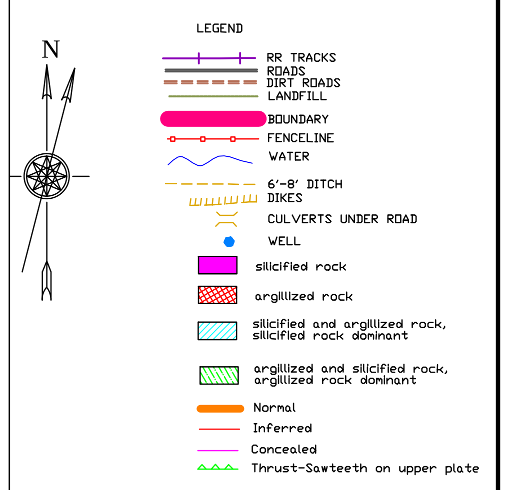
Annual Windrose for the WADF Area (June 1996-June 1997)

Hawthorne Army Depot
Hawthorne, Nevada

Figure A-10

Seismic Standard





147,236 ACRES TOTAL AREA

8000' 4000' 0 8000' 16000'

GRAPHIC SCALE IN FEET

Source: Map Showing Distribution of Altered Rocks, Faults, and Linear Features in the Walker Lake 1X2 Quadrangle, Nevada and California, By Terri L. Purdy and Lawrence C. Rowan, 1985

REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA PERMIT		

REVISIONS 0

APPROVALS		
ENVIRONMENTAL MRG		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTER	LONNIE BROWN	
FIRE INSP.		
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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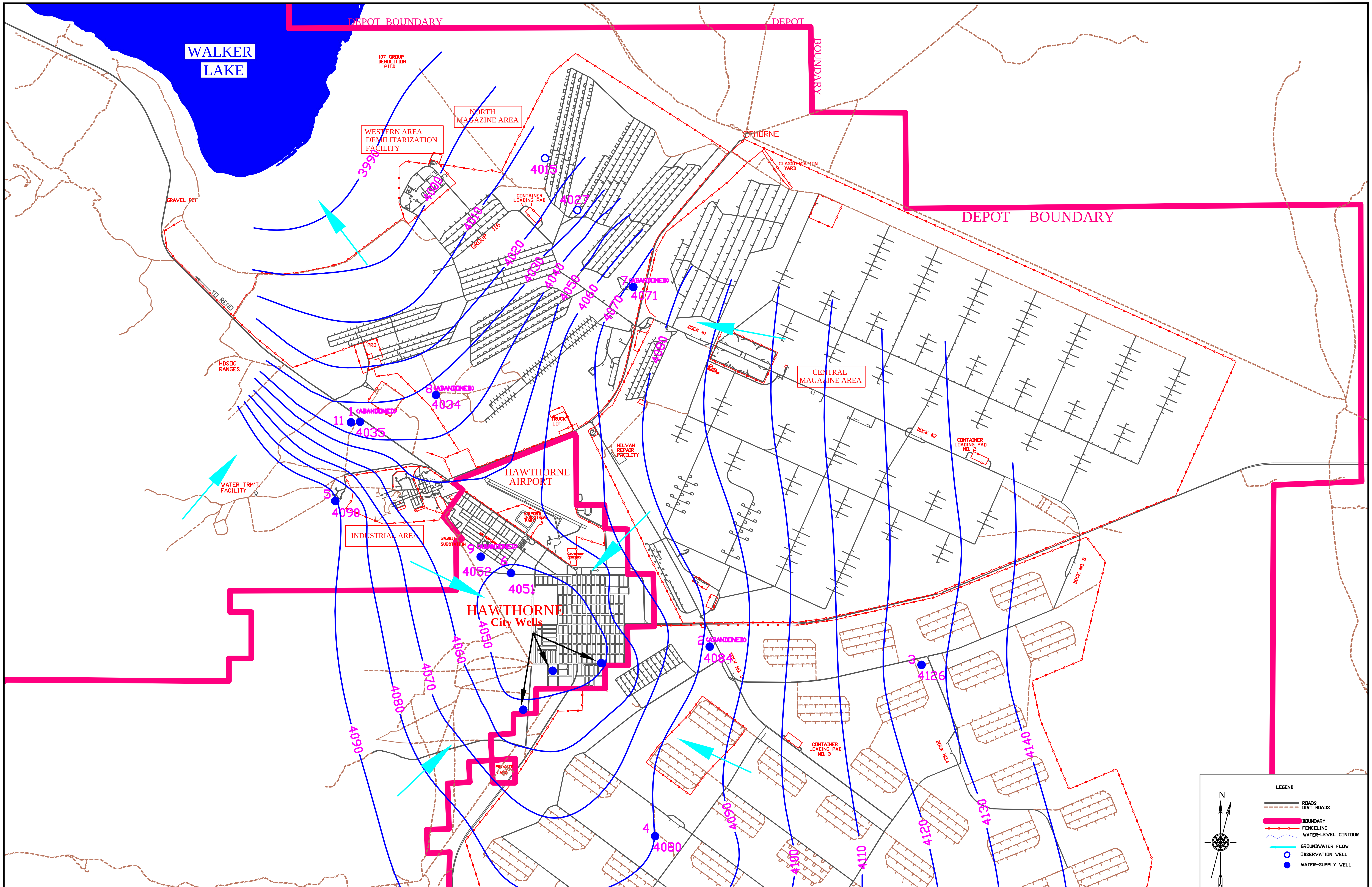
FIGURE A-10
Seismic Standard

FILE: Eng(H:)/Environmental DWG's/RCRA/MainBasePERMIT/FIGUREA-10

SCALE: na | DWG No: | SHEET 1 OF 1

Figure A-11

Generalized Groundwater



REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA MAIN BASE PERMIT		

REVISIONS 0

APPROVALS		
ENVIRONMENTAL MRG		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTER	LONNIE BROWN	
FIRE INSP.		
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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CONTRACTOR / OPERATOR
HAWTHORNE ARMY DEPOT
2 SO. MAINE HAWTHORNE, NV. 89415-0015

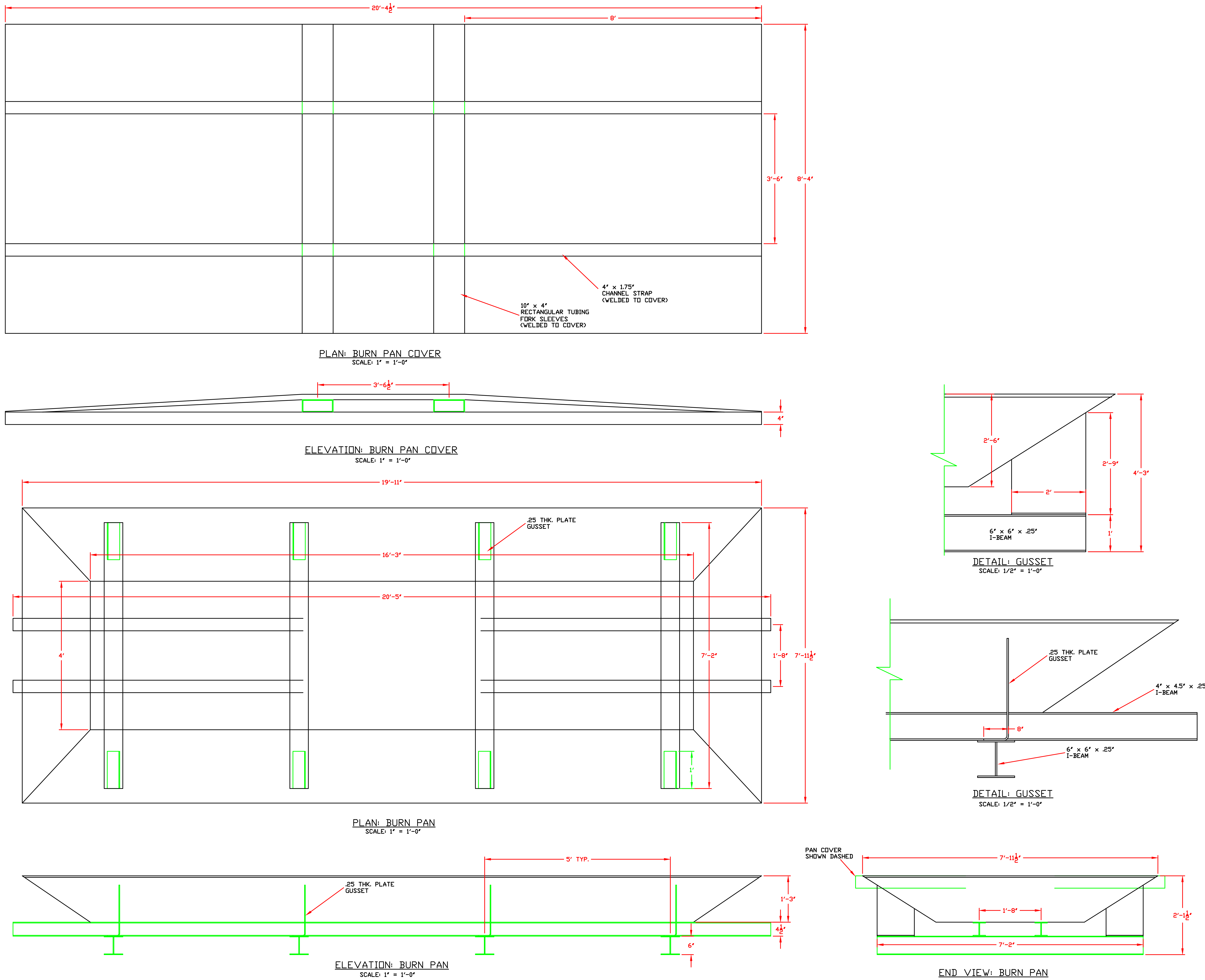
FIGURE A-11
GENERALIZED GROUNDWATER LEVELS, 1974

FILE: Eng(H)/Environmental DWG's/RCRA/MainBasePERMIT/FIGURE A-11

SCALE: SHOWN | DWG No: | SHEET 1 OF 1

Figure A-12

Open Burn - Burn Pan



REV. No	DESCRIPTION	APPROVAL	DATE

REVISION BLOCK

DAY & ZIMMERMANN HAWTHORNE CORP.

DZHC CONTRACTOR OPERATOR OF DZHC

HAWTHORNE ARMY DEPOT

2 SOUTH MAINE HAWTHORNE, NEVADA 89415-0015

FIGURE A-12
BURN PAN (FROM SIERRA AD)

PAN, COVER, & DETAILS

H:/Environmental DWG's/RCRA/FIGURE A-12

MGR ENGINEERING DATE	ENGINEER DATE	PRODUCTION DATE
QUALITY CONTROL DATE	FIRE DEPT. DATE	SAFETY DATE
D.C. BUUM		
DRAFTSMAN DATE	ORGINATOR DATE	

SHOWN		1 / 1	BURN PANS_2
SCALE	DRAWING NUMBER	SHEET No.	CAD FILE NO.

TABLE A-4

Annual Average Daily Traffic

at Portable Traffic Count Stations in Babbitt and Hawthorne,

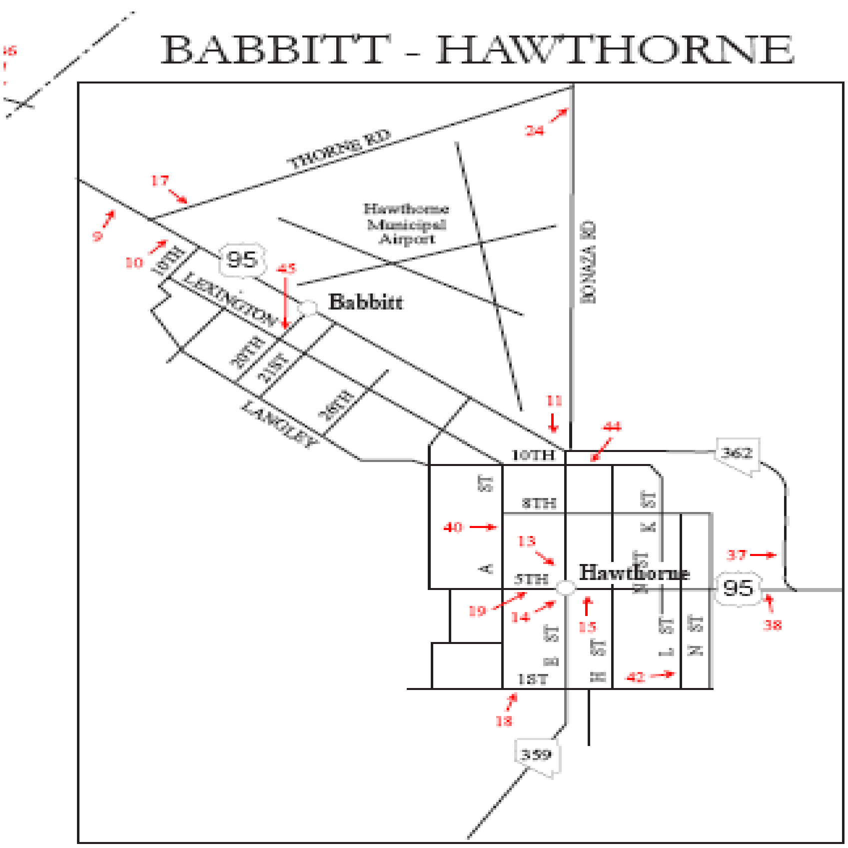
Mineral County, Nevada (1998 - 2007)

http://www.nevadadot.com/reports_pubs/traffic_report/2007/pdfs/Mineral.pdf

Station No.	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
21-00**09**	3250	3200	3400	3000	3000	3000	3300	3050	3100	3700
21-00**10**	4100	4500	4300	4700	4630	2450	4050	4000	3950	4200
21-00**11**	4700	5500	5900	5900	5900	5050	5150	5200	5700	5700
21-00**13**	5400	5900	6300	6300	6300	5600	5600	4950	4850	5200
21-00**37**	800	1300	1050	1050	1050	1150	1200	1450	1500	1600
21-00**38**	1700	1450	1500	1200	1200	1200	1200	1100	1100	1200

Bold station numbers in the table correspond to the station labels shown on Figure A-13.

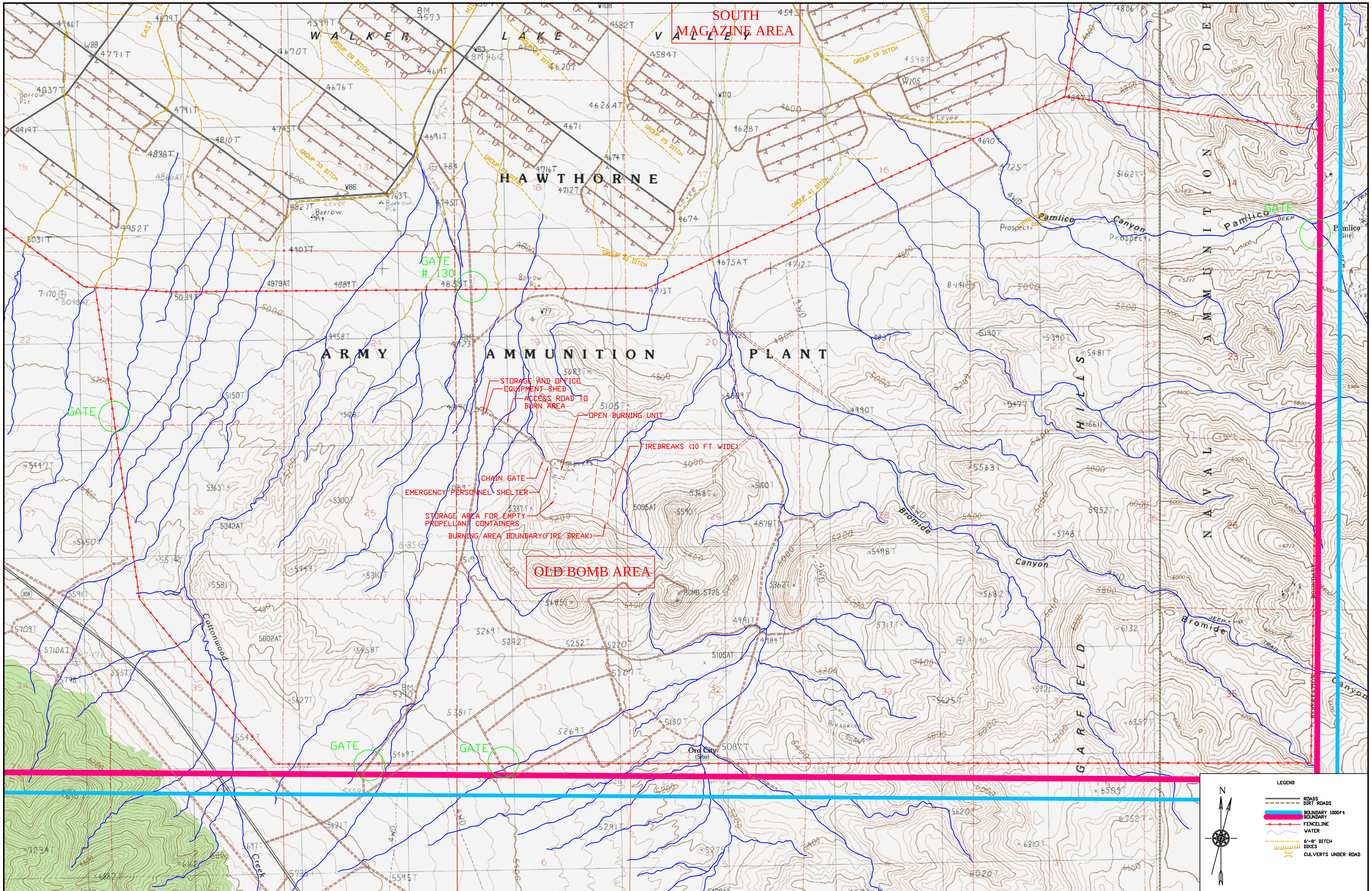
Figure A-13



BABBITT (No longer exists) HAWTHORNE

Figure A-14

Old Bomb Topography Map



147,236 ACRES TOTAL AREA

8000' 4000' 0 8000' 16000'

GRAPHIC SCALE IN FEET

REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA PERMIT		

REVISIONS 0

APPROVALS		
ENVIRONMENTAL MRG		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTER	LONNIE BROWN	
FIRE INSP.		
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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FIGURE A-14
OLD BOMB

FILE: Eng(Hi)/Environmental DWG's/RCRA/MAINBASEPERMIT/FIGURE A-14

SCALE: na | DWG No: | SHEET 1 OF 1

SECTION B. HAZARDOUS MATERIALS/WASTE CONTINGENCY PLAN (HWCP / ISCP)

RCRA requires a Part B permit applicant to submit a contingency plan in order to minimize hazards to human health or the environment due to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents. These requirements are fully described in 40 CFR 270.14, 264.51 through 264.56, 264.171, 264.194(c), 264.227, and 264.255.

40 CFR 264.52(b) states: "If the owner or operator has already prepared a Spill Prevention, Control, and Countermeasures Plan in accordance with Part 112 of this Chapter, or Part 1510 of Chapter V, or some other emergency or contingency plan, he/she needs only amend that plan to incorporate hazardous waste management provisions that are sufficient to comply with the requirements of this Part." This section references existing documents that fulfill the requirements of a RCRA Hazardous Waste Contingency Plan and documents additional provisions necessary to ensure compliance with the regulations. HWAD also has a Disaster Control Plan, published in accordance with Army Regulations for coping with natural and man-made disasters. This plan describes disaster control measures that would be taken in the event of an explosion, fire, flooding, release of hazardous substances, or other disasters.

A facility wide HWCP is submitted as part of the RCRA Part B permit modification submittal. The HWCP is updated on a regular basis; all amendments will be in accordance with the provisions of 40 CFR 270.14(b)(7). A current copy of the HWCP can be found in Appendix C.

SECTION C. PROCEDURES TO PREVENT HAZARDS AT RCRA UNITS ON MAIN BASE

SECURITY [40 CFR 270.14(b)(4)]

HWAD is a secured facility. Access by the general public is not allowed, and access by others (including Army personnel, contractor employees, and others with a business purpose) is strictly controlled 24 hours a day.

Security Procedures and Equipment *[40CFR 270.14(b)(4)]*

The general security provisions at HWAD includes: (1) natural and artificial barriers around major regions of HWAD (North, Central, and South Magazine areas); (2) 24-hour, 7-day-per-week surveillance by roving patrols; (3) warning signs posted along perimeter fences to discourage unknowing or unauthorized entry; (4) internal barriers around specific facilities; (5) controlled entry to major HWAD regions through manned sentry gates; (6) personnel access controlled by HWAD Security Office; (7) two-way radio communications between security personnel, selected employees, and a central communications center, and (8) telephone communications available at selected facilities and field phone stations.

Areas within the major regions of HWAD ((North, Central, and South Magazine areas) are classified according to security requirements as exclusion areas, limited areas, controlled areas, and posted areas. All hazardous waste management (HWM) facilities at HWAD are located within limited areas, the second highest level of security priority. Personnel access is controlled by Security Office and is limited to personnel having a legitimate need to enter these areas to conduct official business. Military and civilian personnel at HWAD who have a continuing requirement to enter these areas are issued a security identification badge that authorizes entry to the areas. Subcontract personnel are issued security identification badges that have access limitations annotated on the face of the badge. Visitors are issued visitor badges and a validating pass with access and escort limitations.

Communications for security personnel are provided by two-way radios, standard telephone system, field phones, and cellular phones. Two base radio stations are located at the Guard Operations Center (GOC) for security, fire, and ambulance services. An alternate base station is located in the Electronic Shop. There are also remote transmitters located in the GOC, the Electronic Shop, and Building 5.

Guards at fixed posts are provided with portable two-way radios. Roving patrol vehicles are equipped with Motorola Converta-Com radio consoles that permit the guards to remove the radio and maintain communications when away from vehicles. Telephones are installed at selected facilities and at fixed guard posts. Field phones are located at strategic points within patrol areas. Both the fixed base radio system and the telephone system are equipped with backup emergency power supplies.

Protective security lighting is provided at all primary entry points to the major regions at HWAD. These include the Main Gate to the Administrative Area, North Magazine Gate #4, Central Magazine Gate #5, Central Magazine Gate #7, and South Magazine Gate #8. These facilities are equipped with flood lights, building lights, and poled street lamps to provide adequate illumination for identifying vehicle occupants and pedestrians approaching these areas during darkness.

24-Hour Surveillance System [40 CFR 264.14(b)(1)

Continuous surveillance of facilities at HWAD, including HWM facilities, is accomplished by roving security patrols. Three eight-hour shifts, with at least 19 personnel on duty per shift are maintained. This security force is at least composed of two supervisors (shift and field), two communications dispatchers, two fixed post guard (main gate), and roving patrol guards. During normal working hours, additional personnel are assigned to the magazine gates. Overall administration of security personnel is performed by designated personnel.

Each roving patrol is motorized and radio equipped and is assigned to a specific patrol area during its watch. Typical duties required by patrol members include:

- Check for possible intrusion or security violations.
- Check for security of locks to bunkers and buildings within the perimeter of the patrol area.
- Check the physical integrity of perimeter barriers.
- Challenge all persons entering or exiting the patrol area who act suspicious, are improperly badged, or who may require questioning. All persons encountered after normal working hours will be challenged.
- Report by radio to the Field Supervisor all incidents and check points.
- Report to contingency calls as directed by the Field Supervisor.
- Perform specific duties outlined in daily activity log for patrol area.

Barrier [40 CFR 264.14(b)(2)(i)]

Each of the major regions of HWAD is enclosed by a five-strand barbed-wire fence approximately 4 feet high. The northern boundary of the North Magazine area is unfenced and entry from this direction is deterred by Walker Lake. Clear zones are maintained on either side of perimeter fences where possible.

In addition to the perimeter fences and gates, entry to individual HWM facilities is controlled by internal barriers. The WADF area, which contains APE 2210 (RF-9) Detonating Furnace RF-9, and PODS, is enclosed by a 6-foot high chain link fence. Gates in the fence are equipped with cattle guards to deter entry by livestock. Two gates at the southern boundary are kept open during normal operations. All other gates are locked unless needed. Security supervision of these gates is not required during normal working hours. The hazardous waste storage buildings are located in North Magazine Area. Access to the area is restricted by several manned and unmanned gates and by a fence. The location of gates for North, Central, and South Magazine Areas is shown in Section A, Figure A-2. All storage buildings are kept locked except when in use. Keys to the buildings are controlled by the Security Key Office, thereby limiting entry to authorized personnel only. Security also verifies that buildings entered have been locked the same day they are entered.

The OB unit is located in the southern part of HWAD in the Old Bomb Area. The unit is restricted by a five-strand fence around the perimeter of HWAD and by gates. The fence is a combination of barbed and barbless wire. Section C, Figure C-1 shows access control in the vicinity of the OB unit. Unmanned gates are locked at all times and have a manual control that requires a key kept by the Guard Operations Center (GOC). During OB operations, the key remains under the control of the Range Supervisor or his designated representative until the burn is completed.

Means to Control Entry [40 CFR 264.14(b)(2)(ii)]

Gates in the perimeter fences are controlled by security personnel and require proper identification badges for entry. Vehicle gates manned by security guards are open during normal working hours at Thorne and Lake Roads, Thorne and Grant Roads, U.S. Highway 95 and Mine Road, and U.S. Highway 95 and Second Avenue. All other gates are opened on as needed basis with security personnel supervision.

Conditions-of-entry signs are erected at all gates outlining the responsibilities, limitations, and liabilities assumed by personnel entering HWAD. In addition, “no trespassing” signs are posted every 500 feet along the perimeter fences.

In addition to the physical barriers and security procedures described, access to all HWM facilities is also controlled by the line supervisors during normal work-day operations. All visitors not part of the normal operations are required to report to the line supervisor and sign the facility visitor log before access is permitted.

Disturbance of the HWAD facilities, though possible, is extremely unlikely. Substantial efforts have been made to isolate and secure this facility. In addition, operating procedures have been developed and implemented to minimize the potential for disturbance of hazardous wastes by other plant activities.

Warning Signs [40 CFR 264.14(c)]

Signs warning “U.S. Government Property – No Trespassing” are posted along the perimeter fences at 500-foot intervals. These signs are approximately 18 inches by 24 inches and are easily visible at a distance of 25 feet. Large signs describing the “Condition of Entry” are posted at each gate to HWAD. These signs are approximately 4 feet by 6 feet in size and warn of the possible consequences of detected unauthorized entry.

Rectangular signs with the warning “Caution – Hazardous Waste Area – Unauthorized Persons Keep Out” are posted in conspicuous locations at each of the HWM facilities and at all avenues of approach to these facilities. No other language edition is necessary since English is the area’s predominant language. Existing signs with legends other than that described above, but still warning of the possible dangers of unauthorized entry, may be used instead, where practical. All signs are legible from at least 25 feet. Warning signs about smoking are posted throughout the area including the buildings where flammable waste is stored. A sign indicating "Caution Containing PCBs" is posted on Building 106-23 where PCB waste is stored. Additional signs requiring visitors to register their entry and exit at the Security Office are posted at the hazardous waste storage buildings.

Several signs are present around the Old Bomb area. These include "Danger. Hazardous Waste Area, Unauthorized Personnel Keep Out." "Danger. Range Area. Live Operations in Progress, Authorized Personnel Only," "Stop. Explosive Danger Zone. Do Not Proceed Beyond This Point When Flag is Flying," and "Restricted Area. Keep Out. Danger." A warning sign in English and Spanish is also posted at the entrance gate to Old Bomb. During OB operations, a red flag is hoisted on the pole located outside the OB unit. A sign is placed at the pole indicating the demolition is in progress when the red flag is flying. The red flag is taken down only when burning operations are completed, and the burn pans are secured.

INSPECTION SCHEDULE [40 CFR 270.14(b)(5)]

At HWAD, all equipment checks and procedures for general safety, emergency equipment, and security are incorporated into inspections that are performed at routine frequencies. These inspections are intended to ensure standard operations of waste facilities and to ensure readiness of equipment and supplies in the event of an emergency. The inspection logs are submitted and maintained on a monthly basis. Inspection logs are maintained at the site for a minimum of three years from the date of the inspection.

Periodic Inspections [40 CFR 264.15(a)]

HWAD conducts periodic inspections for malfunctions and deterioration, operator errors, and discharges which may be causing, or may lead to the release of hazardous waste constituents to the environment or a threat to human health.

General Inspection Requirements [40 CFR 264.15(b)]

HWAD conducts regular and frequent inspections of the hazardous waste management facility, including RF-9 Detonating Furnace, PODS, Old Bomb, BEDS and Hazardous Waste Building. These include regular inspections of equipment malfunction, potential operator errors during operation, structural deterioration, and discharges that could cause or lead to the release of hazardous waste compounds that could adversely affect the environment.

Written Schedule for Inspecting [40 CFR 264.15(b)(1) and (2)]

The following is the written schedule for inspecting monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment such as dikes and sump pumps) that are important to preventing, detecting, or responding to environmental or human health hazards.

HWAD employees are continuously looking for leaking containers and for deterioration of containers and the containment system caused by corrosion or other factors. All areas of concern are reported to the Environmental Office shown below Section C Table C-1.

Table C-1 Inspection Schedule

HW Storage Buildings 264.174	Table K-2	Weekly when in use
OB Unit 264.602	Table G-1	Daily when in use
RF-9 264.347	Table P-2	Daily when in use
PODS 264.347	Table T-1,T-3	Daily when in use
BEDS 264.47	Table Y-1,Y-3	Daily when in use

Any Unit that has been out of operation for one month or more is thoroughly inspected before being placed back into operations. The inspection is carried out as indicated in the inspection log.

Inspection Checklists [40 CFR 264.15(b)(3)]

The following inspection checklists identify the types of problems (e.g. malfunctions or deterioration) which are to be looked for during the inspection.

Table G-2 Old Bomb Checklist
Table G-3 Meteorological Monitoring System Checklist
Table K-3 Hazardous Waste Storage Buildings Checklist
Table N-3 Startup Procedure Checklist
Table N-4 Shut Down Procedure Checklist
Table P-1 RF-9 Checklist

Frequency of Inspections [40 CFR 264.15(b)(4)]

All safety and emergency equipment for RCRA-regulated hazardous waste management units is inspected at regular intervals. In general, each item is inspected on a frequent basis (daily, weekly, or monthly). In some cases extended frequencies are also required for specific inspection item (semi-annually or annually). These inspections are intended to ensure that equipment is maintained and is in condition for use in the event of an emergency. The results of security equipment inspections are documented on inspection log sheets. When completed, each inspection log sheet is placed in the inspection log on file.

Inspections Malfunction of Equipment or Structures [40 CFR 264.15(c)]

RF-9 Detonating Furnace, PODS, Old Bomb, BEDS and Hazardous Waste Building and all associated equipment is subjected to a thorough visual inspection to detect any leaks, spills, fugitive emissions, and for signs of any tampering. The results of inspections are documented on inspection log sheets. When completed, each inspection log sheet is inserted in the inspection log on file. All emergency waste feed cut-off systems and associated alarms are tested on at least a weekly basis to verify operability. General emergency equipment and systems are inspected monthly and/or in operation.

During periods of operation, specific operating parameters are monitored on a continuous or periodic basis, as appropriate. All inspection and monitoring data are noted during operation are recorded in the unit's operating log. Documentation of equipment maintenance activities will be kept in the facility's log.

APE 2210 (RF-9) Detonating Furnace, PODS, BEDS, Old Bomb and all associated equipment is subjected to a thorough visual inspection to detect any leaks, spills, fugitive emissions, and for signs of any tampering. The results of inspections are documented on inspection log sheets. When completed, each inspection log sheet is inserted in the inspection log on file. All emergency waste feed cut-off systems and associated alarms are tested on at least a weekly basis to verify operability if in operations. General emergency equipment and systems are inspected monthly and/or daily when in operations.

Inspections are Recorded on an Inspection Log [40 CFR 264.15(d)]

Inspections are recorded on an inspection log and kept for a minimum of three years from the date of the inspection. These inspection records include the date and time of inspection, the name of the inspector, a notation of the observations made, and date and nature of any repairs or other actions.

PREPAREDNESS AND PREVENTION DOCUMENTATION REQUIREMENTS [40 CFR 270.14(b)(7)]

During periods of operation, specific operating parameters are monitored on a continuous or periodic basis, as appropriate. All inspection and monitoring data are noted during operation are recorded in the unit's operating log. Documentation of equipment maintenance activities will be kept in the facility's log.

HWAD has facility-wide documentation of on-site preparedness and prevention measures. The procedures for hazardous waste management facilities are addressed in the Hazardous Waste Contingency Plan (HWCP). See Section B for additional details regarding HWCP.

Many industrial processes are undertaken at HWAD, some of which generate hazardous waste or hazardous waste constituents. It is the policy of HWAD to control pollution of the environment through the operation and maintenance of the facility in such a manner as to comply with all applicable Federal, State, or local requirements, regulations, and standards, including those contained in the Nevada Hazardous Waste Management regulations and Subpart C of Part 264, Chapter 40 of the CFR.

To implement this policy, HWAD has prepared a HWCP that sets forth the procedures that will be used to minimize or prevent damage to human health and the environment from any sudden or non-sudden discharges of hazardous waste or hazardous waste constituents. Though the likelihood of a release of hazardous wastes or substances is minimized by implementation of operating and emergency procedures, the possibility of a release can never be completely eliminated. Due to the nature of the substances used and managed at the facility, a likely cause of sudden release, if a release were to occur, would be fire or explosion.

Because of the potential for fire or explosion, HWAD operates and maintains its own fire department. HWAD Fire Department is trained in managing emergencies that could occur due to the explosive potential and nature of materials, products, and byproducts handled at the facility. The fire department is on alert at all times to handle the types of fires that could occur during the management of hazardous wastes at the facility.

HWAD has implemented a set of explicit fire fighting instructions that have been formulated to protect the health and safety of installation employees and prevent the spread of fire into adjoining areas. Major provisions of these procedures are as follows:

1. All fires are reported immediately to HWAD Fire Department; however, the Emergency Response Team (ERT) will provide the initial response to all indoor fires or controlling small fires which can be extinguished using hand-held fire extinguishers and other on-site fire-fighting equipment. Fires or explosions occurring on the facility grounds will be handled by the ERT and the HWAD Fire Department unless they are beyond the capabilities of the two units. In that case, the Hawthorne Fire Department will be called in to supplement on-site capabilities. The decision to fight a fire or let it burn is made on a case-by-case basis and is determined by the hazardous classification and characteristics of the materials involved in the fire. If it is judged too hazardous to fight a fire, the Fire Department remains at the site of the fire to contain the fire, prevent access to dangerous areas by unauthorized personnel and keep the fire from spreading to adjacent areas.
2. All transportation vehicles, offices, and operating areas are provided with water or hand-held fire extinguishers. The type of extinguisher provided is correlated to the type of materials handled or processed in that area. Operating personnel are instructed in extinguisher use and advised of the nature of fires for which type of extinguisher should be used.
3. Operating personnel are also instructed to use extinguishers only to fight minor fires, and only if there is no present danger involved in so doing. In all cases, whether or not the fire is judged to be ―minor" by those at the scene, the Fire Department and/or ERT is always immediately notified.

Hazardous waste management facility internal communications are made by direct voice contact or two-way hand-held radio. Communications (internal and external), implementation of emergency or rescue procedures, and similar emergency response procedures are outlined in greater detail in the HWCP.

Equipment Requirements [40 CFR 264.32]

As discussed above, HWAD operates and maintains its own fire department due to the explosive potential and nature of materials, products, and byproducts handled at the facility. This fire department is on alert at all times to implement fire fighting or other appropriate procedures for any incidents involving hazardous materials or hazardous wastes.

The HWCP contains an updated list of all emergency equipment used for emergencies at hazardous waste management facilities. This information is available to the Installation Emergency Response Coordinator (ERC) and the cleanup crews for use in the containment or cleanup of a spill to prevent pollutant migration.

Internal Communications [40 CFR 264.32(a)]

Internal communications at HWAD is made by direct voice contact or two-way hand-held radio. Each person or group of persons is equipped with a two-way radio to maintain contact with the operations center and to request assistance if required. The communications system at HWAD consists of two-way communications between security personnel, selected employees, and a central communications GOC. Two base radio stations are located at the GOC with an alternate station at the electronic shop. Remote transmitters are located in the GOC, electronics shop, and Building 5. Communications during power failures will be maintained by field telephones and radios with independent battery supplies. A list of communications equipment is given in Section C, Table C-2. Details on the communication equipment for the primary control net are in the HWCP.

Fire phones, two-way radios, cellular phones, and other telephones are located throughout the general installation for use in contacting the ERT, rescue squads, cleanup crews, fire department, or other disaster control agencies in the event of an emergency. The ERT can readily summon off-site emergency assistance either from the scene or through the guard dispatcher (see the HWCP).

External Communications [40 CFR 264.32(b)]

Communications with off-site emergency agencies would be conducted through the Emergency Response Coordinator (ERC). The GOC would be initially contacted by two-way radio and/or field phone by range and hazardous waste storage buildings supervisors, the GOC in turn alerts the ERC who is responsible for channeling the needs for emergency assistance to the local agencies and services.

Fire Control, Spill, and Decontamination Equipment [40 CFR 264.32(c)]

Fire and spill equipment is available at the two firehouses located on HWAD. This equipment is listed in the Contingency Plan.

Decontamination of equipment is accomplished by washing and rinsing or disposal of equipment. To prevent fires from occurring, smoking is prohibited in the vicinity of explosives and flammable wastes and all flame-producing devices such as matches are removed from the RF-9, PODS, BEDS, hazardous waste storage buildings and the OB unit. Only non-sparking tools are used when working in the vicinity of explosive material.

WADF Area

Fires or explosions with any of the HWAD buildings handling flammable or explosive materials will be controlled and extinguished by built-in fire protection systems. These include sprinklers and deluge systems. The built-in systems will be activated automatically by heat sensors, but may also be activated manually. Fire extinguishers, hose reels, and hydrants are located at strategic locations in all buildings for use by on-site personnel. The ERT will provide the initial response to all indoor or small fires. Large fires will likely require the assistance of the Hawthorne Fire Department. ***No attempt is made to extinguish fires in explosive areas***. The HWCP contains an updated list of all emergency equipment at the facility used for response to unplanned releases of hazardous materials or wastes.

Hazardous Waste Storage Buildings

Fire fighting and spill equipment is available at the hazardous waste storage building. A list of this equipment is provided in the Contingency Plan. Additional equipment such as phones, vermiculite, absorbent pads, and other absorbents such as ―kitty litter" are also available at these buildings. A list of hazardous material spill response equipment available at HWAD is also provided in the Contingency Plan.

Old Bomb Unit

Firefighting equipment is available at Old Bomb during OB operations. The equipment consists of shovels, axes, and fire extinguishers that are filled and approved for use. Additional emergency equipment is stored at the HWAD Fire Department. This equipment includes respirators, protective clothing, fire extinguishers and first aid kits. It should be noted that fires generally would not be fought at the OB unit. Fire fighting efforts are precluded by the presence of unburned propellants. The only exceptions would be if required as part of a rescue effort or if a small fire occurs during operations which could be easily put out by hand-held tools. Firebreak roads are maintained to control fires.

Water Supply for Fire Control [40 CFR 264.32(d)]

The facility has fire hydrant located near most buildings on the plant property. Section C, Table C-5 and C-6 has the test data shown the fire hydrant pressure for the WADF Area. Sprinkler systems have been installed in buildings that may produce or accumulate hazardous materials, except for hazardous waste buildings and Old Bomb. Water is supplied to the sprinkler deluge systems through the conventional water supply. The water supply system at HWAD consists of seven (7) elevated storage tanks ranging in capacity from 30,000 – 100,000 gallons. There are seven storage reservoirs: Black Beauty with a capacity of 42 million gallons, Station Reservoir with a capacity of 450,000 gallons, two (2) ground level tank which can hold 500,000 gallons each, Cat Dam which can hold 50 million gallons, and Rose Creek 36 million. The working pressure of the water supply system is 60 – 110 psi. In the event of a power failure and extreme emergencies, water can be supplied directly from storage reservoirs in the nearby mountains. Should any deluge system be activated, the water is collected in sumps and transferred to 117-7, Process Water Treatment Facility. With addition protection a Mobile fire protection equipment is maintained at the two facility fire houses listed in Section C, Table C-3

Testing and Maintenance of Equipment [40 CFR 264.33]

Fire protection equipment, spill control equipment, and decontamination equipment is available for all locations on the HWAD where hazardous waste is located.

Aisle Space Requirements [40 CFR 264.35]

At the hazardous storage buildings, a minimum aisle space of 3 feet is maintained, providing adequate clearance for movement of personnel and spill control equipment. At the OB unit, burn pads are placed at least 150 feet apart, allowing unobstructed movement of personnel and fire protection equipment. All other facility must be accessible to fire and other emergency equipment standards for easy access at HWAD.

Contingency Arrangements and Coordination Agreements [40 CFR 264.37]

Agreements are made with Hawthorne Fire Department in case of a fire emergency. In addition, a copy of HWAD Hazardous Material/Waste Contingency Plan was provided to the County Sheriff's Department, Mount Grant General Hospital, County Fire Department, Local Emergency Planning Committee (LEPC), and local police are available to assist in controlling traffic on U.S. Highway 95 and State Highway 359 in the event of an emergency. Military support is also available by contacting AMCCOM Security.

The initial assessment of the emergency is made by the ERC. The ERC determines the potential hazard to human health/safety and the environment and decides on the type of emergency response; i.e., firefighting equipment, traffic control, medical treatment, isolation/evacuation requirement, spill containment/cleanup. (See Contingency Plan in subsection N for further action

PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT [40 CFR 270.14(b)(8)]

This section outlines procedures employed at HWAD to prevent hazards in unloading operations, runoff from hazardous waste management facilities and groundwater contamination. Procedures to mitigate equipment failure and power outages and reduce worker exposure to hazardous substances are also discussed.

Loading/Unloading Operations [40 CFR 270.14(b)(8)(i)]

Prior to any operation, the collection containers are inspected to ensure that adequate volume is available. During any operations, the containers are periodically inspected and replaced when they reach their capacity. During inspection and replacement, facility operators are required to wear protective equipment such as safety glasses and dust masks. When the collection containers are removed, they are sealed with top covers. The containers are inspected for possible corrosion or other defects prior to being used as collection containers and after being filled during operations. Defective containers are replaced. The filled, sealed, and inspected containers are then transported to the container storage facility. The air pollution equipment is constructed on concrete pads providing an electrical impervious base for the collection containers.

Prior to delivery to the container facility, all containerized wastes are inventoried and the source, quantity and type of waste documented on appropriate building logs and Manifest. The containers are marked, inventoried, and labeled. Any necessary samples required as part of the Waste Analysis Plan may be obtained at this time. Upon delivery to the container storage facility, building logs are exchanged and copies filed at the facility and the SOC Environmentalist's office. The material is logged into the building and placed into the appropriate area. The containers are then unloaded from the truck using a forklift and placed in the appropriate area of the storage facility.

PODS

The slag and baghouse dust from the PODS is collected in drum-type containers. Slag is drained batchwise from the PODS primary processing chamber (PPC). The baghouse collection container is positioned under the baghouse in the PODS' Air Pollution Control System where the fly ash material automatically drops into the drum during PODS operation. The baghouse dust collection drum is connected by large diameter flexible hoses equipped with covers design to fit snugly over the top of the drum to control fugitive dust emissions. The PODS is located within Building 117-2 and therefore does not experience any direct rainfall on the equipment.

APE 2210 (RF-9) Detonating Furnace

The ash and baghouse dust from the APE 2210 (RF-9) Detonating Furnace is collected in drum-type containers. These collection containers are positioned at four points of the furnace's Air Pollution Control System. The solid material automatically drops into the containers from the collection hoppers during furnace operation. The hoppers and collection containers are connected by large diameter flexible hoses equipped with covers design to fit snugly over the top of the containers. Properly positioned covers adequately control fugitive dust emissions or run-on from rainfall.

Hazardous Waste Storage Buildings

Waste sludges, spent activated carbon, and irreclaimable explosives are transferred into DOT - approved drums. Loading and unloading operations are conducted using forklifts. Strict procedures for inventory, documentation, labeling, inspection, and chain of custody for these wastes are conducted.

Unloading ramps are used at Buildings. Electric forklifts are used in all of the storage buildings in place of propane-powered forklifts to minimize any source of combustion. The forklifts are serviced annually. Various types of material handling equipment such as slings and barrel lifters are utilized and inspected annually by weight testing. Spill kits are located at Buildings 106-22, 106-23, and 115-9.

Old Bomb Unit

Motor vehicles and mobile heavy equipment used for transporting propellants/explosives meet the vehicle unloading requirements in the SOP on the OB unit for HWAD. Appropriate DOT/DOD explosive placards are displayed on the trucks prior to loading propellants/explosives.

Brakes are set and, if the vehicle is on a grade, both front and rear wheels are chocked. The wheels of trailers are chocked at all times when separated from the tractor. The vehicle(s) are turned off and propellants/explosives are loaded/unloaded on/from the truck(s).

All explosive and propellant containers are opened at least 10 feet from each other and from previously laid out material. Packages are opened only when the vehicle is out of the area. When the vehicle is completely unloaded, it is withdrawn from the area to a safe location until completion of the burning.

Items transported to the OB unit are packaged in containers of strength equal to or greater than those described in 49 CFR Part 173 Subpart C. Explosives and Blasting Agents; Definition and Preparation: Containers are transported to the OB unit in and loaded off at least 10 feet from the burn pan. All containers will be securely stowed to prevent movement during transport. During transport, propellants/explosives are handled with strict adherence to Army and U.S. DOT regulations. Transport vehicles are removed from the hazard area prior to opening the containers.

BEDS

Propellant Drums

At Building 117-4, solid propellant loaded in the specially designed drums is moved into the slurry feed preparation area through an airlock. A water spray is used in each step of the solids handling to wet the solids so as to avoid accidentally detonating the propellant.

Waste Stream Drums

The operation of BEDS will generate one primary waste stream from the baghouse discharge (see Figure X-1 of Section X, ―Process Information for BEDS"). This waste stream is composed of carryover ash from the rotary kiln and combustion chamber, calcium salts from the reaction of acidic gases such as SO_2 and HCl with hydrated lime, unreacted lime, and trace amounts of solids from the evaporative cooler. The waste stream will be collected in drum-type containers. The baghouse collection container is positioned under the baghouse in the BEDS Air Pollution Control System where the waste material automatically drops into the drum during BEDS operation/baghouse cleaning. The baghouse dust-collection drum is connected by large diameter flexible hoses equipped with covers designed to fit snugly over the top of the drums to control fugitive dust emissions. Negligible quantities of ash will be drained batchwise from BEDS rotary kiln, combustion chamber, and evaporative cooler as a maintenance activity.

Prior to BEDS operation, the collection containers are inspected to ensure that adequate volume is available. During extended operations, containers are periodically inspected when capacity is reached. During inspection and replacement, facility operators are required to wear protective equipment such as safety glasses and dust masks. When collection containers are removed, the containers are sealed with top covers. All containers are inspected for possible corrosion or other defects prior to being used as collection containers and after being filled during baghouse operations. Defective containers are replaced. The filled, sealed, and inspected containers are then transported to the container storage facility. BEDS air-pollution equipment is constructed on concrete pads providing an impervious base for the collection containers.

Runoff [40 CFR 270.14(b)(8)(ii)]

All of the facility's hazardous waste handling areas is located at least 8000 feet from the nearest installation boundary, so that any release, fire, or explosion will be contained well within the facility's confines. The HWAD should prevent runoff from the hazardous-waste handling areas to other areas within the facility or to the environment. In the unlikely event that runoff does occur, the installation's maintenance personnel are responsible for containment and cleanup of any contaminated water draining from the hazardous waste handling areas. Spill kits are readily available for cleanup and containment activities as necessary (see the HWCP, Appendix C, for additional details regarding cleanup and containment).

APE 2210 (RF-9) Detonating Furnace and PODS

The APE 2210 (RF-9) Detonating Furnace and PODS are constructed on impervious concrete pads with run-on curbing control and collection sumps. All efforts will be made to prevent runoff from hazardous waste handling areas to other areas within the facility or to the environment. The installation's maintenance personnel are responsible for containment and cleanup of any contaminated water draining from the hazardous waste handling areas. Straw, collection agents, and similar materials are readily available for cleanup and containment activities as necessary (see the HWCP) for additional details regarding cleanup and containment.

Hazardous Waste Storage Buildings

The container storage buildings are enclosed structures. The buildings are also elevated approximately 4 feet aboveground level. No runoff is expected from the immediate storage area. Possible spills of free liquids which may occur within the buildings are controlled by the containment system described in Section M.

Old Bomb Unit

The burn pans are covered during nonoperational periods. During periods of precipitation or flooding, OB operations are halted. Hence, there is no potential for hazardous waste runoff from Old Bomb.

BEDS

The BEDS feed-handling system will be housed inside Building 117-4 and the propellant slurry-tank system will be equipped with a secondary-containment system that excludes runoff (see Section X-2g). The rotary kiln, combustion chamber, and the pollution abatement system will be located on concrete pads near the building. The area where slurry is transferred from the slurry-recirculation loop to the incinerator is surrounded by a 6-inch high curb. The curbed area drains into a process sump.

Water Supplies [40 CFR 270.14(b)(8)(iii)]

Hazardous waste storage facilities containing free liquid wastes are constructed on impervious concrete bases sealed with a coating. This prevents contamination of the surrounding soils and groundwater. There are no pathways by which spilled wastes could reach and contaminated water supplies. Backflow prevention devices are installed throughout the industrial side of HWAD. The loading docks and WADF are also protected by these devices as are all of the clear water systems and the fire protection systems.

The procedures summarized in the previous paragraphs have been outlined in greater detail in the SOP's of the operations and the HWCP. These procedures are designed to prevent contamination of water supplies through prompt and effective response to any spills or releases or hazardous substances. A copy of the current SOP's are maintained at these facilities.

Equipment and Power Failure *[40 CFR 270.14(b)(8)(iv)]*

Communications during power failures are maintained by field telephones and radios with independent battery power supplies. These are operated by security and key operations personnel. In case a truck breaks down and cannot be towed to its destination, a two-man guard will be stationed at the truck site. HWAD will dispatch a truck at once with loading personnel to transfer the load to a replacement vehicle.

WADF Area

Enclosed facilities at WADF (Buildings 117-2, 117-3, 117-4, and 117-7) have emergency lighting systems that are activated automatically during power failures.

Hazardous Waste Storage Buildings

HWAD the hazardous waste storage buildings do not have a source of electrical power. Communications during power failures are maintained by two-way radios with independent battery power supplies and cellular phones, operated by security and key operations personnel.

Old Bomb Unit

Power outages and lightning strikes are not anticipated to be a cause of problems at the OB site. OB operations do not require an outside source of electric or other power; therefore, the facility is not subject to power failures.

The meteorological monitoring station installed at the Old Bomb area has been provided with solar power and a rechargeable battery and would not be impacted in the event of a power outage.

Personnel Protection Equipment *[40 CFR 270.14(b)(8)(v)]*

Personnel working at all HWM facilities are instructed in the proper use of personal safety equipment such as safety glasses, respirators, dust masks, gloves, head protection, footwear, and protective coveralls. First aid equipment and hand-held fire extinguishers are readily available at all enclosed facilities and on vehicles used to transport wastes.

BEDS

Hazardous operations at BEDS are remotely controlled from the Control Room while being viewed from closed circuit television cameras.

PODS

Hazardous operations at the PODS are remote controlled while being viewed from the control observation windows.

APE 2210 (RF-9) Detonating Furnace

Hazardous operations at the APE 2210 (RF-9) Detonating Furnace are remote controlled using closed-circuit television to minimize direct hazards to personnel. All operating personnel at the APE 2210 (RF-9) Detonating Furnace building (Building 117-3) are required to wear conductive-soled safety shoes or boots, safety glasses with side shields, and fire retardant coveralls. Conductive-soled shoes are checked every work shift to determine conductivity. Conductive rubber floor mats are also located around munitions handling stations.

Hazardous Waste Storage Buildings

Personnel involved at all hazardous waste storage buildings are provided and instructed in the proper use of personal safety equipment such as safety glasses, respirators and dust masks, gloves, head protection, footwear, and protective coveralls. First aid equipment and handheld fire extinguishers are readily available at all enclosed facilities and on vehicles used to transport wastes. Required PPE is specified in the Internal Operating Procedure IOP for waste handling operations. This IOP is included as Appendix A. Additional equipment may be required by a specific SOP for a particular propellant/explosive item.

Old Bomb Unit

Operators are grounded to the metal pans during the time they are handling exposed smokeless powder and placing ignition system in the burn pan. The use of respirators is determined by the SOC Safety Office in case dusts, vapors, and gases are present. All personnel at the OB unit will be inside a safety bunker prior to burning of propellants and explosives.

Releases to the Atmosphere [40 CFR 270.14(b)(8)(vi)]

Fugitive emissions from containers are prevented by properly positioning covers that fit snugly over the top of the containers. Releases to the atmosphere are minimized by controlling the types and quantities of wastes treated by OB as described in Section I.

Emergency Shutdown Controls and System Alarms [40 CFR 265.377(a)(3)]

In case of an emergency, communications between personnel at the hazardous waste storage buildings and Guard Operations Center (GOC) are through fixed phones or two-way radio. In addition, a pull alarm is present at Building 108-3. Alarms are not present at the OB unit; communications are through two-way radio. No shutdown controls exist, since once a fuze is initiated in stopping the imminent reaction poses a serious safety hazard to the personnel involved.

PREVENTION OF ACCIDENTAL IGNITION OR REACTION OF WASTE [40 CFR 270.14(b)(9) and 264.7(a)]

HWAD generates, stores, treats, and tests a variety of ignitable, reactive, and incompatible (IRI) wastes. See Waste Analysis Plan (WAP) for waste generated in the WADF area.

PODS

General Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Wastes *[40 CFR 264.17]*

- As required by 40 CFR 270.14(b)(9) and 264.17(a) & (b), the following precautions are observed when managing ignitable or reactive wastes at the PODS. These precautions are taken to prevent accidental ignition or reaction of ignitable or reactive wastes. The wastes are waste propellants, explosives, or pyrotechnics (PEP).
- No flame-producing devices (e.g. matches, cigarette lighters) are allowed within PEP waste treatment areas. Signs indicating this are conspicuously placed in all areas where there is a hazard from PEP wastes. A Security Guard stops each vehicle entering the Ammunition Area and requests all flame producing devices in the vehicle.
- The PEP wastes are shielded from direct sun.
- The PEP wastes are handled in accordance with the requirements of the following Army standards:
  - DoD 4145.26-M, Dod Contractor's Safety Manual for Ammunition and Explosives
- These standards outline specific procedures and practices that are put into place to prevent energetic material emergencies. These are specific quantity/distance relationships that apply to the PEP wastes handled at the PODS.
- The probability of a massive explosion occurring in the PODS is low. The system is designed, however, so the effect of a massive explosion within the PODS PPC is minimized; the systems' enclosure is designed to reduce the explosive effects of a massive explosion in the system to acceptable personnel exposure levels. In addition, shielding will be employed as necessary in accordance with the approved site plan. Note that minor detonations or ―pops" are normal when incinerating certain items i.e. primers, small arms, or fuzes.

General Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste *[40 CFR 264.17(b)]*

1. Normal operating procedures minimize the risk of initiation of the PEP.
2. Heat or spark-producing, electrically powered (not approved for hazardous locations) tools or impact tools required for maintenance are permitted in the facility only with written permission.

3. All electrical equipment is appropriately classified for the operational area. All electrical equipment is grounded and periodically tested for continuity and resistance to ground. Electrical equipment is in accordance with the above referenced Army Safety Manual (which in turn references the National Electrical Code, NFPA-70) requirements.
4. The techniques and procedures used to prevent accidental ignition or explosion at the facility are documented by knowledge of the PEP to be incinerated and over 70 years of experience accumulated by the U.S. Army in the handling and demilitarization of such materials.

Management of Ignitable or Reactive Wastes in Containers *[40 CFR 264.146]*

In addition to the general precautions for PEP wastes discussed above, requirements specific to management of PEP wastes in containers are as follows:

- The PEP wastes are delivered to the incinerator facility in containers approved in accordance with DoD 4145.26-M and the installation SOPs.
- The containers are constructed of non-sparking or other materials approved for the application.
- Non-compatible PEP wastes are not transported in the same container.

Management of Incompatible Wastes in Containers *[40 CFR 264.177]*

- Incompatible wastes are segregated (never place in the same container). Containers from any process are transported directly to their approved hazardous waste storage locations which provide continued segregation and control. All processing facilities at WADF; except 117-2, are equipped with steam cleaning stations which are utilized to clean containers prior to their use. This ensures that containers that may have contained incompatible waste generated at another location or process have been thoroughly cleaned and inspected. The PODS process at 117-2 will not utilize used containers; hence, there will not be a need for steam cleaning stations there.
- Hazard Classification/Compatibility. Selected text from DoD 4145.26-M is in Appendix B.
- Construction of AR 385-100 approved containers for PEP waste are required to meet the following requirements:
  A. Containers for Ammunition and Bulk High Explosives.
     Ammunition will be packed in accordance with approved AMC drawings that comply with DOT regulations.

APE 2210 (RF-9) Detonating Furnace

General Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Wastes *[40 CFR 264.17]*

As required by 40 CFR 270.14(b)(9) and 264.17(a) & (b), the following precautions are observed when managing ignitable or reactive wastes at the APE 2210 (RF-9) Detonating Furnace RF-9. These precautions are taken to prevent accidental ignition or reaction of ignitable or reactive wastes. The wastes are waste propellants, explosives, or pyrotechnics (PEP).

1. No flame-producing devices (e.g. matches, cigarette lighters) are allowed within PEP waste treatment areas. Signs indicating this are conspicuously placed in all areas where there is a hazard from PEP wastes. A Security Guard stops each vehicle entering the HWAD Storage Area Ammunition Area and requests for all flame producing devices in the vehicle.
2. Non-sparking tools (e.g. aluminum, brass, beryllium, or wood) are used when handling the wastes.
3. The PEP wastes are shielded from direct sun.
4. The PEP wastes are handled in accordance with the requirements of the following Army standards:
   (1) AMCR 385-100, Safety Manual, dated 1 August 1985.
   (2) AR 385-64, Ammunition and Explosives Safety Standards, dated 22 May 1987.

   These standards outline specific procedures and practices that are put into place to prevent energetic material emergencies. These are specific quantity/distance relationships that apply to the PEP wastes handled at the APE 2210 (RF-9) Detonating Furnace.
5. The probability of a massive explosion occurring in the APE 2210 (RF-9) unit Detonating Furnace is low. However, the system is designed, however, so the effects of a massive explosion within the furnace are minimized; the system's enclosure is designed to reduce the explosive effects of a massive explosion in the system to acceptable personnel exposure levels. Note that minor detonations or ―pops" are normal when incinerating certain items i.e. primers, small arms, or fuzes.
6. Materials are fed into the retort by an automated feed system which isolates the feed area from propagation in case an explosion in the retort. The furnace feed system has two major components; weigh scale with transfer device, and a two section metal belt conveyor. These are controlled by the APE 2210 (RF-9) Detonating Furnace system programmable controller. An item identification code is entered at the scale at the start of a run. This code programs the feed system, and prevents feeding the items faster than the approved and tested feed rate. The items are loaded

into the scale, weighed, and transferred onto the first conveyor section. This section elevates the items to the second section. The second section feeds the items into the furnace feed chute. The first conveyor section stops during emergency conditions, or upon operator signal to prevent overfeeding the system. The second conveyor section adjacent to the retort runs continually when the retort is operating, thus precluding accumulation of ignitable materials on the conveyor where they may be exposed to excessive heat from the retort.

7. Periodic conductivity tests of safety shoes and calibration checks of the Conductive Shoe Tester are performed as specified by the area supervisor in the instructions posted at the site of the testing.

General Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste *[40 CFR 264.17(b)]*

1. All PEP waste materials treated or disposal of the APE 2210 (RF-9) Detonating Furnace are segregated by type and protected from open flame, smoking, cutting and welding areas, hot surfaces, friction heat, sparks (static, electrical, or mechanical), or radiant heat. The wastes are incinerated only in the controlled and contained environment within the RF-9.
2. Normal operating procedures minimize the risk of initiation of the PEP. Sparks are avoided at the facility by requiring all of the operating personnel to wear conductive shoes and stand on conductive mats when feeding PEP wastes.
3. Heat or spark-producing, electrically powered (not approved for hazardous locations) tools or impact tools required for maintenance are permitted in the facility only with written permission.
4. All electrical equipment is appropriately classified for the operational area. All electrical equipment is grounded and periodically tested for continuity and resistance to ground. Electrical equipment is in accordance with the above referenced Army Safety Manual (which in turn references the National Electrical Code, NFPA-70) requirements.
5. The techniques and procedures used to prevent accidental ignition or explosion at the facility are based on specific documented by information knowledge of the PEP to be incinerated and over 70 years of experience accumulated by the U.S. Army in the handling and demilitarization of such materials.
6. The feed rates for the PEP are carefully developed through extensive, controlled testing. These approved rates are documented in the Incinerator Manual and SOPs. Feed rate for a specific item

is programmed at the feeder scale controls. The programmable controller prohibits the operators from feeding the PEP faster than the allowable, preset rate.

Management of Ignitable or Reactive Wastes in Containers *[40 CFR 264.17]*

In addition to the general precautions for PEP wastes discussed above, requirements specific to management of PEP wastes in containers are as follows:

1. The PEP wastes are delivered to the incinerator facility in containers approved in accordance with AMC-R 385-100 and the installation SOPs.
2. The containers are constructed of non-sparking or other materials approved for the application.
3. The PEP waste containers shall have one or more of the following identification.
   a. Ignitable hazardous waste
   b. Reactive hazardous waste
4. Non-compatible PEP wastes are not transported in the same container.

Management of Incompatible Wastes in Containers *[40 CFR 264.177]*

1. Incompatible wastes are segregated (never place in the same container). Containers from any process are transported directly to their approved hazardous waste storage locations which provide continued segregation and control. All processing facilities at WADF are equipped with steam cleaning stations which are utilized to clean containers prior to their use. This ensures that containers that may have contained incompatible waste generated at another location or process have been thoroughly cleaned and inspected.
2. Hazard Classification/Compatibility Groups (AMC-R 385-100) shown in Section C, Table C-4 are utilized to segregate incompatible wastes.
3. Construction of AMC-R 385-100 approved containers for PEP waste are required to meet the following requirements:
   A. Containers. Hazardous materials in bulk or liquid form must be transported in containers which will prevent leakage. Containers used in intraplant transportation and service storage of explosives and explosives mixtures such as initiating explosives, pyrotechnic compositions, and tracer materials should be made of material in the following order of preference:
      Conductive rubber.
      Plastics (conductive type only).

Nonferrous metal-lined boxes without seams or rivet heads under which explosive dust can accumulate.

Fiber drums.

Fiber drums (DOT 21C) of bulk explosives and propellants should be shipped only by motor carrier or trailer-on-flat car. Glass containers should not be used because of their fragility and severe missile hazard.

B. Black Powder Containers.

a. Standard containers for black powder are built in accordance with drawings that meet DOT specifications.
b. When black powder is shipped or received, each container shall be inspected for holes and weak spots, particularly holes made by small nails and which are visible only upon close examination. Damage containers must not be repaired; the contents shall be transferred to new or serviceable containers.
c. Empty black powder containers may be reused and may be transported empty provided they are clean. Empty metal containers which are not to be reused and will be salvaged shall be thoroughly washed inside with water.
d. Black powder containers must be carefully opened. When it is necessary to open containers by punctu15ring, the operation will be conducted by remote control.

C. Containers for Solid Propellants.

a. Solid propellants shall be packed in accordance with approved Army Material Command (AMC) drawings that comply with DOT regulations.
b. Double-based solid propellants, single-perforated solid propellants, and all-solid propellants with web thickness not greater than 0.019 inch should not be packed in all-steel boxes. Metal lined wooden boxes should be used.
c. Unstable, condemned, or deteriorated solid propellant must be packed submerged in water, in containers meeting requirements of 49 CFR.

D. Containers for Ammunition and Bulk High Explosives.

a. Ammunition and bulk high explosives shall be packed in accordance with approved AMC drawings that comply with DOT regulations.
b. Containers used for packing bulk high explosives should be lined with strong cloth or paper bags or liners with cemented seams to prevent sifting.

4. Location of incoming materials to be thermally treated at the RF-9 from WADF for immediate processing and location of temporary storage of materials for subsequent processing received from storage magazines.

Hazardous Waste Storage Buildings

Some ignitable and all reactive hazardous wastes that are managed at HWAD consist of explosive materials from the production and demilitarization of ammunition and explosive ordnance items. The processes and operations at HWAD are designed with precautions to prevent accidental ignition or reaction of these explosive materials. Cutting (other than as part of demilitarization machine operation) and welding are not permitted within process areas while explosive materials are present. All production and demilitarization areas are designated nonsmoking areas marked by conspicuously marked signs. During munitions processing, all equipment is grounded to prevent the transfer of electrostatic charges to the munitions, and all personnel are required to wear conductive shoes.

Standardized safety procedures and equipment are incorporated into all HWAD operations involving reactive materials and wastes to prevent ignition or reaction of wastes. Conveyors and vehicles used for transport of explosive materials and munitions incorporate stops, interlocks, and guardrails to prevent accidents involving munitions or containers.

A detailed description of the fire protection system is provided in the Contingency Plan.

No incompatible wastes are stored in the same containers. Incompatible wastes, such as acids and bases stored in the same building, are separated by bermed areas to ensure safety. Strict operating procedures restrict the mixing of any wastes, and as no hazardous waste containers are reused at the facility, the containment, characterization, and storage of wastewater is not required.

Old Bomb Unit

All hazardous materials and hazardous waste handled at the OB unit are assumed to be reactive. Non-reactive wastes are not treated at this facility. All personnel working in the OB operation take all appropriate measures to prevent incidents that:

- Generate uncontrolled extreme heat or pressure, fire or explosions, or violet reactions;
- Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment;
- Produce uncontrolled inflammable fumes or gases in sufficient quantities to pose a risk of fire or explosion; and
- Through any other means, threaten human health or the environment.

OB operations generate heat, pressure (shock waves), explosion, and violent reactions. The intent of the OB operations is to initiate these phenomena in a controlled setting.

The means to prevent unintended reactions is provided through the establishment of safety guidelines implemented through the HWAD SOPs. As summarized below, the safety guidelines include, but are not limited to, the following:

- Unauthorized ignition sources such as flame-producing devices are prohibited on site at any time
- Sparking equipment and tools are prohibited from use near explosive materials unless specifically authorized by the Range Supervisor
- All hand tools and mechanical devices are inspected prior to use to ensure their safety
- OB operations cease during inclement weather
- The material is protected against accidental ignition or explosion from fragments, grass fires, burning embers, or the impulse associated with materials being burned
- Dry grass, leaves, and flammable/combustible materials are removed from the OB unit
- Engines of transport vehicles are turned off prior to unloading propellants/explosives at the OB unit
- Propellants are not exposed to high temperatures and direct sunlight for any length of time
- Containers of propellants are not tumbled, dragged, thrown, dropped, rolled, or struck against each other

These SOPs are in use at various DOD open burning operations throughout the country. Experience has shown that, when followed, the danger of accidental detonation or combustion is negligible.

BEDS

PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTES [40 CFR 270.14(b)(9)]

HWAD generates, stores, treats, and tests a variety of ignitable, reactive, and incompatible (IRI) wastes (see ―Waste Analysis Plan [WAP]" in Appendix B). Most of the materials that will be treated at BEDS are considered RCRA hazardous waste due to their reactivity (EPA Waste Code D003). Some may also be hazardous because of lead toxicity (EPA Waste Code D008) resulting from the presence of lead carbonate in their formulation (see Section W, ―Waste Feed Characteristics for BEDS").

General Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Wastes [40 CFR 264.17]

As required by 40 CFR 270.14(b)(9) and 264.17(a) & (b), the following precautions are observed when managing ignitable or reactive wastes at BEDS. These precautions are taken to prevent accidental ignition or reaction of ignitable or reactive wastes. These wastes are waste propellants and explosives.

1. No flame-producing devices (e.g., matches, cigarette lighters) are allowed within the area where WADF is located, unless specially permitted. Signs indicating this are conspicuously placed in all areas. A security guard stops each vehicle entering WADF to inspect and remove, if necessary, all flame producing devices in the vehicle.
2. The energetics wastes are handled in accordance with the requirements of Army standard DoD 4145.26-M, DoD Contractors—Safety Manual for Ammunition and Explosives. This standard outlines specific procedures and practices that are put into place to prevent energetic material emergencies. There is specific quantity/distance relationships that apply to the energetics wastes handled at BEDS.
3. The probability of a massive explosion occurring in BEDS is low. However, Building 117-4 is specially designed with thick concrete walls and blast walls so the effects of a massive explosion within the system would be minimized. Furthermore, the system's enclosure is designed to reduce explosive effects of a massive explosion to acceptable personnel exposure

levels.

General Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Wastes [40 CFR 264.17(b)]

1 Normal operating procedures minimize the risk of initiation of the energetics.

2 Heat- or spark-producing, electrically-powered tools (not approved for hazardous locations), or impact tools required for maintenance, are allowed in the facility only with written permission.

3 All electrical equipment is appropriately classified for the operational area. All electrical equipment is grounded and periodically tested for continuity and resistance to ground. Electrical equipment is in accordance with the above referenced Army Safety Manual (which in turn references the National Electrical Code, NFPA-70) requirements.

4 Techniques and procedures used to prevent accidental ignition or explosion at the facility are documented by knowledge of the energetics to be incinerated and over 70 years of experience accumulated by the U. S. Army in the handling and demilitarization of such materials.

Management of Ignitable or Reactive Wastes in Containers [40 CFR 264.176]

In addition to the general precautions for energetics wastes discussed above, requirements specific to management of energetics wastes in containers are as follows:

1. Energetics wastes are delivered to the incinerator facility in containers approved in accordance with DoD 4145.26-M and the installation SOPs.
2. Containers are constructed of either non-sparking or other materials approved for the application.
3. Incompatible energetics wastes are not transported in the same container.
4. Energetics wastes will not be stored in solid form at BEDS. Upon arrival at BEDS these materials will be processed into a slurry consisting of 25 percent by weight bulk
5. propellant and 75 percent water. This slurry does not have the characteristic of reactivity (see Section X-2j).
6. Energetics will not be stored within 50 feet of the property line. The location of Building 117-4/BEDS is well beyond the 50-foot limit from the property line of the facility.

Management of Incompatible Wastes in Containers [40 CFR 264.177]

Incompatible wastes are segregated (never placed in the same container). Containers from any process are transported directly to the approved hazardous-waste storage locations which provide continued segregation and control. Recycled containers are cleaned prior to use. This ensures that containers that may have contained incompatible waste generated at another location or process have been thoroughly cleaned and inspected. The BEDS process at 117-4 will utilize specially designed containers, which will further reduce the possibility of mixing incompatible wastes. Hazard Classification/Compatibility. Selected text from DoD 4145.26-M is in Appendix B

TABLE C-2: COMMUNICATIONS EQUIPMENT

RADIO NET	EQUIPMENT	LOCATION (IF KNOWN)
Base Telephone System	Standard Telephones	All buildings where H emergency could occur
AAG81, Guard Operations M139, 425	1 Base station 2 Remotes 31 Handi talkies	Guard and Emergency Operations Center 6 at Electronic Shop
AAG842, M139.075	1 Base station 12 Mobile units	
AAG843, M140.82	1 Base station 29 Mobile units 6 Handi talkies	
AAG844, M149.01	4 Base stations 7 Mobile units 5 Handi talkies	
AAG845, M139.375	1 Base station 2 Remotes 12 Handi talkies 24 Pagers	Building 5 and Guard Operations Center

TABLE C-3: MOBILE FIRE PROTECTION AND EMERGENCY EQUIPMENT

EQUIPMENT TYPE	SIZE OR AVAILABILITY	LOCATION
Fire engine #1	750 gpm	Firehouse #2
Fire engine #2	750 gpm	Firehouse #1
Fire engine #4	750 gpm	Firehouse #2
Fire engine #5	750 gpm	Firehouse #1
Mini-brush pumper	400 gal	Firehouse #1
Aerial ladder truck	85 feet	Firehouse #1
Ambulances	2 each	Firehouse #1
Pickup trucks	2 each	Firehouse #1
Gas/chemical rubber suits	6 sets	Firehouse #1 & #2
Air masks and tanks	27 sets	Firehouse #1 & #2
Regular protective clothing	25 sets	Firehouse #1 & #2

AMC-R-100

TABLE C-4 HAZARD CLASSIFICATION/COMPATIBILITY GROUPS

ITEMS	SCG	CLASS 1 DIVISION
1. Initiating explosives.	A	1
2. Detonators and similar initiating devices.	B	1, 2, or 4
3. Bulk propellants, propellant propelling charges, and devices containing propellant with or without means of ignition.	C	1, 2, 3, or 5
4. Black powder, high explosives, and HE ammunition without its own means of initiation and without a propelling charge.	D	1 or 2
5. HE ammunition without its own means of initiation, with or without a propelling charge.	E	1 or 2
6. HE ammunition with its own means of initiation, with or without a propelling charge.	F	1 or 2
7. Fireworks and illuminating, incendiary, smoke or tear producing ammunition or other than ammunition that is activated by exposure to water or the atmosphere.	G	1, 2, 3, or 4
8. Ammunition containing white phosphorus or other pyrophoric material, with or without explosives.	H	2 or 3
9. Ammunition containing flammable liquids, liquids, or gel fillers with or without explosives.	J	2 or 3
10. Ammunition containing toxic chemical agents with explosives.	K	2
11. Ammunition, not included in other groups, requiring separate storage.	L	1, 2, 3, or 4
12. Ammunition which presents no significant hazards.	S	4 or None
13. Ammunition or bulk containers containing toxic chemical agents without explosives.	K	Class 6, Division 1

Table C-5 Fire Hydrant Test Data

Fire Hydrant Test Data – Bldg # 117-2
1215 (out of service)
1216 (out of service)

HYD #	STATIC	RESID	DROP	RESID	TIP	GPM	GPM @ 20PSI	GPM @ 0
1225	125	60	25	60	2.5	1294	2866	3194
LAST PM DATE: 01/11/01								
1226	125	60	25	60	2.5	1294	2866	3194
LAST PM DATE: 01/11/01								

Fire Hydrant Test Data – Bldg # 117-3

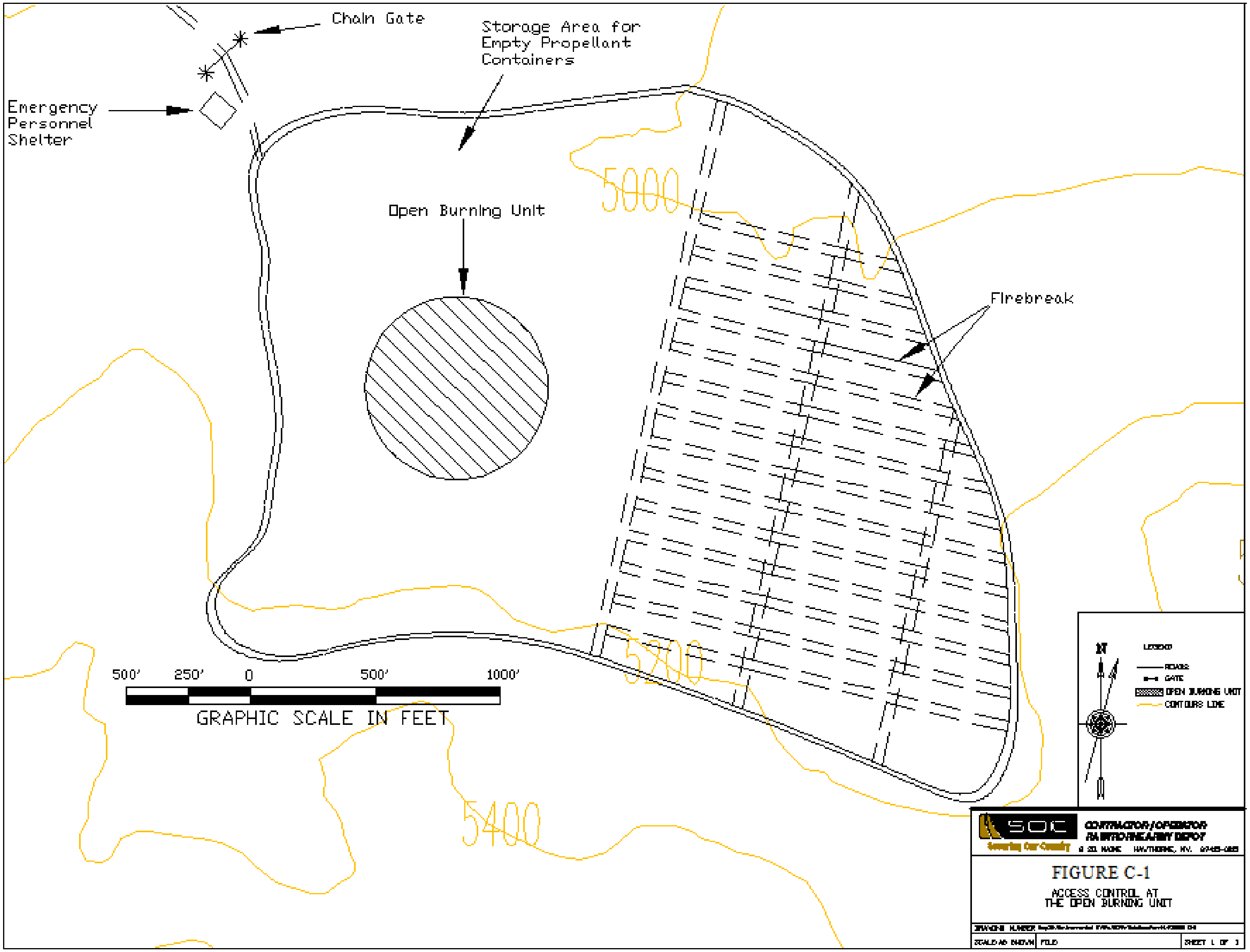
HYD #	STATIC	RESID	DROP	RESID	TIP	GPM	GPM @ 20PSI	GPM @ 0
1213	110	60	25	60	2.5	1294	2866	3149
LAST PM DATE: 04/15/00								
1214	110	90	25	90	2.5	1585	2866	3149
LAST PM DATE: 04/15/00								

Fire Hydrant Test Data: - Bldg # 117-1

HYD #	STATIC	RESID	DROP	RESID	TIP	GPM	GPM @ 20PSI	GPM @ 0
1212	125	90	25	90	2.5	1584	2866	3194
LAST PM DATE: 04/15/00								

TABLE C-6 FIRE HYDRANT TEST DATA

BLDG. No.	HYD. No.	LAST PM DATE	STATIC	RESID	DROP	RESID	TIP	GPM	GPM @ 20 PSI	GPM @ 0 PSI
117-2	1215	OUT OF SERVICE								
117-2	1216	OUT OF SERVICE								
117-2	1225	03/07/03	125	60	25	60	2.5	1294	2866	3194
117-2	1226	01/11/01	125	60	25	60	2.5	1294	2866	3194
117-3	1213	03/07/03	130	60	25	60	2.5	1294	2866	3149
117-3	1214	04/15/00	110	90	25	90	2.5	1585	2866	3149
117-1	1212	03/07/03	130	90	25	90	2.5	1584	2866	1764
117-4	1209	03/07/03	140	75	65	60	2.5	1446	3475	3780
117-4	1210	03/07/03	140	65	75	60	2.5	1346	3475	3780


Chain Gate
Storage Area for
Empty Propellant
Containers
Emergency
Personnel
Shelter
Open Burning Unit
Firebreak
5000
5200
5400
500' 250' 0 500' 1000'
GRAPHIC SCALE IN FEET
FIGURE C-1
ACCESS CONTROL AT
THE OPEN BURNING UNIT

SECTION D. DOCUMENTATION OF COMPLIANCE FOR MAIN BASE

DOCUMENTATION OF COMPLIANCE WITH MANIFEST SYSTEM, RECORDKEEPING, AND REPORTING REQUIREMENTS [*40 CFR 264.70*]

The provisions of 40 CFR Part 264 Subpart E, Manifest System, Recordkeeping, and Reporting, are not specifically identified in the 40 CFR Part 270 as information requirements for a Part B permit. Permit applicants are not required to submit this material to demonstrate compliance with the Part B permit application, but failure to comply with the Subpart E requirements is a violation of any permit that may be issued.

The regulations of Subpart E apply to owners and operators of both off-site and on-site facilities. Off-site facilities are facilities that receive hazardous wastes generated off-site for treatment, storage, or disposal. On-site facilities are facilities that do not receive hazardous wastes from other generators for treatment, storage, or disposal, but that treat, store, or dispose of hazardous wastes generated within their own facility only. Sections 264.72 (Manifest Discrepancies) and 264.76 (Unmanifested Waste Report) do not apply to owners and operators of on-site facilities that do not receive any hazardous waste from off-site sources. Sections 264.71 (Use of Manifest System), 264.73 (Operating Record), 264.74 (Availability, Retention and Disposition of Records), 264.75 (Biennial Report), and 264.77 (Additional Reports) apply to both on-site and off-site facilities and compliance with these sections is presented in the following sections.

Thus, for hazardous wastes generated on-site and treated or stored on-site, HWAD is not required to meet the manifest standards of 40 CFR Part 262. For hazardous wastes generated on-site and shipped off-site for treatment, storage, or disposal, HWAD complies with the manifest standards of 40 CFR Part 262 and the applicable provisions of 40 CFR Part 264 Subpart E. HWAD also complies with the land disposal restrictions of 40 CFR Part 268 regarding restrictions on land disposal of specific wastes, including the waste analysis and recordkeeping provisions of 40 CFR 268.7.

Manifest Handling Requirements [40 CFR 264.70(c)]

The procedures used at HWAD for manifest handling of hazardous wastes shipped off-site for treatment, storage, or disposal are as follows:

1. When hazardous wastes are shipped from HWAD, an agent of the owner or operator of the facility prepares the manifest for shipment. The manifest is prepared using EPA Form 8700-22 Rev. 3-05 and 8700-22A Rev. 3-05 (if necessary). The manifest contains the following information:
   a. Name and address of facility authorized to handle the waste described on the manifest, and the EPA number must be filled in block 8. An alternate authorized facility may also be designated for use if an emergency prevents delivery of the waste to the primary designated facility.
   b. Generator's name, mailing address, and telephone number.
   c. Generator's EPA ID Number.
   d. Transporter's company name and EPA ID Number.
   e. United States Department of Transportation (DOT) description (shipping name, hazard class, ID number, and packing group) of the wastes being shipped under the manifest; a description of the number and type of containers, total quantity of that waste, and the quantity units; handling codes for the wastes, and additional descriptions or special instructions for the wastes.

2. The owner/operator (SOC Nevada LLC) or an agent of the owner/operator (Department of the Army) signs and dates the generator certification on the manifest and returns a signed comeback copy of the manifest to the generator within 45 days. The transporter(s) of the wastes also sign and date the acknowledgment of receipt of the wastes, and the owner/operator of the facility receiving the wastes for treatment, storage, or disposal indicates any discrepancies in the manifest and signs and dates the manifest to indicate receipt of the wastes. If significant discrepancies are noted, they must be satisfactorily resolved within 15 days, or a letter indicating the discrepancies and attempts to resolve them, together with a copy of the manifest, must be forwarded to regulatory authorities by the owner/operator of the receiving facility.

3. Wastes that are restricted under 40 CFR Part 268 (Land Disposal Restrictions), a notification to the treatment, storage, or disposal facility is included. The notification includes (in addition to items listed above) the manifest number, the Environmental Protection Agency (EPA) Hazardous Waste Number and corresponding treatment standard and all applicable prohibitions contained in 40 CFR 268.32 or Section 3004(d) of RCRA, and any available waste characterization data. If the waste is restricted under 40 CFR Part 268, but can be land disposed without further treatment, a certification identifying the applicable restriction and stating that the applicable treatment standard or prohibition levels have been met will be included. Similarly, for wastes that are subject to treatment standards, technology standards, maximum concentration standards, or other requirements prior to disposal or further management at an off-site facility, certifications consistent with the provisions of 40 CFR 268.7 will be provided, and appropriate notifications will be made.

   If the wastes are subject to a case-by-case extension under 40 CFR 268.5, an exemption under 40 CFR 268.6, or a nationwide variance under 40 CFR Part 268 Subpart C, the notification will include (in addition to items listed above) the date that the prohibitions will apply to the waste.

Operating Record [*40 CFR 264.73*]

HWAD maintains an operating record for hazardous waste management. The following information is compiled and maintained as a part of the operating record:

1. Records of locations of wastes within the facility (see Sections F for locations of waste generation, treatment, and storage at the facility).
2. Records of waste analyses results (see Section F for additional documentation on waste analyses).
3. Records related to implementation of the contingency plan (see Section B for additional documentation related to the Hazardous Waste Contingency Plan). The contingency plan is included in Appendix C.
4. Inspection records for hazardous waste units or facilities within the installation (see Section C.
5. Monitoring and operating records for the PODS.

6. Monitoring and operating records for the RF-9.
7. Certification of waste minimization, as required by 40 CFR 264.73(b)(9) See Appendix D.
8. A copy of the notice and certification, and demonstration (if applicable), required by 40 CFR Part 268, of generators or of owners and operators of on-site storage and treatment facilities (see next paragraph for additional details on recordkeeping and record retention).
9. For wastes subject to the land disposal restrictions of 40 CFR Part 268, all supporting data, waste analyses, notices, certifications, demonstrations, and other supporting documentation, as required by 40 CFR 268.7(a)(5) (see next paragraph for additional details on recordkeeping and record retention).

Availability, Retention, and Disposition of Records [*40 CFR 264.74*]

All records required as a part of the operating record (see above) will be retained until the facility is closed, with the exception of inspection records. Inspection records are retained for a minimum of three years from the date of inspection, unless direction is received from regulatory authorities to retain them for a longer period. Records are available for regulatory agency inspection. Copies of the following records will be submitted to local land authorities upon closure of the facility:

1. A description and the quantity of each hazardous waste generated at the PODS and the methods and dates of its treatment.
2. A description and the quantity of each hazardous waste generated at the RF-9 and the methods and dates of its treatment.
3. Records and results of waste analyses
4. Summary reports and details of all incidents that require implementation of the Hazardous Waste Contingency Plan (HWCP)
5. Records and results of inspections for the final three years of operation before closure
6. Records of monitoring, testing, or analytical data
7. For wastes subject to the land disposal restrictions of 40 CFR Part 268, all supporting data, waste analyses, notices, certifications, demonstrations, and other supporting documentation, as required by 40 CFR 268.7(a)(5), will be retained for a minimum of five years from the date that the wastes that were the subject of such documentation were last routed to on-site or off-site treatment, storage, or disposal.

Biennial Report [*40 CFR 264.75*]

A biennial report is prepared by HWAD on the EPA form provided and is submitted to the State of Nevada by March 1 of each even-numbered year. The biennial report includes the following information:

1. A description of facility activities during the previous calendar year, and an identification of the calendar year covered by the report
2. The EPA ID Number, name, and address of the facility and the name of the facility contact
3. A description of wastes generated during the previous calendar year, including waste hazard ID number and quantities of wastes generated, the method of treatment handling method for the wastes, and the units of measure for quantities of wastes
4. Comments and additional information requested to be supplied by the regulatory agency

The biennial report certification is signed and dated by an authorized representative of the facility.

Un-manifested Waste Report [40 CFR 264.76]

HWAD does not accept treatment, storage, or disposal any hazardous waste from an off-site source.

Additional Reports [*40 CFR 264.77*]

Additional reports to USEPA and the State of Nevada (Division of Environmental Protection) include reports of hazardous waste releases, fires, explosions, closures, or other reports as required by regulatory authority. HWAD submits any reports of hazardous waste releases, fires, explosions, and closures to EPA, or as directed by those agencies listed below

- Releases, fires, and explosions when implementing the Contingency Plan (Appendix C)
- Facility closures
- Releases from Solid Waste Management Units (SWMUs) (40 CFR 264 Subpart F)
- Surface Impoundments (HWAD has none) (40 CFR 264 Subpart K)
- Waste Piles (HWAD has none) (40 CFR 264 Subpart L)
- Land Treatment (HWAD has none) (40 CFR Subpart M)
- Landfills (40 CFR Subpart N)
- Air Emission Standards for Process Vents (40 CFR 264 Subpart AA) (please see HWAD Title V Air Permit)
- Air Emission Standards for Tanks, Surface Impoundments & Containers (40 CFR Subpart CC)

SECTION E. PERSONNEL TRAINING [*40 CFR 270.14(b)(12)*]

OUTLINE OF THE TRAINING PROGRAM [*40 CFR 264.16*]

HWAD plans and executes its own employee training program. Instructors use both on-the-job training and formalized classroom instruction for all personnel. Training programs are designed to ensure that employees perform their duties safely, professionally, and in compliance with all applicable U.S. Army, state, and federal regulations. None of these positions will be assigned the duties of or serve as emergency coordinators.

Training Content, Frequency, and Techniques [*40 CFR 264.16(a)(1)*]

An outline of the training program including the training courses required for each job description for hazardous waste management is presented in Section E, Table E-1. All applicable courses must be satisfactorily completed before an employee is allowed to begin his/her assigned job. Each operations course consists of both classroom and hands-on instruction.

Both introductory and refresher training programs are conducted. Each program consists of two phases. Classroom training will provide the theoretical and background information necessary to understand operations and to ensure familiarity with operational safety and emergency procedures. This will be followed by a period of on-the-job training (OJT) where actual operations will be conducted by the trainee under supervision of qualified personnel. Emergency response requirements will be emphasized during the OJT training sessions and periodically during operations.

At the completion of the classroom and hands-on training, an examination will be conducted to verify that the training was effective and the operations and maintenance personnel are properly trained for unsupervised operations. Appropriate documentation attesting to satisfactory completion of the training program will be maintained. Training effectiveness and employee retention shall be demonstrated with written examinations. Employees shall complete a written examination following each classroom-training segment. The examination shall consist primarily of multiple choice and fill-in the blank format. While the examination for each section will be unique to the information covered, the following topics will be emphasized in each examination:

- Theory of system operation
- Control system alarms and interlocks

- Start-up and shutdown operations
- Emergency response scenarios

A score of 70 percent is considered the minimum acceptable score. Any employee not obtaining a minimum score of 70 percent shall retake the examination.

The Human Resource Division at SOC keeps records that apply to hazardous waste training and other operational training.

The operation and maintenance manuals for incineration equipment are extensively used by supervisors and operators, and include detailed discussions, illustrations, and diagrams addressing equipment applications, reporting, system description, system component descriptions, major assembly functional descriptions, controls and instrumentation, start-up and shut-down procedures, furnace feed instructions, waste feed rates, container inspection procedures, maintenance instructions, troubleshooting, and parts lists. OJT is used to familiarize each operator with proper procedures for equipment use, maintenance, inspection, shut-down and cool-down, emergencies, and use of communications systems. See Section R for the operation of Plasma Ordnance Demilitarization System (PODS).

This program is designed and structured to ensure that operating personnel are trained to perform routine operations. The program is also designed to respond properly to emergency situations over and above routine operations, and to maintain compliance with applicable permits and regulations during emergencies.

This training addresses non-routine situations that could lead to a RCRA emergency if proper responses are not implemented, such as:

- Unscheduled shutdown and startups related to storms, power outages, fires, explosions, spills, etc.
- Procedures for locating, using, inspecting, repairing, and replacing facility emergency and monitoring equipment
- Communications or alarms
- Response to fires or explosions

- Shutdown of operations.

See Section B and Appendix C for additional information regarding emergency response.

Procedures for using, inspecting, repairing, and replacing facility emergency response and monitoring equipment are included in applicable SOPs. Communications and alarm systems are addressed in Sections C, R, and V. Response to fires is addressed in Appendix C. Shutdown of operations at RF-9 in response to an emergency situation is addressed in Section N and Appendix C. Shutdown of operations at the PODS in response to an emergency situation is addressed in Section R, and Appendix C.

Training Director [*40 CFR 264.16(a)(2)*]

The Training Director is responsible for teaching safety, operational, and emergency procedures (including hazardous waste management and contingency plan implementation) to all personnel. The training program is designed to provide training to personnel at levels that are relevant to their positions within HWAD.

HWAD's hazardous waste training program is directed by the Manager, Environmental Services of SOC or his/her designated representative. He/she will teach appropriate courses in waste regulations, waste management, and contingency plan/emergency response to all employees involved in the management of hazardous waste. His/her background, training and experience is strong in the field of hazardous waste management.

Specific training on operation and maintenance of the PODS will be provided by the Training Director or his/her designated personnel when required.

IMPLEMENTATION OF THE TRAINING PROGRAM [*40 CFR 264.16(a)(2)*]

The Environmental Services Manager of SOC (Training Director) will implement training requirements specified in 40 CFR Part 264. Newly assigned waste management personnel will receive the required training within 6 months of assignment to the facility. No employee hired to work at this facility will work unsupervised prior to completion of the training program.

Employees are required to meet annually (or whenever process changes occur) for refresher reviews and to receive training program updates, to discuss and study the following subjects:

- The status of storage and operating conditions and procedures, noting any areas where there are problems or potentials for problems
- The requirements contained in the facility's RCRA permit, noting any changes that have occurred. Areas where maintenance of compliance is a problem are identified and discussed, and effective solutions are sought.
- Incidents that have occurred that warranted use of the hazardous materials/waste contingency plan and/or emergency actions. This review focuses on the cause of the incident and identification of steps to be taken to prevent or to ensure better handling of such events in the future.

Records documenting the job title for each position, job descriptions, names of employees, and completed training programs (both introductory and review) are kept in the Human Resources Office at SOC. The following records will be maintained at the office:

- Job title and employee name for all hazardous waste management positions
- A written job description for each position
- A written description of the introductory and continuing training given to each person employed for hazardous waste management activities

All training records for employees are kept on site during the course of employment and for a minimum of 3 years following termination of employment.

TABLE E-1. TRAINING REQUIREMENTS

Course Titles	Environ-mentalist	Manager Demil & Special Projects	Chemical Laboratory Technician	Munition Handler Foreman	Munition Handler	Munitions Destroyer	Water Treatment Plant Operator	Warehouse Person	Chemist	Maintenance Equip. Operator	Motor Vehicle Operator
1. HWAD Orientation	X	X	X	X	X	X	X	X	X	X	X
2. HW Regulations	X	X	X	X	X	X	X	X	X	X	X
3. Contingency Plan	X	X	X	X	X	X	X	X	X	X	X
4. Safety/First Aid	X	X	X	X	X	X	X	X	X	X	X
5. RF-9 Deactivation Furnace and PODS and BEDS		X		X		X					
6. Process Water Treatment							X				
7. Container Storage	X	X	X					X			

SECTION F. WASTE STORAGE CHARACTERISTICS FOR MAIN BASE

PHYSICAL AND CHEMICAL CHARACTERISTICS OF WASTES AND RESIDUES [40 CFR 270.14(b)(2) and 264.13(a)]

Volume and Composition of Wastes

The volumes and compositions of wastes are described in the following sections.

Wastes in Containers [40 CFR 270.15]

The waste received at the hazardous waste storage buildings is transferred from several locations on HWAD. The types and characteristics of the wastes vary depending on the waste-generating activity. The volumes of wastes vary depending on the level of activities at HWAD. The maximum waste quantity anticipated for storage is presented in Part A of this application. Section F, Tables F-1 through F-4 show the type of waste generated, the waste-generating activity, and the waste constituents typically found at each of the four containerized waste storage buildings. Any building may be used for storing any hazardous waste listed in the tables with the only restriction that waste containing free liquid will be stored only in Buildings 106-22, 106-23, and 115-9. Containerized wastes stored in Buildings 106-22 and 106-23 generally consist of non-explosive contaminated liquids, wastes such as ash and baghouse dust from HWAD incinerators and furnaces, corrosives, oils and oil filters, and flammables (i.e., solvents). In addition, PCB waste is accumulated in a designated area in Building 106-23. Building 115-9 is used for containerized storage of explosives-contaminated and reactive wastes typically received from the process water treatment facility. Solids (i.e., soils) contaminated with explosives such as TNT are accumulated in Building 113-73A or Building 115-9. No free liquids are stored at 113-73A building defined under 40 CFR 264.314 (b) in determining the absence or presence of free liquid using the Paint Filter Liquid Test. Chemical and physical analysis results for hazardous wastes managed at the hazardous waste storage buildings are provided in Appendix K.

No free liquids will be stored in the magazines (storage magazine numbers 116-37, 116-38, 116-39, 116-41, 116-42, 116-43, 116-44, and 116-45). The locations of these magazines are shown in Section A, Figure A-6. All these magazines were constructed in the same manner as Building 113-73A. Cracks and/or holes in the floor of these structures will be sealed to prevent any solid material from penetrating the floors. The drainage outlets will also be sealed to prevent water from entering the storage area. Only solids will be stored in these magazines and will include the following RCRA waste codes: D003 (reactivity); D005 (toxicity); D008 (toxicity); D009 (toxicity); and D030 (toxicity). The maximum storage capacity of each retrofitted magazine is 384 55-gallon drums (similar to Building 113-73A; Section F, Table F-4).

The air emission standards for containers (40 CFR Subpart CC [264.1086] are not applicable to the hazardous waste containers at the HWAD for the following reasons:

- Containers held in permitted storage areas are DOT-approved designs, and are not opened once in storage.
- Only units subject to RCRA-permitting requirements are subject to the Subpart CC air emission standards for containers. Units identified in 40 CFR 264 /265.1 that are not subject to interim status or permitted unit statuses are not subject to the Subpart CC standards. HWAD has one 90-day hazardous waste accumulation area at 108-20, Dock 3, 103-16, 117-6, 103-5 and 117-3 see for 117-3 drawing Section N, Figure N-3 and the U.S. Navy has a 90-day temporary storage site at 49-9 (except as noted below). Because HWAD containers in satellite accumulation areas are exempt from RCRA-permitting, they are also exempt from the Subpart CC requirements.
- If any future operations at HWAD require the utilization of regulated containers, they will be restricted to less than 26 gallons in size, to qualify as non-regulated under the volume exemption.

In the event that HWAD operations require the management of hazardous wastes that exceed the 26 gallon threshold or quality for RCRA-permitting, containers will comply with Subpart CC requirements.

Wastes in Tanks [40 CFR 270.16]

There are no tanks to be permitted at HWAD. Because HWAD does not manage hazardous waste in tanks, the corresponding air emission standards for tanks (40 CFR 264.1084) are not applicable.

Wastes in Surface Impoundments [40 CFR 270.17]

There are no surface impoundments to be permitted at HWAD. Because HWAD does not manage hazardous waste in surface impoundments, the corresponding air emission standards for surface impoundments (40 CFR 264.1085) are not applicable.

Waste in Piles [40 CFR 270.18]

There are no facilities at HWAD which treat or store hazardous wastes in waste piles.

Wastes in Incinerators [40 CFR 270.19]

HWAD operates incinerators RF-9 and PODS. Operating incinerators have been issued applicable RCRA and/or CAA permits.

Wastes in Land Treatment Facilities [40 CFR 270.20]

There are no land treatment facilities to be permitted at HWAD.

Wastes in Landfills [40 CFR 270.21]

There are no RCRA Subtitle C landfills at HWAD. HWAD operates a construction and debris (C&D) Solid Waste Landfill Disposal Site which is operated in accordance with the Waivered Class III Landfill Disposal Site Permit No. SWMI-09-68 issued by the NDEP-BWM-SWB.

(a) All waste placed into HWAD's C&D Landfill is incidental to HWAD's industrial operation.

(b) HWAD's C&D Landfill is located on property owned and controlled by the U.S. Army, approximately 1,000 feet northeast of U.S. Highway 95 at mile marker 53.3. The landfill is enclosed within a gated 8-foot chain link fence.

(c) HWAD's C&D Landfill will not receive any hazardous materials as defined under NRS 459.700, Section 4, or receive wastes containing contaminates or waste described in Section (e) below or items that may degrade the waters of Nevada. HWAD C&D Landfill will receive only the wastes described below which are inert and unlikely to create an environmental hazard or threaten the health of the general public.

(d) HWAD's C&D Landfill WILL receive the following type of wastes:

Industrial and Commercial Solid Wastes (as defined by 40 CFR 258.2) limited to only inert solid wastes to include: Construction debris consisting of concrete, natural rocks, uncontaminated natural soil, solid asphalt paving, glass, pipes, wiring, untreated wood, roofing material, scrap metal, and/or metal inert mock munition items (generally used for training or display), paper products, cardboard, fiber tubes, office wastes, office lunchroom wastes, solid rubber waste, solid leather waste, solid fabric wastes, solid styrofoam polymer waster, solid coating wastes, tree stumps, tree branches, and fenceline shrubs-weeds-agricultural cleanup wastes.

(e) HWAD's C&D Landfill WILL NOT receive the following types of wastes: Hazardous Wastes (as defined by RCRA - Subtitle C), Liquid Wastes (as determined by the paint filter test), Household Waste (as defined by 40 CFR 258.2), hydrocarbon contaminated soils exceeding 100 ppm TPH, highly putrescible wastes including dead animals, treated wood, petroleum-oil-lubricant products (POL), waste products with a potential to migrate to the environment via air, water, or groundwater or that may pose an environmental hazard or threaten the health of the general public.

HWAD's C&D Landfill Operations Plan:

HWAD C&D Landfill is accessible to only to employees at HWAD to landfill C&D wastes (described above) incidental only to operations of HWAD only during normal HWAD operational hours. HWAD's C&D Landfill is secured by an 8 foot chain link gate with chain and lock when not operational. HWAD's C&D wastes are observed by a Hazardous Waste Trained HWAD employee to affirm the C&D wastes are only as described in "d" above. The C&D wastes are net weighed and assigned for burial in a gridded cell by landfill personnel. The landfill personnel maintain a log describing the amount (weight) and description of the C&D wastes and the specific receiving burial cell into which the C&D wastes are placed. HWAD's C&D landfill cell development plan is to proceed by 2 cells at a time until such time as the C&D landfill reaches capacity. The C&D landfill personnel cover each operational day, the C&D wastes received with sufficient cover to avoid all debris wind scattering, fugitive dust transport, and any (very minimally present) vector transport. Upon capacity loading of C&D wastes, to each cell, landfill personnel final cover and compact each cell with a minimum of 24 inches of native soil.

Wastes in Miscellaneous Units [40 CFR 270.23]

The OB unit at HWAD is used to demilitarize various propellants and explosives. Table Section F, F-8 shows the General Composition of Military Items. Physical and chemical properties of these items are presented in Section F, Table F-9. Section G, Table G-4 is the List of Propellants and Explosives Treated by OB at HWAD. Prior to treatment, historical data, specifications, and ordnance publications are used to obtain information regarding the nature of the waste to be burned. The specific chemical composition of energetic materials contained in propellants and explosives treated by OB at HWAD are given in Section G, Table G-5. Section G, Table G-5 also lists the EPA hazardous waste codes of the propellants and explosives treated at HWAD. These data are from standard U.S. military technical manuals, field manuals, and various handbooks. These manuals are sufficient to determine the suitability of the waste material for OB and compliance with the Environmental Performance Standards. The identification of specific propellants and explosives as unfit for use can be based on a number of reasons and is impossible to predict for any given period of time. Hence, HWAD needs to be permitted to treat propellants and explosives containing any combination of the materials shown in Section F, Tables F-8 and Section G, G-5 within the limitations prescribed by this permit application. Burning limits are discussed in Section I.

The chemical data described in Section F, Table F-8 are not required by HWAD personnel to determine whether or not treatment by OB is required. OB procedures are based on the military properties (i.e., explosive properties) of the propellant item being treated by OB. The items listed in Section G, Table G-5 are representative of the hazardous constituents present in any energetic items that will be treated by OB at HWAD. Should items be received for OB that are not listed in Section G, Table G-4, they will be identified to the extent necessary to ensure safe handling and treatment.

Ash generated by OB operations is sampled and analyzed for reactivity and metal content. Chemical and physical analysis results for ash are provided in Appendix L.

Certain items will not be treated by OB. These include military chemical warfare agents or related compounds, or materials contaminated with these agents. Typical military chemical warfare agents and related compounds include, but are not limited to, the following classes of agents:

- Choking agents
- Nerve agents
- Blood agents
- Blister agents
- Incapacitating agents
- Vomiting compounds
- Tear-producing compounds

- Herbicides.

A second group of compounds or mixtures that will not be treated except under emergency conditions. These include the following smokes and incendiaries:

- Titanium tetrachloride (FM)
- Sulfur trioxide - chlorosulfonic acid (FS)
- Bulk red phosphorus (RP)
- Oil smoke
- Napalm B (50% polystyrene, 25% benzene, and 25% gasoline by weight).

Finally, OB of any waste that is not reactive is prohibited.

Section F, Table F-5 outlines specific compounds which may be contained in wastes generated by operations at HWAD. This table also outlines in which container storage facility the compound (waste) maybe stored. Section F, Tables F-6 and F-7 are waste compatibility charts for container storage facilities 106-22 and 106-23 respectively. These charts will be used to determine which wastes (compounds) can be stored together in individual cells. In general only like wastes (compounds) can be stored together in individual cells. Wastes (compounds) will be stored together in individual cells only as a last resort due to lack of available storage space.

Wastes in Facilities with Process Vents [40 CFR 270.24]

There are no process vents at HWAD, therefore the air emission standards for process vents (40 CFR 264.1030) do not apply.

Wastes In Systems with Pumps, Compressors, Pressure Relief Devices (Gas/Vapor Service), and Open Ended Valves or Lines

There are no pieces of equipment at HWAD for which 40 CFR 264.1050 air emission standards are applicable. HWAD has no plans to install such equipment.

Table F-1
Description of Hazardous Waste
Typically Stored in Building 106-22

<table>
<tr><th>Waste</th><th colspan="2">Source</th><th>Hazardous Constituent(s)</th><th>RCRA Waste Codes</th></tr>
<tr><td>Ash/Baghouse Dust</td><td colspan="2">Incinerators, Furnaces, OB Unit</td><td>Metals (Cadmium, Chromium, Lead, Barium)</td><td>D006, D007, D008, D005</td></tr>
<tr><td>Water with Ash/Bags</td><td colspan="2">Furnaces, OB</td><td>Barium, Cadmium, Lead, 2, 4-Dinitrotoluene</td><td>D005, D006, D008, D030</td></tr>
<tr><td>Corrosives</td><td colspan="2">Battery Shop, Electronics Shop</td><td>Ammonium Hydroxide, Phosphoric Acid</td><td>D002</td></tr>
<tr><td>Waste Oil Filters</td><td colspan="2">Vehicle Maintenance</td><td>Metals (Lead, Arsenic, Cadmium,)</td><td>D008, D004, D006</td></tr>
<tr><td>Waste Oil</td><td colspan="2">Vehicle Maintenance</td><td>Metals (Lead, Arsenic, Cadmium) Chlorinated Solvents</td><td>D008, D004, D006, F002</td></tr>
<tr><td>TCLP Waste</td><td colspan="2">On-Site Laboratory</td><td>Metals (Cadmium, Chromium, Lead, Barium)</td><td>D006, D007, D008, D005</td></tr>
<tr><td>Mercury Batteries</td><td colspan="2">Battery Shop, Electronic Shop</td><td>Mercury</td><td>D009</td></tr>
<tr><td>Waste Fluid</td><td colspan="2">Equipment Maintenance</td><td>Cadmium</td><td>D006</td></tr>
<tr><td>Sodium Cyanide</td><td colspan="2">Expired Shelf-Life</td><td>Cyanide</td><td>D003</td></tr>
<tr><td>Stencil Ink</td><td colspan="2">Expired Shelf-Life</td><td>Lead, Alcohol</td><td>D008, D001</td></tr>
<tr><td>Battery Electrolyte and Water</td><td colspan="2">Battery Maintenance</td><td>Potassium Hydroxide, Lithium Hydroxide, Lead</td><td>D002, D008</td></tr>
<tr><td>Contaminated Soil</td><td colspan="2">Spills</td><td>Petroleum, Oil, Lubricants</td><td>D001</td></tr>
<tr><td>Spent Aerosol Cans</td><td colspan="2">Maintenance, Expired Shelf Life</td><td>Solvents</td><td>D001, D003</td></tr>
<tr><td colspan="3">Maximum Storage Capacity
Based on Physical Capacity</td><td colspan="2">1,620 Drums</td></tr>
<tr><td colspan="2" rowspan="4">Cell Storage Limits
(See Appendix A)</td><td>Cell 1</td><td colspan="2">136 Drums</td></tr>
<tr><td>Cell 2</td><td colspan="2">288 Drums</td></tr>
<tr><td>Cell 3</td><td colspan="2">216 Drums</td></tr>
<tr><td>Cell 4</td><td colspan="2">980 Drums</td></tr>
<tr><td colspan="5">For Incompatible Wastes See Table F-5, F-6, and F-7</td></tr>
</table>

Table F-2
Description of Hazardous Waste
Typically Stored in Building 106-23

Waste	**Source**	**Hazardous Constituent(s)**	**RCRA Waste Codes**
Spent Solvents	Maintenance, Expired Shelf Life	Acetone, 1, 1,1-Trichloroethane, Barium	D001, F003, U002, U226
Waste Brake Fluids	Vehicle Maintenance Expired Shelf Life	Metals	D006-D008
Paint Waste	Ammo. Maintenance, Paint Shop, Expired Shelf Life	Metals (Cadmium, Lead, Chromium) Solvents	D006-D008, F002, F003, F005, D001
Methyl Ethyl Ketone (MEK)	Ammo. Maintenance, Expired Shelf Life	MEK	D035, U159, D001
PCBs	Hydraulic System, Transformers	PCBs	Priority Pollutant
Paint Thinners	Ammo. Maintenance, Paint Shop, Expired Shelf Life	Toluene, Mercury, Lead, Cadmium, Chromium	D001, F005, U220, D009
Paint Removers	Ammo. Maintenance, Paint Shop, Expired Shelf Life	Methylene Chloride	U080
Spent Aerosol Cans	Maintenance, Expired Shelf Life	Solvents	D001, D003
Maximum Storage Capacity Based on Physical Capacity		1,344 Drums	
Cell Storage Limits (See Appendix A)	Cell 1	160 Drums	
	Cell 2	560 Drums	
	Cell 3	168 Drums	
	Cell 4	96 Drums	
	Cell 5	176 Drums	
	Cell 6	184 Drums	
For Incompatible Wastes See Page Table F-5, F-6, and F-7			

Table F-3

Description of Hazardous Waste

Typically Stored in Building 115-9

Waste	**Source**		**Hazardous Constituent(s)**	**RCRA Waste Codes**
Explosive Scrap in Water	Processwater Treatment Plant, Load-Assembly-Pack (LAP)		TNT, RDX	D030, K047, D003
High-Explosive Sludges	Processwater Treatment Plant, Casting Operations LAP		TNT, RDX	K044, D003
Waste PBX-C 203	Processing Operations		RDX	D003
Contaminated Rugs and Plastics	Ammunition Renovation		TNT, RDX	D030, D003
Composition B	Damaged Containers		TNT, RDX	D003
Composition A-3	Off-Specification		RDX	D003
Waste Powder and Propellants	Maintenance Operations		Nitroglycerine, Nitrocellulose	D003, D030
Spent Carbon	Processwater Treatment Plant		TNT, RDX	K045, D003
Contaminated Dirt and Debris	Spills		TNT, RDX	D003
High-Explosive Contaminated Wax	Maintenance Operations		RDX	D030, D003
Pipe Insulation	Base Wide		Asbestos	Priority Pollutant
Gaskets	Demilitarization Operation		Asbestos	Priority Pollutant
Asbestos and TNT	Building Renovation		Asbestos, TNT	D003
Maximum Storage Capacity Based on Physical Capacity			624 Drums	
Cell Storage Limits (See Appendix A)		Cell 1 Cell 2 Cell 3 Cell 4	96 Drums 192 Drums 192 Drums 144 Drums	
For Incompatible Wastes See Page Table F-5, F-6, and F-7				

Table F-4

Description of Hazardous Waste

Typically Stored in Building 113-73A

Waste	**Source**	**Hazardous Constituent(s)**	**RCRA Waste Codes**
Contaminated Soil	Spills	TNT, RDX	D030, D003
Prohibited Wastes	Non Reactive or Reactive Contaminated Wastes Other Than Asbestos, Liquids		
Maximum Storage Capacity Based on Physical Capacity (See Appendix A)		384 Drums	
For Incompatible Wastes See Page Table F-5, F-6, and F-7			

Table F-5 Waste Storage Outline

	Compound	Waste Code	Building #
1.	Mineral Acids:		106-22
	Sulfuric	D002	
	Nitric Hydrochloric	D002	
	Phosphoric Boric	D002	
	Chromic	D002/D007	
2.	Organic Acids:		106-22
	Acetic	D002	
3.	Alcohols/Glycols:		106-23
	Isopropanol	D001	
	Methanol Ethanol	D001/F003	
	Ethylene Glycol	D001	
4.	Caustics:		106-22
	Sodium Hydroxide	D001	
	Potassium Hydroxide	D001	
	Ammonium Hydroxide	D001	
	Ammonia	D001	
5.	Cyanides:		106-22
	Sodium Cyanide	D007/P006	
	Potassium Cyanide	D003/P098	
6.	Ether:		106-23
	Ethyl Ether	D001/U117	
7.	Aromatic Hydrocarbons:		106-23
	Benzene	D001/U109	
	Toluene	D001/U220/F005	
	Xylene	D001/U239/F003	
8.	Halogenated Organics:		106-23
	Chloroform	D022/U044	
	Trichloroethylene	U228/F002	
9.	Ketones:		106-23
	Acetone	D001/F003/U002	

**Table F-5 Waste Storage Outline
(Continued)**

	Compound	Waste Code	Building #
10.	Metals:		106-22
	Arsenic	D004	
	Barium	D005	
	Cadmium	D006	
	Chromium	D007	
	Lead	D008	
	Mercury	D009	
	Selenium	D010	
	Silver	D011	
11.	Nitro Organic Compounds or Explosives:		115-9
	TNT	D003	
	RDX	D003	
	Ammonium Picrate	D003/D009	
	HMX	D003	
	Smokeless Powder	D003	
	2,4-Dnitrotoluene	D030/D003/U105	
12.	Nitrates:		106-23
	Acetonitrate	D003	
13.	Mercaptans and Other Organic Sulfides:		106-23
	Carbon Disulfide	P022/D001	
14.	Misc. Combustible & Flammable:		106-23
	Gasoline	D001	
	Kerosene	D001	
	Lacquer Thinner	D001	
	Mineral Spirits	D001	
	Stoddard Solvent	D001	

Table F-6 Waste Compatibility Chart for Building 106-22

	1. Mineral Acids	2. Organic Acids	4. Caustics	5. Cyanides	10. Metals
1. Mineral Acids	X	X	O	O	O
2. Organic Acids	X	X	O	O	O
4. Caustics	O	O	X	X	X
5. Cyanides	O	O	X	X	X
10. Metals	O	O	X	X	X

X= **Compatible -OK to store together**

O= **Incompatible -do not store together**

Waste (compounds) not routinely allowed in Building 106-22

- **Alcohol /Glycols**
- **Ethers**
- **Aromatic Hydrocarbons**
- **Halogenated Organics**
- **Ketones**
- **Explosives**
- **Nitrites**
- **Explosives**
- **Mercaptans/Organics Sulfides**
- **Combustibles/Flammables**

Table F-7 Waste Compatibility Chart for Building 106-23

	3. Alcohols/Glycols	6. Ethers	7. Aromatic Hydrocarbons	8. Halogenated Organics	9. Ketones	12. Nitrates	13. Mercaptans/Sulfides	14. Combustible/Flammable
3. Alcohols/glycols	X	X	X	X	X	X	X	X
6. Ethers	X	X	X	X	X	X	X	X
7. Aromatic Hydrocarbons	X	X	X	X	X	X	X	X
8. Halogenated Organics	X	X	X	X	X	X	O	X
9. Ketones	X	X	X	X	X	X	O	X
12. Nitrates	X	X	X	X	X	X	X	X
13. Mercaptans/Sulfides	X	X	X	O	O	X	X	X
14. Combustible/Flammable	X	X	X	X	X	X	X	X

X=Compatible, OK to store together

O=Incompatible, do not store together

Waste (compounds) not routinely allowed in Building 106-22

- Mineral Acids
- Organic Acids
- Caustics
- Cyanides
- Metals

Table F-8

General Chemical Composition of Typical Military Items

Thermally Treated

PROPELLANTS	
Name	**Chemical Formula**
Nitrocellulose	$C_{12}H_{16}(ONO_2)_4O_6$
Nitroglycerine	$C_3H_5N_3O_9$
Nitroguanidine	$CH_4N_4O_2$

These three primary constituents can be used singly or in various combinations along with metals, metallic salts, and organic polymer binders.

PRIMARY EXPLOSIVES	
Name	**Chemical Formula**
Lead Azide	H6Pb (71% Pb)
Mercury Fulminate	$C_2HgN_2O_2$ (70.5% Hg)
Diazodinitrophenol (DDNP)	$C_6H_2N_4O_5$
Lead Styphnate	$C_6HN_3O_8Pb$ (44.2% Pb)
Tetracene	$C_2H_8N_{10}O$
Potassium Dinitrobenzofuroxane (KDNBF)	$C_6H_2N_4O_6K$
Lead Monomitroresorcinate (LMNR)	$C_6H_5NO_{4X}Pb$ (57.5% Pb)
Ingredients to Rocket Propellant: Copper Monobasic Salicylate Lead Salicylate	 $C_{14}H_{12}Cu_2O_8$ $C_{14}H_{10}O_6Pb$
Fuels: Lead Thiocyanate Antimony Sulfide Calcium Silicide	 $Pb(SCN)_2$ (64% Pb) S_5Sb_2 $CaSi_2$
Oxidizers: Potassium Chlorate Ammonium Perchlorate Barium Nitrate Calcium Resinate Strontium Peroxide Barium Peroxide Strontium Nitrate Potassium Perchlorate	 $KClO_3$ NH_4ClO_4 N_2O_6Ba $Ca(C_{44}H_{62}O_4)_2$ SrO_2 BaO_2 $Sr(NO_3)_2$ $KClO_4$

Primary compositions include a mixture of primary explosive (as shown above), fuels, oxidizers and binders (e.g. paraffin wax).

Table F-8

General Chemical Composition of Typical Military Items

Thermally Treated (Continued)

BOOSTER AND SECONDARY EXPLOSIVES (High Explosives)	
Name	**Chemical Formula**
Aliphatic Nitrate Esters:	
1,2,4-Butanetriol Trinitrate (BTN)	$C_4H_7N_3O_9$
Diethyleneglycol Dinitrate (DEGN)	$C_4H_8N_2O_7$
Nitroglycerine (NG)	$C_3H_5N_3O_9$
Nitrostarch (NS)	$C_6H_7(OH)_X(ONO_2)_Y$ where X – Y = 3
Pentaerythritol Tetranitrate (PETN)	$C_5H_8N_4O_{12}$
Triethylene Glycol Dinitrate (TEGDN)	$C_6H_{12}N_2O_8$
1,1,1-Trimethylethane Trinitrate (TMETN)	$C_5H_9N_3O_9$
Nitrocellulose (NC)	$C_{12}H_{16}(ONO_2)_4O_6$
Nitramines:	
Cyclotetramethylene Tetranitramine (HMX)	$C_4H_8N_8O_8$
Cyclotrimethylene-Trinitramine (RDX)	$C_3H_6N_6O_6$
Ethylenedimine Dinitrate (EDDN, Haleite)	$C_2H_6N_4O_4$
Nitroguanidine (NQ)	$CH_4N_4O_2$
2,4,6-Trinitrophenylmethylnitramine (Tetryl)	$C_7H_5N_5O_8$
Nitroaromates:	
Ammonium Picrate (Explosive D)	$C_6H_3N_3O_7H_3N$
1,3-Diamino-2,4,6-Trinitrobenzene (DATB)	$C_6H_4N_5O_6$
2,2’4,4’6,6’-Hexanitroazobenzene (HNAB)	$C_{12}H_4N_8O_{12}$
Hexanitrostilbene (HNS)	$C_{14}H_2N_6O_{12}$
1,3,5-Triamino-2,4,6-Trinitrobenzene (TATB)	$C_6H_6N_6O_6$
2,4,6-Trinitrotoluene (TNT)	$C_7H_5N_3O_6$
Ammonium Nitrate	HNO_3H_3N

Table F-9
Physical and Chemical Properties of OB Potential Constituents of Concern
Hawthorne Army Depot
Hawthorne, Nevada
(Page 1 of 4)

Constituent	Molecular Weight (g/mol)	Physical State	Water Solubility (mg or ml/l @ 20°C)	Vapor Pressure (torr @ 20°C)	Henry's Law Constant (20°C) (atm-m³/mol)	K_{OC} (ml/g)	K_{OW}	Photodegradation[a] Half Life, t½ Low (days)	High (days)
CRITERIA POLLUTANTS									
Carbon Monoxide	28.01	G	23b						
Nitrogen Dioxide	46.01	G		400 mm @ 80°C[c]					
Sulfur Dioxide	64.06	G/L	8.5% @ 25°C[b]	2,538 mm @ 21° C[c]					
Ozone	48.00	G/L							
Lead	207.19 (aw)	S		1 mm @ 973°C[c]					
AIR TOXICS									
Acetylene	26.04	G	1:1[b]	40 atm @16.8°C[c]					
Ammonia	17.04	G/L	31% @ 25°C[b]	10 atm @ 25.7°C[c]	3.21E-4[d]	3.1[d]	1.0[d]		
n-Butane	58.12	G	.15:1[b]	2 atm @ 18.8°C[c]					
Carbon Disulfide	76.14	L	0294[b]	400 mm @ 28°C[c]	1.23E-2[d]	54[d]	100[d]		
Carbon Tetrachloride 153.84	L	785[e]	90[e]	0.023[e]		439[e]	912[e]	657[f]	6,680[f]
Chlorine	35.45(aw)	G	.092 moles/L @25°C[b]	4,800 mm @ 20°C[c]					
Fluorine	38.00(aw)	G	Reacts[g]	> 1 atm @ 68°F[g]					
Hydrogen Chloride	36.46	G	67.3 g/100 g @ 30°C[b]						
Hydrogen Cyanide	27.03	G/L	Miscible[b]	400 mm @ 9.8°C[c]				89.1[f]	876[f]
Hydrogen Fluoride	20.01	G/L	Soluble[b]	400 mm @ 2.5°C[c]					
Hydrogen Sulfide	34.08	G	4.13E+3[b]	20 atm @ 2.5°C[c]					
Nitric Oxide	30.01	G	4.6[b]						
Propane	44.09	G	65 @ 17.8°C, 753 mm[b]	> 1 atm @ 68°F[g]					
METALS									
Aluminum	26.98(aw) S		Insoluble[h]	1 mm @ 1,284°C[c]					
PROPELLANTS									
Nitrocellulose (NC)	504.26	L	Insoluble[i]			1.12[j]	1.15[k]		
Antimony	121.75	S	Insoluble[h]	1 mm @ 886°C[c]					
Arsenic	74.92(aw) S		Insoluble[h]	1 mm @ 372°C[c]					
Barium	137.33(aw)	S	4.0E+4 as $Ba(OH)_2$[h]	10 mm @ 1,049°C[c]					
Beryllium	9.01(aw)	S	Insoluble[h]						

See footnotes at the end of the table.

Table F-9
(Page 2 of 4)

Constituent	Molecular Weight (g/mol)	Physical State	Water Solubility (mg or ml/l @ 20°C)	Vapor Pressure (torr @ 20°C)	Henry's Law Constant (20°C) (atm-m³/mol)	K_{OC} (ml/g)	K_{OW}	Photodegradation[a] Half Life, $t_{½}$ Low (days)	High (days)
Boron	10.81(aw)	S	Insoluble[h]						
Cadmium	1124.40	S	Insoluble[h]						
Chromium	52.00	S	Insoluble[h]						
Copper	63.54(aw)	S	1.77E-[h]	1 mm @ 1,628°C[c]					
Iron	55.85(aw)	S	Insoluble[h]						
Magnesium	24.31(aw)	S	Reacts[b]	1 mm @ 621°C[c]					
Magnesium Oxide	40.31	S	6.2[h]						
Manganese	54.94(aw)	S	Decomposes[b]	1 mm @ 1,292°C[c]					
Mercury	200.59(aw)	L	9.0E-2[h]	2 x 10^{-3} mm @ 25°C[c]					
Molybdenum	95.94(aw)	S	Insoluble[h]	1 mm @ 3,102°C[c]					
Nickel	58.71(aw)	S	Insoluble[h]	1 mm @ 1,810°C[c]					
Potassium	39.10(aw)	S	Decomposes[b]						
Potassium Hydroxide	56.11	S	107 g/100 cc[h]						
Selenium	78.96(aw)	S	Insoluble[h]	1 mm @ 356°C[c]					
Silver	107.87(aw)	S	2.80E-2[h]						
Sodium	22.99	S	Reacts[b]	1.2 mm @ 400°C[c]					
Sodium Hydroxide	40.01	S	1.07E+6[b]	1 mm @ 739°C[c]					
Strontium	87.62(aw)	S	Decomposes[h]	10 mm @ 898°C[c]					
Tin	118.71(aw)	S	Insoluble[h]	1 mm @ 1,492°C[c]					
Uranium	238.00(aw)	S	Insoluble[h]						
Vanadium	50.94(aw)	S	Insoluble[h]						
Zinc	65.37(aw)	S	7.10E-1[h]	1 mm@487					
Zirconium	91.22(aw)	S	Insoluble[h]						
Nitroglycerine (NG)	227.09	L	1.25E+3[l]	2.5E+3[l]	3.3-0.06 (torr-1/mol)[l]	71[l]	112[m]	0.073l	0.73l
Nitroguanidine (NQ)	104.09	S	4,200 @ 25°Cn	1.43 x 10-11 @25°Cn		0.44n	0.148n		
PRIMARY EXPLOSIVES									
Lead Azide	291.25	S	0.023% @ 18°C[b]						
Mercury Fulminate	284.63	S	Soluble[l]						
Diazodinitrophenol (DDNP)	210.08	S							
Lead Styphnate	450.26	S							
Tetracene	188	S							
Potassium Dinitrobenzofuroxane (KDNBF)	265.18								
Lead Mononitroresorcinate (LMNR)									
Copper Monobasic Salicylate	435.33	S							
Lead Salicylate	481.42	S							
Lead Thiocyanate	323.36	S	500[l]						

See footnotes at the end of the table.

Table F-9
(Page 3 of 4)

Constituent	**Molecular Weight (g/mol)**	**Physical State**	**Water Solubility (mg or ml/l @ 20°C)**	**Vapor Pressure (torr @ 20°C)**	**Henry's Law Constant (20°C) (atm-m³/mol)**	**K_{OC} (ml/g)**	**K_{OW}**	**Photodegradation[a] Half Life, $t_{1/2}$ Low (days)**	**High (days)**
Calcium Silicide	76.0	S							
Antimony Sulfide	339.70	S	1.75@ 18°C[l]						
Potassium Chlorate	122.55	S	6006E+4[b]						
Ammonium Chlorate	117.50	S	1.07E +5 @ 0°C[l]						
Barium Nitrate	261.38	S	8.7E+4[l]						
Calcium Resinate	1,349.50	S	Insoluble[l]						
Strontium Peroxide	119.62	S	180[l]						
Barium Peroxide	169.34	S	1.68E+3[l]						
Strontium Nitrate	211.65	S	6.6E+5[b]						
Potassium Perchlorate	138.55	S	1.5E+4[b]						
BOOSTER AND SECONDARY EXPLOSIVES									
1,2,4-Butanetriol Trinitrate (BTN)	241.10								
Diethyleneglycol Dinitrate (DEGN)	196.14	L	4.0E+3 @ 25°C[n]	5.9E-3 @ 25°C[n]	3.83-7 @ 25°C[n]	107[n]	9.55[n]		
Nitrostarch (NS)	208.15	S							
Pentaerythritol Tetranitrate (PETN)	316.17		2.1 @ 25°C[n]	5.83E-9 @ 25°C	1.07E-9 @ 25°C[n]	2,455[n]	5,129[n]		
Triethylene Glycol Dinitrate (TEGDN)	240.20								
1,1,1-Trimethylethane Trinitrate (TMETN)	255.13								
Cyclotetramethylene Tetranitramine (HMX)	296.20	S	5 @ 25°C[n]	3.33E-14 @ 25°C[n]	2.60E-15 @ 25°C[n]	3.47[n]	1.82[n]		
Cyclotrimethylene Trinitramine (RDX)	222.15	S	60 @ 25°C[n]	4.03E-9 @ 25°C[n]	1.96E-11 @ 25°C[n]	100[n]	7.41[n]		
Ethylenediamine Dinitrate (EDDN)	150								
2,4,6-Trinitrophenylmethylnitramine (Tetryl)	287.17	S	80 @ 25°C[n]	5.69E-9 @ 25°C[n]	2.69E-11 @ 25°C[n]	48.98[n]	44.67[n]		
Ammonium Picrate (Picric acid)	229.12	S	1.24E+ @ 25°Cn	7.47E-7 @ 25°Cn		100[n]	107.15[n]	28[f]	180[f]
1,3-Diamino-2,4,6-Trinitrobenzene (DATB)	242								
2,2',4,4'6,6'-Hexanitroazobenzene (HNAB)	452.16								
Hexanitrostilbene (HNS)	446.17								
1,3,5-Triamino-2,4,6-Trinitrobenzene (TATB)	258.15								
2,4,6-Trinitroluene (TNT)	227.15	S	150 @ 25°C[n]	5.51E-6 @25°C[n]	1.10E-8 @ 25°C[n]	525[n]	100[n]	0.15[f,o]	0.47[f,o]
Ammonium Nitrate	80.06	S	2.0E+6[b]						

See footnotes at the end of the table.

Table F-9
(Page 4 of 4)

Constituent	Molecular Weight (g/mol)	Physical State	Water Solubility (mg or ml/l @ 20°C)	Vapor Pressure (torr @ 20°C)	Henry's Law Constant (20°C) (atm-m³/mol)	K_{OC} (ml/g)	K_{OW}	Photodegradation[a] Half Life, t½ Low (days)	High (days)
OTHER ENERGETICS									
Diisopropyl Methyl Phosphonate (DIMP)									
Dinitrotoluene (DNT)									
1,3-Dinitobenzene (DNB)									
Hexachloroethane (HCE)									
Trinitroglycerol (TNG)r	227.09	L	1.25E+3[l]	2.5E+3[l]	.3-0.6 (torr-1/mol)[l]	71[l]	112[m]	0.073[f]	0.73[f]
White Phosphorus (WP)	123.88	S	3.3[b]	1 mm @ 76.6°C[c]					
MISCELLANEOUS COMPOSITION COMPONENTS									
Estane 5702-F1									

See footnotes at the end of the table.

Note: Blanks denote data is not available for the specified constituent.
S = Solid
L = Liquid
G = Gas
AW = Atomic Weight

Reference:

[a] Presented is the half-life in air based on photooxidation with ozone, unless noted.

[b] From ―The Merck Index," Budavari, S., 1989, Merck & Co., Inc., New Jersey.

[c] From ―Dangerous Properties of Industrial Materials," N.i., Sax, et al., 1989, Van Nostranc Reinhold, New York, New York.

[d] From ―Superfund Public Health Evaluation Manual (SPHEM)," October 1986, U.S. EPA, Washington, D.C., OSWER Directive 9285.4-1.

[e] From “Aquatic Fate Process Data for Organic Priority Pollutants,” EPA, 1982, Washington, D.C.

[f] From “Handbook of Environmental Degradation Rates,” Howard, P.H., et al., 1991, Lewis Publishers, Inc., Chelsea, Michigan.

[g] From “NIOSH Pocket Guide to Chemical Hazards,” NIOSH, 1990, Pub. No. 90-117.

[h] Elemental forms of most of the presented metals are found to be insoluble in water (Perry’s Chemical Engineer’s Handbook, 6th Edition,; CRC Handbook of Chemistry and Physics, 65th Edition). Solubilities of mercury, silver, and zinc are from Linke, W. F., “Solubilities, Inorganic and Metal-Organic Compounds,” 4th Edition, American Chemical Society, Washington, D.C. Lang’s Handbook of Chemistry, 14th Edition, shows the solubility of $BA(OH)_2$ at 4.00 parts per 100 grams of water at 25°C. Magnesium oxide, strontium, and potassium hydroxide solubility from CRC Handbook.

[i] From “Hazardous Substances Data Bank (HSDB),’ 1994, National Library of Medicines Specialized Information Services.

[j] From “Equation 4-9, Lyman, et al., 1990, “Handbook of Chemical Property Estimation Methods.”

[k] From “Fragment Analysis,” Chapter 1, Lyman, et al., 1990.

[l] From Equation 4-5, Lyman, et al., 1990.

[m] From Leo, et al., “Partition Coefficients and Their Uses,” Chemical Reviews, Vol. 71, No. 6.

[n] From Hulzinger, O., et al., 1991, “The Handbook of Environmental Chemistry,” Vol. 3, Part G, Springer-Verlag, New York, New York.

[o] Based on measured rate constant for sunlight photolysis in distilled water (for source reference see footnote f).

[p] Based on the estimated photolysis half-life in air (for source reference see footnote f).

[q] Toxicological profile for specified compound.

[r] Equal to nitroglycerine. See Sax, et al., 1989

SECTION G. PROCESS INFORMATION FOR OLD BOMB

APPLICABILITY AS A MISCELLANEOUS UNIT [40 CFR 264.600 and 270.23]

HWAD conducts thermal treatment of propellants and explosives at Old Bomb. The mission of HWAD is to receive, load, maintain, store, and issue ammunition. Items that become unserviceable and cannot be safely demilitarized at the Western Area Demilitarization Facility (WADF) are treated by open burning (OB). The location of the OB unit is illustrated in Figure Section A, A-2. Treatment by OB falls under the miscellaneous units provisions in Sections 40 CFR 264.600 through 264.603.

OB is used for treatment of energetic materials because it is the only safe and effective treatment processes currently available for most energetic material items. The selection of OB is based on energetic material item-specific information developed by the U.S. Army based on energetic material type and content, explosion potential, and historical experience. As discussed in the following sections, the U.S. Army is continuing to study and evaluate alternative treatment processes which may be used in the future rather than OB to treat appropriate energetic materials.

Because the OB treatment process is a non-continuous (i.e., batch) process, the facility is not subject to steady state or normal operating conditions. Wastes are treated according to HWAD SOPs. The SOPs detail the handling of the explosives from storage to unloading, the tools to be used, setting the charge, and ultimately, burning.

OB takes place at Old Bomb which covers approximately 300 acres. The OB unit is located on an area of 6.5 acres. OB is conducted in burn pans. There are major advantages for using OB disposal practices. These include the following:

- Safety. Safety is the most important consideration. Strict observance of proven OB procedures has resulted in an excellent safety record being earned by the personnel who have helped to treat the many millions of pounds of waste military energetic materials safely over the last four decades at numerous DoD installations.
- Versatility. These types of operations are extremely versatile; large or small quantities of the myriad types of materials can easily and safely be treated.
- Reliability. Because of its inherent simplicity, OB is an extremely reliable process not subject to

equipment downtime.

- Treatment Efficiency. OB is very efficient treatment as demonstrated by testing.

Description of Containment Device [40 CFR 270.23(a)]

The OB unit is located in the southern part of the facility in the Old Bomb area. The area of the OB unit is approximately 6.5 acres and consists of a 300-foot radius clearance from the center of the unit. The OB unit consists of a total of four pads, with five burn pans placed in each pad. Each pan is 19'-11" long, 7'-11 ½"wide, and 1'-3" deep. Drawings for the OB burn pans are provided in Section A, Figure A-12. The pans are constructed of a 1/4-inch thick carbon steel plate and are supported by steel burn stands that rise 2 inches above ground. Each pan is equipped with a 8'-4" by 20'-4 1/2"steel precipitation cover. The covers are equipped with handles to allow a Skytrack move the cover on and off the burn pans. Covers are tight fitting and will remain on the burn trays during operational periods to prevent accumulation of precipitation and wind dispersion of any ash and residue.

Leak Detection Provisions [40 CFR 270.23(a)(I) and (2)]

No leak detection is necessary. Any ejected waste are collected during the post-burn inspection and re-burned at this time or during the next OB event. The propellant burns very efficiently and little if any ash remains after a typical burn. The burn pans are situated on top of I-beams to allow visual inspection of their integrity, and the pans have been tested and shown to be structurally reliable. In addition, any damage to the pans would be detected during pre-burn and post-burn inspection, and repaired before they are used again. The environmental assessment in Section G shows that the environmental performance standards can be achieved by using the burn pans without any leak detection equipment.

Precipitation Cover [40 CFR 270.23(a)(1) and (2)]

Precipitation accumulation in the burn pan during non-operational periods is prevented through the use of an steel precipitation cover. Each cover is equipped with handles to allow a Skytrack move it on and off the pan. Covers are tight fitting, are secured in place over the pans, and remain on the pans during non-operational periods. Precipitation accumulation in pans during OB events and cool downs is minimized by conducting OB events only at times when precipitation is not expected.

Integrity of Burn Pans [40 CFR 270.23(a)(2)(1) and (2)]

Control measures are in place to prevent releases from the containment system through possible leaks, breaks, and cracks. The burn pans are elevated on stands 11 inches above the ground surface, thus preventing contact with soils and allowing visual inspection of leaks. Pre-burn and post-burn inspections of the pans are conducted to verify their structural integrity. The pans are taken out of service and repaired if it is found that they have lost their integrity. After each burn event, ash/residue are collected and placed in drums to minimize any releases through breaks in the pans and wind dispersion. In the event of accidental releases, the released materials are collected and treated in the next burn (if reactive) or taken to a disposal site.

Method to Control Deterioration of Fabricated Devices [40 CFR 270.23(a)(1) and (2)]

The most serious deterioration or malfunction during OB would be loss of burn pan integrity such as a burn pan leak. In the event of an accidental release of waste propellants before or during a burn event, the released waste materials will be collected and re-treated in a different burn pan. Response procedures are established and are contained in Section B, Contingency Plan. Procedures to prevent hazards are discussed in Section C.

Prevention of Accumulation of Precipitation [40 CFR 270.23(a)(1) and (2)]

The accumulation of precipitation is minimized by using covers during non-operational periods. Each cover is equipped with handles to allow a Skytrackto remove it easily on and off the pan. These covers are tight fitting which minimized precipitation from entering the burn pans. OB operations are not conducted during periods of precipitation, thereby preventing any accumulation from occurring. In the event water is found in the pans, it is collected and tested for the presence of metals and energetic materials.

Handling of Precipitation [40 CFR 270.23(a)(1) and (2)]

If levels are found above permissible levels, the precipitation will be stored in 55-gallon drums at the hazardous waste storage buildings until transportation to a permitted hazardous waste disposal facility can be secured.

Control of Ejected Waste [40 CFR 270.23(a)(1) and (2)]

Several measures are in place to control the ejection of energetic materials. The burn pan is of a sufficient depth to reduce ejection of propellant and explosive waste; i.e., stray particles will bounce off the inside walls of the pans. The cleaning of pans following the OB operations additionally reduces the potential for contamination. Post-burning inspections reveal the presence of ejected materials. These materials are collected from the OB pad and re-burned or disposed of as potentially hazardous waste. Finally, operations are restricted to periods when surface average wind speed is between 3 miles per hour (mph) and 15 mph, from a direction which would not carry emission products over any publicly accessible areas within 1 mile of the OB unit.

Inspection, Monitoring, and Maintenance Plan [140 CFR 270.23(a)(2)]

The OB unit is inspected before and after use. Prior to any burning operations, the OB unit is inspected to ensure that it is:

- Free of standing water
- Free of ash/residue, un-burnt propellant, blasting caps, fuse igniters, or other OB operational debris
- Free of glass, wood fragments, metal scraps, and debris, trash, obstacles, or tripping hazards
- Free from plant matter or other potentially combustible material.

Thirty minutes after expected burn completion, the burn pans are inspected for partial burns. If unburned material is discovered, it is subsequently re-burned if pan is safe to approach; otherwise, re-burning operations are delayed overnight. The inspection, monitoring, and maintenance plan for the OB unit is discussed in detail in Section G Table G-1, G-2, and G-3.

Equipment Testing and Maintenance [40 CFR 264.33]

Preparedness and prevention equipment inspection schedules for the OB unit are provided in Section G Table G-1.

Table G-1

Inspection Schedule for *OLD BOMB Open Burn (OB) Activities*

Inspection Item	Type of Inspection	Frequency
Truck	Equipment Inspection and Maintenance in Accordance with AR 55-355DD Form 626	Daily
Immediate OB Area	Unauthorized Personnel	Before OB
	Partial Burn	After OB
	Propellant	After OB
	Smoldering Embers	Before/After OB
	Housekeeping	Before/After OB
	Standing Water in Pans	Before OB
	Vegetation	Before OB
Communication Equipment		
Two-Way Radio (vehicular & portable)	Operational	Weekly
Telephone	Operational	Weekly
Safety and Emergency Equipment		
Fire Extinguishers	Present/Operational	Weekly
First Aid Kit	Present	Weekly
Coveralls, Head Covering (fire retardant)	Present	Weekly
Safety Glasses	Present	Weekly
Respirators	Present	Weekly
Security Devices		
Gate	Integrity	Weekly
Lock	Operational	Weekly
Warning Signs	Present	Weekly
Scarlet Range Flag	Present	Weekly

This is inspected at least week if in operations

Table G-2

OLD BOMB BURNING GROUNDS CHECKLIST

The Supervisor or designated representative at the Old bomb Grounds will use this checklist daily, when in operations and comply with all requirements found in the Old Bomb SOP.

PREOPERATION CHECKS

1. Display red danger flag and proper warning signs are present at Burn Grounds office (Building 399). ☐
2. Assure burn area is clear of unauthorized personnel. ☐
3. Verify Cellular Phone and radio communications between vehicle and the Burning Grounds office is functional. ☐
4. Assure firefighting Equipment, proper Respirator, Safety Glasses and first aid kits are available and serviceable. ☐
5. Assure Marine Corps Project Office is notified if concurrent operations are being performed. ☐
6. Assure extraneous combustible material is removed within a 200 feet radius, debris is cleaned up and no standing water is in Burn Pans. ☐

PREDETONATION CHECKS

1. Conduct roll call and account for all personnel. ☐
2. Check personnel/visitor's logs and account for all personnel. ☐
3. Account for all equipment. ☐
4. Lock and guard gate at entrance are present and operational. ☐
5. Assure red flags are displayed at entrance to Burning Grounds and entrance to the Burn Area. ☐
6. Assure Burn Area is clear of personnel and/or equipment.. ☐

POST-DETONATION CHECKS

1. Assure that there are no misfires, partial burn, and smoldering embers in or near the Burning Grounds. ☐
2. Ejected Propellant and debris are disposed of properly in or near the Burning Grounds. ☐
3. The material near the burn pans is collected into properly marked containers. ☐

Supervisor's Signature ______________________ Date/Time _________/__________.

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Table G-3

METEOROLOGICAL WEATHER STATION
INSPECTION CHECKLIST

INSPECTOR	LOCATION	DATE	TIME
WEATHER CONDITIONS		DIRECTION	

DAILY INSPECTION WHEN IN OPERATION

NOTE: INSPECTION WILL INITIAL EACH OF THE FOLLOWING DAILY.

	INITIALS
1. OBSERVE THE TOWER FOR STRUCTURAL DAMAGE.	
2. OBSERVE THE ANEMOMETER IS ROTATING WHEN WIND IS PRESENT. FROZEN OR WORN BEARINGS WILL PREVENT THE CUPS FROM SPINNING. NOTE IF ANY SNOW OR ICE HAS ACCUMULATED ON ANEMOMETER. CHECK FOR MISSING OR DAMAGED CUPS.	
3. OBSERVE THAT THE WIND VANE IS POINTING IN THE DIRECTION FROM WHICH THE WIND IS BLOWING FROM. FROZEN OR WORN BEARINGS OR BRUSHINGS WILL PREVENT THE WIND VANE FROM SPINNING. NOTE IF ANT SNOW OR ICE HAS ACCUMULATED ON WIND VANE.	
4. ASSURE THE WIND VANE IS STRAIGHT. EXCESS WEIGHT ON THE WIND VANE WILL BEND THE METAL ROD CONNECTING THE TAIL WITH THE HEAD OF THE VANE.	
5. OBSERVE THE TEMPERATURE SENSOR ARM IS PERPENDICULAR TO TOWER AND THE TEMPERATURE SENSOR IS VERTICAL AND ABOVE THE ARM. SCREWS THAT FASTEN THE SENSOR TO THE ARMY MAY LOOSEN CAUSING THE SENSOR TO ROTATE UPSIDE DOWN. CHECK FOR ICE OR SNOW BUILDUP ON THE SENSOR.	
6. CHECK STRIP CHART RECORDER. DETERMINE THAT THE STRIP CHART IS OPERATIONAL. CHECK TO ENSURE PAPER HAS NOT RUN OUT. CHECK FOR EVIDENCE OF “LOW PAPER” MARK	
7. TEN METER AREA AROUND THE TOWER SHOULD BE CLEARED OF OBSTRUCTIONS. LOOK FOR VEHICLES, DUMPSTERS AND OTHER MISCELLANEOUS ITEMS.	
8. CHECK SOLAR PANEL FOR CLEANLINESS, BIRD DROPPINGS, AND DIRT ON THE SOLAR PANEL WILL SIGNIFICANTLY REDUCE ITS RECHARCHING CAPABILITIES.	

Ash and Residue Management [40 CFR 270.23(a)(2)]

During OB operations, ash/residue is potentially generated at two locations: (1) within the containment systems as a result of the thermal treatment process, and (2) surrounding the containment device due to the ejection of propellant and explosive waste or ash. Following a burn, the ash/residue is collected in steel drums and temporarily retained prior to characterization and subsequent removal to an approved hazardous or nonhazardous waste management facility, depending on characterization. The ash is sampled for the characteristics of reactivity and TCLP, in accordance with the Waste Analysis Plan provided in Appendix B. Any ash/residue found to contain metals above RCRA TCLP thresholds is managed as hazardous waste. The ash/residue is stored on-site until transportation to a permitted hazardous waste disposal facility can be secured. If the ash does not exhibit the characteristic of toxicity, it will be disposed of in a suitable solid waste disposal facility. Ash/residue will be collected in labeled DOT approved 55-gallon drums with bolted, ring-secured lids. After the OB operations, soils are also analyzed for hazardous characteristics (reactivity and toxic metals) and disposed of based on test results. Analytical results are kept for a minimum of three years following disposal at a RCRA-approved hazardous waste facility.

Copy of SOP [40 CFR 270.23(a)(2)]

OB operations are conducted in accordance with the HWAD SOP for Old Bomb, which is provided in Appendix G. This SOP is periodically reviewed and updated.

OPEN BURNING ON THE GROUND SURFACE WHERE UNIT INCORPORATES SOIL AS PART OF THE UNIT (40 CFR 270.23 and 270.32)

HWAD no longer conducts OB on the ground surface. Therefore these requirements are not applicable.

GEOLOGIC REPOSITORIES [52 FR 46952]

HWAD does not place containerized hazardous waste or bulk non-liquid hazardous waste in geologic repositories such as underground salt formations, mines, or caves; therefore these requirements are not applicable.

DEACTIVATED MISSILE SILOS [52 FR 46952)]

HWAD does not dispose of waste in deactivated missile silos; therefore these requirements are not applicable.

CERTAIN THERMAL TREATMENT UNITS OTHER THAN INCINERATORS [56 FR 720002 AND 57 FR 546952]

HWAD does not dispose of waste in the types of units covered under this section i.e., molten salt pyrolysis, calcination, wet-air oxidation, microwave destruction, carbon regeneration, and sludge dryers; therefore these requirements are not applicable.

CERTAIN CHEMICAL, PHYSICAL, AND BIOLOGICAL TREATMENT UNITS [52 FR 46952]

HWAD does not treat wastes in chemical, physical and biological treatment units; therefore these requirements are not applicable.

ENVIRONMENTAL PERFORMANCE STANDARDS

Environmental performance standards were developed to demonstrate compliance with the environmental performance standards described in 40 CFR 264 Subpart X. The performance standards address waste characterization, operating procedures, allowable treatment quantities, groundwater monitoring, training, residue collection and disposition, prevention and control of releases, and closure of the OB unit. All standards are based on information provided in the permit application. References to relevant sections of the permit application are provided.

QUANTITY AND PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE WASTE AND PRODUCTS OF COMBUSTION

Wastes

Wastes treated will not exceed the HWAD Title V Air Permit. The maximum allowable N.E.W. burned in OB pans is 1000 per pan; 20,000 per day combined; and 3,900,000 pounds per calendar year. The maximum allowable number of open burns combines will not exceed 20 per day.

Products of Combustion and Incomplete Combustion

The primary air emissions from OB operations are products of combustion, which typically include the following:

- Ammonia
- Carbon dioxide
- Carbon monoxide
- Methane
- Nitrogen and nitrogen oxides
- Sulfur dioxide
- Water

Secondary air emissions include various products of incomplete combustion, which can include energetic materials, organics, and trace metals. A list of the potential OB products of combustion and incomplete combustion is given in Section G, Table G-7. This list represents a compilation of potential emission constituents (based on U.S. Army studies) considering the wide range of ordnance, munitions, and propellants which are treated by the Military Services. HWAD currently treats a subset of these energetic materials items.

A list of representative energetic material items which are candidates for OB treatment at HWAD is included in Section G, Table G-4. Although the POLU-11 combustion emissions model was used in the 1993 application to estimate the products of combustion for the HWAD items listed in, Section G, Table G-4, this model does not estimate products of incomplete combustion (PIC). To account for PICs, information contained in the U.S. Army Environmental Center's (AEC, 1995) "Air Pathway Screening Assessments for RCRA Subpart X Permitting" (Revision 1, July 1995) document was used. PIC emission factors are presented in Table G-6 for open burning operations, for both short-term (<24 hours) and long-term (>24 hours) exposure periods (AEC 1995). The short-term emission factors are based on maximum measured air concentrations, whereas long-term emissions are based on average air concentrations from Bang Box tests conducted at Dugway Proving Grounds, Utah. These emission factors represent results from the testing of 128 propellant and propellant charge items (AEC, 1995) see Appendix Q.

Table G-4

List of Propellants and Explosives

Treated by OB at HWAD

Number	**Description**
M1	Single-Base Propellant, Howitzer
M2	Double-Base Propellant, Howitzer
M5	Double-Base Propellant, Howitzer
M6	Single-Base Propellant, Howitzer
M6+2	Single-Base Propellant, Howitzer
M7	Double-Base Propellant, Mortar
M8	Double-Base Propellant, Mortar
M9	Double-Base Propellant, Mortar
M10	Single-Base Propellant
M12	Single-Base Propellant
M14	Single-Base Propellant, Howitzer
M15	Triple-Base Propellant, Howitzer
M17	Triple-Base Propellant, Howitzer
M26	Double-Base Propellant
M26A1	Double-Base Propellant
M26E1	Double-Base Propellant
M30	Triple-Base Propellant, Howitzer
M30A1	Triple-Base Propellant, Howitzer
M30A2	Triple-Base Propellant, Howitzer
M31	Triple-Base Propellant, Howitzer
M31A1	Triple-Base Propellant, Howitzer
M31A1E1	Triple-Base Propellant, Howitzer
AHH	Double-Base Propellant
ARP	Double-Base Propellant
---	Ballistic Double-Base Propellant
---	Benite Single-Base Propellant
T20	Triple-Base Propellant
T25	Double-Base Propellant
HPC-13	Double-Base Propellant
IMR	(Improved Military Rifle) Single-Base Propellant, Small Arms

Table G-4

List of Propellants and Explosives

Treated by OB at HWAD (Continued)

Number	Description
CBI	(Clean Burning Initiator) Single-Base Propellant
DIGL-RP	Single-Base Propellant
N12	Double-Base Propellant
N14	Double-Base Propellant
JA-2	Double-Base Propellant
LCA 6260	Triple-Base Propellant
NACO II	Single-Base Propellant, Naval Ordnance
NOSOL-18	Single-Base Propellant
WC	Double-Base Propellant, Small Arms
XM41	Triple-Base Propellant
N5	Double-Base Propellant
N8	Double-Base Propellant
LKL	Single-Base Propellant
NACO I	Single-Base Propellant, Naval Ordnance
T29	Triple-Base Propellant
T238	Double-Base Propellant
---	TNT
---	Ammonium Picrate
SPCF	Single Base
SPCG	Triple Base
SPD	Single Base
SPDF	Single Base
SPDN	Single Base

Table G-5
Chemical Composition of Energetic Items
Treated by OB at HWAD

Item	Energetic Constituent	Weight Percent *	RCRA Waste Codes
M1 Single-Base Propellant, Howitzer	Nitrocellulose Dinitrotoluene Diphenylamine Dibutylphthalate	85.0 10.0 1.0 5.0	D003 D030
M2 Double-Base Propellant, Howitzer	Nitrocellulose Nitroglycerine Barium Nitrate Potassium Nitrate Ethyl Centralite Graphite, Carbon Black	77.45 19.5 1.4 0.75 0.6 0.3	D003 D005
M5 Double-Base Propellant, Howitzer	Nitrocellulose Nitroglycerine Barium Nitrate Potassium Nitrate Ethyl Centralite Graphite, Carbon Black	81.95 15.0 1.4 0.75 0.6 0.3	D003 D005
M6 Single-Base Propellant, Howitzer	Nitrocellulose Dinitrotoluene Diphenylamine Dibutylphthalate	87.0 10.0 1.0 3.0	D003 D030
M6+2 Single-Base Propellant, Howitzer	Nitrocellulose Dinitrotoluene Diphenylamine Dibutylphthalate Potassium Sulfate	87.0 10.0 0.9 3.0 2.0	D003 D030
M7 Double-Base Propellant, Mortar	Nitrocellulose Nitroglycerine Ethyl Centralite Potassium Perchlorate Graphite, Carbon Black	54.6 35.5 0.9 7.8 1.2	D003
M8 Double-Base Propellant, Mortar	Nitrocellulose Nitroglycerine Potassium Nitrate Ethyl Centralite Diethylphthalate	52.15 43.0 1.25 0.6 3.0	D003
M9 Double-Base Propellant, Mortar	Nitrocellulose Nitroglycerine Potassium Nitrate Ethyl Centralite	57.75 40.0 1.5 0.75	D003
M10 Single-Base Propellant	Nitrocellulose Diphenylamine Potassium Sulfate Graphite, Carbon Black	98.0 1.0 1.0 0.1	D003
M12 Single-Base Propellant	Nitrocellulose Dinitrotoluene Potassium Sulfate Tin Dioxide	97.7 8.0 (Coating) 0.75 0.75	D003 D030
M14 Single-Base Propellant, Howitzer	Nitrocellulose Dinitrotoluene Diphenylamine Dibutylphthalate	90.0 8.0 1.0 (Coating) 2.0	D003 D030

Table G-5
Chemical Composition of Energetic Items
Treated by OB at HWAD (Continued)

Item	Energetic Constituent	Weight Percent *	RCRA Waste Codes
M15 triple-Base Propellant, Howitzer	Nitrocellulose	20.0	D003
	Nitroglycerine	19.0	
	Nitroguanadine	54.7	
	Ethyl Centralite	6.0	
	Cryolite	0.3	
M17 Triple-Base Propellant, Howitzer	Nitrocellulose	22.0	D003
	Nitroglycerine	21.5	
	Nitroguanadine	54.7	
	Ethyl Centralite	1.5	
	Cryolite	0.3	
	Graphite, Carbon Black	0.1	
M26 Double-Base Propellant	Nitrocellulose	67.25	D003
	Nitroglycerine	25.0	D005
	Barium Nitrate	0.75	
	Potassium Nitrate	0.7	
	Ethyl Centralite	6.0	
	Graphite, Carbon Black	0.3	
M26A1 Double-Base Propellant	Nitrocellulose	68.7	D003
	Nitroglycerine	25.0	
	Ethyl Centralite	6.0	
	Graphite, Carbon Black	0.3	
M26E1 Double-Base Propellant	Nitrocellulose	68.7	D003
	Nitroglycerine	25.0	
	Ethyl Centralite	6.0	
	Graphite, Carbon Black	0.9	
M30 Triple-Base Propellant, Howitzer	Nitrocellulose	28.0	D003
	Nitroglycerine	22.5	
	Nitroguanadine	47.7	
	Ethyl Centralite	1.5	
	Cryolite	0.3	
	Graphite, Carbon Black	0.2	
M30A1 Triple-Base Propellant, Howitzer	Nitrocellulose	28.0	D003
	Nitroglycerine	22.5	
	Nitroguanadine	47.0	
	Potassium Sulfate	1.0	
	Ethyl Centralite	1.5	
	Graphite, Carbon Black	0.15	
M30A2 Triple-Base Propellant, Howitzer	Nitrocellulose	27.0	D003
	Nitroglycerine	22.5	
	Nitroguanadine	46.25	
	Potassium Sulfate	2.75	
	Ethyl Centralite	1.5	
	Graphite, Carbon Black	0.15	
M31 Triple-Base Propellant, Howitzer	Nitrocellulose	20.0	D003
	Nitroglycerine	19.0	
	Nitroguanadine	54.7	
	Dibutylphthalate	4.5	
	Cryolite	0.3	
	2-Nitrodiphenylamine	1.5	
	Graphite, Carbon Black	0.15	

Table G-5
Chemical Composition of Energetic Items
Treated by OB at HWAD (Continued)

Item	Energetic Constituent	Weight Percent *	RCRA Waste Codes
M31A1E1 Triple-Base Propellant, Howitzer	Nitrocellulose Nitroglycerine Nitroguanadine Dibutylphthalate Potassium Sulfate Ethyl Centralite Graphite, Carbon Black	21.5 18.0 54.7 3.0 1.25 1.5 0.05	D003
AHH Double-Base Propellant, Howitzer	Nitrocellulose Nitroglycerine Nitroguanadine Ethyl Centralite Cryolite Graphite, Carbon Black	22.0 21.5 54.7 1.5 0.3 0.1	D003
M26 Double-Base Propellant	Nitrocellulose Nitroglycerine 2-Nitrodiphenylamine Lead Stearate Lead 2-Ethyl Hexoate	83.0 11.4 1.0 2.3 2.3	D003 D008
ARP Double-Base Propellant	Nitrocellulose Nitroglycerine 2-Nitrodiphenylamine Lead Beta Resorcylate Lead Salicylate Graphite, Carbon Black	75.0 17.0 2.0 3.0 3.0 0.04	D003 D008
Ballistic Double-Base Propellant	Nitrocellulose Nitroglycerine Diethylphthalate Methylcellulose Wax, Candelilla Wax Ethyl Centralite Graphite, Carbon Black	50-60 40-50 5-15 5-15 5-15 5-15 5-15	D003
Benite Single-Base Propellant	Nitrocellulose Potassium Nitrate Ethyl Centralite Sulfur Charcoal	40.0 44.3 0.5 6.3 9.4	D003
T20 Triple-Base Propellant	Nitrocellulose Nitroglycerine Nitroguanadine Dibutylphthalate Ethyl Centralite Lead Carbonate Graphite, Carbon Black	20.0 13.0 60.0 5.0 2.0 1.0 -	D003 D008
T25 Double-Base Propellant, Howitzer	Nitrocellulose Nitroglycerine Barium Nitrate Potassium Nitrate Ethyl Centralite Graphite, Carbon Black	73.25 20.0 0.75 0.7 5.0 0.3	D003 D005
HPC-13 Double-Base Propellant	Nitrocellulose Nitroglycerine Potassium Sulfate Ethyl Centralite Graphite, Carbon Black	Balance 25-32 0.5-1.0 0.5-1.0 0.4	D003

Table G-5
Chemical Composition of Energetic Items
Treated by OB at HWAD (Continued)

Item	Energetic Constituent	Weight Percent *	RCRA Waste Codes
IMR (Improved Military Rifle) Single-Base Propellant, Small Arms	Nitrocellulose Dinitrotoluene Diphenylamine Potassium Sulfate	100 8.0 (Coating Added) 0.7 (Coating Added) 1.0 (Coating Added)	D003 D030
CBI (Clean Burning Initiator) Single-Base Propellant	Nitrocellulose Diphenylamine Graphite, Carbon Black	98.0 1.5 0.3	D003
DIGL-RP Single-Base Propellant	Nitrocellulose DEGN Magnesium Oxide Methyldiphenylurea Ethyl Centralite Graphite, Carbon Black	62.5 36.7 0.05 0.45 0.25 0.05	D003
N12 Double-Base Propellant	Nitrocellulose Nitroglycerine 2-Nitrodiphenylamine Di-n-propyladipate Wax, Candelilla Wax Cupric Salicylate	50.0 38.0 2.0 5.85 0.15 2.0	D003
N14 Double-Base Propellant	Nitrocellulose Nitroglycerine 2-Nitrodiphenylamine Di-n-propyladipate Wax, Candelilla Wax Monobasic R-303 and C-505	48.0 44.5 2.0 0.4 0.1 5.0	D003
JA-2 Double-Base Propellant	Nitrocellulose Nitroglycerine Akardit II DEGN Magnesium Oxide Graphite, Carbon Black	59.5 14.9 0.7 24.8 0.05 0.05	D003
LCA 6260 Triple-Base Propellant	Nitrocellulose Nitroglycerine Nitroguanadine Dioctylphthalate Ethyl Centralite RDX	29.3 22.7 5.0 5.0 1.5 36.5	D003
NACO II Single-Base Propellant, Naval Ordnance	Nitrocellulose Potassium Sulfate Ethyl Centralite Butyl Stearate Lead Carbonate	93.6 1.2 1.03 3.0 1.0	D003 D008
NOSOL-18 Single-Base Propellant	Nitrocellulose Dibutylphthalate Triethylene Glycol Dinitrate Wax, Candelilla Wax Metriotrinitrate Potassium Sulfate Ethyl Centralite Lead Carbonate	46.0 8.1 3.0 0.1 38.5 1.3 2.0 1.0	D003 D008

Table G-5
Chemical Composition of Energetic Items
Treated by OB at HWAD (Continued)

Item	Energetic Constituent	Weight Percent *	RCRA Waste Codes
WC Double-Base Propellant, Small Arms	Nitrocellulose	Balance	D003
	Nitroglycerine	8-12	D030
	Dinitrotoluene	1.0	
	Diphenylamine	0.75-1.5	
	Dibutylphthalate	3.5-7.5	
	Potassium Nitrate	1.0-1.5	
	Calcium Carbonate	1.0 (Max.)	
	Sodium Sulfate	0.5 (Max.)	
	Graphite, Carbon Black	0.4 (Max.)	
XM41 Triple-Base Propellant	Nitrocellulose	42.68	D003
	Nitroglycerine	26.5	
	Nitroguanadine	20.0	
	Potassium Sulfate	1.22	
	Ethyl Centralite	1.4	
	Di-n-propyladipate	8.0	
	Cupric Salicylate	0.1	
	Graphite, Carbon Black	0.1	
N5 Double-Base Propellant	Nitrocellulose	50.0	D003
	Nitroglycerine	34.9	D008
	Diethylphthalate	10.5	
	2-Nitrodiphenylamine	2.0	
	Lead Salts	2.4	
	Wax, Candelilla Wax	0.2	
N8 Double-Base Propellant	Nitrocellulose	49.55	D003
	Nitroglycerine	37.69	D008
	Diethylphthalate	6.65	
	2-Nitrodiphenylamine	1.98	
	Lead 2,4-Dihydroxybenzoate/ Lead Salicylate	3.98	
	Wax, Candelilla Wax	0.1	
	Graphite, Carbon Black	0.05	
LKL Single-Base Propellant	Nitrocellulose	93.6	D003
	Dinitrotoluene	3.0	D030
	Diphenylamine	1.0	
	Dibutylphthalate	1.0	
	Potassium Sulfate	1.4	
	Graphite, Carbon Black	0.2 (Added)	
NACO I Single-Base Propellant, Naval Ordnance	Nitrocellulose	87.3	D003
	Potassium Sulfate	3.3	D008
	Ethyl Centralite	1.03	
	Butyl Stearate	4.16	
	Lead Carbonate	1.19	
T29 Triple-Base Propellant	Nitrocellulose	46.0	D003
	Nitroglycerine	21.5	
	Nitroguanadine	30.7	
	Ethyl Centralite	1.5	
	Cryolite	0.3	
	Graphite, Carbon Black	0.1	
T238 Double-Base Propellant	Nitrocellulose	60.0	D003
	Nitroglycerine	23.8	D008
	2-Nitrodiphenylamine	1.4	
	Dimethylphthalate	2.6	
	Lead Stearate	2.0	

Table G-5
Chemical Composition of Energetic Items
Treated by OB at HWAD (Continued)

Item	Energetic Constituent	Weight Percent *	RCRA Waste Codes
TNT	TNT	100	D003 D030
Ammonium Picrate	Ammonium Picrate	100	D003
SPCF Single-Base Propellant	Nitrocellulose Ethyl Centralite Butyl Stearate Potassium Sulfate Lead Carbonate	93.75 1.0 3.0 1.25 1.0	D003
SPCG Triple-Base Propellant	Nitrocellulose Nitroglycerine Nitroguanidine Ethyl Centralite Potassium Sulfate	18.0 19.0 55.0 7.0 1.0	D003
SPD Single-Base Propellant	Nitrocellulose Diphenylamine	99.0 1.0	D003
SPDF Single-Base Propellant, Naval Ordnance	Nitrocellulose Diphenylamine Potassium Sulfate	97.0 1.0 2.0	D003
SPDN Single-Base Propellant	Nitrocellulose Diphenylamine Dinitrotoluene Dibutylphthalate Potassium Sulfate	84.0 1.0 10.0 3.0 2.0	D003

* Total weight percent of energetic constituents may not equal 100 percent.

Table G-6
Summary of Air Emission Factors
(Pound of Contaminant per Pound of Material Treated)*

	Exposure Period	
Emission Contaminant	**Short (≤24 hours)**	**Long (>24 hours)**
Criteria Pollutants		
Carbon Monoxide	9.8E-04	3.9E-04
Nitrogen Dioxide	1.9E-03	7.5E-04
Sulfur Dioxide	1.7E-03	2.5E-04
PM10	2.8E-02	1.1E-02
Lead	2.6E-02	2.6E-02
Air Toxics		
Ammonia	2.0E-05	2.0E-05
Hydrogen Cyanide	2.0E-05	2.0E-05
Nitric Oxide	5.3E-03	2.5E-03
Metals		
Aluminum	6.4E-04	6.4E-04
Barium	7.4E-03	7.4E-03
Copper	2.6E-03	2.6E-03
Magnesium	5.0E-04	5.0E-04
Potassium	1.7E-01	1.7E-01
Sodium	5.5E-04	5.5E-04
Tin	7.5E-03	7.5E-03
RDX	1.0E-06	7.2E-09
HMX	1.6E-07	2.2E-09
TNT	1.0E-06	4.4E-08
TNG	4.9E-07	1.5E-07
DNT	1.3E-07	3.2E-08
NG	5.5E-07	4.0E-08
TNB	1.4E-08	8.8E-09
Other Combustion Products		
Dinitropyrene, 1,6-	1.0E-08	1.0E-08
Nitropyrene, 1-	1.9E-08	1.2E-08
Methylene bis(4-methyl-6-t-butyl phenol) 2,2'-	1.0E-08	1.0E-08
Naphthalylamine, 2-	1.0E-08	1.0E-08

Emission Contaminant	Exposure Period	
	Short (≤24 hours)	Long (>24 hours)
Nitrodiphenylamine, 2-	1.3E-08	1.1E-08
Nitronaphthalene, 2-	8.1E-08	2.6E-08
Ethyl-1,3-diglycidyl-5-methylhydentoin diepoxide, 5'-	1.0E-08	1.0E-08
Benzo(a)pyrene	7.5E-07	1.5E-07
Benzene	1.6E-05	5.6E-06
Benzo(a)anthracene	1.2E-07	3.3E-08
Benzo©acridine	1.0E-08	1.0E-08
Dictylsebacate	1.0E-08	1.0E-08
Dibenz(a,h)anthracene	1.0E-08	1.0E-08
Dibenzofurans	9.9E-05	1.7E-05
Diethylene tramine	1.0E-08	1.0E-08
Di-n-propyladipate	1.0E-08	1.0E-08
Diphenylamine	2.6E-07	5.1E-08
Isophorone di-isocyanate	1.0E-08	1.0E-08
Nitrophenol, o-	2.1E-06	2.8E-07
Salicylic acid	1.0E-08	1.0E-08
N-nitrosodiphenylamine	1.2E-06	2.3E-07
Naphthalene	1.7E-06	5.1E-07
Resorcinol	1.0E-08	1.0E-08
Phenyl di-isodecylphosphite	1.0E-08	1.0E-08
Phenol	8.7E-06	2.7E-06
Pyrene	3.4E-07	8.4E-08
TNMHC	6.3E-04	2.2E-04
Triacetin	1.0E-08	1.0E-08

*Non-metal emission factors from AEC, 1995. Metal emission factors based on mass balance approach using worst-case metal composition for energetic listed in Table G-5

Table G-7
Major Chemical Components Associated with OB Operations

Energetic Materials	Paraffins	Olefins	Semivolatiles
Ammonium Picrate	i-Butane	Acetylene	Benzo(a)anthracene
Ammonium Nitrate	n-Butane	1,3-Butadiene	Benzo(a)pyrene
Barium Nitrate	Cyclopentane	1-Butene	Benzo(c)acridine
Boric Acid	2,2-Dimethylbutane	i-Butene	Biphenyl
Calcium Stearate	2,3-Dimethylbutane	Cis-2-Butene	Dibenz(a,h)anthracene
Cyclotetramethylene	2,3-Dimethylhexane	Trans-2-Butene	Dibenzofuran
Tetranitramine (HMX)	2,4-Dimethylhexane	Cyclopentene	Diepoxide
Cyclo-1,3,5-Trimethylene-	2,4-Dimethylpentane	Ethylene	Diethylenetriamine
2,4,6-Trinitramine (RDX)	1,3-Dinitrobenzene	1-Hexene	1,6-Dinitropyrene
Diethylhexylsebacate	Dinitrotoluene	Cis-2-Hexene	2,5-Diphenyloxazole
Diisopropylmethyl-	Ethane	rans-2-Hexene	5-Ethyl-1,3-diglycidyl-5-
Phosphonate	Ethylcyclohexane	Isoprene	methylhydantoin
Hexachloroethane	3-Ethylhexane	2-Methyl-1-Butene	Isophorone Diisocyanate
Lead Styphnate	n-Heptane	2-Methyl-2-Butene	2,2-Methylene bis(4-
Lead Azide	n-Hexane	3-Methyl-1-Butene	methyl)-6-t-butylphenol-
Mercury Fulminate	Methylcyclohexane	2-Methyl-1-Pentene	1-Methylnaphthalene
Monoethylamine	Methylcyclopentane	2-Methyl-2-Pentene	2-Methylnaphthalene
Nitrocellulose	2-Methylheptane	4-Methyl-1-Pentene	N-Nitrosodiphenylamine
Nitroglycerine	3-Methylhexane	Myrcene	Naphthalene
Nitroguanidine	2-Methylpentane	1-Pentene	2-Naphthaleneamine
Nitromethane	3-Methylpentane	Cis-2-Pentene	2-Naphthylamine
Pentaerythritol Tetranitrate	n-Nonane	Trans-2-Pentene	2-Nitrodiphenylamine
(PETN)	n-Octane	Propane	4-Nitrodiphenylamine
Polystyrene	i-Pentene		2-Nitronaphthalene
Potassium Nitrate	Propane		4-Nitrophenol
Sodium Nitrate	2,2,3-Trimethylpentane		1-Nitropyrene
Sulfur	2,3,4-Trimethylpentane		4-Nitrosodiphenylamine
Trinitroanisole	Trinitroglycerol		Phenanthrene
Trinitro-2,4,6-			Phenyl Ciisodecyl
Phenylmethylnitramine			Phosphite
Trinitrotoluene			di-n-Propyl Adipate
White Phosphorus			Pyrene
			Resorcinol
			Salicylic Acid
			Triacetin
			1,1,3-Trimethyl-3-
			Phenylindane
			1,3,5-Trinitrobenezne

Table G-7
Major Chemical Components Associated with OB Operations (Continued)

Aromatics	Terpenes/Miscellaneous	Metals and Inorganics	Gaseous Constituents
Benzene	δ-3-Carene	Aluminum	Ammonia
sec-Butylbenzene	Dioctyl Sebacate	Antimony	Carbon Disulfide
Dinitrobenzenes	δ-Limonene	Arsenic	Carbon Monoxide
2,4-Dinitrophenol	Phthalic Anhydride	Barium	Chlorine
Dinitrotoluenes	α-Pinene	Bromine	Hydrogen Sulfide
Diphenylamine	ß-Pinene	Cadmium	Hydrogen Cyanide
Ethylbenzene	α-Terpinene	Calcium	Hydrogen Chloride
1-Ethyltoluene	δ-Terpinene	Chromium	Nitric Oxide
2-Ethyltoluene	Terpinolene	Copper	Nitrogen Dioxide
3-Ethyltoluene		Gallium	Ozone
Nitrobenzene		Germanium	Particulates (PM10)
Phenol		Iodine	Sulfur Dioxide
n-Propylbenzene		Iron	
1-Propylbenzene		Lead	
Styrene		Magnesium	
Toluene		Molybdenum	
1,2,4-Trimethylbenzene		Nickel	
1,3,5-Trimethylbenzene		Potassium	
o-Xylene		Selenium	
m-Xylene		Silicon	
p-Xylene		Silver	
		Strontium	
		Tin	
		Titanium	
		Uranium	
		Vanadium	
		Zinc	
		Zirconium	

Table G-8

Actual Modeled Chemical Composition of Energetics

in Items Treated by OB at HWAD

Item Number	Item	Energetic Constituent	Weight Percent
1305-A974	Cartridge, 25-mm APD5-T Lnkd, M791	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite	91.3 7.0 0.6 0.9 0.2
1305-A975	Cartridge, 25-mm HEI-T Lnkd, M792	HMX Nylon Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite	19.79 1.04 72.30 5.52 0.48 0.71 0.16
1305-A976	Cartridge, 25-mm TP-T Lnkd, M793	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite	91.4 7.0 0.6 0.9 0.2
1305-A978	Cartridge, 25-mm TP Sngl Rd, PGU-23/U	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite	91.4 7.0 0.6 0.9 0.2
1305-B112	CTG 30mm HEI MK3Z LNKD LHF	PETN TNT	50 50
1305-B113	CTG 30mm TP MK4Z LNKD LHF	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite	91.3 7.0 0.6 0.9 0.2
1305-B114	CTG 30mm HEI M3Z-1 LNKD RHF	PETN TNT	50 50
1305-B115	CTG 30mm TP MK4Z LNKD RHF	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite	91.3 7.0 0.6 0.9 0.2
1305-B124	CTG 30mm HEI M799 LNKD LHF	PETN TNT	50 50
1305-B125	CTG 30mm HEI M799 LNKD RHF	PETN TNT	50 50
1310-B480	Cartridge, 40-mm Tp Lnkd F/Heli Launcher,	Does not model.	NA

Table G-8

Actual Modeled Chemical Composition of Energetics

in Items Treated by OB at HWAD

Item Number	Item	Energetic Constituent	Weight Percent
	M385		
1310-B534	Cartridge, 40mm MP M576	Barium Nitrate	1.16
		Nitrocellulose Nitroglycerine Potassium Nitrate Lead Azide Ethyl Centralite Potassium Chlorate Sulfur	69.27 17.32 1.16 3.01 1.16 5.77 1.15
1310-B542	Cartridge, 40-mm HEDP, M430	Lead Azide Barium Nitrate Nitrocellulose Nitroglycerin Potassium Nitrate RDX Tetryl Wax Ethyl Centralite	0.28 0.16 8.29 2.09 0.08 86.43 1.30 1.31 0.06
1310-B545	Cartridge, 40-mm Blank Saluting	Sodium Nitrate Charcoal Sulfur	75 15 10
1310-B551	CTG 40mm AP M81A1 Clipped	Potassium Nitrate Nitrocellulose Dinitrotoluene Dibutylphthalate Diphenylamine Magnesium Aluminum Polyvinyl Chloride Barium Peroxide	0.99 80.23 9.44 4.72 0.94 1.09 0.05 0.20 0.33
1310-B553	Cartridge, 40-mm HEP MK2	Nitrocellulose TNT Dinitrotoluene Dibutylphthalate Diphenylamine Potassium Nitrate Charcoal Sulfur	69.80 15.99 8.21 4.11 0.82 0.78 0.16 0.11
1310-B555	Cartridge, 40-mm HEI-P MK2	Nitrocellulose TNT Dinitrotoluene Dibutylphthalate Diphenylamine Potassium Nitrate Charcoal	69.80 15.99 8.21 4.11 0.82 0.78 0.16

Table G-8

Actual Modeled Chemical Composition of Energetics in Items Treated by OB at HWAD

Item Number	Item	Energetic Constituent	Weight Percent
		Sulfur	0.11
1310-B556	Cartridge, 40-mm HEI-P-NP	TNT	100
1310-B557	Cartridge, 40-mm HEI-SD 4/Clip	TNT	100
1310-B558	Cartridge, 40-mm HEI-T-NSD 4/Clip	TNT	100
1310-B559	40mm HEI-T-SD 4/CLIP	Nitrocellulose Dinitrotoluene Diphenylamine	70.38 8.28 0.83
		Dibutylphthalate Potassium Nitrate Charcoal Sulfur TNT	3.31 0.79 0.16 0.10 16.10
1310-B560	Cartridge, 40-mm HEI-T-DI-SD	TNT	100
1310-B561	Cartridge, 40-mm HE-P	TNT	100
1310-B562	Cartridge, 40-mm HE-T-SD, MK2	TNT	100
1310-B563	Cartridge, 40-mm BL-P	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite	91.4 7.0 0.6 0.9 0.2
1310-B564	Cartridge, 40-mm BL-T 4/Clip	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite	91.4 7.0 0.6 0.9 0.2
1310-B576	Cartridge, 40-mm TP LNKD, M385	Nitrocellulose Nitroglycerin Potassium Nitrate Barium Nitrate Graphite Ethyl Centralite Potassium Chlorate	77.27 19.42 0.75 1.39 0.30 0.59 0.28
1310-B666	Cartridge, 3 Pounder BLNK, MK1-1	Potassium Nitrate Charcoal Sulfur	75 15 10
1315-C025	Cartridge, 75-mm Blank, M337A2	Potassium Nitrate Charcoal Sulfur	75 15 10
1315-C162	CTG-3 IN 50 CAL VT NON-FRAG MK33	Nitrocellulose Dinitrotoluene	72.66 5.56

Table G-8

Actual Modeled Chemical Composition of Energetics in Items Treated by OB at HWAD

Item Number	Item	Energetic Constituent	Weight Percent
		Potassium Sulfate Diphenylamine Graphite Potassium Nitrate Charcoal Sulfur	0.477 0.715 0.159 15.35 3.07 2.05
1315-C164	CTG-3 IN 50 CAL VT NON-FRAG MK33	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite Potassium Nitrate Charcoal Sulfur	72.53 5.57 0.476 0.715 0.159 15.35 3.07 2.05
1315-C183	Cartridge, 3-in 50 Cal Blank	Sodium Nitrate Charcoal Sulfur	75 15 10
1315-C319	CTG-3 IN 50 CAL VT NON-FRAG MK31	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite Potassium Nitrate Charcoal Sulfur	72.53 5.57 0.48 0.72 0.16 15.35 3.07 2.05
1315-C320	CTG-3 IN 50 CAL VT NON-FRAG MK31	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite Potassium Nitrate Charcoal Sulfur	72.53 5.57 0.48 0.72 0.16 15.35 3.07 2.05
1315-C373	CTG 3 in 50 CAL VT NON-FRAG MK36 NFL	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine Graphite Sodium Nitrate Charcoal Sulfur	77.85 5.96 0.511 0.766 0.17 11.12 2.22 1.48
1315-C375	CTG 3 in 50 CAL VT NON-FRAG MK36 NFL	Nitrocellulose Dinitrotoluene Potassium Sulfate Diphenylamine	77.79 5.96 0.51 0.77

Table G-8

Actual Modeled Chemical Composition of Energetics

in Items Treated by OB at HWAD

Item Number	Item	Energetic Constituent	Weight Percent
		Graphite Sodium Nitrate Charcoal Sulfur	0.17 11.10 2.22 1.48
1315-C697	CTG 4.2 in HE M329A2 W/O FUZE	RDX TNT Nitroglycerin Nitrocellulose Potassium Nitrate	51.30 38.81 3.84 4.65 0.40
		Charcoal Ethyl Centralite Sulfur	0.06 0.05 0.04
1315-F382	Bomb, Adapter Booster, Mod TA6E4	Tetryl	100
1320-D579	155-mm High-Explosive Projectile, RAP M549 Series (Composition B)	RDX Trinitrotoluene Wax Tetryl	58.64 40.35 0.98 0.03
1325-E463	Bomb, GP 250 lb, MK81 Mod 1 (H-6/Tritonal)	TNT Powdered Aluminum	80 20
1325-E464	Bomb, GP 250 lb, MK81 Mod 0 (Tritonal)	TNT Powdered Aluminum	80 20
1325-E465	Bomb, GP 250 lb, MK81 Mod 1 (H-6, Tritonal)	TNT Powdered Aluminum	80 20
1325-E485	Bomb, GP 550 lb, MK82 Mod 1 (Tritonal)	TNT Powdered Aluminum	80 20
1325-E506	Bomb, GP 1000 lb, MK83 Mod 4	RDX TNT Powdered Aluminum Paraffin Nitrocellulose Calcium Chloride	45.0 30.0 20.0 4.0 0.7 0.3
1325-E807	Dispenser and Bomb, ACFT LS FAE, CBU 55/B	Ethylene Oxide PETN	98.92 1.08
1325-E820	Dispenser and Bomb, ACFT, CBU 59/B	HMX Nylon	94 6
1325-F372	Booster Adapter, T45E7	Tetryl	100
1330-G881	Fragmentation Hand Grenade, M67	RDX TNT Wax	60 39 1
1330-G890	Fragmentation Hand Grenade, MK2/M26 Series	RDX TNT Wax	43.42 52.79 0.01

Table G-8

Actual Modeled Chemical Composition of Energetics

in Items Treated by OB at HWAD

Item Number	Item	Energetic Constituent	Weight Percent
		Tetryl	3.78
1330-G892	Grenade, Hand Frag, MK2A1	TNT	100
1330-G911	Offensive Hand Grenade, MK3A2	TNT	100
1330-G970	Heat Rifle Grenade, M28/M31	RDX TNT Wax PETN Tetryl	58.93 38.17 0.95 0.05 1.90
1340-H342	Rocket Motor, JATO, MK25 Mod 1	Does not model.	NA
1340-H343	Rocket Motor, JATO, MK7 Mod 2 w/o Igniter	Does not model.	NA
1340-H345	Rocket Motor, JATO, MK7 Mod 1 w/o Igniter	Does not model.	NA
1345-K090	Mine AP M2 Series	Potassium Nitrate Charcoal Sulfur Lead Azide Tetryl TNT	1.50 0.30 0.20 0.15 9.27 88.58
1345-K121	Antipersonnel Mine, M14	Tetryl	100
1345-K143	M18A1 Antipersonnel Mine with M57 Firing Device	Does not model.	NA
1345-K146	Mine, APERS, M26	RDX TNT Wax	60 39 1
1345-K250	AT Heavy M19 Non-metallic	RDX TNT Wax	60.22 38.78 1.00
1370-L377	Simulator, Expl, MK2 Mod 0	Potassium Nitrate Charcoal Sulfur	75 15 10
1370-L594	Simulator, Proj Grnd Burst, M115A1	Does not model.	NA
1375-M034	Charge, Demo Block TNT 8 Lb	TNT	100
1375-M035	Charge, Demo Chain, M1 8 X 2 1/2 Lb	Tetryl TNT	75 25
1375-M420	Charge, Demo Shaped, M2 Series	RDX TNT	59.99 38.99
1375-M421	Charge, Demo Shaped, 40 Lb, M4 Series	RDX TNT PETN	67.57 29.36 3.07

Table G-8

Actual Modeled Chemical Composition of Energetics in Items Treated by OB at HWAD

Item Number	Item	Energetic Constituent	Weight Percent
1375-M456	Cord, Type 1 Class E (PETN) @ 1000 feet	PETN	100
1390-N538	Primer, Elec, MK49 Mod 4	Potassium Nitrate Charcoal Sulfur	74.0 15.6 10.4

As the Bang Box test results are based on actual measured constituent concentrations in air, these data are deemed more accurate than POLU-11 modeling performed previously for the 1993 permit application. For this reason Bang Box results, summarized in AEC (1995), have been used to estimate emissions for energetics and criteria air pollutants, in addition to PICs. Section G, Table G-8 shows the chemical or energetic constituent of each item and the approximate weight-percent composition.

For informational purposes, technical information on the POLU-11 model is presented in Appendix P along with. Previous POLU-11 modeling output for historic OB simulations.

Emission factors from AEC (1995), except for metals as presented below, were used in the air pathway modeling analysis and to establish the performance standard for the various OB treatment items. The emission factors were used in conjunction with the air quality modeling dispersion factors and health criteria to establish treatment limits for various pollutants and energetic compounds.

A compilation of short-term and long-term OB air emission is presented in Section G, Table G-6. Emission rates for metals were developed on the basis of a mass-balance assumption (i.e., what goes in also comes out) from the weight composition data presented in Section G Table G-5. The total weight of any metal compound constituent was assigned to the appropriate metal element.

Worst-case emission factors (from all energetic material items treated) for each metal were selected to evaluate exposures. This compilation of worst-case emission factors results in an overestimate of the potential metal emissions (i.e., it is not mass conservative). Explosive and propellant item specific metal emission factors are presented in Section G Table G-6 along with historic POLU-11 emission factors for propellants and explosives. Note: POLU-11 emission factors for propellants and explosives were not used in establishing treatment limits.

Physical and chemical properties of constituents modeled for subsurface pathways are included in the MEPAS model used for that analysis. [Section G, Table G-6 Summary of Air Emissions Factors (Pound of Contaminant per Pound of Material Treated)]

HWAD Physiography and Topography [40 CFR 264.601(b)(3) and (c)(4)]

See Section A

HYDROGEOLOGICAL CHARACTERISTICS OF THE SITE

Depth to Water Beneath the Unit [40 CFR 264.601(a)(2) and 270.23(b)]

The water table in the Hawthorne Area has been declining. This is related to the decline in the level of Walker Lake (approximately 4 feet annually) (IT, 1989).

The depth to groundwater varies by location at HWAD, but slopes to approximately 200 feet in the Old Bomb Area of the installation (RAI, 1992).

The water table levels in 1965 taken from wells approximately 5 miles north of where the OB unit is located, give water table depths of between 478 and 245 feet (ESE, 1985). Boring log information is presented in Appendix O. The water table level at the OB unit has not been measured.

Estimate of Net Recharge Rate [40 CFR 264.601(a)(2) and 270.23(b)]

The characteristic climate at HWAD is cool mountain desert conditions and is arid. According to the USAEHA 1988 report the average annual precipitation is 3.95 inches. The average temperatures range from 34^{o}F in January to 75^{o}F in July. The potential evapotranspiration rate is approximately 48 inches. Therefore, the potential net annual water loss calculated from the difference in precipitation and evapotranspiration is 44 inches. This large negative water balance severely limits groundwater recharge to the aquifer. The amount of water reaching the aquifer equals the total infiltration minus the amount of water absorbed by the surficial deposits in the saturated zone. In arid regions such as HWAD, rainfall is seldom sufficient to exceed the storage capacity of the subsurface materials (USAEHA, 1988).

Runoff into the Old Bomb Area emanates from the Garfield Hills and the Excelsior Mountain Range to the east and southeast, respectively. The entire Whiskey Flats-Hawthorne area generates runoff at approximately 10,000 acre-feet/year (ESE, 1985).

Description of Uppermost Aquifer [40 CFR 264.601(a)(2) and 270.23(b)]

Groundwater is available in large quantities from various zones and depths below HWAD. The installation obtains their production water largely from deeper wells. Section A, Table A-3 is a list of these production wells.

The specific yield of the uppermost 100 feet of saturated material averages 10 percent and may be as high as 15 percent. Several wells near the town of Hawthorne and in the Whiskey Flats area have saturated thickness exceeding 300 feet (RAT, 1992). No other information on the uppermost aquifer is available.

Description of Soil Types and Depth Range of Each Soil [40 CFR 264.601(a)(2) and 270.23(b)]

The surface soils and strata in the Whiskey Flats area are composed mainly of rocks and sediments common to alluvial aprons of the Quaternary Age. The dominant lithology is of clay from land surface to a depth of at least 500 feet, interbedded with layers of high permeability sands and gravel. A soil boring log taken at a well located approximately 5 miles north of the OB unit is presented in Section G, Table G-9. It shows alternating layers of yellow clays, gravel, sand, and cemented gravel of widely different permeabilities. A general description of soil type is provided in Appendix M.

Table G-9 Soil Boring Log for Well 8/31-32Bl near Old Bomb Area

Material	Thickness (feet)	Depth (feet)
Topsoil	10	10
Sand	17	27
Gravel	57	84
Clay, Yellow	42	126
Clay, Yellow, Sandy	21	147
Sand, Packed	109	256
Clay, Yellow, Sandy	8	264
Sand and Gravel, Fine	4	268
Clay, Yellow, Sandy	50	318

Clay, Gravel, and Boulders	37	355
Gravel	11	366
Clay, Yellow	5	371
Gravel, Cemented	33	404
Clay and Gravel	8	412
Gravel, Cemented	40	452

The OB unit is located on a Candelaria with very stony sandy loam and 2 to 4 percent slopes. This soil originated from mixed alluvium parent material and is found on summits of fan piedmont remnants. Located at elevations of 4,500 - 5,200 feet, there is no hazard of this soil being flooded and the permeability is moderate due to the high sand content. Water erosion hazard is slight as a result of the gentle slopes, but the wind erosion hazard is moderate. Shrink-swell potential and potential frost action are both low because of the low expansive clay content and water holding capacity. This Candelaria soil is highly corrosive, however. The following is a typical profile (SCS, 1991):

Surface Cover: Stones/boulders: 4%, Cobbles: 5%, Pebbles: 60% Depth: 0 to 4 inches

Texture: very stony sandy loam

Structure: platy

Consistence: slightly hard, very friable

Reaction: strongly alkaline

Salinity: <4mmhos per cm

Depth: 4 to 7 inches

Texture: gravelly fine sandy loam Structure: platy

Consistence: hard, very friable Reaction: strongly alkaline Salinity: <4mmhos per cm

Depth: 7 to 21 inches

Texture: very gravelly loamy sand Structure: massive

Consistence: slightly hard, very friable Reaction: very strongly alkaline Salinity: >8mmhos per cm

Depth: 21 to 60 inches

Texture: stratified extremely gravelly sand/very gravelly sand Structure: massive

Consistence: soft, very friable

Reaction: strongly alkaline

Salinity: 4-8mmhos per cm.

Topography of the Unit Area [40 CFR 264.601(a)(2) and 270.23(b)]

The OB unit is located in the lowland area bordered on the east by Garfield Hills and Excelsior Mountain range and on the west by the Wassuk Mountains. Elevation above mean sea level ranges from 3,956 feet at Walker Lake to 11,239 feet at the peak of Mount Grant (USAEHA, 1988). The pans are located at an approximate elevation of 5,095 feet.

PROTECTION OF GROUNDWATER AND SUBSURFACE ENVIRONMENT

Potential for Migration Through Soil, Liners, and Containing Structures [40 CFR 264.601(a)(1)]

The potential for ash/residue or wastes to migrate through soil, liners and containing structures is minimized by conducting the burn in aboveground pans. The potential for such a release is minimized through pre-burn and post-burn inspections of burn pan integrity. Each burn pan is situated aboveground through the use of I-beams to allow visual inspection for leaks. The use of I-beams facilitates the conduct of routine integrity inspections of the burn pans. The use of a concrete structure on which to place the burn pans is not desirable based on safety considerations.

The pans will not be used if there is any evidence of deterioration, and any damaged pans will be repaired prior to being returned to use. Additionally, the structural integrity of the steel pans has been shown to be reliable in previous U.S. Army tests at the Tooele Army Depot. The results of these tests are contained in Appendix R. In addition, new pans have been constructed for future use.

There is no need to construct secondary containment at the OB unit to be fully protective of the environment. Any ejection collected during the post-burn inspection re-burned at the next OB event, the propellant burns very efficiently, and little if any ash remains after a typical burn. The burn pans are situated on top of I-beams to allow visual inspection of their integrity, and the pans have been tested and shown to be structurally reliable. In addition, any damage to the pans would be detected during pre-burn and post-burn inspection, and repaired before they are used again. Soil samples collected before and after burns have shown only low levels of contamination (see Section H Tables H-3 and H-4). Sections H, I, and J further discusses the sampling plan that will be implemented to detect migration of soil contaminants, if any. Also, the environmental assessment in Section G shows that the environmental performance standards can be achieved by using the burn pans without any secondary containment.

Groundwater Quality and All Possible Sources of Contamination [40 CFR 264.601(a)(3)]

Groundwater quality data showed that the groundwater at various locations in the basin is generally similar, with relatively high sulfate and total dissolved solids (TDS) concentration. These levels frequently exceed the U.S. EPA National Secondary Standards for drinking water. Several wells in the area also have concentrations of nitrates and fluorides that exceed the standards. Also, the quality of the water did not deteriorate or change significantly between 1946 and 1966.

The chemical quality of the groundwater found at the edge of a closed basin such as Walker valley is usually of better quality than the groundwater in the central part of the basin. Water analyses of samples from wells from the western part of the valley have TDS of approximately 400 to 500 mg/L whereas the wells closer to Walker Lake were reported to have even higher TDS. The sources of the poor water quality in the basin are unknown, but several natural sources are possible. The most important of these sources would be presence of the evaporite deposits in the valley fill material.

One solid waste management unit (SWMU) has been identified at the OB unit (see Section AA Table AA-1). There is no evidence of resulting groundwater contamination.

The results of an extensive field investigation conducted by USAEHA in 1984 to evaluate the impact of the selected OB/OD units on groundwater quality under varying site-specific conditions indicated that no groundwater contamination was present where the annual evaporation exceeded annual precipitation by more than two feet. In arid areas like HWAD, there is no driving force to leach potential contaminants to the water table. At HWAD, the evaporation potential exceeds the precipitation rate by about 44 inches and no wastes containing free liquids are open burned at the unit (EBASCO, 1988).

Groundwater Flow and Rate [40 CFR 264.601(a)(4) and (b)(5)]

The generalized groundwater elevation and flow direction map is presented in Section A, Figure A-11. The groundwater flows east to the valley (EBASCO, 1988). The horizontal groundwater flow rate for the Hawthorne area is estimated at approximately 20 to 25 feet per year (USAEHA, 1988).

Proximity to and Withdrawal Rates of Current and Potential Groundwater Users [40 CFR 264.601(a)(5)]

There is no resident population near the OB unit. The closest resident population is the town of Hawthorne which is about 8 miles northwest. There is no commercial, agriculture, silviculture or livestock production in the immediate area of the OB unit.

The HWAD resident/worker population, obtain no drinking water from the underlying groundwater (RAI, 1992).

Potential for Damaging Unsaturated Zone [40 CFR 264.601(b)(8)]

The potential for damaging the unsaturated zone is minimized by conducting the burn in aboveground pans. The pan walls are of sufficient height (1'-3" high) to minimize the ejection of waste. Also, the post burn inspections of the area surrounding the pan will reveal the presence of ejected materials, which are subsequently collected and re-burned. A determination is made as to whether there is any remaining contamination by having experienced personnel carefully inspect the pans and the surrounding area after a burn.

Land Use Patterns in the Area [40 CFR 264.601(a)(6) and (b)(9)]

The OB unit is located in an area known as Old Bomb. Section A, Figure A-8 shows the land use patterns.

Potential for Deposition or Migration of Waste Constituents into Subsurface Physical Structures, and Into Root Zone of Food Chain Crops and Other Vegetation [40 CFR 264.601(a)(7)]

The potential for deposition or migration of waste constituents into the subsurface structures and into the root zone of the food chain crops and other vegetation is minimized by conducting the burn in aboveground pans. The pan walls are of sufficient height (1'-3 high) to minimize the ejection of waste. Also, the post burn inspections of the area surrounding the pan will reveal the presence of ejected materials, which are subsequently collected and reburned. A determination is made as to whether there is any remaining contamination by having experienced personnel carefully inspect the pans and the surrounding area after a burn.

Effects of Explosion on Geologic Units and Groundwater Flow Under the Unit [40 CFR 264.601(a)(1), and (b)(2) and 270.23(e)]

The effects of burning on geologic units and groundwater flow under the unit are minimized by conducting the burn in aboveground pans. The pan walls are of sufficient height (1'-3 foot high) to minimize the ejection of waste. Also, the postburn inspections of the area surrounding the pan will reveal the presence of ejected materials, which are subsequently collected. A determination is made as to whether there is any remaining contamination by having experienced personnel carefully inspect the pans and the surrounding area after a burn.

Potential Impacts on Human Health [40 CFR 264.601(a)(8) and (b)(10)]

The potential impacts on human health are discussed in Section I

Potential for Damage to Flora, Fauna, and Physical Structures Due to Exposure [40 CFR 264.601(a)(9) and (b)(11)]

Because humans are expected to be the most sensitive receptors, and the potential impacts on human health are low (as discussed in Section I), there is low potential for damage to flora and fauna.

PROTECTION OF SURFACE WATER, WETLANDS, AND SOIL SURFACE

Effectiveness and Reliability of Containing, Confining, and Collecting Systems and Structures in Preventing Migration [40 CFR 264.601(b)(2)]

This section addresses the concern that ash/residue or wastes may be released from the burn pans if they should develop leaks, break, or crack. The potential for such a release is minimized through pre-burn and post-burn inspections of burn pan integrity. Each burn pan is situated above-ground through the use of I-beams to allow visual inspection for leaks. The use of I-beams facilitates the conduct of routine integrity inspections of the burn pans. Use of a concrete structure on which to place the burn pans is not desirable based on safety considerations (i.e., the intense heat of the bum may cause cracking of the concrete, and energetic materials may collect in the pores and cracks in the concrete and pose an explosion hazard).

The pans will not be used if there is any evidence of deterioration, and any damaged pans will be repaired prior to being returned to use. Additionally, the structural integrity of the steel pans has been shown to be reliable in previous U.S. Army tests at the Tooele Army Depot. The results of these tests are contained in Appendix R.

There is no need to construct secondary containment for the OB unit to be fully protective of the environment. Any ejecta are collected during the post-burn inspection, reburned at the next OB event, the propellant burns very efficiently and little if any ash remains after a typical burn. The burn pans are situated on top of I-beams to allow visual inspection of their integrity, and the pans have been tested and shown to be structurally reliable. In addition, any damage to the pans would be detected during pre-burn and post-burn inspection, and repaired before they are used again.

Precipitation Patterns in the Area [40 CFR 264.601(b)(4)]

Annual precipitation varies from approximately 4 inches in the valley, where HWAD is located to approximately 25 inches in the mountains. Snow is common in the mountain areas during the winter, and localized thundershowers provide much of the summer precipitation (RAI, 1992).

Proximity of Units to Surface Waters [40 CFR 264.601(b)(6)]

HWAD occupies the Walker Lake drainage basin. The Wassuk Mountains on the western boundary of the installation are the primary watershed for the installation. The majority of the surface drainage originates here. According to the USAEHA, 1988 report the installation captures the water in a series of basins located on major creeks above HWAD. There are no perennial surface streams on the valley floor. Surface overflow occurs only after a major rainfall or snowmelt. Once the drainage paths reach the valley floor, the gradient decreases abruptly and the stream becomes influent. The surface flow rarely reaches Walker Lake (RAI, 1992).

Walker Lake is the only natural lake within the installation. It occupies a bolson (intermontane basin) with no surface drainage. Overall, the shore line of Walker Lake is receding).

Water and Surface Soil Quality Standards, Quality Data, and Uses [40 CFR 264.601(b)(7) and (8)]

A 1978 study involving samples of surface water and sediment collected from Walker Lake indicated that the surface water is fee of explosives (TNT, RDX, and hydrolyzed ammonium picrate). Two of the twelve sediment samples collected contained TNT concentration of 50 and 200 ppb. The U.S. Army Medical Bioengineering Research and Development Laboratory evaluated these results and concluded that if the areas of contamination were not widespread, and if there were good mixing of lake waters, dissolved TNT levels would be low and the hazard to aquatic life would be minimal (RAI, 1992).

Walker Lake is not used as a potable water source and is seasonally used by recreational fishermen (RAI, 1992). The OB unit is over 8 miles south of Walker Lake.

SOIL, GROUNDWATER, AND SURFACE WATER PATHWAYS ASSESSMENT [40 CFR 264.601(a)(8) and (b)(10)]

Modeling Approach

Environmental modeling assessments can be used to evaluate the potential impact from future activities at HWAD for the soil, groundwater, and surface water pathways. Impacts are based on the assumption that 100 percent of air emissions that would be associated with the maximum annual quantity of waste that could be treated by OB are available for hydrologic and re-suspension transport. The screening approach followed will therefore tend to overestimate the impacts from future activities at HWAD. The Multimedia Environmental Pollutant Assessment System (MEPAS) was used. A description of MEPAS (PNL, 1987; PNL, 1989) and MEPAS output files are provided in Appendix N

General

The modeling of the transport of metals, and energetic compounds through the environment at Old Bomb was performed using MEPAS. This model was selected over several other candidates due to its flexibility and the potential for modeling multiple transport pathways in a sequential manner. For example, MEPAS simulates the leaching of surface contamination downward through unsaturated soil to an aquifer, then allows that aquifer to reach any designated well in the area down gradient from the sources. Moreover, the aquifer can be made to recharge any nearby stream, river, or lake, and then the model provides estimates of contaminant concentrations at any point in surface waters downstream of the site.

The model can track nearly 400 different contaminants. Modeling at HWAD emphasized nine contaminants, all of which have been identified as the primary potential metal and energetic releases for the energetic material items treated by OB at HWAD. The contaminants include:

Representative metals:

- Barium (Ba)
- Lead (Pb)
- Potassium (K).

Representative energetic compounds:

- Cyclo-1,3,5-trimethylene-2,4,6-trinitramine (RDX)
- 2,4,6-Trinitrotoluene (TNT)
- Cyclotetramethylenetetranitramine (HMX)
- 1,3-Dinitrobenzene (DNB)
- 2,4-Dinitrotoluene (DNT).

The MEPAS methodology uses empirical and analytical methods to predict the potential for contaminant migration from any site to receptors of concern using pathway analysis. Four major pathways of contaminant migration are considered in MEPAS modeling:

- Groundwater leaching;
- Overland run-off;
- Surface water recharge; and
- Atmospheric deposition.

These transport pathways can be linked to form a chain of environmental media specific to the site being assessed. MEPAS considers:

- Specific site information and constituent characteristics associated with the pathways being modeled
- Metals and energetic compounds
- The potential direction of contaminant movement
- Pollutant mobility and persistence
- Population distribution of potentially exposed receptors

- Various routes of exposure
- Contaminant toxicities
- Duration of exposure to contaminants and
- Contaminant arrival times to sensitive receptors

Source Term Calculations

Modeling of the impacts of OB operations on human health and the environment requires estimating a source term for contaminants. The following is a discussion of the process used to estimate source terms for the various pathways.

Source Term

The mass of each contaminant available for release at the OB unit was calculated by multiplying the proposed annual treatment rate (2,600,000 pounds) by the maximum air emissions factor. The approach followed to calculate a source term was conservative and will tend to overestimate the impacts from future activities at HWAD. The overall source term was calculated for 10 years of OB operations.

The contaminant mass for energetics was assumed to be evenly divided among RDX, HMX, TNT, DNT, and DNB because these are the only five energetics available in MEPAS. The source term concentrations were calculated by dividing the annual mass available for release by a soil volume typifying the operation. The soil volume was estimated as a 743-acre unit to a depth of 20 inches. For overland run-off and atmospheric deposition pathways, the top 6 inches of soil was assumed to be available. The soil concentrations, given in Section G, Table G-10, were calculated by dividing the annual mass available for release by a soil volume typifying the operation. The health criteria used for potential contaminants are listed in Section G, Table G-11.

Table G-10

Soil Concentrations Predicted for

Future Operations at HWAD

Constituent	Soil Concentration Within OB Unit (g/cm^3)
RDX	2.3E-6
HMX	2.3E-6
TNT	2.3E-6
DNT	2.3E-6
DNB	2.3E-6
Pb	8.2E-2
Ba	4.4E-2
K	1.6E-1

Table G-11

Health Criteria for Potential Contaminants

Constituent	Criteria (mg/L)
RDX	0.4[a]
HMX	20[a]
TNT	0.02[a]
DNT	0.00005[b]
DNB	0.004[b]
Pb	0.05[b]
Ba	2.0[b]
K	--

[a]Drinking Water Health Advisory

[b]RCRA Action Level

Potential for Migration, Groundwater Flow/Environmental Parameters

Three hydrologic pathways were identified for transport of contaminants from the OB area: groundwater, groundwater to surface water (unnamed stream), and overland run-off (to unnamed stream). The hydrogeologic parameters were based on default values supplied by MEPAS (which are a function of soil type). The model output given in Appendix Nalso includes a listing of the environmental parameters used as inputs.

The soil above the OB groundwater is sand (EBASCO, 1988), the thickness of which is assumed to be 100 feet. The bulk density of this soil is assumed to be 1.64 g/cc. The saturated zone is also sand with an assumed pore water velocity of 115.2 feet/day. Groundwater travel distance from the OB unit to the installation boundary is about 42,240 feet (8 miles) to the northwest. The distance from the edge of the OB unit to the intermittent unnamed stream is about 868 feet north and the stream was assumed to be flowing at 5 feet/second in a 4-foot-deep, 5-foot-wide channel.

Potential for Migration

Partially saturated zone and saturated zone adsorption coefficients (K_D values) for the energetic contaminants were default values supplied by MEPAS based on the soil type input, while the K_D values for the metals were set to zero as a conservative assumption. Surface K_D values were adjusted to ensure that all contaminants were not leached out prior to 10 years of OB unit operations. Ten years of operations was the basis for the source term calculations. K_D values reflect a contaminant's tendency to bind to soil rather than to water. A contaminant with a higher K_D value has a greater affinity for soil than for water, so such a contaminant is not likely to migrate from soil into groundwater. Section G, Table G-12 lists the partially saturated zone and saturated zone K_D values used. The surface K_D values were adjusted to 2.52 for all constituents for infiltration to groundwater to a stream and a well.

The Kd values used in the MEPAS model were calculated from Kac values in the MEPAS database. This database currently contains data on 576 referenced organic and inorganic chemicals and radionuclides. The Kd values were adjusted, based on transport pathway, during model calibration to prevent the constituents from leaching completely out of the soil before the end of the 10-year simulation period. The MEPAS simulation used a ~~0~~.0” organic carbon content. For the soil type on site (sand and gravel), this is very close. This is also a worst-case condition for off-site contaminant transport.

Table G-12

OB Unit Adsorption Coefficient (K_D Values) at HWAD

Contaminant	K_D in Partially Saturated Zone	K_D in Saturated Zone
RDX	0.5732	0.5732
HMX	0.001362	0.001362
TNT	0.0101	0.0101
DNT	0.02554	0.02554
DNB	0.01084	0.01084
Sb	0.0	0.0
Pb	0.0	0.0
Ba	0.0	0.0
K	0.0	0.0

Source: Calculated by MEPAS.

Potential Impacts/Environmental Concentrations

Because of the low source terms (i.e., moderately contaminated soil) and relatively arid climatology, MEPAS predicts that the receptor concentrations of most contaminants from the OB unit is low, in the parts per billion range or less for all four environmental pathways modeled, groundwater leaching, overland run-off, surface water recharge, and atmospheric deposition. The contaminant from OB which MEPAS predicts will appear at the highest level is lead (4.1 ppb) in the intermittent unnamed stream located 868 feet north of the OB unit (Section G, Table G-13). The source of the lead is via groundwater. Environmental criteria levels for the constituents listed in Section G, Table G-13 are presented in Section G, Table G-14.

Proximity to Groundwater Users

There are no users of groundwater within 1,000 feet of the OB unit.

Sensitivity Analysis of the Results

As is the case with most types of environmental transport models, MEPAS is more sensitive to certain types of input parameters than others. Of primary influence is the average concentration of contaminants used as input to the model. The mass of each contaminant available for release at the OB unit was calculated by multiplying the maximum annual treatment rate (2,600,000 pounds) by the maximum air emissions factor. Environmental concentrations are directly proportional to these source concentrations. The quantity (i.e., flow rate) into which the contaminant is dispersed is also a parameter with which the calculated concentrations are directly proportional. The unnamed stream flow rate is such a parameter. [Section G, Table G-13 Environmental Criteria (ppm)]

For groundwater scenarios, the travel times through the partially saturated and unsaturated layers of soil, together with the adsorption coefficients, are the most sensitive input parameters

These values to a large extent determine the rates of transport of contaminants as well as the total amounts of contaminants which can reach the accessible environment. The values of the adsorption coefficients for the metals and energetic materials were sufficiently low, except for RDX, that they were transported through the soils unretarded. RDX coefficients were sufficiently high to effectively retard its migrations. Adsorption coefficient values for energetics were based on soil characteristics; typical values supplied by MEPAS were used. The values for metals were conservatively chosen as zero. Changes in travel times would result in corresponding changes in the time at which environmental concentrations appear at various locations. The concentrations, however, would not change significantly.

The sensitivity of the input parameters varies from pathway to pathway. For the overland run-off pathway, the most sensitive parameter used in the modeling is the Soil Conservation Service (SCS) curve number. This number is developed based on known or assumed soil conditions at the site. It is this number which determines the fraction of precipitation run-off at the installation. In the case of the OB unit at HWAD, this number was assigned a relatively high value for the unit conditions of 68. This value was selected in order to err on the high side relative to the modeling results, due to the minimal amount of information available on the soils in the OB unit. Even with these assumptions, the model predicted minimal concentrations at the unnamed receptor.

Table G-13
MEPAS Model Results for the Old Bomb Site

Constituent	Scenario 1		Scenario 2		Scenario 3	
	Concentration (ppm)	Time (years)	Concentration (ppm)	Time (years)	Concentration (ppm)	Time (years)
DNT	3.90E-08	1240.4	3.90E-08	1240.4	1.41E-09	0
Barium	2.07E-03	853.6	2.07E-03	853.6	1.60E-04	0
HMX	5.60E-08	873.0	5.60E-08	873.0	1.08E-10	0
Lead	4.14E-03	853.6	4.14E-03	853.6	3.13E-10	0
DNB	4.80E-08	1018.1	#	#	7.34E-10	0
Potassium Ion	1.11E-03	853.6	1.11E-03	853.6	0.00E+00	0
RDX	1.23E-09	6826.0	1.23E-09	6826.0	4.06E-09	0
TNT	5.41E-08	1006.7	5.41E-08	1006.7	6.92E-10	0

Senario 1: Vadose zone flow > groundwater > stream > receptor
Senario 2: Vadose zone flow > groundwater > well > receptor
Senario 3: Overland surface flow > stream > receptor

Notes:

1 For the surface runoff scenario, the maximum concentration occurs very quickly one run off occurs.
Data value not readable from original computer print-out in Appendix N

Table G-14
Environmental Criteria (ppm)

Constituent	MCL[a]	RCRA Action Level[b]	Ambient Water Quality Criteria[c]	Health Advisory[d]	Other
DNT	NA	5E-05	0.23	0.04	0.2[e]
Barium	2.0	NA	NA	2.0	NA
HMX	NA	NA	NA	NA	1.7[f]
Lead	NA	NA	0.0032	NA	0.015[g]
DNB	NA	4E-03	NA	0.001	NA
Potassium	NA	NA	NA	NA	NA
RDX	NA	NA	NA	NA	0.013[h]
TNT	NA	NA	NA	0.002	0.13[i]

[a,d] Drinking water regulations and health advisories (USEPA, 1996).

[b] Subpart S Action Levels, FR55, No. 145 7/27/90, 30798.

[c] EPA, 1986 (chronic value, water hardness of 100 ppm assumed).

[e] Chronic water quality criterion for the protection of aquatic life (Etnier, 1987)

[f] Ambient water quality criterion for the protection of human health (Bausam, 1989).

[g] Action level at tap.

[h] Ambient water quality criterion for the protection of human health (Etnier, 1986)

[i] Chronic water quality criterion for the protection of aquatic life (Talmage and Opresko, 1995).

SECTION H. PROTECTION OF GROUNDWATER

Old Bomb Unit is a Regulated Unit [40 CFR 264.90(a)(2), 270.14(c) and 270.23(b)]

HWAD conducts thermal treatment of conventional energetic material items at the OB unit. Treatment by OB falls under the miscellaneous units provisions in Sections 264.600 through 264.603. OB is used for treatment of energetic materials because it is the only safe and effective treatment processes currently available for most energetic material items.

Existing Groundwater Monitoring Data [40 CFR 270.14(c) and 270.23]

Although there are no groundwater wells at the OB unit, three groundwater monitoring wells were installed nearby during a study performed by IT in 1984 during an investigation of an adjacent area. Depth to groundwater is approximately 200-300 feet. Contamination from this area is extremely unlikely (IT, 1989). Locations for these wells are delineated in Figure H-1 and their descriptions are in Table H-1. The closest upgradient wells to the OB unit are the town of Hawthorne's Whiskey Flats water wells in the Whiskey Springs area approximately two miles south of the OB unit. The closest downgradient wells are wells No. 2, 3, and 4 in the South Magazine Area which is approximately eight miles north of the unit (see Figure A-11 in Section A. These latter wells are hydrologically separated from the IT study area by major geologic features (IT, 1989).

The results from the 1989 IT report are in Section H, Table H-2. The analytical results indicated no explosive compounds present above detection limits in any of the water samples collected. The principal soluble metals, calcium and sodium, ranged between 34 to 43 mg/L and 43 to 57 mg/L, respectively. The principal anions, chloride and sulfate, ranged between 26 to 33 mg/L and 65 to 90 mg/L, respectively, and nitrate, quantified as nitrogen, ranged 0.05 to 1 mg/L. Total dissolved solids ranged between 62 to 385 mg/L (IT, 1989). These are all at or below the lower end of the range for water wells in the general area. Arsenic was detected in all well samples and ranged from 0.002 to 0.02 mg/L. This compares to arsenic levels of less than 0.003 mg/L in the two town of Hawthorne Whiskey Springs water wells located two miles south of the unit. No organic, semi-volatile, or volatile compounds were reported except for one well sample.

The soil surrounding the pans is sampled upon completion of OB for wastes with different chemical constituent profiles. Soils are removed if found to be contaminated above RCRA levels. The soil sampling results are presented in Section H, Tables H-3 and H-4. The results show low levels of some metals, which are generally below toxicity characteristic (TC) levels. Samples 2069002, 2209007, and 2302002 exceeded or equaled the TC level for lead of 5.0 mg/L with concentrations of 20.0 mg/L, 9.0 mg/L, and 5.0 mg/L, respectively.

HWAD has established a soil sampling monitoring program for the OB unit. The data generated will be carefully evaluated to determine the need for additional information such as additional soil and, if warranted, a groundwater monitoring program.

Table H-1

Well Installation Data (Old Bomb Area)

Well No.	Location	Location Rationale	Depth of Borehole (feet)	Elevation[1]		
				Screened Zone (feet)	Groundwater (feet)	Permeability (feet/min)
HWAAP-02	South Central Lower Valley (N. 1336369, E. 510896, Elev. 5028.82)	Downgradient of open burn area near rocket impact area	190	172-182	4,885	$3.0x10^{-3}$
Boring-03[2]	Central Lower Valley (N. 1337365, E. 510634, Elev. 5014.68)	Downgredient from TNT washout area. Backfilled with concrete.	260	NA	NA	NA
Boring-04[2]	Central Lower Valley (N. 1335347, E. 411014, Elev. 5006.65)	Downgradient of entrant gulch containing burial/burn pits and downgradient of TNT steam-out area. Backfilled with concrete.	300	NA	NA	NA
Boring-05[2]	Western Upper Plain (N. 1335377, E. 506003, Elev. 5286.51)	Downgradient of open burn area. Backfilled with concrete.	200	NA	NA	NA
HWAAP-09	North Central Lower Valley (N. 1339182, E. 511539, Elev. 4977.13)	Downgradient of Upper Plain and Valley Area.	176	163-173	4,880	$5.0x10^{-3}$
HWAAP-10	North Lower Valley (N. 1341569, E. 512264, Elev. 4900.84)	Downgradient of Landfill and on north boundary of Old Bomb Area.	101	88-99	4,833	NA

[1]Based on depth of water at time of sampling (late May 1988).

[2]Wells were not installed in these borings.

Source: IT (International Technology Corporation), November 1989.

Table H-2

Groundwater Monitoring Sample Log (Old Bomb Area)

Sample ID No.	Location	Date-Time	Comment
OB[1]	Old Bomb Area Well No. HWAAP-02	05/26/88-1715	Groundwater. Sample has light brown tint, slightly turbid, small suspended particles, no noticeable order
OB-2D[1]	Old Bomb Area Well No. HWAAP-02	05/26/88-1715	Duplicate of OB-2 taken as a QA/QC sample for the IT Laboratory. Sample has light brown tint, slightly turbid, small suspended particles, no noticeable odor.
OB-2M[1]	Old Bomb Area Well No. HWAAP-02	05/26/88-1715	Triplicate of OB-2 taken as a QA/QC split sample for the Army's MRD Laboratory. Sample has light brown tint, slightly turbid, small suspended particles, no noticeable odor.
OB-9	Old Bomb Area Well No. HWAAP-09	05/24/88-1830	Groundwater. Sample has light brown tint, slightly turbid, small suspended particles, no noticeable order
OB-10	Old Bomb Area Well No. HWAAP-10	05/26/88-1842	Groundwater. Sample has light brown tint, slightly turbid, small suspended particles, no noticeable order
Trip Blank	NA	NA	Trip Blank. QA/QC sample of reagent grade water prepared in the IT Laboratory and carried into the field along with the other samples. Trip blanks were prepared for both the IT Laboratory and the Army's MRD Laboratory

[1] These samples were given a false well number (82) so that they could be submitted to the labs ―blind," i.e., The labs should not be aware that these are QA/QC samples.

Source: IT 1989.

Table H-3
Summary of Analytical Results
For Soil Samples Collected at the HWAAP OB Unit

Parameter/ Sample Extraction Procedure	Detection Limit (mg/L)	Toxicity Characteristic Level (mg/L)	Sample Date, Number, and Results (mg/L)				
			7/18/89 9199002[1]	7/18/89 9199003[2]	12/19/89 9353003[3]	3/19/90 0109002[4]	3/19/90 0109003[5]
Ignitability	N/A	N/A	Negative	Negative	N/A	Negative	Negative
Reactivity: Gap Test Internal Ignition	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TCLP Metals							
Arsenic	0.001	5.0	0.027	0.024	0.022	0.018	0.008
Barium	0.1	100.0	1.5	3.0	1.0	ND	ND
Cadmium	0.005	1.0	0.07	0.060	ND	0.025	0.050
Chromium	0.05	5.0	ND	ND	ND	ND	ND
Lead	0.1	5.0	0.6	1.0	0.5	1.5	1.5
Mercury	0.0002	0.2	ND	ND	ND	ND	0.001
Selenium	0.002	1.0	0.014	0.011	0.035	ND	ND
Silver	0.01	5.0	0.10	0.10	0.10	ND	ND

[1] Sample taken before burning of 8"/55 smokeless powder.

[2] Composite sample from the area around four burning trays.

[3] Soil/residue from burn pans.

[4] Dirt from two lower burn areas.

[5] Dirt from two upper burn pans.

[6] TC level is 0.13 mg/l

[7] Soil/ash from propellant burn

ND=Not detected

N/A=Not applicable or not analyzed for the parameter

SOURCES: **Hazardous Waste Determination sample analysis result sheets, 1989 to 1992. Sampling and analysis Performed by Day & Zimmermann/Basil Corporation.**

Closure Plan for the Burning Ground at Old Bomb, Day & Zimmermann/Basil Corporation, 1993.

Table H-3
Summary of Analytical Results
For Soil Samples Collected at the HWAAP OB Unit

Parameter/ Sample Extraction Procedure	Sample Date, Number, and Results (mg/L)						
	7/6/90 0187004[2]	7/6/90 0187005[2]	7/6/90 0187006[2]	7/6/90 0187007[2]	1/25/91 1025003	1/25/91 1025004	3/9/92 2069001
Ignitability	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Reactivity: Gap Test Internal Ignition	N/A	N/A	N/A	N/A	Negative Negative	Negative Negative	N/A
TCLP Metals							
Arsenic	0.004	ND	ND	ND	0.033	0.03	ND
Barium	ND	ND	ND	ND	1.0	1.0	ND
Cadmium	0.05	0.025	0.010	0.025	0.1	0.05	0.25
Chromium	ND	ND	ND	ND	ND	ND	ND
Lead	ND	ND	0.2	1.0	0.75	1.0	1.5
Mercury	ND	ND	ND	ND	0.0019	0.0015	ND
Selenium	ND	ND	ND	ND	ND	ND	ND
Silver	0.10	ND	ND	ND	ND	ND	ND

[1] Sample taken before burning of 8"/55 smokeless powder.

[2] Composite sample from the area around four burning trays.

[3] Soil/residue from burn pans.

[4] Dirt from two lower burn areas.

[5] Dirt from two upper burn pans.

[6] TC level is 0.13 mg/l

[7] Soil/ash from propellant burn

ND=Not detected

N/A=Not applicable or not analyzed for the parameter

SOURCES: **Hazardous Waste Determination sample analysis result sheets, 1989 to 1992. Sampling and analysis Performed by Day & Zimmermann/Basil Corporation.**

Closure Plan for the Burning Ground at Old Bomb, Day & Zimmermann/Basil Corporation, 1993.

Table H-3
Summary of Analytical Results
For Soil Samples Collected at the HWAAP OB Unit

Parameter/ Sample Extraction Procedure	Sample Date, Number, and Results (mg/L)							
	3/9/92 2069002	3/9/92 2069003	3/9/92 2069004	7/29/92 2209007[7]	10/28/92 2302001	10/28/92 2302002	10/28/92 2302003	10/28/92 2302004
Ignitability	Negative	Negative	Negative	N/A	N/A	N/A	N/A	N/A
Reactivity: Gap Test Internal Ignition	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TCLP Metals								
Arsenic	ND	ND	ND	0.025	ND	0.025	ND	ND
Barium	ND	ND	ND	1.0	1.5	1.5	1.5	3.0
Cadmium	0.025	0.025	0.015	0.025	ND	0.05	ND	ND
Chromium	ND	ND	ND	ND	ND	ND	ND	ND
Lead	20.0	1.5	0.5	9.0	ND	5.0	ND	1.0
Mercury	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND

[1] Sample taken before burning of 8"/55 smokeless powder.

[2] Composite sample from the area around four burning trays.

[3] Soil/residue from burn pans.

[4] Dirt from two lower burn areas.

[5] Dirt from two upper burn pans.

[6] TC level is 0.13 mg/l

[7] Soil/ash from propellant burn

ND=Not detected

N/A=Not applicable or not analyzed for the parameter

SOURCES: **Hazardous Waste Determination** **sample analysis result sheets, 1989 to 1992. Sampling and analysis Performed by Day & Zimmermann/Basil Corporation.**
Closure Plan for the Burning Ground at Old Bomb, Day & Zimmermann/Basil Corporation, 1993.

Table H-4
Summary of Analytical Results (Totals)
For Soil Samples Collected at the HWAAP OB Unit

Sample Date and Number	Constituent Concentration (mg/kg)		
	RDX	2,4,6-TNT	2,4-DNT
3/9/92 2069001	0.70	ND	ND
3/9/92 2069002	ND	ND	ND
3/9/92 2069003	ND	ND	2.47
3/9/92 2069004	ND	ND	ND
7/29/92 2209007[a]	32.57	N/A	ND
10/28/92 2302001	0.57	ND	0.28
10/28/92 2302002	ND	ND	0.44
10/28/92 2302003	ND	ND	0.30
10/28/92 2302004	ND	0.14	ND

ND=Not detected

N/A=Not analyzed for the constituent

[A] = Soil/ash from propellant burn

Identification of Uppermost Aquifer and Aquifers Hydraulically Interconnected Beneath the Facility Property [40 CFR 270.14(c)(2) and 270.23]

Groundwater is available in large quantities from various zones and depths below HWAD. The installation obtains their production water largely from deeper wells. Table A-3 presents a list of these production wells.

The specific yield of the uppermost 100 feet of saturated material averages 10 percent and may be as high as 15 percent. Several wells near the town of Hawthorne and in the Whiskey Flats area have saturated thickness exceeding 300 feet (RAI, 1992). No other information in the uppermost aquifer is available.

Groundwater Flow, Direction, Rate, and Source of Information [40 CFR 270.14(c)(2) and 270.23]

The generalized groundwater elevation and flow direction map is presented in Figure A-11. The groundwater flows east to the valley (EBASCO, 1988). The horizontal groundwater flow rate for the Hawthorne area is estimated at approximately 20 to 25 feet per year (USAEHA, 1988).

Description of Any Plume of Contamination that has Entered the Groundwater From a Regulated Unit [40 CFR 270.14(c)(4) and 270.23]

No plume has been identified at the OB unit. No groundwater sampling and analysis has been conducted at the OB unit.

According to RAI (1992), records of groundwater quality data showed that the groundwater at various locations in the basin is generally similar, with relatively high sulfate and total dissolved solids (TDS) concentration. These levels frequently exceed the U.S. EPA National Secondary Standards for drinking water. Several wells in the area also have concentrations of nitrates, arsenic and fluorides that exceed the standards. Also, the quality of the water did not deteriorate or change significantly between 1946 and 1966.

The RAI (1992) report indicates that the chemical quality of the groundwater found at the edge of a closed basin such as Walker valley is usually of better quality than the groundwater in the central part of the basin. Water analysis of samples from wells from the western part of the valley has TDS of approximately 400 to 500 *mg/L* whereas the wells closer to Walker Lake were reported to have even higher TDS. The sources of the poor water quality in the basin are unknown, but several natural sources are possible. The most important of these sources would be presence of the evaporate deposits in the valley fill material.

The results of an extensive field investigation conducted by USAEHA in 1984 to evaluate the impact of the selected *OB/OD* units on groundwater quality under varying site-specific conditions indicated that no groundwater contamination was present where the annual evaporation exceeded annual precipitation by more than two feet. In arid areas like HWAD, there is no driving force to leach potential contaminants to the water table. At HWAD, the evaporation potential exceeds the precipitation rate by 44 inches and no wastes containing free liquids is open burned at the unit (EBASCO, 1988).

General Groundwater Monitoring Requirements [40 CFR 264.97, 264.600, 270.14(c)(5) and 270.23]

A groundwater monitoring program is not proposed for the OB unit for several reasons. First, the groundwater at the unit occurs at great depth (depths greater than 200 feet below surface) and thus the potential for contamination of the groundwater is low. Second, the soil surrounding the pans is sampled after treating wastes containing chemical constituents that differ from those previously treated at the unit. Soils contaminated above RCRA levels are removed. Third, as indicated above, the results of an extensive field investigation concluded by USAEHA in 1984 to evaluate the impact of the selected OB/OD units on groundwater quality under varying site-specific conditions indicated that no groundwater contamination was present where the annual evaporation exceeded annual precipitation by more than two feet like in the case of HWAD (EBASCO, 1988).

Surface soils will be collected before and after treatment of wastes with different chemical constituent profiles. A site-specific environmental monitoring program provides a means to define or confirm the extent of contamination, demonstrate compliance with regulatory requirements and performance standards, and to identify potential future releases. These data will also be used to define conditions for unit closure, as described in Section J such that additional environmental sampling prior to closure to define contamination conditions may be unnecessary.

Soil Sampling

Surface soils will continue to be collected from the area surrounding the pans before and after treatment of wastes containing chemical constituents that differ from those previously treated at the unit. Samples will be composites from the 10-foot area on the sides and ends of the burn pans. Deeper samples are not necessary because ash and residues will be most concentrated at the surface.

In order to prevent run-on and run-off problems, HWAD has installed a natural soil berm around the OB unit was created. The berm is 18-inches in height and approximately 25 feet from the burn pans. A sloped ramp is constructed to allow vehicles access to the pans. Although the use of burning pans limits the contamination of surrounding soils, the berm will prevent run-on of rainwater from upslope areas, and would limit off-site transport of potentially contaminated surface soil. As the slope of the land adjacent to the Old Bomb unit is relatively flat, additional contouring is not necessary.

The interior of the bermed area will be routinely cleared of vegetation to prevent the occurrence of fires during OB operations.

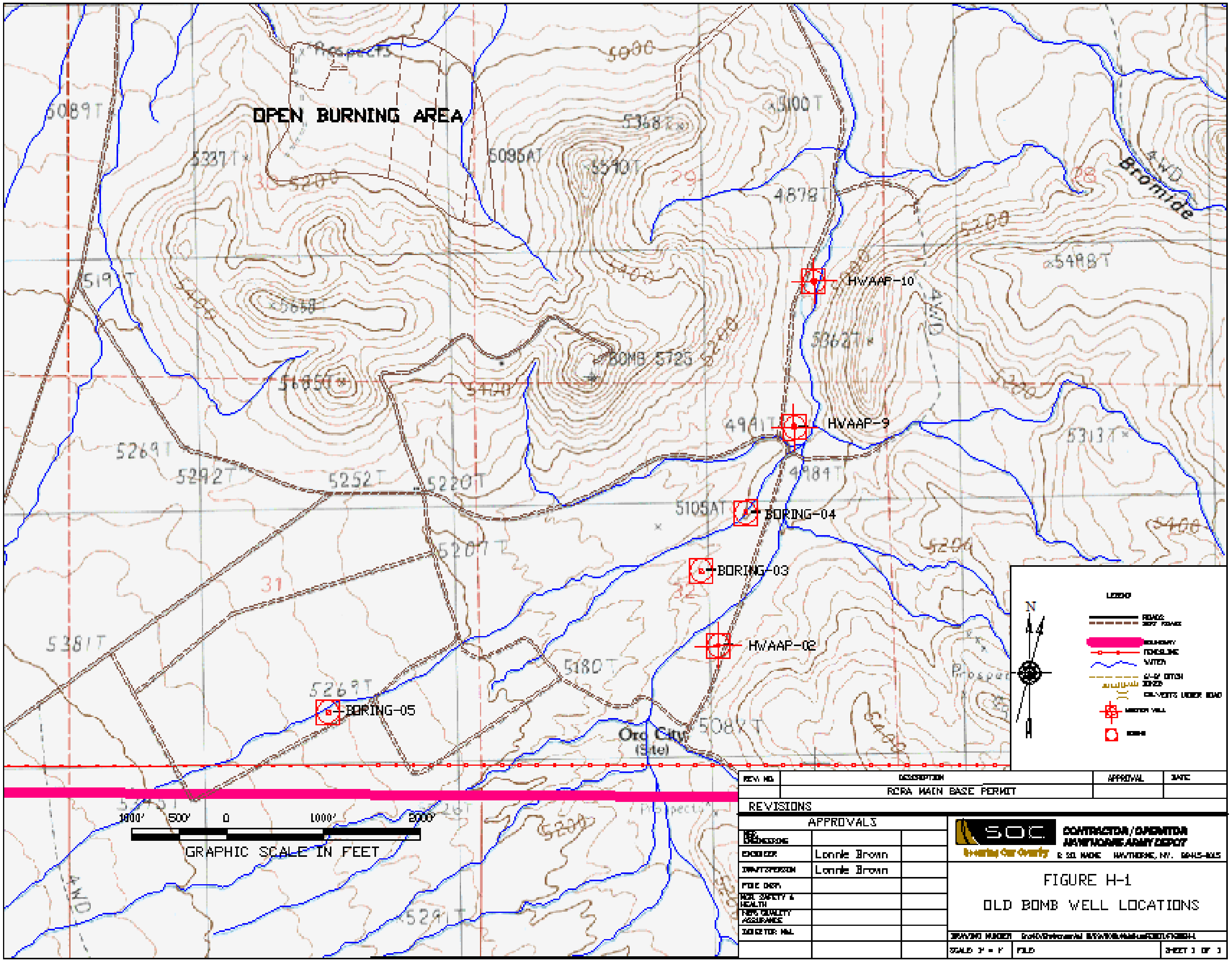
Sampling Methods

Soil samples will be collected pursuant to SW-846 sampling methods as follows:

- A record of sampling operations (including sampling location) will be maintained on standardized field logs.
- Soil samples will be conducted in accordance with Waste Analysis Plan.

GROUNDWATER MONITORING FOR RF-9 AND PODS [40 CFR 264.90]

No hazardous waste storage or disposal units are located within the RF-9 or PODS facilities. In accordance with 40 CFR 264.90(b)(2), the applicant must demonstrate that the proposed unit will not degrade the quality of groundwater. These facilities are designed and operated to exclude liquids, precipitation, and other run-on and run-off. Therefore, in accordance with 40 CFR 264.90(b)(2) the groundwater monitoring requirements for this unit are not applicable.


OPEN BURNING AREA
Prospects
HWAAP-10
HWAAP-9
BORING-04
BORING-03
HWAAP-02
BORING-05
BOMB 5725
Bromide
4WD
Oro City (Site)
1000' 500' 0 1000' 2000'
GRAPHIC SCALE IN FEET
N
DESCRIPTION
APPROVAL
DATE
RCRA MAIN BASE PERMIT
REVISIONS
APPROVALS
ENGINEER
Lonnie Brown
Lonnie Brown
HEALTH
ASSURANCE
SOC
FIGURE H-1
OLD BOMB WELL LOCATIONS
DRAWING NUMBER
FILE

SECTION I. AIR QUALITY ASSESSMENTS

VOLUME AND PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE WASTE IN THE UNIT [40 CFR 270.23(b) AND 264.601(c)(1)]

The wastes treated and their chemical compositions are described in Section F. The wastes are all solids. Emission factors are provided at the end of this section.

EFFECTIVENESS AND RELIABILITY OF SYSTEMS AND STRUCTURES TO REDUCE OR PREVENT EMISSIONS [40 CFR 270.23(d) and 264.601(c)(2)]

Due to the nature of thermal treatment, no systems or structures are applied to the OB unit to prevent air emissions. OB is inherently an effective treatment process with a DRE of about 99.9999 percent shown in Army tests (U.S. Army, 1992).

OPERATING CONDITIONS OF THE UNIT [40 CFR 264.601(c)(3)]

OB is limited to 5,000 pounds per pad, 4 pads per day, with an annual limit of 2,600,000 pounds per year. OB operations are limited per the SOP to include daytime operation; winds more than 3 mph and less than 15 mph; no electrical/thunderstorms; no periods of reduced visibility less than one mile; and surface winds not blowing to carry smoke and/or by-products over any populated areas or public road within one mile of the unit. There is no ambient air monitoring associated with OB. Meteorological data are obtained by contacting Fallon NAS Weather Service Office and ground weather equipment. An on-site meteorological monitoring station was installed in June 1996 (IT, 1996).

ATMOSPHERIC, METEOROLOGICAL AND TOPOGRAPHIC CHARACTERISTICS OF THE UNIT AND SURROUNDING AREAS [40 CFR 264.601(c)(4)]

The climate in the area consists of mild temperatures ranging from an annual average of 34°F in January to 75°F in July (USAEHA, 1988). The temperature extremes are -16°F in December to 104°F in July (EBASCO, 1988).

The Hawthorne area is arid. Hawthorne receives about 4 inches of precipitation annually with about 25 inches annually in the mountains. The average monthly and annual precipitation is shown in Section A Table A-1. Precipitation falls largely as mixed rain and snow from December to March. Summer rain comes in the form of brief middle afternoon thundershowers (EBASCO, 1988; IT, 1989; RAI, 1992).

EXISTING AIR QUALITY (TOXIC POLLUTANTS) AND OTHER SOURCES OF CONTAMINATION [40 CFR 264.601(c)(5)]

Ambient air concentrations of selected particulate pollutants were monitored at HWAD for a 16-month period from July 1, 1978 to October 31, 1979. The air concentrations were monitored according to State of Nevada guideline. The air quality was found to be good with respect to those pollutants monitored (USAEA, 1979 as cited in EBASCO, 1988). There are two meteorological station located at WADF and Old Bomb for more information go to CPT RF-9 and CPT PODS in Appendix E .

POTENTIAL IMPACTS TO HUMAN HEALTH AND THE ENVIRONMENT [40 CFR 264.601(c)(6)]

A screening assessment has been conducted to evaluate the potential impacts to human health resulting from OB operations. Potential impacts before, during, and removal of residues is regulated by OSHA during burning. A health risk assessment for human and ecological receptors is presented in Appendix E.

Screening Assessment [40 CFR 264.601(c) and 264.602]

Types and Quantities of Wastes [40 CFR 264.601(c)(1)]

The wastes treated at the OB unit are propellants and explosives, which are hazardous primarily for reactivity. These items are listed in Section G, Table G-4 and the chemical compositions of their energetics are listed in Section G, Table G-5.

Number of Units/Events [40 CFR 264.601(c)(3)]

There are 4 burn pads with a capacity of 5,000 pounds per pad. Each pad contains five pans with a capacity of 1,000 pounds per pan. Operations are limited to using a maximum of 4 pads per day for a daily limit of 20,000 pounds. The annual limit is 2,600,000 pounds treated. The OB operation is further described in Section G and the locations of the pans are shown in Figure A-2.

Pollutants Emitted [40 CFR 264.601(c)(1)]

Results from Bang Box tests at Dugway Proving Ground (AEC, 1995) were used to predict pollutant emissions for these wastes. The emission factors on a pound emitted/pound treated basis, is summarized in Appendix S.

Once the list of chemicals that might be emitted was developed, potentially applicable regulatory standards and criteria were identified. These standards/criteria include National Ambient Air Quality Standards (NAAQS), proposed Resource Conservation and Recovery Act (RCRA) Action Levels, Clean Water Act Ambient Water Quality Criteria (AWQC) for the protection of aquatic life and human health, Safe Drinking Water Act Maximum Contaminant Levels (MCLs), U.S. Environmental Protection Agency Drinking Water Health Advisories (HAs), and occupational standards/criteria.

A summary of the regulatory standards/criteria that are potentially applicable to OB activities is provided at the end of this section. This table identifies applicable criteria for representative release constituents for OB that were used to evaluate potential human health and environmental impacts. A more detailed risk assessment is presented in Appendix E.

The majority of the health and environmental standards/criteria presented at the end of this section are based on protection of human rather than on environmental receptors. The reasons for this are twofold. First, with the exception of the AWQC for the protection of aquatic organisms, standards and criteria for the protection of environmental receptors have not been developed to date. Second, human receptors are generally the most sensitive receptors considered, and concentrations protective of human health are expected to be protective of environmental receptors as well. Comparison of the AWQC for the protection of human health with the AWQC for protection of aquatic organisms from acute and chronic effects provides evidence to support this assertion. A detailed ecological risk assessment was performed and is presented in Appendix E.

A detailed discussion of each of the regulatory standards/criteria and the reference concentrations is provided in the subsections that follow.

EFFECTIVENESS OF TREATMENT

The effectiveness of the OB thermal treatment process has been demonstrated by visual inspection and by collecting representative samples of ash or residue remaining after each burn event and analyzing them for reactivity using the Gap Test and Internal Ignition Test.

A DoD study was conducted to develop a database to correlate reactivity of samples with total explosive concentrations. The results of this study were considered to be applicable to the following explosives: TNT, DNT, HMX, RDX, and tetryl. The study recommended using a conservative criterion, below which the sample would not be reactive, of 12 percent (120,000 ppm) of total explosives in the sample. Therefore, if the total concentration of the explosives listed above does not exceed 12 percent of the sample, then the sample is not considered reactive. Using this study, representative samples collected from ash/residue remaining after a burn of each category of waste treated at the unit will be analyzed for total explosives. If the total does not exceed 12 percent, then the treatment process will be considered to be effective in rendering the waste nonreactive. This method is significant because the cost to perform explosives analysis is much less than the cost to perform reactivity analyses.

The treatment effectiveness of OB is addressed in the U.S. Army Armament, Munitions and Chemical Command OB/OD Study (U.S. Army, 1992). This study indicated that treatment by OB is about 99.9999 percent effective.

ADDITIONAL INFORMATION

NOISE CONSIDERATIONS

The potential noise impacts of OB operations at HWAD have been evaluated. No potential noise impacts can be attributed to sounds associated with the OB unit.

The Noise Control Act (NCA) of 1972 states "...that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare. However, there are no established Federal noise impact criteria that are applicable to OB operations.

The U.S. Army, in compliance with the requirements of the Quiet Communities Act of 1978 (PL 95-609) and the NCA of 1972 (PL 92-574), has developed an environmental noise abatement program (U.S. Army, 1990). The goal of this program "is to control noise produced by Army activities to protect the health and welfare of its members and the public within, adjacent to, and surrounding Army installations. A major feature of the overall noise abatement program is the Installation Compatible Use Zone (ICUZ) program. The ICUZ program is used to determine the compatibility of noise-sensitive land uses adjacent to or near Army activities which produce noise. Incompatible uses are discouraged. The U.S. Army Construction Engineering Research Laboratory (USACERL), in cooperation with other agencies, has performed significant research to determine appropriate noise levels for each zone. ICUZ zones have been defined in terms of the annual average day/night noise level (DNL) as defined by U.S. EPA. This descriptor applies a 10-decibel penalty to nighttime noise levels between 10 p.m. and 7 a.m. to account for the increased sensitivity of people to noise at night. Also, a separate frequency weighting network is used to account for the different way people perceive blast noise as compared with normal everyday noises such as from aircraft and traffic. The A-weighted frequency network is used for typical sounds and the C-weighted frequency network is used for large-amplitude impulse noise. The corresponding DNLs are denoted by ADNL and CDNL, respectively.

The acceptability of the three ICUZ zones for noise-sensitive land uses such as housing, schools, and hospitals is as follows:

Zone I -Acceptable;
Zone II -Normally unacceptable; and
Zone III -Unacceptable.

The corresponding noise levels in decibels used to delineate the zones are as follows:

ICUZ Noise Zone	CDNL (decibels)
I	62
II	62 to 70
III	70

Minimum Protective Distance [40 CFR 265.382 and 270.23(e)]

The minimum allowable safe distance for OB activities is specified in 40 CFR 265.382. The maximum quantity of propellants burned during any one day at the HWAD OB unit will be 20,000 pounds, each burn being separated by a 1-minute interval. According to 40 CFR 265.382, burning of these quantities (up to 10,000 pounds) of explosives requires a minimum distance of 1,730 feet from the property of others. As shown in Section A, Figure A-2, this distance does not reach any property not part of HWAD. The nearest installation boundary is about 8,800 feet. The distances from the personnel safety shelters and State Highway 359 also exceed this minimum distance.

SECTION J. CLOSURE PLANS, POST-CLOSURE PLANS, AND FINANCIAL REQUIREMENTS FOR OLD BOMB

This section is submitted in accordance with the requirements of 40 CFR 264, Subpart X and 40 CFR Part 270 and describe the activities that will be undertaken to clean close the Open Burning (OB) unit at HWAD to risk-based or background levels. The OB unit are not expected to undergo partial closure during their active life; therefore, partial closure actions are not specifically addressed in this Closure Plan. However, this Closure Plan is designed to be amenable to partial closure if the need arises. HWAD is a Federal Facility and is exempt from financial requirements; thus, closure cost estimates and financial assurance documents are not discussed.

HWAD will notify the U.S. EPA Region IX Administrator and the NDEP at least 180 days prior to the date closure is expected to begin. Closure activities will be carried out in accordance with this Closure Plan. Upon completion of closure, HWAD will submit a Certification of Closure signed by an independent, registered Nevada professional engineer to the EPA Region IX Administrator. HWAD will maintain this Closure Plan until certification of closure completeness has been submitted and accepted by EPA Region IX Administrator. HWAD will maintain this Closure Plan until certification of closure completeness has been submitted and accepted by EPA Region IX. Any changes to the schedules and activities described in this Closure Plan will be approved by EPA prior to implementation. HWAD will be responsible for plan amendment. The OB unit covers an area of 6.5 acres where a total of four OB pads are for plan amendment.

Description of Closure Procedures [40 CFR 264.112(b)(2) and (4), 264.114]

Closure actions of the OB unit will be conducted in the following phases:

- Sampling and analysis of all ash/burn residues remaining after final burn for reactivity, TCLP metals, and explosivity.
- Decontamination of burn pans by flash burning at WADF.
- Removal of contaminated ash/burn residues: All ash/burn residue remaining at the time of closure will be containerized in DOT-approved containers. Material which is proven to be non-reactive hazardous waste will be disposed of through routine Defense Logistics Agency (DLA) procedures, utilizing DLA approved contracts for transportation and disposal.
- Removal of contaminated soil (if required): If monitoring data indicates that soil within the

active burn area is contaminated above allowable levels, the contaminated area will be excavated, containerized, and disposed of or treated in an appropriate manner. The top 12 inches of soil will be removed, then at intervals of 6 inches thereafter, with re-sampling performed after each excavation. Excavation will continue until analysis demonstrates soil contamination below allowable levels.

- Following removal of contaminated soil (if determined to be appropriate to meet risk-based levels or background conditions), the OB unit will be re-graded using native soils to match the contours of the surrounding area, and will be re-vegetated to its natural condition.

The wastes generated from the OB unit during closure will fall into one of four categories: (1) reactive, or explosive solids or soils contaminated with such materials, (2) solid materials or soils which are not reactive, or explosive, but which may be contaminated with constituents (e.g., lead, TNT, and RDX) remaining as a result of OB and which require treatment to remove this contamination; (3) contaminated liquids resulting from closure activities, primarily equipment decontamination; and (4) solid, nonhazardous wastes that require no further treatment.

Any solid un-reacted, ignitable, or explosive materials that have been segregated from the other wastes will be sorted and burned in a burn pan to destroy any remaining potentially explosive materials. The burn pan will then be decontaminated and the residues will be collected, containerized, labeled, and placed in the staging area.

Closure Performance Standard [40 CFR 264.112(b)(1)]

When operations at the OB unit are terminated, closure will be conducted in a manner that eliminates the need for post-closure care. This Closure Plan has been designed to:

- Minimize the need for further maintenance of the OB unit.
- Minimize post-closure escape of hazardous waste, hazardous constituents, waste degradation products, leachate, and contaminated run-off into surface water and groundwater to the extent necessary to protect human health and the environment.
- Comply with the environmental performance standards of 40 CFR Part 264, Subpart X relative to closure activities and post-closure facility conditions.

Cleanup goals at the OB unit will include risk-based or background levels and will be established through a series of screening steps and detailed evaluation.

Partial Closure Activities [40 CFR 264.112(b)(2)]

The OB unit described in this permit application are expected to remain in service during the active life of the facilities. No partial closure is anticipated. Closure of the OB unit will proceed as described in this Closure Plan. In the event that future circumstances require HWAD to close a portion of the facilities, this Closure Plan will be amended.

Maximum Waste Inventory [40 CFR 264.112(b)(3)]

Propellants and explosives are neither stored nor accumulated at the OB unit. Because these waste materials are transported to the OB unit on the day of treatment and treated on that day, there will be no inventory of such materials at this unit at the time of closure. The maximum daily inventory of explosive material subject to OB at the facility is also limited by the environmental performance standards specified in Appendix F.

The maximum inventory of wastes at any given time on site at this facility is equal to the daily operational capacity of the burn area. The SOP for this operation allows for 1,000 pounds of propellant to be placed into each pan. A total of 20 pans would be used. Therefore, the maximum amount of waste present at the OB unit at any one time will be 20,000 pounds.

Closure Goals for the OB Unit

The list of Potential Constituents of Concern (PCOCs) has been adopted from the established base-wide proposed closure goals (PCGs) for soils at HWAD from the document "Hawthorne Army Depot, Remedial Investigation, Group B Solid Waste Management Units, Final Data Package," (Final Data Package; Tetra Tech, 1996) Volume 1, January 1996. The list of PCOCs takes into consideration historical activities at HWAD, residues detected at other DOD OB/OD sites, and potential transformation products of OB operations. PCBs and dioxins are excluded from the constituents of concern as there is no reason to believe they are involved in the OB operations.

In addition, several other energetic compounds have been identified to be typically associated with OB activities. These energetic compounds include trinitroglycerol (TNG), hexachloroethane (HCE), white phosphorus, and nitroguanidine (NG). These compounds are incorporated into Section J, Table J-1.

Table J-1

List of Potential Contaminants of Concern

Hawthorne Army Depot, Hawthorne, Nevada

Contaminants	Chemical Classification
1,3-Dinitrobenzene	Explosive
2,4-Dinitrotoluene	Explosive
2,6-Dinitrotoluene	Explosive
Nitrobenzene	Explosive
Nitrotoluene (2-, 3-, 4-)	Explosive
Octahydro-1357-tetranitro-1357-tetrazocine (HMX)	Explosive
RDX	Explosive
Tetryl	Explosive
1,3,5-Trinitrobenzene	Explosive
2,4,5-Trinitrotoluene	Explosive
Trinitroglycerol (TNG)	Explosive
Hexachloroethane (HCE)	Explosive
White Phosphorus (WP)	Explosive
Nitroguanidine (NG)	Explosive
Yellow D (Ammonium picrate)	Explosive
Aluminum	Metal
Arsenic (cancer endpoint)	Metal
Barium and compounds	Metal
Beryllium and compounds	Metal
Cadmium and compounds	Metal
Total Chromium	Metal
Lead	Metal

Contaminants	Chemical Classification
Mercury and compounds (inorganic)	Metal
Selenium	Metal
Silver and compounds	Metal
Acenaphthene	PAH
Benzo(a)anthracene	PAH
Benzo(a)pyrene	PAH
Benzo(b)fluoranthene	PAH
Benzo(k)fluoranthene	PAH
Chrysene	PAH
Dibenz(a,h)anthracene	PAH
Fluoranthene	PAH
Fluorene	PAH
Indeno(1,2,3-cd)pyrene	PAH
Naphthalene	PAH
Pyrene	PAH
Bis(2-ethylhexyl)phthalate (DEHP)	SVOC
Bromoform (tribromomethane)	SVOC
Butyl benzyl phthalate	SVOC
Dibromochloromethane	SVOC
Dibutyl-phthalate	SVOC
Diethyl phthalate	SVOC
Phenanthrene	SVOC
Phenol	SVOC
Acetone	VOC
Anthracene	VOC

Contaminants	**Chemical Classification**
Benzene	VOC
Bis(2-chloroisopropyl)ether	VOC
Bromomethane	VOC
Carbon tetrachloride	VOC
Chlorobenzene	VOC
Chloroform	VOC
Chloromethane	VOC
1,2-Dibromomethane	VOC
1,2-Dichlorobenzene	VOC
1,4-Dichlorobenzene	VOC
Dichlorodifluoromethane	VOC
Ethylbenzene	VOC
Methylene bromide	VOC
Methylene chloride	VOC
1,1,2,2-Tetrachloroethane	VOC
Tetrachloroethylene (PCE)	VOC
Toluene	VOC
1,1,1-Trichloroethane	VOC
Trichloroethylene (TCE)	VOC
Trichlorofluoromethane	VOC
1,2,3-Trichloropropane	VOC
Vinyl chloride	VOC
Xylene Total (m-,o-,p-)	VOC

Upon closure of the OB unit, potential ingestion and dermal exposure are the primary routes of exposure to contaminated soils. Groundwater or surface water is not a significant media of concern because the water table is generally at least 100 feet below ground surface at HWAD and precipitation is approximately 4 inches annually. Clean closure action levels for the soil PCOCs in soil media in the area of the OB unit will be based on either background levels or risk-based levels, whichever are higher. The background levels of metals in the near-surface soils of the Hawthorne Valley at locations not likely to have been directly impacted by HWAD operations have been established in Section 4.0 of the Group B SWMUs Final Data Package (Tetra Tech, 1996). At the time of closure for the OB Unit, risk-based concentrations for the PCOCs will be developed using the guidance provided in the NDEP contaminated soil and groundwater remediation policy, the U.S. EPA Region IX Preliminary Remediation Goals (PRGs), and the RCRA 40 CFR Subpart S levels. HWAD will use their most current modeling data available to calculate applicable action levels per NDEP contaminated soil and groundwater remediation policy to calculate risk-based concentrations. The action levels developed at the time of closure will take into consideration combined cumulative risk effects due to multiple contaminants, future land use, and use of updated toxicological (e.g., CSFs, RfDs, RfCs) information.

Establishing Background Soil Concentrations

In an effort to establish background levels, soil samples were collected from locations near the HWAD area that are unlikely to have been impacted by past facility activities. A statistical analysis was performed on a total of 54 background soil data that have been collected for HWAD to provide minimum and maximum concentrations and to calculate the means, standard deviations, and a range of one standard deviation from the mean. This statistical analysis assumed normal distribution of the data. In case of non-detect for any analytical parameter in the samples, a value of one-half of the detection limit was assigned to those samples. This background concentration study concluded that all background sample concentrations fall within the appropriate ranges published in the USGS Professional Paper 1270 for the Western United States, and all species appear to be indigenous to the Hawthorne Valley. The analytical results for background soil samples are presented in Section 4 of the Group B SWMUs Final Data Package (Tetra Tech, 1996).

To determine the "statistically significant" level for any naturally occurring constituent, a tolerance interval approach will be used to determine the upper 95% tolerance limit (UTL) which contains at least

95% of the distribution of observations from background data. If any compliance concentration does not fall under the upper 95% tolerance limit, there is statistically significant evidence of contamination. The statistical method for determination of the 95% UTL is as follows:

UTL = X + K S

where, UTL = 95% upper tolerance limit (one-sided)

X = mean of background data

K = one-sided normal tolerance factor

S = Standard deviation of background data

Preliminary 95% UTLs for naturally occurring constituents in the background samples are presented in Section J, Table J-2.

Table J-2
95% Upper Tolerance Limits for Naturally Occurring Constituents
In the Hawthorne Valley Background Samples
Hawthorne Army Depot
Hawthorne, Nevada

	Al (mg/kg)	**As (mg/kg)**	**Ba (mg/kg)**	**Be (mg/kg)**	**Cd (mg/kg)**	**Cr (mg/kg)**	**Pb (mg/kg)**	**Hg (mg/kg)**	**Se (mg/kg)**	**Ag (mg/kg)**
Max.	18,000	27	200	0.81	1.60	17.0	58.0	0.40	<5.0	<0.9
Min.	1,800	<4.0	35	0.11	<0.2	1.2	<5.0	<0.04	<5.0	<0.9
Mean	6,406	4.2	77	0.3	0.5	4.7	6.3	0.03	NA	NA
St dev.	2,979	5.3	31	0.1	0.3	2.9	7.2	0.09	NA	NA
95% UTL	12,558	15.2	141.0	0.51	1.12	10.7	21.2	0.22	NA	NA

Notes: (1) Mean values for background concentrations were calculated by summing the total concentrations and dividing by the sample population. Non-detect values were included as half of the detect limit. No statistical evaluation was conducted if the total population was reported below the detection limit.
(2) Preliminary 95% UTLs were calculated based on a total of 54 background samples (K=2.065).

Background soil samples were collected, with prior approval from the U.S. Army Corps of Engineers (USACE) and NDEP, at 54 locations throughout the Hawthorne Valley. Background soil data are presented in Section 4 of the Group B SWMUs Final Data Package (Tetra Tech, 1996). It was concluded that all background soil samples appear to be indigenous to the Hawthorne Valley.

Consideration of Buried Energetic Materials

In OB operations, ash and residue are potentially generated (1) within the burn pans as a result of the thermal treatment process, and (2) in the immediate vicinity of the burn pan due to the ejection of propellant and explosive waste or ash. After the OB operations, the burn pans and immediate OB area are inspected for partial burns, propellants, smoldering embers, and debris, including ash. If unburnt material is discovered, it will be reburned subsequently or on the next day. Burn residue is collected in labeled DOT-approved 55-gallon drums, transferred to Building 106-22, and tested (TCLP-8 and reactivity analyses) to determine the proper disposal mechanism. Soils from the immediate vicinity of the burn pans are also analyzed for hazardous characteristics (reactivity and TCLP-8) as found in the waste analysis plan and disposed of accordingly. The inspection procedures are described in detail in the HWAD Old Bomb SOP in Appendix G.

At the time of closure for the OB area, the same inspection procedures will be followed to identify and remove any buried energetic materials and dispose of appropriately. Similarly, materials other than waste explosives, such as shrapnel, from historical Old Bomb operations will be identified and removed at the time of closure. The shrapnel will be decontaminated as needed at WADF, and then sold as scrap metal.

Effects on groundwater by any buried energetic materials from historical OB operations will be monitored by the existing groundwater monitoring wells located near the OB area. Analytical results from the existing groundwater monitoring wells, which have shown that depth to groundwater ranges from 200 to 300 feet below the ground surface, indicate no explosive compounds are present above detection limits. In the unlikely event that contaminated groundwater is detected in the samples from the existing groundwater monitoring wells, a contingency plan will be prepared to investigate the source of contamination and to propose corrective actions based on the conditions discovered.

Consideration of Soil Erosion

Upon closure of the OB Unit, the area will be re-graded using native soils to match the contours of the surrounding area, and will be re-vegetated to its natural condition. Any buried energetic materials from historical Old Bomb operations will be removed and disposed of properly. In the unlikely event that soil erosion is causing the uncovering of unexploded ordnance, this ordnance will be treated under the Range Clearance SOP.

Sampling and Analysis Plan at Closure

A Waste Analysis Plan (WAP), which is to be used at the time of closure of the OB area, has been prepared and is a part of Appendix B in this permit application. This plan includes the following sections:

i) **Sampling Plan Objectives:**

   To determine if any residual contamination is present in the OB area and to measure the concentrations of contaminants of concern

ii) **Field Screening Techniques (phased sampling approach):**

   Field screening for energetic materials and others (such as shrapnel), resulting from Old Bomb operations, is performed after each treatment event and will be repeated at the time of closure. Procedures for the field screening (i.e., cleanup) are described in the SOP for Old Bomb. Screening for UXO will be performed prior to any field sampling activities

iii) **List of Parameters to be Sampled and Analyzed:**

   List of parameters to be sampled and analyzed are the same as the list of potential COCs as described in response to comment 16(a)(i) and Table J-1.

iv) **Area of Concern (area to be sampled):**

   Area of concern covers the 6.5 acres where the OB Unit is located and the OB ash/residue may have been deposited. The area of concern is a circular area 600 feet in diameter and encompasses the four burn pads as shown on Section J, Figure J-1

v) **Sampling Scheme and Methodology**

   150 feet by 150 feet grid system will be laid out over the area of concern for sampling purposes. Surface soil samples will be randomly collected from the surface (up to 6 inches) at each grid node located in the OB area. Subsurface soil samples will be randomly collected at a depth of approximately 2 to 4 feet only at 9 grid nodes located in the central area of the OB Unit where historical OB operations occurred. It is estimated that 13 surface soil samples and 9 subsurface soil samples will be randomly collected for this effort. The proposed sampling grid and sampling locations are shown on Section J, Figure J-1

vi) **Sampling Methods**

Sampling methods, including sampling procedures, equipment, containers, preservation techniques, chain-of-custody, decontamination, and QA/QC procedures and objectives, are presented in the WAP

vii) **Analytical Methods**

Analytical methods, including laboratory methods, detection limits, quantization limits, QA/QC procedures, data validation procedures, and comparison to relevant action levels, are described in the WAP

Selection of Remedial Actions

The objective of closure at the OB area is clean closure. If the results of any grid sample indicate the presence of contamination at levels above background and risk-based concentrations, additional samples will be collected at locations half way between the grid node exhibiting contamination and the adjacent grid node showing no contamination. The delineation process will continue until the boundary of the contaminated area is determined. It is possible that localized excavation may be needed to remove discrete contaminated soils in the immediate area of the sampling location where contamination is detected. In the case of discrete contamination, soil at the grid sampling location and a radius of 5-feet will be excavated to at least 1 foot below the sample depth. Contaminated soils will be characterized and sent off-site for treatment, as needed, and disposal. Note that if contamination is found to be extensive and remediation is impractical, HWAD will evaluate options for leaving residuals in place combined with appropriate post-closure care. Upon completion of a verification sampling program as described below, the excavation area will be regraded or clean backfill materials will be brought in to restore the topography in the adjacent areas in order to minimize soil erosion. Due to uncertainties in the needs or extent of remedial actions, a detailed remedial action plan will be prepared based on the findings of the extent of contamination, if any, and submitted to NDEP for approval prior to implementation.

Verification Sampling Plan

In the event that remedial actions are required at the OB area, commercially available field sampling techniques (e.g., TNT in soil test kits) may be used to guide the excavation efforts by providing timely results for decision-making. Upon completion of the remedial actions, verification sampling will be performed in the areas of the excavation (including bottom, sidewall, and adjacent areas) to verify that all contamination has been removed.

Random soil samples will be collected at previous 150 feet by 150 feet grid node locations that fall within the excavation. All soil samples will be collected only from the surface (up to 6 inches) at verification sampling locations and sent to the analytical laboratory for analysis. The number of verification samples will depend upon the extent of excavation.

Sampling methods, including sampling procedures, equipment, containers, preservation techniques, chain-of-custody, decontamination, and QA/QC procedures and objectives as presented in the Waste Analysis Plan will be followed. It is also anticipated that the same analytical methods, detection limits, quantization limits, QA/QC procedures, and data validation procedures as described in the Waste Analysis Plan will be followed.

Schedule for Closure [40 CFR 264.112(b)(6) and 264.113]

Closure of the OB unit is schedule to occur 30 years from the date the permit is issued. It will proceed according to the schedule shown in Section J, Table J-3. No extension of closure time is requested at this time.

Table J-3

Schedule for Closure of the OB Unit*

Step	**Description**	**Latest Cumulative Time (Days)**
1	Notify Director of intent to close	180 prior to receipt of final waste volume
2	Receipt of final waste	0
3	Begin closure	30
4	Process final volume of wastes and store residue in on-site interim status storage facilities	90
5	Complete sampling and testing of all samples; dispose of any contaminated soil off site	150
6	U.S. Army certifies that closure is completed in accordance with plan	165

Step	Description	Latest Cumulative Time (Days)
7	Independent registered Nevada professional engineer and CEM certifies closure completed in accordance with plan	180

* Note that should monitoring data available at the time of closure indicate that substantial remediation will need to be conducted; an extension of the 180 day timeframe required for closure will be requested.

Throughout the OB unit closure activities, all operations will be performed in a manner that will protect personnel, human health, and the environment. The necessary level of protection will be achieved by ensuring that various precautions are put in place and properly implemented during closure. The precautions will include:

- **Security:** All existing security (e.g., signs, gates) will be maintained and, as necessary, supplemented.
- **Inspections:** The facility inspection program will be expanded to include inspection of areas where hazardous waste and residues are temporarily stored during remediation and decontamination.
- **Personnel Training:** All personnel associated with facility closure will receive the training necessary to perform their duties in accordance with applicable laws and regulations.
- **Preparedness and Prevention:** During closure activities, all equipment necessary to respond to potential emergencies at the facility will remain available. The facility will be maintained in such a manner as to minimize the potential for emergencies during closure.
- **Contingency Plan and Emergency Procedures:** The facility contingency plan will be maintained, and, as necessary, augmented to describe proper responses in the event of emergencies during closure.

Closure Certification

Within 60 days of the completion of closure of the OB unit, HWAD will provide the EPA Region IX Administrator, by registered mail, a certification that the unit has been closed in accordance with the Closure Plan. The certification will be signed by the Installation Commander and by an independent, registered Nevada professional engineer, and a Certified Environmental Manager. Documentation supporting the engineer's certification will be furnished.

Closure Certification Report

The Closure Certification Report will be prepared at the time of unit closure and will include the following sections:

i) Description of sampling plan implementation and decisions
ii) Description of remediation decisions and activities, if any
iii) Description of verification sampling plan implementation and decisions, if any
iv) Data analysis and presentation (data posting on a map, contour plotting, tables), and, if any, figures showing location of remediation areas
v) Sampling and analysis documentation
vi) Statistical analyses performed, presentation of representative calculations
vii) Certification by an independent registered professional engineer that closure is completed in accordance with approved closure plan, facility permit, and relevant regulations.
viii) Certification by a State of Nevada certified environmental manager

If contamination is left in place at the time of unit closure, a survey plat indicating the location and dimensions of the unit with respect to permanently surveyed benchmarks will be submitted to the local zoning authority and to the USEPA Regional Administrator. The plat will be prepared and certified by a professional land surveyor and will contain a note, prominently displayed, which states the owner/operator obligation to restrict disturbance of the disposal unit in accordance with applicable 40 CFR Subpart G regulations.

POST-CLOSURE PLAN [40 CFR 264.117, 264.118, 264.603]

The post-closure plan does not apply to Old Bomb because all hazardous wastes would be removed after closure is complete. It is also expected that the facilities will be closed in a condition of acceptable environmental standards of cleanliness and housekeeping. This clean closure will require no Post Closure Plan, because the area will be available for use without restriction. In the event that clean closure is unattainable, a revised closure plan will be required, to address the appropriate closure and post-closure requirements based on the conditions determined at the time of closure. Existing fencing around the OB unit will be maintained following unit closure if it is believed that contaminated subsoils and/or UXO will be left in place.

A waste analysis plan has been prepared to be utilized at closure of the OB area to determine if clean closure action levels are attainable. Clean closure action levels for the soil media in the OB area will be based on either background levels or risk-based levels, whichever are higher. HWAD will remove or decontaminate all waste residues and contaminated soils, structures and equipment contaminated with waste at levels exceeding the to be determined clean closure action levels, and manage them as hazardous waste unless exemptions in 40 CFR 261 can be applied.

In the event that, after evaluation of results from the WAP at closure, HWAD determines that clean closure is not attainable, HWAD will prepare a post closure plan and submit it to the NDEP in accordance with applicable requirements in 40 CFR 264.118, based on the promulgated munition rules at the time of closure. The post-closure plan will be submitted within 90 days from the date that HWAD or NDEP determines that the OB Unit will be closed, subject to the appropriate requirements. The plan will identify the activities that will be performed after closure of the OB Unit and the frequency of these activities, and include at least:

(1) A description of the planned monitoring activities and frequencies at which they will be performed to comply with the applicable regulations in 40 CFR 264 during the post closure care period

(2) A description of the planned maintenance activities, and frequencies at which they will be performed, to ensure:

    (i) The integrity of the cap and final cover or other containment systems in accordance with the applicable requirements in 40 CFR 264; and

    (ii) The function of the monitoring equipment in accordance with the requirements in 40 CFR 264

(3) The name, address, and telephone number of the person or office to contact about the unit or facility during the post closure care period.

After final closure has been certified, the person or office specified in the post-closure plan will follow the approved post closure plan during the remainder of the post closure period. If a change in the approved post closure plan is needed at any time during the post closure care period, HWAD will submit a written notification of or request for a permit modification in accordance with the applicable requirements of 40 CFR 124 and 40 CFR 270. The written notification or request will include a copy of the amended post closure plan for review or approval by the NDEP. As indicated in 40 CFR 264.118, HWAD will submit a written request for a permit modification at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event has occurred which has affected the post closure plan.

CLOSURE AND POST-CLOSURE COST ESTIMATE
[40 CFR 264.142, 264.144, 270.14(b)(15) and (16)]

States and the Federal Government are exempt from RCRA financial requirements. HWAD is a federally owned and operated facility and, therefore, qualifies for this exemption.

FINANCIAL ASSURANCE MECHANISMS [40 CFR 264.143, 264.145, and 264.146]

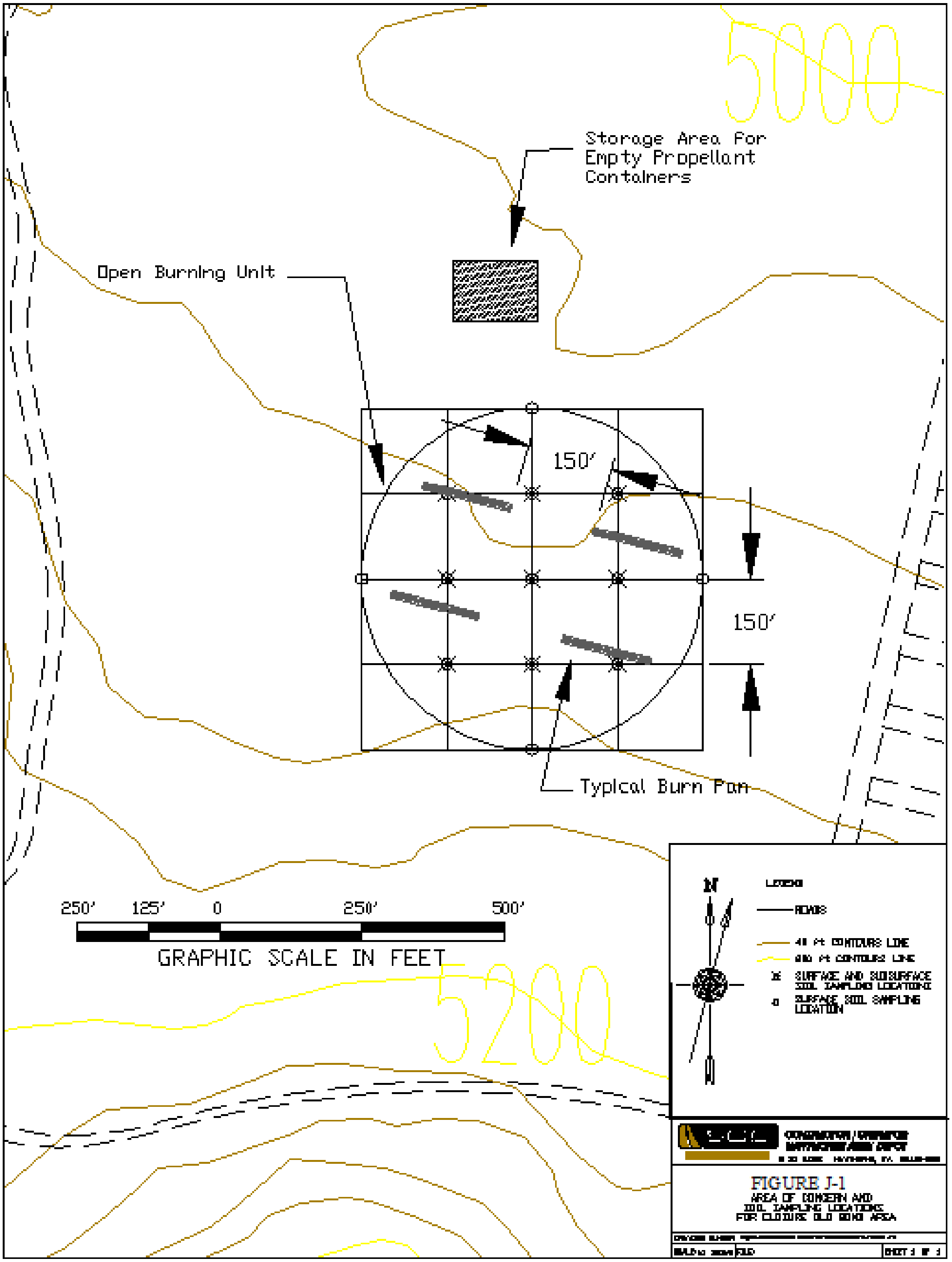
States and the Federal Government are exempt from RCRA financial requirements. HWAD is a federally owned and operated facility and, therefore, qualifies for this exemption.

NOTICE OF DEED [40 CFR 270.14(b)(14) and 264.119]

Old Bomb are not waste disposal facilities; therefore, HWAD qualifies for this exemption.

INSURANCE POLICY [40 CFR 264.147]

States and the Federal Government are exempt from RCRA financial requirements. HWAD is a federally owned and operated facility and, therefore, qualifies for this exemption.


5000
Storage Area For
Empty Propellant
Containers
Open Burning Unit
150'
150'
Typical Burn Pan
250'
125'
0
250'
500'
GRAPHIC SCALE IN FEET
5200
N
LEGEND
ROADS
SURFACE AND SUBSURFACE
SOIL SAMPLING LOCATIONS
SURFACE SOIL SAMPLING
LOCATION
FIGURE J-1
AREA OF CONCERN AND
SOIL SAMPLING LOCATIONS

SECTION K. CONTAINER USE AND MANAGEMENT DESCRIPTION FOR HAZARDOUS WASTE STORAGE BUILDINGS [40 CFR 270.15]

This section addresses process information for hazardous waste storage buildings at HWAD including Buildings 106-22, 106-23, 115-9, and 113-73A.

APPLICABILITY [40 CFR 264.170]

As part of its mission, HWAD has the responsibility to renovate, recover, treat, and dispose of unserviceable ammunition and explosives. These operations generate hazardous waste that is stored on-site in containers in designated buildings until disposal through an off-site contractor. Storage of containerized hazardous waste falls under the use and management of containers provisions in Sections 264.170 through 264.178.

CONTAINERS WITH FREE LIQUIDS

Storage of containers with free liquids is in Buildings 106-22, 106-23, and 115-9. A list of waste received at these locations is provided in Section F, Tables F-l, F-2, and F-3, Waste Characteristics. The annual maximum estimated generation rates are itemized in Part A Permit Application.

Description of Containers

Wastes received at Buildings 106-22, 106-23, and 115-9 are stored in containers that are approved by the Department of Transportation (DOT). Container sizes range from 5 gallons to 55 gallons as well as 1 cubic yard boxes and are DOT-approved containers. Photographs of the interior of 106-22 and 115-9 are shown on the next two pages. The majority of containers consist of 55-gallon drums. The drums have either a bung hole or a lid affixed with a ring and bolt. Storage containers found to be leaking or damaged are typically over-packed in 85-gallon drums. Hazardous waste labels are placed on containers indicating the type of waste that is accumulated and signs are placed near each waste group. Non-RCRA wastes are also marked properly. Drums containing PCBs have a label indicating "Caution Contains PCB."

An adequate supply of empty drums in good conditions is maintained at HWAD. Drums are inspected for potential leaks, structural integrity, and evidence of corrosion. Wastes are stored in containers made of material compatible with the wastes. For example, drums containing corrosives and spent solvents are lined with high-density polyethylene or cured epoxy.

Container Management Practices

Containers for wastes with free liquids are stored on pallets, each holding a maximum of four containers (55-gallon). Pallets are stacked to a maximum of two high. Each pallet has a load-bearing capacity of at least 4,000 pounds. Containers remain tightly sealed with the bungs tightened and lids affixed with rings and bolts tightened with nut, except when transfer of container contents is necessary.

Transport of containers within the storage facility is conducted using forklifts. HWAD maintains a fleet of electric forklifts of various brand makes and capacities. The specific type of forklift used depends upon the availability at the time of use. The use of palletized storage with forklift transport minimizes the exposure of the containers to structural damage. Hand trolleys are also available to move containers.

Wastes are never stored in leaking, cracked, or otherwise damaged containers which could result in an accidental release of contents. The contents of containers discovered to have leaks or damage which could result in a release of contents are immediately transferred to a secure, compatible container. Drums are inspected and verified to be free of damage, such as perforations, creases, rust, or gouges, prior to use.

Containerized wastes remain closed while in storage. Containers are opened only for the purposes of adding wastes, removing wastes, sampling, or otherwise inspecting the wastes or their containers. Containerized wastes are not handled in a manner which is likely to result in rupture or leakage. Workers do not attempt to move more wastes at one time than is prudent. Carts are utilized for moving wastes inside the buildings.

A minimum of 3 feet aisle clearance is maintained to allow for movement of personnel and equipment.

Secondary Containment System Design and Operation

Requirements for HWAD to Contain Liquids

Buildings 106-22, 106-23, and 115-9 are enclosed structures of reinforced concrete design. The floors consist of a 6-inch-thick reinforced concrete slab with 4-inch x 4-inch 6/6 wire mesh reinforcement. The floors are elevated approximately 4 feet above surrounding ground level on earth fill. The containment systems that are in place at these buildings can contain any accumulated liquids which reach the floor until detected and removed. The locations of these magazines are shown in Section A, Figure A-2

All three buildings were upgraded in 1990 to include secondary containment. Concrete berms and ramps were constructed in various areas of the three buildings in accordance with ASTM standards. Berm heights are typically 2 inches high and 6 inches wide at the base, except in the cells in which PCB wastes are stored where berm height is 6 inches. The concrete floors in each building were etched with a muriatic acid solution, primed, and then sealed with at least 1/8-inch-thick coating of Treflite, an epoxy compound that consists primarily of a resin and a hardener. The impervious epoxy floors are resistant to abrasion, thermal and physical shock, acids, alkalis, oxidizers, and solvents as well as steel wheel traffic and the weight of drums. Concrete surfaces sealed with the epoxy compound include the floors, the entire berms, surrounding walls (equal in height to surrounding berms), and ramps. The concrete berms allow the segregation of containers with free liquids and those with no free liquids, as well as the separation of incompatible waste.

Containment System Capacity

All cells surrounded with berms have adequate volume (at least 10 percent of volume of all containers or the volume of the largest container, whichever is greater) to contain spills and leaks. Supporting calculations showing cell volumes and maximum quantities of wastes stored per cell are provided in Section K, Exhibit II.

The maximum amount of wastes that would ever be present in each building is presented in Section K, Table K-1. For buildings 106-22, 106-23, and 115-9, the maximum amount of liquid waste that can be safely stored at any one time is controlled primarily by secondary containment capacity. For this reason, maximum inventories have been selected that are equal to ten times the secondary containment system capacity for these buildings. (The only exception is building 106-23, which has one cell with 6-inch-high berms. The storage capacity of that cell is controlled by a combination of aisle space and stacking height limitations.) The storage capacity of building 113-73A which stores only wastes that do not contain free liquids, has been calculated based solely on aisle space and stacking height limitations see Section K, Figures K-1, K-2, K-3, and K-4.

Table K-1, Building Storage Capacities

Building	**Secondary Containment Capacity**	**Storage Capacity**
Building 106-22	10,872 gallons	108,720 gallons
Building 106-23	13,583 gallons	101,661 gallons
Building 115-9	4,367 gallons	43,670 gallons

Secondary containment for PCB waste is provided by placing units containing PCBs in steel trays to prevent potential leaks from reaching the floor. The trays are about 4 feet long, 4 feet wide, and 1 foot deep and provide adequate capacity to contain leaks. Concrete ramp structures are constructed at the doorways and in various locations of the free liquid storage areas. The height of the ramps is typically 6 inches at the doorways and 2 inches near the berms.

Containment System Drainage

The base of the container storage facility is constructed without a slope; however, the drum containers will be elevated above the base by the pallets on which they are stored and are therefore protected from contact with any fluids which may accumulate on the floor. Therefore, drainage standards in Section 40 CFR 264.175 are not required. Also, no drains are required or exist in the buildings.

Control of Run-On

The buildings are enclosed structures and are elevated on a 4-foot-high concrete slab above ground level. This design and the presence of ramps at the doorways would prevent any precipitation or run-on from reaching the room.

Removal of Liquids from Containment Systems

When evidence of leakage occurs in a specific pallet stack, facility operators will identify and segregate the leaking container(s). Remaining liquids in the leaking container(s) will be transferred to new containers in good condition. Any spillage will be cleaned up following the procedures described in the Contingency Plan provided in Section B. Any contaminated absorbent material used during cleanup will be placed in metal drums dedicated to that task and stored as hazardous material. After all fluids have been transferred to new containers and residues removed from the base, the palletized containers will be restacked in their original configuration.

Absorbent pads, vermiculite, and kitty litter are immediately available in each storage building to remove liquids from containment areas and trays.

CONTAINERS WITHOUT FREE LIQUIDS

Storage of containers without free liquids is in Buildings 106-22, 106-23, 115-9, and 113-73A. A list of waste received at these locations is presented in Section F, Tables F-1, F-2, F-3, and F-4, Waste Characteristics for Hazardous Waste Storage Buildings and the Open Burn Unit.

Test for Free Liquids

The wastes will be visually inspected prior to being sealed within their containers to ensure no free liquids are present. Testing of the wastes for free liquid is conducted in accordance with the procedures provided in the Waste Analysis Plan in Appendix B. Because of the known physical characteristics of these wastes, free liquids can be easily detected by visual inspection if present.

Description of Containers

Waste received at buildings 106-22, 106-23, 115-9, and 113-73A are stored in containers that are approved by DOT. Container sizes range from 5 gallons to 55 gallons as well as 1 cubic yard boxes and are DOT approved containers. These containers are obtained from HWAD's common stockpile of drums, and inspected for structural integrity and evidence of corrosion before use. The drums stockpiled at HWAD are manufactured to military specifications. An adequate supply of drums in good condition is maintained at HWAD. Storage containers found to be suffering from structural failures will have their contents transferred to containers in good condition. Wastes are stored in containers made of material compatible with the wastes.

Container Management Practices

Containers will be stored on pallets with each pallet holding a total of four containers (55 gallon) or 1 cubic yard box with pallets stacked to a maximum of two high. The pallets will have a load-bearing capacity of at least 4,000 pounds. The containers will remain sealed at all times except when transfer of container contents is necessary.

Forklifts are used to transport containers within the facility. HWAD maintains a fleet of electric forklifts of various makes and capacities. Each building typically maintains one to three forklifts. The specific type of forklift used will depend upon the current availability. The combination of palletized container storage with forklift transport should minimize the exposure of the containers to structural damage.

Container Storage Area Drainage

All four buildings are enclosed structures elevated above the level of the surrounding ground surface. No run-on to the storage buildings should occur. Storage of containers are on pallets that are 4 inches high above the floor, thus the containers will not be exposed to any accumulated fluids that could occur on the floor.

SPECIAL REQUIREMENTS FOR IGNITABLE OR REACTIVE WASTE [40 CFR 264.176]

The container storage facilities are located more than 50 feet from the HWAD property line. To prevent possible ignition or reaction of wastes at storage buildings, special precautions are taken. Welding, cutting, smoking, and open flames are strictly controlled. "No Smoking" signs are posted outside each building.

SPECIAL REQUIREMENTS FOR INCOMPATIBLE WASTE [40 CFR 264.177]

Incompatible wastes are not placed in the same containers. In addition, these wastes are separated by bermed areas. Containers used are new and therefore don’t require prewashing. Incompatibility of wastes is determined using the compatibility charts in Appendix A.

INSPECTIONS [40 CFR 265.15]

Inspections for leaks and deterioration of containers and the containment system are conducted on a weekly basis. The inspections are followed by the inspection schedule in Section K Table K-2 and are documented in the log presented in Section K, Table K-3.

Equipment Testing and Maintenance [40 CFR 264.33]

Preparedness and prevention equipment inspection schedules for hazardous waste storage buildings are provided in Section K, Table K-2.

Table K-2
Inspection Schedule for the
Hazardous Waste Storage Buildings

Inspection Item	Type of Inspection	Frequency
Container Placement	Aisle Space, Height of Stacks	Weekly
Container Sealing	Lid Tight, Bung Hole Cover Corrosion,	Weekly
Container Integrity	Leakage, Structure Defects	Weekly
Incompatible Waste	Segregation	Weekly
Pallets	Damage	Weekly
Floors	Cracks	Weekly
Hazardous Waste Labels	Present	Weekly
PCB Labels	Present	Weekly
Storage Capacity	Adequate	Weekly
Safety and Emergency Equipment		
Fire Extinguishers	Present/Operational	Weekly
Showers/Eyewashes	Water Pressure, Leakage Present	Weekly
First Aid Kit	Present	Weekly
Respirators	Present	Weekly
Gloves	Present	Weekly
Telephone System	Power Failure	Weekly
Fire Alarm Device	Power Failure	Weekly
Source of Ignition	Removed	Weekly
Security Devices		
Doors	Integrity	Weekly
Lock	Operational	Weekly
Warning Signs	Present	Weekly
Communication Equipment Two-Way		
Radio	Operational	Weekly
Cell phone	Operational	Monthly

Table K-3
Inspection Checklist for Hazardous Waste Storage Buildings

Building #:___________________

Date:_______________________ Time of Inspection:__________________

Name of Inspector:____
Form Revised: May 2012

Weekly Inspection		Yes	No
1	Container integrity intact (no perforations, creases, rust or gouges)		
2	Aisle Space >3 feet		
3	Height of stacks acceptable		
4	Lids with ring and bolt tight		
5	Bungs tight		
6	Incompatible waste segregated with no damage		
7	Pallets in good condition		
8	Are there cracks in floor		
9	Do cracks need to be sealed		
10	Hazardous labels affixed to containers		
11	PCB Labels affixed		
12	Storage capacity exceeded		
13	Fire extinguishers present and operational		
14	Showers / Eyewash stations operating properly		
15	First Aid Kit available		
16	Respirators present		
17	Gloves present		
18	Safety glasses and face shields present		
19	Telephone system operational (106-22 & 106-23)		
20	Cellular phone operational		
21	Two-way radio operational		
22	Any source of ignition		
23	Doors and door locks operational		
24	Warning signs present		
25	Verify logbook accuracy (written and laptop)		
26	Floor are swept		

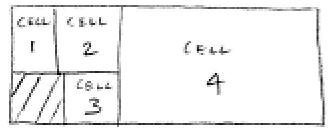
Comments	
Item #	Comments: (conditions, amounts notations, repairs needed, repairs completed, etc)

Exhibit II

Containment System Capacity Calculation

Title: Secondary Containment Capacity Calculations BUILDING 106-22	Project Number: 931973	Page: 1
	Project Name: HWAAP Part B Permit Application	Of: 4

CELL 1: 24' × 27'
CELL 2: 54' × 27'
CELL 3: 21' × 43'
CELL 4: 119' × 48'



CELL 1: • Vol. of Bermed Area = 24' × 27' × $(\frac{2}{12})'$ = 108 ft³ = 807.8 gal

• Max. Storage Capacity = 807.8 ÷ 10% = 8078 gal

CELL 2: • Vol. of Bermed Area = 54' × 27' × $(\frac{2}{12})'$ = 243 ft³ = 1,817.6 gal

• Max. Storage Cap. = 1,817.6 ÷ 10% = 18,176 gal

CELL 3: • Vol. of Bermed Area = 21' * 43' * $(\frac{2}{12})'$ = 150.5 ft³ = 1,125 gal

• Max Storage Cap. = 1,125 ÷ 10% = 11,257 gal

CELL 4: • Vol. of Bermed Area = 119' × 48' * $(\frac{2}{12})'$ = 952 ft³ = 7,120.9 gal

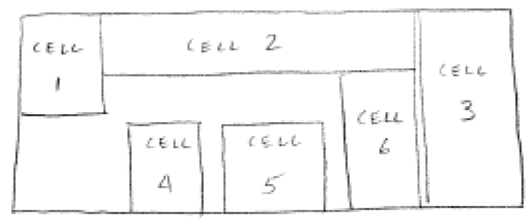
• Max. Storage Cap = 7,120.9 ÷ 10% = 71,209 gal

CONTAINMENT CAPACITY = Vol. Bermed Areas = 807.8 + 1,817.6 + 1,125 + 7,120.9 = 10,872 gal
TOTAL STORAGE CAPACITY = 8078 + 18,176 + 11,257 + 71,209 = 108,720 gal

By: JOHN KANG	Checked By: Sana Hamady	The Earth Technology Corporation
Date: 7/9/93	Date: 7/12/93	

Title:	Project Number:	Page:
Secondary Containment Capacity Calculations BUILDING 106-23	931973	2
	Project Name: HWAAP Part B Permit Application	Of: 4

CELL 1: 25' x 34'
CELL 2: 18.5' x 148'
CELL 3: 33.5' x 48' (6"-high berm)
CELL 4: 19' x 30.5'
CELL 5: 19' x 50.5'
CELL 6: 31' x 30.5'



CELL 1: Vol. of Bermed Area = 25' x 34' x $\left(\frac{2}{12}\right)'$ = 141.67 ft^3 = 1059.7 gal

Max. Storage Cap = 1059.7 ÷ 10% = 10,597 gal

CELL 2: Vol. of Bermed Area = 18.5' x 148' x $\left(\frac{2}{12}\right)'$ = 456.33 ft^3 = 3,413 gal

Max. Storage Cap = 3,413 ÷ 10% = 34,133 gal

CELL 3: Vol. of Bermed Area = 33.5' x 48' x $\left(\frac{6}{12}\right)'$ = 804 ft^3 = 6,013.9 ga

Max. Storage Cap. = 6,013.9 ÷ 10% = 60,139 gal *

* MAX Storage Cap. = 25,960 gal
DUE TO CONSTRAINTS AS DESCRIBED
IN SECTION IV

By:	Checked By:	
JOHN KANG	Sana Hamady	The Earth Technology Corporation
Date: 7/9/93	Date: 7/12/93	

Title: Secondary Containment Capacity Calculations BUILDING 106-23 (cont.)	Project Number: 931973	Page: 3
	Project Name: HWAAP Part B Permit Application	Of: 4

CELL 4: Vol. of Bermed Area = $19' \times 30.5' \times (\frac{2}{12})' = 96.58 ft^3 = 722.4$ gal

Max Storage Cap. = 722.4 ÷ 10% = 7224 gal

CELL 5: Vol. of Bermed Area = $19' \times 50.5' \times (\frac{2}{12})' = 159.9 ft^3 = 1,196.1$ gal

Max. Storage Cap. = 1,196.2 ÷ 10% = 11,961 gal

CELL 6: Vol. of Bermed Area = $31' \times 30.5' \times (\frac{2}{12})' = 157.6 ft^3 = 1,178.7$ gal

Max. Storage Cap = 1,178.7 ÷ 10% = 11,787 gal

CONTAINMENT CAPACITY = Vol. Bermed Areas

= 1,059.7 + 3,413 + 6,013.9 + 722.4 + 1,196.1 + 1,178.7 = 13,583 gal

TOTAL STORAGE CAPACITY

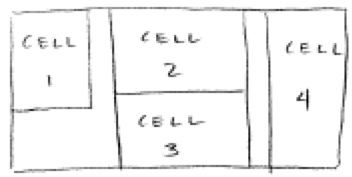
= 10,596 + 34,133 + 25,960 + 7224 + 11,961 + 11,787

= 101,661 gal

By: JOHN KANG	Checked By: Sana Hamady	The Earth Technology Corporation
Date: 7/9/93	Date: 7/12/93	

Title: Secondary Containment Capacity Calculations BUILDING 115-9	Project Number: 931973	Page: 4
	Project Name: HWAAP Part B Permit Application	Of: 4

CELL 1: 18' x 33.5'
CELL 2: 25' x 39'
CELL 3: 25' x 39'
CELL 4: 19' x 50'



CELL 1: Vol. of Bermed Area = 18' x 33.5' x $(\frac{2}{12})'$ = 100.5 ft^3 = 751.7 gal
Max. Storage Cap. = 751.7 ÷ 10% = 7517 gal

CELL 2: Vol. of Bermed Area = 25' x 39' x $(\frac{2}{12})'$ = 162.5 ft^3 = 1215.5 gal
Max. Storage Cap. = 1215.5 ÷ 10% = 12,155 gal

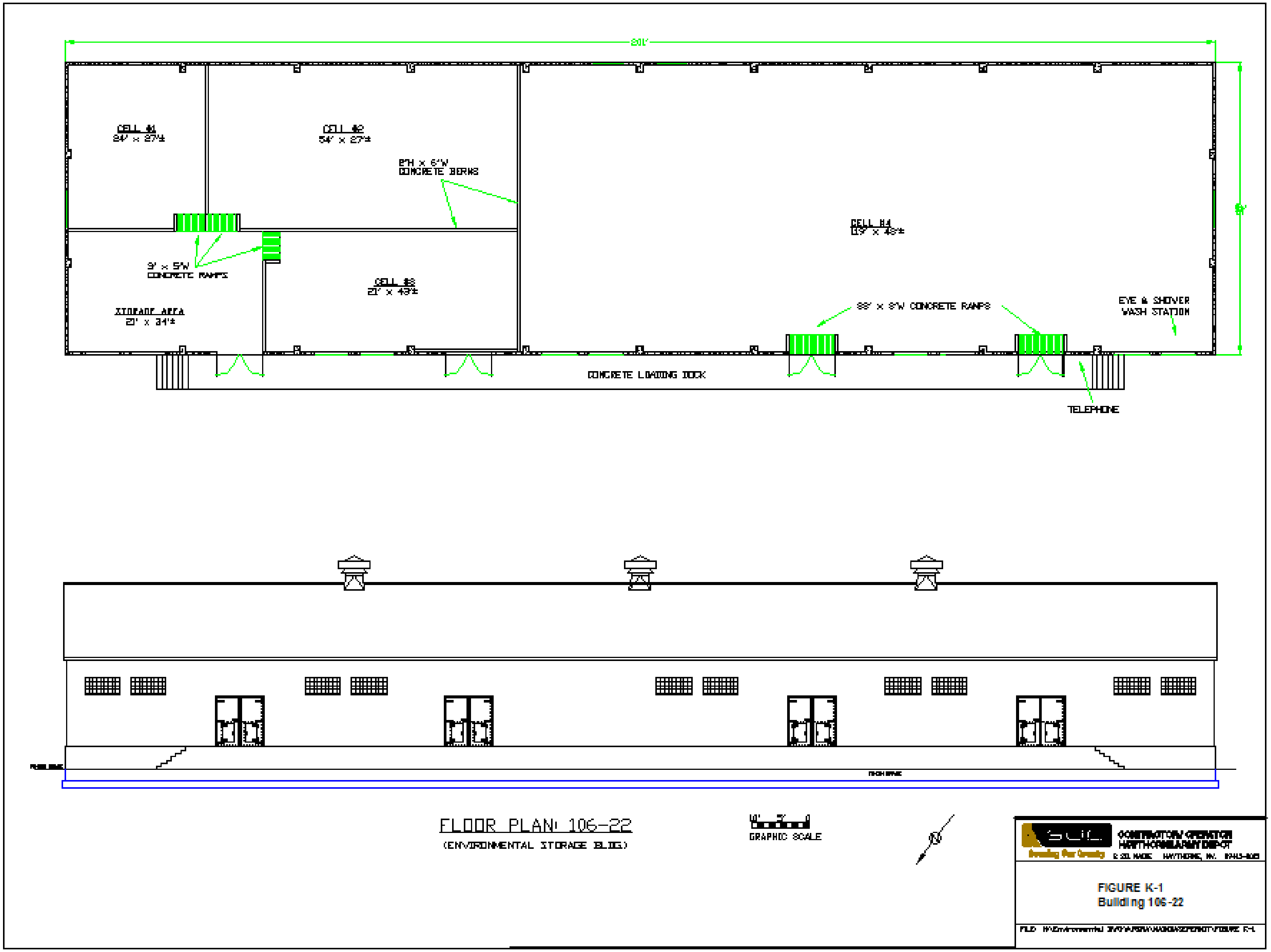
CELL 3: Vol. of Bermed Area = 25' x 39' x $(\frac{2}{12})'$ = 162.5 ft^3 = 1215.5 gal
Max. Storage Cap = 1215.5 ÷ 10% = 12155 gal

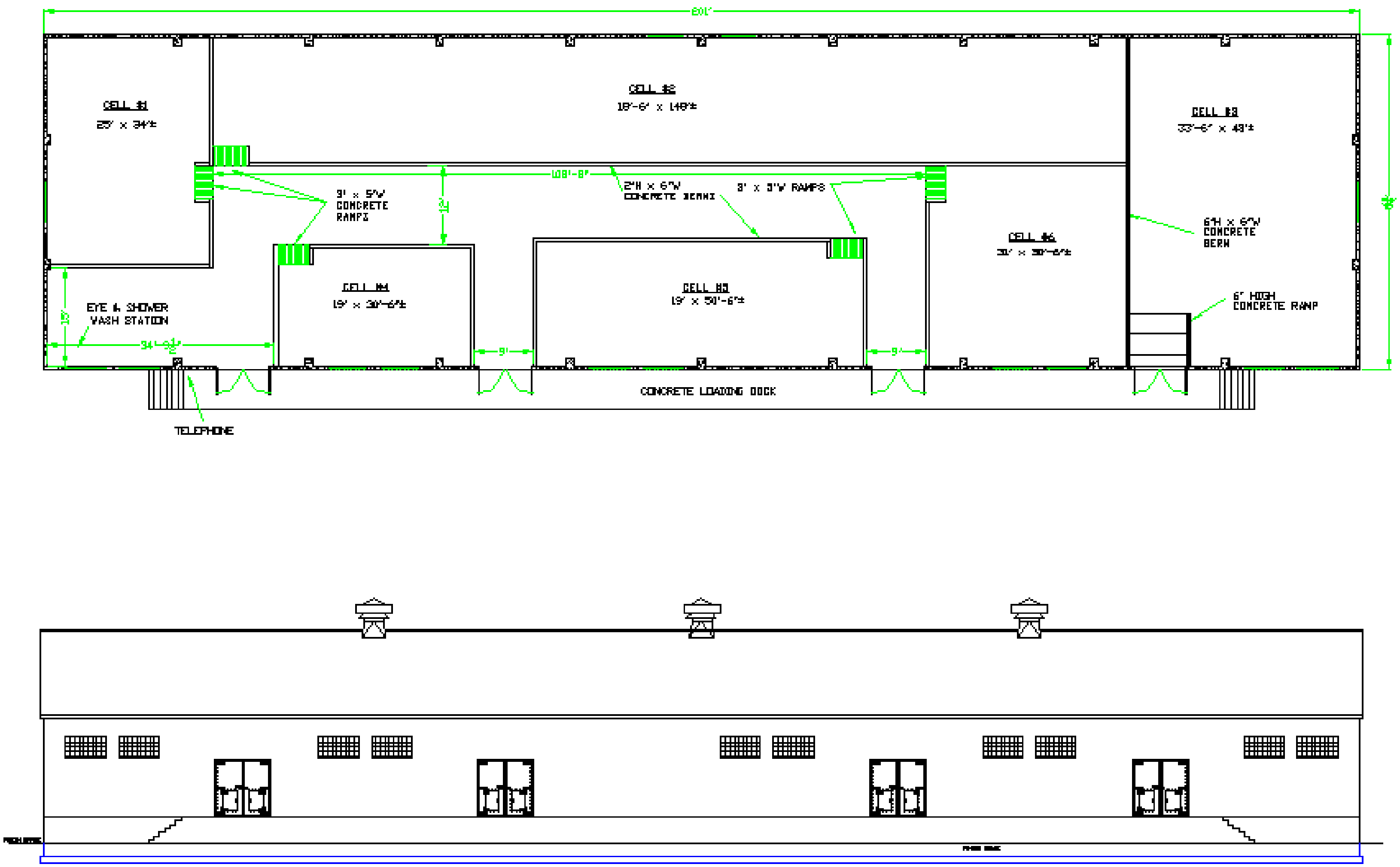
CELL 4: Vol of Bermed Area = 19' x 50' x $(\frac{2}{12})'$ = 158.3 ft^3 = 1,184.3 gal
Max. Storage Cap = 1,184.3 ÷ 10% = 11,843 gal

CONTAINMENT CAPACITY = Vol. Bermed Areas = 751.7 + 1215.5 + 1215.5 + 1,184.3 = 4,367 gal

TOTAL STORAGE CAPACITY = 7517 + 12,155 + 12,155 + 11,843 = 43,670 gal

By: JOHN KANG	Checked By: Sana Hamady	The Earth Technology Corporation
Date: 7/9/93	Date: 7/12/93	


CELL #1
24' x 27'±
CELL #2
54' x 27'±
8"H x 6"W
CONCRETE BERMS
CELL #4
119' x 48'±
9' x 5'W
CONCRETE RAMPS
STORAGE AREA
20' x 34'±
CELL #3
21' x 43'±
8' x 8'W CONCRETE RAMPS
EYE & SHOWER
WASH STATION
CONCRETE LOADING DOCK
TELEPHONE
FLOOR PLAN: 106-22
(ENVIRONMENTAL STORAGE BLDG.)
GRAPHIC SCALE
CONTRACTOR/ OPERATOR
HAWTHORNE ARMY DEPOT
HAWTHORNE, NV.
FIGURE K-1
Building 106-22



FLOOR PLAN: 106-23

(ENVIRONMENTAL STORAGE BLDG.)

10' 5' 0

GRAPHIC SCALE

CONTRACTOR OPERATOR
HAWTHORNE ARMY DEPOT

HAWTHORNE, NV.

FIGURE K-2

Building 106-23

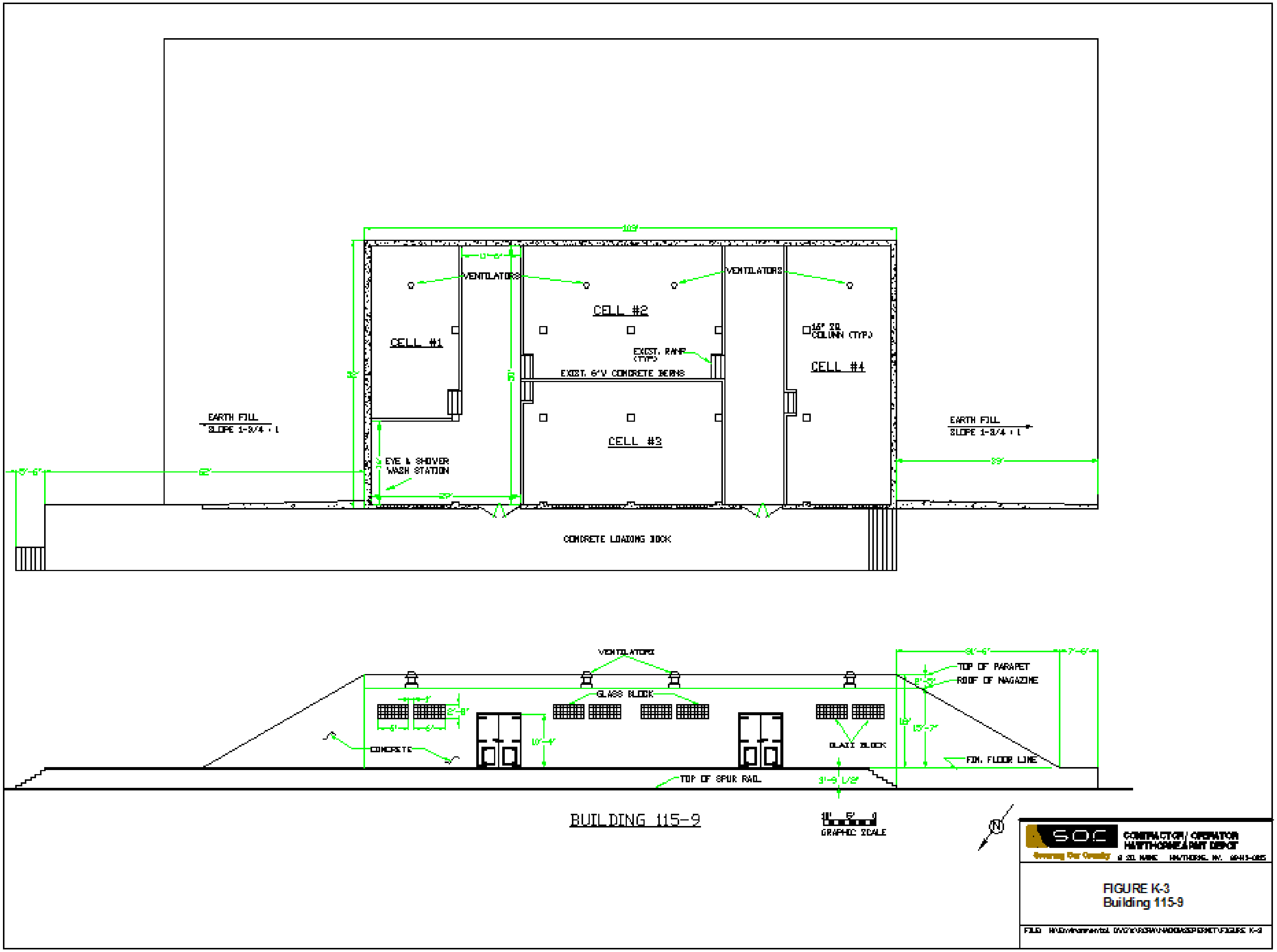
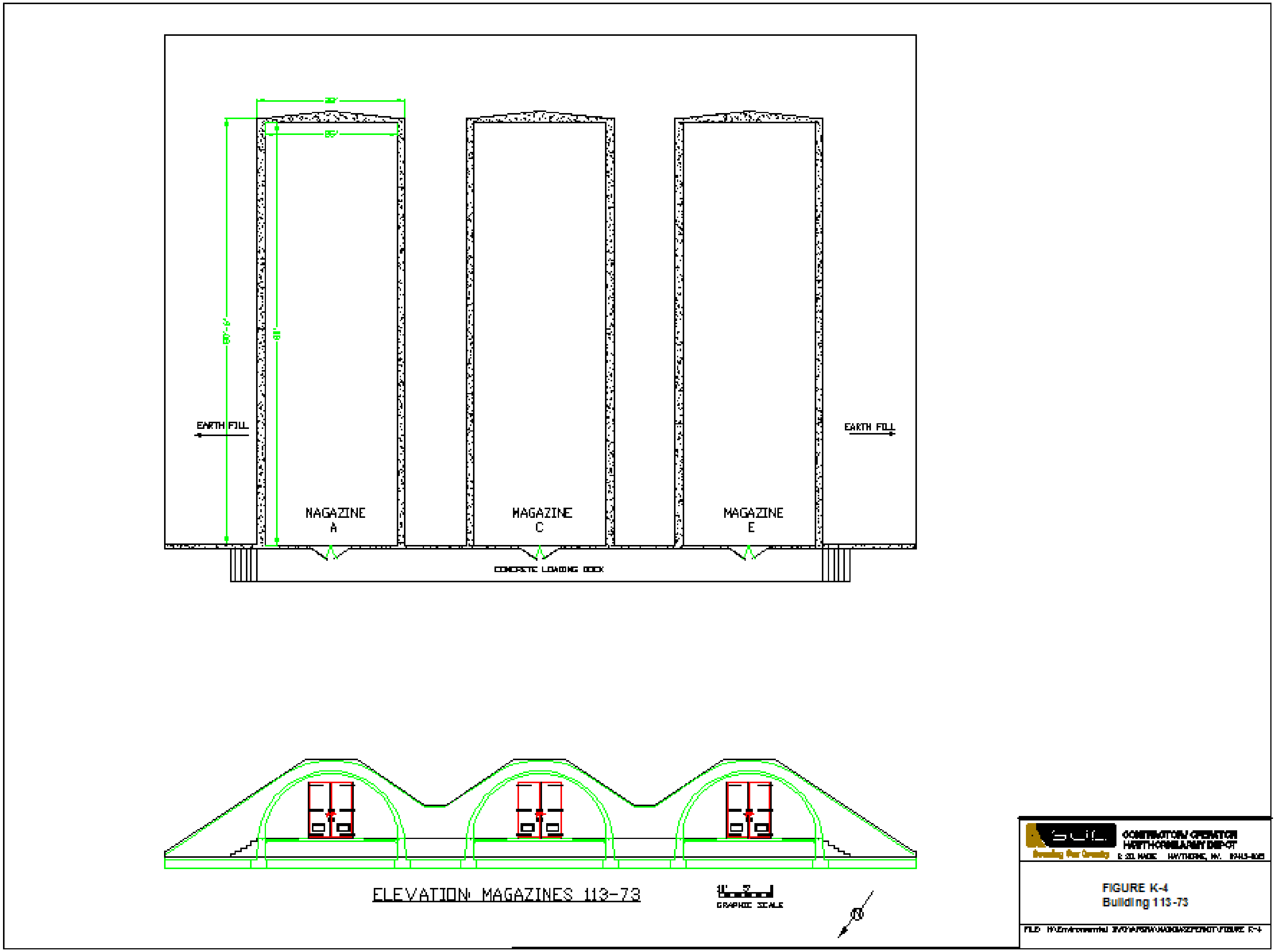


FIGURE K-3
Building 115-9


EARTH FILL
MAGAZINE A
MAGAZINE C
MAGAZINE E
EARTH FILL
CONCRETE LOADING DOCK
ELEVATION MAGAZINES 113-73
GRAPHIC SCALE
CONTRACTOR/ OPERATOR
HAWTHORNE ARMY DEPOT
HAWTHORNE, NV.
FIGURE K-4
Building 113-73

SECTION L. CONTAINER USE AND MANAGEMENT DESCRIPTION FOR HAZARDOUS WASTE MUNITION ITEMS STORAGE MAGAZINES [40 CFR 270.15]

This section addresses process information for hazardous waste storage buildings at HWAD which will hold only munition items which have been declared hazardous waste. These buildings are storage magazine numbers 116-37, 116-38, 116-39, 116-41, 116-42, 116-43, 116-44 and 116-45.

Applicability [40 CFR 264.170]

As part of its mission, HWAD has the responsibility to demilitarize obsolete and/or unserviceable munition items. These operations may generate components that can no longer be used for munition items or cannot be processed through any further reclamation process. These items may be designated as a hazardous waste and be transported to the designated storage facility. Storage of containerized hazardous waste falls under the use and management of containers provisions in Section 264.170 through 264.178.

Prohibition of Containers with Free Liquids

Only solids will be stored in the magazines designated for hazardous waste munition items according to the MIDAS database to show no free liquids. The MIDAS database informs us of the constituents of available munitions. If a munition is not available through MIDAS, working knowledge and other historical records will indicate. Then the waste will be investigated further to determined if it is safe to store with no free liquids using the paint filter test.

The locations of these magazines are shown in Section A, Figure A-2 All of these magazines was constructed in the same manner as Building 113-73A. Cracks and/or holes in the floor of these structures will be sealed to prevent any liquid material from penetrating the floors. The drainage outlets will also be sealed to prevent water from entering the storage area. Work orders are in the process of being placed to complete required crack and drainage work activities. Only solids will be stored in the 116 group magazines and may include the following RCRA waste codes: D003 (reactivity); D005 (Barium); D008 (Lead); D009 (Mercury); and D030 (2,4-Dinitrotoluene). The maximum storage capacity for these magazines is 125,000 pounds Net Explosive Weight (NEW) per arch (three arches per building) but the physical storage limitations with the required three foot aisle space will limit the maximum amount of NEW to much less than this amount. A maximum of 96 pallets of material may be stored at one time in each arch.

To insure the maximum amount of explosives (125,000 lb) are not exceeded within each arch, the waste tracking log will be completed with NEW for each item being stored and a cumulative total for NEW stored within the arch.

Description of Containers

Wastes received at Buildings 116-37 through 116-39 and 116-41 through 116-45 are stored in typical ammunition packing configurations. This could range from wood boxes to metal boxes and/or cans placed on a pallet and/or banded with steel banding or plastic stretch wrap to a pallet. All wastes will be in DOT approved containers (packaging) for the type of ammunition, before storage in these facilities.

Container Management Practices

Containers for wastes are stored on pallets, each holding a maximum of four containers (55-gallon) or 4,000 lbs. of munitions. Pallets are stacked to a maximum of two high. Each pallet has a load-bearing capacity of at least 4,000 pounds. Containers remain tightly sealed with hasps and wire seals intact.

Transport of containers within the storage facility is conducted using forklifts. HWAD maintains a fleet of electric forklifts of various makes and capacities. The specific type of forklift used depends upon the availability at the time of use. The use of palletized storage with forklift transport minimizes the exposure of the containers to structural damage. Hand trolleys are also available to move containers.

Wastes are never stored in leaking, cracked, or otherwise damaged containers which could cause an accidental release of contents. The contents of containers discovered to have leaks or damage which could cause a release of contents are immediately transferred to a secure, compatible container. Containers are inspected and verified to be free of damage, such as perforations, creases, rust, or gouges, prior to use.

Containerized wastes remain closed while in storage. Containerized wastes are not handled in a manner which is likely to result in rupture or leakage. Workers do not attempt to move more wastes at one time than is prudent. Carts are utilized for moving wastes inside the buildings.

A minimum of 3 feet aisle clearance is maintained to allow for movement of personnel and equipment.

Special requirements for Ignitable or Reactive Waste [40 CFR 264.176]

The container storage facilities are located more than 50 feet from the HWAD property line. To prevent possible ignition or reaction of waste munition items at storage buildings, special precautions are taken; welding, cutting, smoking, and open flames are strictly forbidden in ordnance areas at HWAD.

Special Requirements for Incompatible Waste [40 CFR 264.177]

Incompatible wastes are not placed in the same containers. Munition items are required to pack separately with only like items in a pack. All munition wastes are packed in accordance with DOD and DOT instructions. Serviceable munitions are stored in magazines according to DOD compatibility groups. These unserviceable waste munition items will also be stored according to DOD and army storage criteria, thus avoiding incompatible storage. All munition waste will be stored in accordance with the latest version of the Receipt Storage and Issue (RSI), Depot Operations SOP (Appendix A).

Inspections [40 CFR 264.174]

Inspections for broken or damaged container (packing) and storage requirements are performed on a weekly basis. The inspections are documented in the log presented in Section K, Table K-3.

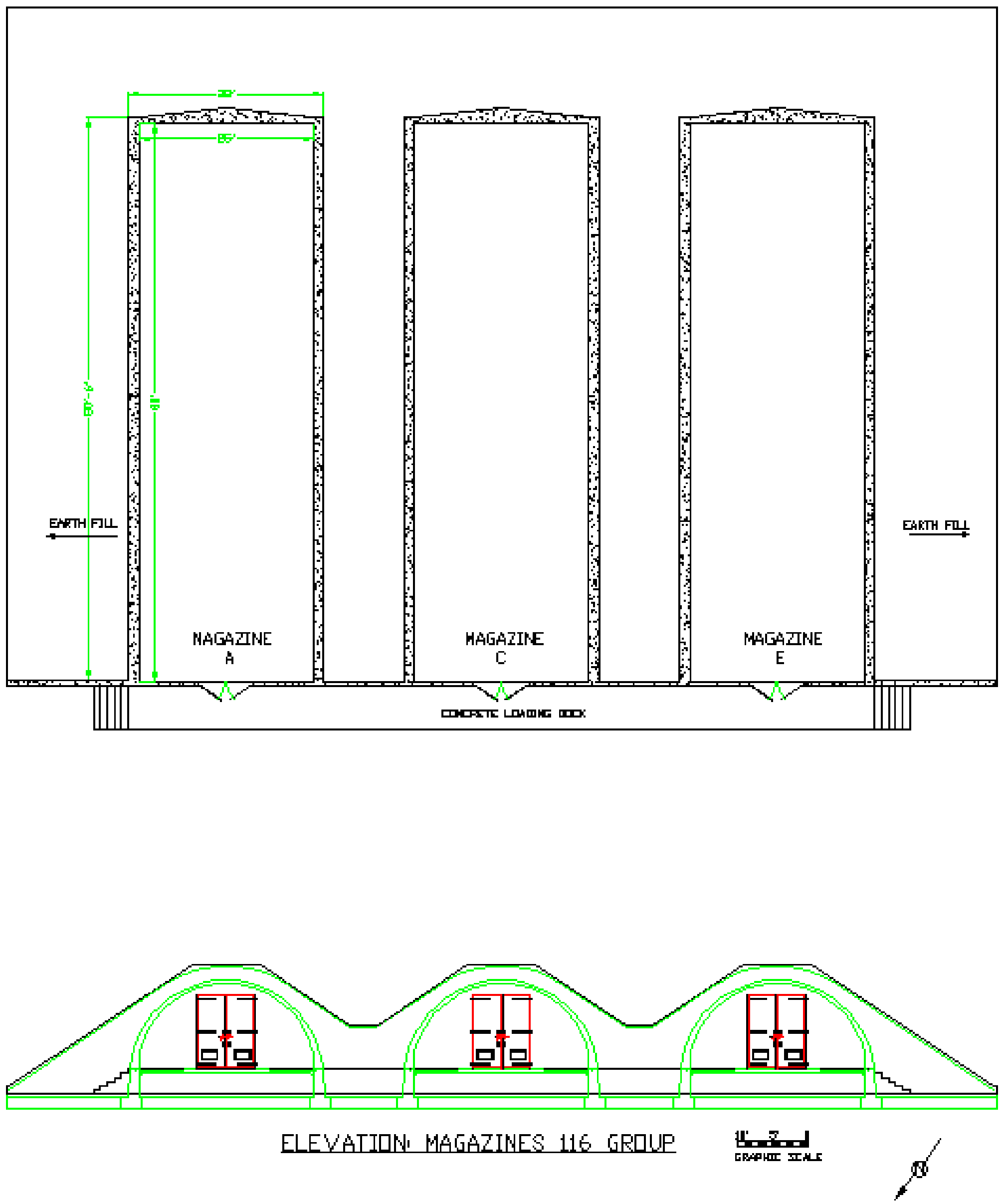


FIGURE L-1
Building 116
GROUP

SECTION M. CLOSURE PLANS, POST-CLOSURE PLANS, AND FINANCIAL REQUIREMENTS FOR HAZARDOUS WASTE STORAGE BUILDINGS AND MAGAZINES

This section is submitted in accordance with the requirements of 40 CFR 264, Subpart X and 40 CFR Part 270 and describe the activities that will be undertaken to clean close the hazardous waste storage buildings and magazines unit at HWAD to risk-based or background levels. The buildings are not expected to undergo partial closure during their active life; therefore, partial closure actions are not specifically addressed in this Closure Plan. However, this Closure Plan is designed to be amenable to partial closure if the need arises. HWAD is a Federal Facility and is exempt from financial requirements; thus, closure cost estimates and financial assurance documents are not discussed.

HWAD will notify the U.S. EPA Region IX Administrator and the NDEP at least 180 days prior to the date closure is expected to begin. Closure activities will be carried out in accordance with this Closure Plan. Upon completion of closure, HWAD will submit a Certification of Closure signed by an independent, registered Nevada professional engineer to the EPA Region IX Administrator. HWAD will maintain this Closure Plan until certification of closure completeness has been submitted and accepted by EPA Region IX Administrator. HWAD will maintain this Closure Plan until certification of closure completeness has been submitted and accepted by EPA Region IX. Any changes to the schedules and activities described in this Closure Plan will be approved by EPA prior to implementation. HWAD will be responsible for plan amendment. The twelve hazardous waste storage buildings will be used fully during their active life.

Description of Closure Procedures [40 CFR 264.112(b)(2) and (4), 264.114]

Final closure of the twelve hazardous waste storage buildings at HWAD will occur following the cessation of demilitarization and production activities at the Main Base. Closure activities will include:

- Removal of all remaining hazardous wastes.
- Disposal of all remaining hazardous waste through an authorized permitted off-site hazardous waste disposal facility.
- Inspection of the storage area for any evidence of spills or leaks. Any spill or leak-related waste or contaminated material observed will be collected and containerized along with any cleanup items, such as mops or cloths, for disposal with other containers.
- Decontamination of the unit until cleanup levels (to be determined by HWAD and NDEP at the

time of closure) are achieved.

During removal of the containers, observations will be made to assure that the conditions of the containers are good and that no corrosion has occurred. If there is an indication of corrosion or damage, stored wastes will be transferred to appropriate containers in good condition, and the damaged, containers will be thoroughly cleaned before disposal.

The rinse waters will be sampled and analyzed in accordance with the sampling and analysis procedures prescribed in 40 CFR 261. If necessary, the waste residue will be containerized and transported to a permitted facility for disposal. Subsequent washings and collection of wash residue (including sampling and analysis as discussed above) will be performed until an analysis of the wash residue from all affected surfaces indicates that the wash water is not contaminated.

Closure Performance Standard [40 CFR 264.112(b)(1)]

When operations at the hazardous waste storage buildings are terminated, closure will be conducted in a manner that eliminates the need for post-closure care. This Closure Plan has been designed to:

- Minimize the need for further maintenance of the hazardous waste storage buildings
- Minimize post-closure escape of hazardous waste, hazardous constituents, waste degradation products, leachate, and contaminated run-off into surface water and groundwater to the extent necessary to protect human health and the environment.
- Comply with the environmental performance standards of 40 CFR Part 264, Subpart X relative to closure activities and post-closure facility conditions.

Soil contamination is not expected as a result of hazardous waste storage activities because the waste is stored in fully-enclosed buildings.

Partial Closure Activities [40 CFR 264.112(b)(2)]

The hazardous waste storage buildings described in this permit application are expected to remain in service during the active life of the facilities. No partial closure is anticipated. Closure of the buildings and the OB unit will proceed as described in this Closure Plan. In the event that future circumstances require HWAD to close a portion of the facilities, this Closure Plan will be amended.

Maximum Waste Inventory [40 CFR 264.112(b)(3)]

HWAD will remove or decontaminate all waste residues and contaminated soils, structures and equipment contaminated with waste at levels exceeding the to be determined clean closure action levels, and manage them as hazardous waste unless exemptions in 40 CFR 261 can be applied.

The maximum operating inventory of hazardous waste in storage at any one time is presented in Section M, Table M-1 for each building.

Table M-1

Maximum Waste Inventory

Building	Capacity in Pallets	Capacity in gallons
106-22	494 Pallets	108,720 gallons
106-23	492 Pallets	101,661 gallons
115-9	198 Pallets	43,670 gallons
113-73A	96 Pallets	21,120 gallons
116-37 A	96 Pallets	21,120 gallons
C	96 Pallets	21,120 gallons
E	96 Pallets	21,120 gallons
116-38 A	96 Pallets	21,120 gallons
C	96 Pallets	21,120 gallons
E	96 Pallets	21,120 gallons
116-39 A	96 Pallets	21,120 gallons
C	96 Pallets	21,120 gallons
E	96 Pallets	21,120 gallons
116-41 A	96 Pallets	21,120 gallons
C	96 Pallets	21,120 gallons
E	96 Pallets	21,120 gallons
116-42 A	96 Pallets	21,120 gallons
C	96 Pallets	21,120 gallons
E	96 Pallets	21,120 gallons
116-43 A	96 Pallets	21,120 gallons
C	96 Pallets	21,120 gallons
E	96 Pallets	21,120 gallons
116-44 A	96 Pallets	21,120 gallons
C	96 Pallets	21,120 gallons
E	96 Pallets	21,120 gallons
116-45 A	96 Pallets	21,120 gallons
C	96 Pallets	21,120 gallons
E	96 Pallets	21,120 gallons

Establishing Background Soil Concentrations

In an effort to establish background levels, soil samples were collected from locations near the HWAD area that are unlikely to have been impacted by past facility activities. A statistical analysis was performed on a total of 54 background soil data that have been collected for HWAD to provide minimum and maximum concentrations and to calculate the means, standard deviations, and a range of one standard deviation from the mean. This statistical analysis assumed normal distribution of the data. In case of non-detect for any analytical parameter in the samples, a value of one-half of the detection limit was assigned to those samples. This background concentration study concluded that all background sample concentrations fall within the appropriate ranges published in the USGS Professional Paper 1270 for the Western United States, and all species appear to be indigenous to the Hawthorne Valley. The analytical results for background soil samples are presented in Section 4 of the Group B SWMUs Final Data Package (Tetra Tech, 1996).

To determine the "statistically significant" level for any naturally occurring constituent, a tolerance interval approach will be used to determine the upper 95% tolerance limit (UTL) which contains at least 95% of the distribution of observations from background data. If any compliance concentration does not fall under the upper 95% tolerance limit, there is statistically significant evidence of contamination. The statistical method for determination of the 95% UTL is as follows:

$$UTL = X + K S$$

where, UTL = 95% upper tolerance limit (one-sided)

X = mean of background data

K = one-sided normal tolerance factor

S = Standard deviation of background data

Preliminary 95% UTLs for naturally occurring constituents in the background samples are presented in Section M, Table M-2.

Table M-2
95% Upper Tolerance Limits for Naturally Occurring Constituents
In the Hawthorne Valley Background Samples
Hawthorne Army Depot
Hawthorne, Nevada

	Al (mg/kg)	**As (mg/kg)**	**Ba (mg/kg)**	**Be (mg/kg)**	**Cd (mg/kg)**	**Cr (mg/kg)**	**Pb (mg/kg)**	**Hg (mg/kg)**	**Se (mg/kg)**	**Ag (mg/kg)**
Max.	18,000	27	200	0.81	1.60	17.0	58.0	0.40	<5.0	<0.9
Min.	1,800	<4.0	35	0.11	<0.2	1.2	<5.0	<0.04	<5.0	<0.9
Mean	6,406	4.2	77	0.3	0.5	4.7	6.3	0.03	NA	NA
St dev.	2,979	5.3	31	0.1	0.3	2.9	7.2	0.09	NA	NA
95% UTL	12,558	15.2	141.0	0.51	1.12	10.7	21.2	0.22	NA	NA

Notes: (1) Mean values for background concentrations were calculated by summing the total concentrations and dividing by the sample population. Non detect values were included as half of the detect limit. No statistical evaluation was conducted if the total population was reported below the detection limit.

(2) Preliminary 95% UTLs were calculated based on a total of 54 background samples (K=2.065).

Background soil samples were collected, with prior approval from the U.S. Army Corps of Engineers (USACE) and NDEP, at 54 locations throughout the Hawthorne Valley. Background soil data are presented in Section 4 of the Group B SWMUs Final Data Package (Tetra Tech, 1996). It was concluded that all background soil samples appear to be indigenous to the Hawthorne Valley.

Schedule for Closure [40 CFR 264.112(b)(6) and 264.113]

Closure of the buildings is scheduled to occur 30 years from the date the permit is issued. It will proceed according to the schedule shown in Section M, Table M-3. No extension for closure is requested at this time. If closure of any one of the buildings is necessary sooner than expected, this closure plan will be followed.

Table M-3

Schedule for Closure of HW Storage Buildings

Step	**Description**	**Latest Cumulative Time (Days)**
1	Notify Administrator of intent to close	180 prior to receipt of final waste volume
2	Receipt of final volume of HW	0
3	Complete removal for ultimate disposal	30
4	Complete decontamination	60
5	U.S. Army certifies that closure is completed in accordance with plan	90
6	Independent registered Nevada professional engineer and Certified Environmental Manager (CEM) certifies closure completed in accordance with plan	90

Within 90 days after receiving the final volume of hazardous waste, all waste stored at the buildings will be removed and disposed of through an offsite contractor. EPA Region IX and NDEP will be notified 180 days before closure activities begin. No extension of closure time is requested at this time.

Throughout the storage buildings closure activities, all operations will be performed in a manner that will protect personnel, human health, and the environment. The necessary level of protection will be achieved by ensuring that various precautions are put in place and properly implemented during closure. The precautions will include:

- **Security:** All existing security (e.g., signs, gates) will be maintained and, as necessary, supplemented.
- **Inspections:** The facility inspection program will be expanded to include inspection of areas where hazardous waste and residues are temporarily stored during remediation and decontamination.
- **Personnel Training:** All personnel associated with facility closure will receive the training

necessary to perform their duties in accordance with applicable laws and regulations.

- **Preparedness and Prevention:** During closure activities, all equipment necessary to respond to potential emergencies at the facility will remain available. The facility will be maintained in such a manner as to minimize the potential for emergencies during closure.
- **Contingency Plan and Emergency Procedures:** The facility contingency plan will be maintained, and, as necessary, augmented to describe proper responses in the event of emergencies during closure.

Closure Certification

Within 60 days of the completion of closure of the hazardous waste storage buildings, HWAD will provide the EPA Region IX Administrator, by registered mail, a certification that the unit has been closed in accordance with the Closure Plan. The certification will be signed by the Installation Commander and by an independent, registered Nevada professional engineer, and a Certified Environmental Manager. Documentation supporting the engineer's certification will be furnished.

Closure Certification Report

The Closure Certification Report will be prepared at the time of unit closure and will include the following sections:

i) Description of sampling plan implementation and decisions
ii) Description of remediation decisions and activities, if any
iii) Description of verification sampling plan implementation and decisions, if any
iv) Data analysis and presentation (data posting on a map, contour plotting, tables), and, if any, figures showing location of remediation areas
v) Sampling and analysis documentation
vi) Statistical analyses performed, presentation of representative calculations
vii) Certification by an independent registered professional engineer that closure is completed in accordance with approved closure plan, facility permit, and relevant regulations.
viii) Certification by a State of Nevada certified Environmental Manager

If contamination is left in place at the time of unit closure, a survey plat indicating the location and dimensions of the unit with respect to permanently surveyed benchmarks will be submitted to the local zoning authority and to the USEPA Regional Administrator. The plat will be prepared and certified by a professional land surveyor and will contain a note, prominently displayed, which states the owner/operator obligation to restrict disturbance of the disposal unit in accordance with applicable 40 CFR Subpart G regulations.

POST-CLOSURE PLAN [40 CFR 264.117, 264.118, 264.603]

The post-closure plan does not apply to the hazardous waste storage buildings and because all hazardous wastes would be removed after closure is complete. It is also expected that the facilities will be closed in a condition of acceptable environmental standards of cleanliness and housekeeping. This clean closure will require no Post Closure Plan, because the area will be available for use without restriction. In the event that clean closure is unattainable, a revised closure plan will be required, to address the appropriate closure and post-closure requirements based on the conditions determined at the time of closure

In the event that, after evaluation of results from the WAP at closure, HWAD determines that clean closure is not attainable, HWAD will prepare a post closure plan and submit it to the NDEP in accordance with applicable requirements in 40 CFR 264.118, based on the promulgated munition rules at the time of closure. The post closure plan will be submitted within 90 days from the date that HWAD or NDEP determines that the hazardous waste storage buildings will be closed, subject to the appropriate requirements. The plan will identify the activities that will be performed after closure of the hazardous waste storage buildings and the frequency of these activities, and include at least:

(1) A description of the planned monitoring activities and frequencies at which they will be performed to comply with the applicable regulations in 40 CFR 264 during the post closure care period

(2) A description of the planned maintenance activities, and frequencies at which they will be performed, to ensure:

    (i) The integrity of the cap and final cover or other containment systems in accordance with the applicable requirements in 40 CFR 264; and

    (ii) The function of the monitoring equipment in accordance with the requirements in 40 CFR 264

(3) The name, address, and telephone number of the person or office to contact about the unit or facility during the post closure care period.

After final closure has been certified, the person or office specified in the post-closure plan will follow the approved post closure plan during the remainder of the post closure period. If a change in the approved post closure plan is needed at any time during the post closure care period, HWAD will submit a written notification of or request for a permit modification in accordance with the applicable requirements of 40 CFR 124 and 40 CFR 270. The written notification or request will include a copy of the amended post closure plan for review or approval by the NDEP. As indicated in 40 CFR 264.118, HWAD will submit a written request for a permit modification at least 60 days prior to the proposed change in facility design or operation, or no later than 60 days after an unexpected event has occurred which has affected the post closure plan.

CLOSURE AND POST-CLOSURE COST ESTIMATE
[40 CFR 264.142, 264.144, 270.14(b)(15) and (16)]

States and the Federal Government are exempt from RCRA financial requirements. HWAD is a federally owned and operated facility and, therefore, qualifies for this exemption.

FINANCIAL ASSURANCE MECHANISMS [40 CFR 264.143, 264.145, and 264.146]

States and the Federal Government are exempt from RCRA financial requirements. HWAD is a federally owned and operated facility and, therefore, qualifies for this exemption.

NOTICE OF DEED [40 CFR 270.14(b)(14) and 264.119]

The hazardous waste storage buildings are not waste disposal facilities; therefore, HWAD qualifies for this exemption.

INSURANCE POLICY [40 CFR 264.147]

States and the Federal Government are exempt from RCRA financial requirements. HWAD is a federally owned and operated facility and, therefore, qualifies for this exemption.

SECTION N. PROCESS INFORMATION FOR APE 2210 (RF-9) DEACTIVATIOIN FURNACE

INTRODUCTION

RCRA required the USEPA to promulgate regulations for the management of hazardous waste. These regulations have been promulgated and address, among other activities, the treatment of hazardous wastes. Treatment is defined by these regulations to include any method, technique or process designed to change the physical, chemical or biological character or composition of a hazardous waste. Therefore, incineration of hazardous waste is considered to be treatment and is subject to management under RCRA.

The United States Army has an APE 2210 (RF-9) deactivation furnace (DF) located at HWAD, Hawthorne, NV see Section A, Figure A-6. The upgrade of the DF, designated as RF-9, was designed by the Ammunition Equipment Directorate (AED) at Toole Army Depot (TEAD) for the purpose of incineration by thermally treating obsolete munitions considered hazardous waste either by the reactivity or toxicity characteristic as defined in 40 CFR Part 261. Therefore, the DF must be permitted under the regulations of RCRA.

The Ammunition Peculiar Equipment (APE) 2210 (RF-9) Detonating Furnace is designed to safely destroy (or deactivate) a wide variety of obsolete and unserviceable munitions. These materials are considered RCRA hazardous waste due to their explosive (reactive) components. Some materials may also be hazardous due to metal content or POHC. Section O provides a description of the wastes to be treated at the APE 2210 (RF-9) Detonating Furnace.

This section presents a description of the of the APE 2210 (RF-9) Detonating Furnace. The Process Flow Diagram is provided in Section N, Figure N-1 of this plan. The main components of the incinerator consist of feed preparation and handling systems, feed conveying systems, a munitions detonation rotary kiln (MDRK), a combustion chamber, air pollution control equipment, metals and ash handling systems, and plant support systems. The remaining plant support systems are distillate-oil supply, electric power, instrument and plant air, plant water, fire water, runoff water control and telecommunication systems. The control system for operating the incinerator plant uses a control system that incorporates all necessary environmental monitoring.

APE 2210 (RF-9) DETONATING FURNACE *[40 CFR Part 264 Subpart Q]*

Engineering Design of APE 2210 (RF-9) Detonating Furnace *[40 CFR 270.62(b)(2)(ii)]*

Thermal treatment of hazardous and non-hazardous wastes is accomplished in an APE 2210 (RF-9) Detonating Furnace. The APE 2210 (RF-9) Detonating Furnace is a rotary furnace which has been upgraded. Upgrades to the APE 2210 (RF-9) Detonating Furnace include the addition of an Primary Combustion Chamber and Evaporative Cooler systems, continuous emission monitoring (CEM) equipment, feed conveyor, automatic feed rate controls, and computerized controls. The stack of the incinerator is also being raised as part of the upgrade. The APE 2210 (RF-9) Detonating Furnace system is located in Cells 2, and 3 of the decontamination building, Building 117-3. APE 2210 (RF-9) Detonating Furnace is shown in Section N, Figure N-2.

Waste Feed Monitor System (WFMS)

The feed system of the APE 2210 (RF-9) Detonating Furnace consists of a Waste Feed Monitor System (WFMS) and waste feed conveyors. The WFMS consists of a frame, weigh scale, electrical enclosures, push-off system and connection cables to the control system. The frame is made of carbon steel and is designed to fit over the primary feed conveyor and house the scale, push-off system, and two electrical enclosures. The frame protects the electrical components and is part of the system which prevents exceeding the feed rate for a munition. The weigh scale is an explosion-proof scale which can weigh accurately to 1/1000 of a pound. It weighs the munitions each time before they are loaded on the conveyor and prevents loading excess feed onto the conveyor. The push-off system is box-mounted over the scale which is powered by an air cylinder. It pushes the munitions off the scale onto the conveyor. It is triggered automatically when the door is shut. It will not move if the munitions on the scale exceed the allowable weight limit for that item. The first electric enclosure houses the sensors, transmitters, and power supply for the scale. It provides signals to the control system which are used by the Programmable Logic Controller (PLC) to make decisions and activate operations. The second electric enclosure houses the air valves which operate the air cylinders that move the push-off box and lock the door during each cycle. The cables transmit data to the computer which compares the weight on the scale with the weight which is stored in the memory of the computer. If the weight on the scale is less than the allowable limit, the computer signals the PLC to load to the conveyor Section N, Figure N-3.

Waste Feed Conveyor

The waste feed conveyor consists of a primary and secondary conveyor. The purpose of the two-conveyor arrangement is to cut off waste feed to the furnace in an upset condition and still allow the conveyor over the feed housing to operate. When an emergency situation arises, the primary waste feed conveyor shuts down. The short conveyor, however, remains operating. This allows munitions near the kiln to continue moving into the furnace and deters possible explosions outside the furnace.

The primary conveyor is a standard APE feed conveyor which has been shortened. It is approximately 18 feet long and extends through the blast wall and out over the secondary feed conveyor. It transports the munitions into the feed chute at the low temperature end of the rotary kiln Section N, Figure N-3.

The secondary conveyor is patterned after a standard APE feed conveyor. It is approximately 6 feet long and extends from under the primary feed conveyor to the feed housing at the furnace. Both conveyors are shrouded. The shrouding in the feed room extends from the waste feed monitor to the blast wall. The shrouding outside the feed room extends from the feed end of the retort to the interface location of the conveyors. The shroud inside the feed room is to prevent bypassing the waste feed monitor. The shroud outside the feed room is designed to contain fugitive emissions until they can be pulled back into the furnace and through the air pollution system. The interface of the primary and secondary feed conveyors is designed to permit smooth transfer of munitions from one conveyor to the other Section N, Figure N-3.

The Metal components of end-item munitions are discharged from the furnace onto the discharge conveyor. The discharge conveyor transports the waste to the scrap collection point. The conveyor is 20 feet long and 24 inches wide with flights spaced 18 inches apart. The conveyor is capable of supporting a 40 pound load per linear foot Section N, Figure N-3.

In the chance of an emergency or the munition item having a problem, the recycle conveyor will take it from the discharge conveyor. From there it will transport the debris back to the MDRK for re-treatment Section N, Figure N-3.

The APE 2210 (RF-9) Munitions Detonation Rotary Kiln (MDRK)

The munitions detonation rotary kiln is a deactivation furnace designed with intermittent internal spiral flights that advance the waste through the kiln as it rotates. The munitions detonation rotary kiln is also referred to as a retort or as having retort sections. The munitions detonation rotary kiln design is based on the APE 2210 kiln that the US Army developed specifically to incinerate configured munitions and bulk explosives. There are a number of these installations throughout the continental United States and other countries. The Army kiln has been extensively tested and has proven to be a safe, effective method for the deactivation of munitions and explosives Section N, Figure N-3.

The munitions detonation rotary kiln uses five retort sections in lieu of the standard kiln design of only four sections in order to increase the material residence time by 25 percent. In addition, the middle retort section has an enlarged inside diameter to enhance materials residence time. The increased residence time provides greater destruction efficiency for the more difficult to incinerate feeds. The overall length of the kiln, including the kiln feed housing and kiln burner/discharge housing is approximately 25 feet. The cross sectional area inside the retort is 3.7 square feet which results in a total retort volume of 93 cubic feet, after taking into account the volume occupied by the spiral flights. The effective combustion volume, which reflects the dimension from the point where the waste ignites to where the combustion gases exit the kiln, is 35 cubic feet.

The wall thickness of the munitions detonation rotary kiln is 3.25 inches for all five sections. This provides extra strength to the kiln to ensure maximum safety during detonations of heat sensitive materials. The material of construction for all sections is cast steel for high strength and ductility at elevated temperature. Refractory or fire brick is not used for insulation because fragments and explosive pressures would destroy any of these materials.

The munitions detonation rotary kiln has a single burner assembly at the hot end of the kiln, which is the opposite end from where the wastes are fed. A distillate-oil burner is used during the destruction of waste to sustain the operation of the munitions detonation rotary kiln. The fuel consumption varies with the specific waste material to be processed. When a high heat content material is incinerated, distillate-oil will only be required to support the pilot, which requires approximately 75,000 Btu/hr of fuel. At maximum firing, the fuel consumption may be increased up to 4,000,000

Btu/hr. The burner is equipped with all accessory equipment necessary for the burner operation. A flame sensor that detects the presence of flame by sensing its ultraviolet light emissions acts a flame failure safety device. The control system will not allow wastes to be fed to the rotary kiln unless the flame sensor in the flame safety system detects a flame from the burner.

The munitions detonation rotary kiln feed end temperature is used to provide operator insight to kiln operations. It is measured with a Type K thermocouple located in the kiln exhaust duct just as it exits the kiln feed end housing. The burner end temperature is measured using a Type K thermocouple located just above the burner in the kiln burner end housing at the materials discharge end of the kiln.

The munitions detonation rotary kiln is not designed to provide complete combustion of the organic materials in the feed. The kiln is designed to volatilize the organic materials from the munitions and provide partial combustion prior to the combustion chamber.

Materials to be thermally treated are fed into the cool end of the retort and are propelled towards the flame at the burner end via spiral flights. As the items being treated approach the flame, they burn or detonate, depending upon their characteristics. The APE 2210 (RF-9) Detonating Furnace does not run at capacity at all times, nor is it in continuous operation. High order detonations are contained within the retort walls, which are 2.25 inches thick at the ends and between 2.25 to 3.75 inches thick in the center (where most high-order detonations occur). Scrap metal and residue pass from the retort onto the discharge conveyor. The ash will collect in an approved hazardous waste container positioned at the discharge end. If the facility has an ash separator, ash residue will be separated from the metals at the discharge end of the furnace. Gases, ashes, and other residues escaping from the retort are routed through the Air Pollution Control System (APCS) Section N, Figure N-4.

Air Pollution Control Equipment [40 CFR 63.1207(f)(1)(iii)(G)]

Primary Combustion Chamber

The Primary Combustion Chamber (PCC) ensures complete combustion of the exhaust gases from the kiln and is therefore the equipment item where the combustion temperature is important to ensure that stack emissions of organic compounds comply with the MACT standards see Section N,

Table N-2. The combustion chamber is horizontally mounted, heats the exhaust gases from the MDRK up to 1,800^{o}F, provides greater than 1 second of residence time, and achieves highly turbulent flow to ensure good mixing and therefore effective destruction of waste gases. The combustion chamber is constructed of carbon steel and is internally insulated with a modular ceramic insulation.

The PCC exhaust temperature is used for regulatory compliance to ensure efficient combustion conditions. It is measured with a Type K thermocouple located in the combustion chamber exhaust duct just as it exits the kiln feed end housing.

The burner for the combustion chamber is a forced draft distillate-oil burner that normally fires at a rate of 56.6 gallons per hour (gph). The burner is designed for a maximum heat release of 8,200,000 Btu/hr. As in other burners used at HWAD, the combustion chamber is equipped with a UV flame sensor to monitor ignition and assure that a flame is present when waste is being fed. Additional combustion air is provided as needed to the combustion chamber by the Combustion Air Blower, depending on the exact requirement for each type of waste (as measured by combustion chamber exhaust temperature and stack oxygen concentration).

Diesel fuel for the kiln and combustion chamber burners comes from an existing fuel storage tank and piping system included in the Main Base operating permit. The system serves multiple thermal treatment operations in the same complex.

Fugitives Control for RF-9 Munitions Detonation Rotary Kiln

There are four existing levels of interrelated controls against the release of fugitive emissions caused by a pressure surge within the RF-9 MDRK. These measures work together to meet the combustor MACT requirement that the PCC be continuously maintained at a pressure lower than ambient, as specified in 40 CFR 63.1206(c)(5) and 40 CFR 63.1209 (p) Section N, Table N-2.. These four levels of fugitive controls are for the sole purpose of reducing the emissions of particulates, which is a controls issue similar to the Pollution Abatement System, although placed near the kiln itself to control the same kinds of emissions that are also controlled at the stack under the MACT regulations. MACT guidance documentation clarifies that the purpose of the PCC pressure regulation (as cited above) is for control of these same particulates that are otherwise controlled at the stack. Therefore, the improvement of these existing fugitive particulate controls does not constitute a change in the combustion chamber itself, but only in the emissions controls.

Continuous Draft Control: An Induced-Draft (ID) fan provides continuous negative-draft suction to the MDRK: this flow of gases is swept from the kiln into the kiln feed-end plenum and from there up into the combustion chamber, evaporative cooler, and fabric-filter baghouse. This draft control is continuously modulated (via the process control computer) at the fan inlet damper to provide a constant negative draft pressure at the kiln itself. An induced draft fan has always been installed on RF-9 for draft control.

Close-Fitting Kiln-End Plenums: Each end of the RF-9 MDRK rotates within a steel plenum that is now more closely fitted (typical gap is now 1/8 inch) to the rotating kiln surface to increase the velocity of air that flows into the plenum because of the negative pressure within. The potential for fugitive release is minimized because the flow path to the plenum main outlet pipe (more than 2.1 ft^2) is much greater than the flow path through the rotating kiln-plenum interface gap (less than 0.1 ft^2). The majority of the metal coverage of these plenums was installed before the RCRA permitting.

Back-Up Draft Control: A back-up suction is attached to both of the RF-9 kiln-end plenums. The primary air fan inlet suction is connected via piping to both kiln-end plenums. This unit was also installed before the RCRA permitting.

Pressure Pulse Attenuation: The volume of the MDRK feed room is 2000 ft^3, which provides a high degree of attenuation for any pressure pulses emanating from the kiln. It has always been attached to the feed-end plenum and has always provided this pressure attenuation. This kiln feed room is maintained at a negative pressure via a more direct connection to the primary air fan suction. The feed room does not need to be completely sealed from the ambient atmosphere because it is maintained below ambient pressure by the fan suction, thereby ensuring that no fugitive emissions are released through the room.

Fugitive Emissions Control for the Metal Handling System

The conveyors and transfer points for the metal handling and recycling system will be totally enclosed and maintained under negative pressure with the exhaust gas being part of the combustion air for the burners. This system will satisfy the negative pressure requirement of the MACT emission standards Section N, Table N-2..

Evaporative Cooler

In addition to the pollution control function that the combustion chamber provides, this plant will utilize a two-stage pollution abatement system (PAS). The first stage of the system is the evaporative cooler. The exhaust gases from the combustion chamber are routed to the evaporative cooler, where they are rapidly quenched from up to 1,800^{o}F to approximately 350 to 400^{o}F with injected water. The temperature of the exhaust gas from the evaporative cooler is maintained by controlling the flow of quench water to the evaporative cooler.

If the evaporative cooler exit temperature exceeds the high temperature limit, waste feed is cut off to the incinerator. Emergency water sprays are activated if the evaporative cooler exit temperature continues to rise (to assure protection of the equipment).

Sorbent Delivery System

Just downstream of the evaporative cooler, a reagent - hydrated calcined lime, $Ca(OH)_2$ - will be continuously fed into the gas stream to react with HCl gas to form chloride salts. A sufficient stoichiometric ratio will be used to ensure an excess of reagent and thereby attain a high percentage of capture of HCl gas. Hydrated lime is supplied in 1 cubic yard sacks, which discharge directly into a feeder that meters the solids into a venturi mixer located in the baghouse inlet duct.

The sorbent shipping container (a large sack) is the feed hopper. The feeder is totally enclosed. Therefore, no emissions are associated with loading or unloading of sorbent.

Baghouse

The second stage of the PAS is the baghouse. The baghouse is designed so that all of the high-efficiency bags operate in parallel. Reagent will be carried over to the baghouse in the exhaust gases as they leave the evaporative cooler. The particulate matter will collect on the fabric filter bags to obtain a highly efficient removal of solids, including fly ash, reaction products, and reagent. Although the primary function of the baghouse is to remove particulates, an additional scrubbing action takes place there. Unreacted reagent that collects on the bags reacts with unreacted HCl in the effluent gases from the evaporative cooler.

A pulse-jet cleaning system operating on compressed air cleans the bags in the baghouse. The dust, composed of the reaction products, fly ash, and unreacted reagent, is collected in the bottom section of the baghouses. Valves transfer the collected dust via sealed piping to the collection containers, which will be disposed of appropriately.

The baghouse is sized to accommodate the full flow of quenched flue gas. The pressure drop across the baghouses is 3 inches to 7 inches water column. The baghouse is bypassed only in the event that the gas exiting the evaporative cooler exceeds the maximum operating temperature of the baghouse (approximately 450 ˚F). An interlock is provided to activate automatic waste feed cutoff if the bypass valve is opened. Emissions released during bypass operations will be minimal since the waste feed is stopped and the facility will go into shutdown mode to correct the conditions that caused the bypass valve to open.

The baghouse exhaust pipe includes a bag leak detector capable of sensing less than 0.001 grains of particulates per cubic foot of flue gas. This bag leak detector includes a pre-wired 4-20 mili Amper (mA) output signal that HWAD uses in its controls system to warn operators of a leak in a fabric filter bag. Section N, Figure N-5.

High Efficiency Particulate Air (HEPA)

A high efficiency particulate air (HEPA) filter downstream of the baghouse is the final component of the APC.

Induced Draft (ID) Fan

An existing Induced Draft Fan will provide the system draft control, using a variable frequency drive to modulate fan suction based on a pressure signal at the kiln exhaust gas manifold piping.

Stack

The exhaust gases from the Induced Draft Fan enter the stack where they rise through the stack and are released to the atmosphere. The stack is a key contributor to the emission characteristics of the plant. By design, the flue gas dispersion characteristics are enhanced. The stack for this plant is 45 feet tall and 20 inches in diameter

Emissions Control and Monitoring *[40 CFR 264.345(b)&(d)]*

Gaseous emissions from the systems include sulfur dioxide, carbon dioxide, water, and hydrogen chloride. Volatile organic compounds (VOC) may also be present in the flue gas due to incomplete combustion. For components of the original munitions formulations that are designated as POHCs, the Deactivation Furnace is required to achieve a DRE of 99.99 percent in the flue gas before the exhaust air is released to the atmosphere. Complete combustion results in no POHCs being exhausted. The percent degradation actually attained will be determined by stack sampling and analysis, one of the purposes of the Comprehensive Performance Test (RF-9).test.

Total combustion results in the conversion of carbon to carbon dioxide, however, in actual practice there is usually a measurable amount of carbon monoxide (2 to 100 ppm). Stack gases are continuously monitored for CO and O_2 when the furnace is operating. The gas monitoring equipment uses a non-dispersive infrared photometer as the principle of measurement. The sampling method is extractive and is capable of concentration corrections for carbon dioxide and water vapor. The sample probe is a continuous operating extraction system. The equipment provides continuous strip chart readout for corrected CO concentrations as required by the EPA and/or state environmental agencies.

Total continuous leaves no nitrogen in the form of (NO_x). In actual practice, NO_x can vary from none detected to over 1000 ppm depending on the fuel enrichment and how rapidly the flue gas temperature is quenched. Suspended particulate is expected to be well below RCRA limit of 0.08 grains per cubic foot of flue gas. The concentration of the SO_2 is expected to be about 40 to 50 ppm when the system is operating at 2100 scfm of draft.

The APE 2210 (RF-9) Detonating Furnace facility is designed for control of fugitive emissions. The furnace system, including the feed chute and the end plate is enclosed in a shroud of 11 gauge, A36 carbon steel. The shroud is approximately 8 inches away from the furnace exterior and acts as a floating skin for the deactivation furnace, thereby confining the fugitive emissions from the furnace. These emissions are then removed through three fugitive emission return ducts (FERD). The FERD are held under negative pressure by the burner blower which routes the emissions back into the furnace.

In addition to controlling and monitoring the concentrations of gaseous emissions, the facility includes equipment to monitor the exhaust gas velocity. This equipment provides an output to a process controller that is used to obtain numeric velocity output. The equipment is temperature compensated to account for variance in temperature of the gas flow. The system operates in the stack in a temperature range of 100 to 300°F. The duct gas velocity monitoring equipment is a complete system consisting of a pitot tube and a thermocouple. The equipment is placed inside the exhaust stack in accordance with the EPA 40 CFR Part 60 Appendix A-Test Methods, paragraph 2-1. The velocity monitoring equipment provides an output to the system controller that can be recorded for EPA reporting. The fugitive emissions from the MDRK and the PCC are controlled by maintaining negative pressure in these two pieces of equipment. Pressure sensors are located on the shroud of the rotary kiln on the PCC.

A complete list of monitoring parameters, devices, location, and calibration frequency and calibration methods is shown in Comprehensive Performance Test Plan (RF-9).

Computer System Controller [40 CFR 264.347(a)]

The SOC incinerator is equipped with a computerized control system that is capable of sensing field instrument values, performing the necessary process adjustments and automatically shutting off the waste feed conveyor or shutting the entire process down if operational parameters deviate from required operating ranges. The computerized control system is capable of monitoring the ―operational envelope" of the incinerator and is capable of performing a number of activities including:

- Control room indication of processor sensors located within the incinerator (such as pressure indication of a pressure transmitter);
- Process controller for single instrument loops or an individual sub-system, such as a pressure control loop involving a sensor reading from one pressure transmitter affecting the function of one pressure control valve;
- Alarm for an exceedance of a designated set point, such as a high pressure or low temperature;

- Shut-down of individual equipment when the measured parameter exceeds a set point (such as a shut-off of waste feed conveyor when the combustion temperature is too low); and
- Shut-down of one or more subsystems when one or more measured parameters exceeds a set point (such as shutdown of combustion chamber burner when high exit temperature in the spray dryer is detected).

The computerized control system will continuously monitor and control the operation of the incinerator. When out-of-range conditions exist, it will notify the operator of those conditions. The DCS is programmed to shut-down equipment (i.e., bring the system into a safe mode) when designated parameters are exceeded, which is a protective mechanism against potential equipment damage, operation outside of permit limits, or conditions that might lead to a release to the environment.

Automatic Waste Feed Cut-off System

The RF-9 incineration system has an Automatic Waste Feed Cut-Off (AWFCO) System that will shut waste feeds off to the kiln by stopping the feed conveyor in the event certain operating parameters deviate from allowable set points. The data control system (DCS) continuously monitors operating parameters, making adjustments to the process as needed for proper control. Alarm logic is incorporated into the DCS system to automatically initiate an AWFCO. Section N, Table N-1 summarizes current AWFCO set points. Once the AWFCO situation has been resolved and the rest of the system is at steady state, the waste feed is re-established. AWFCO limits have been established based on regulatory or permit limits that are summarized below.

Regulatory/permit limits – established to comply with existing permits. An example of this type of limit is the minimum temperature AWFCO, below which waste cannot be fed until the proper minimum temperature is re-established with auxiliary fuel. In addition, the HWC MACT regulations require that the AWFCO system be interlocked with the span of each process instrument that is part of the Continuous Monitoring System (CMS). A listing of these CMS instruments and their interlocked span set points is maintained as part of SOC's operating record.

In addition to the AWFCO system, operators can manually shutdown waste feeds or the entire process should this be needed. The DCS has also been programmed to stop the waste feed based on other factors summarized below.

Process safety limits – established to assure process equipment is protected and unsafe operating conditions do not occur. An example of this is inadequate excess air in the combustion chamber that can lead to fuel rich conditions and the possibility of an explosion.

Utility or Power failure – established to facilitate a controlled shutdown of the process during loss of process air, steam, water or electricity. An example of this is the loss of instrument air that is necessary for certain types process instruments to function properly. Wastes will not be re-introduced into the incinerators until proper operation of key instruments is re-established.

APE 2210 (RF-9) Detonating Furnace Startup/Shakedown Conditions [40 CFR 270.62]

A number of parameters are checked during the start-up of the APE 2210 (RF-9) Detonating Furnace. The checklist during start-up is shown in Section N, Table N-3. The complete Startup procedure can be found in Appendix I as well as RF-9 SOP Appendix H. The shakedown condition is found in Section N Table N-4

Shutdown Procedures [40 CFR 264.345(c)&(j) and 270.62(b)(2)(vii)]

The APE 2210 (RF-9) Detonating Furnace is shut down by stopping the waste feed into the furnace. The furnace is operated until the last waste introduced has had adequate time to travel completely through the retort (15 minutes minimum) or until the retort discharge system is empty, whichever is greater. The APE 2210 (RF-9) Detonating Furnace at HWAD is equipped with an automatic waste feed cut-off (AWFCO), which will be activated when certain operating conditions occur or when any monitoring device fails. All monitoring devices are equipped with a closed loop signal which is sent from the controller to the operating device. Specific device failures or emergency conditions which will activate the AWFCO are found Section N, Table N-1. For further information see the complete shutdown procedure found in Appendix I as well as RF-9 SOP Appendix H and see Section N, Table N-5.

Table N-1
Summary of RF-9 AWFCO Set Points Established During 2008 CPT

Group 1 Parameters	AWFCO Set Points
Minimum Combustion Chamber Exit Temperature, deg F	1646
Maximum Flue Gas Flow Rate, ft/sec (at exhaust stack)	41.6
Maximum Feedrate of PEP (Propellants, Explosives and Pyrotechnics), lb/hr	240
Maximum Temperature at Inlet to Baghouse, deg F	350
Maximum Ash Feedrate, lb/hr	51.65
Maximum Feedrate of SVM (Pb and Cd), lb/hr (extrapolated based on CPT results)	6.53(1)
Maximum Feedrate of LVM (As, Be & Cr), lb/hr (extrapolated based on CPT results)	0.115(1)
Maximum Feedrate of Total Mercury, lb/hr	0.00069(2)
Maximum Total Chlorine and Chloride Feedrate, lb/hr	3
Minimum Sorbent Feedrate, lb/hr	72
Group 2 Parameters	
Stack Gas Maximum Carbon Monoxide (ppmvd @ 7% oxygen)	100
Combustion Chamber Pressure, inches WG	-0.1
Group 3 Parameters	
Minimum Stack Oxygen, %	4

(1) Extrapolated metals feed rate limits for semi-volatile metals (SVM) and low volatile metals (LVM) using the MACT emission standards and the demonstrated system removal efficiency for the representative metal (lead for SVM and chromium for LVM) in the February 2008 CPT.

(2) Mass rate based on the Maximum Theoretical Emission Concentration (MTEC) for mercury of 130 ug/dscm @ 7% oxygen.

Table N-2
MACT Operating Parameter Limits

	Parameter	Anticipated Limit[1]	Format	Basis
1	Minimum combustion chamber exit temperature (°F)	1646	HRA[2]	Condition 1 testing in CPT
2	Maximum baghouse inlet gas temperature (°F)	350	HRA	Condition 1 testing in CPT
3	Maximum feed rate of PEP (lb/hr)	240	HRA	Condition 1 testing in CPT
4	Maximum particulate feed rate (lb/hr)	51.65	THRA[3]	Condition 1 testing in CPT
5	Maximum SVM feed rate (lb/hr)	6.53	THRA	Condition 1 testing & extrapolation
6	Maximum LVM feed rate (lb/hr)	0.115	THRA	Condition 1 testing & extrapolation
7	Maximum mercury MTEC (ug/dscm)	130	THRA	HWC MACT (calculated)[4]
8	Maximum chlorine/chloride feed rate (lb/hr)	3.0	THRA	Condition 1 testing in CPT
9	Minimum baghouse pressure differential (in.W.C.)	3	HRA	Operational guidance
10	Maximum baghouse pressure differential (in. W.C.)	7	HRA	Operational guidance
11	Stack gas maximum CO (ppmv dry, @ 7% O_2)	100	HRA	HWC MACT
12	Maximum stack gas flow rate (ft/sec)	41.6	HRA	Condition 1 testing in CPT

1. Expected MACT operating parameter limits planned for the NOC following this CPT Appendix E.
2. HRA = hourly rolling average.
3. THRA = 12-hour rolling average.
4. Calculated MTEC concentration to be computed considering stack gas flow as well as average stack moisture determined during the testing in this plan.

Table N-3

START-UP PROCEDURE COMPLETION CHECK LIST

(To be filled out by the Operator during each start-up)

1. INTRODUCTION

This standard operating procedure (SOP) is part of the start-up, shutdown, and malfunction plan. The SOP, in its entirety, will be followed for each start-up from a cold, secured condition. Partial system start-ups resulting from recovery (including malfunction conditions, unplanned maintenance, and shortage of consumables or waste materials) will be performed at the direction of a certified primary control room operator or shift supervisor. The operator will use the RF-9 start-up procedures as guidance for reconfiguring the RF-9 systems and reestablish operating conditions that were invalidated by the unplanned condition. Partial system start-ups will be documented in the control room operator's logbook.

1.1 REFERENCES

Drawings

General arrangement drawing.

Piping and Instrumentation Diagram. S410.104

DZHC, RF-9 PLC upgrade DWGs. 05-363, 1 thru 48

Bundy Electrical DWGs. S410.401 thru S410.407

Manuals

RF-9 operations and maintenance (O&M) manual

RF-9 continuous emissions monitoring system (CEMS) plan

Miscellaneous

Valve lineup list

Electrical lineup list

2. PREREQUISITES

This list identifies the verifications and other prerequisite activities necessary to ensure sufficient consumables are available and that the RF-9 is configured to support processing operations.

1.	Verify that Building 117-3 compressed air system is on line and available.	
2.	Verify that the Western Area Demil Facility (WADF) Industrial Cold Water System is lined up and available to support Building 117-3.	
3.	Verify that 117-3 diesel storage tank contains sufficient quantity for planned operation.	
4.	Verify that the RF-9 lime injection system contains sufficient quantity to support planned operations.	
5.	Verify the 117-3 propane storage tanks contain sufficient quantity for the planned run.	
6.	Verify that the ash collection barrel has sufficient space available for the planned operations.	
7.	Verify that CEMS calibration gases are on hand in sufficient quantities to support planned operations. Verify expiration date on each gas, making sure it hasn't expired.	
8.	Review the lockout/tag out log and resolve any discrepancies.	
9.	Review plant maintenance status log and ensure all required/essential maintenance and repair work has been completed.	

3. PRESTART-UP CHECKLIST

1.	Verify that a valve lineup has been completed, if required.	
2.	Verify that an electrical lineup has been completed, if required.	
3.	Energize CEMS analyzers.	
4.	Verify that the control and data recording computers are running.	
5.	Log onto the main control computer as operator.	

4. SUPPORT SYSTEM START-UP PROCEDURE

	Note: Unless stated otherwise, all start, stop, adjustment and monitoring of process equipment is to be performed from the main control computer in the Central Control Room (CCR).	
4.1	**UNINTERRUPTIBLE POWER SUPPLY**	
1.	At the UPS local panel, verify the UPS Input Power indicator is illuminated and the UPS Output Availability indicator is illuminated.	
4.2	**CONTROL AND DATA RECORDING COMPUTERS**	
1.	Start the controlling computer.	
2.	Verify the controlling computer boots up and displays the main control screen.	
3.	Verify the data-recording computer is operating.	
4.	Verify/Reset the ESS function at main control console. **Note:** ESS button must reset before the ESS function can be reset.	
5.	Verify batch/ parameter is set. (recipe loaded)	
6.	Verify system is "ON" and equipment control is in "AUTO"	
4.3	**INSTRUMENT AND PLANT AIR SUPPLY**	
1.	Verify on the pollution abatement screen, "Instrument air OK"	
2.	Verify that the instrument air dryer is "energized"	
3.	Verify on the pollution abatement screen, "Plant air OK"	
4.	Open or verify open, the valves in accordance with attachment D	

4.4	**INDUSTRIAL COLD WATER**	
1.	Open or verify open, the valves in accordance with attachment D.	
4.5	**CEMS START-UP**	
1.	Energize CEMS analyzers. (allow for sufficient equipment warm up)	
2.	Energize “stack sample line” heating system. Breaker #??, panel ??.	
3.	Perform CEMS calibration In accordance with SOP. (start-up sequence, step #4)	
4.6	**INDUCED DRAFT FAN START-UP**	
1.	Start “induced draft fan” in accordance with SOP. (start-up sequence, step #5)	
4.7	**PAS SYSTEM START-UP**	
1.	Start “bag house hopper heater” IAW SOP. (PAS Panel)	
2.	Start “bag house cleaning cycle” IAW SOP. (PAS Panel)	
3.	Start “rotary airlock” IAW SOP. (PAS Panel)	
4.	Start “Evap. cooler water pumps” IAW SOP. (PAS Panel)	
4.8	**PCC START-UP**	
1.	Start “fuel pump” IAW SOP. (HMI Fuel system Screen)	
2.	Start “PCC Combustion Blower” IAW SOP. (HMI, Start-up Sequence PG 2)	
3.	Start “PCC Burner” IAW SOP . (HMI, Start-up Sequence PG 2)	
4.9	**PCC START-UP**	
1.	Start “MDRK Combustion Blower” IAW SOP. (HMI, Start-up Sequence PG 2)	
2.	Start “MDRK Burner” IAW SOP. (HMI, Start-up Sequence PG 2)	
4.10	**MDRK ROTATION START-UP**	
1.	Start “MDRK Rotation”. IAW SOP. (HMI, Start-up Sequence PG 2).	
2.	Note: Conveyors RF-24, RF-23, RF-22, and RF-19 will start after the MDRK has reach rotation speed set point.	
4.11	**MAGNETIC SEPARATOR START-UP**	
1.	Start “Magnetic Separator”. IAW SOP. (HMI, Start-up Sequence PG 2).	
2.	Note: Conveyors RF-15, and RF-21, will start after the Magnetic separator has started.	
4.12	**BAGHOUSE ISOLATION VALVES**	
1.	Execute “bag house” online IAW SOP. (HMI, Start-up Sequence PG 3).	
2.	Start “reagent blower” IAW SOP. (HMI, Start-up Sequence PG 3).	
3.	Start “reagent blower” IAW SOP. (HMI, Start-up Sequence PG 3).	

5. RF-9 WASTE PROCESSING START-UP

This section starts RF-9 waste processing equipment. All support equipment has been started.

5.1	**START FEED SYSTEM**	
1.	Verify the Pre-Start-up Checklist has been completed. IAW SOP, STEP 21	
2.	Start “Secondary Feed Conveyor” IAW SOP. (HMI, Start-up Sequence PG 3).	
3.	Start “Primary Feed Conveyor” IAW SOP. (HMI, Start-up Sequence PG 3).	
4.	Start “Waste Feed System” IAW SOP. (HMI, Start-up Sequence PG 3).	
5.2	**START-UP COMPLETE**	
1.	Acknowledge “Start-up Complete” (HMI, Start-up Sequence PG 3).	

5.3	**AWFCO Testing**	
1.	Perform ―AWFCO Test" IAW SOP (HMI, Utilities, AWFCO Testing).	

IAW SOP can be found in appendix I

Operator's Signature ____________________________ Date __________________________

This is to be filed under START-UP CHECK LIST in the filing cabinet at 117-3.

TABLE N-4

RF-9 SHAKEDOWN WASTE FEED RATES

ITEM NO.	PROPOSED FEED	PROPOSED WASTE FEED RATE
1	M7 Propellant	124.0 lb M7/hr
2	M1 Propellant/ HCB†‡	240.0 lb M1/hr 3.31 lb HCB/hr
3	Cal .50 M48A1/ Cal .45 M1911/ $Pb(NO_3)_2$‡SbS_3‡/ Cr‡	6,600. items/hr 11,780. items/hr 8.79 lb $Pb(NO_3)_2$/hr 5.04 lb SbS_3/hr 0.0054 lb Cr/hr
4	Cal .50 M17	3,869. items/hr
5	Cal .50 M17	3,869. items/hr

† As a surrogate for DPA

‡ Powder

Table N-5

SHUTDOWN PROCEDURE COMPLETION CHECKLIST

(To be filled out by the Operator during each start-up)

		Operator's Initials
1.	Shutdown ―Waste Feed System”. IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 1).	
2.	Execute ―Recycle Chute” to recycle. IAW SOP/ Test Plan (HMI, Shutdown Sequence PG 1).	
3.	Execute ―Recycle Chute” to discharge after preset time. IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 1).	
4.	Execute ―Recycle Chute” to recycle after preset time. IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 1).	
5.	Shutdown conveyors RF-21, RF-15 and RF-16. IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 1).	
6.	Shutdown ―MDRK Burner” IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 1).	
7.	Shutdown ―MDRK Burner” after preset time IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 1).	
8.	Shutdown ―Reagent Blower” and ―Feeder” IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 2).	
9.	Execute ―Bag house isolation valve” to offline, IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 2).	
10.	Shutdown ―Evaporative Cooler Water Pumps” IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 2).	
11.	Shutdown ―MDRK Combustion Blower” after preset time, IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 2).	
12.	Shutdown ―PCC Combustion Blower” after preset time, IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 2).	
13.	Shutdown ―MDRK Rotation” after preset time, IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 2).	
14.	Shutdown ―ID Fan” after preset time, IAW SOP/ Test Plan. (HMI, Shutdown Sequence PG 2).	
15.	Shutdown ―Rotary Airlock” IAW SOP/ Test Plan (PAS Panel)	
16.	Shutdown ―Bag house Cleaning Cycle” IAW SOP/ Test Plan (PAS Panel)	
17.	Shutdown ―Bag house Hopper Heaters” IAW SOP/ Test Plan (PAS Panel)	
18.	Shutdown ―CEMS system” IAW SOP/ Test Plan. (CEMS Panel)	
	Note: CEMS shutdown for extended periods only.	
	Note: Shut down sequence has pre-set timers in the sequence for cool down periods.	

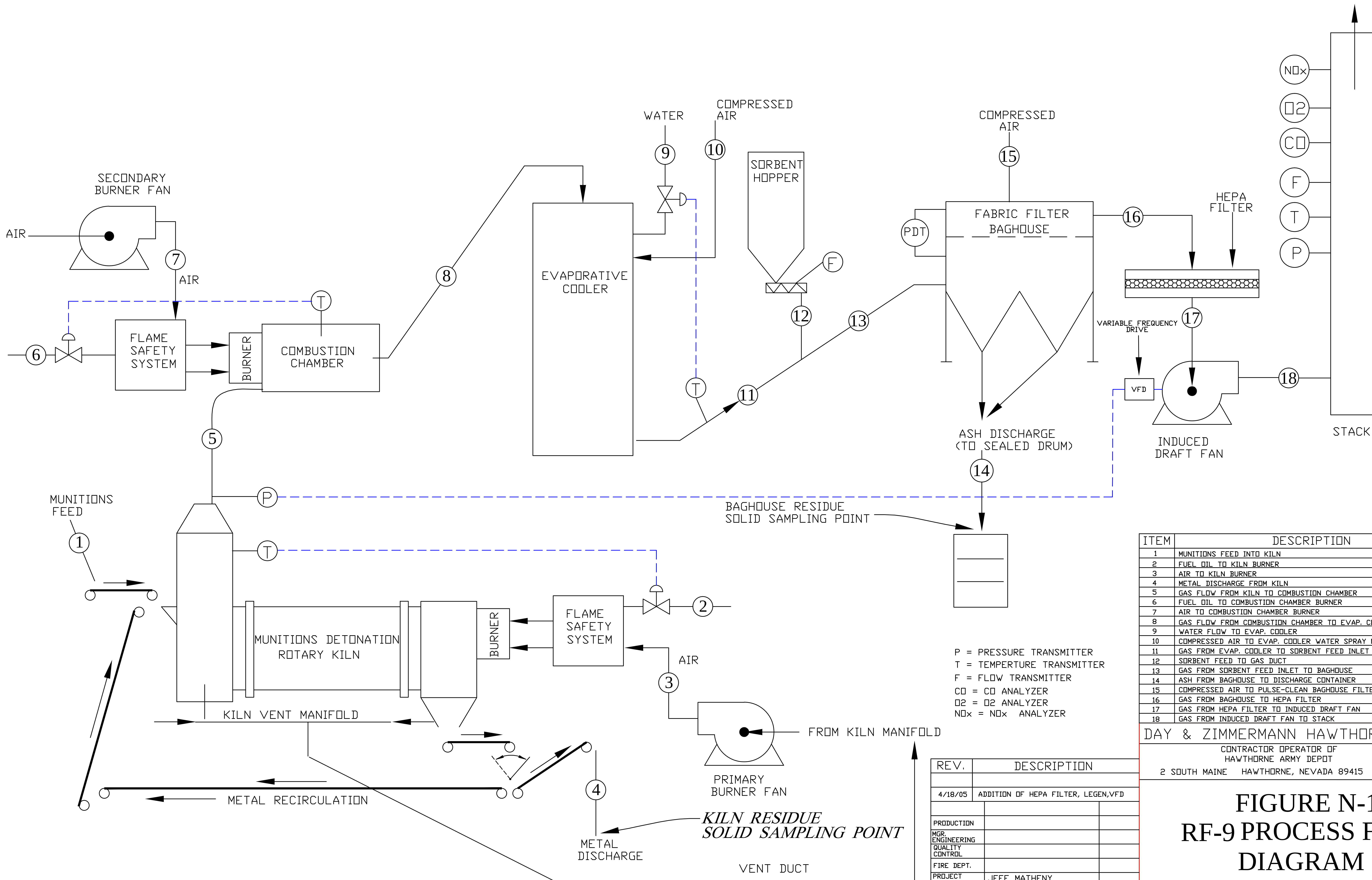
IAW SOP can be found in appendix I

Operator's Signature ___________________________ Date _________________________

This is to be filed under SHUTDOWN CHECK LIST in the filing cabinet at 117-3.

Figure N-1

RF-9 Process Flow Diagram



ITEM	DESCRIPTION
1	MUNITIONS FEED INTO KILN
2	FUEL OIL TO KILN BURNER
3	AIR TO KILN BURNER
4	METAL DISCHARGE FROM KILN
5	GAS FLOW FROM KILN TO COMBUSTION CHAMBER
6	FUEL OIL TO COMBUSTION CHAMBER BURNER
7	AIR TO COMBUSTION CHAMBER BURNER
8	GAS FLOW FROM COMBUSTION CHAMBER TO EVAP. COOLER
9	WATER FLOW TO EVAP. COOLER
10	COMPRESSED AIR TO EVAP. COOLER WATER SPRAY NOZZLES
11	GAS FROM EVAP. COOLER TO SORBENT FEED INLET
12	SORBENT FEED TO GAS DUCT
13	GAS FROM SORBENT FEED INLET TO BAGHOUSE
14	ASH FROM BAGHOUSE TO DISCHARGE CONTAINER
15	COMPRESSED AIR TO PULSE-CLEAN BAGHOUSE FILTERS
16	GAS FROM BAGHOUSE TO HEPA FILTER
17	GAS FROM HEPA FILTER TO INDUCED DRAFT FAN
18	GAS FROM INDUCED DRAFT FAN TO STACK

REV.	DESCRIPTION	
4/18/05	ADDITION OF HEPA FILTER, LEGEN,VFD	
PRODUCTION		
MGR. ENGINEERING		
QUALITY CONTROL		
FIRE DEPT.		
PROJECT ENGINEER	JEFF MATHENY	
SAFETY		
DRAFTER	D.C. BUUM	

DAY & ZIMMERMANN HAWTHORNE COR

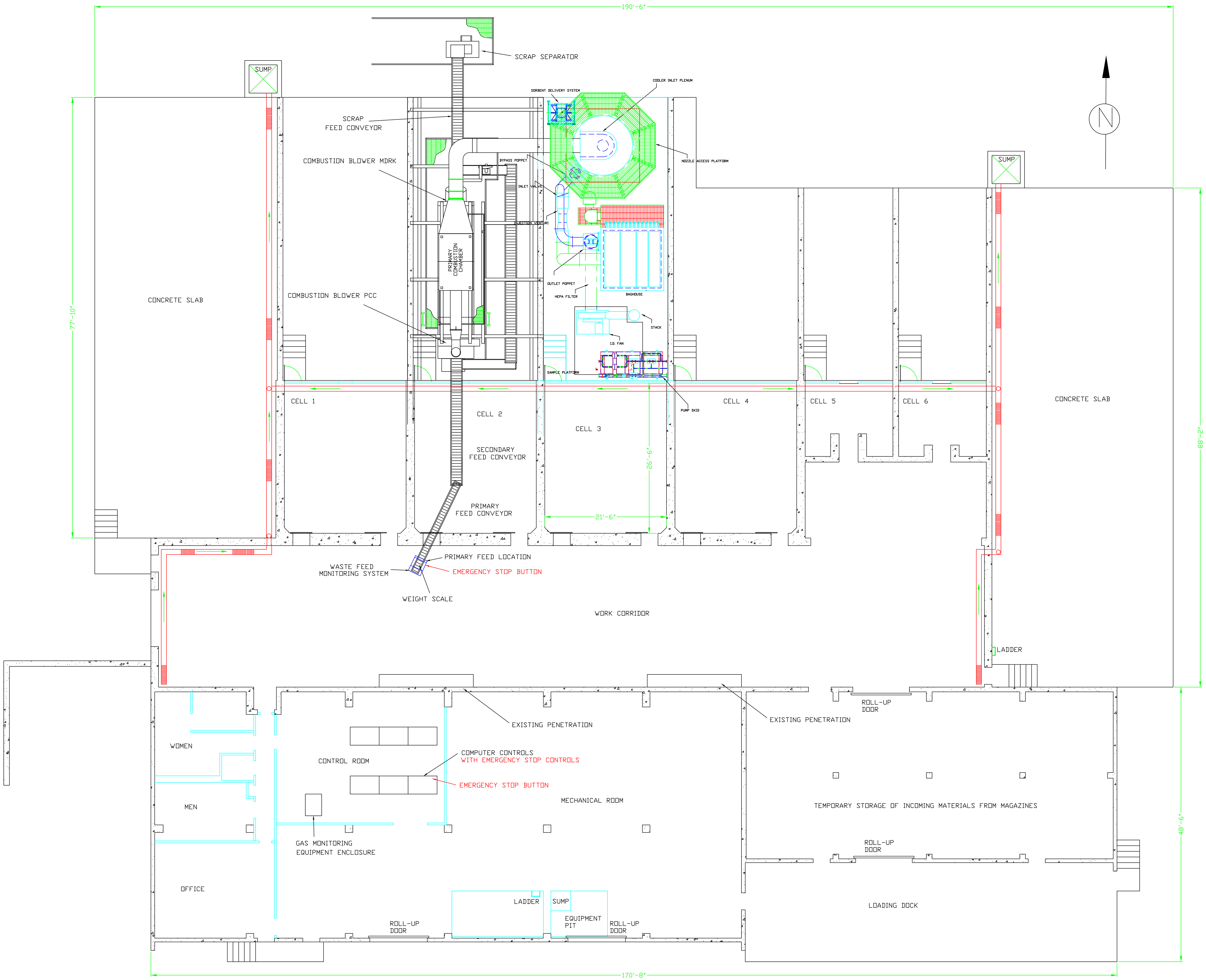
CONTRACTOR OPERATOR OF
HAWTHORNE ARMY DEPOT
2 SOUTH MAINE HAWTHORNE, NEVADA 89415

FIGURE N-1
RF-9 PROCESS FLOW
DIAGRAM

SCALE	DRAWING NO.	SHEET OF	CAD FILE NO.
NONE	N / A	1 / 1	RF-9PFD

Figure N-2

RF-9 Floor Plan



FLOOR PLAN: BUILDING 117-3

10' 5' 0 10'
GRAPHIC SCALE

REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA MAIN BASE PERMIT		

REVISIONS

APPROVALS		
MGR. ENVIRONMENTAL		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTSPERSON	LONNIE BROWN	
FIRE INSP.		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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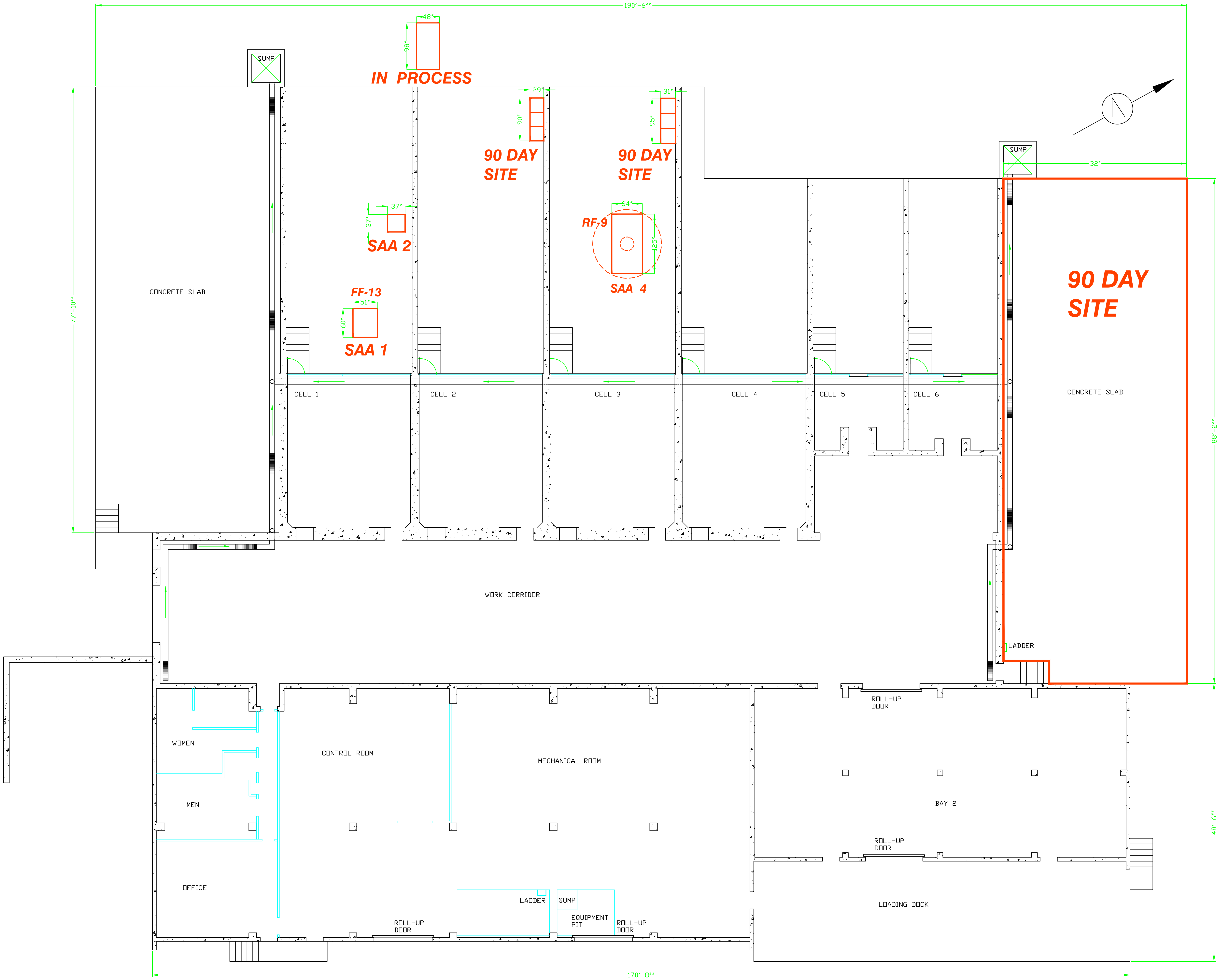
HAWTHORNE ARMY DEPOT
2 SO. MAINE HAWTHORNE, NV. 89415-0015

FIGURE N-2
RF-9 FLOOR PLAN

DRAWING NUMBER NUMBER
SCALE: N/A
FILE: Eng(Hi)/Environmental DWG's/RCRA/MAINBASEPERMIT/FIGURE N-2
SHEET 1 OF 1

Figure N-3

SAA Sites



FLOOR PLAN: BUILDING 117-3 (RF-9)

10' 5' 0 10'
GRAPHIC SCALE

REV. NO.	DESCRIPTION	APPROVAL	DATE
REVISIONS			

APPROVALS		
MGR. ENGINEERING		
ENGINEER		
DRAFTER	D.C. BUUM	
FIRE INSP.		
ENVIRONMENTAL	Y. DOWNS	
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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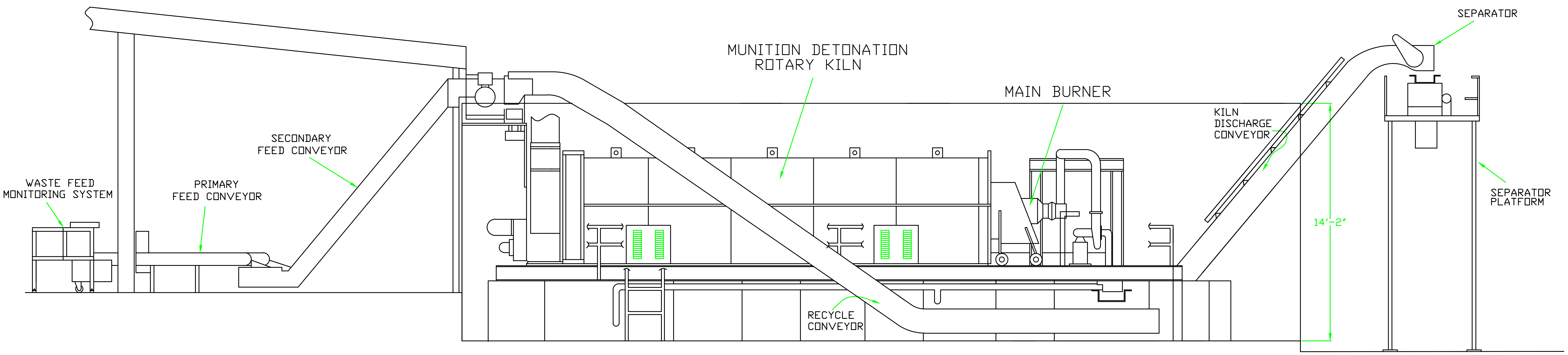
FIGURE N-2
SAA SITES
(SATELLITE ACCUMULATION AREAS)

FILE: H:\ENVIRONMENTAL DWGs\RCRA\MainBase\FigureN-2
SCALE: SHOWN | DWG No: N / A | SHEET 1 OF 1

Figure N-4

Locations of Conveyor



REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA MAIN BASE PERMIT		

REVISIONS

	APPROVALS	
ENVIRONMENTAL MRG		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTER	LONNIE BROWN	
FIRE INSP.		
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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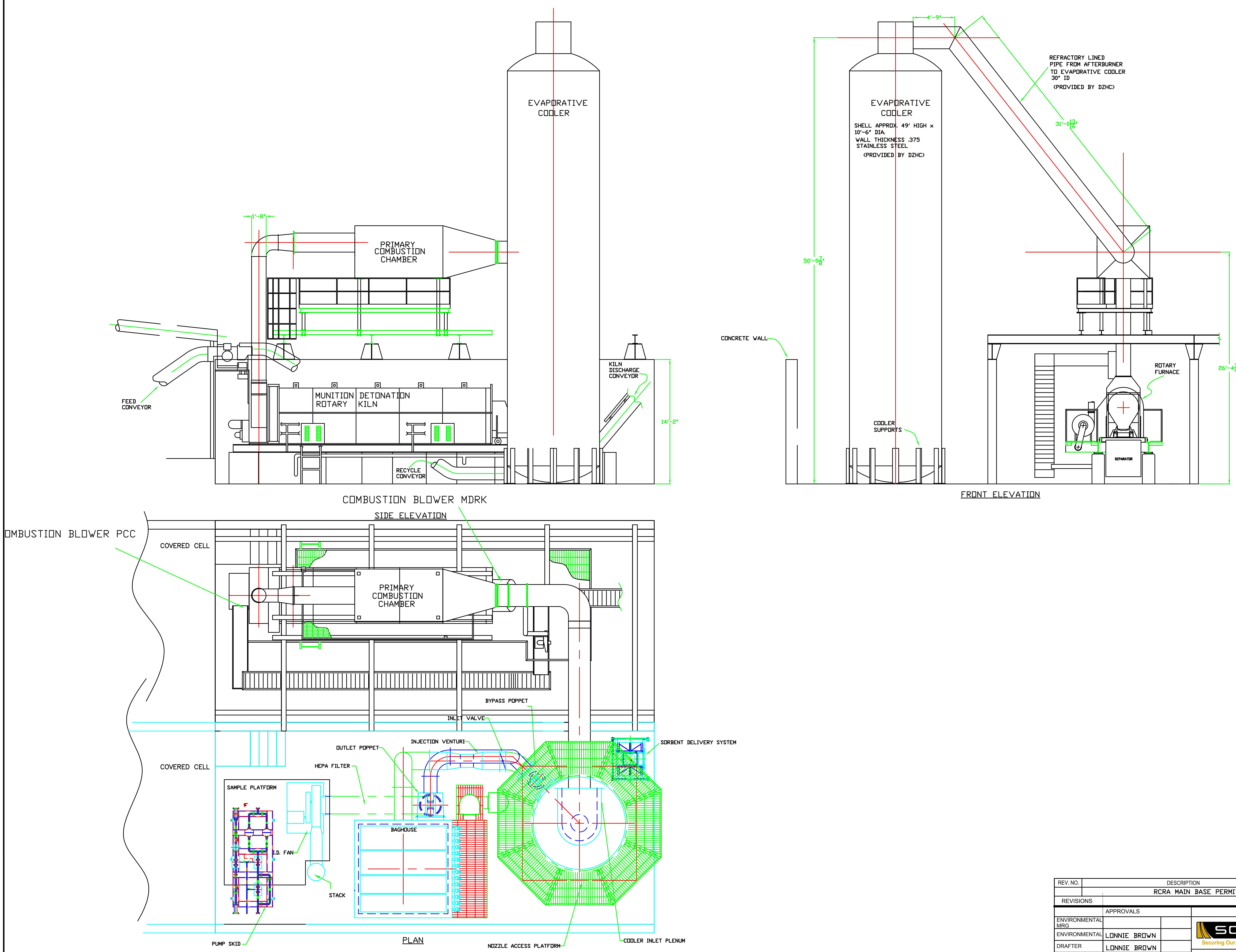
FIGURE N-4
LOCATIONS OF CONVEYOR

FILE: Eng(H)/Environmental DWG's/RCRA/MainBasePermit/FIGURE N-4

SCALE: na | DWG No: | SHEET 1 OF 1

Figure N-5

Locations of Air Pollution Control Equipment



REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA MAIN BASE PERMIT		

REVISIONS

	APPROVALS	
ENVIRONMENTAL MRG		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTER	LONNIE BROWN	
FIRE INSP.		
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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FIGURE N-5

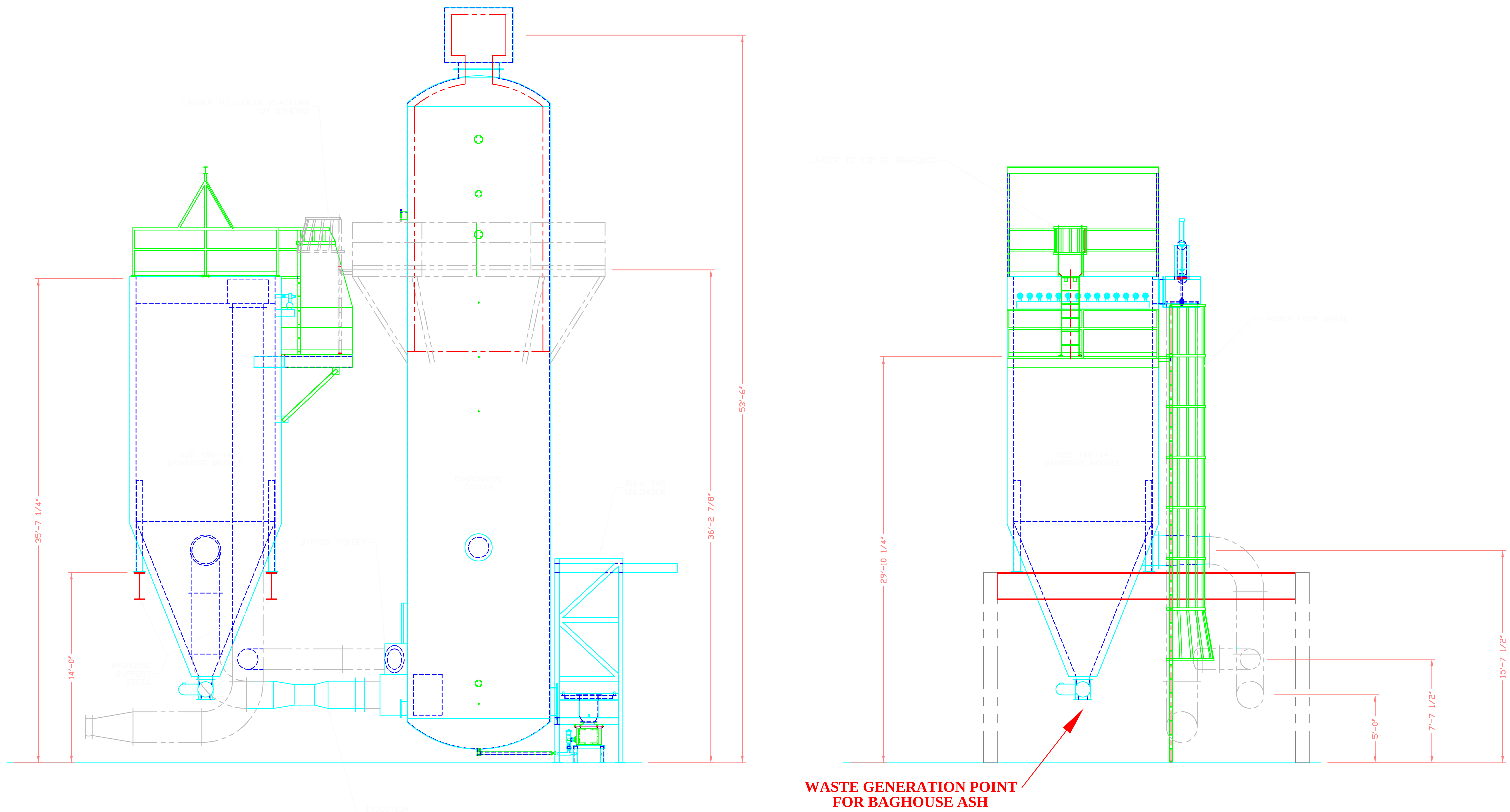
LOCATIONS OF AIR POLLUTION CONTROL EQUIPMENT

FILE: Eng(H)/Environmental DWG's/RCRA/MainBasePermit/FIGUREN-5

SCALE: na | DWG No: | SHEET 1 OF 1

Figure N-6

Location of Baghouse



REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA MAIN BASE PERMIT		

REVISIONS

APPROVALS		
ENVIRONMENTAL MRG		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTER	LONNIE BROWN	
FIRE INSP.		
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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FIGURE N-6

LOCATION OF BAGHOUSE

FILE: Eng(H)/Environmental DWG's/RCRA/MainBasePermit/FIGUREN-6

SCALE: na | DWG No: | SHEET 1 OF 1

SECTION O WASTE FEED CHARACTERISTICS FOR RF-9

WASTE FEED CHARACTERISTICS AND GENERAL INFORMATION

Waste Characterization

The Hazardous Waste Combustor (HWC) Maximum Achievable Control Technology (MACT) Section N, Table N-2. standards indicate that the total constituent feedrate should be determined by multiplying the weight percent of the constituent in each waste stream by the feedrate of each waste stream. The continuously calculated feedrate value should be used to calculate one-minute average and one-hour rolling average total feedrate values for each constituent. The calculated one-hour rolling average value should then be compared to the permit limit established during the CPT see Appendix E to demonstrate compliance with the HWC MACT standards.

However, in lieu of continuously determining the one-hour rolling average for each constituent and consistent with the 2008 CPT and ongoing operation of RF-9, SOC is requesting an alternative monitoring approach, as allowed by 40 CFR 63.1209(g). Instead of being limited to a total mass flow rate for all munitions, SOC will determine the maximum waste feed rate for a given munition item that will demonstrate compliance with all HWC MACT constituent feedrate limitations Section N, Table N-2. (e.g. SVM, LVM, chlorine, PM feedrate limits as set by the CPT see Appendix E).

Constituent data for these determinations is obtained from the Munitions Items Disposition Action System (MIDAS). The maximum allowable feedrate of the waste stream is then calculated using the Munitions Analytical Compliance System (MACS) see Section O, Table O-1. The control system will not permit items to be fed to the incinerator in excess of this maximum calculated feedrate.

Waste Types

This CPT has been structured around the items that are demilitarized (detonated within the rotary kiln) in the RF-9 incineration system. These items are either munitions, components of munitions, or other explosive devices. The items contain solid parts (bullets, cases, etc.) and PEP components (propellants, tracer mixes, primer mixes, etc.). The items are introduced into the munitions detonation rotary kiln and are subjected to heat which produces detonations within the kiln. The PEP is reduced to gases and particulates while the solid metallic components are propelled through the kiln by the internal spiral flights and are collected for scrap using a discharge conveyor system.

Waste Composition

Since the PEP is the generator of the products treated by the Pollution Abatement System (PAS), only the PEP constituents are considered in the feed characterization. Due to the hazardous nature of disassembling munitions to perform individual analysis and the high degree of quality control involved with the production of military explosives, analyses of waste feed items are not performed during normal incinerator operation. Feedrate data during the CPT will be based upon item specifications. Therefore, sampling and analysis of the waste feed will not be performed during the CPT. Specifications for the spiking materials [chromium oxide (LVM), aluminum oxide (ash) and PVC (chloride)] will be included in the CPT report. The vendor-supplied composition information will be used along with the measured feed rate during each run to determine the feed rate of metals, ash and chloride from the spiking material and munitions.

Waste Feed Listing

Due to the large number of potential munition items that may be treated in an APE 2210, the total waste feed list is a combination of items which have been fully characterized and those which full characterization has not been conducted.

SOC will notify NDEP as additional items are fully characterized and also a description of the process for characterizing these items. This will allow SOC personnel the flexibility to add these currently uncharacterized items, as needed (and when fully characterized), with the assurance that all permit (feed) limits are met.

Item Characterization

The PEP feed rate limit of 240 lb/hr is one of the governing factors in evaluating current and potential feed items. Since all of the potential feed items are produced by meeting specific manufacturing specifications, all of the feed items, their individual components, and PEP constituents are fully characterized per these specifications. The data within these specifications has been transitioned into MIDAS.

The MIDAS contains a listing of all components/constituents found in a given munition. Even with the large number of potential munition items that can be processed, the exact amount of PEP within the item is known. A computer interface between the MIDAS database and SOC will allow SOC to establish the maximum feed rates for all MACT regulated constituents (including Cl, SVM, LVM, and potential PM) for each individual feed item processed. Thus, the maximum PEP feed rate is independent of the total item hazardous waste (total munition mass) throughput. The mass throughput for any individual item is actually dependent on the MACT-regulated constituent content (including total PEP). In addition, the mass throughput is still used as the AWFCO for the furnace, both as an individual charge weight as well as the hourly mass throughput. Thus, the total mass throughput of an individual item is less relevant than the PEP content. As such, SOC will regulate PEP feed rate as the OPL in lieu of the "total hazardous waste feed rate". This also precludes having to feed additional items to meet the total throughput requirement during CPT testing, which is not indicative of normal operations.

Waste Feed Selection

The waste feed item was selected to provide all of the conditions necessary for the given standard. In order to evaluate all relative criteria of potential feed items, the characterization process previously developed under RCRA and historical CPT stack emissions data were used to help generate the proposed MACT feed rates Section N, Table N-2. Section N, Table N-2. The characterization process has been expanded by integrating the MIDAS database with software especially developed to establish site-specific maximum item feed rates such that none of the regulated constituent limits are exceeded.

When disposing of munitions through incineration, it is required to know the maximum rate at which different items can be fed. These upper limits are based on various criteria such as environmental regulations and system capacity limits. Unfortunately, due to the number of different items fed to the system, and the number of alternative compositions, it is impractical to directly characterize the emissions from each item. The MIDAS is a database of munitions that contains both chemical and mechanical characterizations for a large number of munitions. Using this system, it is possible to predict the maximum allowable feed rates of a particular munition item.

The MIDAS database contains many fields to help uniquely identify each item or part in it. Complete munitions are uniquely identified by their National Stock Number (NSN). However, each

NSN number may contain many alternate compositions for an item. These are primarily due to different mixtures of PEP used during the construction of the munition. Therefore, for each regulated pollutant, it is necessary to go through all alternate configurations of an item to find the configuration that contains the most of that particular pollutant. Based on this configuration, a maximum feed rate for the item is calculated and associated with that pollutant. This is done for all regulated pollutants (Cl, SVM, LVM, and potential PM) and total PEP. The minimum feed rate from all of these pollutants is taken as the upper feed rate limit. This feed rate is then compared to the maximum feed rate that the system can handle and the lesser of the two is taken as the ultimate feed rate limit.

Pollutants are calculated based on a worst-case scenario. The PEP components are the only parts of a munition that are considered in pollutant calculations. The solid metal portions of munitions do not contribute significant pollutants and are therefore not included in calculations. The worst-case scenario involves two assumptions that are made to ensure no limits are ever exceeded. First, it is assumed that out of all the alternatives for a particular NSN, the worst polluting alternate is the one being fed. Second, the Feed rate Program assumes that all PEP components that are capable of producing pollutants produce the maximum amount possible. When the pollutant is particulate matter, the pollutant rate is based on oxidation equations for the particular PEP component, and considers any solids-generated particulate matter.

The Feed rate Program is designed to be a standardized means for feeding items at a rate that complies with all regulations and feed rates. Therefore, it has the following operational modes. In the first mode (the user mode), the user is allowed to choose an NSN number, and generate reports based on that NSN number. In this mode no changes are allowed to either the items in the MIDAS database, or the applicable limits that the calculations are based on. The second mode (the administrator mode), requires a password to enter and once enabled, allows a qualified administrator to enter new items, or make corrections to existing items in the MIDAS database. It also allows the administrator to make any necessary changes to the pollutant limits that the program uses for its calculations. The administrator can also perform all of the actions that a standard user can. The operating procedure is such that after choosing a munition based on an NSN number the user is given the option of generating four reports.

The feed rate report contains information on the levels of pollutants in each individual munition, as well as the maximum feed rate based on that pollutant and the applicable limits. It identifies the pollutant that limits the maximum feed rate, reports the emissions based on the overall maximum feed rate, and most importantly contains the final calculated maximum feed rate for the item.

TABLE O-1

DEACTIVATION FURNACE WASTE FEED LIST –

CHARACTERIZED FEED ITEMS from MDAS DATA

Waste	Item Feed Rate (items/hr)	Feed Rate Limiting Parameter	Gross Feed Rate (lb/hr)
76mm Projectile, HVTP-T – M315A1	660	EFR	6,105
76mm Projectile, AP-T – M339	330	EFR	4,785
40mm Projectile, AP-5 – M81	1,107	$C1^{-}$	NYC
40mm Practice Ctg. – M385	660	EFR	510
40mm Practice Ctg. – M407	660	EFR	330
20mm APIT – M52	1,200	EFR	669
20mm API – M53	1,200	EFR	683
20mm HPT – M54	1,200	EFR	753
20mm TP – M55A2	1,200	EFR	675
20mm HEI – M56A3	990	EFR	561
20mm HEI – M56A4	990	EFR	561
20mm APT – M95 (w/WC 875)	1,200	EFR	686
20mm APT – M95 (w/IMR 7013)	1,200	EFR	686
20mm INC – M96 (w/WC 875)	990	EFR	566
20mm INC – M96 (w/IMR 7013)	990	EFR	566
20mm HEI – M97A2 (w/WC 875)	990	EFR	566
20mm HEI – M97A2 (w/IMR 7013)	990	EFR	566
20mm TP – M99 (w/WC 875)	1,200	EFR	686
20mm TP – M99 (w/IMR 7013)	1,200	EFR	686
20mm TP – M204 (w/WC 875)	1,200	EFR	686
20mm TP – M204 (w/IMR 7013)	1,200	EFR	686
20mm HEI – M210 (w/WC 875)	990	EFR	566
20mm HEI – M210 (w/IMR 7013)	990	EFR	566
20mm TPT – M220	1,200	EFR	675
20mm HEIT – M 242	990	EFR	574
20mm HEIT-SD – M246	990	EFR	576
Cal .50 Tracer – MI	5,296	PEP	1,351
Cal .50 Ball, HPT – M1	6,022	Pb_m, SB_m	1,813
Cal .50 Incendiary – M1	6,081	PEP	1,516
Cal .50 Blank – M1	8,000	EFR	1,019
Cal .50 Blank – M1A1	8,000	EFR	1,046
Cal .50 Ball – M2 (w/WC 860)	6,620	DPA	1,714
Cal .50 Ball – M2 (w/IMR 5010)	7,141	PEP	1,849
Cal .50 AP – M2 (w/WC 860)	6,620	DPA	1,714
Cal .50 AP – M2 (w/IMR 5010)	7,141	PEP	1,849
Cal .50 API – M8 (w/WC 860)	6,620	DPA	1,679
Cal .50 API – M8 (w/IMR 5010)	6,795	PEP	1,714
Cal .50 Tracer – M10	5,279	PEP	1,331
Cal .50 Tracer – M17 (w/WC 860)	3,869	$C1^{-}$	960
Cal .50 Tracer – M17 (w/IMR 5010)	3,869	$C1^{-}$	960

Waste	Item Feed Rate (items/hr)	Feed Rate Limiting Parameter	Gross Feed Rate (lb/hr)
Cal .50 Tracer (w/Steel Bullet) – M17 (w/WC 860)	6,600	EFR	1,620
Cal .50 Tracer (w/Steel Bullet) – M17 (w/IMR 5010)	6,600	EFR	1,620
Cal .50 API-T – M20 (w/WC 860)	6,500	PEP	1,595
Cal .50 API-T – M20 (w/IMR 5010)	6,500	PEP	1,595
Cal .50 Incendiary – M23 (w/IM-28)	3,681	Ba	798
Cal .50 Incendiary – M23 (w/IM-11)	2,960	Ba	642
Cal .50 Ball – M33 (w/WC 860)	6,620	DPA	1,668
Cal .50 Ball – M33 (w/IMR 5010)	7,141	PEP	1,799
Cal .50 Ball, Spotter-Tracer – M48A1	6,600	EFR	1,644
Cal .50 Ball, Spotter-Tracer – M48A2	6,294	PM	1,568
Cal .50 API – T49	5,952	PEP	1,358
Cal .50 Ball, Practice – T249E2	8,000	EFR	1,986
Cal .50 Ball, HPT – T251	6,022	Pb_m, SB_m	1,636
Cal .50 API – Mark 211 (w/WC 860)	6,189	PEP	1,560
Cal .50 API – Mark 211 (w/IMR 5010)	6,189	PEP	1,560
Cal .45 Ball, HPT – M1 (w/HPC 18)	22,500	EFR, Pb_m, SB_m	1,067
Cal .45 Ball, HPT – M1 (w/SR 7970)	22,500	EFR, Pb_m, SB_m	1,067
Cal .45 Blank – M9	22,500	EFR	335
Cal .45 Tracer – M26 (w/SR 7970)	22,500	EFR	1,064
Cal .45 Tracer – M26 (w/HPC 18)	22,500	EFR	1,064
Cal .45 Line Throwing – M32	22,500	EFR	NYC
Cal .45 Ball – M1911 (w/SR 7970)	22,500	EFR, Pb_m, SB_m	1,067
Cal .45 Ball – M1911 (w/HPC 18)	22,500	EFR, Pb_m, SB_m	1,067
Cal .45 Match – M1911 (w/SR 7970)	22,500	EFR, Pb_m, SB_m	1,074
Cal .45 Match – M1911 (w/HPC 18)	22,500	EFR, Pb_m, SB_m	1,074
Cal .38 Ball, Special – PGU-12/B	22,500	EFR	653
Cal .38 Ball, Special – M41 (w/SR 7325)	22,500	EFR	653
Cal .38 Ball, Special – M41 (w/HPC1)	22,500	EFR	653
Cal .30 Carbine, Ball – M1	22,500	EFR	620
Cal .30 Carbine, Grenade – M6	22,500	EFR	331
Cal .30 Carbine, HPT – M18	22,500	EFR	749
Cal .30 Carbine, Tracer – M27 (w/I-276)	22,500	EFR	614
Cal .30 Carbine, Tracer – M27 (w/I-280)	22,500	EFR	614
Cal .30 Tracer – M1 (w/I-276)	22,500	EFR	1,283
Cal .30 Tracer – M1 (w/I-280)	22,500	EFR	1,283
Cal .30 HPT – M1	22,500	EFR	1,388
Cal .30 AP – M2 (w/WC 852)	22,500	EFR	1,363
Cal .30 AP – M2 (w/IMR 4895)	22,500	EFR	1,363
Cal .30 Ball – M2 (w/WC 852)	22,500	EFR	1,311
Cal .30 Ball – M2 (w/IMR 4895)	22,500	EFR	1,311
Cal .30 OHF – M2	22,500	EFR	1,311
Cal .30 Rifle Grenade – M3	22,500	EFR	791
Cal .30 API – M14 (w/WC 852)	22,500	EFR	1,311
Cal .30 API – M14 (w/IMR 4895)	22,500	EFR	1,311
Cal .30 Frangible Ball – M22	22,500	EFR	1,029
Cal .30 Tracer – M25 (w/WC 852)	22,227	Cl^-	1,276
Cal .30 Tracer – M25 (w/IMR 4895)	22,227	Cl^-	1,276

Waste	Item Feed Rate (items/hr)	Feed Rate Limiting Parameter	Gross Feed Rate (lb/hr)
Cal .30 Match – M72	22,500	EFR	1,366
Cal .30 Blank – M1909 (w/WC Blank)	22,500	EFR	701
Cal .30 Blank – M1909 (w/SR 4990)	22,500	EFR	701
7.62mm Ball – M59 (w/WC 846)	22,500	EFR	1,263
7.62mm Ball – M59 (w/IMR 4475)	22,500	EFR	1,263
7.62 HPT – M60	22,500	EFR	1,324
7.62mm AP – M61 (w/WC 846)	22,500	EFR	1,263
7.62mm AP – M61 (w/IMR 4475)	22,500	EFR	1,263
7.62mm Tracer – M62	22,500	EFR	1,231
7.62mm Rifle Grenade – M64 (w/WC 830)	22,500	EFR	749
7.62mm Rifle Grenade – M64 (w/IMR 8097)	22,500	EFR	749
7.62mm Ball – M80 (w/WC 846)	22,500	EFR	1,260
7.62mm Ball – M80 (w/IMR 4475)	22,500	EFR	1,260
7.62mm Ball OHF – M80	9,139	SB_m	513
7.62mm Blank – M82 (w/WC 818)	22,500	EFR	755
7.62mm Blank –M82 (w/SR 4759)	22,500	EFR	755
7.62mm Special Ball – M118 (w/WC 846)	7,675	SB_m	428
7.62mm Special Ball – M118 (w/IMR 4895)	7,675	SB_m	428
7.62mm Frangible Ball – M160 (w/WC 140)	22,500	EFR	1,013
7.62mm Frangible Ball – M160 (w/SR 8075)	22,500	EFR	1,013
7.62mm Duplex Ball – M198	22,500	EFR	1,321
7.62mm Dim Tracer – M276	16,573	Ba	1,231
7.62mm Match – M852	22,500	EFR	1,238
5.56mm Ball – M193 (w/WC 844)	22,500	EFR	586
5.56mm Ball – M193 (w/CMR 170)	22,500	EFR	586
5.56mm Grenade – M195	22,500	EFR	405
5.56mm Tracer – M196 (w/WC 844)	22,500	EFR	569
5.56mm Tracer – M196 (w/IMR 8208-M)	22,500	EFR	569
5.56mm HPT – M197	22,500	EFR	559
5.56mm Blank – M200 (w/WC814)	22,500	EFR	350
5.56mm Blank – M200 (w/HPP-13)	22,500	EFR	350
5.56mm Ball, NATO – M855	22,500	EFR	611
5.56mm Tracer, NATO – M856	22,500	EFR	617
Cal .22 Long Rifle (Commercial)	22,500	EFR	167
Cal .22 Short (Commercial)	22,500	EFR	NYC
Cal .22 Ball, Long Rifle – M24	22,500	EFR	170
Cal .22 Ball, Hornet – M65	22,500	EFR	331
M1 Propellant	240	PEP, DNT	240
M7 Propellant	124	$C1^-$	124
Delay Plunger – M1	438	Cr	NYC
Non-Delay – M9	57,824	Pb	NYC
Delay – M2	558	Cr	NYC
Detonator – M16A1	134	Cr	NYC
Detonator – M17	17,608	Pb	NYC
Detonator – M18	19,418	Pb	NYC
Detonator – M23	23,610	Pb	NYC
Detonator – M22	24,637	Pb	NYC

Waste	Item Feed Rate (items/hr)	Feed Rate Limiting Parameter	Gross Feed Rate (lb/hr)
Detonator – M24	19,788	Pb	NYC
Detonator – M35	15,860	Pb	NYC
Detonator – M30A1	34,629	Pb	NYC
Detonator – M36A1	23,783	Pb	NYC
Detonator – M37	16,534	Pb	NYC
Detonator – M41	14,499	Pb	NYC
Detonator – M42	14,218	Pb	NYC
Detonator – M44	20,042	Pb	NYC
Detonator – M45	13,139	Pb	NYC
Detonator – M47	35,936	Pb	NYC
Detonator – M48	35,018	Pb	NYC
Detonator – M53	88	Cr	NYC
Detonator – M55	69,576	Pb	NYC
Detonator – M57A1/A2	42,273	Pb	NYC
Detonator – M58	68,531	SB	NYC
Detonator – M59	34,708	Pb	NYC
Detonator – M61	198,622	Pb	NYC
Detonator – M63	29,202	Pb	NYC
Detonator – M80	18,333	Pb	NYC
Detonator – M84	64,282	Pb	NYC
Detonator – MK 18 Mod 0	34,822	Pb	NYC
Detonator – MK 19 Mod 0	59,934	Pb	NYC
Detonator – MK 25 Mod 0	18,441	Pb	NYC
Detonator – MK 28 Mod 0	8,804	Pb	NYC
Detonator – MK 29 Mod 0	25,338	Pb	NYC
Detonator – MK 33 Mod 0	16,846	Pb	NYC
Detonator – MK 37 Mod 0	38,957	Pb	NYC
Detonator – MK 43 Mod 0	32,464	Pb	NYC
Detonator – MK 44 Mod 0	32,980	Pb	NYC
Detonator – MK 44 Mod 1	32,446	Pb	NYC
Detonator – MK 54 Mod 0	13,262	Pb	NYC
Detonator – MK 55 Mod 0	23,791	Pb	NYC
Detonator – MK 56 Mod 0	300,481	Sb	NYC
Detonator – MK 59 Mod 0	34,822	Pb	NYC
Detonator – MK 96 Mod 0	35,216	Pb	NYC
Detonator – T 83E1	211,656	Pb	NYC
Detonator – T 84E1	37,729	Pb	NYC
Fuze, Point Detonating – MK27 (w/booster)	660	EFR	NYC
Fuze, Auxiliary Det. – MK 31 Mod 2 (w/booster)	14,623	Pb	NYC
Fuze, Point Detonating – M48	438	Cr	NYC
Fuze, Base Detonating – M66A1/A2	660	EFR	NYC
Fuze, Point Detonating – M78A1 (w/booster)	558	Cr	NYC
Fuze, Grenade – M204A2, M206, M213, M214	528,459	Pb	NYC
Fuze, MTSQ – M502	440	PEP	NYC
Fuze, 20mm Point Detonating – M505A3	42,562	Pb	NYC
Fuze, Point Initiating – Base Det. – M509A1	13,339	PEP	NYC
Fuze, Proximity – M513A1	4,327	PEP	NYC

Waste	Item Feed Rate (items/hr)	Feed Rate Limiting Parameter	Gross Feed Rate (lb/hr)
Fuze, Point Detonating – M521	12,633	Pb	NYC
Fuze, Point Detonating – M525 (w/booster)	6,222	PEP	NYC
Fuze, Point Detonating – M557, M572 (w/booster)	438	Cr	NYC
Fuze, Point Detonating – M564 (w/booster)	4,621	Pb	NYC
Mine Activator, Anti-tank – M1	12,643	Pb	NYC
Ejection Ctg., Bomb – CCU-1/B	6,600	EFR	NYC
Booster – M21A4	440	EFR	NYC
Booster, Fuze –M125A1	4,516	PEP	NYC
Booster – MK 39 Mod 0	4,040	PEP	NYC
Ignition Ctg. – M5A2	19,425	NG	NYC
Delay Plunger, 0.5 sec – M1	36,569	Pb	NYC
Detent	22,500	EFR	NYC
Impulse Ctg. – MK 15 Mod 0	45,000	EFR	NYC
Cutter Ctg. M21, M22	2,640	EFR	NYC
Fin Assembly w/ primer for 81mm Mortar	2,640	EFR	NYC
Primer – A216 (Primer Mix 5061)	115,411	Pb	NYC
Primer – A216 (Primer Mix 5074)	844	Cr	NYC
Primer – M1BA2	20,741	PEP	NYC
Primer – M22A3	15,413	PM	NYC
Primer – M23A1/A2	47,852	PM	NYC
Primer Stab – M26	63,165	Cl^-	NYC
Primer – M31	6,759	PM	NYC
Primer – M31A2/B2	6,759	PM	NYC
Primer – M32	285,747	Cl^-	NYC
Primer – No. 34	434,028	Sb	NYC
Primer – FA34	434,028	Sb	NYC
Primer – M28B2	2,640	EFR	NYC
Primer – M34	22,500	EFR	NYC
Primer – 40A2	1,320	EFR	NYC
Primer – M57	660	EFR	NYC
Primer – M71	22,500	EFR	NYC
Primer – M82	22,500	EFR	NYC
Primer, Percussion – M26	63,165	Cl^-	NYC
Primer, 20mm Percussion – M36A2	107,965	Pb	NYC
Primer, M47 and M68	3,395	PM	NYC
Primer, Percussion – M79	2,683	PM	NYC
Primer, 20mm Electric – M52A3	111,564	Pb	NYC
Primer, Electric – M80A1	1,925	PEP	NYC
Primer – M35	600,553	Cl^-	NYC
Primer – M28/M28A2/M28B1/M28B2	2,640	EFR	NYC
Primer – M29A1 (NOL 60)	334,691	Pb	NYC
Primer – M29A1 (#5061)	528,459	Pb	NYC
Relay – M5	44,843	Pb	NYC
Relay – M7	40,475	Pb	NYC
Relay – XM9	27,951	Pb	NYC
Igniter, Rocket Motor – MK117, MK118	2,280	EFR	NYC
Igniter, Rocket Motor – MK125-5	6,600	EFR	NYC

Waste	Item Feed Rate (items/hr)	Feed Rate Limiting Parameter	Gross Feed Rate (lb/hr)
Rocket Motor, 3.5 inch	240	EFR	NYC
Signal, Illuminating – AN-M37A2	10,808	PM	NYC
Signal, Illuminating – AN-M43A2	13,765	PM	NYC
Signal, Ground Illuminating (Red) – M158	1,324	PM	NYC
Squib – XC9/MK 1 Mod 0	628,574	PM	NYC
Tracer – M5A2B1/B2	12,225	Cl^{-}	NYC
Tracer – M10/XM10	6,800	PM	NYC
Tracer – M12	1,374	Cl^{-}	NYC
Tracer – M13	3,771	Cl^{-}	NYC
Tracer – No. 1/No. 2 (75-14-333)	8,969	Cl^{-}	NYC
#41 Primer (5.56mm)	361,781	EFR	NYC
#43 Primer (7.62mm)	489,314	Pb	NYC
M223 Fuze	30,000	EFR	NYC
M42 Grenade	1,200	EFR	NYC
M47 Grenade	1,200	EFR	NYC
M77 Grenade	1,000	EFR	NYC
WC 140 Propellant	221	DPA	221
WC 150 Propellant	221	DPA	221
WC 665 Propellant	221	DPA	221
WC 740 Propellant	221	DPA	221
WC 814 Propellant	221	DPA	221
WC 818 Propellant	221	DPA	221
WC 820 Propellant	221	DPA	221
WC 830 Propellant	221	NG	201
WC 844 Propellant	221	DPA	221
WC 846 Propellant	221	DPA	221
WC 852 Propellant	221	DPA	221
WC 860 Propellant	221	DPA	221
WC 870 Propellant	221	DPA	221
WC 872 Propellant	221	DPA	221
WC 875 Propellant	221	DPA	221
WC Blank Propellant	221	DPA	221
M1A1 Propellant	226	NG	228
M2 Propellant	240	PEP	240
M5 Propellant	240	PEP	240
M6 Propellant	103	NG	103
M9 Propellant	110	NG	111
M10 Propellant	240	PEP	240
M12 Propellant	240	PEP	240
M14 Propellant	240	PEP	240
M15 Propellant	232	NG	234
M17 Propellant	205	NG	207
M17E1 Propellant	205	NG	207
M18 Propellant	240	PEP	240
M26 Propellant	176	NG	178
M26E1 Propellant	176	NG	178
M30 Propellant	196	NG	197

Waste	Item Feed Rate (items/hr)	Feed Rate Limiting Parameter	Gross Feed Rate (lb/hr)
M30A1 Propellant	185	NG	186
M30E1 Propellant	196	NG	193
M31 Propellant	232	NG	234
M33 Propellant	122	NG	123
M37 Propellant	122	NG	123
MK43 Propellant	126	NG	127
N5 Propellant	126	NG	127
SR 4759 Propellant	240	PEP	240
SR 4990 Propellant	240	PEP	240
SR 7325 Propellant	240	PEP	240
SR 7641 Propellant	240	PEP	240
SR 7970 Propellant	240	PEP	240
SR 8074 Propellant	240	PEP	240
SR 8231 Propellant	240	PEP	240
T 2 Propellant	147	NG	148
T 3 Propellant	163	NG	164
T 5 Propellant	113	NG	113
T 6 Propellant	160	NG	161
T 8 Propellant	196	NG	197
T 9 Propellant	217	PM	180
T 25 Propellant	221	NG	222
Hi-Skor 700X Propellant	119	NG	120
HPC1 Propellant	110	NG	111
HPC2 Propellant	240	PEP	240
HPC4 Propellant	166	DPA	166
HPC5 Propellant	240	PEP	240
HPC8 Propellant	240	PEP	240
HPC18 Propellant	205	NG	207
HPC23 Propellant	103	NG	103
IMR MTP4-2-700 Propellant	240	PEP	240
IMR 4198 Propellant	240	PEP	240
IMR 4475 Propellant	240	PEP	240
IMR 4831 Propellant	240	PEP	240
IMR 4895 Propellant	240	PEP	240
IMR 5010 Propellant	240	PEP	240
IMR 7013 Propellant	240	PEP	240
IMR 7383 Propellant	213	NDT	213
IMR 8097 Propellant	240	PEP	240
JA 2 Propellant	240	PEP	240
AFX-900	185	PM	185
AFX-110	175	PM	175
Ammonium Perchlorate	12	Cl^{-}	12
Composition A-3	200	PEP	200
Composition A-5	200	PEP	200
Composition B	240	PEP	240
Composition CH-6	200	PEP	200
Cyclotol Type I	200	PEP	200

Waste	Item Feed Rate (items/hr)	Feed Rate Limiting Parameter	Gross Feed Rate (lb/hr)
Cyclotol Type II	200	PEP	200
LX-14	240	PEP	240
Octol Type I	240	PEP	240
Octol Type II	240	PEP	240
PBX-AF-708	121	PM	122
Black Powder/Lime (50/50 w)	325		

EFR – Established Feed Rate

NYC – Not Yet Calculated

$C1^-$ – Chlorine

PB – Elemental Lead

SB – Elemental Antimony

PEP – Propellant, Explosives, and Pyrotechnics

Ba – Barium

DNT – Dinitrotoluene

Cr – Chromium

NG – Nitroglycerin

DPA – Diphenylamine

SECTION P. PROCEDURES TO PREVENT HAZARDS FOR RF-9

AWFCO System Testing

SOC tests the AWFCO systems weekly when the system is in continuous use. In the event the system is idle for extended periods due to lack of waste, the AWFCO system will be tested as part of the system startup and prior to waste introduction. Incinerator personnel check the functionality of AWFCO logic that is part of the incinerator's DCS system to make sure that should process conditions deviate from allowable limits, the computer logic will initiate waste feed shutdowns as required. This is accomplished by manually simulating process conditions that are outside allowable limits and observing and documenting when the control software logic shuts off the waste feed conveyor. Should actual AWFCOs occur during a given week, these are documented by operating personnel to satisfy regulatory requirements for system testing. Results of this testing are documented on a separate AWFCO Testing Log and maintained as part of the unit's operating record.

Air Pollution System Inspection

The inspection checklist Section P, Table P-1 and maintenance practices for the APC equipment are described below.

Primary Combustion Chamber - The PCC is inspected weekly to ensure that gauges are operational and operating within design specification. A weekly inspection is also conducted to check the housing and piping for hot spots or external corrosion that is indications of a breakdown of insulation within the afterburner chamber. The combustion chamber is opened during quarterly inspection for an internal inspection of the combustion chamber insulation. Repairs to the insulation are performed as necessary, based on these inspections.

Evaporative Cooler - The evaporative cooler is inspected weekly for cracks or leaks in pipes and fittings. The weekly inspection consists of checks of external corrosion, functioning of the evaporative cooler nozzles, maintenance of in-line oilers oil level on air lines, inspection of the operation of the knife gate valves. Maintenance is performed as necessary. Nozzles are changed as they become plugged.

Baghouses - The baghouses are inspected weekly for external corrosion. Rotary valves are checked for proper operation to ensure proper removal of filtered ash is being accomplished. Gear boxes on the rotary valves are checked monthly for leaks, proper lubrication levels, unusual noises, excessive heat, excessive vibration, and properly installed guarding.

Draft Fan - The draft fan is inspected weekly for excessive vibration and proper lubricant levels. On a weekly basis, the draft fan is checked for the condition of the sheaves, belt tension, belt condition, proper guarding, buildup, wear, or fractures on the fan blades, excessive vibration, heat, or noise in the motor. The motor is lubricated weekly, as are the draft fan bearings.

Plant Instruments - Plant instruments, such as pressure gauges, switches, and sensors, thermocouples, flow meters, broken bag detectors, etc., are inspected and calibrated on a schedule varying from weekly to monthly to annually, depending on the instruments' demonstrated reliability. Instruments are repairs and/or replaced as necessary. Records are kept of all inspections, and repairs of plant instruments.

Types of Problems [40 CRF 264.15(b)(3)]

Table Section P, Table P-2 is an inspection schedule for safety, emergency, and security equipment that is considered important in preventing, detecting, or responding to environmental or human health hazards associated with potential discharges of hazardous waste materials. The schedule is in effect whenever equipment/facilities are in operation or whenever waste is present.

Section P in Table P-2 lists the types of problems that may be found for each of the specific items to be inspected at each facility or for each area of concern. See Section P, Tables P-2 for coverage of the operational inspection schedule and maintenance schedule specific to APE 2210 (RF-9) Detonating Furnace.

Table P-1
Inspection Checklist for RF-9 Operations

Operation: 117-3, RF-9 DETONATING FURNACE

Date:________________________ Time of Inspection:___________________

Name of Inspector:____

Form Revised: May 2012

		Yes	No
General Safety Requirements			
1	Fire extinguishers present and operational		
2	Locks operational		
3	Warning signs present		
4	Telephone operational		
5	Ladders and catwalks are in proper working order		
6	Proper PPE present		
General Maintenance			
7	All fittings, bearings, pulleys, etc. are lubed and operational		
8	Any unusual emissions coming from exhaust stack		
9	Any leaks, spills, or usual discoloration		
10	Containers properly labeled		
11	Containers are in proper location		
12	Fuel lines not leaking and are operating properly		
13	Fuel oil tank is damage or leaking		
14	System has proper fuel oil pressure		
15	All required circuit breakers are on		
16	Any damage to electrical conduit		
17	Power distributor panels are operating properly		
18	Air monitoring instruments are in proper working order		
19	The HEPA Filter is in proper working order		
20	Ducting is in proper working order		
21	Fan inlet screens are clear of debris.		
Waste Feed Monitoring System			
22	The waste feed monitor is operational		
23	Any debris on or near the scale.		
24	The scale is zeroed out		
25	The cycle switch is activated		
26	The waste feed cutoff and the emergency stop works		
27	The scale is calibrated		
Conveyor Systems			
28	Any debris on or near conveyor.		
29	The conveyor systems are operational		
30	Correct placement of conveyor		
31	Motion sensor and control operational		
32	Is there any jammed items or build up of feed stock		
33	Is scrap metal drum half-full *(if so then replace drum)*		

MDRK Furnace			
34	The MDRK Furnace is operational		
35	Any debris on or near the Furnace.		
36	UV sensor and view port clean		
37	Combustion air blower is operational		
PCC System			
38	The PCC is operational		
39	Any debris on or near the PCC.		
40	UV sensor and view port clean		
41	Combustion air blower is operational		
Evaporative Cooler			
42	The evaporative cooler is operational		
43	Water is spraying properly		
Baghouse			
44	The Baghouse is operational		
45	Is baghouse ash drum three quarters-full *(if so then replace drum)*		

Comments

Item # Comments: (conditions, amounts notations, repairs needed, repairs completed, etc)

_______ ____
_______ ____
_______ ____
_______ ____
_______ ____
_______ ____
_______ ____
_______ ____
_______ ____

TABLE P-2

OPERATIONAL INSPECTION SCHEDULE

APE 2210 (RF-9) DETONATING FURNACE RF-9

ITEM	TYPES OF PROBLEMS	FREQUENCY*
SAFTY EQUIPMENT		
Fire extinguishers	Visual inspect to see if it needs recharging	Weekly Maintenance
Telephone system	Power failure	Weekly Maintenance
Emergency shower and eyewash	Water pressure, leaking, drainage	Weekly Maintenance
Warning signs	Damaged, missing	Weekly Maintenance
Emergency lighting system	Battery failure, lights inoperative	Weekly Maintenance
Proper PPE	Visual inspect to make sure it is there	Weekly Maintenance
Gates and locks	Corrosion, damage to fencing or barbed wire, sticking or corroding locks	Weekly Maintenance
Ladder and catwalk	Inspect for damage and general condition.	Weekly Maintenance
Ductwork	Inspect for alignment.	Weekly Maintenance
FEED SYSTEM		
Waste Feed Monitor System (WFMS)	Inspect WFMS for damage and general condition. Checks weigh scale calibration. Check for adequate air pressure for valves that operate air cylinders	Weekly Maintenance
Fuel storage tank	Inspect for leaks and corrosion. Check fuel level.	Prior to startup and after shutdown
Propane storage tank and piping	Inspect for leaks and corrosion. Check fuel level.	Prior to startup
Primary feed conveyor	inspect and start to observe operation.	Weekly Maintenance Prior to startup and after shutdown
Secondary feed conveyor	inspect and start to observe operation.	Weekly Maintenance Prior to startup and after shutdown
Recycle chute	Inspect for blockage.	after shutdown
MDRK		
Burner and controls	Visually inspect for any physical damage. Verify that links and levers on control valves are properly adjusted. Verify that safety shutoff valves are closed.	Prior to startup

ITEM	TYPES OF PROBLEMS	FREQUENCY*
Combustion air blower	inspect and start to ensure proper operation and pressure.	Prior to startup
Kiln	Visually inspect kiln and surroundings for signs of leakage.	Weekly Maintenance Prior to startup and after shutdown
Kiln drive system	Visually inspect and start to ensure proper operation.	Weekly Maintenance Prior to startup and after shutdown
Kiln drive assembly	a) Check the gear sprockets, drive shafts, drive chains, roller surfaces, and bearings for wear and loose mountings. Check oil level or vari-drive gearbox. b) Inspect thrust and trunnion assemblies. Grease Zerk fittings.	Weekly Maintenance
Kiln drive	Inspect drive chains for wear and adjustment. Clean and oil drive chains and sprockets.	Weekly Maintenance
Kiln frame assembly	Inspect the frame assembly for cracked or broken welds. Inspect the thrust bearing assembly for loose mounting and worn components. Inspect guard plates and bearing reflectors for loose mounting.	Weekly Maintenance
Kiln retort assembly	Inspect the kiln rotating for damage that may have occurred from detonation of items and loose bolts between sections. Inspect end plates for loose mounting. Inspect kiln internal baffles for damage	Weekly Maintenance
Discharge conveyor	inspect and start to observe operation.	Prior to startup Weekly Maintenance
Recycle conveyor	inspect and start to observe operation.	Weekly Maintenance
Fugitive emissions containment	Visually inspect shroud and ducts for alignment.	Weekly Maintenance
<u>PCC</u>		
Burner and controls	Visually inspect for any physical damage. Verify that links and levers on control valves are properly adjusted. Verify that safety shutoff valves are closed.	Weekly Maintenance Prior to startup and after shutdown
Combustion air blower	Visually inspect clean inlet screen and start to ensure proper operation and pressure.	Weekly Maintenance Prior to startup and after shutdown
Ductwork and shell	Inspect for alignment.	Weekly Maintenance

ITEM	TYPES OF PROBLEMS	FREQUENCY*
EVAPORATOR COOLER		
Water spray	Visually inspect to ensure proper operation.	Weekly Maintenance
Pipes and fittings	Visually inspect for cracks and leaks	Weekly Maintenance
Ductwork and shell	Inspect for alignment.	Weekly Maintenance
LIME INJECTION SYSTEM		
Feed lines	Lines are clear and operational	Weekly Maintenance
BAGHOUSE		
Bypass	Actuate bypass. Verify that baghouse isolation valves close and bypass valve opens.	Weekly Maintenance
Residue isolation valve	Inspect and observe operation.	After shutdown
Bag cleaning system	Observe operation and pressure drop.	Prior to startup after shutdown
Residue containment drum	Check for general condition and verify if there is sufficient room for the ash which will be collected.	Prior to startup and during operation
Rotary air lock	Inspect and observe operation	Weekly Maintenance
Dump hose	Inspect for leaks	Weekly Maintenance
Ductwork and shell	Inspect for alignment.	Weekly Maintenance
HEPA FILTER		
Filter	Inspect for leaks	Weekly Maintenance
Ductwork and shell	Inspect for alignment	Weekly Maintenance
I.D. FAN		
Fan	Inspect for high vibration and high motor temperature.	Weekly Maintenance Prior to startup and after shutdown
EXHAUST STACK		
Exhaust gas	Observe exhaust gas for visible emissions.	Weekly Maintenance.
Ductwork and shell	Inspect for alignment.	Weekly Maintenance

ITEM	TYPES OF PROBLEMS	FREQUENCY*
UTILITIES		
Air compressor	a) Check oil level. b) Drain water from tank and air separator.	Prior to startup After shutdown
INSTRUMENTATION AND CONTROLS		
Automatic waste feed shut-off (AWFSO)	Test per AWFSO test procedures.	Prior to startup
CEMs	Verify calibration.	Prior to startup
MDRK burner flame detector	Inspect wiring and clean viewing window.	Weekly Maintenance.
PCC burner flame detector	Inspect wiring and clean viewing window.	Weekly Maintenance
Fuel feed pumps	Inspect for leaks and coupling condition. Listen for noisy motor or pump.	Weekly Maintenance

SECTION Q. CLOSURE PLAN FOR RF-9

Closure Performance Standards *[40 CFR 264.111 and 264.112]*

As closure of the active hazardous waste treatment at HWAD is not contemplated at this time, detailed sampling and analysis plans have not been prepared. The closure performance standard will be determined at such time that closure of the hazardous waste management unit at HWAD is contemplated. The closure performance standard will be defined to ensure the following:

- The need for continuing maintenance (i.e. post-closure maintenance) will be minimized.
- The closure activities will control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere.
- That the closure activities will comply with the provisions of 40 CFR Part 264 Subpart G.

The closure performance standard will be defined and proposed by HWAD and will be submitted to the USEPA for approval before implementation of the closure plan.

A copy of the closure plan will be kept at HWAD until closure is completed and certified. If changes in operating plans or facility design affect the closure plan, the plan will be amended in accordance with the provisions of 40 CFR 264.112. HWAD will be responsible for expanding upon and updating the facility's copies of closure plans when revisions are necessary due to changes in the operations, facility, design, and schedule. The USEPA Region IX will be notified at least 45 days prior to the date closure activities are scheduled to begin. All closure activities will be completed within 180 days after the closing units receive the final volume of waste for treatment.

Within 60 days of completion of closure activities, the owner/operator and an independent registered Professional Engineer will certify that closure of the facilities was completed in accordance with the specification contained in the approved Closure Plan and with 40 CFR 264.115. This certification will be forwarded to the Regional Administration, USEPA.

Closure of APE 2210 (RF-9) Detonating Furnace *[40 CFR 254.351]*

The APE 2210 (RF-9) Detonating Furnace treats hazardous waste generated at HWAD through thermal treatment. Closure activities for the APE 2210 (RF-9) Detonating Furnace must therefore meet the requirements for closing hazardous waste incinerators. The closure of the APE 2210 (RF-9) Detonating Furnace RF-9 will be performed according to the approved closure plan, will meet the closure performance standard, and will be implemented in accordance with the approved plan. The APE 2210 (RF-9) Detonating Furnace RF-9 includes equipment and structures; removal and/or decontamination of the equipment and structures will meet the closure performance standard, and will be implemented in accordance with the approved closure plan.

POST CLOSURE PLAN [40 CFR 270.14(b)(13)]

In accordance with [40 CFR 270.14(b)(13)] post-closure plans are required as part of the Part B permit applications as applicable under 40 CFR 264.110(b). Since the APE 2210 (RF-9) Detonating Furnace RF-9 is not a hazardous waste disposal facility, nor a waste pile or surface impoundment, nor a tank system, post-closure requirements do not apply.

CLOSURE PLAN *[40 CFR 270.14(b)(13)]*

The closure plan has been prepared for the APE 2210 (RF-9) Detonating Items Furnace. The plan is designed to meet the performance standard of 40 CFR § 264.111 as follows:

a. Minimizes the need for further maintenance.
b. Controls, minimizes or eliminates, to the extent necessary to prevent threats to human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.

The closure plan for the APE 2210 (RF-9) Detonating Items Furnace includes:

(1) The necessary steps to completely close the facility at the end of its intended operating life.
(2) An estimate of the maximum inventory of wastes in treatment at any time during the life of the facility.
(3) A description of the steps needed to decontaminate facility equipment during closure.
(4) An estimate of the expected year of closure and a schedule for final closure which includes the

total time required to close the facility.

Within ninety (90) days after receiving the final volume of hazardous wastes, the facility will treat or remove from the site, all hazardous wastes in accordance with the approved closure plan.

Because the installation is a federal facility, no closure cost estimates or finance assurance mechanisms are necessary according to 40 CFR § 264.140(c).

Copies of the closure plan are maintained at the installation. If any operational changes occur that will affect the closure plan, an amendment to the closure plan will be submitted to the EPA

DETONATING ITEMS FURNACE DESCRIPTION

The description of RF-9 equipment and layout can be found in Section N as well as in Section N Figure N-1 through N-5

Maximum Waste Inventory *[40 CFR 264.112(b)(3)]*

Waste materials are not stored at the APE 2210 (RF-9) Detonating Items Furnace. Ammunition is stored in appropriate buildings at the installation. When the decision to destroy the ammunition is made, the ammunition is moved from the storage area to the APE 2210 (RF-9) Detonating Items facility. Once the ammunition is received and signed for at the APE 2210 (RF-9) Detonating Items facility, it is considered a hazardous waste. Only enough ammunition for one days' operation is moved at a time.

Several end products result after incineration of the ammunition. The metal parts, which have been thermally decontaminated in the rotary kiln are collected and recycled and/or sold as scrap metal. Residues from incineration operation include the dusts collected from the ducting, Primary Combustion Chamber (PCC), Evaporator cooler baghouse. The waste streams from these points of the Air Pollution Control System (APCS) will be combined in 55 gallon drums. The residue in the drums will be analyzed for reactivity, and toxicity using the Toxic Characteristic Leaching Procedure (TCLP).

CLOSURE PROCEDURES

The APE 2210 (RF-9) Detonating Items Furnace components will be decontaminated to the "XXX" condition as described by the Department of Army Technical Bulletin TB 700-4 see Appendix T on the Decontamination of Facilities and Equipment. The "XXX" condition is a military standard which indicates that equipment or facilities have been examined and decontaminated by approved procedures and that no contamination can be detected by appropriate instruments, test solutions, or visual inspection. Facilities classified as "XXX" are considered safe for the intended government use. Army Regulation ARRCOM 385-5, "Contamination, Decontamination, and Disposal" also prescribes policies and procedures relating to the decontamination and disposal of contaminated items. A copy of this regulation is also contained in Appendix T.

Disposal or Decontamination of Equipment *[40 CFR 264.112(b)(4)]*

Rotary **The retort section of the furnace is made of ASTM A217 chromium-molybdenum and contains an** ***Kiln***

internal auger made of cast steel which moves waste ammunition laterally through the furnace. The inside diameter of the auger plates is approximately eight (8) inches. The residues inside the furnace are heterogenous ash/metallic lead, and metallic lead layers.

Since decontamination of this is physically difficult and expensive, the rotary kiln will be sealed by welding steel plates on the ends and disposed off-site as a hazardous waste. Since the outside of the retort is exposed to the weather, the steel corrodes uniformly, and HEPA-vacuuming should effectively remove any possible exterior contamination. "OR" Decontamination will occur by removing all residues from within the rotary kiln and properly containerizing the residue. The rotary kiln will then be disassembled and placed upon containment liners for physically and manually removing the remainder of residue that may be within the kiln sections. The containment liners will be containerized and managed as hazardous waste.

Feed Conveyors

The feed conveyors will be dry-brushed to remove any large quantities of contamination that may exist. The brushings will be collected and analyzed to determine if they are hazardous. The feed system components will then be steam-cleaned. The rinse water will be collected and analyzed to determine if it is hazardous.

Air Pollution Control System (APCS)

The APCS is comprised of a Primary Combustion Chamber (PCC), Evaporator cooler, baghouse, compressor, induced draft (ID) fan, stack, and associated ducting.

Filter bags will be removed from the baghouse and containerized as hazardous waste. Any remaining dust in the baghouse, hoppers, and Evaporator cooler will be removed and tested to determine if it is hazardous.

Since all equipment is exposed to the weather, extensive exterior surface contamination is not expected. Equipment will be dry brushed on the exterior surface. The brushings will be collected and tested.

The interior surfaces of equipment will be decontaminated by detergent/water rinse. Gates and other ancillary devices will be vacuumed. Further decontamination, such as scrubbing, solvent rinse, etc., will depend upon analysis of the samples.

Disposal of Waste

If determined by testing to be hazardous, debris, waste water, and other contaminated residues or materials will be disposed as hazardous waste at an off-site, permitted hazardous waste disposal facility. All filter bags from the baghouse automatically will be containerized and disposed as hazardous waste. Furnace equipment, such as the rotary kiln, which is difficult or too time consuming to decontaminate adequately, will be disposed as hazardous waste. Surfaces of the rotary kiln will be HEPA-vacuumed prior to disposal. Any soils which contain hazardous levels or are shown to contain contamination will be excavated and transported offsite to a licensed disposal facility.

All waste residues will be placed in DOT approved hazardous waste drums and removed from the incinerator area within ninety (90) days from the day the drum is full. Full drums of wastes may be stored at the installation in a permitted Hazardous Waste Storage facility prior to disposal. Wastewater may be accumulated in tanks or tank trucks during contamination prior to disposal.

Prior to any materials being disposed as non-hazardous waste or sold as scrap metal, the materials must be certified decontaminated by analyses.

SUBMISSION OF SAMPLING AND ANALYSIS PLAN

Brushings, rinse water and rust will be tested to determine if they are hazardous in accordance with 40 CFR § 261, Appendices II and III and EPA Report No. SW-846. Samples will be analyzed for metals, using TCLP, and the principle organic hazardous constituents of the types of ammunition destroyed in the incinerator. If hazardous, the brushings, rinse water and/or dust will be transported to an off-site EPA-licensed facility for disposal.

After decontamination operations, equipment, floors, and walls will be sampled and analyzed for possible contamination. A wipe sampling technique will be used to determine the surface concentration of metals remaining on the detonating items furnace and surrounding areas.

The wipe sampling technique involves wiping a selected number of areas on the surface area to be sampled with kimwipe tissues wetted with distilled water. Each area will be thoroughly wiped with one kimwipe to remove all residues within the area. Each individual kimwipe will be placed in a separate new bag and transported to the laboratory.

The laboratory will determine the total metal content of the kimwipe in each sample bag. Sample metal contents will be divided by the corresponding total wipe area to determine the areal metal concentration on the surface which has been sampled.

Soil boring samples, two feet in depth will be collected at ten-foot intervals at the APE 2210 (RF-9) Detonating Items Furnace. Samples will be taken at the edge of the structures (eg. concrete slab, footer) supporting the rotary kiln and other equipment. Samples then will be taken around the entire detonating items furnace perimeter and will extend outwards for a minimum of fifty feet. Analyses will be conducted for reactivity and toxicity (TCLP).

Background soil boring samples will be collected from multiple locations and depths.

Background levels will be determined by averaging the analyses of nearby unaffected soil samples from the multiple locations and depths, eliminating analytical results which are found to be significantly different.

In the event that all background samples show a parameter to be non-detectable, the decontamination objective shall then be less than or equal to two times the detection limit for that parameter. However, in the event that only some of the background samples indicate a parameter to be non-detectable, the concentration of the parameter in those samples will be assumed to be equal to one-half the detection limit.

To achieve this accomplishment it may require testing of the potential contaminated area to be tested at great depths and farther distances to determine the rate and extent of contamination and to perfect a clean closure.

If the groundwater is found to be contaminated during soil sampling, a sampling and analysis plan will be submitted to the EPA. This plan would include procedures and techniques for sample collection, sample presentation and shipment, analytical procedures, and chain of custody control.

SAMPLING AND ANALYSIS PLAN

This sampling plan has been developed for the Resource Conservation and Recovery Act (RCRA) closure activities for the RF-9 located at the Hawthorne Army Depot (HWAD) in Hawthorne, Nevada. The plan describes the sampling and analysis activities required to complete closure of the BEDS unit. The closure plan requires equipment and surface sampling and analysis to demonstrate that decontamination procedures were effective. This plan describes the sampling strategies for the closure project, provides detailed procedures for sampling, and establishes quality assurance (QA) and quality control (QC) procedures.

Plan Organization

This sampling plan has been prepared generally following the United States Environmental Protection Agency's (USEPA's) *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) *Chapter Nine, Sampling Plan*. The plan will serve as an essential guidance by which the closure samples will be collected and handled. The plan defines all aspects of QA/QC procedures and establishes sampling and analytical quality indicators that will demonstrate achievement of the sampling objectives.

Sampling Objectives

During the closure activities, sampling will be performed to verify that the closure performance standards have been achieved. The performance standards have been developed to control, minimize, or eliminate, to the extent necessary to prevent threats to human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.

This sampling plan addresses the sampling requirements for closure. The following performance standards will be achieved for closure:

- The exterior of all APC equipment that is located outdoors will be cleaned to the point that no hazardous residue is indicated.
- all process equipment, will be sealed or protected to prevent the infiltration of rainwater and contamination of runoff.
- The walls and floors of the primary RF-9 building will be cleaned such that no visible residue remains on them. The building will then be closed in place.

Sampling will be used to verify that cleaning procedures were effective for the exterior of the APC equipment that is located outdoors and for the walls and floors of the BEDS building. The closure plan specifies that wipe sampling will be performed. Wipe samples will be collected and analyzed to verify that the equipment and surfaces are free of hazardous residues. Comparison of wipe sample analytical results to an unused wipe media sample (blank) will be used to determine the presence or absence of contamination.

Sampling Design

A judgmental sampling design has been chosen for the closure sampling activities. This sampling design is described in USEPA's Guidance on Choosing a Sampling Design for Environmental Data Collection, December 2002. Judgmental sampling refers to the selection of sample locations based on professional judgment alone, without any type of randomization. Judgmental sampling was chosen based on the following criteria:

- Relatively small-scale features or conditions are under investigation;
- There is reliable historical and physical knowledge about the feature or condition under investigation; and
- The objective of the investigation is to screen an area(s) for the presence or absence of contamination at levels of concern.

In judgmental sampling, the selection of sampling units (i.e., the number and location of samples) is based on knowledge of the feature or condition under investigation and on professional judgment. This method is appropriate for the closure sampling because the current condition of the equipment and area is known and the sampling is only being used to indicate possible contamination after cleaning.

This sampling plan addresses wipe sampling for the exterior of the RF-9 equipment and for the walls and floors of the RF-9 building. For sampling purposes, the RF-9 equipment has been separated into two regions: the interior process equipment, and the APC equipment that is located outdoors (the Combustion Chamber, Evaporation Cooler, and Baghouse). The two interior walls closest to the RF-9 equipment will be sampled, and the floor in the vicinity of the RF-9 equipment will be sampled. Sample locations will be chosen based on visual observations and process knowledge. Any visibly stained areas on equipment, walls, and floor will be chosen as sampling locations. In the absence of such visual indication, process knowledge will be used to select locations most likely to have been contaminated during unit operation. Table Q-1 summarizes the sampling locations and defines the number of samples to be taken for each location

TABLE Q-1 SAMPLE LOCATIONS AND NUMBER OF SAMPLES

SAMPLE LOCATION [1]	NUMBER OF SAMPLES		NOTES
	METALS (INCLUDING MERCURY)	ORGANICS (EXPLOSIVES)	
RF-9 process equipment	3	3	Samples should be distributed over the surface of the RF-9 process equipment, with preference given to those areas most likely to be contaminated (via visual indication or process knowledge).
RF-9 feed conveyors	8	8	Samples should be distributed over the surface of the feed conveyors.
Rotary Kiln	2	2	Samples should be distributed over the surfaces of the Rotary Kiln.
Combustion Chamber	2	2	Samples should be distributed over the surfaces of the Combustion Chamber.
Evaporation Cooler	2	2	Samples should be distributed over the surface of the Evaporation Cooler.
Baghouse	4	4	Samples should be distributed over the surface of the baghouse.
HEPA Filter	2	2	Samples should be distributed over the surface of the HEPA Filter.
Separator	2	2	Samples should be distributed over the surface of the Separator.
Building walls	6	6	Samples should be distributed over surface of the two walls closest to RF-9 equipment.
Building floor	3	3	Samples should be distributed over the surface of the floor surrounding and under the RF-9 equipment
Field duplicates	2	2	Collected immediately adjacent to one of the samples at two designated locations. The baghouse and the building floor have been chosen as the field duplicate sampling locations.
Blanks	3	3	Carried to site, unopened, labeled as blank in field.
Total Number of Samples to Be Analyzed	37	37	

When collecting wipe samples of equipment or building surfaces, preference should be placed on sampling areas with stains or other indications of possible contamination. Absence such evidence, select areas most likely to be contaminated based on process knowledge. If no such areas can be identified, distribute the samples randomly over the surface of the item to be sampled.

Sampling Procedures

The sampling procedures for this project will conform to the following ASTM standards:

- D6966–08, Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Determination of Metals; and
- D6661–10, Standard Practice for Field Collection of Organic Compounds from Surfaces Using Wipe Sampling.

Copies of the referenced procedures are provided in Appendix W. An overview of each procedure is provided herein. This section is only intended to provide a basic overview of the standards. The actual standards in the appendix should be referenced when performing the sampling.

Wipe Sampling for Metals Determination

The procedures of ASTM Standard D6966–08 Section 7 are summarized in Table Q-2. Each sampling area will be defined as a 10 centimeter (cm) by 10 cm square. A template will be developed prior to sampling to ensure uniform sample areas.

TABLE Q-2
WIPE SAMPLING PROCEDURE FOR METALS DETERMINATION

STEP	PROCEDURE
1	Don a pair of clean, powderless, plastic gloves
2	Carefully place a clean template on the surface to be sampled. Tape the outside edge of the template and outline it with a Sharpie® marker to indicate the position of the template and make sure it does not move.
3	Clean the outside of the wipe container to ensure that the wipe does not become contaminated with dust.
4	Remove the wipe from its container, and inspect the wipe.
5	Using an open flat hand with the fingers together, place the wipe on the surface to be sampled. Wipe the selected surface area, side to side, in an overlapping "S" or "Z" pattern. Wipe the surface so that the entire selected surface area is covered.
6	Inspect wipe for significant shape change or tearing. If any significant changes noted, restart sampling procedures with a different type of wipe at a new sampling location.
7	Fold the wipe in half with the collected dust side folded inward and repeat the wiping procedure (step 5) within the selected sampling area using an up and down overlapping "S" or "Z" pattern at right angles to the first wiping.
8	Fold the wipe in half again with the collected dust side folded inward and repeat the wiping procedure (step 5) one more time, concentrating on collecting settled dust from edges and corners within the selected surface area.
9	Fold the wipe again with the collected dust side folded inward and insert the wipe into a sample container.
10	Label the sample container, identify the sample location, record dimensions of sampling area.
11	Discard gloves.

Wipe Sampling for Organics Determination

The procedures of ASTM Standard D6661–10 Section 7 are summarized in Table Q-3. Each sampling area will be defined as a 10 cm by 10 cm square. A template will be developed prior to sampling to ensure uniform sample areas.

TABLE Q-3
WIPE SAMPLING PROCEDURE FOR ORGANICS DETERMINATION

STEP	PROCEDURE
1	Don a pair of clean, powderless, plastic gloves
2	Carefully place a clean template on the surface to be sampled. Tape the outside edge of the template and outline it with a Sharpie® marker to indicate the position of the template and make sure it does not move.
3	Clean the outside of the wipe container to ensure that the wipe does not become contaminated with dust.
4	Remove the wipe from its container, and inspect the wipe.
5	Wipe the entire surface to be sampled using firm strokes by pressing with the fingertips. Wipe vertically and then horizontally to ensure there is complete coverage in both directions with minimal overlap of the previous stroke.
6	Fold the wipe with the sampled side inward, place it in the sample container, and cap the container.
7	Label the sample container, identify the sample location, record dimensions of sampling area.
8	Discard gloves.

Blank Samples

The objective of the sampling activities is to verify that cleaning procedures were effective for the exterior of the APC equipment and for the walls and floors of the RF-9 building. In order to determine the presence or absence of contamination, blank samples must be analyzed to provide a point of comparison.

Unused wipe media samples will be used as the blanks for this sampling program. ASTM Method D6966–08 requires that field blanks field are collected at a minimum frequency of five percent, with a minimum number of three samples for each batch. A total of 37 samples will be collected for this sampling event. Three blank samples will collected.

Blank samples will travel to the site with the other sample media. The containers will not be opened. The blank containers will be labeled onsite and shipped to the laboratory with the collected surface samples.

Field Duplicate Samples

A field duplicate will be collected for two sampling locations, an outside location and an inside location. The sampling locations chosen for the field duplicates are the baghouse and the building floor. For each chosen sampling location, one duplicate sample will be collected. The duplicate sample will be collected immediately adjacent to one of the regular samples for that location.

Other Miscellaneous Samples

Other miscellaneous samples will be collected as necessary to satisfy sampling conditions of other permits or to determine the method of proper disposal. Details on this sampling and the required analyses can be found in the source permits.

Sampling Equipment

The following equipment will be required for the sampling:

- Disposable, powderless, plastic gloves;
- Plastic or cardboard templates for metals sampling;
- Stainless steel, aluminum, disposable heavy-duty aluminum foil or other inert material templates for organics sampling;
- Adhesive tape to secure templates;
- Cleaning cloths to clean templates and other equipment between samples;
- Pre-wetted sampling wipes (material and solution to be selected by laboratory);
- Rigid, sealable sample containers; and
- Preprinted labels, sample log forms, and chain of custody forms.

Analytical Procedures

The analytical methods to be used for this sampling effort are detailed in Table Q-4. The table presents the referenced analytical method and sample preparation method.

Table Q-4
Sample Preparation and Analysis Procedures

Parameter	Preparation/Analytical Method
Metals (except mercury)	SW-846 Method 6010B
Mercury	SW-846 Method 7470A or 7471A
Organics (explosives)	SW-846 Method 8330

Table Q-5 specifies the target analytes for each analytical method.

Table Q-5
Target Analytes

Analyte	CAS No.	Analyte	CAS No.
SW-846 Method 6010B (Metals)			
Arsenic	7440–38–2	Lead	7439–92–1
Barium	7440–38–2	Selenium	7782–49–2
Cadmium	7440–43–9	Silver	7440–22–4
Chromium	7440–47–3		
SW-846 Method 7470A or 7471A (Mercury)			
Mercury	7439-97-6		
SW-846 Method 8330 (Explosives)			
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	Nitrobenzene (NB)	98-95-3
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	2-Nitrotoluene (2-NT)	88-72-2
1,3-Dinitrobenzene (1,3-DNB)	99-65-0	3-Nitrotoluene (3-NT)	99-08-1
2,4-Dinitrotoluene (2,4-DNT)	121-14-2	4-Nitrotoluene (4-NT)	99-99-0
2,6-Dinitrotoluene (2,6-DNT)	606-20-2	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7

Quality Assurance and Quality Control

The HWAD is committed to ensuring that the data generated during this project are scientifically valid, defensible, complete, and of known precision and accuracy. This section discusses the QA procedures that will be in place for sample collection and handling. In addition, QC objectives for the analytical methods are established.

Sample Identification

The sampling contractor will be responsible for ensuring that sample tracking documentation procedures are followed for the field sampling efforts. Documentation of all sample collection activities will be recorded on pre-printed data collection forms and sample labels. Table Q-6 provides a summary of sample documentation requirements.

TABLE Q-6
SAMPLE DOCUMENTATION REQUIREMENTS

DOCUMENT	REQUIRED INFORMATION
Sample identification label	Time and date of sampling
	Description of sample (equipment name, location, etc.)
	Unique identifier for sample
	Target analytes (metals or organics)
	Sampler's name
Sample data forms	List of all samples taken
	Time and date of sampling
	Description of sample (equipment name, location, etc.)
	Unique identifier for sample
	Sampling technique (ASTM Standard D6966–08 or D6661–10)
	Target analytes (metals or organics)
	Sampler's name

Chain of Custody

- An essential part of any sampling and analysis program is ensuring the integrity of the sample from collection to data reporting. The possession and handling of samples should be traceable from the time of collection through analysis and final disposition. Chain of custody procedures will be used to ensure the integrity of the samples by tracking possession from the time of collection to delivery to the laboratory. The custody of all samples is tracked using chain of custody forms. The following procedures will be employed: All samples will be properly labeled. Labels will be affixed to the sample container. Sample labels will be completed using waterproof ink.
- A chain of custody form will accompany all samples. When transferring the possession of samples, the individuals relinquishing and receiving the sample(s) will sign, date, and note the time on the form. This form will document sample custody transfer from the sampler, often through at least one other person, to the laboratory.

- The chain of custody form will specify the preservation requirements and the preparation and analysis methods to be used for each sample, as well as any additional information related to the sample.
- Authorized personnel will maintain chain of custody for all samples. The history of each sample and its handling will be documented from the time it is collected through all transfers of custody, until it is relinquished to the laboratory. The laboratory will then maintain internal custody according to the laboratory's procedures.

A sample will be considered to be in a person's custody if:

- It is in one's actual physical possession;
- It is in one's view, after being in one's physical possession;
- It is in one's physical possession and locked or otherwise sealed so tampering will be evident; or
- It is kept in a secure area, restricted to authorized personnel only.

Sample Handling

Samples will be collected, transported, and stored in new, unused containers, such as glass jars, which are constructed of materials inert to the analytical matrix. Only containers that allow airtight seals, such as containers with Teflon-lined lids, will be used.

Table Q-7 outlines the holding times for the analytical parameters for wipe samples. All sample holding times will be consistent with the requirements of the method(s), or an equivalent method, if the prescribed method does not specify a holding time. The holding times begin on the day of sample collection, not on the day that samples arrive at the laboratory. Samples are typically hand-delivered or shipped via overnight mail to the contract laboratory.

TABLE Q-7
SAMPLE HOLDING TIME REQUIREMENTS

PARAMETER	HOLDING TIME FROM SAMPLE TO EXTRACTION	HOLDING TIME FROM EXTRACTION TO ANALYSIS
Metals (except mercury)	180 days	180 days
Mercury	28 days	28 days
Organics (explosives)	14 days	40 days

Quality Control Parameters

QC objectives include precision, accuracy, representativeness, comparability, and completeness. Typical QC parameters include matrix spike (MS) and MS duplicate (MSD) samples, laboratory control sample (LCS) and LCS duplicate (LCSD) samples, surrogates, and duplicates. Tables Z-8 provides the project specific QC procedures for assessing accuracy and precision. The table lists the parameter of analysis, QC parameter, QC procedure, frequency at which accuracy and precision are determined, and objective.

TABLE Q-8
QUALITY CONTROL OBJECTIVES

ANALYTICAL PARAMETERS	QC PARAMETER	QC PROCEDURE	FREQUENCY	OBJECTIVE [1]
Metals (except mercury)	Accuracy	LCS	1 per batch	80-120% recovery
	Precision	Field duplicate	1 per chosen sampling location [2]	<25% RPD
Mercury	Accuracy	LCS	1 per batch	80-120% recovery
	Precision	Field duplicate	1 per chosen sampling location [2]	<25% RPD
Organics (explosives)	Accuracy	Surrogates	Every sample	50-130% recovery [3]
	Accuracy	MS	1 per batch	50-130% recovery [3]
	Precision	Surrogates	Calculate RSD for batch	<35% RSD of recovery
	Precision	MSD	1 per batch	<50% RPD [3,4]
	Precision	Field duplicate	1 per chosen sampling location [2]	<20% RPD [3]

1 RPD refers to relative percent difference. RSD refers to relative standard deviation.
2 The chosen sampling locations for the field duplicates are the baghouse and building floor.
3 Limits specified are generally applicable. Actual limits are determined by the laboratory and are compound specific.
4 If the concentrations are less than five times the reporting limit, the laboratory will be unable to control these limits.

Precision

Precision is a measure of the reproducibility of results under a given set of conditions. It is expressed in terms of the distribution, or scatter, of replicate measurement results, calculated as the relative standard deviation (RSD) or, for duplicates, as relative percent difference (RPD). RPD and RSD values are calculated using the following equations:

$$RPD = \left(\frac{|X_1 - X_2|}{\text{avg } X} \right) x\, 100$$

$$RSD = \left(\frac{STDEV}{\text{avg } X} \right) x\, 100$$

Where X_1 and X_2 represent each of the duplicate results.

Blanks

Blanks will be collected for the sampling event. Blanks will be used to evaluate the effects of contamination on results and also to define background levels for target analytes.

Table Q-9 provides the type and acceptance criteria for each stack gas blank to be analyzed. All of these blanks, as well as the laboratory method blanks for the waste samples, provide critical information on the potential contamination that may occur in test program samples. The results of blank analyses can prove very useful when attempting to understand anomalies in data, or generally higher than expected test results.

TABLE Q-9
BLANK ANALYSIS OBJECTIVES

ANALYTICAL PARAMETERS	BLANK TYPE	FREQUENCY	OBJECTIVE
Metals (except mercury)	Initial calibration blank	Following initial calibration verification	<Reporting limit
	Continuing calibration blank	Following continuing calibration verification	<Reporting limit
	Field blank	Three per sampling event	<Reporting limit
	Method blank	One per batch	<Reporting limit
Mercury	Initial calibration blank	Following initial calibration verification	<Reporting limit
	Continuing calibration blank	Following continuing calibration verification	<Reporting limit
	Field blank	Three per sampling event	<Reporting limit
	Method blank	One per batch	<Reporting limit
Organics (explosives)	Field blank	Three per sampling event	<Reporting limit
	Method blank	One per batch	<Reporting limit

Detection Limits

The sampling program will rely on comparisons to background concentrations (i.e., blanks) to assess contamination. Analytical results are expected to be at or below detection limits. Therefore, it is imperative that consistent detection limits be achieved across all samples.

Table Q-10 presents the expected detection limits for each analyte. The values in the table are laboratory reporting limits (RLs). The laboratory will be instructed to ensure that RLs are consistent for all samples for each analyte.

TABLE Q-10
REPORTING LIMITS

ANALYTE	REPORTING LIMIT (PPM)
SW-846 Method 6010B (Metals)	
Antimony	0.05 ppm
Arsenic	0.05 ppm
Barium	0.05 ppm
Beryllium	0.05 ppm
Cadmium	0.05 ppm
Chromium	0.05 ppm
Lead	0.05 ppm
Nickel	0.05 ppm
Selenium	0.05 ppm
Silver	0.05 ppm
Thallium	0.05 ppm
SW-846 Method 7470A or 7471A (Mercury)	
Mercury	0.05 ppm
SW-846 Method 8330 (Explosives)	
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	1 ppm (aqueous), 10 ppm (solids)
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	1 ppm (aqueous), 10 ppm (solids)
1,3-Dinitrobenzene (1,3-DNB)	1 ppm (aqueous), 10 ppm (solids)
2,4-Dinitrotoluene (2,4-DNT)	1 ppm (aqueous), 2.5 ppm (solids)
2,6-Dinitrotoluene (2,6-DNT)	1 ppm (aqueous), 10 ppm (solids)
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1 ppm (aqueous), 10 ppm (solids)
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1 ppm (aqueous), 10 ppm (solids)
Nitrobenzene (NB)	1 ppm (aqueous), 10 ppm (solids)
2-Nitrotoluene (2-NT)	1 ppm (aqueous), 10 ppm (solids)
3-Nitrotoluene (3-NT)	1 ppm (aqueous), 10 ppm (solids)

4-Nitrotoluene (4-NT)	1 ppm (aqueous), 10 ppm (solids)
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	1 ppm (aqueous), 10 ppm (solids)
1,3,5-Trinitrobenzene (1,3,5-TNB)	1 ppm (aqueous), 10 ppm (solids)
2,4,6-Trinitrotoluene (2,4,6-TNT)	1 ppm (aqueous), 10 ppm (solids)

Data Validation and Reporting

This section presents the approaches to be used to reduce, validate, and report measurement data. The project team will make certain that:

- All raw data packages are paginated and assigned a unique project number. Each project number will reflect the type of analyses performed (*i.e.*, metals, organics).
- The data packages contain a case narrative, sample description information, sample receipt information, COC documentation, and summary report. All associated QA/QC results, run/batch data, instrument calibration data, sample extraction/preparation logs, and chromatograms, etc., will be included in the final laboratory report.
- These data are assigned to a specific appendix in the sampling report for easy reference and data review.

Data Validation

Validation demonstrates that a process, item, data set, or service satisfies the requirements defined by the user. For this program, review and evaluation of documents and records will be performed to assess the validity of samples collected, methodologies used, and data reported. This review comprises three parts: review of field documentation, review of laboratory data reports, and evaluation of data quality.

Review of Field Documentation

Sample validation is intended to ensure that the samples collected are representative of the population under study. Criteria for acceptance include positive identification, documentation of sample shipment, preservation, and storage, and documentation demonstrating adherence to sample collection protocols and QC checks.

As part of the review of field documentation, field data sheets and master logbooks will be checked for completeness, correctness, and consistency. The following specific items will be checked:

- Sample collection date;
- Sample identification;
- Any comments that may affect interpretation of results;
- Number of required field QC samples (*i.e.*, field blanks, field duplicates); and
- Sample tracking documentation.

Review of Data Reports

The representative from each laboratory will approve all data results. The representative's signature will be included in the report. This signature will indicate that all QA/QC expectations were met. If expectations were not met, the discrepancies will be explained in the laboratory case narrative. The laboratory representatives will discuss the QA/QC issues and include the impact of these issues on the data results in the case narrative.

The project team will perform a qualitative evaluation of the reported data to verify:

- Adherence to holding time requirements;
- Completeness of target analyte lists;
- Correctness of reporting limits;
- Correctness and consistency of measurement units;
- Inclusion of necessary flags and meaningful comments regarding data;
- Adherence to specified analytical methodologies; and
- Sample tracking documentation.

Evaluation of Data Quality

The project team will review field and laboratory documentation to assess the following indicators of data quality:

- Integrity and stability of samples;
- Performance of instruments used for analysis;
- Possibility of sample contamination;
- Identification and quantitation of analytes;
- Precision; and
- Accuracy.

Data Reporting

All data will be reported in the appropriate units as applicable to the sample and the method of analysis. Wipe sample results will be reported as concentrations per unit area (e.g., µg/cm2). The same unit area (10 cm by 10 cm square = 100 cm2) will be used to calculate the concentration for each sample and the blanks. The results of each sampling location will be compared to the results of the blanks to assess possible contaminant.

Schedule for Closure [40 CFR 264.112(b)(6)]

As closure of the APE 2210 (RF-9) Detonating Items Furnace is not contemplated at this time, specific dates for closure cannot be determined. Final closure will be implemented when the Army decides to close the facility. Closure shall then commence after the 45-day notification period required by 40 CFR 264.112(d)(l).

Ninety days prior to the intended operating life of the facility, no additional hazardous wastes will be treated in the APE 2210 (RF-9) Detonating Items Furnace. In essence, this facility will shut down operations ninety days prior to the intended operating life to prevent generation of hazardous wastes.

Closure will be completed within 180 days of implementation. A general schedule for closure activities is presented in Section Q, Table Q-11.

Partial Closure Activities *[40 CFR 264.112(b)]*

Partial closure is not anticipated for the HWAD APE 2210 (RF-9) Detonating Furnace at this time. If future circumstances require HWAD to close a portion of the unit or close it for a period of time, a revision in the closure plan will be submitted to the appropriate regulatory agencies within the required time limit.

CERTIFICATION OF CLOSURE

Upon completion of closure, the owner/operator and a registered independent professional engineer will certify that closure of the facilities was completed in accordance with the specification contained in the approved closure plan and with 40 CFR 264.115. This certification will be forwarded to the U.S. EPA.

TABLE Q-11 CLOSURE SCHEDULE RF-9

TIME PERIOD (WEEKS)	ACTIVITY DESCRIPTION
Weeks 1 through 4	Perform testing and analyses in accordance with approved plan
Weeks 1 through 6	Decontamination and/or removal of equipment, appurtenances, and structures in accordance with approved plan
Weeks 4 through 8	Prepare Post Closure Plan (if wastes are likely to remain at the site after completion of closure activities) and submit to NDEP and the U.S. EPA for approval
Weeks 4 through 8	Remediation of contamination in accordance with approved plan
Week 9	Prepare and file closure certification with NDEP and the U.S. EPA
Week 10	Commencement of the Post Closure activities defined in the Post Closure Plan

SECTION R. PROCESS INFORMATION FOR PODS

INTRODUCTION

The Plasma Ordnance Demilitarization System (PODS) is designed to safely destroy a wide variety of obsolete and unserviceable munitions (not otherwise treatable in the RF-9) and contaminated soils, scrap metal and other RCRA wastes. Most of the materials that will be treated in the RF-9 and PODS are considered RCRA hazardous waste due to their explosive (reactive) components. This unit will allow the Army to treat wastes that cannot be effectively treated in the RF-9 or cannot be reduced, reused, or recycled.

PODS is designed to safely destroy a wide variety of obsolete and unserviceable munitions not otherwise treatable in the RF-9 (or that cannot be reduced, reused, or recycled), contaminated soils, scrap metal and other RCRA wastes. Most of the materials treated in the PODS are considered RCRA hazardous waste due to their explosive (reactive) components. Some materials may also be hazardous due to metal content or principle organic hazardous constituent (POHC). Section S provides a description of the wastes to be treated by the PODS, or references the appropriate sections of the PODS CPTP.

Sections U describe the design and operation of the PODS. Additional and more detailed descriptions are provided in the PODS Comprehensive Performance Test Plan (CPTP) Appendix E.

PLASMA ORDNANCE DEMILITARIZATION SYSTEM (PODS) *[40 CFR Part 264 Subpart O]*

The PODS consists of a plasma furnace with air pollution control equipment and a water treatment system. The plasma furnace consists of computerized controls, a primary processing chamber, a slag collection chamber, a plasma arc torch, and a feed system. The air pollution control equipment consists of organic, volatile metal, acid gas, particulate and oxides of nitrogen destruction/removal process steps. The water treatment system provides removal of both suspended and dissolved metals.

Additional and more detailed descriptions are provided in the following sections.

Engineering Design of PODS

PODS Technology Description

The PODS is designed to safely destroy a wide variety of obsolete and unserviceable munitions using plasma technology. These materials are considered RCRA hazardous waste due to their explosive (reactive) components. Some materials may also be hazardous due to metal content or POHC. One of the advantages that PODS has over conventional incineration technologies is that it can successfully immobilize heavy metals in the slag.

Plasma technology can treat heterogeneous unconsolidated feeds, including organic materials, sludge's, metals, rock, concrete soils, and other types of wastes, such as whole items that contain hazardous organic/inorganic materials as part of their components. This technology can treat heterogeneous non-sorted waste directly or can be used as part of an integrated waste treatment system to stabilize the final waste from other treatment processes.

The United States Army plans to use the PODS to treat pyrotechnic and other ordnance at the Western Area Demilitarization Facility (WADF) at the Hawthorne Army Depot (HWAD). The PODS is located in Building 117-2.

PODS Process Description

Plasma Furnace

The PODS furnace consists of a sealed primary processing chamber (PPC) in which plasma torches supply thermal energy to melt inorganic materials, and combust organic materials through high temperature oxidation. From the PODS slag collection chamber, a treated glassy slag and off gas are generated. The off gas is treated forming additional waste streams of discharged solid particulate and treated flue gas. Off gas scrubber water is treated to form a water treatment sludge and treated water. Waste streams will be discussed later and in more detail Section R, Figure R-1.

The furnace operates as a stationary hearth furnace with an almost continuously moving torch. Material in the hearth is heated by a plasma torch to conducting temperature, which creates an electrically conductive molten bath that is ready to receive the waste input. Ordnance and slag forming materials (soil, iron, and/or slag enhancing additives) are fed into the PPC hearth during processing by conveyor feeders.

At the point when the hearth becomes full, feeding is stopped. The pool is thoroughly heated and treated with the plasma torches to ensure oxidation and mixing.

The hearth is then tapped and the molten slag is poured into slag molds. The slag molds are positioned below the PPC in the slag collection chamber. The plasma torch is used during pouring to ensure that the pool near the tap hole remains molten.

The gas generated by the processing operation is drawn into the air pollution control equipment from the top of the dome of the PPC.

Air Pollution Control Equipment (APCE)

The inorganic fraction of the processed ordnance goes into the slag, while the organic fraction is combusted and converted to off gas. The PODS PPC is maintained at a slight negative pressure, drafting off gas through a secondary combustion chamber (SCC) for assurance of combustion of organic materials. The APCE cools the off gas, and then removes volatile metals, acid gas, particulate, and NO_x. A gas sampling station and continuous emissions monitoring system (CEMS) monitor the thread off gas prior to its release to atmosphere see Section R, Figure R-2.

The high temperatures of the molten slag combined with high stoichiometric ratios ensure the combustion of organic contaminants is performed in the PPC. A SCC was added to the process to ensure any products that may escape combustion in the PPC will be burnt in the SCC. The SCC will also trap large particulate (clinkers) that may be present in the off gas stream.

The hot gas exciting the SCC is quenched with fresh water, and then scrubbed for volatile metals and acid gas removal. A second scrubbing with clean, treated water removes entrained particulate. Water used in this wet off gas system as ―scrubber liquor" is constantly blown down to a water treatment system where it is cleaned prior to discharge. A baghouse provides backup for particulate removal. A blower keeps the untreated gas stream at a negative pressure in the off gas equipment and the PCC and maintains flow. A NO_x removal unit removes nitrogen oxides from the off gas before it is released into the atmosphere.

The PODS has a low volume of emissions and because of this the APCE is considerably smaller than many other incinerator designs. The PODS off gas flow rate is relatively small compared to the waste stream processing rate for several reasons:

- Plasma arc torches use a small amount of gas (air) compared to a fuel burner which uses combustion air and fuel for a burning process,
- Oxygen is used for oxidation of organics in the PPC and SCC which also limits gas flow as compared to air,
- The off gas is cooled which further reduces the off gas volume, and
- The PODS PPC and off gas system are designed and constructed with relatively tight chambers. Only a small amount of air will leak into this process as compared to other incinerators configurations.

Water Treatment System

The ―blown down" scrubber liquor from the wet air pollution control equipment contains particulate and dissolved metals. The particulate and dissolved metal is removed by the water treatment system with chemical precipitation and is followed by a solid/liquid separation. Treated water is combined with blow down from the plant cooling water system and is collected in storage ponds for use in roadway dust suppression.

PODS Equipment Description

Major components of the PODS are:

- Feed system;
- Primary Processing Chamber (PPC);
- Slag Collection Chamber;
- Torch;
- Secondary Combustion Chamber(SCC);
- Air Pollution Control Equipment (APCE);
- Stack Gas Continuous Emissions Monitoring System (CEMS);
- Scrubber Liquid Water Treatment System, and

- Controlling Computer

Feed System

The soil and ordnance conveyor feeders consist of separate conveyors with individual pockets to hold discrete items such as ordnance, metal pieces, or loose materials. Mass monitors weigh feed material. Ordnance items pass through a mass monitor located at the discharge end of the conveyor, above the feed chute funnel. The ordnance mass monitor reports to the control computer. Programmed interlocks halt the feed conveyor if excess weight is monitored. Soil and iron are weighed by mass monitors located between the respective storage hopper and the conveyor. Each conveyor empties into separate feed chutes which have double valves in series which provide isolation from the primary processing chamber. The feed chutes combine below both double valves sets. A single water cooled feed port penetrates the PPC dome. Feed material fall straight down into the furnace, with no feed chute mounted within the chamber, to the corner of the hearth opposite the tap hole and off gas port.

Each set of valves located in the feed chutes operate in a sequence. The contents of an individual conveyor pocket drop on top of the first valve. Then, the first valve opens and the items fall into the space between the two valves. The first valve closes, then the second valve opens and the feed item travels down to the hearth of the PPC. The second valve closes and the sequence is started over again. Note that only one of the two valves is open at one time, limiting the quantity of air drawn into the PPC.

The valves associated with each feeder differ slightly because the feed material form and consistency for each feeder is different. The soil feeder valves are a flap valve design. The valve disk tilts to allow the fine material to slide off the upper surface of the valve and not collect on the surface which could jam the moving parts. The ordnance feeder valves are sliding gate valves. The valve gates slide to open due to the limited space between the valves. This allows the valve surface to move out of the way to allow long ordnance devices to drop without pinching devices between the valves.

Primary Processing Chamber

The PPC consists of a fixed crucible section, a refractory lined spool piece and a refractory lined domed, figures illustrate arrangement and sectional views of the furnace. The internal diameter of the chamber is about 6 and 1/2 feet after the refractory has been installed. The external diameter is almost 8 feet. The spool piece section is 4 feet high. The dome adds another 4 and 1/2 feet of internal height and the crucible adds another foot in depth for slag. The internal volume of the chamber is 284 $ft.^3$ and 19 $ft.^3$ in the crucible. A refractory packed "transition piece" is located at the bottom of the spool piece and over the crucible to provide a smooth transition between the cylindrical spool piece and the six sided top of the crucible. The types of refractory in the PPC for the Plasma Ordnance Demilitarization System are as follows Section R, Figure R-3:

- Upper section – Harbison Walker 14-85 castable refractory
- Lower section – Ruby SR firebrick
- Transition piece – Harbison Walker Ruby plastic

The crucible is fabricated with water-cooled, carbon-steel plates capable of maintaining structural integrity when full of slag and processing ordnance at the rated temperature. The crucible is electrically grounded to allow transferred torch operation. A water-cooled port in the crucible acts as the tap hole when pouring slag. The crucible will not have a refractory lining; instead, the cooling passages through the crucible panels will be designed to sufficiently cool the crucible, assuming molten material is in contact with the hot face of the panel. The slag is expected to solidify, forming an insulating barrier over a majority if the crucible during operation.

A water cooled, carbon steel, refractory lined spool piece provides volume to the furnace, allowing burnout of the ordnance reaction products, allowing surge volume for the sudden expansion of gases as ordnance burns or explodes, and removes excess heat of combustion from ordnance that has a high heat generation rate. The internal volume of the PPC has been sized for a minimum gas residence time of greater than 2 seconds. A gas residence time of 2 to 10 seconds will exist dependent on feed stock gas generation. Eight seconds is typical for most feed materials. The design surface temperature of the refractory is 3,000°F. Ports for mounting oxygen lances, camera(s) and miscellaneous instrumentation have been provided Section R, Figure R-4.

The dome is refractory lined carbon steel. Its main function is to provide mounting for the transferred and non-transferred torches, feed entrance, off gas exit, and camera ports needed to operate the furnace. Primary chamber gas temperature and pressure are measured near the top of the chamber.

Oxygen is delivered to the chamber from a single injector. A pinhole camera is mounted to allow viewing of the arc, the molten slag (melt), and the processing feed material inside the chamber. A pressure relief valve is installed on the primary chamber to relieve pressure should it exceed 15 pounds per square inch gauge (psig).

Slag Collection Chamber

The slag collection chamber is located directly below the primary chamber. The slag chamber is an enclosed carbon-steel chamber to ensure that personnel are not exposed to hot materials. This chamber is partially water-cooled and contains the automated mechanisms needed to tap the pour hole into the crucible with a tapping lance and guide the molten slag into a steel slag mold which contains the hot slag prior to the solidification of the slag.

The slag collection chamber contains two slag molds at one time on a conveyor system that moves the slag mold for positioning. The empty slag mold will be loaded onto the conveyor through the loading door in the back of the chamber. The mold will then be conveyed to the pour position. After the pour, the hot, full mold/drum will be removed to the cooling position where the molten slag will be cooled and solidified into a stable solid glassy waste product. Once solidified (after approximately 60 minutes), the mold is removed via a door opposite the loading door. The two mold design ensures that an empty mold is in the pour position at all times.

A ―burning bar” tapping mechanism for clearing the tap hole of solidified slag is mounted on the side of the slag collection chamber. The ―burning bar” mechanism consists of a lance torch mounted to a positioning mechanism. The tapping lance is a steel casing packed with special aluminum or magnesium wire. Pressure regulated gaseous oxygen is introduced to the cold end of the bar. Oxygen flows through the wire packing to the hot end of the bar. The bar is then ignited. In the presence of oxygen, the wire packing burns extremely hot. The oxygen flow rate is varied to control burn rate and temperature. The tapping lance bar is a commercial product used in foundries and steel mills to open tap holes and by the construction industry for specialty demolition steel and concrete structures. The tapping lance is a consumable item with additional segments being added to the cold end. The tap hole is normally plugged with solidified slag and the burning bar is needed to open this port.

Two maintenance doors are mounted on the slag collection chamber wall opposite the tapping mechanism for maintenance to crucible, conveyors, and other equipment contained within the chamber.

A shroud encloses the crucible and seals the collection chamber to the PPC. The slag chamber is also fitted with purge air capability which allows the chamber to be fully purged prior to opening of the slag access doors. All gases from the cooling slag, the tapping lance, and all slag chamber purges will be routed to the PODS control and interlock system to ensure personnel and equipment safety.

Torches

The PPC has one torch which is a universal torch. The torch can be operated in transfer mode or non-transfer mode, mounted on and penetrating through its dome. The torch is equipped with 3-axis positioning mechanisms in the transfer mode, ensuring that both the torch can reach the entire surface of the hearth. The transferred arc torch consists of an anode that is the positive termination point for the electric arc. The transferred arc torch generates heat by passing a sustained electrical arc between the torch anode and the molten, electrically-conductive hearth contents. The non-transferred mode consists of an anode and cathode internal to the torch. The non-transferred torch generates heat by sustaining an electric arc between the torch anode and cathode.

Helium is used as the torch plasma gas for torch ignition because it decreases the voltage necessary to initiate an arc discharge, and immediately after ignition, the torch gas is switched to air. Each torch is water cooled. A closed loop de-mineralized water cooling system cools both torches. A separate gas supply system and direct current power supply is provided for each torch. During normal operation, one torch will be operated while the other is shutdown. It should be noted, however, that the control system supports dual torch operation.

The non-transferred mode is used for startup to create a conductive molten pool. It can also be used for treatment of the molten pool prior to pouring if required. Ordnance can be fed with either torch running. When high energy ordnance is being fed, the smaller, non-transferred mode is operated due to its lower power rating. This allows the energy inherent in the ordnance itself to provide most of the heat required by the process. The plasma torch in this circumstance is used only to ensure that the slag pool remains molten and stirred.

Secondary Combustion Chamber

The SCC is situated between the PODS and the air pollution control equipment, but may be considered part of the APCE as the SCC burns off gas thereby reducing air pollution. The SCC is connected to the PPC dome through a refractory lined pipe. The SCC interior is refractory lined and the internal dimensions give a volume sufficient to maintain a minimum off gas residence time of two seconds before exiting the SCC.

The off gas enters the SCC tangentially and heat from a diesel/oxygen fired burner enters horizontally. The inlet section of the SCC is designed to mix the combustion gases with the burner output before passing through a neck into the main body of the SCC before exiting.

Air Pollution Control Equipment

The air pollution control equipment consists of an off gas quencher, packed bed absorber, high energy scrubber, demister, superheater, baghouse, induced draft blower, and NO_x removal equipment.

The quencher uses fresh water to cool the hot combustion gases in the upper section of the quencher. Recirculated scrubber liquor washes the quenchers' lower walls to prevent the plating of solids and provides additional cooling of the off gas.

The absorber also removes heat from the off gas and provides volatile metal and acid gas removal. It is a packed bed scrubber design with the off gas flowing downward through the packed bed. The quencher and absorber share a common sump and appear as one unit.

The recirculated scrubber liquor has a caustic solution of sodium hydroxide mixed into the liquor stream prior to being sprayed into the absorber. The pH of the common sump is monitored to automatically maintain sump pH. This scrubber liquor is cooled with a chiller prior to the introduction to the absorber.

The high energy (hydrosonic) scrubber is a wet scrubbing system in which the energy for the cleaning the off gas is provided by the flow of high-pressure gas (air). The ejector nozzle is fitted with a water ejector ring through which fresh water is introduced. A supersonic shock wave is developed at the scrubber throat, breaking up the scrubbing liquid into fine droplets and turbulently mixing the gas and liquid. The fine droplets capture particulate down to the submicron range. The liquid coalesce in a mixing tube (agglomerator) into larger droplets which are removed downstream in a cyclone separator.

The water from the hydrosonic scrubber and moisture separator is drained back to the quencher/absorber sump. The absorber sump level is maintained by draining off the excess liquor through a level control valve to a holding tank that is part of the scrubber water treatment system. This water is treated to reduce dissolved and suspended metals.

A superheater reheats the off gas leaving the moisture separator, heating the gas above the dewpoint before it enters baghouse. The baghouse is a backup to the hydrosonic scrubber to trap particulate which may have evaded capture. The baghouse has been equipped with an air pulse-jet cleaning system. Particulate collected on the surfaces of the bags will drop into a hopper. The amount of particulate collected in the baghouse is expected to be small, as approximately 95 percent of the particulate is removed by the hydrosonic scrubber.

Induced Draft Blower

A blower is located downstream of the air pollution control equipment to provide motive force for the gases and keeps both chambers and air pollution control equipment at a vacuum up to 30 inches water column (W.C.). Because of the system upstream the blower is under vacuum, any gas leaks in the system will result in air being drawn into the system rather than combustion gas leakage to the atmosphere. The blower is controlled to maintain vacuum in the PPC.

NO_x Removal

NO_x is removed from the off gas by a selective catalytic reduction nitrogen oxides removal system. A reheater heats the gas to catalytic temperature of approximately 500°F prior to entering the NO_x removal unit. The heated gas flows to the catalytic reactor where anhydrous ammonia is injected. The ammonia reacts on the catalyst with NO and NO_2 to form elemental nitrogen and water.

Continuous Emissions Monitoring System (CEMS)

After exiting the NO_x removal equipment, gas samples are drawn from the gas sample station for the continuous emissions monitoring system (CEMS) mounted on the exhaust stack. The CEMS analyses include carbon monoxide (CO), oxygen (O_2), sulfur oxide (SO_x), and oxides of nitrogen (NO_x). See Appendix E for more details on the CEMS.

Scrubber Liquid Wastewater Treatment System

Scrubber liquor blowdown is stored in the water treatment equalizing tank. This tank also receives rejected water from the filter press, the sand filter, and any water split onto the floor sump.

The first two stages of water treatment use a liqui-solid separation by coagulation, flocculation, and precipitation. This process chemically makes the metals insoluble and flocculates the minute particles into a large dense mass that readily settles.

The first stage is operated at elevated pH to soften the water, remove calcium, magnesium, sulfate, carbonates and heavy metals. The precipitated solids are removed in the initial clarifier. The pH is then reduced to near neutral pH to precipitate aluminum, trivalent chromium and other allotropic metals. The precipitated metals are then removed in the secondary clarifier. The clarifiers are high rate, circular up-flow style clarifiers which accumulate solids in the bottom. A motorized rake aids in removing the solids which are pumped to the filter press. The effluent is drained off the top of the clarifiers onto a gravity fed sand filter.

Collected solids are continuously pumped from the bottom of the clarifiers for subsequent compaction and dewatering in a pressurized filter press. The filtrate is returned to the equalization tank at the beginning of the process. The dewatered sludge is dumped into a container and will be placed in a 55 gallon poly drums that are sealed to prevent the sludge from spilling and drying.

The clarified liquid is further filtered through a gravity flow and sand filter. Any small floccules that exit the clarifier are composed of millions of molecules, have considerable mass and will easily be captured in the sand filter. If these particles were subject to the high shear forces of a centrifugal impeller, the particles would disintegrate and would not easily reform before entering the sand filter. The sand would not be able to capture or retain molecular size particles. This gravity flow sand filter provides a significant advantage in removing the metallic precipitates.

Water leaving the sand filter is discharge to holding ponds for use in roadway dust suppression.

Controlling Computer

Various process parameters of the PODS are controlled, monitored, and indicated by a PC based computer system located in the central control room. The controlling computer has the capability to control PODS operations in programmed sequences, provide process information, monitor interlocks, instrument set points, and control requirements and provide alarms in the event of uncommon operations. All conditions that potentially endanger personnel, equipment, or emissions compliance are addressed automatically by the control system.

The programming of control software and integration of the overall PODS control scheme has been conducted as an integrated system. The process is programmed for many parameters, equations, and other inputs or information needed for furnace operation. The system controller has the capability for self-diagnostic to pinpoint any existing or potential problems, such as sensor loss or equipment failure.

PODS Process Operation

Startup

PODS startup consists of initiation of auxiliary systems, verification of critical PODS cooling flows and fluid levels, and checkout of critical interlocks.

The SCC and non-transferred torch are started and the entire process is brought up to operating temperature. Once a molten pool is formed, the transferred torch is started to deepen the molten pool. During this time oxygen levels in the PPC, SCC and off gas are controlled to maintain oxidizing conditions. Finally, soil and iron feeding is started on an intermittent rate to prepare the slag pool for ordnance processing and personnel will load the ordnance feeder in preparation for ordnance processing operations. A detailed startup checklist is provided. Appendix E contains detailed procedures for verifying critical interlocks and automatic waste feed cut off functions.

Processing Operations

The PODS operator will determine when slag pool is ready for ordnance processing and will verify all automatic waste feed cutoff parameters are met. The feed rates will be increased to production processing rates as the process is established. When the heat generation from ordnance processing increases to the point the transferred torch is no longer required, the operator will switch to the non-transferred torch. PPC temperatures will be maintained by control of ordnance feed rates, attemperation water injection into the PPC, and use of the lower powered torch.

Ordnance and soil will be processed at ratios and rates required for specific waste items. Oxygen levels and all off gas parameters will be maintained within the RCRA and air quality permit's parameters. When the hearth is full, ordnance and soil/iron feeding will be stopped. The slag pool will continue to be treated to ensure oxidation, mixing, and processing of ordnance within the slag pool.

After treatment, the slag will be poured into slag molds in the slag collection chamber as described in the process and equipment descriptions using the oxylance. After the pour has been completed, the ordnance processing will resume. The filled slag mold will be moved into the cooling position and replaced with an empty slag mold.

When all scheduled ordnance processing has been completed, the PODS will be shutdown by first stopping all feed into furnace. The molten slag is treated as described for a pour. Some or all of the processed slag will be left in the hearth, and then cooled, providing a slag layer for a cold startup later. The torch is secured first, and then the SCC is secured. When the furnace has cooled sufficiently (to below 300°F), the APCE and support systems are secured.

PODS Waste Streams

The PODS generates four waste streams: slag, particulate from the SCC and baghouse, water treatment system sludge, and excess water. Each of these wastes is discussed below. Detailed waste analysis is specified in Appendix B.

1. Slag

The slag will be in a hard vitrified form in slag molds. Samples will be collected and analyzed to ensure the material is below the threshold hazardous levels listed in 40 CFR 261.24 Table 1. The slag drums will be removed from the slag collection chamber and allowed to cool in a cooling area until safe to handle. Storage and disposal will be per all applicable state and federal regulations.

Slag handling methods:

Slag Collection

The slag collection chamber is located directly below the primary chamber. Slag molds are designed to flow into another slag mold if overfilled. A conveyor system moves the slag mold into position for pouring and out for mold removal through the slag access doors. The slag in the mold is cooled until solidified into a stable solid glassy waste product. The slag mold is removed while the slag is hot, and then stored in a hot storage designated area for cooling. Experience has shown off gassing of the hot slag has not been a problem. When the slag cools fully (after approximately 24 hours), the slag is transported to a temporary storage area awaiting final disposition. In the event that the slag exceeds regulatory limits, it can be crushed using non-PODS equipment to facilitate additional thermal processing in the PODS. Alternatively, the slag will be shipped off site as a hazardous waste if it is deemed as such.

Slag Mold Compromise:

The slag product is a solid glassy type material. If the slag mold is damaged during handling, only slag material that has been shattered into small fragments could leak, not the majority of the contents of the mold. The shattered slag is reasonably safe product not requiring any safe handling procedures or PPE other than gloves as the product is close to shattered glass in nature.

2. SCC Particulate and Baghouse Particulate

These waste streams have been combined as the form and makeup of both will be very similar. The SCC particulate will be of larger particulate size and mostly from refractory scale. The amount generated will be small (less than 1% of the off gas particulate) and need only be removed during maintenance inspections. The baghouse particulate will be small particulate that has not been trapped in the scrubber liquor. This stream is expected to be less than 5% of the off gas particulate. The particulate collected on the bags surfaces will be dislodged by the baghouse cleaning air pulse cycles and collected in the hopper. This hopper is equipped with a slide valve and a drum closure lid to allow transferring particulate into drums without spilling. Both the SCC and baghouse particulate are expected to contain metals. Both streams will be collected and contained, and then the storage and disposal will be per all applicable state and federal regulations.

Particulate handling methods:

Particulate Collection:

Both collection points are expected to be of small quantities. The removal of this material may be removed as a batch during maintenance periods. Analysis of this particulate should match the material elements processed and it is expected to fail TCLP. The potential to recycle this waste stream back through the melter exists, but due to the quantity involved this material is typically sent to a treatment/storage/disposal (TSD) facility.

Particulate from the SCC will be removed after the PODS has been completely shutdown and cooled down as part of periodic maintenance requirements. Personnel performing this operation will wear appropriate PPE. The particulate will then be collected, bagged and tagged, containerized into a DOT-approved container, sampled and disposed of per state and federal regulations.

The baghouse hopper is equipped with a slide valve and a drum closure lid to allow transferring particulate into drums without spilling the use of shop vacuums with high quality filters should be used to collect fugitive dust. Any bags should be stored in protective containment (drum or suitable box) for storage and shipping.

Particulate Container Compromise:

The particulate is a dust form and in the event the container is compromised, personnel involved with its cleanup must use appropriate PPE. The ruptured container should be placed in an overpack container, with material escaping collected and placed in the new container as well. This material should be collected in a manner that generates the least dust, such as a shop type vacuum equipped with HEPA filter.

3. Sludge From Scrubber Water Treatment System

The sludge from the scrubber water treatment system will consist of metals as well as salts such as calcium, magnesium, sulfates, and carbonates from the wastewater removed through coagulation, flocculation, and precipitation. This process will form sludge at the bottom of the two clarifier tanks.

The sludge will then be pumped to a filter press for dewatering. The liquid stream from the filter is recirculated to the front end of precipitation process. The resultant filter cake will contain approximately 50% solids. This filter cake will be analyzed to determine whether it is hazardous or nonhazardous. If nonhazardous, it is proposed to dispose of it in the HWAD landfill. If the sludge is greater than or equal to 50% water, it will not be sent to the HWAD landfill. If hazardous, it will be either be reprocessed through PODS or disposed offsite as a hazardous waste. In either instance, the sludge filter cake should not pose any adverse effects to the public,

Sludge handling methods:

Sludge Collection:

The dewatered sludge from the filter press is transferred into a hopper located below the press. The sludge will be transferred into cubic yard boxes or sealed bags to prevent the sludge from spilling or drying. The slag will be shipped offsite as a hazardous waste if it is determined to be a hazardous waste.

Sludge Containment Compromise:

The sludge will be in a dewatered state, as long as this sludge is not allowed to dry fully, dust will not be a major problem. If the compromise is on a soil surface, the sludge collection should include removing contaminated soil along with sludge to prevent groundwater contamination.

4. Excess Water

Excess water, following metals removal, will be discharged to holding ponds.

Proposed PODS Permit Monitoring Points

Control and monitoring systems for PODS will be operational during the Mini Burn and Comprehensive Performance Test. The systems are designed in a layered hierarchy and consist of four parts, each providing specific levels and types of control and protective response. The four levels are:

- Annunciated Alarms and Warnings
- Automated Protective Interlocks
- Emergency Shutdown Sequence
- Automatic Waste Feed Cut Off (AWFCO)

The annunciated alarms and warnings alert the operator to process conditions that are approaching action levels but that do not require immediate action. The annunciated alarms and warnings are intended to provide the operator time to stabilize process conditions before they reach a more serious state. Response to alarms and warnings is based on operator experience and administrative procedures.

The automated protective interlocks secure the process in a safe condition in response to any circumstances that threatens equipment integrity or personnel safety. These actions will be taken automatically by the PODS control computer, independently of the system operator.

The Emergency Shutdown Sequence (ESS) is actuated either manually or automatically by the control computer. Manual actuation points are located in the control room and at selected locations in Building 117-2. The ESS will be hardwired to bypass the process control computer in case of manual actuation. The ESS takes all process equipment to the fail-safe condition. The ESS is intended for computer failure and other emergencies.

The Automatic Waste Feed Cutoff (AWFCO) has been designed to ensure that all APCE is operating within design parameters, ensuring that emissions comply with permit requirements. The AWFCO is actuated automatically by the control computer. The AWFCO stops both feeders until the condition clears and must be reset by the operator, preventing processing operations outside the permitted operating envelope. The proposed AWFCO parameters and setpoint are presented in Section R, Table R-1. Appendix E identifies the process instruments used to implement the AWFCO and also presents instrument specifications.

Ordnance Feed Rate

The operator will input, from the standard operating procedure, the national stock number (NSN) for the ordnance, the number of items to be placed in each pocket of the feed conveyor, and the total weight per pocket into the process control computer. The computer will use the information entered to access programmed lookup tables to calculate the maximum allowable feed rate for that ordnance in pounds per hour (lbs/hr). Feed weight and maximum weight per cell are measured in lbs/hr. The ordnance NSN, items per pocket, and maximum allowed ordnance feed rate will be displayed for the operator.

During the operation, the contents of one belt cell will be dumped to the weight cell, and measured weight will be compared with the maximum allowed cell weight. If the measured weight is less than or equal to the maximum weight, the weight cell will dump the ordnance to the ordnance orientation funnel, and feed processing will be allowed to continue. The computer will compare actual ordnance feed rate with the maximum allowed ordnance feed rate. If the actual feed rate exceeds the maximum allowed feed rate, an AWFCO is initiated.

Primary Processing Chamber (PPC) Pressure

The PPC will operate under a maximum of -0.05 inches of water created by the induced draft blower. PODS and its air pollution control equipment have been designed as a tight system, with the PPC and SCC designed for pressures up to 15 psig. An upper pressure limit for the PPC overpressure limits is not reached. A 60-second time delay prevents this pressure limit from inadvertently stopping the feeder. The feeder feeds the PPC in pockets of ordnance in ―mini-batches.” Ordnance that is burning in the PPC generates pressure at a rate greater than the offgas system can initially remove it and can cause pressure in the PPC to increase for a short time. The time delay allows continuous feeding and ensures ensuring the PODS is operated within its RCRA and air permit limits. This 60-second delay also applies to the following components:

Primary Procession Chamber Temperature

In order to minimize the use of specialty construction materials both in the PPC and in downstream equipment, the PPC is designed to remove a significant portion of the energy released during the combustion of energetic materials. The surface area of the PPC and the design of the PPC cooling water passages support this design consideration. The PPC refractory is designed to control the amount of energy transmitted to the cooling water passages, and specifically, control the temperature gradient across the PPC carbon steel liner.

Due to the high heat removal capacity of the PPC, it is considered impractical to size the plasma torch to preheat the PPC to operational temperatures normally encountered in combustion systems prior to introducing wastes. Normal combustion zone temperatures in the PPC are not reached until waste processing is initiated. Under these conditions, the operator has limited capability to control minimum PPC temperatures. Once waste is being processed, limiting feed rate or injection of atemperation water controls maximum temperature in the PPC.

To compensate for these limitations in controlling minimum PPC temperature, the Secondary Combustion Chamber has been sized to ensure all gases (up to maximum rated design) can be heated to a minimum of 1800°F and held for a minimum of 2 seconds.

As a result, a minimum PPC temperature is not being proposed for incorporation into the AWFCO. The conditions for effective organic destruction will be ensured by the proposed SCC minimum temperature AWFCO.

Secondary Combustion Chamber Outlet Temperature

The SCC is designed with a minimum 2-second residence time. The low temperature automatic waste feed cutoff is proposed to ensure that all combustion gases are treated at high temperature for at least 2 seconds. A 60-second running average is being proposed.

Quench Water Flow

The quencher cools gases as they exit the SCC by spraying water into the hot gas stream via a spray nozzle. To ensure adequate performance of the quencher, an automatic waste feed cutoff is proposed for low flow of quench water. A 60-second running average is being proposed. This AWFCO replaces an absorber sump blowdown rate AWFCO.

Quench Water Pressure

To ensure the wear of the quench water spray nozzle does not impair its performance; an automatic waste feed cutoff is being proposed for minimum quench water pressure. A 60-second running average is being proposed. This parameter is based on vendor recommendations and will not be demonstrated during the comprehensive test.

Scrubber Liquor Absorbent Sump pH

The quencher and packed bed share a common sump. Caustic liquid is injected into the scrubber water before it flows into the packed bed scrubber. The pH of the scrubber liquor will be monitored with redundant probes located in a recirculation line off the discharge of the scrubber liquor pumps. An automatic waste feed cutoff low pH has been proposed to ensure effective removal of acid gas. A 60-second running average is being proposed.

Absorber Solution Flow

The absorber removes acid gases and volatile metals from the gas stream by contact with chilled scrubber solution and absorber packing material. To ensure adequate liquid-to-gas ratios, an automatic waste feed cutoff for minimum absorber solution flow is being proposed. A 60-second running average is being proposed.

Absorber Solution Pressure

To ensure that wear of the absorber solution spray nozzle does not impair its performance, an automatic waste feed cutoff for minimum quench water pressure is being proposed. A 60-second running average is being proposed. This parameter is based on vendor recommendations and will not be demonstrated during the comprehensive test.

Absorber Offgas Exit Temperature

The AWFCO for the outlet temperature of offgas from the packed bed is set to ensure effective removal of volatile metals. Development testing has shown this parameter as an excellent indication of the performance of the quencher and absorber. A relatively low temperature waste feed shutdown has been specified. A 60-second running average is being proposed.

Absorber Sump Blowdown Rate

To ensure that the total suspended solids and total dissolved solids content of the absorber solution remains below critical levels, a minimum amount of solution must be blown down from the scrubber sump to the wastewater treatment process. The quencher, absorber, and high-energy scrubber all share a common sump. Since the quencher and high-energy scrubber are operated by injecting fresh water and a parameter for waste feed cutoff has been proposed for the flow of water to these two devices (see Quench Water Flow), a constant influx of water is guaranteed to the absorber sump. A valve controls the water level in the sump by varying the blowdown rate. Because of this configuration, blowdown flow to the absorber sump is controlled by the flow to the quencher and high-energy scrubber, both of which will trigger automatic waste fed cutoffs. No direct flow rate of blowdown from the absorber is being proposed as an AWFCO.

High-Energy Scrubber Atomizing Pressure

Pressure drop across the hydrosonic scrubber is not an essential control parameter as a result of the design basis of its operation. The scrubber is a wet scrubbing system that obtains energy for cleaning the flue gas from the flow of high-pressure gas (air). The ejector nozzle is fitted with a water ejector ring used to introduce fresh water. The interaction of the injected water and high-pressure air breaks up the scrubbing liquid into fine water. The interaction of the injected water and high-pressure air breaks up the scrubbing liquid into fine droplets and turbulently mixes the gas and liquid. The fine droplets capture particulate down to the submicron range. The liquid coalesces in a mixing tube and then into larger droplets, which are removed downstream in a cyclone-type moisture separator equipped with a mesh-type demister.

Consequently, the total efficiency of the hydrosonic scrubber depends almost totally on the ratio of gas flow to saturated gas flow, with scrubber pressure having an inconsequential effect on efficiency. In fact, rather than a drop in pressure across the scrubber, there is actually a rise in pressure that helps the blowers maintain a vacuum in the system.

The scrubber requires a minimum air pressure for efficient operation. A low air pressure AWFCO has been specified for the hydrosonic scrubber to ensure effective removal of particulate. A 60-second running average is being proposed. The AWFCO will be used in place of a minimum scrubber pressure drop AWFCO.

High-Energy Scrubber Air Flow

The airflow to the high-energy scrubber shatters incoming water. To ensure optimum scrubber performance, an automatic waste feed cutoff is proposed to airflow to the high-energy. A 60-second running average is being proposed.

High-Energy Scrubber Water Flow

An AWFCO for low flow of water to the hydrosonic scrubber has been provided to prevent buildup of particulates and salts in the scrubber solution. This low limit ensures a minimum blowdown is provided. A 60-second running average is being proposed.

High-Energy Scrubber Solution Pressure

To ensure that wear of the spray nozzle for the high-energy scrubber solution does not impair its performance, an automatic waste feed cutoff is being proposed for minimum scrubber waste pressure. A 60-second running average is proposed. This parameter is based on vendor recommendations and will not be demonstrated during the comprehensive test.

High-Energy Scrubber Pressure Drop

The high-energy scrubber is not a pressure drop device such as a venture scrubber (see High-Energy Scrubber Atomizing Air Pressure). Instead, the high shear between the high-energy scrubber in air and injected water provides the energy to create the atomized water droplets that are required to entrain particulate and aerosols. As a result, no system to monitor the pressure drop in the high-energy scrubber is proposed.

Baghouse Differential Pressure

Minimum and maximum AWFCO on baghouse differential pressure to ensure proper operation of the baghouse are proposed. A 60-second running average is proposed.

Baghouse Leak Detection

An upper limit on baghouse particulate pass through has been incorporated in the AWFCO.

Stack Gas Mass Flow

An upper mass flow limit for the AWFCO has been provided to ensure that the APCE is operated within design mass flow. A 60-second running average is being proposed.

CO in Stack Offgas

An upper limit based on a rolling hourly average for carbon monoxide in the stack offgas for the AWFCO has been proposed to ensure adequate oxygen is available for effective combustion of organic matter.

Instrument Span

All instrument included as automatic waste feed cutoff process measuring devices will be monitored to ensure they do not indicate values that exceed the calibration span. All out-of-span readings will initiate an automatic waste feed cutoff.

PODS Items Furnace Start-up/Shakedown Conditions [40 CFR 270.62]

The start-up and shakedown conditions for the Plasma Ordnance Demilitarization System (PODS) are similar to those utilized during the Comprehensive Performance Test. During startup and shakedown, the PODS will be operated within the envelope defined for the AWFCO specified in Section R, Table R-1. Mini Burns during shakedown testing will be conducted with feeds as designated in the Comprehensive Performance Test Plan, as well as those specified in Appendix E and Table R-2. Additional munitions may also be fed.

Shutdown Pressures [40 CFR 264.345(c)) and 270.62(b)(2)(vii)]

When all scheduled ordnance processing has been completed, the PODS will be shutdown by first stopping all feed into furnace. The molten slag is treated as described for a slag pour. Some or all of the processed slag may be left in the hearth, and then cooled, providing a slag layer for a cold startup later. The torches are secured and the SCC is next secured. When the furnace has cooled sufficiently, the APCE and support systems are secured.

Controlling Computer System [40 CFR 264.347(a)]

The PODS control system is a personal computer (PC) based system utilizing data bus technology to interface with field equipment and computer graphics technology for operator PC interface. The PC monitors the combustion temperature, waste feed rate, and the indicator of combustion gas velocity. It also monitors the CO at the point in the incinerator downstream of the combustion zone and prior to release to the atmosphere on a continuous basis. Sampling and analysis of the waste and exhaust emissions are conducted to verify operating requirements are meeting performance standards of 264.343.

The PODS Control and Monitoring System is designed in a layered hierarchy consisting of four layers, each providing specific levels and types of control and protective response. The four levels are:

1. Annunciated Alarms and Warnings
2. Automated Protective Interlocks
3. Emergency Shutdown Sequence (ESS)
4. Automatic Waste Feed Cut Off (AWFCO)

The annunciated alarms and warnings alert the operator to process conditions that require monitoring, but not immediate action. The Annunciated Alarms and Warnings are intended to provide the operator time to stabilize the process conditions before reaching a more serious condition. Response to alarms and warnings is based on operator experience and administrative procedures.

The automated protective interlocks secure the process in a safe condition in response to any condition that threatens equipment integrity or personnel safety. These actions will be taken automatically by the PODS control computer, independently of the system operator.

The Emergency Shutdown Sequence is actuated either manually or automatically by the control computer. Manual actuation points are located in the control room and at selected points in Building 117-2. The ESS will be hardwired to by-pass the process control computer in case of manual actuation. The ESS takes all process equipment to the fail safe condition. The ESS is intended for computer failure and other emergencies.

The Automatic Waste Feed Cutoff (AWFCO) has been designed to ensure that all APCE is operating with design parameters, ensuring that emissions comply with permit requirements. The AWFCO is actuated automatically by the control computer.

The system controller also has the capability to perform a self-diagnostic program to pinpoint any existing or potential problems, such as sensor loss or equipment failure. Monitoring requirements 264.347(d) are listed in Appendix J.

PODS PERFORMANCE TESTING [40 CFR 270.19(b)]

Once installed and during shakedown operations, a Mini Burn will be performed for the PODS to ensure representative operations of PODS during the comprehensive performance test. A Comprehensive Performance Test Plan (CPTP) Appendix E for the PODS. The Mini Burn will be conducted on the PODS after the PODS CPTP has been reviewed and approved by the USEPA and NDEP. After the Mini Burn, MSE Technology Applications, Inc. (MSE), the PODS' manufacturer, will adjust the pollutant feed rate levels, the PODS, the feed rate control, or monitoring systems as required.

Comprehensive Performance Test Plan [40 CFR 270.62(b)(2)]

The PODS CPTP has been prepared in accordance with the requirements of 40 CFR Part 63 Subpart EEE and EPA guidance. The PODS CPTP is appended to this permit modification application (see Appendix E.

Post- Comprehensive Performance Test Operating Parameters

Post-Comprehensive Performance test operating parameters for the PODS are presented in Appendix E Values presented are preliminary and may be changed based on the results of the performance test.

Table R-1
PODS AUTOMATIC WASTE FEED CUTOFF PARAMETERS

Parameter	Lower Limit	Upper Limit
Ordnance Feed Rate (based on pollutant content) (lbs./hr)	None	Item Specific
Regulatory AWFCO (lbs.)	None	0.2
Primary Combustion Chamber Temperature (˚F)	None	None
Primary Combustion Chamber Pressure (inches H2O)	None	-0.08
Secondary Combustion Chamber Temperature (˚F)	1800	None
Quench Water Flow (gpm)	2	None
Quench Water Pressure (psig)	5	None
Absorber Solution pH (pH)	5	None
Absorber Solution Flow (gpm)	45	None
Absorber Solution Pressure (psig)	10	None
Absorber Exit Temperature (˚F)	None	90
Absorber Sump Blowdown (gpm)	None[1]	None[1]
High Energy Scrubber Air Pressure (psig)	170	None
High Energy Scrubber Air Flow (lbs./min)	7.5	None
High Energy Scrubber Solution Flow (gpm)	1	None
High Energy Scrubber Solution Pressure (psig)	6	None
High Energy Scrubber Pressure Drop (psig)	None[2]	None[2]
Baghouse Pressure Drop (inchs H2O)	0.5	10
Baghouse Inlet Temperature (˚F)	None	190
Baghouse Leak Detection System	TBD	TBD
Stack Gas Flow (scfm)	None	430
CO (60-min rolling average) (ppm)	None	100
Instrument Span Check	Range Dependent	
Feed Rate of Mercury (lbs./hr)	TBD	
Feed Rate of Metals (lbs./hr)	TBD	
Feed Rate of Total Chlorine/Chloride (lbs./hr)	TBD	

Notes:
1 Replaced by quench water flow
2 Replaced by High energy scrubber air pressure

scfm	standard cubic feet per minute
gpm	gallons per minute
inches H2O	inches of water
lbs./hr	pounds per hour
ppm	parts per million
psig	pounds per square inch gauge
TBD	to be determined

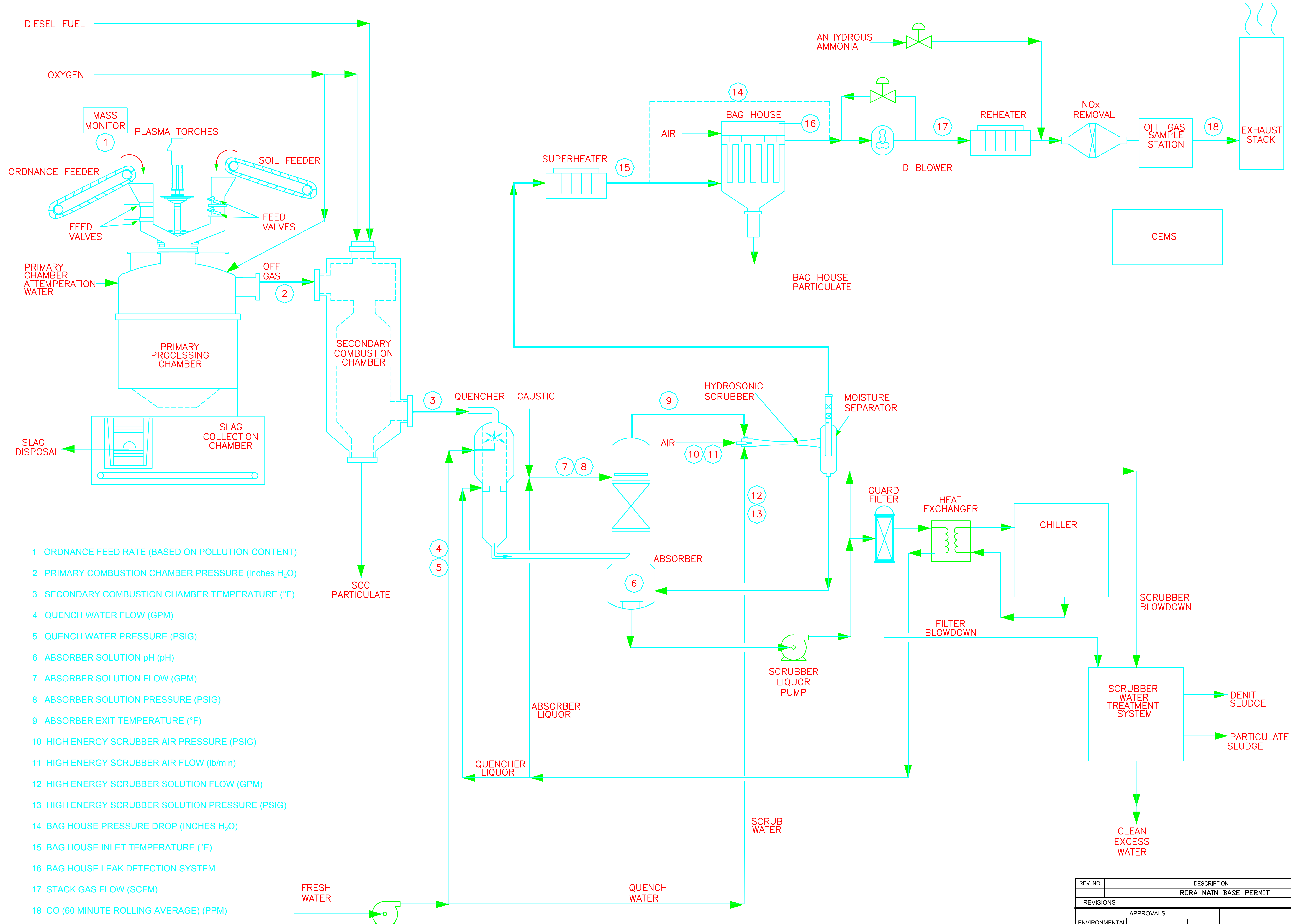
TABLE R-2
PODS SHAKEDOWN WASTE FEED RATES (During Mini Burn)

Item No.	Proposed Feed	Proposed Waste Feed Rate
1	M676 Device Soil Carbon Steel	425 lb/hr 340 lb/hr 85 lb/hr
2	Grenade, AN-M14	800 lb/hr
3	Cartridge, 30 mm, M788	700 lb/hr
4	TBD	TBD

TBD-to be determined

Figure R-1

PODS Layout



1 ORDNANCE FEED RATE (BASED ON POLLUTION CONTENT)
2 PRIMARY COMBUSTION CHAMBER PRESSURE (inches H_2O)
3 SECONDARY COMBUSTION CHAMBER TEMPERATURE (°F)
4 QUENCH WATER FLOW (GPM)
5 QUENCH WATER PRESSURE (PSIG)
6 ABSORBER SOLUTION pH (pH)
7 ABSORBER SOLUTION FLOW (GPM)
8 ABSORBER SOLUTION PRESSURE (PSIG)
9 ABSORBER EXIT TEMPERATURE (°F)
10 HIGH ENERGY SCRUBBER AIR PRESSURE (PSIG)
11 HIGH ENERGY SCRUBBER AIR FLOW (lb/min)
12 HIGH ENERGY SCRUBBER SOLUTION FLOW (GPM)
13 HIGH ENERGY SCRUBBER SOLUTION PRESSURE (PSIG)
14 BAG HOUSE PRESSURE DROP (INCHES H_2O)
15 BAG HOUSE INLET TEMPERATURE (°F)
16 BAG HOUSE LEAK DETECTION SYSTEM
17 STACK GAS FLOW (SCFM)
18 CO (60 MINUTE ROLLING AVERAGE) (PPM)

REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA MAIN BASE PERMIT		

REVISIONS

APPROVALS		
ENVIRONMENTAL MRG		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTER	LONNIE BROWN	
FIRE INSP.		
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
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FIGURE R-1
PODS LAYOUT

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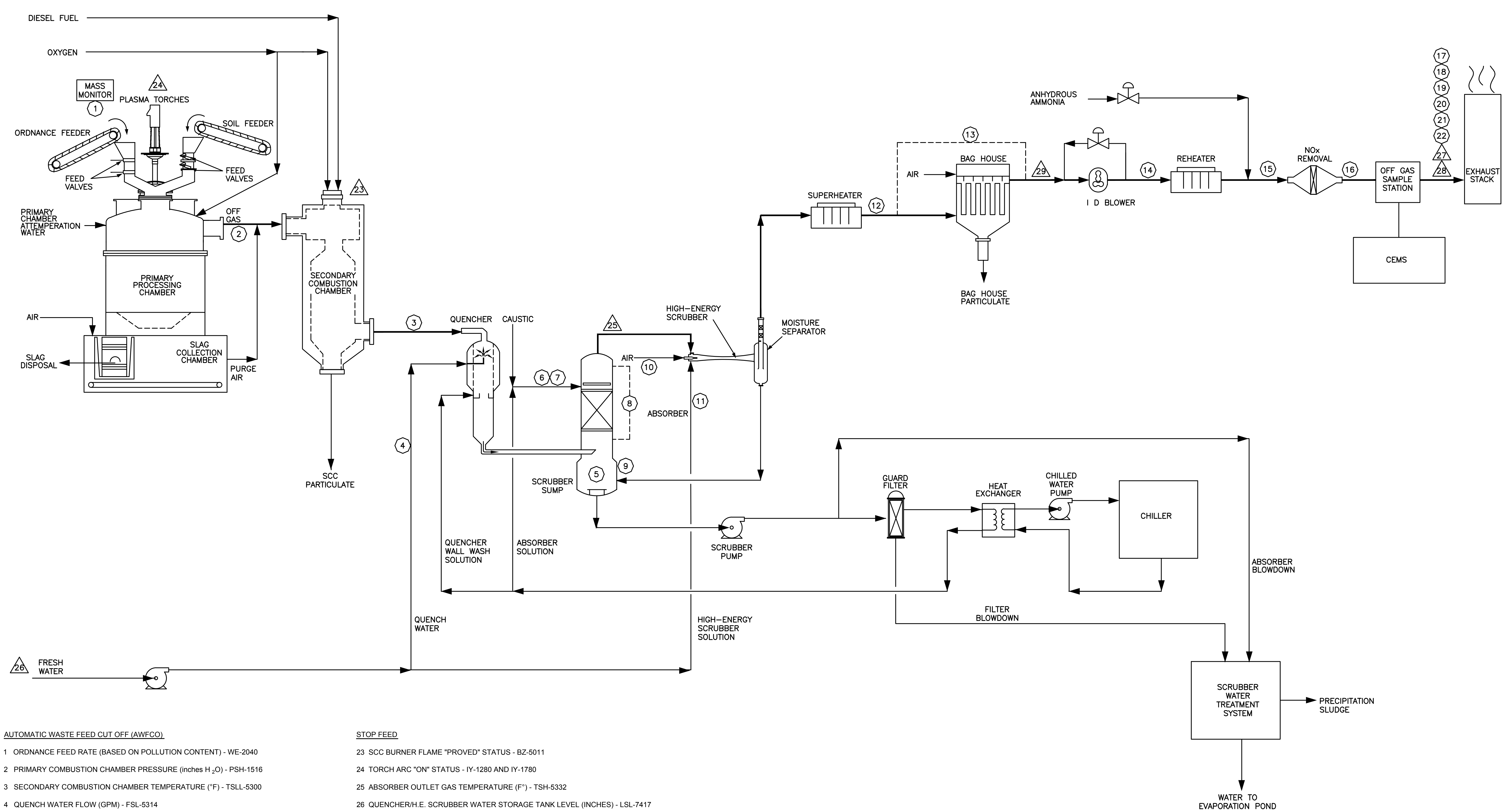
Figure R-2

Air Monitoring System



AUTOMATIC WASTE FEED CUT OFF (AWFCO)

1 ORDNANCE FEED RATE (BASED ON POLLUTION CONTENT) - WE-2040

2 PRIMARY COMBUSTION CHAMBER PRESSURE (inches H_2O) - PSH-1516

3 SECONDARY COMBUSTION CHAMBER TEMPERATURE (°F) - TSLL-5300

4 QUENCH WATER FLOW (GPM) - FSL-5314

5 ABSORBER SOLUTION pH (pH) - ZSLL-5320

6 ABSORBER SOLUTION FLOW (GPM) - FAL-4222

7 ABSORBER SOLUTION PRESSURE (PSIG) - PAL-5372

8 ABSORBER COLUMN dP (inches H_2O) - PDIT-5313

9 SCRUBBER SUMP LEVEL (inches) - LSLL-5324

10 HIGH ENERGY SCRUBBER AIR PRESSURE (PSIG) - PAL-5362

11 HIGH ENERGY SCRUBBER SOLUTION FLOW (GPM) - FALL-5363

12 BAG HOUSE INLET TEMPERATURE (°F) - TSHH-5412

13 BAG HOUSE PRESSURE DROP (inches H_2O) - PDISLL-5432

14 STACK GAS FLOW (LB/MIN) - MFHH-5530

15 NOx SKID SCR INLET TEMPERATURE (F°) - TAL-5630

16 NOx SKID SCR OUTLET TEMPERATURE (F°) - TAH-5650

17 CO (60 MINUTE ROLLING AVERAGE) (PPM) - YAH-5820

18 CO (60 MINUTE ROLLING AVERAGE) (lb/HR) -YAH-5820

19 NOx (60 MINUTE ROLLING AVERAGE) (lb/HR) - AIT-5810

20 S (60 MINUTE ROLLING AVERAGE) (lb/HR) - YAH-5880

21 SO_2 (60 MINUTE ROLLING AVERAGE) (lb/HR) - YAH-5880

22 OPACITY (60 MINUTE ROLLING AVERAGE) (%) - AIT-5870

STOP FEED

23 SCC BURNER FLAME "PROVED" STATUS - BZ-5011

24 TORCH ARC "ON" STATUS - IY-1280 AND IY-1780

25 ABSORBER OUTLET GAS TEMPERATURE (F°) - TSH-5332

26 QUENCHER/H.E. SCRUBBER WATER STORAGE TANK LEVEL (INCHES) - LSL-7417

27 CEMS STACK GAS OXYGEN CONTENT (%) - YAL-5840

28 CEMS "TROUBLE" STATUS - YA-5825

29 BAGHOUSE LEAK DETECTOR (%) - LD-5732

REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA MAIN BASE PERMIT		
REVISIONS			

APPROVALS		
ENVIRONMENTAL MRG		
ENVIRONMENTAL	LONNIE BROWN	
DRAFTER	LONNIE BROWN	
FIRE INSP.		
SECURITY		
MGR. SAFETY & HEALTH		
MGR. QUALITY ASSURANCE		
DIRECTOR M&L		
MGR. PP & PE		

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FIGURE R-2

AIR MONITORING SYSTEM

FILE:

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Figure R-3

PPC Cross Section

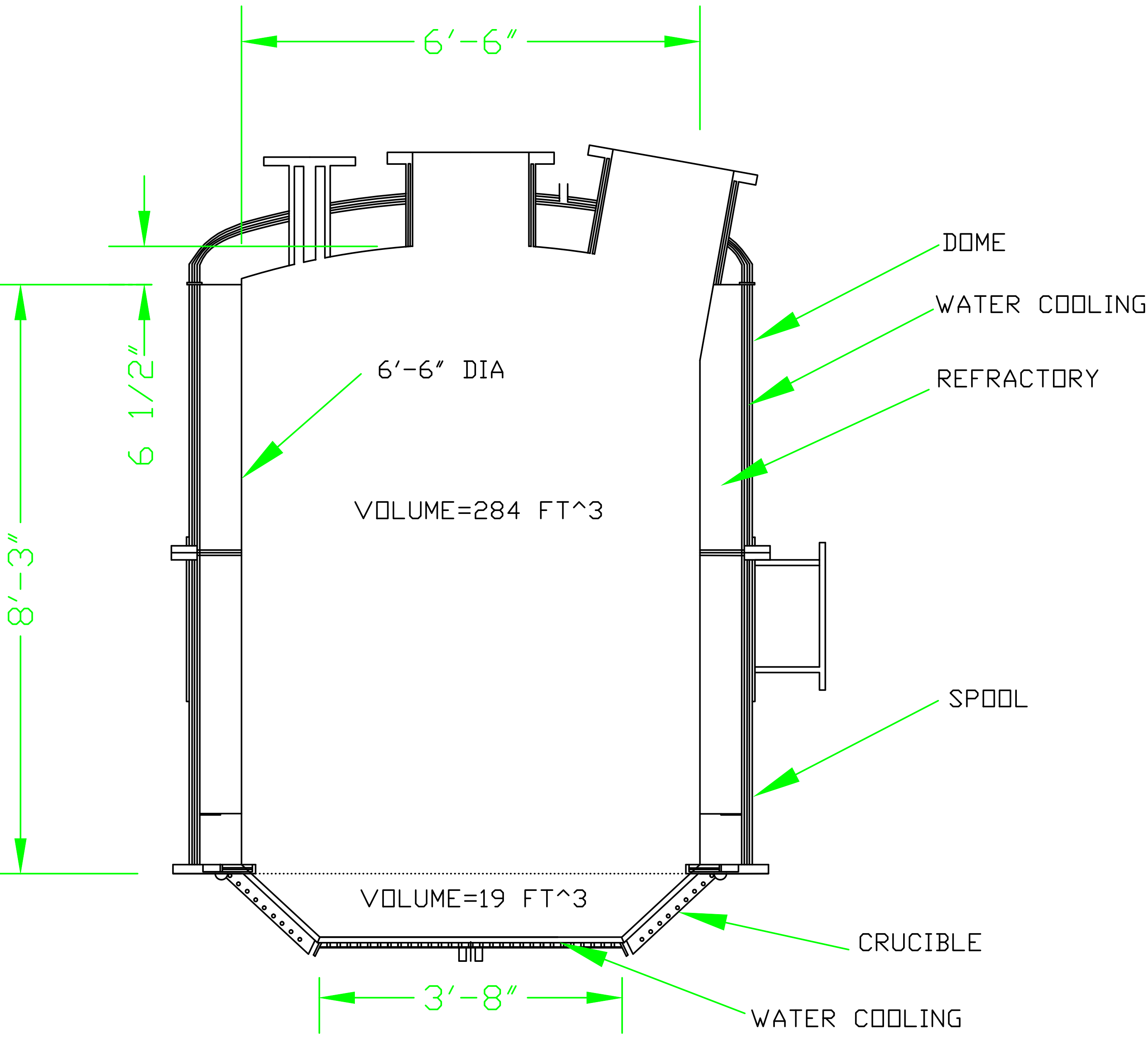

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FIGURE R-3

PPC CROSS SECTION

DRAWING NUMBER		
SCALE: AS SHOWN	FILE:	SHEET 1 OF 1

Figure R-4

PODS Primary Processing Chamber (PPC)

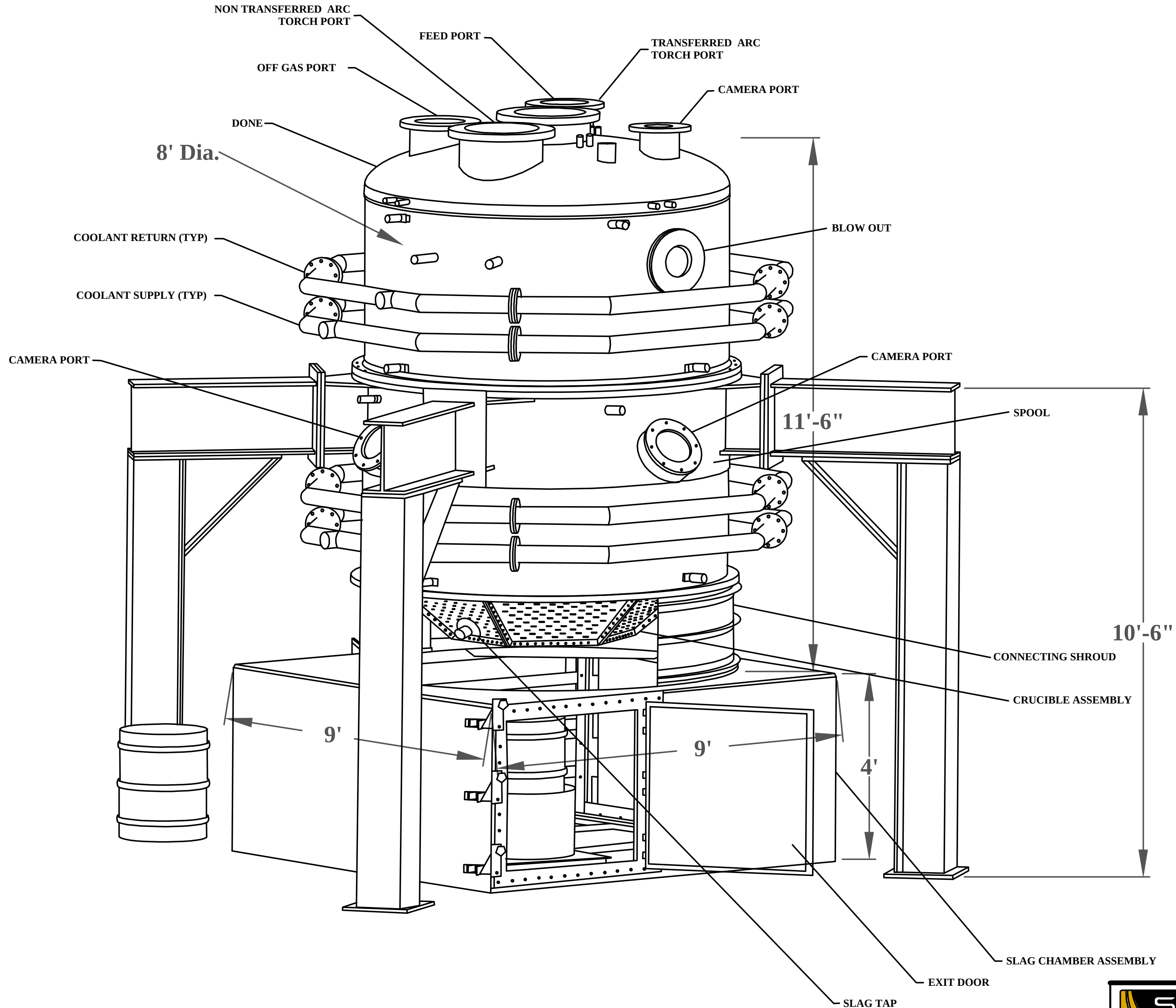

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FIGURE R-4 PODS Primary Processing Chamber (

RCRA MAIN BASE PERMIT

SCALE: na | FILE: Eng(H:)/Environmental DWG's/RCRA/MainBasePermit/FIGURE R-4 | SHEET

SECTION S. WASTE FEED CHARACTERISTICS FOR PODS

This section provides a background on the characteristics of the wastes to be treated in the PODS.

WASTE FEED CHARACTERISTICS AND GENERAL INFORMATION

Waste Feed Types

The wastes to be treated at the PODS are obsolete and unserviceable munition items. Due to the vast number of potential wastes that may be treated in the PODS, the waste feed list includes only items which have been fully characterized. For more details see Section S, Table S-2 in this section. It should be noted that although ordnance items are listed in Section S, Table S-2, feed rates for these items were determined based on compounds within each item. The procedure for characterization and establishment of feed rates for new items is described in Section S. This procedure will allow HWAD the flexibility to add these new items without inundating NDEP with permit (feed list) modifications, yet will assure that each item has been properly characterized.

Waste Feed Composition

As required by 40 CFR 270.62(b)(2)(i), the characterization of munition chemical composition and the method for developing component feed rates for items which may be demilitarized in the PODS at HWAD are included in Section S. These compositions are based on military specifications for the various items in lieu of actual analysis of each material. Waste composition is detailed further in Appendix E. The items are primarily being demilitarized in this facility because of obsolescence, not because these are ―off-specification" items. Due to the hazardous nature of disassembling munitions to perform individual analysis and the high degree of quality control involved with the production of military explosives, analysis of waste feed items is not performed during normal incinerator operation.

Waste Feed Rates

Feed rates for the items to the PODS are required in order to evaluate the items as potential Mini Burn and Comprehensive Performance Testing feed items. (The procedure used is discussed in detail in Section 3.3 and the Mini Burn is discussed in Section 3.5 of the PODS Comprehensive Performance Test Plan (CPTP). The feed rates are generic feed rates based on the Comprehensive Performance Testing limits. After the Mini Burn and formal Performance Testing, final individual feed rates for all items will be established such that none of the permit MACT emission limits are exceeded. (The waste composition, feed rate, and selection of waste feed for performance testing and operating conditions to meet permit emission limits are described in detail in Sections 3.0 and 4.0 of the PODS CPTP. The following discussion describes the development of feed rate limits for the PODS in order to meet MACT pollutant emission regulatory limits.

Proposed Automated Feed Rate Control System

This section explains the PODS feed rate control system that will be used to control munition item feed rate so as to assure compliance with regulated pollutant emission limits. The same feed rate control scheme is being proposed in both the RCRA and the Class I Air Quality Operating Permit # AP9711-0863.01 renewals. Due to the large variety of munitions that could be processed in the PODS, HWAD is seeking a permit that will specify limitations on the feed rate of certain regulated pollutants generated by the waste feed (such as MACT metals, POHCs, and chlorine), as opposed to placing a feed rate limit on each specific munition. The pollutant feed rate permit limits will be those demonstrated during the Comprehensive Performance Test for which stack emissions limits are achieved. This section describes the system that will be used to control the munition item feed rate so as to assure that none of the pollutant feed rate limits are exceeded.

Feed Rate Control Theory

Due to the wide variety of munition types that could be processed through PODS, a feed rate limit on specific pollutant is being proposed as a permit limit in lieu of a feed rate limit being identified for every individual munition. To assure that the pollutant feed rate limits are not exceeded, a computer based feed rate control system has been developed. The feed rate control system calculates maximum feed rates for each munition item and that assures that none of the individual pollutant feed rate limits are exceeded. A brief description of the central computation of this system is provided below.

The feed rate control system uses one simple calculation to determine the maximum munition item feed rate that will assure that none of the pollutant feed rate limits are exceeded. It is provided below.

$$\frac{\text{Pollutant Feed Rate Limit (lb/hr)}}{\text{Total Pollutant in the Item (lb/item)}} = \text{Maximum Item Feed Rate (items/hr)}$$

The "Pollutant Feed Rate Limit" is the permitted pollutant feed rate limit as determined through the comprehensive performance test. The "Total Pollutant in the Item" is the amount of the regulated pollutant that the item under consideration will generate. This is determined from the ingredients that comprise the item which is based on the official Army specification for that item found in the MIDAS database.

For each item, a separate maximum feed rate is calculated for each pollutant contained in the item. The lowest pollutant feed rate is then used as the overall maximum feed rate for that item. In this manner, the munition item feed rate applied to the item assures that the most restrictive pollutant feed rate limit is achieved.

Feed Rate Control System

A system has been created to control the feed rate of munition items to assure compliance with the regulated stack emissions. This system consists of several specific control elements. Fundamental to the feed rate control system is a regulatory limit on the feed rate of specific pollutants generated by munition items rather than on the munition items themselves. Because of the pollution abatement system, most of the pollutants generated from the munition items are removed before they reach the stack. During the comprehensive performance test, pollutant feed rates were demonstrated and stack emissions sampled to verify that the regulatory stack emission limits are not exceeded at the demonstrated pollutant feed rates. It is proposed that these demonstrated pollutant feed rates become the basis for calculating the limits for regulating compounds contained in the permit. The feed rate of the specific munitions will then be set and positively controlled by the feed rate control system to assure that the regulatory pollutant feed rate limits are not exceeded. A description of this Feed Rate Control System (Control Elements A-H) is provided below and keyed to the Feed Rate Control System flow diagram (Section S, Figure S-1).

In describing this flow diagram, it must be understood that the words "compound" and "pollutant" have very specific definitions. A compound is defined as an ingredient of a munition item (e.g., chlorine or chromium). The pollutants are generated directly from the compounds contained within the munition items by processing the munition items in the PODS furnace.

Control Element A – Pollutant Feed Rate Limits

This control element identifies all regulated pollutants and their permit feed rate limits. The pollutant feed rate limits are determined through the comprehensive performance test and incorporated into the permit. Once the feed rate limits are determined, they are entered manually into the Item Feed Rate Program (Control Element D, Section S, Figure S-1). Target pollutant feed rate limits are presorted in Section S Table S-2.

Control Element B – MIDAS "Summary of PEP Compounds in An Item" Report

The Army has developed the MIDAS as a database defining the compounds of munition items. This database was created to assist in environmental permitting process by providing a detailed characterization of the contents of a munition item. The database provides a report titled the "Summary of PEP Compounds in an Item." This report identifies all of the compounds contained in the pyrotechnic, explosive, and propellant (PEP) materials of an item with the corresponding weight of each compound. The PEP materials include all materials that are energetic in nature. The MIDAS database is the official Army characterization for munition items in the disposal inventory; therefore, this information will be used to provide the official munition item characterization. An example report is given on Table S-1. In addition to characterization of the PEP compounds, the MIDAS report also provides item identification information as follows:

- Nomenclature – The official item name with model number (e.g., SIGNAL ILLUM GRND M159).
- Department of Defense Identification Code (DODIC) – An identifier specifying a specific munition type (e.g., L307).
- National Stock Number (NSN) – A further identifier that uniquely identifies each munition (e.g., 1370007562588). Items having the same DODIC could have different NSNs due to slight variations in packaging or PEP compounds. All items having the same NSN contain the exact same PEP compounds and weights.
- Item weight – The weight of the item not including packaging. (Note: When an item is actually processed during normal PODS operation, the weight will be measured, and this weight used as the item weight to provide the most accurate data possible).

Both the item identification information and the PEP compound information are entered manually into the Item Feed Rate Program.

Control Element C – Munition Item Casing Characterization

It is assumed that some casing materials of each munition item may be processed with a munition item and that it melts into the slag. Also, it is assumed that some of this material generates pollutants that leave the furnace and enter the air pollution control equipment. The assumption is that munition items with metal casings may also generate pollutants that enter the pollution abatement train. These materials were not accounted for in the ―MIDAS Summary of PEP Compound in an Item" report (Control Element B). To properly account for these materials, each munition item will be evaluated prior to its being processed in the PODS furnace. If the casing materials contain compounds that could create pollutants that would pass through the furnace and into the pollution abatement train, these compounds will be entered into the Item Feed Rate Program.

Control Element E – PODS Control Computer

The PODS control computer will assure compliance with the maximum allowable munition item feed rate determined in Control Element D. The computer controls the munition feed rate by controlling the feed conveyor (Control Element G). The feed conveyor is a pocketed conveyor that incrementally dumps each pocket of munitions into a weigh cell (Control Element F). The weigh cell weighs and dumps the increment of munitions into the furnace before receiving a new increment from the conveyor. The PODS control computer calculates the actual minimum item feed rate by multiplying the pounds measured by the weigh cell (in pounds per cell) with the actual feed conveyor belt speed (in cells per hour) to determine the actual feed rate in pounds per hour. It then compares this value with the maximum allowable feed rate as retrieved from the Item Feed Rate Program (Control Element D). If the maximum feed rate is exceeded, the PODS control computer therefore provides positive control that assures compliance with the maximum munition item feed rate and consequently with the maximum regulatory pollutant feed rate. The PODS control computer provides a report showing the actual munition item feed rate (Control Element H) which compares actual feed rates with the maximum allowed, verifying compliance.

Control Element F – Weigh Cell

The weigh cell measures the weight in pounds of each cell of the conveyor feeder (Control Element G) before it dumps the cell into the PODS furnace. It provides this weight to the PODS control computer (Control Element E).

Control Element G – Conveyor Feeder

The conveyor feeder is a pocketed conveyor that holds and transports the munition items to the PODS furnace. It dumps the items into the weight cell (Control Element F), which subsequently dumps them into the PODS furnace. The conveyor feeder will stop on command of the PODS control computer (Control Element G).

Control Element H – Actual Feeder Rate Report

The actual feed rate report is a hard copy report of the munitions that have been processed through the PODS furnace, the maximum allowable feed rate, and the feed rates actually achieved. It can be used for compliance review and reporting.

New Munitions Items

Due to the wide variety of munition items in the Army disposal inventory, it is not feasible to include all possible items that could eventually be processed through the PODS in the permit application. However, the Feed Rate Control system that is explained above will assure that munition item feed rates set for new items are in compliance with permitted pollutant limits. To set the munition item feed rate, the characterization of the new item will be entered into the Item Feed Rate Control Program. The program will then set a munition item feed rate that will assure compliance with the emission limits based upon the most limiting pollutant(s) contained in that item.

New Pollutants

In the event that items contain pollutants not listed or limited within applicable permits, HWAD will submit a proposed permit amendment application to include new pollutant(s) not included in the issued permit or under established limitations included in the issued permit. Upon approval by the NDEP, this information will be added to the Feed Rate Control program. The program will then set a munition item feed rate that will assure compliance with the new emission limits based upon the most limiting pollutant(s) contained in that item for any permitted limitation.

Sample Calculations

The Item Feed Rate Program (Control Element D) performs the critical calculations that determine the feed rate for each item that will assure that the regulated pollutant feed rates are not exceeded. A Microsoft Excel file that demonstrates some of these calculations (“Feed Rate Control Spreadsheet”) is in Appendix E. The file shows a representative sample of calculations contained in the Item Feed Rate Control Program. Below is a narrative that explains the sequence of calculations performed in the Excel file. Two worksheets are contained in the attached file and labeled “MUNITIONS DATABASE” and “CALCS,” are referenced in the narrative below.

Basic Item Information

Columns A through C of the “MUNITIONS DATABASE” worksheet and the “CALCS” worksheet contain the following basic item information:

- Column A is the Official Department of Defense Item Nomenclature
- Column B is Department of Defense Identification Code (DODIC)
- Column C is the National Stock Number (NSN)

Note that some items may have the same DOD nomenclature and DODIC, but have a different NSN. This usually means that while the item itself is extremely similar, there is some slight difference, such as packaging or compound percentages.

Column D of the “MUNITIONS DATABASE” is the weight of an item in pound/item as given in the MIDAS “Summary of PEP Compounds in an Item Report.”

Regulatory Pollutant Feed Rate Limits

Row 1 and Columns F through AD of the “CALCS” worksheet provide the pollutant feed rate limits for the regulated pollutants as determined during the comprehensive performance test (Control Element A of the Feed Rate Control System). These numbers, used in subsequent calculations are the maximum feed rates of the regulated pollutants that assure that stack emission limits are not exceeded, based on the pollution abatement system destruction and removal efficiencies, as demonstrated during the comprehensive performance test.

Munition Item Pollutant Content

Columns G through AE of the —MUNITIONS DATABASE" provide the amount of each pollutant in each item in terms of pounds per item. These numbers are used for subsequent calculations and were derived in the following manner.

- The MIDAS —Summary of PEP Compounds in an Item" report was first referenced to review the compounds contained in the item for an example showing the —Signal Illum GRND M159" item, DODIC L307, NSN 1370007562588). The amount of pollutant generated by each compound was then calculated. Chromium will be used as an example.
- There are two compounds in the item containing chromium: barium chromate and chromic oxide. The weight of the chromium in these compounds was calculated through several steps as follows. Full calculations are first shown for barium chromate.
- First, the molecular weight (MW) of barium chromate is calculated as follows:

  MW Barium Chromate ($BaCrO_4$) =
  (MW of Ba) + (MW of Cr) + (MW of O) x 4

  - The molecular weights of each of these compounds are:

    MW of barium (Ba) = 137.33 atomic mass units (AMU)
    MW of chromium (Cr) = 51.996 AMU
    MW of oxygen (O) = 15.9994 AMU

  - Consequently, the molecular weight of barium chromate is:

    MW barium chromate ($BaCrO_4$) = (137.33) + (51.996) + (15.9994 x 4) =
    253.3236 AMU

- Next, from the MIDAS —Summary of PEP Compounds in an Item" report, the item contains 0.000708 pounds of barium chromate. The weight of the chromium in barium chromate is calculated by determining the weight percentage of chromium in barium chromate (molecular weight of chromium/molecular weight of barium chromate), and multiplying it by the weight of the barium chromate in the item, as follows:

$$\text{MW, lb} = \frac{\text{(MW of chromium, AMU)}}{\text{(MW of barium chromate, AMU)}} \times \text{(Weight of barium chromate, lb)}$$

$$\text{Weight of chromium, lb} = \frac{\text{(51.996 AMU)}}{\text{(253.3236 AMU)}} \times \text{(0.000708 lbs)}$$

$$\text{Weight of chromium, lb} = 0.000145321$$

- Similarly, for chromium oxide (Cr2O3):

$$\text{Weight of chromium, lb} = \frac{\text{(51.996 AMU)}}{\text{(151.990 AMU)}} \times \text{(0.000032 lbs)}$$

$$\text{Weight of chromium, lb} = 0.000010947$$

- The total weight of chromium in this item is therefore:

  Total weight of chromium, lb = 0.000145321 lb + 0.000010947 lb = 0.000156268 lb
- This number is then entered into the spreadsheet (see column J, row 249 of the ―MUNITIONS DATABASE" worksheet).
- The total weight of the other pollutant is calculated in the same manner and added to the appropriate column of the spreadsheet.

Munition Item Maximum Feed Rate

The next step in the calculations is to determine the maximum feed rate of each munition item that would assure that none of the pollutant feed rate limits would be exceeded. This was done by calculating a munition item feed rate based on each pollutant individually and then using the most restrictive munition item feed rate. This calculation was performed as described in the following steps:

- In columns F through AD of the ―CALCS" worksheet and for each munition item, the munition item feed rate that would produce the maximum allowed pollutant feed rate was calculated for each pollutant. The pounds of pollutant per item from columns G through AE in the “MUNITIONS DATABASE” worksheet is divided by the pollutant feed rate limit in pounds per hour provided in columns F through AD and row 1 of the “CALCS” spreadsheet for that pollutant. The formula is provided below, using the munition item Signal Illum Grnd M159 item, DODIC L307, NSN 1370007562588 as an example:

$$\frac{\text{“MUNITIONS DATABASE, column J, row 249}}{\text{“CALCS, ” column I, row 1}} = \text{“CALCS,” column I, row 248}$$

$$\frac{\text{0.000156268 lb chromium/item}}{\text{21 lb. chromium/hr}} = \text{7.44133E-06 hr/item}$$

The result is given in terms of “hr/item.” This is a theoretical concept and represents the minimum time period over which a single munition item must be fed in order to not exceed the pollutant feed rate limit (chromium in this case). If the item were fed any faster (i.e., over a shorter period of time), the maximum pounds per hour of pollutant (in this case chromium) would be exceeded. This unit (“hr/item) is the inverse of items per hour. This inverse was calculated to avoid an error messages because if the item did not contain any chromium, the calculation would be a division by zero, which would result in an error message. A munition item feed rate is calculated in this manner for every pollutant for each items in the spreadsheet.

- Once an item feed rate is calculated for every pollutant for each item, the most restrictive item feed rate must be determined. The most restrictive item feed rate for any item is the maximum hr/item calculated for any pollutant. Column E of the “CALCS” worksheet contains a function that returns the maximum value in columns F through AH. If the item is fed at this rate, none of the pollutant feed rates will be exceeded. Note that if the inverse of hr/items (items/hr) were calculated in columns F through AD and an error message was displayed due to a division by zero, the function in column E would not work. This is why hr/item was calculated in those columns instead of items/hr.

- Once the maximum hr/item has been determined, the figure can then be inverted to show the item/hr. This is the maximum feed rate at which the item can be fed such that none of the pollutant feed rate limits will be exceeded. This simple calculation is done in column D of the “CALCS” worksheet, as shown below, using the same item as an example:

$$\frac{1}{\text{“CALCS,” column E, row 248}} = \text{“CALCS,” column D, row 248}$$

$$\frac{1}{7.44133\text{E-06 hr/item}} = 134{,}385 \text{ items/hr}$$

It should be noted that for some items an “N/A” appears in this column. This indicates that that particular item contains none of the regulated pollutants. In this case, there is no maximum munition item feed rate.

- The maximum items/hr for each item is then copied to the “MUNITIONS DATABASE” worksheet in column E. See column E and row 249 for the example for the DODIC L307 munition item.
- The maximum items/hr for each item is then converted to the corresponding pounds per hour in column F of the “MUNITIONS DATABASE” worksheet by multiplying the items/hr by the item weight in lb/item as shown below:

(“MUNITIONS x (“MUNITIONS = (“MUNITIONS DATABASE,” col. E, row 249)
col. D, row 249 col. F, row 249

(134,385 items/hr) x (1.1000 lb./item) = 147,823 lb/hr

- The new MACT rule groups metals by volatility classes and impose a feed rate limit on the entire group, rather than imposing a limit on the individual metals. The actual feed rate limits for a representative metal in each volatility class will be established from the removal efficiency demonstrated during the comprehensive performance test. The permit will consequently impose a feed rate limit on each group of metals rather than on specific metals in the group. Consequently, the feed rate control program will be modified to identify the pollutant feed rate for each group of metals instead of specific metals. The program will also calculate a munition item feed rate that assures that the pollutant feed rate for each group of metals in not exceeded. A pollutant feed rate for each individual metal was shown in the spreadsheet for the sample calculations to demonstrate the concept.

Pollutant Feed Rate Compliance Verification

Once the maximum allowable munition item feed rate is calculated, the rate is verified to assure that none of the regulatory pollutant feed rate limits are exceeded at this item feed rate. This verification is performed as described in the following steps.

- The verification is performed in the ―MUNITIONS DATABASE" worksheet, columns AK through BI.
- Row 2 of columns AG through BE gives the regulatory pollutant feed rate limits.
- For each pollutant in each of items, the pollutant feed rate in lb/hr is calculated for the maximum item feed rate is shown in columns E and F of the ―MUNITIONS DATABASE" worksheet. This calculation is done by multiplying the item feed rate in items/hr by the pollutant content in lb/item, as shown below (continuing to use chromium for the item ―Signal Illum Grnd M159" item, DODIC L307, NSN 1370007562588, as an example):

(―MUNITIONS x (―MUNITIONS = (―MUNITIONS DATABASE," col. E, row 249)
col. J, row 249 col. AJ, row 249

(134,385 items/hr) x (0.000156268 lb = 21 lb/hr of chromium/item chromium

- The above calculation is performed for each pollutant in each item. Each pollutant pound-per-hour feed rate can then be compared to the regulatory limit in row 2 of columns BS through EC to verify that none of the limits are exceeded. To allow this to be checked quickly, a function has been put in row 3 of columns AG through BE of the ―MUNITIONS DATABASE" worksheet that returns the maximum pollutant feed rate in lb/hr for each of the pollutants. By scanning this row, it can be seen that in no instance does a pollutant feed rate exceed the maximum allowed.

PERMIT CONDITIONS FOR WASTE FEED RATES AND HEALTH RISK ASSESSMENT

It is requested that feed rate limitations in the permit be established for those constituents in the waste feed which have a direct effect on the controlled emissions. These limitations should be based on the results of the Comprehensive Performance Test at HWAD. In the Comprehensive Performance Test, the feed items having the greatest impact upon levels of controlled emissions will be incinerated. The criteria used to select those wastes which will have the greatest impact upon controlled emissions have been previously described in detail.

The Screening Health Risk Assessment for PODS at HWAD (USACHPPM, February 2000) is presented in this modification application as Appendix E based on the NDEP and USEPA Region 9 approved Health and Ecological Risk Assessment Protocol (Appendix E). The Screening Health Risk Assessment estimated chronic cancer risks below the acceptable target cancel level of 1E-05 and estimated chronic noncancer hazards below the acceptable target noncancer hazard index of 0.25. Short-term inhalation hazards from potential upset conditions (such as an air pollution control system [APCS] equipment bypass event) were generally acceptable, except for on-site worker respiratory irritation. However, the actual emissions are expected to be lower than those estimated because conservative assumptions were used in the study. In addition, estimated ecological risks were generally found to be below the target screening levels of 2.5, except for hexachloroethane exposure to the Little Pocket Mouse (estimated hazard index of 0.99). As there are no other known sources of hexachloroethane in Mineral County, Nevada, the estimated HI of 0.99 is expected to be acceptable, and as background emissions will not increase the HI above 1.0. The actual ecological hazards are expected to be lower due to the level of conservatism used throughout the assessment. It should be noted that the PODS chemical constituent feed rates used for the Screening Health Risk Assessment were generally conservative to overestimate emissions. Results from the Comprehensive Performance Test will be used to prepare a ―post-burn" Health Risk Assessment to confirm initial findings of no significant adverse impacts to human health and the environment.

Figure S-1. Feed Rate Control System Flow Diagram

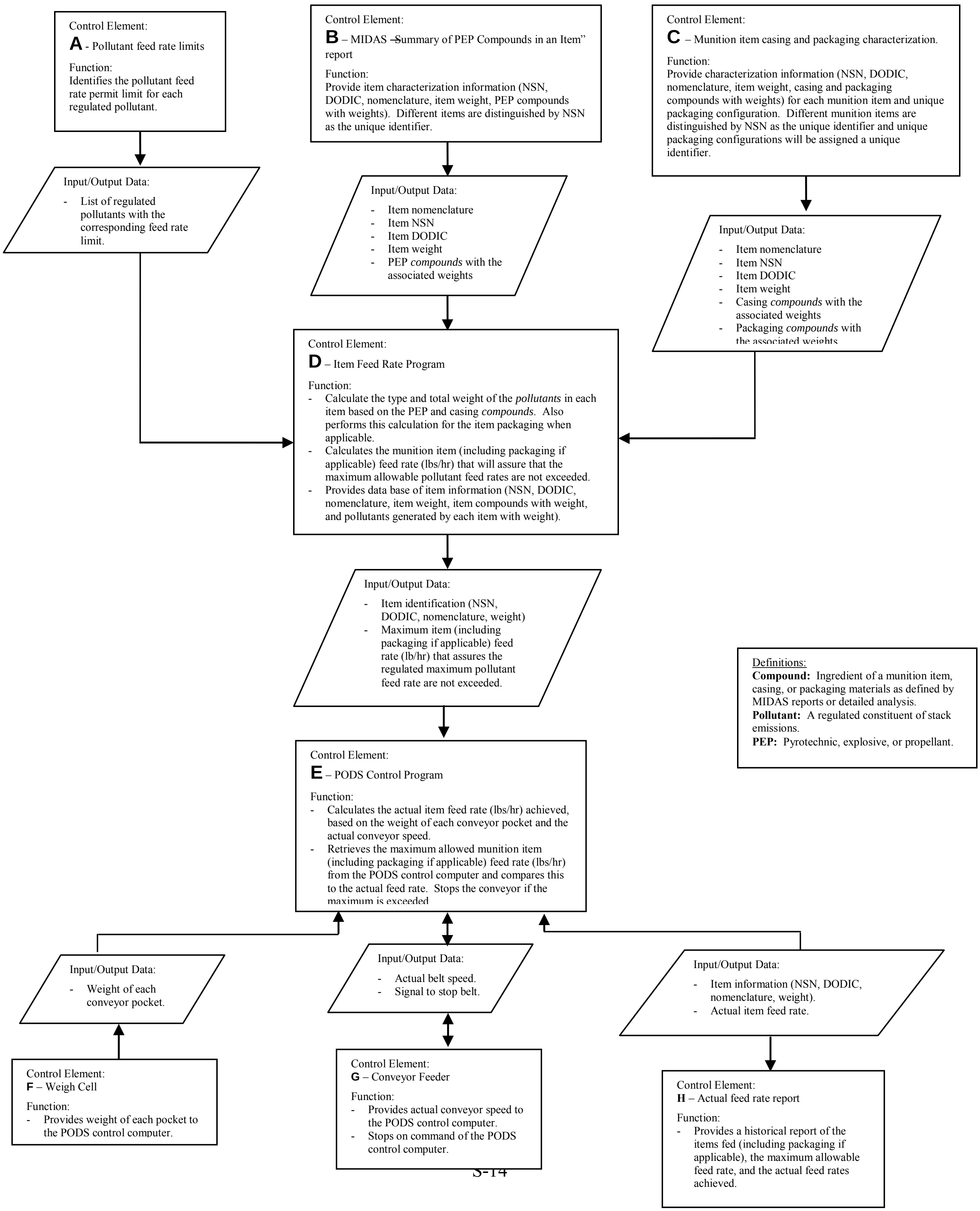

Table S-1. MIDAS Summary of PEP Compounds in an Item

Page No. 1 USADACS – MIDAS SUMMARY OF PEP COMPOUNDS IN AN ITEM

10/08/97 Nomenclature: Signal Illum Grnd M159 Status: OFFICIAL

NSN: 1370007562588 DODIC: L307 Reported Weight: 1.1100 LB Calculated Weight: 0.7149 LB

NOMENCLATURE	WEIGHT (LB)	% OF CALCULATED WEIGHT
AL PWDR	0.000008	0.001119
B AMORPHOUS PWDR		
BA CHROMATE	0.000708	0.099035
BA NITRATE	0.023151	3.238350
CA CARBONATE	0.002551	0.356833
CHARCOAL	0.004631	0.647782
CO NAPHTHENATE	0.000014	0.001958
COTTON WICK		
CR OXIDE	0.000032	0.004476
K NITRATE	0.021980	3.074551
K PERCHLORATE	0.000143	0.020003
LAMINAC	0.002292	0.320604
LAMINAC/LUPERSOL	0.000014	0.001958
LUPERSOL DDM	0.000038	0.005315
MG PWDR 30/50	0.013828	1.934253
MO TRIOXIDE	0.000050	0.006994
PB STYPHNATE	0.000052	0.007274
PETN	0.000006	0.000839
S	0.003097	0.433207
SB SULFIDE	0.000019	0.002658
S1	0.000057	0.007973
SR NITRATE	0.007734	1.081828
TETRACENE	0.000005	0.000699
TETRANITROCARBAZOLE	0.000029	0.004057
VINYL ALCOHOL	0.000006	0.000839
W	0.000402	0.056232
ZR	0.000115	0.016086
ZR HYDRIDE	0.000043	0.006015
	0.081005	

TABLE S-2

PLASMA ORDNANCE DEMILITARIZATION SYSTEM (PODS) WASTE FEED LIST

CHARACTERIZED FEED ITEMS

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate(lb/hr)
CTG CAL .50 TR M1	A570	1305000286394	0.2550	141,393	36,055
CTG CAL .50 TR M17	A570	1305000286427	0.2481	144,249	35,794
CTG CAL .50 TR M17	A570	1305000286430	0.2481	144,249	35,794
CTG CAL .50 TR M10	A570	1305000286437	0.2503	179,453	44,914
CTG CAL .50 TR M17	A570	1305005557051	0.2503	144,249	36,104
CTG CAL .50 TR M17	A570	1305005855189	0.2503	144,229	36,104
CTG CAL .50 TR M1	A571	1305000286395	0.2550	141,393	36,055
CTG CAL .50 TR M17	A571	1305000286607	0.2503	144,249	36,104
CTG CAL .50 TR M10	A571	1305005854385	0.2503	179,453	44,914
CTG CAL .50 TR M17	A571	1305005855187	0.2503	144,249	36,104
CTG CAL .50 TR M17	A571	1305005855188	0.2503	144,249	36,104
CTG 20mm TP M55	A661	1305011531799	0.5621	54,900	30,862
CTG 20mm AP0T M95	A765	1305000284549	0.5714	74,669	42,668
CTG 20mm AP0T M95	A765	1305000284551	0.5714	58,945	33,683
CTG 20mm AP0T M95	A765	1305000284553	0.5714	74,669	42,668
CTG 20mm AP0T M95	A765	1305005161425	0.5714	74,669	42,668
CTG 20mm AP0T M95	A765	1305009117272	0.5714	74,669	42,668
CTG 20mm INC M96	A776	1305000284555	0.5714	350,263	200,150
CTG 20mm INC M96	A776	1305000284556	0.5714	350,263	200,150
CTG 20mm INC M96	A776	1305001276589	0.5714	350,263	200,150
CTG 20mm INC M96	A776	1305001276598	0.5714	350,263	200,150
CTG 20mm INC M96	A776	1305003011587	0.5714	350,263	200,150
CTG 20mm INC M96	A776	1305005557057	0.5714	350,263	200,150
CTG 20mm INC M96	A776	1305005557078	0.5714	350,263	200,150
CTG 20mm INC M96	A776	1305009117274	0.5714	350,263	200,150
CTG 20mm M204 TP	A777	1305000284559	0.5714	58,945	33,683
CTG 20mm M99 TP	A777	1305007244089	0.5714	357,143	204,082
CTG 25.4mm DECOY M839	A965	1305010828986	0.3374	254,339	85,821
CTG 25mm TP0T M793	A976	1305012125066	1.1043	6,715	7,415
CTG 30mm TRNG M639	B109	1305001436969	0.2316	347,826	80,557
CTG 30mm TP PGU015/B (AEROJET)	B116	1305010577914	1.4900	14,466	21,554
CTG 30mm TP PGU015/B (HONEYWELL)	B116	1305010933333	1.2000	14,918	19,902
CTG 30mm TP M788	B120	1305010785505	0.9489	28,283	26,838
CTG 40MM YLW SMK CANOPY M676	B475	1310001339413	0.4800	7,796	3,742
CTG 40MM GRN STAR PARA M661	B504	1310005416148	0.4900	135,577	66,433
CTG 40mm M713 RED SMOKE	B506	1310005416149	0.4900	7,240	3,548
CTG 40mm M715 GREEN SMOKE	B508	1310005416452	0.4900	7,324	3,589
CTG 40mm M716 YELLOW SMOKE	B509	1310005416153	0.4900	7,324	3,589
TRACER MK11 MOD0 F/40mm	B516	1310006715127	0.2094	1,125,210	235,659
TRACER MK11 MOD0 F/40mm	B516	1310006715128	0.2094	1,125,210	235,659
CTG 40mm M781 TP	B519	1310010507967	0.4519	18,772	8,484
CTG 40mm M781 TP	B519	1310011075404	0.4519	18,772	8,484

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate (lb/hr)
CTG 40mm M781 TP	B519	1310011488881	0.4519	18,772	8,484
CTG 40mm M781 TP	B519	1310012118073	0.4519	18,772	8,484
CTG 40mm M576E1 MULT-PROJ	B534	1310009634061	0.2529	547,945	138,552
CTG 40mm WHT STAR PARA M583A1	B535	1310001593198	0.4390	135,577	59,518
CTG 40mm WHT STAR CLUSTER M585	B536	1310009229784	0.4100	49,881	20,451
CTG 40mm CHEM AGENT CS M674	B537	1310009359229	0.7500	2,773	2,080
CTG 40mm CHEM AGENT CS M674	B537	1310009993455	0.7500	2,773	2,080
CTG 40mm TP M385 LNKD	B576	1310009947441	0.7500	201,106	150,830
CTG 40mm TP M385 LNKD	B576	1310011593184	0.7500	201,106	150,830
CTG 40mm PRAC M407A1	B577	1310007248082	0.5000	464,450	232,225
CTG 40mm PRAC M407A1	B577	1310009650738	0.5000	464,450	232,225
CTG 40mm TP M918	B584	1310012187069	0.7600	201,106	152,841
CTG 40mm TP M918	B584	1310013625294	0.7600	201,106	152,841
CTG ING M5A1 F/60MM MORTAR	B620	1310000963076	0.0117	174,978	2,055
CTG ING M5A1 F/60MM MORTAR	B620	1310010510959	0.117	174,978	2,055
CTG IGN M4 F/60MM MORTAR	B621	1310000963073	0.0840	148,920	12,509
CTG IGN M4 F/60MM MORTAR	B621	1310000963074	0.0840	148,920	12,509
CTG IGN M4 F/60MM MORTAR	B621	1310000963073	0.0840	148,920	12,509
CTG PROP M3A1 F/60 MM MORTAR	B622	1310000284981	0.0061	159,236	965
FIN ASSY 60MM M2 W/CTG IGN N5A1	B623	1310000963083	0.8553	83,368	71,305
FIN ASSY 60MM M2 W/CTG IGN N5A1	B623	1310007527616	0.8553	83,368	71,305
FIN ASSY 60MM M2 W/CTG IGN N5A1	B623	1310007528507	0.8553	83,368	71,305
FIN ASSY 60MM M2 W/CTG IGN N5A1	B623	1310008287429	0.8553	83,368	71,305
CTG 60MM TP M50A3	B634	1310012764075	3.1500	70,609	222,418
CTG 60MM TP M50A3	B634	1310009351995	3.1500	70,609	222,418
CTG 60MM TP M50A2	B634	1310000284939	3.0700	83,368	255,940
CTG 60MM TP M50A2	B634	1310005092970	3.0700	83,368	255,940
CTG 60MM TP M50A2	B634	1310005092971	3.0700	83,368	255,940
PROJECTILE 60mm RIOT CONTROL KE M743 W/CTG M755	B638	1310010156246	0.8800	778,210	684,825
CHG PROP INCR M181	BX08	1310008546648	0.0086	118,378	1,015
CTG IGN M285 F/81mm MORTAR	C009	1315009368253	0.0442	64,809	2,865
CTG IGN M66A1 F/81mm MORTAR	C010	1315001436874	0.0542	60,864	3,299
CTG IGN M66A1 F/81mm MORTAR	C010	1315008251400	0.0542	60,864	3,299
TR PROJ M10 F/90mm M7A1	C012	1315010545176	0.1975	453,355	89,538
CHG PROP INCR A M90A1 F/81mm MORTAR	C021	1315003703548	0.0320	38,045	1,217
CHG PROP INCR A M90A1 F/81mm MORTAR	C022	1315003789841	0.0320	41,667	1,333
CTG 81mm ILLUM M301 W/FUZE TIME MJ84	C226	1315000284964	10.7000	20,541	219,792
CTG 81mm ILLUM M301 W/FUZE TIME MJ84	C226	1315001437122	10.7000	20,541	219,792
CTG 81mm ILLUM M301 W/FUZE TIME MJ84	C226	1315001645290	10.7000	20,541	219,792
CTG 81MM TP M43A1 W/PD FUZE	C227	1315000285000	7.2900	28,137	205,121
CTG 81MM TP M43A1 W/PD FUZE	C227	1315008887627	7.2900	28,137	205,121

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate (lb/hr)
CHG PROP INCR M2A1 F/81mm MORTAR	C239	1315000284983	0.0320	31,997	1,024
CHG PROP INCR M2A1 F/81mm MORTAR	C239	1315008265404	0.0320	31,997	1,024
CHG PROP INCR M2A1 F/81mm MORTAR	C239	1315009650841	0.0320	31,997	1,024
CTG IGN M6	C242	1315000963081	0.0417	57,372	2,392
CTG IGN M6	C242	1315000284957	0.0417	57,372	2,392
CTG IGN M6	C242	1315000963081	0.0417	57,372	2,392
CTG IGN M2A2 F/4.2 IN MORTAR	C244	1315001379307	0.0500	1,715,631	85,782
CTG IGN M2A2 F/4.2 IN MORTAR	C244	1315008270456	0.0500	1,715,631	85,782
CTG 81MM WINDOW MK115 MOD 0	C250	1315009996308	10.7100	20,541	219,997
CTG 90mm APERSOT M580	C275	1315001438235	41.2500	454	18,707
CTG 90mm APERSOT M580	C275	1315009269328	41.2500	454	18,707
CANISTER 105MM SMK GRN M2	C395	1315002896880	4.1000	310	1,273
CANISTER 105MM SMK HC M1	C396	1315003833889	4.1000	72	294
CANISTER 105MM RED M2	C397	1315002896883	4.1000	343	1,406
CANISTER 105MM SMK YLW M2	C399	1315002896879	4.1000	368	1,509
TR PROJ M13	C422	1315002296532	0.0363	539,811	19568
CHG PROP M67	C436	1315008251384	2.9000	1,573	4,562
CHG PROP M67	C436	1315012379775	2.9000	1,573	4,562
EXPELLING CHG ASSY	C474	1315001437127	0.1708	N/A	N/A
CTG IGN M2	C713	1315003833923	0.0762	119,832	9,131
BURSTER PROJ M53A1	C751	1315004035603	0.2100	N/A	N/A
BAG CHG	D017	1320007837980	0.1347	302,343	40,726
EXPULSION CHARGE	D017	1320011712666	1.4000	156,372	218,921
BAG CHG	D018	1320000095316	0.0050	4,651,163	23,256
CANISTER 155MM SMK HC M1	D445	1320003833890	7.3500	75	551
CANISTER 155MM SMK GRN M3	D446	1320002896881	4.8066	313	1,505
CANISTER 155MM SMK RED M3	D447	1320002896864	4.8066	365	1,756
CANISTER 155MM SMK RED M3	D447	1320002896884	4.8066	365	1,756
CANISTER 155MM SMK YELLOW M3	D449	1320002896878	4.8066	372	1,789
CANISTER 155MM SMK HC M2	D450	1320003833891	3.7900	150	568
CANISTER 155MM SMK GRN M4	D451	1320002896882	2.7700	731	2,024
CANISTER 155MM SMK RED M4	D452	1320002896885	2.7700	717	1,987
CANISTER 155MM SMK YELLOW M4	D454	1320002896875	2.7700	731	2,024
FLASH REDUCER M1	D490	1320000284366	1.7500	N/A	N/A
FLASH REDUCER M1	D490	1320000284367	1.7500	N/A	N/A
FLASH REDUCER M2	D552	1320009356053	0.1000	N/A	N/A
FLASH REDUCER M3	D681	1320000284368	1.0500	N/A	N/A
FLASH REDUCER M3	D681	1320009269303	1.0500	N/A	N/A
CTG SIGNAL PRAC BOMB MK4 MOD3	F562	1325000384638	0.1600	187,791	30,047
FUZE BOMB MT M907E2	F716	1325007294384	2.000	297,189	594,377
FUZE BOMB MT M907E2	F716	1325009269401	2.000	297,189	594,377
FUZE BOMB MT M907E2	F716	1325009269402	2.000	297,189	594,377
FUZE BOMB NOSE MT MK339 MOD 1	F740	1325000093729	3.7500	221,738	831,517
FUZE BOMB TAIL MK344 MOD 0	F837	1325009187053	4.3000	12,283	52,816

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate (lb/hr)
FUZE BOMB TAIL M905	F989	1325007562184	1.1000	221,130	243,243
DELAY ELEMENT FUZE BOMB M9 NON-DELAY	G212	1325005859290	0.1250	412,901	51,613
DELAY ELEMENT FUZE BOMB M9 NON-DELAY	G212	1325008915445	0.1250	412,901	51,613
GREEN LNCHR SMK SCREENING RP UK L8A3	G815	1330010200504	1.5000	575	862
GREEN LNCHR SMK SCREENING RP UK L8A3	G815	1330011245031	1.5000	575	862
CTG 7.62mm NATO GREN RIFLE M64	G839	1330003011989	0.0345	327,332	11,293
CTG 7.62mm NATO GREN RIFLE M64	G839	1330008924106	0.0345	327,332	11,293
CTG 7.62mm NATO GREN RIFLE M64	G839	1330010774291	0.0345	327,332	11,293
CTG 7.62mm NATO GREN RIFLE M64	G839	1330010824110	0.0345	327,332	11,293
CHG PRAC HAND GREN M21 W/O PLUG	G850	1330000285854	0.0608	N/A	N/A
CHG PRAC HAND GREN M21 W/O PLUG	G850	1330000285855	0.0608	N/A	N/A
CHG PRAC HAND GREN M21 W/O PLUG	G850	1330003085657	0.0608	N/A	N/A
CHG PRAC HAND GREN M21 W/O PLUG	G850	1330005299939	0.0608	N/A	N/A
CHG PRAC HAND GREN M21 W/O PLUG	G850	1330005859362	0.0608	N/A	N/A
CHG PRAC HAND GREN M21 W/ PLUG	G851	1330000285856	0.0608	N/A	N/A
CHG PRAC HAND GREN M21 W/ PLUG	G851	1330000285857	0.0608	N/A	N/A
CHG PRAC HAND GREN M21 W/ PLUG	G851	1330000285858	0.0608	N/A	N/A
FUZE HAND GREN M205A2	G870	1330000285851	0.1600	42,635	6,822
FUZE HAND GREN M206A2	G872	1330002939517	0.1625	42,635	6,928
FUZE HAND GREN M204A2	G873	1330008623229	0.1600	42,635	6,822
FUZE HAND GREN M201A1	G874	1330002939516	0.1600	97,087	15,534
FUZE HAND GREN M213	G877	1330001823570	0.1563	42,635	6,664
FUZE HAND GREN M213	G877	1330001823590	0.1563	42,635	6,664
GREN HAND INCND TH3 AN-M14	G900	1330002198557	2.9380	2,101	6,171
GREN HAND RIOT CS M47 W/FUZE M227	G922	1330001437146	0.9039	1,439	1,301
GREN HAND RIOT CS M47 W/FUZE M227	G922	1330004776704	0.9039	1,439	1,301
GREN HAND RIOT CS01 M23A2	G924	1330006456211	0.5000	3,799	1,899
GREN HAND SML HC AN0M8	G930	1330002198511	1.5000	213	319
GREN HAND SMK RED M48 W/M227 FUZE	G932	1330004776719	1.1875	3,462	4,111
GREN HAND SMK GRN M18	G940	1330002896851	1.1875	1,731	2,056
GREN HAND SMK YELLOW M18	G945	1330002896854	1.1875	1,731	2,056
GREN HAND SMK RED M18	G950	1330002896852	1.1875	1,731	2,056
GREN HAND SMK VIOLET M18	G955	1330000288531	1.1875	1,731	2,056
GREN HAND SMK VIOLET M18	G955	1330002896853	1.1875	1,731	2,056
GREN HAND RIOT CN M7A1	G960	1330002198577	1.1563	970	1,122
GREN HAND RIOT CN M7	G960	1330002198576	1.0625	1,793	1,905
GREN HAND RIOT CN M7	G960	1330005298542	1.0625	1,793	1,905

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate (lb/hr)
GREN HAND RIOT CN M7	G960	1330008713697	1.0625	1,793	1,905
GREN HAND RIOT CS	G963	1330002181027	0.9688	925	896
GREN HAND RIOT CS	G963	1330009650802	0.9688	925	896
GREN HAND RIOT CS M7A2	G963	1330007998816	0.9688	3,471	3,363
GREN RIFLE SMK GRN M22A2	G995	1330009356122	1.2600	1,741	2,193
GREN RIFLE SMK GRN M22A2	G995	1330000285909	1.2600	1,741	2,193
GREN RIFLE SMK GRN STRMR M23A1	H000	1330005409148	1.1050	2,722	3,008
GREN RIFLE SMK RED STRMR M23A1	H015	1330000285887	1.1050	2,218	2,451
GREN RIFLE SMK RED STRMR M23A1	H015	1330000285915	1.1050	2,218	2,451
GREN RIFLE SMK RED STRMR M23A1	H015	1330003011978	1.1600	2,218	2,573
GREN RIFLE SMK VIOLET STRMR M23A1	H025	1330005298532	1.1600	3,102	3,599
GREN RIFLE SMK VIOLET STRMR M23A1	H025	1330000285890	1.1600	3,102	3,599
GREN RIFLE SMK YELLOW STRMR M23A2	H040	1330000285888	1.2600	1,699	2,140
GREN RIFLE SMK YELLOW STRMR M23A2	H040	1330000285917	1.2600	1,699	2,140
RCKT MTR IGN MK165 MOD0	H403	1340000931075	1.5667	5,539	8,678
RCKT APERS 2.75IN W/WHD WDU 4A/A	H459	1340004014460	20.3060	191	3,874
RCKT APERS 2.75IN W/WHD WDU 4A/A	H459	13400002237224	20.3060	191	3,874
RCKT 3.5IN PRAC M29A2	H601	1340000286092	8.9600	3,134	28,083
RCKT PRAC 35mm SUBCAL M73	H708	1340001436911	0.3439	44,593	15,336
RCKT PRAC 35mm SUBCAL M73	H708	1340003605050	0.3439	44,593	15,336
WHD MARKER 2.75 IN M152	H845	1340009650592	9.1250	172,249	1,571,770
WHD MARKER 2.75 IN M153	H845	1340009650561	9.1250	172,249	1,571,770
FUZE RCKT PD M427	J346	1340007695304	0.8000	172,249	137,799
FUZE RCKT PD M423	J349	1340007643640	0.8000	172,249	137,799
FUZE RCKT PROX M429	J350	1340010809448	0.8000	397,1714	317,737
RCKT MTR 3.5IN	JX12	1340001226551	9.0000	3,134	28,209
CHG SPOTTING F/MINE AP PRAC M8	K040	1345000285127	0.0610	N/A	N/A
FUZE MINE M603	K050	1345000285122	0.0971	104,512	10,153
FUZE MINE COMB M10A1	K055	1345000285121	0.3750	N/A	N/A
FUZE MINE M605	K058	1345007175770	0.3800	116,363	44,218
FUZE MINE M605	K058	1345009650694	0.3800	116,363	44,218
MINE APERS NM M14	K121	1345000285108	0.2325	87,534	20,352
DISP & RIIOT CNTRL AGENT CR M36	K532	1365002839046	0.2425	N/A	N/A
DISP & RIIOT CNTRL AGENT CR M36	K532	1365011476013	0.2425	N/A	N/A
SMK POT GRND, TYPE HC M1	K865	1365002198512	12.5000	20	255
SMK POT HC 360LB ABC0M5	K866	1365005985207	33.0000	7	232
SMK POT FLOATING TYPE HC M4A2	K867	1365010961455	38.0000	8	286
SMK POT FLOATING TYPE HC M4A2	K867	1365005985220	38.0000	8	286
SIGNAL KIT ILLUM MK79 MOD0	L118	1370008669788	0.3946	88,454	34,906
CTG PHOTOFLASH M112	L135	1370000285923	1.0100	2,680	2,706
CTG PHOTOFLASH M123A1	L136	1370000285924	1.0100	2,680	2,706
CTG PHOTOFLASH M123A1	L139	1370000285927	4.3000	759	3,265
CTG PHOTOFLASH M123A1	L139	1370009010605	4.3000	759	3,265

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate (lb/hr)
SIGNAL ILLUM STAR RED COMET MK1 MOD0	L191	1370000384979	1.0000	1,639	1,639
SIGNAL ILLUM MARINE YELLOW STAR MK1 MOD0	L192	1370000384981	1.0000	1,069	1,069
SIGNAL ILLUM MARINE RED STAR MK1 MOD0	L193	1370000384982	0.2974	4,726	1,406
SIGNAL SMK MARINE MK2 MOD1 RED	L201	1370000384977	1.0000	9,094	9,094
SIGNAL ILLUM ACFT DBL STAR RED/RED M37	L225	1370006182401	0.3500	8,162	2,857
SIGNAL ILLUM ACFT DBL STAR RED/RED M37	L225	1370005408506	0.3500	8,162	2,857
SIGNAL ILLUM ACFT DBL STAR YLW/YLW M38	L226	1370000285962	0.4250	7,193	3,057
SIGNAL ILLUM ACFT DBL STAR YLW/YLW M38	L226	1370006185786	0.4250	7,193	3,057
SIGNAL ILLUM ACFT DBL STAR GRN/GRN M39	L227	1370006185784	0.3500	5,509	1,928
SIGNAL ILLUM ACFT DBL STAR GRN/GRN M39	L227	1370008014014	0.3500	5,509	1,928
SIGNAL ILLUM ACFT DBL STAR RED/YLW M40	L228	1370005419628	0.3875	3,824	1,482
SIGNAL ILLUM ACFT DBL STAR RED/YLW M40	L228	1370006182403	0.3875	3,824	1,482
SIGNAL ILLUM ACFT DBL STAR RED/GRN M41	L229	1370000285953	0.3500	3,290	1,151
SIGNAL ILLUM ACFT DBL STAR RED/GRN M41	L229	1370005408500	0.3500	3,290	1,151
SIGNAL ILLUM ACFT DBL STAR RED/GRN M41	L229	1370006185788	0.3500	3,290	1,151
SIGNAL ILLUM ACFT DBL STAR GRN/YLW M42	L230	1370005408505	0.3875	3,120	1,209
SIGNAL ILLUM ACFT DBL STAR GRN/YLW M42	L230	1370006185789	0.3875	3,120	1,209
SIGNAL ILLUM ACFT SNGL STAR RED M43A2	L231	1370005408507	0.2688	6,984	1,877
SIGNAL ILLUM ACFT SNGL STAR RED M43A2	L231	1370006185790	0.2688	6,984	1,877
SIGNAL ILLUM ACFT SNGL STAR YEL M44A2	L232	1370006185791	0.2453	6,784	1,664
SIGNAL ILLUM ACFT SNGL STAR GRN M45A2	L233	1370006181402	0.3213	5,587	1,795
SIGNAL ILLUM ACFT SNGL STAR GRN M45A2	L233	1370006182402	0.3213	5,587	1,795
SIGNAL ILLUM ACFT DBL STAR RED/YWL M53	L234	1370006185793	0.3125	6,275	1,961
SIGNAL ILLUM ACFT DBL STAR RED/RED M54	L235	1370006185794	0.3125	28,245	8,827
SIGNAL ILLUM ACFT DBL STAR GRN/RED M55	L236	1370006185774	0.3125	13,248	4,140
SIGNAL ILLUM ACFT DBL STAR GRN/GRN M56	L237	1370006185775	0.3125	12,970	4,053

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate (lb/hr)
SIGNAL ILLUM ACFT DBL STAR GRN/GRN M56	L237	1370005801397	0.3125	12,970	4,053
SIGNAL ILLUM ACFT DBL STAR RED/RED M57	L238	1370005801395	0.3125	14,060	4,394
SIGNAL ILLUM ACFT DBL STAR RED/RED M57	L238	1370006185776	0.3125	14,060	4,394
SIGNAL ILLUM ACFT DBL STAR GRN/RED M58	L239	1370006185777	0.3125	8,992	2,810
SIGNAL ILLUM ACFT RED STAR MK80 MOD0	L258	1370009307746	0.0331	88,454	2,925
SIGNAL SMK AND ILLUM MARINE GRN/GRN MK67	L267	1370009600451	6.8000	1,177	8,003
SIGNAL SMK AND ILLUM MARINE YLW/YLW MK68	L268	1370009600452	6.8000	2,045	13,903
SIGNAL SMK & ILLUM MARINE MK11 MOD1	L275	1370003095024	0.4000	6,325	2,530
SIGNAL ILLUM GRND WHT STAR M188	L279	1370009216119	0.0600	322,785	19,367
SIGNAL ILLUM GRND M158	L306	1370007562591	1.1100	31,346	34,794
SIGNAL ILLUM GRND M159	L307	1370007562588	1.1000	95,989	105,588
SIGNAL ILLUM GRND RED STAR PARA M126	L311	1370006292336	1.2000	89,701	107,641
SIGNAL ILLUM GRND M127	L312	1370007531859	1.8900	89,701	169,534
SIGNAL ILLUM GRND M125A1	L314	1370006292335	1.1100	30,912	34,313
SIGNAL ILLUM GRND M125A1	L314	1370013416282	1.1100	30,912	34,313
SIGNAL SMK GRND GRN M64	L318	1370000286001	0.8900	30,943	27,539
SIGNAL SMK GRND YLW M64	L322	1370000286000	0.8900	28,411	25,286
SIGNAL SMK GRND RED M168	L342	1370009261933	0.0595	18,599	1,107
SIMULATOR PROJ AIR BURST M74A1	L366	1370000286007	0.3375	347,981	117,444
FLARE ACFT COUNTERMEASURE M206	L410	1370010482138	0.4200	28,258	11,868
FLARE SURF TRIP M49	L495	1370000285943	1.4400	3,192,173	4,596,729
FLARE SURF TRIP M49	L495	1370000285944	1.4400	3,192,173	4,596,729
FLARE SURF TRIP M49	L495	1370005420027	1.4400	3,192,173	4,596,729
FUSEE SIGNALING BLUE MK1 MOD1 (Alt 1)	L535	1370000384951	0.4500	1,711	770
FUSEE SIGNALING BLUE MK1 MOD1 (Alt 2)	L535	1370000384951	0.4500	3,105	1,397
FUSEE SIGNALING BLUE MK1 MOD1 (Alt 3)	L535	1370000384951	0.4500	878	395
SIGNAL ILLUM MARINE GRN STAR MK2 MOD0	L541	1370000384930	0.0661	27,003	1,786
SIGNAL ILLUM MARINE GRN STAR MK2 MOD0	L541	1370000384927	0.0661	27,003	1,786
SIGNAL ILLUM MARINE RED STAR MK2 MOD0	L542	1370000384926	0.0661	22,047	1,458
SIGNAL ILLUM MARINE RED STAR MK2 MOD0	L542	1370000384929	0.0661	22,047	1,458
SIGNAL ILLUM MARINE WHT STAR MK2 MOD0	L543	1370000384925	0.0661	N/A	N/A

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate (lb/hr)
SIGNAL ILLUM MARINE WHT STAR MK2 MOD0	L543	1370000384928	0.0661	N/A	N/A
MARKER LOCATION MARINE YLW MK1 MOD3	L561	1370000384921	3.0000	3,192,173	9,576,518
MARKER LOCATION MARINE MK58 MOD0	L585	1370007944594	12.7500	834	10,635
SIMULATOR PROJ GRND BURST M115A2	L594	1370007528126	0.3000	4,100	1,230
SIMULATOR FLASH ART M110	L596	1370000285112	1.8333	5,362	9,830
SIMULATOR FLASH ART M110	L596	1370000285113	1.8333	5,362	9,830
SIMULATOR FLASH ART M110	L596	1370000285114	1.8333	5,362	9,830
SIMULATOR FLASH ART M110	L596	1370009351969	1.8333	5,362	9,830
SIMULATOR BOOBY TRAP FLASH M117	L598	1370000075562	0.1400	80,549	11,277
SIMULATOR BOOBY TRAP FLASH M117	L598	1370000285256	0.1400	80,549	11,277
SIMULATOR BOOBY TRAP FLASH M117	L598	1370002839443	0.1400	80,549	11,277
SIMULATOR BOOBY TRAP ILLUM M118	L599	1370000087788	0.1400	33,725	4,722
SIMULATOR BOOBY TRAP ILLUM M118	L599	1370000285257	0.1400	33,725	4,722
SIMULATOR BOOBY TRAP ILLUM M118	L599	1370002839442	0.1400	33,725	4,722
SIMULATOR BOOBY TRAP M119 WHISTLE	L600	1370000285255	0.1500	50,721	7,608
SIMULATOR HAND GREN M116A1	L601	1370007528124	0.4330	10,793	4,674
SIMULATOR FLASH ARTY M21	L602	1370010341397	0.5000	1,237,113	618,557
SIMULATOR FLASH ARTY M21	L602	1370011280418	0.5000	1,237,113	618,557
SIMULATOR TARGET KILL M26	L720	1370013525723	1.9500	425	828
FLARE CTG ALA017B	LY12	1370012098783	3.0000	64,956	194,869
CTG IMPULSE MK17 MOD1	M011	1377000214213	0.1020	422,356	43,080
CTG IMPULSE MK17 MOD1	M011	1377010892860	0.1020	422,356	43,080
CAP BLASTING #3 DELAY EFFECT	M103	1375005298515	0.1080	32,786	3,541
CAP BLASTING #6 DELAY EFFECT	M108	1375005298521	0.1080	32,786	3,541
CTG CAL .50 BLK (ELECT INITIATED)	M174	1385005122886	0.1700	314,713	53,501
CTG CAL .50 BLK (ELECT INITIATED)	M174	1385006050253	0.1700	314,713	53,501
CTG CAL .50 BLK (ELECT INITIATED)	M174	1385008963694	0.1700	314,713	53,501
CTG A/C FIRE EXIT	M182	1377007561384	0.1800	340,017	61,203
CTG FIRE EXIT CCU093/A	M182	1377012571358	0.1664	549,941	91,536
CTG IMPULSE MK8 MOD0	M185	1377000755846	0.1700	44,287	7,529
CTG IMPULSE MK2 MOD1	M190	1377001033434	0.0701	N/A	N/A
CTG IMPULSE MK2 MOD1	M190	1377002938184	0.0701	N/A	N/A
CTG IMPULSE MK2 MOD1	M190	1377010587367	0.0701	N/A	N/A
CTG IMPULSE MK14 MOD0	M219	1377006583059	0.3521	801,565	282,227
CTG IMPULSE MK14 MOD1	M219	1377013898957	0.1330	210,859	28,051
DESTRUCTOR HE UNIVERSAL M10	M241	1375000285171	0.5625	N/A	N/A
CTG DELAY MK4 MOD2	M282	1377001056659	0.0115	76,468	877

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate (lb/hr)
COUPLING BASE W/PRIMER	M327	13750003855280	0.1500	4,445,043	666,756
COUPLING BASE W/PRIMER	M327	1375006995236	4.0500	3,192,173	12,928,299
POWDER ACTUATED CUTTER M21	M500	1377000600885	0.8615	40,916	35,249
POWDER ACTUATED CUTTER M22	M504	1377000600886	0.6215	21,659	13,461
CTG IMPULSE MK9 MOD0	M509	1377007319264	0.1453	110,619	16,073
CTG IMPULSE MK44 MOD0	M514	1377009873603	0.0526	40,551	2,133
FIRING DEVICE PRESSURE RELEASE M5	M627	1375000285190	0.0925	3,192,173	295,276
FIRING DEVICE PRESSURE RELEASE M5	M627	1375000285192	0.0925	3,192,173	295,276
FIRING DEVICE DEMO PULL TYPE M1	M630	1375000285181	0.2450	3,192,173	782,082
FIRING DEVICE DEMO PULL TYPE M1	M630	1375002621661	0.2450	3,192,173	782,082
FIRING DEVICE DEMO PULL TYPE M1	M630	1375005801392	0.2450	3,192,173	782,082
FUSE BLASTING TIME M700 4000 FT	M670	1375000285151	68.0000	N/A	N/A
FUSE BLASTING TIME M700 4000 FT	M670	1375000285152	68.0000	N/A	N/A
FUSE BLASTING TIME M700 4000 FT	M670	1375000285246	68.0000	N/A	N/A
FUSE BLASTING TIME M700 4000 FT	M670	1375002621674	68.0000	N/A	N/A
CTG ACTUATED INITIATOR	M720	1377008254910	0.4900	506,329	248,101
CTG ACTUATED INITIATOR	M720	1377002380552	0.4900	3,259,698	1,597,252
IGN TIME BLASTING M60	M766	1375002839452	0.0500	3,192,173	159,609
IGN TIME BLASTING M60	M766	1375006911671	0.0500	3,192,173	159,609
CTG IMPULSE CCU048/B	MD66	1377010633161	0.0860	201,511	17,330
CTG IMPULSE CCU048/B	MD66	1377010633164	0.0860	201,511	17,330
CTG IMPULSE CCU048/B	MD66	1377010633165	0.0860	201,511	17,330
CTG IMPULSE M796	MD73	1377010496365	.0117	254,339	2,976
CTG IMPULSE CCU043/B	MF08	1377010633168	2.7000	86,374	233,211
DETONATOR MK29 MOD0	ML68	1376007321987	0.0008	179,159	150
CTG IMPULSE BBU035/B	MY74	1377010378651	0.2410	240,738	58,027
FUZE AUX DET MK395 MOD 1	N218	1390000321666	1.4730	202,217	297,866
FUZE AUX DET MK43 MOD 1	N223	1390000389767	0.9200	71,975	66,217
FUZE AUX DET MK55 MOD 0	N228	1390000389774	0.7600	71,975	54,701
FUZE MT MK50 MOD7	N240	1390002000182	2.2700	2,274,208	5,162,453
FUZE MT MK50 MOD7	N240	1390002034304	2.2700	2,274,208	5,162,453
FUZE MT MK61 MOD1	N242	1390000389724	2.2800	4,389,237	10,007,461
FUZE MT M565	N248	1390008892104	2.0500	61,063	125,180
FUZE MT M565	N248	1390009935691	2.0500	61,063	125,180
FUZE MT MK342 MOD1	N250	1390004518695	1.4500	2,274,208	3,297,602
FUZE MT MK342 MOD1	N250	1390009196083	1.4500	2,274,208	3,297,602
FUZE MT MK349 MOD1	N251	1390003512743	2.2800	2,274,208	5,185,195
FUZE MT MK349 MOD1	N251	1390009375748	2.2800	2,274,208	5,185,195
FUZE BD MK21 MOD 3	N255	1390007140108	2.1900	103,126	225,845
FUZE BD MK21 MOD 1	N255	1390000389756	2.3700	142	336
FUZE BD MK 31 MOD 2	N256	1390000389761	1.6200	103,126	167,063
FUZE PIBD M509A2	N260	1390002288383	0.3100	258,136	80,022
FUZE MT MK51 MOD1	N262	1390002038548	1.3200	4,389,237	5,793,793
FUZE MTSQ M501	N276	1390000284913	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390000284915	1.3700	106,684	146,157

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate (lb/hr)
FUZE MTSQ M501	N276	1390000284916	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390000284916	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390000284917	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390001695414	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390001695415	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390003050868	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390003414184	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390005557179	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390006767870	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390008924897	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390009356140	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390009356141	1.3700	106,684	146,157
FUZE MTSQ M501	N276	1390009356144	1.3700	106,684	146,157
FUZE MTSQ M564	N278	1390008892044	2.1400	46,807	100,166
FUZE MTSQ M548	N282	1390008924193	2.1400	52,260	111,837
FUZE MTSQ M548	N282	1390008143422	2.1400	46,807	100,166
FUZE PD M521	N301	1390004323232	1.6000	94,618	151,389
FUZE PD M716	N310	1390009356056	1.2500	138,804	173,505
FUZE PD MK29 MOD3	N315	1390000931245	1.4500	72,475	105,088
FUZE PD MK29 MOD3	N315	1390004485750	1.4500	72,475	105,088
FUZE PD MK29 MOD1	N315	1390000389703	1.4900	75,559	112,584
FUZE PD MK29 MOD1	N315	1390000388652	1.4900	75,559	112,584
FUZE PD M48A3	N318	1390000284898	1.4100	98,755	139,245
FUZE PD M48A3	N318	1390009351952	1.4100	98,755	139,245
FUZE PD M557	N335	1390001875392	2.1200	51,695	109,592
FUZE PD M557	N335	1390008924302	2.1200	51,695	109,592
FUZE PD MK 27 MOD1	N345	1390000389702	0.2300	458,284	105,405
PRIMER STAB M56	N364	1390000749761	0.0247	303,758	7,500
FUZE MT M592	N386	1390004256265	1.1400	104,565	147,437
FUZE PROX M532	N402	1390007649124	1.2800	1,630	2,086
FUZE PROX M513A1	N412	1390003050866	1.8000	10,504	18,907
FUZE PROX M513A1	N412	13900030949720	1.8000	10,504	18,907
FUZE VT M517 (T178E3)	N417	1390003241420	1.2800	1,630	2,086
PRIMER PERC M28A2	N518	1390001512556	0.3316	1,950,772	646,820
PRIMER PERC M28A2	N518	1390008251370	0.3316	1,950,772	646,820
PRIMER PERC M57	N519	1390008251381	0.2500	1,950,772	487,693
PRIMER PERC M58	N520	1390000782747	0.4000	1,950,772	780,309
PRIMER PERC M82	N523	1390008924202	0.2000	3,055,967	611,193
PRIMER PERC M82	N523	1390010079177	0.2000	3,055,967	611,193
PRIMER PERC M82	N523	1390010980280	0.2000	3,055,967	611,193
PRIMER PERC MK2A4	N525	1390000095571	0.0600	2,123,153	127,389
PRIMER PERC MK2A4	N525	1390009359234	0.0600	2,123,153	127,389
PRIMER PERC MK2A4	N525	1390010084605	0.0600	2,123,153	127,389
PRIMER PERC M32	N527	1390000284925	0.0493	4,681,853	230,635
PRIMER PERC M32	N527	1390000963077	0.0493	4,681,853	230,635
PRIMER PERC M71A2	N532	1390008287449	0.0495	4,681,853	231,752

ITEM NOMENCLATURE	DODIC	NSN	Item Total Mass (lb/item)	MAXIMUM Feed Rate (items/hr)	MAXIMUM Feed Rate (lb/hr)
PRIMER PERC M71A2	N532	1390009359232	0.0495	4,681,853	231,752
PRIMER ELEC MK42 MOD0	N539	1390000389813	0.3740	1,321,499	494,241
PRIMER ELEC MK42 MOD0	N539	1390000389811	0.3740	28,284,395	10,578,364
CASE COMB PRIMER MK20 MOD0	N540	1390006203461	0.0044	99	0
PRIMER ELEC MK40 MOD1	N542	1390000389808	1.1000	12,445,134	13,689,647
PRIMER ELEC M80A1	N547	1390002288416	0.5000	548,655	274,327
PRIMER ELECT M86	N549	1390001794278	0.0800	544,402	43,552
PRIMER PERC MK14 MOD1	N563	1390000389785	0.2100	99	21
CASE IGN COMB PRIMER MK13 MOD0	N579	1390000389781	0.3600	40,120	14,443
PRIMER ELECTRIC MK39 MOD1	N584	1390000389805	1.3750	12,4455,134	17,112,059
BOOSTER M125A1	N634	1390000701022	0.7100	108,479	77,020
BOOSTER M125A1	N634	1390001875391	0.7100	108,479	77,020
PRIMER ELECTRIOC MK39 MOD0	N339	1390000389804	1.3750	12,445,134	17,112,059
PRIMER ELECT MK 48 MOD 1	N642	1390006203479	0.3740	55,881	20,899
PRIMER PERC MK22 MOD0	N644	1390000389792	0.1700	1,657,474	281,771
DELAY PLUNGER M1	NX51	1390010303420	0.1661	281,530	46,750
DELAY PLUNGER M1	NX51	1390000693070	0.1666	302,017	50,325

Notes: Item feed rates are based on calculated pollutant emissions. The proposed pollutant feed rate limits may be changed prior to actual Comprehensive Performance Tests based on the outcome of the Mini Burn testing. The spreadsheet used to develop and calculate item feed rates is included on a disk in this permit.

SECTION T. PROCEDURES TO PREVENT HAZARDS FOR PODS

PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT *[40 CFR 270.14(b)(8)]*

This section outlines procedures employed at HWAD to prevent hazards in unloading operations, runoff from hazardous waste management facilities and groundwater contamination. Procedures to mitigate equipment failure and power outages and reduce worker exposure to hazardous substances are also discussed Section T, Table T-1, T-2, and T-3.

TABLE T-1: INSPECTION SCHEDULE – SAFETY/EMERGENCY/SECURITY EQUIPMENT

FACILITY/ EQUIPMENT	SPECIFIC ITEM	TYPES OF PROBLEMS	FREQUENCY
Safety & Emergency Equipment	Lighting protection system (visual)	Lack of continuity and ground	Semi-annually
	Lighting protection wiring continuity and grounding (testing)	Lack of continuity and ground	Annually
	Accident prevention; unsafe work practice and unsafe physical and mechanical conditions	Unsafe working environment	Daily/Monthly
	Electrical equipment and installation	Electrical circuitry/power, shorts	Annually
	Static electricity grounding of equipment (testing)	Lack of continuity and ground	Annually
	Personnel protective clothing and equipment	Loss of integrity, normal wear and tear, inadequate inventory	Monthly/As used
	General fire inspection	Poor housekeeping, smoking violations, blocked fire doors	Daily
	Fire extinguishers	Need recharging	Monthly/After each use
	Fire blackouts	Dispersing	As used
	Emergency shower and eyewash	Water pressure, leaking, drainage	Weekly
	Face shields and goggles	Broken or dirty, out of stock	Monthly/As needed
	Generators	Fuel supply, spark plugs, oil	Annually/As needed
	Emergency lighting system	Battery failure, lights inoperative	Per NFPA
	Crane operators	Failure to lift proper weight	Annually

FACILITY/ EQUIPMENT	SPECIFIC ITEM	TYPES OF PROBLEMS	FREQUENCY
Inspection Schedule – Security Equipment	Area/Facility fences and barriers	Corrosion, damage to fences, barbed wire or barriers	Annually
	Warning signs	Damaged, missing	Monthly
	Gates and locks	Corrosion, damage to fencing or barbed wire, sticking or corroding locks	Monthly
	Two-way radio	Transmitter, receiver, batteries, inoperative	As used/Upon failure

TABLE T-2: SECURITY/EMERGENCY/SECURITY EQUIPMENT INSPECTION LOG SHEET

INSPECTOR'S NAME/TITLE ____
DATE OF INSPECTION ______________________
TIME OF INSPECTION ______________________

ITEM	TYPES OF PROBLEMS	ACCEPTABLE	UNACCEPTABLE	OBSERVATIONS	REMEDIAL ACTION
Area/Facility fences and barriers	Corrosion, damage to fences barbed wire or barriers				
Warning signs	Damaged, missing				
Gates and locks	Corrosion, damage to fencing, sticking or corroded locks				
Two-way radios	Transmitter, receiver, batteries				
Lightning protection system (visual)	Lack of continuity and ground				
Lightning protection wiring and ground (testing)	Lack of continuity and ground				
Accident prevention	Unsafe working environment				
Electrical equipment and installation	Electrical circuitry, power, shorts				
Personal protective clothing and equipment	Wear and tear, loss of integrity				
General fire inspection	Poor housekeeping, smoking violations, blocked fire doors				
Fire extinguishers	Recharging				
Emergency shower and eyewash	Water pressure, leaking, drainage				

INSPECTOR'S NAME/TITLE ____
DATE OF INSPECTION ______________________
TIME OF INSPECTION ______________________

ITEM	TYPES OF PROBLEMS	ACCEPTABLE	UNACCEPTABLE	OBSERVATIONS	REMEDIAL ACTION
Face-shields and goggles	Broken or dirty, out of stock				
Crane operations	Failure to lift proper weight				
Generators	Fuel supply, oil, spark plugs				
Emergency lighting system	Battery failure, lighting				
First air equipment and supplies	Out of stock, lack of integrity, inoperative				
Decontamination facility	Housekeeping, leaks, drainage				

TABLE T-3

PODS MAINTENANCE SCHEDULE

ITEM	PROCEDURES	FREQUENCY*
FEED SYSTEM		
PPC refractory	Inspect for alignment, spalling, or cracking	Yearly
PPC supporting structure	Inspect for cracked or broken welds	Yearly
Feed and soil conveyors Fuel feed pumps and piping	Inspect for conveyor belts for wear, loose connections, and binding. Grease fittings. Inspect drive chains for wear. Clean and oil drive chains and sprockets.	Monthly
Feed and soil conveyor gear motors	Check oil level and refill as required	Weekly
ID blowers	Check oil level and refill as required. Grease gear drive.	Monthly Monthly
Air compressor+	a) Dust of cylinder fins, heads, intercoolers, aftercoolers, and other compressor parts that collect dust. Remove air strainers and wash in a non-explosive solvent. Allow to dry and re-install. Check the air line oil filter. Change the filter element if necessary. Check the safety relief valve by pulling on the ring to release air from tank. b) Check the pressure switch cut-in and cut-out settings. Inspect drive belts. Tighten if necessary. Replace worn, cracked or broken belts.	Monthly Monthly
SCC	Inspect for spalling or cracking	Annually
SCC	Inspect for particulate accumulations	Bi-Annually
Quencher	Inspect nozzles for wear and/or plugging	Annually
Quencher	Inspect interior for pitting and/or corrosion	Annually
Absorber Sump	Inspect interior for pitting and/or corrosion cracking	Annually
Absorber	Inspect nozzles for wear and/or plugging	Annually
Absorber	Inspect packing for plugging and/or particulate build up	Annually

+ Air compressors will be maintained by plant air system maintenance staff.

ITEM	PROCEDURES	FREQUENCY*
High-Energy Scrubber	Inspect nozzles for wear	Annually
Chiller Pre-Filter	Actuate by-pass manually to clean value seats	Monthly
Scrubber and Chiller Heat Exchangers	Inspect heat exchanger plates for fouling or plugging	Annually
NO_x Removal	Inspect catalysts for plugging	Annually
NO_x Removal	Inspect NH3 nozzles for wear and/or plugging	Annually
Baghouse and bags	Inspect bags for tears or rips replace damaged bags as required. Inspect bag cages and bag clamps. Inspect frame insulation.	Bi-Annually
INSTRUMENT AND CONTROLS		
PPC pressure measurement	a) Check calibration	Annually
Stack gas mass flow measurement	a) Check calibration	Annually
Baghouse pressure drop measurement	a) Check calibration	Annually
SCC temperature loop	Verify calibration	Annually
Quencher/Absorber Off Gas Exit temperature loop	Verify calibration	Annually
Quencher/Absorber sump pH loop	Verify calibration	Annually
Ordnance conveyor feed rate proximity switch	Verify calibration	Annually
Soil conveyor feed rate proximity switch	Verify calibration	Annually
SCC burner flame detector	Inspect wiring and clean viewing window	Annually
Quencher/Absorber sump pH probe	Clean and inspect pH probe	Annually
Scrubber atomizing air pressure measurement	a) Check calibration	Annually
Scrubber water flow measurement	a) Check calibration	Annually

SECTION U: CLOSURE PLAN FOR PODS

Closure of Plasma Ordnance Demilitarization System (PODS) ***[40 CFR 264.351]***

The PODS will treat hazardous waste and contaminated materials generated at HWAD through thermal treatment. Closure activities for the PODS must therefore meet the requirements for closing hazardous waste incinerators. The closure of the PODS will meet the closure performance standards and will be implemented in accordance with the approved closure plan. Any inventories of wastes will be removed and disposed of in accordance with the approved closure plan. See the closure plan for a description of planned closure activities, including inventory removal and removal and/or decontamination of equipment and structures.

Closure Performance Standards [40 CFR 264.111 and 264.112]

The closure performance standard will be determined at such time that closure of the hazardous waste management unit at HWAD is contemplated. The closure performance standard will be defined to ensure the following:

- The need for continuing maintenance (i.e. post-closure maintenance) will be minimized.
- The closure activities will control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere.
- The closure activities will comply with the provisions of 40 CFR Part 264 Subpart G.

The closure performance standard will be defined and proposed by HWAD and will be submitted to the USEPA and NDEP for approval before implementation of the closure plan.

A copy of the closure plan will be kept at HWAD until closure is completed and certified. If changes in operating plans or facility design affect the closure plan, the plan will be amended in accordance with the provisions of 40 CFR 264.112. HWAD will be responsible for expanding upon and updating the facility's copies of closure plans when revisions are necessary due to changes in the operations, facility design, and schedule. The USEPA Region IX and NDEP will be notified prior to the date closure activities are scheduled to begin as required by the regulation. All closure activities will be completed within 180 days after closure is initiated.

Within 60 days of completion of closure activities, the owner/operator and an independent registered Professional Engineer will certify that closure of the facilities was completed in accordance with the specification contained in the approved Closure Plan and with 40 CFR 264.115. This certification will be forwarded to the Regional Administration, USEPA.

CLOSURE PLAN [40 CFR 270.14(b)(13)]

INTRODUCTION

This closure plan has been prepared to address the temporary or complete closure of the Plasma Ordnance Demilitarization System (PODS). The plan is designed to meet the performance standards of Title 40 Code of Federal Regulations (CFR) Section 264.111 as follows:

a. The plan is designed to minimize the need for further maintenance of the PODS facility; and
b. The plan is designed to control, minimize, or eliminate, to the extent necessary to prevent threats to human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the groundwater, surface water, or atmosphere.

The closure plan includes:

1. The necessary steps to temporary layaway the facility until funding for operation of the unit is available or to permanently close the unit should it be necessary to do so;
2. An estimate of the maximum inventory of wastes in treatment at any time during the life of the facility;
3. A description of the steps needed to decontaminate facility equipment and secure it for future use during the temporary closure period or dismantle and permanently close it; and
4. An estimate of the expected year of temporary closure or complete closure and a schedule for temporary and complete closure, which includes the total time required to complete the closure activities.

Copies of the closure plan are maintained at the installation. If any operational changes occur that will affect the closure plan, an amendment to the closure plan will be submitted to the

Nevada Department of Environmental Protection (NDEP). In accordance with 40 CFR § 264.140(c), no closure cost estimates or financial assurance mechanisms are included in this closure plan because the installation is a federal facility.

PLASMA ORDNANCE DEMILITARIZATION SYSTEM DESCRIPTION

Plasma Ordnance Demilitarization System

The PODS consists of a plasma furnace with air pollution control equipment (APCE) and a water treatment system. The PODS is designed to safely destroy (or deactivate) a wide variety of obsolete and unserviceable munitions using plasma technology. These materials are considered hazardous waste under the Resource Conservation and Recovery Act (RCRA) due to their explosive (reactive) components. Some materials may also be hazardous due to their metal content or principal organic hazardous constituents (POHC).

PODS PROCESS DESCRIPTION

Plasma Furnace

The PODS furnace consists of a sealed primary processing chamber (PPC) in which plasma torches supply thermal energy to melt inorganic materials and combust organic materials through high temperature oxidation. The plasma furnace consists of computerized controls, a PPC, a slag collection chamber, a plasma arc torch, and a feed system.

The PODS furnace operates as a stationary hearth (crucible) furnace with an almost continuously moving torch. Material in the hearth is heated by a plasma torch to melting temperature, which creates an electrically conductive molten bath that is ready to receive the waste input. Ordnance and slag forming materials (soil, iron, and/or slag enhancing additives) are fed into the PPC hearth during processing by conveyor feeders. Both a treated, non-hazardous glassy slag and an off gas are generated as part of this process.

At the point when the hearth becomes full, feeding is stopped, and the pool is thoroughly heated and treated with the plasma torches to ensure complete oxidation and mixing. The hearth is then tapped and the molten slag is poured into thick steel molds. The mold filling station is located below the PPC in the slag collection chamber. A torch is used during pouring to ensure that the pool near the tap hole remains molten.

The off gas generated by the processing operation is sent to the downstream afterburner and APCE, exiting from the top dome of the PPC.

Afterburner and Air Pollution Control Equipment (APCE)

Ordnance loaded into the PODS furnace melts into the slag. Products from the combustion process (i.e., volatilized metals, particulate matter, and organic products of incomplete combustion (PICs) pass from the furnace into the downstream afterburner and APCE. The PODS PPC is maintained at a slight negative pressure to draw the PPC off gas through the afterburner and assure complete combustion of any organics remaining in the off gas. The downstream APCE then cools the off gas and removes particulate and acid gas. A gas sampling station and continuous emissions monitoring system (CEMS) monitor the treated off gas prior to its release to the atmosphere.

The high temperatures generated by the molten pool of slag and the high stoichiometric ratios in the PPC help to ensure the complete combustion of organic contaminants. However, an afterburner was added to the process to ensure that any PICs that may escape combustion in the PPC will be destroyed before the off gas is emitted to the atmosphere.

The hot gas exiting the afterburner is quenched and then scrubbed for particulate and acid gas removal. A second scrubbing with clean, treated water further removes the particulate. Water used in this wet off gas system as ―scrubber liquor" is constantly blown down to a water treatment system where it is cleaned prior to discharge. A baghouse provides additional particulate removal. An induced draft (ID) fan maintains a negative pressure in the off gas equipment and the PPC to control fugitive emissions. A selective catalytic reduction (SCR) system removes nitrogen oxides (NOx) from the off gas before it is released to the atmosphere.

Water Treatment System

The scrubber water blowdown stream (purge) from the APCE contains high particulate concentrations. The particulate is removed by the water treatment system with chemical precipitation and filtration. As the water enters the water treatment system, it is pH adjusted with lime and then sulfuric and phosphoric acids to remove metals from the water stream. The water is then passed through a flocculation basin where solids are removed. The solid materials are sent through a filter press to remove water and produce the solid filter cake for disposal. The cleaned water is discharged to holding ponds, where it is allowed to evaporate.

HAZARDOUS WASTE INVENTORY

Waste materials are not stored locally at the PODS facility. Ammunition is stored in appropriate buildings at the installation. When the decision to destroy the ammunition is made, the ammunition is moved from the storage area to the PODS facility. Any ammunition left undestroyed at the end of the operating day is moved back to the storage area prior to suspending operations for the day.

The waste streams generated from processing ordnance in the PODS are slag, fly ash that accumulates in the PPC and afterburner, baghouse ash, scrubber blowdown liquid, filter cake from the water treatment system, and excess clean treated water. These waste streams are stored, handled, and disposed in accordance with all state and federal regulations.

CLOSURE PROCEDURES

Performance Standards

The performance standards for closure of the PODS will vary depending upon the type of closure being performed. In both cases, the standards have been developed to control, minimize, or eliminate, to the extent necessary to prevent threats to human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.

For temporary closure, the following performance standards will be achieved:

1) The exterior of all APCE that is located outdoors will be cleaned to the point that no hazardous residue is indicated via a wipe sample analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) for metals (SW-846 Method 1311) and using a High Performance Liquid Chromatography (HPLC) method for explosives (SW-846 Method 8330M).
2) The internals of all process equipment, except for the water treatment equipment, will be sealed or protected to prevent the infiltration of rainwater and contamination of runoff.

The filter bags and accumulated dust will be removed from the baghouse, and the absorber packing and demister pads will be rinsed in place prior to sealing the units.

3) The interior walls and floors of the primary PODS building will sampled to determine if any contamination is present. If such contamination is found, the walls and floors will be rinsed clean with water such that no visible residue remains on them, and wipe tests of them confirm no residual contamination of metals or explosives. The exterior of all process equipment located inside the primary PODS building will also be sampled to evaluate the level of contamination (if any). If necessary, this equipment will then be rinsed with water and wipe tested to confirm no residual contamination of metals or explosives. Rinse water will be collected and sent through the water treatment system. The building will then be closed in place, as components of the heating and fire suppression systems within the building service other adjacent process equipment and will need to be serviced during the post-closure period.
4) The water treatment equipment will be rinsed and pumped to the evaporation ponds, inspected and cleaned of visible residue, and secured to minimize water infiltration.

For complete closure of PODS, the following performance standards will be achieved:

1 All PODS components will be decontaminated to the ―XXX" (3X) condition as described in Chapter 2, Section 2-2(c)(2) in the Department of Army Technical Bulletin TB700-4 on the Decontamination of Facilities and Equipment. The 3X condition is a criteria described in the Bulletin which indicates that equipment or facilities have been examined and decontaminated by approved procedures and that no contamination can be detected by appropriate instruments, test solutions, or visual inspection. Facilities classified as 3X are considered safe for intended government use. Further description on the methods that will be used for decontaminating PODS components and meeting the 3X criteria are further specified in Items 2 through 6 below.

2 All internal components that can be removed from the PODS equipment (*e.g.,* filter bags, scrubber packing, demister pads, *etc.*) will be removed and disposed as either a hazardous or non-hazardous waste, as appropriate.

3 All process equipment will be cleaned to the point that no hazardous residue is indicated via a wipe test for explosives and TCLP metals, or the equipment will be disposed as a hazardous waste at a RCRA permitted landfill.

4 As the PODS building is also used to support the nearby boiler plant, it may remain in place after being RCRA-closed to continue its service to the boiler plant. In this case, the walls and floors of the primary PODS building will be cleaned to the point that no hazardous residue is indicated via a wipe test for explosives and TCLP metals. Should the boiler plant no longer be in operation at the time of PODS closure, the building may be demolished and disposed as a hazardous waste at a RCRA permitted landfill in lieu of being cleaned and RCRA-closed.

5 The water treatment equipment will be decontaminated and removed for use in either another location, scrapped, or disposed accordingly.

6 The soil and groundwater surrounding the PODS will be verified as not contaminated via analyses of soil borings as described in Section V or appropriate remedial action will be taken.

Decontamination of Surfaces, Structures, and Components [40 CFR 264.112(b)(4)]

PPC, Afterburner, and Refractory Lined Off Gas Piping

The PPC section of the furnace is made of carbon steel and is refractory lined in the middle and upper sections. The lower hearth section will contain non-poured slag. A layer of particulate from the process will cover the PPC internals and will contain metals from the processing of ordnance. Likewise, the off gas piping and the afterburner are refractory lined and the lining, as well as other internal components, will be covered in a layer of particulate from the processing operation. This particulate will contain metals similar to those in the processed ordnance.

For temporary closure, any previously non-poured slag remaining in the PPC will be contained within the vessel. This slag has been shown to be non-hazardous and will remain stable within the unit. The PPC, afterburner, and the off gas piping will be secured and sealed to prevent infiltration of rain water during the post-closure period. No internal residue will be removed from either the afterburner or the off gas piping as to do so would require dismantling of the chamber and/or duct and would result in more contamination than if they are simply sealed. The PPC, afterburner, and the off gas piping will be closed in place and will not be dismantled and disposed as part of the temporary closure process.

The exterior of the equipment inside the PODS building will then be wipe tested to determine if residual contamination is present. If found, this contamination will be rinsed and cleaned until no residual contamination is evident via a wipe test.

For complete closure, decontamination will be performed as described above but will also include removal of any non-poured slag and disposal of the refractory on the internal surfaces of the PPC and afterburner. Following removal of the debris and refractory, the PPC will be disassembled and placed on containment liners for physically and manually removing any remaining residue. These containment liners will then be containerized and managed as hazardous waste. The PPC and afterburner shells will be non-hazardous, as the internal lining and refractory has protected them from exposure to the hazardous wastes. As such, the shells will either be scrapped or disposed at a non-hazardous solid waste landfill. The off gas piping will be removed, sealed on either end, and disposed of as a hazardous waste.

Feed Conveyors

The feed conveyors transport flux material (e.g., soil, iron or slag enhancing materials) and waste munitions to the PPC. Over time, the feed conveyors may accumulate residue from these materials. As a result, for temporary closure, the feed conveyors will be wipe sampled to determine if any hazardous waste residue is present. If such contamination is evident, the conveyors will be water-rinsed to remove the accumulated residue. The water will be collected and sent through the water treatment system. After rinsing is complete, wipe samples will be taken to ensure no residual contamination of metals or explosives exist.

For complete closure, the feed system components will be steam cleaned following the initial brushing described above. The rinse water will be collected and analyzed for explosives and TCLP metals to determine if it is characteristically hazardous. Wipe samples will then be collected from the feed conveyors and will be tested to determine if the conveyors still contain hazardous residue. Additional cleaning (e.g., scrubbing, solvent rinse, etc.) will then be performed as necessary until the conveyors are confirmed as non-hazardous. The conveyors will then be scrapped, disposed at a non-hazardous waste landfill, or commissioned for another government project.

Air Pollution Control Equipment (APCE)

The APCE is comprised of a quencher, absorber, hydrosonic scrubber, moisture separator, two gas reheaters, baghouse, ID fan, SCR unit, stack, and associated piping. The absorber contains metal packing that provides the surface area for acid gas removal, the moisture separator contains demister pads that remove excess moisture from the gas stream, and the baghouse contains filter bags that help to remove particulate from the flue gas. Each of the wet APCE components generate a liquid residue stream that is treated in the wastewater treatment system, and the baghouse generates a solid residue stream. The SCR system contains a catalyst that is integral to the unit with zero residue discharge.

For temporary closure, the filter bags and any remaining dust from the baghouse will be removed and containerized as a hazardous waste. The absorber packing and demister pads will be rinsed in place and dried to remove any lingering residue. After rinsing, the packing and demister pads will be left in place, secured in the units. The liquid residue from the wet APCE will be discharged to the water treatment system upon shutdown of the unit and will be handled as described in Section (4) below.

All APCE units located outside the PODS building will be dry brushed and/or cleaned on the exterior surface. All APCE units located inside the PODS building will be water-rinsed. The water will be collected and sent through the water treatment system. All gates and other ancillary devices will be vacuumed. Wipe samples from the exterior of each device will be collected as described in Section V and will be tested for explosives and TCLP metals to determine if any hazardous residue remains. Further decontamination, such as scrubbing, solvent rinse, etc., will depend upon analysis of the samples.

Once all APCE external components have been tested and confirmed to contain no hazardous residue on their exterior surfaces, each unit will be sealed to prevent the infiltration of rainwater during the post-closure period. The units will then be closed in place and will not be dismantled and disposed as part of the temporary closure process.

In the event that complete closure is performed, the absorber's packing and the demister pads from the moisture separator will be removed. The packing and demister pads will be analyzed to determine whether they are hazardous or non-hazardous and will be disposed as required based on the results of these analyses. The interior of the APCE units will then be decontaminated using a detergent and water rinse. The two exceptions to this are the reheaters and the SCR unit. Each of these units will be kept whole and disposed as a RCRA hazardous waste. Further decontamination of the APCE components, such as scrubbing, solvent rinse, etc., will depend upon analysis of the wipe samples. Once the equipment has been thoroughly decontaminated and confirmed to be non-hazardous, it will either be scrapped or disposed at a non-hazardous solid waste landfill.

Scrubber Blowdown Water Treatment System

The water treatment system is designed with chemical precipitation and filtration to remove metals and particulate from the scrubber blowdown streams. The only residues generated from this process are the solid filter cake, which has occasionally tested as hazardous, and the non-hazardous cleaned water that is discharged to the holding ponds.

Prior to initiating the closure activities, the water treatment system will be restarted and tested to confirm proper operation. At that time, any remaining liquid within the PODS system will be treated in the water treatment system as excess water. The cleaned water will then be pumped to the lined ponds. All excess solids and materials from the process (e.g., filter cake and other solid reside) will be collected and removed. These materials will then be tested for explosives and TCLP metals to determine if they are characteristically hazardous and will be disposed accordingly.

All tanks, pumps, and piping in the water treatment system will be flushed of processing residue while still connected to the water treatment system. The flushed residue will be processed through the water treatment system and handled in the same manner as described above for excess water. The openings for the tanks, pumps, and piping will then be sealed from the environment closed in place.

Once all water and residue has been removed from the water treatment system, the unit will then be closed in place and will not be dismantled and disposed as part of the temporary closure process. Covers will be installed on the clarifier and mix tanks and the filter press to prevent accumulation of water in the tanks during the post-closure period.

If complete closure is performed, the tanks, pumps, and piping in the water treatment system will be steam cleaned and dismantled. The equipment will then be wipe tested as described in Section V to determine if it is hazardous or non-hazardous. The equipment will then be disposed of accordingly based on the determination made from the wipe tests.

Cleaned Excess Water from Pond Liners

Upon initiation of temporary or complete closure, any remaining water within the ponds will be allowed to evaporate. The interior of the ponds after draining will be swept clean of all residue except for that collected in the corners of the pond, which is used to help anchor the liner. The collected material will be analyzed for explosives and TCLP metals to determine whether it exhibits any hazardous characteristics and will be disposed accordingly. If the analysis determines the samples to be non-hazardous, the material in the corners will be left to serve as an anchor for the liners. If the material is determined to be hazardous, the material in the corners will be removed, and after further decontamination of the liners, an alternate method of anchoring the liners will be determined.

For temporary closure, the pond liners and system will be closed in place once the solid residue has been removed and will not be dismantled. Any water that accumulates in the ponds after temporary closure is complete will be allowed to evaporate. Any solid residue that accumulates in the ponds after they have been swept clean will be allowed to accumulate until such a point that it becomes necessary to remove the material. At this time, samples of the collected solid material will be collected and analyzed to determine the appropriate method of disposal Note that any water or solids that do accumulate during the post-closure period will be from precipitation events or the surrounding area.

To ensure continued integrity of the pond liners following temporary closure and during the subsequent post-closure period, the liners will be inspected annually for damage and will be repaired as necessary. Additionally, sampling of the water system below the ponds will continue in accordance with the NPDES permit.

For complete closure, after the residue has been swept from the ponds, wipe samples will be collected from the pond liners as described in Section V. These wipe samples will be tested for explosives and metals to determine if any hazardous residue remains on the liners. Further decontamination of the liners, such as scrubbing, solvent rinse, etc., will depend upon analysis of the samples. Upon review of the results, it will be decided whether to proceed with further cleaning of the pond liners or simply dispose of them as a hazardous waste. After final decontamination (or after deciding to dispose of the liners as hazardous waste), the pond liners will be removed and disposed appropriately and the pond basins will be filled with clean fill.

Disposal of Accumulated Residues, Clean-Up Debris, and Used Equipment

As described above, the temporary or complete closure of the PODS facility will result in the generation of various solid and liquid residues, as well as some clean-up debris and used equipment. If any of these materials are determined via process knowledge or testing to be characteristically hazardous they will be disposed as hazardous waste at an off-site, permitted hazardous waste disposal facility. Information on the disposition of specific items resulting from the closure process is provided in Table U-1, below.

TABLE U-1
FINAL DISPOSITION OF ACCUMULATED RESIDUES,
CLEAN-UP DEBRIS, AND PODS EQUIPMENT

Process Equipment	Item	Disposition [1]	Temporary Closure	Closure
All	Cleaning materials (wipes, brushes, *etc.*)	Hazardous waste landfill	✓	✓
Primary processing chamber	External water Rinse	Water treatment system	✓	✓
	Unpoured slag	Remove and dispose at non-hazardous solid waste landfill	- - -	✓
	Refractory	Hazardous waste landfill	- - -	✓
	Containment liners	Hazardous waste landfill	- - -	✓
	Shell	Non-hazardous solid waste landfill or scrap [2]	- - -	✓
Afterburner	External water rinse	Water treatment system	✓	✓
	Refractory	Hazardous waste landfill	- - -	✓
	Containment liners	Hazardous waste landfill	- - -	✓
	Shell	Non-hazardous solid waste landfill or scrap [2]	- - -	✓

Off gas piping	External water rinse	Water treatment system	✓	✓
	Shell and refractory	Hazardous waste landfill	- - -	✓
Feed conveyors	External water rinse	Water treatment system	✓	✓
	Rinse water from steam cleaning	Test and dispose accordingly	- - -	✓
	Conveyors	Non-hazardous solid waste landfill, scrap, or recommision [2]	- - -	✓
Quencher	Detergent and/or water rinses	Water treatment system or test and dispose accordingly	✓	✓
	Shell	Non-hazardous solid waste landfill or scrap [2]	- - -	✓
Absorber	Detergent and/or water rinses	Water treatment system or test and dispose accordingly	✓	✓
	Metal packing	Test and dispose accordingly	- - -	✓
	Shell	Non-hazardous solid waste landfill or scrap [2]	- - -	✓
Scrubber	Detergent and/or water rinses	Water treatment system or test and dispose accordingly	- - -	✓
	Shell	Non-hazardous solid waste landfill or scrap [2]	- - -	✓
Moisture separator	Detergent and/or water rinses	Water treatment system or test and dispose accordingly	- - -	✓
	Demister pads	Test and dispose accordingly	- - -	✓
	Shell	Non-hazardous solid waste landfill or scrap [2]	- - -	✓
Water treatment system	Cleaned water	Evaporation ponds	✓	✓
	Filter cake and other solid residues	Test and dispose accordingly	✓	✓
	Rinses	Test and dispose accordingly	- - -	✓
	Water treatment equipment	Non-hazardous solid waste landfill or scrap [2]	- - -	✓
Gas re-heaters	Shell and internals	Hazardous waste landfill	- - -	✓

Baghouse	Filter bags	Hazardous waste landfill	✓	✓
	Brushed internal residue	Hazardous waste landfill	- - -	✓
	Brushed external residue	Hazardous waste landfill	✓	✓
	Detergent and/or water rinses	Test and dispose accordingly	- - -	✓
	Shell	Non-hazardous solid waste landfill or scrap [2]	- - -	✓
Selective catalytic reduction unit	Shell and internals	Hazardous waste landfill	- - -	✓
Evaporation ponds	Held and collected water	Evaporate	✓	✓
	Solid residues	Test and dispose accordingly	✓	✓
	Liners	Test and dispose accordingly	- - -	✓
Soil	Contaminated soil	Hazardous waste landfill	- - -	✓

1 Testing will be conducted via SW-846 Method 1311 for TCLP metals and via SW-846 Method 8330M for explosives to evaluate whether an item is characteristically toxic or reactive. Where appropriate, a pH analysis will also be conducted via SM 4500 to determine if the item is characteristically toxic.

2 Alternatively, if cleaning and decontamination of the equipment shell proves too expensive or labor intensive, the shell will be handled as a hazardous waste and disposed at a RCRA permitted landfill.

SAMPLING AND ANALYSIS

Brushings, rinse water, and dust will be tested to determine if they are characteristically hazardous in accordance with 40 CFR § 261. Analyses will be conducted using USEPA's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) and *Standard Methods for the Examination of Water and Wastewater* (SM). Samples will be analyzed for the following:

- Metals specified in 40 CFR § 261.24 via SW-846 Method 1311 to evaluate whether the sampled item is characteristically toxic;
- Explosives via SW-846 Method 8330M to evaluate whether the sampled item is characteristically reactive; and
- pH, where appropriate, via SM 4500 to evaluate whether the sampled item is characteristically corrosive.

The collected materials will be deemed hazardous if the concentration measured exceeds the threshold for each characteristic specific in 40 CFR §§ 261.22 through 261.24. If hazardous, the brushings, rinse water, and/or dust will be handled as such and will be transported to an off-site RCRA permitted TSDF for disposal.

The PODS equipment and building floors and walls will be sampled and analyzed for possible contamination, as described previously. A wipe sampling technique will be used to determine the surface concentration of metals and explosives on the equipment. The wipe sampling technique involves wiping selected measured areas on the surface to be sampled with Kim Wipe tissues (or equivalent) wetted with distilled water or another appropriate solvent, selected based on the constituents being analyzed. The proposed sampling protocol will generally conform with USEPA Standard Operating Procedure #2011 for wipe samples presented in the *Compendium of Environmental Response Team Waste Sampling Procedures* (EPA/540/P-91/008, January 1991), provided in Appendix A of this plan, or other applicable guidance, as appropriate. Each sample location will be thoroughly wiped with one Kimwipe to remove all residues within the specific measured area to be sampled.

Each individual Kimwipe will be placed in a separate bag and transported to the laboratory for analysis once sample collection is complete. Measured pollutant concentrations will be divided by the corresponding total wipe area to determine the area pollutant concentration for the surface which has been sampled.

Only temporary closure of the PODS is planned at this time. (It is anticipated that operation of the unit will resume in the future when funding becomes available.) Therefore, no soil boring samples will be collected as part of the temporary closure efforts. However, should future administrative decisions require complete closure of the PODS facility, soil boring samples, 2 feet in depth, will be collected at 10-foot intervals around the PODS facility. Samples will be taken at the edge of the structures (*e.g.*, concrete slab, footer) supporting the PPC and other equipment. Samples then will be taken around the entire PODS building perimeter and will extend outwards for a minimum of 50 feet. Analyses will be conducted for explosives and TCLP metals to evaluate the hazardous characteristics of reactivity and toxicity, respectively.

These analyses will then be compared to the analysis of background samples that are collected from multiple locations and depths. The established ―background level" for any constituent will be defined as follows:

- For all constituents for which concentrations in the background samples are above detectable levels, the established background concentration will be defined as the average of the analytical results from nearby unaffected soil samples from the multiple locations and depths. Any analytical results that are found to be significantly different (via statistical methods) will be eliminated from the dataset before the average is determined.
- For all constituents for which concentrations in the background samples are below detectable levels (in all samples), the established background concentration will be defined as two times the average detection limit for the constituent.
- For all constituents for which concentrations in the background samples are a mixture of detectable and non-detectable concentrations, the established background concentration will be defined as the average of the detectable concentrations and two times the detection limit in the non-detectable results.

Any instance in which the soil boring samples collected around the PODS unit exceed the background concentration defined above, will be discussed with NDEP and agreeable cleanup procedures and criteria will be established, if necessary.

If the groundwater is found to be contaminated during soil sampling, a groundwater sampling and analysis plan will be developed and submitted to the NDEP. This plan will include procedures and techniques for sample collection, sample presentation and shipment, analytical procedures, and chain of custody control.

SAMPLING AND ANALYSIS PLAN

This sampling plan has been developed for the Resource Conservation and Recovery Act (RCRA) temporary closure activities for the Plasma Ordnance Demilitarization System (PODS) located at the Hawthorne Army Depot (HWAD) in Hawthorne, Nevada. It, along with the RCRA closure plan provided with the HWAD permit application, describes the sampling and analysis activities required to complete temporary closure of the PODS unit. The closure plan requires equipment and surface sampling and analysis to demonstrate that decontamination procedures were effective. This plan describes the sampling strategies for the closure project, provides detailed procedures for sampling, and establishes quality assurance (QA) and quality control (QC) procedures.

Plan Organization

This sampling plan has been prepared generally following the United States Environmental Protection Agency's (USEPA's) *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) *Chapter Nine, Sampling Plan*. The plan will serve as an essential guidance by which the closure samples will be collected and handled. The plan defines all aspects of QA/QC procedures and establishes sampling and analytical quality indicators that will demonstrate achievement of the sampling objectives.

Sampling Objectives

During the closure activities, sampling will be performed to verify that the closure performance standards have been achieved. The performance standards have been developed to control, minimize, or eliminate, to the extent necessary to prevent threats to human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.

The closure plan addresses two types of closure:

- Temporary closure to secure the unit in place until funding for operation of the unit is available; or
- Permanent closure of the unit.

This sampling plan addresses the sampling requirements for temporary closure. The following performance standards will be achieved for temporary closure:

- The exterior of all APC equipment that is located outdoors will be cleaned to the point that no hazardous residue is indicated.
- The internals of all process equipment, except for the water treatment equipment, will be sealed or protected to prevent the infiltration of rainwater and contamination of runoff.

- The walls and floors of the primary PODS building will be cleaned such that no visible residue remains on them. The building will then be closed in place.
- The water treatment equipment will be rinsed and drained to the retention ponds, inspected and cleaned of visible residue, and secured to minimize water infiltration.

Sampling will be used to verify that cleaning procedures were effective for the exterior of the APC equipment that is located outdoors and for the walls and floors of the PODS building. The closure plan specifies that wipe sampling will be performed. Wipe samples will be collected and analyzed to verify that the equipment and surfaces are free of hazardous residues. Comparison of wipe sample analytical results to an unused wipe media sample (blank) will be used to determine the presence or absence of contamination.

Sampling Design

A judgmental sampling design has been chosen for the closure sampling activities. This sampling design is described in USEPA's Guidance on Choosing a Sampling Design for Environmental Data Collection, December 2002. Judgmental sampling refers to the selection of sample locations based on professional judgment alone, without any type of randomization. Judgmental sampling was chosen based on the following criteria:

- Relatively small-scale features or conditions are under investigation;
- There is reliable historical and physical knowledge about the feature or condition under investigation; and
- The objective of the investigation is to screen an area(s) for the presence or absence of contamination at levels of concern.

In judgmental sampling, the selection of sampling units (i.e., the number and location of samples) is based on knowledge of the feature or condition under investigation and on professional judgment. This method is appropriate for the closure sampling because the current condition of the equipment and area is known and the sampling is only being used to indicate possible contamination after cleaning.

This sampling plan addresses wipe sampling for the exterior of the PODS equipment and for the walls and floors of the PODS building. For sampling purposes, the PODS equipment has been separated into two regions: the interior process equipment, and the APC equipment that is located outdoors (the baghouse and the SCR). The two interior walls closest to the PODS equipment will be sampled, and the floor in the vicinity of the PODS equipment will be sampled. Sample locations will be chosen based on visual observations and process knowledge. Any visibly stained areas on equipment, walls, and floor will be chosen as sampling locations. In the absence of such visual indication, process knowledge will be used to select locations most likely to have been contaminated during unit operation. Table U-2 summarizes the sampling locations and defines the number of samples to be taken for each location

Table U-2
Sample Locations and Number of Samples

Sample Location [1]	Number of Samples		Notes
	Metals (Including Mercury)	Organics (Explosives)	
PODS interior process equipment	3	3	Samples should be distributed over the surface of the PODS internal process equipment, with preference given to those areas most likely to be contaminated (via visual indication or process knowledge).
PODS feed conveyors	2	2	Samples should be distributed over the surface of the feed conveyors.
Baghouse	4	4	Samples should be distributed over the surface of the baghouse.
SCR reheater	2	2	Samples should be distributed over the surface of the reheater.
SCR catalytic reactor	2	2	Samples should be distributed over the surface of the reactor.
Water treatment system filter press	2	2	Samples should be distributed over the surface of the filter press plates.
Building walls	6	6	Samples should be distributed over surface of the two walls closest to PODS equipment.
Building floor (main level)	3	3	Samples should be distributed over the surface of the floor surrounding and under the PODS equipment and the waste staging area.
Building floor (basement level)	3	3	Samples should be distributed over the surface of the floor surrounding and under the PODS equipment and the waste staging area.
Field duplicates	2	2	Collected immediately adjacent to one of the samples at two designated locations. The baghouse and the building floor have been chosen as the field duplicate sampling locations.
Blanks	3	3	Carried to site, unopened, labeled as blank in field.
Total Number of Samples to Be Analyzed	32	32	

[1] When collecting wipe samples of equipment or building surfaces, preference should be placed on sampling areas with stains or other indications of possible contamination. Absence such evidence, select areas most likely to be contaminated based on process knowledge. If no such areas can be identified, distribute the samples randomly over the surface of the item to be sampled.

Sampling Procedures

The sampling procedures for this project will conform to the following ASTM standards:

- D6966–08, Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Determination of Metals; and
- D6661–10, Standard Practice for Field Collection of Organic Compounds from Surfaces Using Wipe Sampling.

Copies of the referenced procedures are provided in Appendix W. An overview of each procedure is provided herein. This section is only intended to provide a basic overview of the standards. The actual standards in the appendix should be referenced when performing the sampling.

Wipe Sampling for Metals Determination

The procedures of ASTM Standard D6966–08 Section 7 are summarized in Table U-3. Each sampling area will be defined as a 10 centimeter (cm) by 10 cm square. A template will be developed prior to sampling to ensure uniform sample areas.

TABLE U-3
WIPE SAMPLING PROCEDURE FOR METALS DETERMINATION

STEP	PROCEDURE
1	Don a pair of clean, powderless, plastic gloves
2	Carefully place a clean template on the surface to be sampled. Tape the outside edge of the template and outline it with a Sharpie® marker to indicate the position of the template and make sure it does not move.
3	Clean the outside of the wipe container to ensure that the wipe does not become contaminated with dust.
4	Remove the wipe from its container, and inspect the wipe.
5	Using an open flat hand with the fingers together, place the wipe on the surface to be sampled. Wipe the selected surface area, side to side, in an overlapping "S" or "Z" pattern. Wipe the surface so that the entire selected surface area is covered.
6	Inspect wipe for significant shape change or tearing. If any significant changes noted, restart sampling procedures with a different type of wipe at a new sampling location.
7	Fold the wipe in half with the collected dust side folded inward and repeat the wiping procedure (step 5) within the selected sampling area using an up and down overlapping "S" or "Z" pattern at right angles to the first wiping.
8	Fold the wipe in half again with the collected dust side folded inward and repeat the wiping procedure (step 5) one more time, concentrating on collecting settled dust from edges and corners within the selected surface area.
9	Fold the wipe again with the collected dust side folded inward and insert the wipe into a sample container.
10	Label the sample container, identify the sample location, record dimensions of sampling area.
11	Discard gloves.

Wipe Sampling for Organics Determination

The procedures of ASTM Standard D6661–10 Section 7 are summarized in Table U-4. Each sampling area will be defined as a 10 cm by 10 cm square. A template will be developed prior to sampling to ensure uniform sample areas.

TABLE U-4
WIPE SAMPLING PROCEDURE FOR ORGANICS DETERMINATION

STEP	PROCEDURE
1	Don a pair of clean, powderless, plastic gloves
2	Carefully place a clean template on the surface to be sampled. Tape the outside edge of the template and outline it with a Sharpie® marker to indicate the position of the template and make sure it does not move.
3	Clean the outside of the wipe container to ensure that the wipe does not become contaminated with dust.
4	Remove the wipe from its container, and inspect the wipe.
5	Wipe the entire surface to be sampled using firm strokes by pressing with the fingertips. Wipe vertically and then horizontally to ensure there is complete coverage in both directions with minimal overlap of the previous stroke.
6	Fold the wipe with the sampled side inward, place it in the sample container, and cap the container.
7	Label the sample container, identify the sample location, record dimensions of sampling area.
8	Discard gloves.

Blank Samples

The objective of the sampling activities is to verify that cleaning procedures were effective for the exterior of the APC equipment and for the walls and floors of the PODS building. In order to determine the presence or absence of contamination, blank samples must be analyzed to provide a point of comparison.

Unused wipe media samples will be used as the blanks for this sampling program. ASTM Method D6966–08 requires that field blanks field are collected at a minimum frequency of five percent, with a minimum number of three samples for each batch. A total of 32 samples will be collected for this sampling event. Three blank samples will collected.

Blank samples will travel to the site with the other sample media. The containers will not be opened. The blank containers will be labeled onsite and shipped to the laboratory with the collected surface samples.

Field Duplicate Samples

A field duplicate will be collected for two sampling locations, an outside location and an inside location. The sampling locations chosen for the field duplicates are the baghouse and the building floor. For each chosen sampling location, one duplicate sample will be collected. The duplicate sample will be collected immediately adjacent to one of the regular samples for that location.

Other Miscellaneous Samples

Other miscellaneous samples will be collected as necessary to satisfy sampling conditions of other permits, such as the facility National Pollutant Discharge Elimination System (NPDES) permit, or to determine the method of proper disposal. Details on this sampling and the required analyses can be found in the source permits.

Sampling Equipment

The following equipment will be required for the sampling:

- Disposable, powderless, plastic gloves;
- Plastic or cardboard templates for metals sampling;
- Stainless steel, aluminum, disposable heavy-duty aluminum foil or other inert material templates for organics sampling;
- Adhesive tape to secure templates;
- Cleaning cloths to clean templates and other equipment between samples;
- Pre-wetted sampling wipes (material and solution to be selected by laboratory);
- Rigid, sealable sample containers; and
- Preprinted labels, sample log forms, and chain of custody forms.

Analytical Procedures

The analytical methods to be used for this sampling effort are detailed in Table U-5. The table presents the referenced analytical method and sample preparation method.

TABLE U-5
SAMPLE PREPARATION AND ANALYSIS PROCEDURES

PARAMETER	PREPARATION/ANALYTICAL METHOD
Metals (except mercury)	SW-846 Method 6010B
Mercury	SW-846 Method 7470A or 7471A
Organics (explosives)	SW-846 Method 8330

Table U-6 specifies the target analytes for each analytical method.

TABLE U-6
TARGET ANALYTES

ANALYTE	CAS NO.	ANALYTE	CAS NO.
SW-846 Method 6010B (Metals)			
Arsenic	7440–38–2	Lead	7439–92–1
Barium	7440–38–2	Selenium	7782–49–2
Cadmium	7440–43–9	Silver	7440–22–4
Chromium	7440–47–3		
SW-846 Method 7470A or 7471A (Mercury)			
Mercury	7439-97-6		
SW-846 Method 8330 (Explosives)			
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	Nitrobenzene (NB)	98-95-3
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	2-Nitrotoluene (2-NT)	88-72-2
1,3-Dinitrobenzene (1,3-DNB)	99-65-0	3-Nitrotoluene (3-NT)	99-08-1
2,4-Dinitrotoluene (2,4-DNT)	121-14-2	4-Nitrotoluene (4-NT)	99-99-0
2,6-Dinitrotoluene (2,6-DNT)	606-20-2	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7

Quality Assurance and Quality Control

The HWAD is committed to ensuring that the data generated during this project are scientifically valid, defensible, complete, and of known precision and accuracy. This section discusses the QA procedures that will be in place for sample collection and handling. In addition, QC objectives for the analytical methods are established.

Sample Identification

The sampling contractor will be responsible for ensuring that sample tracking documentation procedures are followed for the field sampling efforts. Documentation of all sample collection activities will be recorded on pre-printed data collection forms and sample labels. Table U-7 provides a summary of sample documentation requirements.

TABLE U-7
SAMPLE DOCUMENTATION REQUIREMENTS

DOCUMENT	REQUIRED INFORMATION
Sample identification label	Time and date of sampling
	Description of sample (equipment name, location, etc.)
	Unique identifier for sample
	Target analytes (metals or organics)
	Sampler's name
Sample data forms	List of all samples taken
	Time and date of sampling
	Description of sample (equipment name, location, etc.)
	Unique identifier for sample
	Sampling technique (ASTM Standard D6966–08 or D6661–10)
	Target analytes (metals or organics)
	Sampler's name

Chain of Custody

- An essential part of any sampling and analysis program is ensuring the integrity of the sample from collection to data reporting. The possession and handling of samples should be traceable from the time of collection through analysis and final disposition. chain of custody procedures will be used to ensure the integrity of the samples by tracking possession from the time of collection to delivery to the laboratory. The custody of all samples is tracked using chain of custody forms. The following procedures will be employed: All samples will be properly labeled. Labels will be affixed to the sample container. Sample labels will be completed using waterproof ink.
- A chain of custody form will accompany all samples. When transferring the possession of samples, the individuals relinquishing and receiving the sample(s) will sign, date, and note the time on the form. This form will document sample custody transfer from the sampler, often through at least one other person, to the laboratory.

- The chain of custody form will specify the preservation requirements and the preparation and analysis methods to be used for each sample, as well as any additional information related to the sample.
- Authorized personnel will maintain chain of custody for all samples. The history of each sample and its handling will be documented from the time it is collected through all transfers of custody, until it is relinquished to the laboratory. The laboratory will then maintain internal custody according to the laboratory's procedures.

A sample will be considered to be in a person's custody if:

- It is in one's actual physical possession;
- It is in one's view, after being in one's physical possession;
- It is in one's physical possession and locked or otherwise sealed so tampering will be evident; or
- It is kept in a secure area, restricted to authorized personnel only.

Sample Handling

Samples will be collected, transported, and stored in new, unused containers, such as glass jars, which are constructed of materials inert to the analytical matrix. Only containers that allow airtight seals, such as containers with Teflon-lined lids, will be used.

Table U-8 outlines the holding times for the analytical parameters for wipe samples. All sample holding times will be consistent with the requirements of the method(s), or an equivalent method, if the prescribed method does not specify a holding time. The holding times begin on the day of sample collection, not on the day that samples arrive at the laboratory. Samples are typically hand-delivered or shipped via overnight mail to the contract laboratory.

TABLE U-8
SAMPLE HOLDING TIME REQUIREMENTS

PARAMETER	HOLDING TIME FROM SAMPLE TO EXTRACTION	HOLDING TIME FROM EXTRACTION TO ANALYSIS
Metals (except mercury)	180 days	180 days
Mercury	28 days	28 days
Organics (explosives)	14 days	40 days

Quality Control Parameters

QC objectives include precision, accuracy, representativeness, comparability, and completeness. Typical QC parameters include matrix spike (MS) and MS duplicate (MSD) samples, laboratory control sample (LCS) and LCS duplicate (LCSD) samples, surrogates, and duplicates. Tables U-9 provides the project specific QC procedures for assessing accuracy and precision. The table lists the parameter of analysis, QC parameter, QC procedure, frequency at which accuracy and precision are determined, and objective.

TABLE U-9
QUALITY CONTROL OBJECTIVES

ANALYTICAL PARAMETERS	QC PARAMETER	QC PROCEDURE	FREQUENCY	OBJECTIVE [1]
Metals (except mercury)	Accuracy	LCS	1 per batch	80-120% recovery
	Precision	Field duplicate	1 per chosen sampling location [2]	<25% RPD
Mercury	Accuracy	LCS	1 per batch	80-120% recovery
	Precision	Field duplicate	1 per chosen sampling location [2]	<25% RPD
Organics (explosives)	Accuracy	Surrogates	Every sample	50-130% recovery [3]
	Accuracy	MS	1 per batch	50-130% recovery [3]
	Precision	Surrogates	Calculate RSD for batch	<35% RSD of recovery
	Precision	MSD	1 per batch	<50% RPD [3,4]
	Precision	Field duplicate	1 per chosen sampling location [2]	<20% RPD [3]

1 RPD refers to relative percent difference. RSD refers to relative standard deviation.

2 The chosen sampling locations for the field duplicates are the baghouse and building floor.

3 Limits specified are generally applicable. Actual limits are determined by the laboratory and are compound specific.

4 If the concentrations are less than five times the reporting limit, the laboratory will be unable to control these limits.

Precision

Precision is a measure of the reproducibility of results under a given set of conditions. It is expressed in terms of the distribution, or scatter, of replicate measurement results, calculated as the relative standard deviation (RSD) or, for duplicates, as relative percent difference (RPD). RPD and RSD values are calculated using the following equations:

$$RPD = \left(\frac{|X_1 - X_2|}{\text{avg } X} \right) x\ 100$$

$$RSD = \left(\frac{STDEV}{avg\ X} \right) x\ 100$$

Where X_1 and X_2 represent each of the duplicate results.

Blanks

Blanks will be collected for the sampling event. Blanks will be used to evaluate the effects of contamination on results and also to define background levels for target analytes.

Table U-10 provides the type and acceptance criteria for each stack gas blank to be analyzed. All of these blanks, as well as the laboratory method blanks for the waste samples, provide critical information on the potential contamination that may occur in test program samples. The results of blank analyses can prove very useful when attempting to understand anomalies in data, or generally higher than expected test results.

TABLE U-10
BLANK ANALYSIS OBJECTIVES

ANALYTICAL PARAMETERS	BLANK TYPE	FREQUENCY	OBJECTIVE
Metals (except mercury)	Initial calibration blank	Following initial calibration verification	<Reporting limit
	Continuing calibration blank	Following continuing calibration verification	<Reporting limit
	Field blank	Three per sampling event	<Reporting limit
	Method blank	One per batch	<Reporting limit
Mercury	Initial calibration blank	Following initial calibration verification	<Reporting limit
	Continuing calibration blank	Following continuing calibration verification	<Reporting limit
	Field blank	Three per sampling event	<Reporting limit
	Method blank	One per batch	<Reporting limit
Organics (explosives)	Field blank	Three per sampling event	<Reporting limit
	Method blank	One per batch	<Reporting limit

Detection Limits

The sampling program will rely on comparisons to background concentrations (i.e., blanks) to assess contamination. Analytical results are expected to be at or below detection limits. Therefore, it is imperative that consistent detection limits be achieved across all samples.

Table U-11 presents the expected detection limits for each analyte. The values in the table are laboratory reporting limits (RLs). The laboratory will be instructed to ensure that RLs are consistent for all samples for each analyte.

TABLE U-11
REPORTING LIMITS

ANALYTE	REPORTING LIMIT (PPM)
SW-846 Method 6010B (Metals)	
Antimony	0.05 ppm
Arsenic	0.05 ppm
Barium	0.05 ppm
Beryllium	0.05 ppm
Cadmium	0.05 ppm
Chromium	0.05 ppm
Lead	0.05 ppm
Nickel	0.05 ppm
Selenium	0.05 ppm
Silver	0.05 ppm
Thallium	0.05 ppm
SW-846 Method 7470A or 7471A (Mercury)	
Mercury	0.05 ppm
SW-846 Method 8330 (Explosives)	
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	1 ppm (aqueous), 10 ppm (solids)
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	1 ppm (aqueous), 10 ppm (solids)
1,3-Dinitrobenzene (1,3-DNB)	1 ppm (aqueous), 10 ppm (solids)
2,4-Dinitrotoluene (2,4-DNT)	1 ppm (aqueous), 2.5 ppm (solids)
2,6-Dinitrotoluene (2,6-DNT)	1 ppm (aqueous), 10 ppm (solids)
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1 ppm (aqueous), 10 ppm (solids)
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1 ppm (aqueous), 10 ppm (solids)
Nitrobenzene (NB)	1 ppm (aqueous), 10 ppm (solids)
2-Nitrotoluene (2-NT)	1 ppm (aqueous), 10 ppm (solids)
3-Nitrotoluene (3-NT)	1 ppm (aqueous), 10 ppm (solids)
4-Nitrotoluene (4-NT)	1 ppm (aqueous), 10 ppm (solids)
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	1 ppm (aqueous), 10 ppm (solids)
1,3,5-Trinitrobenzene (1,3,5-TNB)	1 ppm (aqueous), 10 ppm (solids)
2,4,6-Trinitrotoluene (2,4,6-TNT)	1 ppm (aqueous), 10 ppm (solids)

Data Validation and Reporting

This section presents the approaches to be used to reduce, validate, and report measurement data. The project team will make certain that:

- All raw data packages are paginated and assigned a unique project number. Each project number will reflect the type of analyses performed (*i.e.*, metals, organics).
- The data packages contain a case narrative, sample description information, sample receipt information, COC documentation, and summary report. All associated QA/QC results, run/batch data, instrument calibration data, sample extraction/preparation logs, and chromatograms, etc., will be included in the final laboratory report.
- These data are assigned to a specific appendix in the sampling report for easy reference and data review.

Data Validation

Validation demonstrates that a process, item, data set, or service satisfies the requirements defined by the user. For this program, review and evaluation of documents and records will be performed to assess the validity of samples collected, methodologies used, and data reported. This review comprises three parts: review of field documentation, review of laboratory data reports, and evaluation of data quality.

Review of Field Documentation

Sample validation is intended to ensure that the samples collected are representative of the population under study. Criteria for acceptance include positive identification, documentation of sample shipment, preservation, and storage, and documentation demonstrating adherence to sample collection protocols and QC checks.

As part of the review of field documentation, field data sheets and master logbooks will be checked for completeness, correctness, and consistency. The following specific items will be checked:

- Sample collection date;
- Sample identification;
- Any comments that may affect interpretation of results;
- Number of required field QC samples (*i.e.*, field blanks, field duplicates); and
- Sample tracking documentation.

Review of Data Reports

The representative from each laboratory will approve all data results. The representative's signature will be included in the report. This signature will indicate that all QA/QC expectations were met. If expectations were not met, the discrepancies will be explained in the laboratory case narrative. The laboratory representatives will discuss the QA/QC issues and include the impact of these issues on the data results in the case narrative.

The project team will perform a qualitative evaluation of the reported data to verify:

- Adherence to holding time requirements;
- Completeness of target analyte lists;
- Correctness of reporting limits;
- Correctness and consistency of measurement units;
- Inclusion of necessary flags and meaningful comments regarding data;
- Adherence to specified analytical methodologies; and
- Sample tracking documentation.

Evaluation of Data Quality

The project team will review field and laboratory documentation to assess the following indicators of data quality:

- Integrity and stability of samples;
- Performance of instruments used for analysis;
- Possibility of sample contamination;
- Identification and quantitation of analytes;
- Precision; and
- Accuracy.

Data Reporting

All data will be reported in the appropriate units as applicable to the sample and the method of analysis. Wipe sample results will be reported as concentrations per unit area (e.g., µg/cm2). The same unit area (10 cm by 10 cm square = 100 cm2) will be used to calculate the concentration for each sample and the blanks. The results of each sampling location will be compared to the results of the blanks to assess possible contaminant.

Schedule for Closure [40 CFR 264.112(b)(6)]

Closure of the PODS facility may occur in one of two forms: temporary closure until funding for continued operation of the unit is available or complete closure should the decision be made to permanently discontinue all funding for the unit. Complete closure of the PODS is not contemplated at this time, therefore, a detailed schedule and specific dates for complete closure cannot be determined. However, temporary closure of the site is anticipated, allowing a more specific closure schedule to be developed for those activities. A timeline for temporary closure of the PODS is provided in Table U-12, and a more general timeline for complete closure of the PODS is provided in Table U-13. As shown in these tables, in both cases, no additional hazardous wastes will be treated in the PODS within 90 days prior to initiating closure activities. (In essence, the facility will shut down hazardous waste operations 90 days prior to the intended operating life to prevent generation of hazardous wastes.) Additionally, no closure activities will commence until after the 45-day notification period required by 40 CFR § 264.112(d)(1), and all closure activities will be completed within 150 days of implementation. Also depending whether temporary closure or complete closure, a checklist will be followed in Table U-14 and U-15

TABLE U-12
DETAILED SCHEDULE FOR TEMPORARY CLOSURE OF PODS

Days [1]	Activity
0	Initiate temporary closure of PODS
0 - 5	Conduct preliminary sampling of PODS interior structures
7 - 28	Laboratory analysis of preliminary samples
35 - 54	Decontaminate and/or remove equipment, appurtenances, and structures, conduct post-cleaning samples
56 - 77	Laboratory analysis of accumulated residues, debris, and used equipment
77 - 90	Decontaminate remaining equipment or structures if necessary
90 - 120	Remove all accumulated hazardous waste and hazardous waste residues from PODS facility
90 - 150	Remove all accumulated non-hazardous waste and non-hazardous residues from PODS
150 - 160	Dispose of all remaining process reagents and chemicals
160	Complete temporary closure of PODS
180	Submit temporary closure certification and post-closure plan (if necessary) for post-closure care activities

[1] Specified in calendar days. In the event that the calculated duration ends on a Saturday or Sunday, the next activity will begin the following Monday.

TABLE U-13
GENERAL SCHEDULE FOR COMPLETE CLOSURE OF PODS

Day [1]	Activity
-90	Final volume of hazardous waste received and processed at PODS
-45	Submit 45-day notification of closure to NDEP
0	Initiate closure of PODS
0-45	Decontamination and/or removal of equipment, appurtenances, and structures
15-45	Sampling and analysis of accumulated residues, debris, and used equipment
45-60	Remove all accumulated hazardous waste and hazardous waste residues from PODS facility
60-90	Remove all accumulated non-hazardous waste and non-hazardous residues from PODS
75-150	Sample, analyze, and remediate surrounding soils, as necessary
150	Complete closure of PODS
150-210	Develop post-closure plan for PODS facility (if necessary)
210	Submit closure certification and post-closure plan (if necessary) for post-closure care activities

[1] Specified in calendar days.

CERTIFICATION OF CLOSURE

Upon completion of temporary closure and full closure activities, the owner/operator and a registered independent professional engineer will certify that closure of the facilities was completed in accordance with the specification contained in the approved closure plan and with 40 CFR §264.115. This certification will be forwarded to the NDEP and be found in Appendix X.

DRAWINGS

Drawings that demonstrate the size, dimensions, layout, and contours of the facility, the PODS containment building, and the PODS equipment (in addition to Section R, Figure R-1, R-2).

Extension for Closure Time *[40 CFR 264.113]*

Within 90 days of receiving the final volume of hazardous waste, HWAD will treat and remove from the PODS all hazardous waste in accordance with the approved closure plan. Closure activities will be completed within 180 days after receiving final volume of hazardous waste for treatment.

POST CLOSURE PLAN [40 CFR 270.14(b)(13)]

In accordance with 40 CFR 270.14(b)(13) post-closure plans are required as part of the Part B permit application as applicable under 40 CFR 264.110(b). Since PODS is not a hazardous waste disposal facility, nor a waste pile, nor surface impoundment, nor a tank system, post-closure requirements do not apply.

TABLE U-14 CHECKLIST FOR TEMPORARY CLOSURE

TASK	COMPLETE	COMMENTS
Prior to Initiating Closure		
Reassemble the wastewater treatment plant and prepare it for operation and treatment of liquid residue and rinses generated during closure.		
Prepare collection bins, drums, and temporary holding tanks to collect and hold all liquid residue, rinse water, and solid residues generated during the closure process.		
Communicate with the designated offsite laboratory that will be processing all wipe and residue samples. Confirm the required analysis times and detection limits.		
Temporary Closure Procedures for the PODS Building		
Inspect and note the general condition of the building, including all floor and wall surfaces.		
Rinse the walls and floors of the building with water to remove all visible residue, collecting the rinses in an appropriate accumulation container.		
Transfer the collected rinses to the wastewater treatment system for processing.		
Collect wipe samples of the walls and floors per the detailed instructions provided in the sampling and analysis plan.		
Send the collected wipe samples offsite to the designated laboratory for analysis.		
Provide further rinsing and cleaning of the walls and floors as necessary to ensure no residual contamination exists. (Not necessary if wipe samples determine that no contamination remains).		
Temporary Closure Procedures for Combustion Equipment		
Inspect and note the general condition of all combustion equipment.		
Collect wipe samples of the interior process equipment per the detailed instructions provided in the sampling and analysis plan.		
Seal and secure all PPC openings to prevent the infiltration of rain water.		
Seal and secure all afterburner openings to prevent the infiltration of rain water.		
Seal and secure all openings in the off-gas piping between the PPC and afterburner to prevent the infiltration of rain		

TABLE U-14 CHECKLIST FOR TEMPORARY CLOSURE

TASK	COMPLETE	COMMENTS
water.		
Inspect and note the general condition of all feed system components.		
Rinse the feed conveyors with water to remove any material that has accumulated on the conveyor system during unit operations, collecting the rinses in an appropriate accumulation container.		
Transfer the collected rinses to the wastewater treatment system for processing.		
Collect wipe samples of the feed conveyors per the detailed instructions provided in the sampling and analysis plan.		
Send the collected wipe samples offsite to the designated laboratory for analysis.		
Provide further rinsing and cleaning of the feed conveyors as necessary to ensure no residual contamination exists. (Not necessary if wipe samples determine that no contamination remains).		
Temporary Closure Procedures for the Air Pollution Control System		
Inspect and note the general condition of all air pollution control system components.		
Dry brush or clean the exterior surface of all air pollution control equipment located outside of the PODS building.		
Vacuum all air pollution control equipment gates or ancillary devices to remove accumulated residue.		
Remove the filter bags and accumulated ash from the baghouse and dispose as a hazardous waste.		
Rinse the exterior surface of all air pollution control equipment located inside of the PODS building, collecting the rinses in an appropriate accumulation container.		
Rinse the absorber packing and demister pads in place to remove any lingering residue.		
Transfer and discharge any remaining liquid residue or liquid rinses of the air pollution control equipment to the wastewater treatment system for processing.		
Collect wipe samples from the exterior of all air pollution control equipment per the detailed instructions provided in the sampling and analysis plan.		
Send the collected wipe samples offsite to the designated laboratory for analysis.		
Provide further rinsing and cleaning of the air pollution control equipment as necessary to ensure no residual contamination exists. (Not necessary if wipe samples determine that no contamination remains).		

TABLE U-14 CHECKLIST FOR TEMPORARY CLOSURE

TASK	COMPLETE	COMMENTS
Seal and secure all openings in the air pollution control equipment located outside of the PODS building to prevent the infiltration of rain water.		
Temporary Closure Procedures for the Water Treatment System		
Inspect and note the general condition of water treatment system components.		
Complete processing of all liquid residue and rinses.		
Flush all tanks, pumps, and piping associated with the water treatment system, processing the flush water through the water treatment system.		
Pump cleaned water to the accumulation ponds.		
Remove and collect all excess solids and materials from the water treatment equipment in an appropriate container.		
Collect wipe samples from the filter press per the detailed instructions provided in the sampling and analysis plan.		
Collect samples of the accumulated solid residues.		
Send the samples to the designated laboratory for analysis.		
Dispose of the accumulated solid residues appropriately based on the results of the laboratory analysis.		
Vacuum any residual liquids from the water treatment equipment and transfer the collected liquids to the accumulation ponds.		
Install covers on the clarifier tanks, the mix tanks, and the filter press to prevent accumulation of water.		
Seal and secure all other openings for the tanks, pumps, and piping in the water treatment system.		
Temporary Closure Procedures for the Evaporation Ponds		
Inspect and note the general condition of the evaporation ponds and the initial level of water in the ponds.		
Allow water accumulated within the ponds to evaporate.		
Sweep the pond liners clean of all residue, except for that collected in the corner of the pond. Adequate sediment should remain in the corners to help anchor the liners.		
Collect samples of the accumulated solid residues.		
Send the collected residue samples offsite to the designated laboratory for analysis.		
Dispose of the accumulated solid residues appropriately based on the results of the laboratory analysis.		
If the accumulated solid residues were deemed hazardous waste, sweep the remaining solid residue from the corners of the ponds.		
Dispose of the remaining solid residues appropriately.		
Provide another mechanism for anchoring the pond liners.		

TABLE U-15 CHECKLIST FOR COMPLETE CLOSURE

TASK	COMPLETE	COMMENTS
Prior to Initiating Closure		
Reassemble the wastewater treatment plant and prepare it for operation and treatment of liquid residue and rinses generated during closure.		
Prepare collection bins, drums, and temporary holding tanks to collect and hold all liquid residue, rinse water, and solid residues generated during the closure process.		
Communicate with the designated offsite laboratory that will be processing all wipe and residue samples. Confirm the required analysis times and detection limits.		
Complete Closure Procedures for the PODS Building		
Inspect and note the general condition of the building, including all floor and wall surfaces.		
Rinse the walls and floors of the building with water to remove all visible residue, collecting the rinses in an appropriate accumulation container.		
Transfer the collected rinses to the wastewater treatment system for processing.		
Collect wipe samples of the walls and floors per the detailed instructions provided in the sampling and analysis plan.		
Send the collected wipe samples offsite to the designated laboratory for analysis.		
Provide further rinsing and cleaning of the walls and floors as necessary to ensure no residual contamination exists. (Not necessary if wipe samples determine that no contamination remains).		
Complete Closure Procedures for Combustion Equipment		
Inspect and note the general condition of all combustion equipment.		
Remove any unpoured slag from the PPC and dispose as a non-hazardous solid waste.		
Remove all refractory from the internal surfaces of the PPC and the afterburner and dispose as hazardous waste.		
Remove the off-gas piping, seal all openings, and dispose as a hazardous waste.		
Disassemble the PPC, place components on containment liners, and remove any remaining residue from the chamber.		
Containerize the spent liners and collected residue and dispose as a hazardous waste.		
Complete disassembly of the PPC and afterburner shells and prepare them for scrap or non-hazardous solid waste disposal.		

TABLE U-15 CHECKLIST FOR COMPLETE CLOSURE

TASK	COMPLETE	COMMENTS
Complete Closure Procedures for the Feed System		
Inspect and note the general condition of all feed system components.		
Rinse the feed conveyors with water to remove any material that has accumulated on the conveyor system during unit operations, collecting the rinses in an appropriate accumulation container.		
Steam clean the feed conveyors to remove any additional residue accumulated on the conveyor system, collecting runoff in an appropriate accumulation container.		
Transfer the collected rinses to the wastewater treatment system for processing.		
Collect wipe samples of the feed conveyors per the detailed instructions provided in the sampling and analysis plan.		
Send the collected wipe samples offsite to the designated laboratory for analysis.		
Provide further rinsing and cleaning of the feed conveyors as necessary to ensure no residual contamination exists. (Not necessary if wipe samples determine that no contamination remains).		
Complete disassembly of the feed conveyor system and prepare the components for scrap, non-hazardous solid waste disposal, or recommissioning on another system.		
Complete Closure Procedures for the Air Pollution Control System		
Inspect and note the general condition of all air pollution control system components.		
Dry brush or clean the exterior surface of all air pollution control equipment located outside of the PODS building.		
Vacuum all air pollution control equipment gates or ancillary devices to remove accumulated residue.		
Remove the filter bags and accumulated ash from the baghouse and dispose as a hazardous waste.		
Remove the absorber packing and demister pads, collecting samples for laboratory analysis.		
Rinse the exterior surface of all air pollution control equipment located inside of the PODS building, collecting the rinses in an appropriate accumulation container.		
Decontaminate the interior of all air pollution control equipment, except for the reheaters and SCR unit, using a detergent and water rinse.		
Transfer and discharge any remaining liquid residue or liquid rinses of the air pollution control equipment to the wastewater treatment system for processing.		

TABLE U-15 CHECKLIST FOR COMPLETE CLOSURE

TASK	COMPLETE	COMMENTS
Collect wipe samples from the exterior and interior of all air pollution control equipment per the detailed instructions provided in the sampling and analysis plan.		
Send each of the collected residue and wipe samples offsite to the designated laboratory for analysis.		
Dispose the absorber packing and demister pads as appropriate based on the laboratory analysis.		
Provide further rinsing and cleaning of the air pollution control equipment as necessary to ensure no residual contamination exists. (Not necessary if wipe samples determine that no contamination remains).		
Complete disassembly of the air pollution control system.		
Prepare each of the cleaned air pollution control components for scrap or non-hazardous solid waste disposal.		
Seal and secure all openings on the preheaters and the SCR and dispose as a hazardous waste.		
Complete Closure Procedures for the Water Treatment System		
Inspect and note the general condition of water treatment system components.		
Complete processing of all accumulated liquid residue and rinses.		
Flush all tanks, pumps, and piping from the water treatment system, processing flush water through the water treatment system.		
Steam clean the tanks, pumps, and piping from the water treatment system, processing all water through the water treatment system.		
Collect wipe samples of the cleaned tanks, pumps, and piping per the detailed instructions provided in the sampling and analysis plan.		
Pump cleaned water to the accumulation ponds.		
Remove and collect all excess solids and materials from the water treatment equipment in an appropriate container.		
Collect samples of the accumulated solid residues per the detailed instructions provided in the sampling and analysis plan.		
Send the collected wipe samples and residue samples offsite to the designated laboratory for analysis.		
Complete disassembly of the water treatment equipment and dispose appropriately based on the results of the laboratory analysis.		
Dispose of the accumulated solid residues appropriately based on the results of the laboratory analysis.		

TABLE U-15 CHECKLIST FOR COMPLETE CLOSURE

TASK	COMPLETE	COMMENTS
Complete Closure Procedures for the Evaporation Ponds		
Inspect and note the general condition of the evaporation ponds and the initial level of water in the ponds at the time of closure.		
Allow water accumulated within the ponds to evaporate.		
Sweep the pond liners clean of all residue.		
Collect samples of the accumulated solid residues per the detailed instructions provided in the sampling and analysis plan..		
Collect wipe samples of the pond liners per the detailed instructions provided in the sampling and analysis plan..		
Send the collected residue samples and wipe samples offsite to the designated laboratory for analysis.		
Dispose of the accumulated solid residues appropriately based on the results of the laboratory analysis.		
Provide further rinsing and cleaning of the pond liners as necessary to ensure no residual contamination exists, or dispose as a hazardous waste. (Not necessary if wipe samples determine that no contamination remains).		
Fill the pond basins with clean fill.		
Collect soil boring samples as directed in the Closure Plan at 10-foot intervals around the PODS facility.		
Send the collected soil boring samples offsite to the designated laboratory for analysis.		
Evaluate the soil boring sample results and determine an appropriate plan of action for site cleanup, if necessary.		

SECTION V FACILITY DESCRIPTION FOR THE BULK ENERGETICS DEMILITARIZATION SYSTEM (BEDS)

BEDS FACILITY DESCRIPTION

GENERAL FACILITY DESCRIPTION [40 CFR 270.14(b)(1)]

The Bulk Energetics Demilitarization System (BEDS) is designed to safely destroy a wide variety of obsolete and unusable bulk propellants using a rotary kiln and combustion chamber coupled with a slurry-feed system and state-of-the-art Pollution Abatement System (PAS) that meets or exceeds National Air Emission Standards. Air emissions from BEDS operation, as well as any air pollutants generated (expected to be minor) during the renovation and closure phases of the project, will be regulated under the CAA as administered by the Nevada Division of Environmental Protection (NDEP). Design and operation of BEDS will satisfy all applicable federal and state environmental regulations. Section X (―Process Information for BEDS") and Appendix U (―BEDS Comprehensive Performance Test Plan") provide more detailed information on BEDS. Since much of the overall facility information presented in Section A, ―Facility Description," is also applicable to BEDS, Section V will only address BEDS specific information.

(a) LOCATION OF BEDS

BEDS is located in the Western Area Demilitarization Facility (WADF). The existing Building 117-4 is the slurry preparation building for BEDS. Building 117-4, the existing East Incinerator, and the proposed new PAS make up the BEDS facility. WADF is located on the Hawthorne Army Depot (HWAD) just southeast of Walker Lake. Figure V-1 is a map showing WADF and the location of Building 117-4/BEDS within WADF.

As a point of clarification, there are two incinerator systems at Building 117-4; the East and the West Incinerators. The East Incinerator is the system associated with BEDS.

(b) BEDS FACILITY INFORMATION

The BEDS facility will consist of the following major components:

- Feed System
- Rotary Kiln
- Combustion Chamber

- Pollution Abatement System (PAS)
- Process Control Computer

A process-flow diagram showing the arrangement of these components is given in Figure X-1 of Section X (―Process Information for BEDS"). A schematic drawing of the BEDS facility is shown in Figure V-2.

b(1) Feed System

The feed system consists of two subsystems: container handling and slurry preparation with recirculation. These two subsystems are located in separate rooms in the basement of Building 117-4. The slurry preparation with recirculation system will be equipped with secondary containment which meets the requirements of 40 CFR Part 264.193.

b(2) Rotary Kiln and Combustion Chamber

The rotary kiln and combustion chamber are located on a concrete pad approximately 77 feet northeast of Building 117-4. The rotary kiln and combustion chamber that will be used have previously been referred to as the East Incinerator at Building 117-4.

b(3) Pollution Abatement System (PAS)

The PAS consists of an evaporative cooler, hydrated lime hopper/injector, baghouse, induced draft fan, continuous emissions monitoring system (CEMS), and exhaust stack. These components will be located on a new concrete pad located between Building 117-4 and the combustion chamber.

b(4) Process Control Computer

The process control computer will be located in the control room in the basement of Building 117-4.

TOPOGRAPHIC MAPS [40 CFR 270.14(b)(19)]

As the map in Figure V-1 shows, BEDS is located in close proximity to the RF-9 (Building 117-3) and the Plasma Ordnance Demilitarization System (PODS) (Building 117-2) facilities. The topographic map presented in Figure V-3 shows topography in the vicinity of BEDS, PODS and RF-9. Information for HWAD, PODS, and RF-9 presented in Section A-2 of the ―Facility Description" with associated maps and figures is also applicable to BEDS and fulfills the requirements of 40 CFR 270.14 (b)(19). This information includes floodplain and wind (i.e., wind rose) information and locations of monitoring wells, sewer lines, and water supply wells.

PROTECTION OF GROUND AND SURFACE WATER

The BEDS facility is designed to use process sumps to contain any liquid that might be accidentally spilled during slurry preparation or during feed of the slurry into the rotary kiln. The use of cameras and daily inspections of process areas will allow timely response to contain any accidental spills. Storm water sumps are used to keep precipitation from entering the slurry preparation area and mixing with process liquids. (see Section X, ―Process Information for BEDS"). Therefore, BEDS should not impact ground or surface water. No Solid Waste Management Units (SWMUs) are located within the BEDS facility. Therefore, the requirements of 40 CFR 264.90 are not applicable

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Figure V-1
MAP OF WADF SHOWING LOCATION OF BUILDING 117-4/BEDS

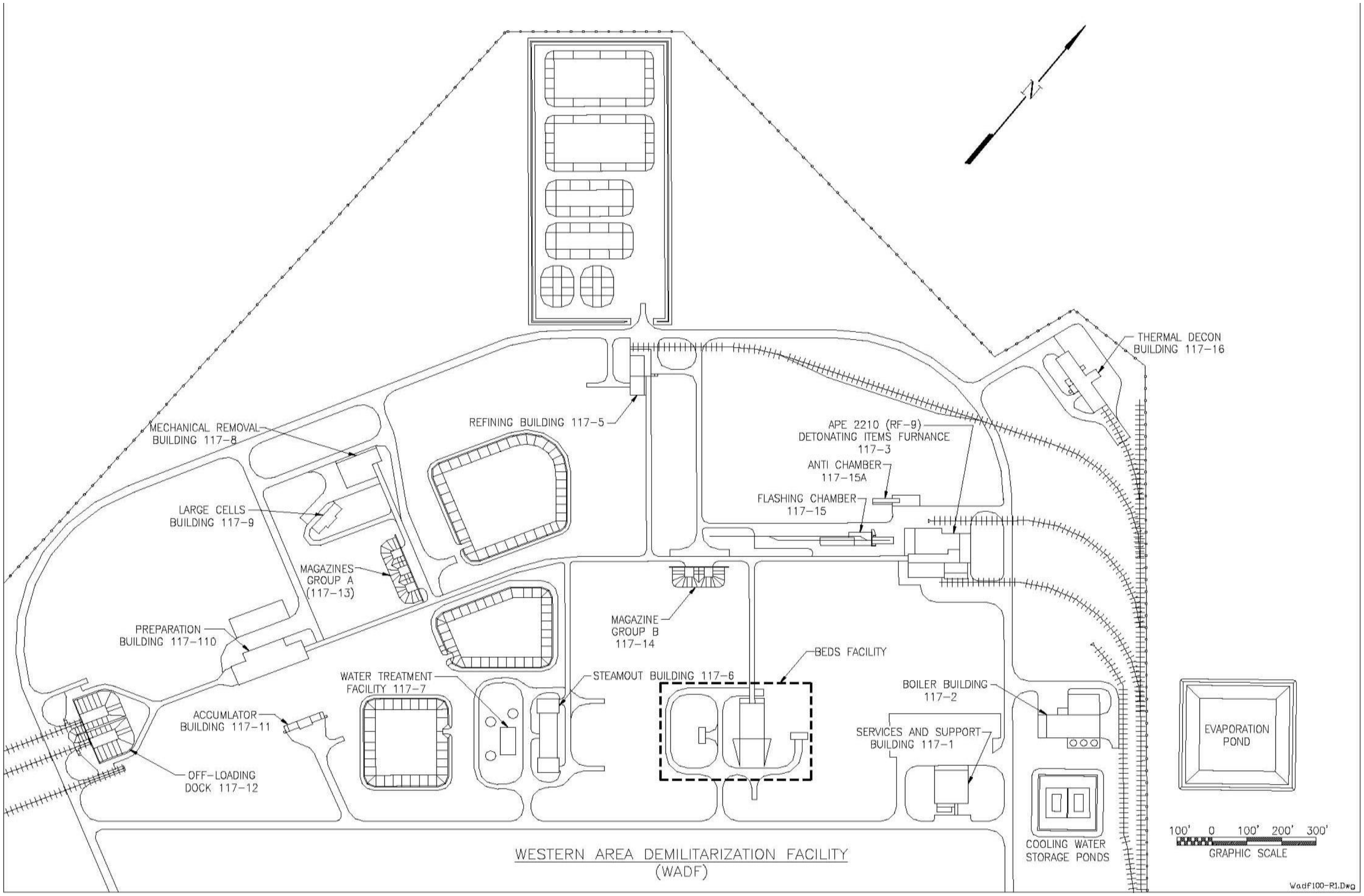


Figure V-2

SCHEMATIC SHOWING LOCATIONS OF BEDS COMPONENTS IN AND AROUND BUILDING 117-4

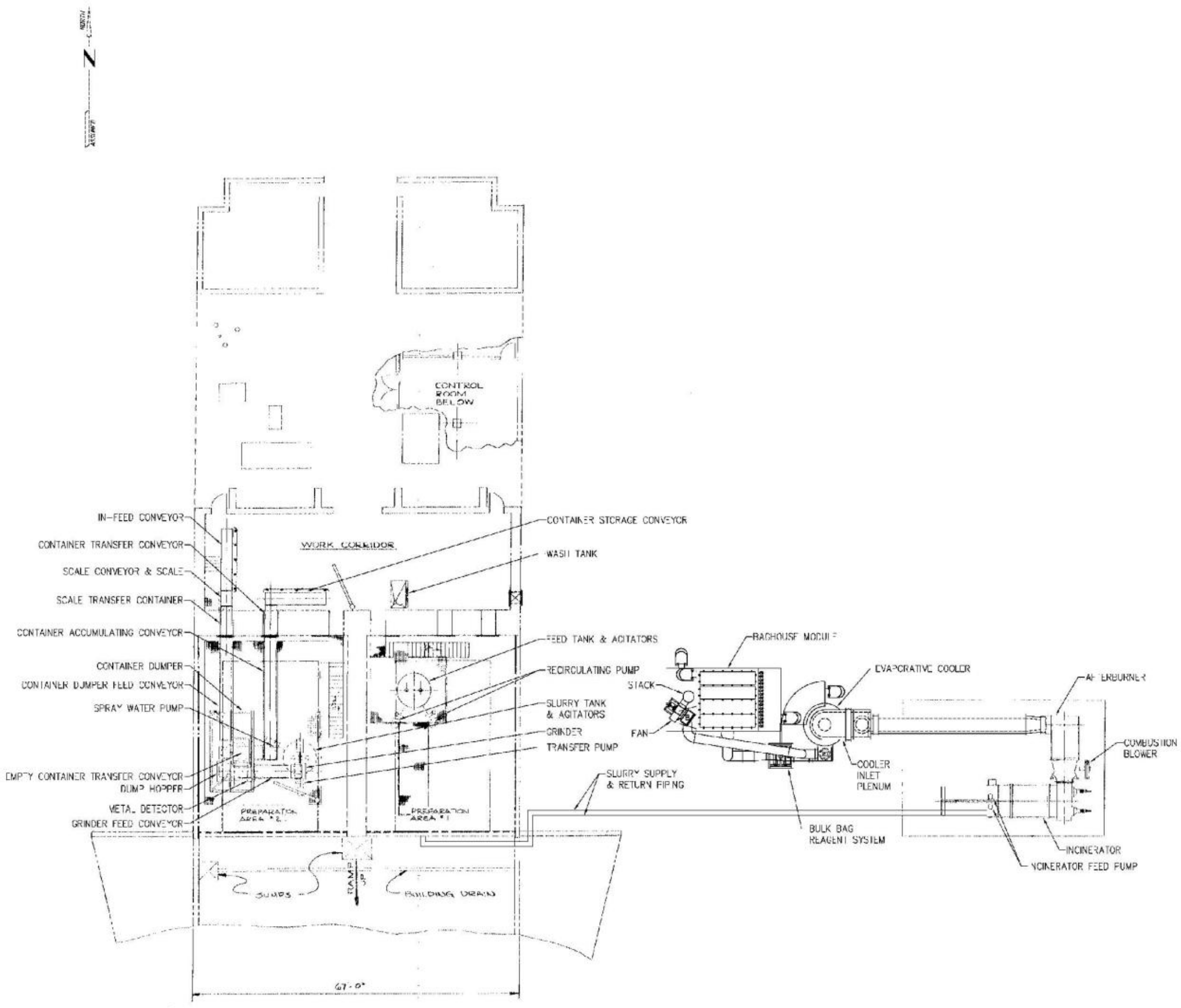
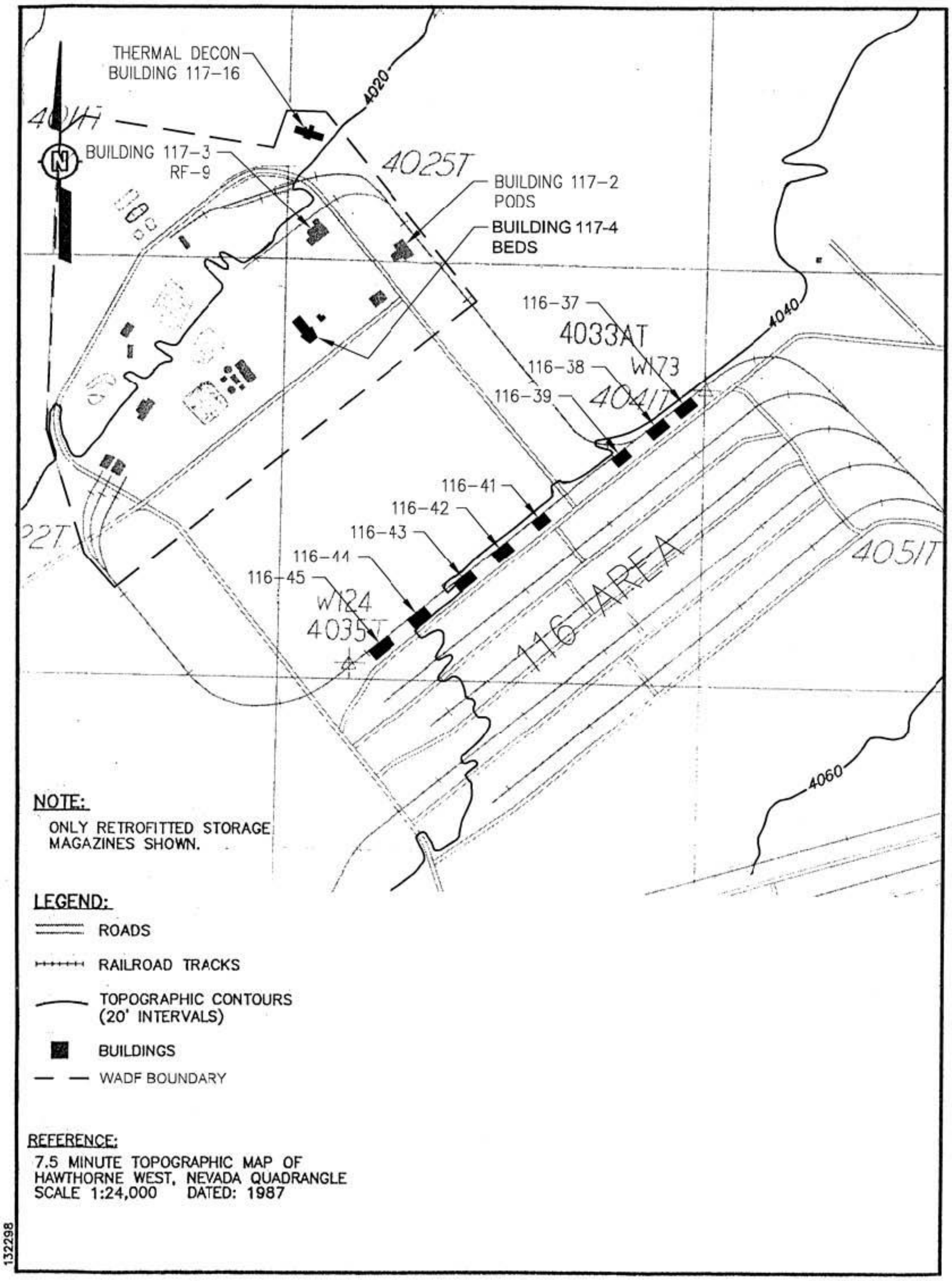


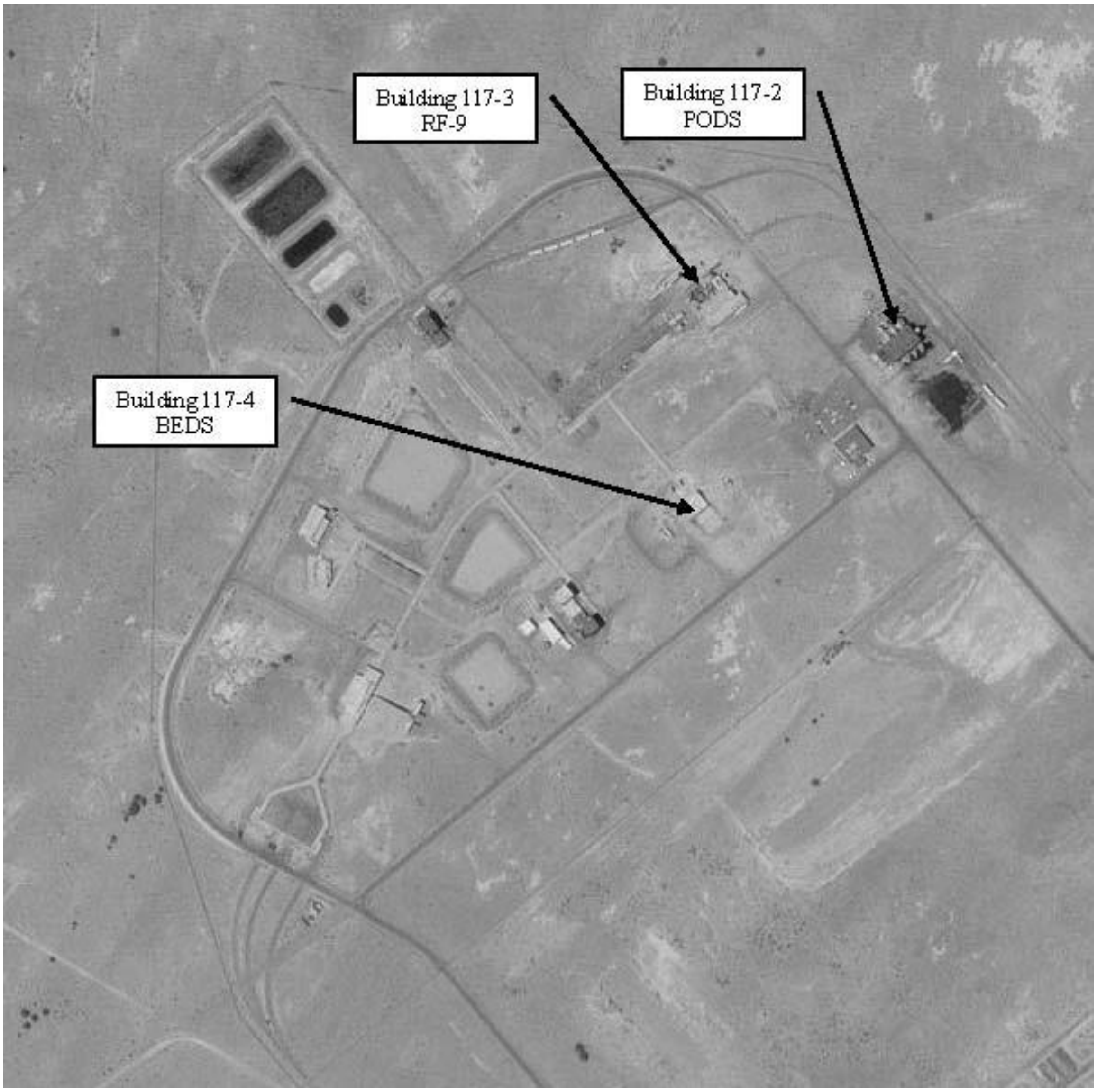
Figure V-3

TOPOGRAPHY IN THE VICINITY OF BEDS



Aerial Layout.dwg

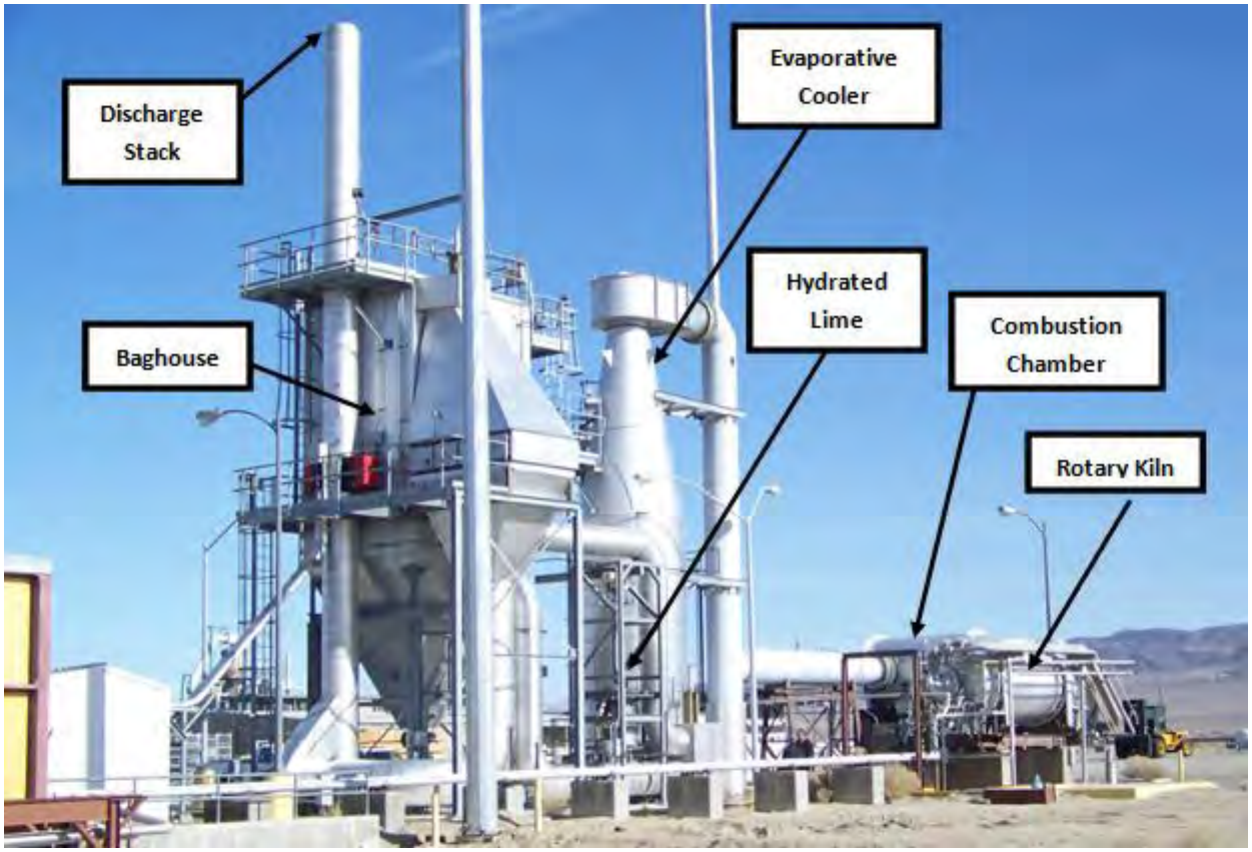
TOPOGRAPHIC MAP OF THE AREA AROUND BUILDING 117-4



AERIAL PHOTOGRAPH OF WADF SHOWING LOCATION OF BUILDING 117-4/BEDS

Building 117-4 – Front View

Building 117-4 – Rear View Building 117-4 (Rear) and East Incinerator



East Incinerator
[Note: Components designated with asterisk (*) will be replaced]

SECTION W WASTE FEED CHARACTERISTICS FOR BEDS

WASTE FEED CHARACTERISTICS FOR BEDS (40 CFR 270.14(b)(2)& (3) and 270.62(b)(2)(i))

INTRODUCTION

The United States Army plans to renovate and operate BEDS located in the WADF Building 117-4 at the HWAD. BEDS is designed to safely destroy a diverse group of energetic materials emerging from demilitarization operations in an environmentally acceptable manner. Most materials to be treated at BEDS are considered RCRA hazardous waste due to material reactivity (EPA Waste Code D003). Some may also be hazardous because of lead toxicity (EPA Waste Code D008) resulting from the presence of lead carbonate in formulation. BEDS will allow the Army to reduce the utilization of open burn/open detonation (OB/OD) to destroy energetic material.

WASTE FEED CHARACTERISTICS AND GENERAL INFORMATION

Waste Feed Types

Wastes to be treated at BEDS will include bulk propellants in the form of fine powders, grains, extrusions, sticks, rolls, and other shapes. Propellants may be single based (nitrocellulose only) or multi-based (nitrocellulose with nitroglycerine and/or nitroguanidine). Later, additional propellants currently loaded in munitions may be added as feedstock after demilitarization.

Small quantities of secondary explosives that have no recycle value, such as Explosive D, might also be processed. Table W-1 is a representative list of energetics that may be processed at BEDS. This list includes both energetics that are inventoried at the site and some that are not currently at HWAD but could be processed by the system.

Waste Feed Composition

Waste feed compositions are presented in column two of Table W-1. These compositions are obtained from the Munitions Items Disposition Action System (MIDAS) database for various items in lieu of actual analysis of each material. MIDAS provides parts and composition data for nearly 20,000 components in 6,500 munitions items.

Waste Feed Rate

The feed rate of propellant to the BEDS facility is expected to be 550 pounds per hour, regardless of the propellant being processed. Material and energy balances have been developed for 24 representative propellants. Other anticipated propellants are similar in nature. The incinerator and pollution abatement system are predicted to successfully process each anticipated feedstock in a manner such that the Maximum Achievable Control Technology (MACT) emissions standards are met. Propellant will be fed as a slurry consisting of 25-weight-percent propellant (maximum) and 75-weight-percent water, resulting in a slurry feed rate of 2,200 pounds per hour. BEDS is expected to operate 24 hours/day, 7 days/week for 3 to 6 week intervals. The annual operating hours will be no more than 3,120 hours as limited by the air permit.

Feed Rate Control System

Propellant slurries will be mixed in a batch process. Propellant material will be weighed for each batch. Water will be measured using a flow meter. A densitometer will be used to verify that the slurry density is approximately a 3:1 liquid-to-solid ratio in the Slurry Mix Tank. Each slurry batch will be transferred to the Slurry Feed Tank. A second densitometer will verify that the 3:1 liquid-to-solid ratio is maintained during feed of the slurry to the incinerator. A metering pump will control the flow of slurry to the incinerator at a consistent rate.

Regulatory Emission Limits

As of September 30, 1999, the CFR was revised to avoid duplicative requirements under RCRA and the CAA by transitioning the RCRA requirements under 40 CFR 270.19 and 40 CFR 270.62 to the CAA under 40 CFR Part 63 Subpart EEE, which is also known as the MACT rule. BEDS PAS is designed to meet or exceed the U.S. Environmental Protection Agency's (EPA's) National Air Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors given in 40 CFR Part 63 Subpart EEE. Air emissions will be regulated under a CAA Permit (see Section W-3) administered by the NDEP. Since the waste feed rate will be constant for all propellants, the Comprehensive Performance Test Plan (CPTP) of the CAA Permit will include a trial burn using the propellant with the ―worst" emission profile. A copy of the CPTP is also given in Appendix U of this RCRA Permit.

WASTE ANALYSIS PLAN FOR BEDS

Waste analysis for BEDS will be conducted in accordance with the Waste Analysis Plan for the Hawthorne Facility, as detailed Appendix B.

Table W-1
Representative List of Energetics to be Processed at BEDS[a]

Energetic	Composition[b]	Quantity	
		Bulk (lb)	Total (lb)
Black Powder	73%PN, 16% Chr, 11% S	(c)	(c)
Cordite	19% NC, 7.3% EC, 18.7% NG, 55% NQ, and <2% PS	11,400	11,400
IMR4064	93% NC, 5% DNT, and <2% DPA, PS, G		(c)
M1	84% NC, 10% DNT, 5% DBP, and <2% DPA, LC, PS	234,516	7,386,555
M2	77% NC, 19% NG, and <2% EC, BN, PN, G	(c)	(c)
M5	82% NC, 15% NG, and <2% EC, BN, PN, G	(c)	(c)
M6	87% NC, 10% DNT, 3% DBP, and <2% DPA, PS	10,530	6,696,230
M6+2	86% NC, 9% DNT, 2% DBP, 2% PS, and <2% DPA	(c)	(c)
M7	55% NC, 35% NG, 85 PP, AND <2% EC, CB		
M8	52% NC, 43% NG, 3% DEP, and <2% PN, EC		162,274
M9	58% NC, 40% NG, and <2% EC, PN, G		40,301
M10	98% NC, and <2% DPA, PS, CB	(c)	(c)
M14	89% NC, 8% DNT, 2% DBP, and <2% DPA	(c)	(c)
M15	55% NQ, 21% NC, 20% NG, 4% EC, and <2% G, Crl		
M17	55% NQ, 22% NC, 22% NG, and <2% EC, G, Crl		
M26	67% NC, 25% NG, 6% EC, and <2% BN, PN, G	120,823	120,823
M26E1	69% NC, 25% NG, 6% EC, and <2% G	(c)	(c)
M30	48%NQ, 28% NC, 22% NG, and <2% EC, G, Crl	(c)	(c)
M30A1	28% NC, 22% NG, 47% NQ, and <2% EC, PS, G		5,694
M30A2	27% NC, 23% NG, 46% NQ, 3% PN, and <2% EC, G		41,598
M31	20% NC, 19% NG, 55% NQ, 4.5% DBP, and <2% G, Crl, 2-DNPDA		99,644
M31A1	20% NC, 19% NG, 54 NQ, 4.5% DBP, and <2% DPA, PS		6,782,920
M31A1E1	22% NC, 18% NG, 55% NQ, 3% DBP, and <2% EC, PS, CB		29,580
M38	98% NC, and <2% DPA, PN, PS, G	(c)	(c)
Pyrocellulose	100% NC	(c)	(c)
SPC	95% NC, 3.8% EC, and <2% LC—possible <2% NBS		19
SPCF	94% NC, 3% BS, and <2% EC, LC, PS	3,063,229	3,065,625
SPCG F	19% NC, 19% NG, 55% NQ, 7% EC, and <2% PS	36,386	36,386
SPCG	18% NC, 19% NG, 55% NQ, 7% EC, and <2% PS	47,820	59,995
SPD	99% NC, and <2% DPA	4,398	17,932
SPDB N	99% NC, and <2% DPA	6,133	6,775
SPDF N	86% NC, 9% DNT, 3% DBP, and <2% DPA, PS	36,163	37,795
SPDF	97% NC, 2% PS, and <2% DPA	116,435	120,967

Table W-1
(contd.) Representative List of Energetics to be Processed at BEDS[a]

Energetic	Composition[b]	Quantity	
		Bulk (lb)	Total (lb)
SPDN B	91% NC, 7% DNT, and <2% DPA	92,911	322,133
SPDN F	91% NC, 7% DNT, <2% DPA, PS		2,964
SPDN	90% NC, 3% DNT, 3% MC, 2% PS, and <2% DPA, DBP, LC,G	603,692	1,161,588
SPDN M6	86% NC, 10% DNT, 3% DBP, and <2% DPA	(c)	(c)
SPDW	99% NC, <2% DPA	300,627	308,308
SPWF	97% NC, 2% PS, and <2% DPA	306,876	309,303
WC 872	78% NC, 10% NG, 8%DBP, and <2% DPA, PN, G, TO, SS	(c)	(c)
WC875	78% NC, 10% NG, 8% DBP, and <2% DPA, PN, G, TO, CC, SS	(c)	(c)
Explosive D	100% Ammonium Picrate	small	small

[a] Acronyms list:

2-DNPDA	2-Dinitrophenyldiamine	DNT	Dinitrotoluene	NQ	Nitroguanidine
BN	Barium Nitrate	DPA	Diphenylamine	PN	Potassium Nitrate
BS	Butyl Stearate	EC	Ethyl Centralite	PP	Potassium Perchlorate
CB	Carbon Black	G	Graphite	PS	Potassium Sulfate
CC	Calcium Carbonate	LC	Lead Carbonate	S	Sulfur
Chr	Charcoal	MC	Methyl Centralite	SS	Sodium Sulfite
Crl	Cryolite	NBS	n-Butyl Stearate	TO	Tin Oxide
DBP	Dibutylphthalate	NC	Nitrocellulose		
DEP	Diethylphthalate	NG	Nitroglycerin		

[b] The composition of the energetics is based on MIDAS data: if additional energetics are processed, a material balance will be completed to determine the waste stream and to ensure that MACT standards are achieved. [c] Material currently not at HWAD

SECTION X PROCESS INFORMATION FOR BEDS

BEDS is designed to safely destroy a wide variety of bulk energetic materials resulting from demilitarization operations in an environmentally acceptable and safe manner. In the past, Open Burning/Open Detonation (OB/OD) was the standard method for the disposal of bulk energetics; however, OB/OD is coming under increased scrutiny by both the public and regulators because of concern about air, land, and water pollution from this relatively uncontrolled treatment method. As a result, a less polluting method for treatment of bulk propellants and other energetic materials is needed. Most of the materials treated in BEDS are RCRA characteristic hazardous wastes due to their explosive (reactive) components. Some materials may also be hazardous due to metal content.

Section X-1a(2)(a) provides a description of the materials to be treated by BEDS.

Section X-1 describes the design and operation of BEDS, Section X-2 covers specific Part B requirements for the tank system, and Section X-3 covers performance testing. A more detailed description of BEDS is provided in the CPTP, (Appendix U).

As of September 30, 1999, the CFR was revised to avoid duplicative requirements under the RCRA and the CAA by transitioning the RCRA requirements under 40 CFR 270.19 and 40 CFR 270.62 to the CAA under 40 CFR Part 63 Subpart EEE, which is also known as the MACT rule. As a result, the requirements for a CPTP, risk assessment, etc., previously addressed under RCRA will be addressed in the CAA Permit rather than in this RCRA Permit. Thus, many process details that follow are not regulated under RCRA and are provided for informational purposes only, and to be consistent with previous permit modifications; 40 CFR citations were left in the text to allow cross-checking by the permit writer.

BULK ENERGETICS DEMILITARIZATION SYSTEM (BEDS) [40 CFR Part 264, Subpart O]

The objective of BEDS is to destroy energetic materials emerging from demilitarization operations in an environmentally acceptable and safe manner. This system is designed to meet or exceed the EPA's National Air Emission Standards for Hazardous Air Pollutants from

Hazardous Waste Combustors given in 40 CFR Part 63 Subpart EEE. A flow diagram of the BEDS process is shown in Figure X-1.

In the process, a slurry containing approximately 25 percent by weight bulk propellant and 75 percent water is fed from the waste feed tank to the rotary kiln at a rate of approximately 2200 pounds per hour. The mixture is burned at approximately 1400°–1800°F. Gases and products from incomplete combustion pass from the rotary kiln to the combustion chamber where additional combustion occurs at a temperature of about 1800°F. These gases then enter the PAS that consists of an evaporative cooler which reduces the temperature to about 400ºF; lime injection; a dry scrubber, fabric filter; and other components necessary to meet National Air Emission Standards. Finally, the cleaned gas exits the stack at about 350°F.

The major solid waste stream resulting from the operation will be baghouse solids consisting primarily of ash, un-reacted lime, and calcium salts of acid gases, such as sulfur dioxide (SO_2) and hydrogen chloride (HCl). Additional solids may be removed from the clean-out doors downstream of the rotary kiln, the combustion chamber, and the evaporative cooler, as needed. All wastes will be characterized and disposed of in compliance with state and federal regulations. Additional and more detailed descriptions of the waste streams are provided in Section X-1a(4)(c).

a Engineering Design of BEDS [40 CFR 270.62(b)(2)(ii)]

X-a(1) BEDS Technology Description

BEDS is designed to safely destroy a wide variety of obsolete and unusable bulk propellants using a rotary kiln and combustion chamber coupled with a slurry feed system and state of the art PAS that meets or exceeds the National Air Emission Standards. Air emissions from BEDS operation, as well as any air pollutants generated (expected to be minor) during the renovation and closure phases of the project, will be regulated under a CAA Permit administered by the Nevada Division of Environmental Protection (NDEP). The ability to contain and cleanup combustion gases prior to release to the atmosphere is one of the primary advantages of BEDS over OB/OD.

The United States Army plans to use BEDS to treat bulk propellants and related energetic materials at the WADF at the HWAD. BEDS will be located at Building 117-4. Section V, "Facility Description for BEDS" provides a map of WADF showing the location of Building 117-4 (Figure V-1), a schematic showing the BEDS facility (Figure V-2), and a map showing topography in the vicinity of BEDS (Figure V-3).

X-1a(2) BEDS Process Description

X-1a(2)(a) Feed Streams

The primary feedstock will be bulk propellants in the form of fine powders, grains, extrusions, sticks, rolls, and other shapes. Propellants may be single based (nitrocellulose only) or multibased (nitrocellulose with nitroglycerine and/or nitroguanidine). Additional propellants currently loaded in munitions could also be included as feedstock, if demilitarized later on. Small quantities of secondary explosives that have no recycle value, such as Explosive D, might also be processed. This feedstock will be referred to throughout this process description by the general term of "propellant."

Table X-1 provides a representative list of energetics that may be processed at BEDS. If the need arises to process other energetic materials, MIDAS data will be obtained to determine the composition of the material. A mass and energetic balance will be performed to make sure that the material can be processed in compliance with MACT requirements.

X-1a(2)(b) Slurry Feed System

The slurry feed system is used to reduce the size of propellant and prepare a water-based slurry for feeding to the rotary kiln.

Solid propellant loaded in specially designed drums is delivered to Building 117-4. The energetic material is weighed and then moved into the slurry preparation area through an airlock. In each step of the solids handling in the slurry preparation area described below, a water spray is used to wet solids so as to avoid accidentally detonating the propellant. The contents of the drums are fed into the feed hopper. The feed hopper is equipped with vibratory means for uniformly feeding energetic solids through a bottom opening in the feed hopper onto a conveyor. The conveyor is used to move energetic solids through a metal detection device wherein any tramp metal can be detected. If metal is detected, the conveyor is stopped and metal is manually removed. Propellant is conveyed into a wet grinder at a controlled rate. In the wet grinder, energetic material is ground in the presence of water. The resulting solids have a maximum dimension of 0.1 inch or less.

Ground particles of energetic material, water used during grinding, and additional water as required to develop a mixture of three-parts water to one-part explosive (by weight) are directed into the slurry mixing tank where agitation and recirculation are provided to keep these particles in suspension. A hydroclone provides particle-free liquid for recycle to the balance of the system as needed (including sprays in the dump hopper, the vibratory conveyor, the grinder hopper, and the grinder).

The suspension is then pumped to the slurry feed tank and subsequently pumped through a slurry feed line. Flow through the slurry feed line is maintained in the turbulent range to ensure particles remain in suspension. In addition, the slurry is constantly re-circulated through the loop and back to the feed tank to prevent the settling of solids. A pump pulls a slip-stream from the slurry feed line and discharges it to the rotary kiln.

X-1a(2)(c) Rotary Kiln

The rotary kiln is a refractory-lined rotary furnace. It is approximately 5.5 feet in internal diameter and 11 feet-long. The rotary kiln has a single burner assembly rated at 14.6 million British thermal units per hour at the discharge end, which is the opposite end from where wastes are fed. A low-sulfur Diesel Fuel No. 2 Burner is used to initiate combustion of waste material and to sustain the operational temperature. The burner is equipped with all accessory equipment necessary for the burner operation. A flame sensor detects flame presence by sensing its ultraviolet-light (UV) emissions, acting as a flame failure safety device. The control system will not allow wastes to be fed to the rotary kiln unless the flame sensor in the flame safety system detects a flame from the burner. The rotary kiln is supported and rotated by rollers at a variable speed (0.5–6.0 revolutions per minute). Ash drops from the discharge end of the rotary kiln to an ash container for intermittent removal if needed. Gases leaving the rotary kiln are ducted to the combustion chamber.

X-1a(2)(d) Combustion Chamber

The combustion chamber provides final combustion of rotary kiln exhaust gases. This chamber is equipped with two burners rated at 3.3 million British thermal units per hour (total) and is capable of heating exhaust gases up to 2000°F, and achieving highly turbulent flow to ensure good mixing and, therefore, effective destruction of waste gases. The combustion chamber is constructed of carbon steel and internally insulated with a refractory liner.

A combustion air fan supplies air to fuel-oil burners in the combustion chamber. The combustion chamber burners are equipped with an UV-flame sensor to monitor ignition and assure that a flame is present before waste is fed.

X-1a(2)(e) Pollution Abatement System (PAS)

PAS completes the pollution control function of the combustion chamber. Exhaust gases from the combustion chamber are routed to the evaporative cooler where gases are quenched from approximately 1800°F to approximately 350°-400°F with injected water. Temperature of the exhaust gas from the evaporative cooler is maintained by controlling the flow of quench-water. Only enough water is added to cool the stream. No liquid water is carried in the gas stream. Just downstream of the evaporative cooler, hydrated lime will be continuously fed into the gas stream to react with HCl or SO_2 gases to form calcium salts. An excess stoichiometric ratio will be used to ensure that a high percentage of HCl, SO_2, and other acid gases are removed. If the evaporative cooler exit temperature exceeds the high temperature limit, an automatic waste feed cutoff to the rotary kiln will be activated, assuring protection of the equipment.

The next stage of the air pollution control system is the baghouse. The baghouse is designed so that all bags operate in parallel. Injected lime is carried over to the baghouse in the gas stream. Particulate matter is collected on the fabric filter bags to achieve highly efficient removal of solids, including fly ash, reaction products, and reagent. Although the primary function of the baghouse is to remove particulates, an additional acid scrubbing action takes place there. Un-reacted reagent collecting on the bags reacts with any un-reacted HCl or SO_2 in the evaporative cooler effluent gases.

A pulse-jet cleaning system operating on compressed air cleans the bags. Dust composed of reaction products, fly ash, and un-reacted reagent, is collected in the bottom section of the baghouse. Manually operated valves transfer collected dust to the collection containers for ultimate disposal. Nonhazardous waste will be disposed on-site at a permitted landfill or equivalent, and hazardous waste will be sent off-site for disposal at a permitted hazardous waste landfill.

The baghouse is sized to accommodate the full flow of quenched flue gas. The baghouse will only be bypassed in the event that gas exiting the evaporative cooler exceeds the maximum operating temperature of approximately 450°F. An interlock shall be provided to activate automatic waste feed cutoff if the bypass valve is opened. Emissions released during bypass operations will be minimal since waste feed is stopped and the facility goes into shutdown mode to correct the conditions which resulted in opening the bypass valve.

The baghouse exhaust duct includes a bag leak detector capable of sensing <0.001 grains of particulates per cubic foot of flue gas. This bag leak detector includes a prewired output signal that will be used in the controls system to warn the operator of a leak in a fabric filter bag.

An induced draft fan provides the system draft control, using a variable frequency drive to modulate fan speed based on a pressure signal at the rotary kiln exhaust gas manifold duct. The induced draft fan discharges all gases to an adjacent exhaust stack, which contains a gas sampling system to provide continuous analysis for opacity, carbon monoxide (CO), oxygen (O_2), sulfur dioxide (SO_2), and oxides of nitrogen (NO_x).

X-1a(3) BEDS Equipment Description

Major components of BEDS are shown in Figure X-1 and include:

- Feed System
- Rotary Kiln
- Combustion Chamber
- Pollution Abatement System (PAS)
- Process Control Computer

Table X-2 (Major Equipment Specifications) provides detailed information on equipment capacities, ratings, and materials of construction.

X-1a(3)(a) Feed System

The feed system consists of two subsystems: container handling and slurry preparation with recirculation.

Container Handling System

The Container Handling System consists of the following major equipment items arranged as shown in Figure X-2, Process Flow Diagram.

BD-1 In-Feed Conveyor
BD-2 Scale Conveyor
BD-3 Scale
BD-4 Scale Transfer Conveyor
BD-5 Container Dumper Feed Conveyor
BD-6 Empty Container Transfer Conveyor
BD-7 Container Accumulating Conveyor
BD-8 Container Transfer Conveyor
BD-9 Container Storage Conveyor
BD-10 Container Dumper
BD-24 Wash Station Mechanical Assist (not shown)
BD-26 Jib Crane (not shown)
BD-28 Type III Containers (not shown)
BD-29 Type IV Containers (not shown)
BD-30 Exhaust Fan (not shown)

The system is made up of a series of hydraulically powered roller conveyors that convey Type III containers (55-gallon, stainless-steel drums) of materials into the slurry preparation area for processing. After the containers are emptied and rinsed out by the processing equipment, the roller conveyors accumulate and convey them back to the work corridor for reuse.

In-feed conveyor (BD-1), scale conveyor (BD-2), scale transfer conveyor (BD-4), and the container dumper feed conveyor (BD-5) are all interlocked with scale (BD-3) and/or container dumper (BD-10) by a pneumatic logic control circuit. The control circuit allows the in-feed conveyor (BD-1), located in the corridor, to accumulate six drums. Each drum is then conveyed in sequence onto scale (BD-3) by manually actuating the ―Enter to Scale” control. Scale (BD-3) consists of an electronic load cell built into the scale conveyor (BD-2). A preset dwell time of three seconds allows the scale to stabilize and to provide net weight readouts on both a display indicator in the corridor and in the control room. After the three-second period expires, scale conveyor (BD-2) and scale transfer conveyor (BD-4) convey the weighed drums from the corridor to the head of container dumper feed conveyor (BD-5). The scale is also equipped with a control interlock which prevents the automatic indexing of a container of material from the scale if the Maximum Allowable Batch Weight (MABW) would be exceeded.

Electronic scale (BD-3) is programmed to automatically deduct the container tare weight from the gross weight and display the net weight of the materials on both the digital readout in the corridor and on control console (PBD-1). It also adds the net weight to the total batch weight and displays the Total Accumulated Batch Weight (TABW). Set points on the scale allow the MABW to be entered so the operator will be alerted by an alarm when that weight is reached. The TABW is required to determine the volume of water necessary to produce slurry of proper density.

All cell doors are closed and all personnel are vacated from the corridor work area while the materials are being dumped and processed and the containers being washed. All manual control functions are initiated from the control room during this period. Containers are dumped and washed by container dumper (BD-10) on an individual basis and then conveyed and accumulated on conveyors BD-6 and BD-7, respectively. Upon completion of the slurry preparation process, the pneumatic control circuitry for container accumulating conveyor (BD-7), container transfer conveyor (BD-8), and container storage conveyor (BD-9), are used to convey the emptied containers into the corridor for reuse.

Chain-driven roller conveyors powered by hydraulic motors are used exclusively for handling the containers. Containers are conveyed at speeds from 20 to 40 feet per minute. Indexing and accumulation of the containers is controlled by pneumatic logic circuitry which is signaled by sensing devices triggered when the containers depress spring loaded rollers.

Water soluble materials in Type IV, 540-gallon containers can be processed directly, bypassing the slurry preparation system. These materials can be pumped directly to the incinerator, or pumped to the slurry feed tank. Special hoses and adapters are provided for this purpose.

Control and processing of water soluble materials will be performed in accordance with the Standing Operating Procedure (SOP).

Slurry Preparation and Recirculation System

The Slurry Preparation and Recirculation System consists of the following major equipment arranged as shown in Figure X-3.

BD-10 Container Dumper
BD-11 Dump Hopper
BD-12 Grinder Feed Conveyor
BD-13 Metal Detector
BD-14 Grinder
BD-15 Slurry Tank
BD-16 Transfer Pump
BD-17 Feed Tank
BD-18 Recirculation Pumps
BD-27 Agitators
BD-33 Spray Water Pump
Grinder Control Panel (not shown) Density Meter (not shown)

Batches of slurry containing approximately 25 percent by weight bulk propellant and 75 percent water are prepared in a 2,155-gallon (2,200-gallon, nominal) stainless-steel slurry tank (BD-15). Each batch is made up of materials of known weight which are added to a measured volume of water, to produce slurry of known density. Two agitators (BD-27) are mounted on the tank to keep the slurry solids suspended.

All of the water added to a batch of slurry, whether during the processing operations or by adding water directly to the slurry tank, is metered by a totalizing flowmeter and displayed in the control room. Prior to the beginning of each batch, the flowmeter will be set to the amount of water required to attain the slurry density specified in the SOP based on the MABW as programmed into scale (BD-3). After the flowmeter is set an initial charge of water will be added to slurry tank (BD15), at which point the agitator selected in the control console room will be started. When the desired level is achieved, the spray water pump (BD-33) will start and pump hydrocloned water from the slurry tank to the grinder sprays. Clean processed water is provided to the dump hopper and container wash sprays when these systems are activated. At this point, processing of the containers and materials in the slurry preparation area may be started.

The container dumper (BD-10) is a semiautomatic device which is hydraulically operated by the same power unit as the conveyors BD-1 through BD-9 (Figure X-2). It is controlled by a pneumatic logic control circuit, and is designed to empty materials from Type III containers.

A dumper lifts the first container of the batch from conveyor (BD-5), positions it over the dump hopper (BD-11), then rotates the container to its dump position where contents are dumped into the dump hopper and onto a grinder-feed conveyor (BD-12). As materials are conveyed to the grinder, the dumper rotates the container to a “Wash” position where water from spray nozzles wash any remaining container material. After a preset time period, the drum is rotated to an “Inspect” position where the interior may be viewed on the Closed Circuit Television (CCTV) monitor by the control room operator. If additional washing is necessary, this cycle may be repeated by manual control. If the container is visually clean, depressing the “Continue” button allows the dumper to rotate the container back to its vertical position. The dumper will then move the container to the empty container transfer conveyor (BD-6) where it will be released. Conveyor (BD-6) will then transfer the container to the container accumulating conveyor (BD-7), where it will move to a position at the head end. After releasing the container, the container dumper will automatically return to its initial “Rest” position over the container dumper feed conveyor (BD-5). The cycle is repeated until all of the containers in the batch are processed and accumulated on conveyor (BD-7).

The grinder feed conveyor (BD-12) is a vibratory conveyor with a non-metallic pan trough. This conveyor transports explosive materials and water beneath a metal detector (BD-13) mounted directly over the conveyor. If a metallic object is detected, the conveyor motor is stopped to prevent the object from entering the grinder (BD-14). At the same time, the grinder and dump-hopper sprays will stop. The conveyor will be inspected and any metal objects will be removed. The system will then be restarted.

The grinder (BD-14) is a stainless-steel, direct-drive grinder that reduces explosive materials to a size suitable for slurry preparation. Along with the metal detector, several safety devices are provided with the grinder. Vibration monitors are attached to the pillow block bearings to sense an imbalance in the rotor. Thermocouples are attached to the motor, bearings, and housing (or hog) to detect an increase in temperature that could signify imminent failure or breakdown. Water coolant sprays are located inside the grinder housing for cooling and cleaning purposes. Any alarm condition caused by any of the above sensors actuates the grinder brake and stops it. For normal shutdown, however, the grinder rotor will be allowed to coast to a stop; the brake will not be applied.

Ground materials are discharged from the grinder into the slurry tank (BD-15). This tank serves as a mixing vessel to create the slurry. Agitators (BD-27) stir the mixture and keep particles in suspension. The slurry density is an important process parameter that is monitored and controlled by pumping slurry through a density meter. If required, additional water may be metered into the slurry tank. When the correct density is obtained, the slurry may be pumped to the slurry feed tank (BD-17).

The slurry feed tank (BD-17) has a capacity of 3,030 gallons (3,000 gallons, nominal) and is equipped with two agitators (BD-27) for keeping the slurry in suspension. A recirculation pump (BD-18) located below the feed tank is provided for moving slurry through a loop and back to the feed tank with a slip-stream to the rotary kiln, as needed.

All outdoor slurry pipelines in the system are insulated and self-draining to prevent solids in the slurry from building up in the piping. The system is purged with water any time it is shut down. A densitometer measures the density of slurry. A flowmeter is installed on the slurry return line of the recirculation loop. It is anticipated that additional flowmeters will be added to this portion of the process.

X-1a(3)(b) Rotary Kiln

The rotary kiln consists of the following major components arranged as shown in Figure X-1.

- Incinerator Feed Pump
- Rotary Kiln

- Combustion Air Blower
- Ash Accumulator
- Fuel Oil Tank (not shown)
- Propane Tank (not shown)

All waste will be fed into the rotary kiln as an aqueous slurry (one-part propellant to about three-parts water by weight), via the incinerator feed pump. During operation, the pump will deliver 0 to 10 gallons per minute of slurry from the recirculation line directly into the feed end of the rotary kiln through an open-ended, 2-inch, stainless-steel pipe. The rotary kiln is equipped with a variable speed drive which is capable of rotating its body through the range of 1/2 to 6 revolutions per minute. A fuel oil burner is located at the discharge end of the rotary kiln, and provides the heat required to initiate combustion of the energetics slurry and maintain the rotary kiln temperature. The combustion air blower supplies air for combustion. Ash is removed from the rotary kiln as needed via an ash accumulator. It is anticipated that very little ash will build up and removal may only be required as a maintenance activity at the end of a process run. The amount of waste slurry in the rotary kiln and the combustion process is viewed by the control room operator on the CCTV monitors on the control console. Adjustments, such as feed rate, rotation, speed, and temperature, are controlled in the control room.

The rotary kiln burner is a 14.6 million British thermal units per hour North American Model No. 5514-9 Oil Fired Burner with a propane pilot light for ignition. The burner is fired counter current with the waste feed and is rated at 118 gallons per hour (gph) of No. 2 Fuel Oil. Air flow to the rotary kiln is 1,685 actual cubic feet per minute (ACFM).

Fuel oil used for the rotary kiln and the combustion chamber, and propane used for the rotary kiln and the combustion chamber pilot lights, will be stored in tanks near Building 117-4. Controls for pumping the fuel oil to the rotary kiln and combustion chamber are located in the control room. New above ground tanks will be installed for fuel storage. The fuel oil tank is anticipated to have a capacity of 10,000 to 20,000 gallons and the capacity of the propane tank is anticipated to be 100 to 250 gallons.

The rotary kiln dimensions are 6 feet 7 inches outside diameter (O.D.) by 16 feet 6 inches long. The rotary kiln has a 1/2-inch steel shell and is lined with 6 inches of 50 percent alumina brick.

The resulting inside dimensions are, therefore, approximately 5 feet 6 inches internal diameter (I.D.) by 15-feet long. The cross sectional area is 23.8 square feet and the volume is approximately 356 cubic feet.

X-1a(3)(c) Combustion Chamber

The combustion chamber consists of the following major components arranged as shown in Figure X-1.

- Combustion Chamber
- Combustion Forced Draft Fan
- Fuel Oil Tank (not shown)
- Propane Tank (not shown)

The combustion chamber is located downstream from the rotary kiln. It is a refractory lined chamber, equipped with two burners, to ensure that all of the combustibles are burned and that the hydrocarbon emissions are reduced to acceptable environmental levels. The combustion chamber uses two North American Model No. 5422-7-A burners with propane pilots for ignition. These burners fire concurrent with the flue gases. Combustion air is supplied through the combustion air blower. The combined burners are rated at 3.3 million British thermal units per hour, which would be equivalent to 24 gallons per hour of No. 2 Fuel Oil. Air flow to the combustion chamber is approximately 630 ACFM.

The combustion chamber measures 6-feet 8-inch shell O.D. by 11-feet 3-inches long. It is lined with high alumina castable lining. The cross sectional area of the combustion chamber is approximately

25.2 square feet, with a volume of approximately 206 cubic feet.

X-1a(3)(d) Pollution Abatement System (PAS)

The PAS is designed to meet or exceed EPA's National Air Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors given in 40 CFR Part 63 Subpart EEE. The PAS consists of the following major components arranged as shown in Figure X-1.

- Evaporative Cooler

- Hydrated Lime Hopper/Injector
- Baghouse
- Induced Draft Fan
- Continuous Emissions Monitoring System
- (CEMS)
- Exhaust Stack

Evaporative Cooler

The custom made evaporative cooler has an 8-foot 6-inch diameter with an overall height of 43 feet 6 inches. The evaporative cooler has a narrow throated expansion chamber to maintain even gas distribution across the cooler and avoid eddy currents as the gas expands to a slower velocity. Approximately half way down this cone, compressed air atomized water is injected to cool the gas stream. The system is designed so that the water is totally evaporated in the cooler, giving a dry discharge of flue gas cooled from an inlet temperature of approximately 1800°F to a range of 350°-400°F. A temperature control loop modulates the flow of water to maintain the outlet set-point temperature, regardless of fluctuation in the flue gas flow and temperature.

Hydrated Lime Hopper/Injector

After the cooled flue gas exits the evaporative cooler through a duct at the base on the cooler, a dry reagent (hydrated lime) is injected to scrub the HCl, SO_2, and other acidic components from the gas stream. Lime is injected into the duct through a specially designed injection section. This injection section accelerates the gas and disperses the reagent across the entire gas stream for maximum contact and scrubbing. As soon as the reagent is injected, it begins to react with the acidic component from the gas stream to form calcium salts. These solid particulates will be removed by the fabric filter.

Baghouse

The flue gas with injected lime flows into the fabric filter (baghouse). Virtually all solid particulate, including the reacted HCl, SO_2, and the lead, if present, are filtered out. Accumulation of particulate on the bags form a ―filter cake" which helps fill any void and enhances the filtration efficiency. Also, the un-reacted reagent becomes a part of the filter cake and provides a considerable amount of additional acid gas scrubbing. Contact between the flue gas and reagent is particularly effective because of the dense cake and very slow gas movement. Build-up of particulate on the bags causes a restriction to flow (increase in pressure drop) and periodically these bags are cleaned by a jet of compressed air blown inside the bags. The bag inflates rapidly, snaps when it reaches full diameter, and particulate on the outside of the bag is thrown off and settles into the hopper where it is removed for proper disposal. The baghouse exhaust duct includes a bag leak detector capable of sensing <0.001 grains of particulates per cubic foot of flue gas. This bag leak detector includes a prewired output signal that will be used in the control system to warn the operator of a leak in a fabric filter bag.

A 100 percent sealing by-pass valve and duct system can divert flue gas around the baghouse when necessary to protect the equipment. The baghouse is isolated by valves at the inlet and outlet during these periods of by-pass, as well as when the system is offline.

If it becomes needed, HEPA filters may be inserted downstream of the baghouse to meet MACT emission standards. The need for HEPA filters will be influenced by the wording of the MACT rules to be announced in June 2005.

Induced Draft Fan

Cleaned flue gas is ducted to the ID fan and discharged to the atmosphere. The ID fan is furnished with a variable frequency drive (VFD) that automatically changes fan speed in response to an incinerator pressure reading and provides a constant draft on the incinerator.

Continuous Emissions Monitoring System (CEMS)

After exiting the baghouse, gas samples are drawn from the stack for analysis by the CEMS. The CEMS analyses include carbon monoxide (CO), oxygen (O_2), sulfur dioxide (SO_2), and oxides of nitrogen (NO_x).

Continuous Opacity Monitoring System (COMS)

A monitoring system will be incorporated to continuously monitor the opacity of stack gases.

Exhaust Stack

The previously constructed exhaust stack will be replaced with a new stack in order to comply with federal and state requirements. The stack will be approximately 60-feet tall and have a 26-

inch I.D.

X-1a(3)(e) Process Control Computer

Various process parameters of BEDS are controlled, monitored, and indicated by a process-control (PC) based computer system located in the control room. This PC computer has the capability to control BEDS operations in programmed sequences, provide process information, monitor safety systems, instrument set points, and control requirements, plus provide alarms in the event of uncommon operations. All conditions that potentially endanger personnel, equipment, or emissions compliance are addressed automatically by the control system.

The programming of control software and integration of the overall BEDS control scheme will be conducted as an integrated system to the greatest extent possible. The process is programmed for many parameters, equations, and other inputs or information needed for BEDS operation. The system controller has the capability for self-diagnosis to pinpoint any existing or potential problems such as sensor loss or equipment failure.

X-1a(4) BEDS Process Operation

X-1a(4)(a) Startup

BEDS startup consists of initiation of rotary kiln, combustion chamber, and PAS operation without hydrated-lime injection, using ambient air and preparation of the slurry feed system to begin accepting propellant. This includes verifying operation of BEDS safety features and the CEMS. As the rotary kiln and combustion chamber approach operational temperatures, slurry is prepared and continuously recirculated through the slurry feed tank loop. After the rotary kiln and combustion chamber reach operational temperatures, slurry feed and hydrated-lime injection is begun. As the system approaches steady state, adjustments to burners and other system components are made automatically by the process control computer, or manually by the operators as needed, to optimize the process and meet emission standards specified in the CAA Permit.

X-1a(4)(b) Processing Operations

Operations are continued at ―steady state.” Operators will make minor adjustments, as needed, to maintain system performance, including maintaining nominal production rates, and complying with CAA Permit requirements. When the initial slurry batch has been processed, another batch will be prepared and processed. After processing of all batches is completed, BEDS will be shutdown as described in Section X-1c.

X-1a(4)(c) BEDS Waste Streams

The operation of BEDS will generate one major waste stream: the collection of waste from the baghouse (see Figure X-1). Wastes collected will be produced at a rate of approximately 24 pounds per ton of propellant slurry processed and be collected in drums from the bottom of the baghouse. These wastes include carryover ash from the rotary kiln and combustion chamber, calcium salts from the reaction of acidic gases such as SO_2 and HCl with hydrated lime, unreacted lime, and trace amounts of solids from the evaporative cooler. Other negligible sources of waste will be heavier ash from the rotary kiln, collected in drums from the downstream side of the rotary kiln, and wastes from the evaporative cooler.

Each waste stream will be sampled and analyzed pursuant to the Waste Analysis Plan, which is detailed in Appendix B. These wastes will be disposed in compliance with state and federal regulations. It is not anticipated that BEDS will generate any liquid waste streams.

X-1a(4)(d) Proposed BEDS Permit Monitored Points

Control and monitoring systems proposed for BEDS will be operational during the Comprehensive Performance Test. There are three alarm levels, each triggering different responses. The alarm levels are these:

1 Critical Alarm
2 System Alarm
3 Indication Alarm

Critical alarms are triggered by events that put personnel safety, the environment, or equipment integrity in danger. These alarms may automatically shutdown individual subsystems or activate the Automatic Waste Feed Cut Off (AWFCO). The AWFCO has been designed to ensure that all PAS equipment is operating within design parameters and emissions comply with CAA Permit requirements. AWFCO prevents processing operations outside the permitted operating envelope. It is actuated automatically by the process control computer. AWFCO stops slurry feed to the rotary kiln until the condition clears and must be reset by the operator. The proposed

AWFCO parameters and set point are presented in Table X-3.

System alarms are triggered by an event that affects other components in the system but does not indicate current personnel, environmental, or equipment danger. Indication alarms are triggered by an event that needs to be known to the operator but has no impact on any other system components. Table X-4 summarizes these alarms, respective levels, and automatic system responses.

X-1b BEDS Items Start-Up/Shakedown Conditions [40 CFR 270.62 and 246.345]

Start-up and shakedown conditions for BEDS are similar to those utilized during the Comprehensive Performance Test (see Appendix U). During start-up and shakedown, BEDS will be operated within the envelope defined for AWFCO specified in Table X-3. Mini burns during shakedown testing will be conducted with feeds as designated in the Comprehensive Performance Test Plan, as well as those specified in Table X-1. Additional propellants may also be fed.

X-1c Shutdown Procedures [40 CFR 264.345(c)&(e) and 270.62(b)(2)(vii)]

When all scheduled propellant processing has been completed, BEDS will be shutdown by stopping propellant feed to the dump hopper, purging the slurry preparation and feed system with water into the rotary kiln, and purging the remainder of BEDS with ambient air until the CEMS indicates that all residual propellant has been processed, and the combustion gases have exited the stack. The slurry preparation and feed system, rotary kiln, combustion chamber, and PAS will then be shutdown. Procedures/systems for shutting down the system in the event of an equipment or other malfunction are given in Section X-1a(4)(d).

X-1d Process Control and Monitoring System [40 CFR 264.347(a)]

The control system is a PC-based system utilizing data bus technology to interface with field equipment and computer graphics technology for operator-PC interface. The Control and Monitoring System is designed in a layered hierarchy consisting of three layers, each providing specific levels and types of control and protective response. These three levels are described in Section X-1a(4)(d) above. BEDS permit monitored points are also given in Section X-1a(4)(d). The system controller also has the capability to perform a self-diagnostic program to pinpoint any existing or potential problems, such as sensor loss or equipment failure.

X-2 SPECIFIC PART B REQUIREMENTS FOR TANK SYSTEMS [40 CFR 270.14(b)(1), 270.16, and 264 Subpart J

X-2a Description (Type, Volume, Number, Dimensions, and Location) [40 CFR 270.14(b)(1) and 270.16(b)]

BEDS has two existing 10-gauge, 316-stainless-steel tanks, a 2,155-gallon (2,200-gallon, nominal) slurry mix tank, and a 3,030-gallon (3,000-gallon, nominal) slurry feed tank. Both are part of the Feed System described under Section X-1a(3)(a), which provides additional details concerning operation. These tanks are shown schematically in Figure X-1. Dimensions of the slurry mix tank are 7-feet O.D. by 8-feet high, and the dimensions of the slurry feed tank are 9-feet O.D. by 7-feet high. The tanks are located on the floor in the basement of Building 117-4.

X-2b Assessment of Tank System's Integrity [40 CFR 270.16(a) & (e), 264.191, and 264.192]

Prior to operation of BEDS, a written assessment of the tank system's integrity will be prepared and certified by an independent, qualified registered professional engineer. The assessment will be conducted so as to determine the tank system is adequately designed and have sufficient structural strength and compatibility with the materials being stored or treated, and ensure that the tanks will not collapse, rupture, or fail.

X-2c External Corrosion Protection [40 CFR 270.16(e) and 264.192(f)]

Since the slurry mix and feed tanks and ancillary equipment (except the slurry feed line to the rotary kiln) are located in Building 117-4, external corrosion should not be a factor. The equipment will not be in contact with solid or water. The feed line to the rotary kiln is constructed of stainless steel and readily visible for daily inspection.

X-2e Description of Feed Systems, Safety Cutoff, Bypass Systems, and Pressure Controls [40 CFR 270.16(c)]

A description of the feed system and bypass is provided in Section X-1a(3)(a) above. Safety cutoff systems are described in Section X-1a(4)(d). Both the slurry mix and feed tanks are open-top tanks not subjected to pressures greater than 1 atmosphere.

X-2f Diagram of Piping, Instrumentation, and Process Flow [40 CFR 270.16(d)]

A flow diagram for BEDS, including the tank system, is given in Figure X-1 and a diagram of the Slurry Preparation and Recirculation System is provided in Figure X-3. Diagrams showing piping and instrumentation are given in Figure X-4.

X-2g Plans and Description of the Design, Construction, and Operation of the Secondary Containment System [40 CFR 270.16(g) and 264.193(a) – (f)]

Since the slurry preparation and feed system will only be operated when processing a batch of propellant, this is the only time the tank system will contain slurry. After processing is completed, the system will be purged with water into the rotary kiln and the wash water and residual propellant contained therein processed as part of the BEDS shutdown procedure (see Section X-1c).

A schematic showing the secondary containment system is shown in Figure X-5. The slurry mix, feed tanks, and associated piping, etc., (except the slurry feed line to the rotary kiln) are located on the concrete floor in the basement of Building 117-4. The slurry mix tank is located on the west side of the basement floor, and the slurry feed tank is located on the east side. These tanks were installed in 1974. The north, east, and west walls of the basement are also constructed of concrete. The south wall is a blast wall which has two entry doors, one in the center of the west side and one in the center of the east side. In addition, a rollup door is located in the east corner of the south wall. A concrete drive slopes south from ground level to a storm drain grating located approximately 8 feet from the base of the south wall. This drive then slopes up to the base of the south wall. The storm-drain grating extends across the width of the concrete drive and drains to a stormwater sump located on the west side of the drive.

Secondary containment for the slurry feed system except the slurry recirculation loop consists of the basement floors and walls which drain into grating covered concrete troughs located on the south side of the basement. Troughs drain through a PVC pipe encased in concrete to a concrete secondary containment process sump located just outside the center of the south wall. The concrete floor, walls, troughs, and sump are compatible with the slurry. Additionally, these have sufficient strength and thickness to prevent failure owing to pressure gradients (including static head and external hydrological forces), physical contact with the slurry, climatic conditions, and the stress of daily operation (including stresses from nearby vehicular traffic).

The process sump is equipped with a level-indicating float which provides a display of the sump-liquid level in the control room. In order to allow detection of leaks from the tank system within 24 hours, the basement area will be inspected and the sump level checked by operating personnel at least once each eight hours anytime the tank system contains slurry. These actions will be documented in the daily operating log. Any leaks or spills to the secondary containment system will be removed within 24 hours using a portable pump. Basement floors, nonelectrical contaminated equipment, troughs, PVC pipe, and process sump will be washed with water to remove residual propellant. Recovered slurry and wash water will be placed in suitable containers on the basement floor or in the slurry mix or feed tanks, if not leaking, for reprocessing through BEDS. If recovered slurry is a hazardous waste (see 40 CFR 261.3(d)(1)) and cannot be reprocessed within 24 hours, it will be transferred to a storage area which meets EPA and NDEP regulatory requirements for storage of hazardous waste and reprocessed as soon as possible.

The secondary-containment sump currently has a capacity of 1,122 gallons. Prior to BEDS operation, the sump will be expanded to provide a capacity of 3,100 gallons which is more than 100 percent of the volume of the largest tank in the system (i.e., slurry-feed tank, volume = 3,030 gallons). The sump will be covered, have a concrete curb around the perimeter; the surrounding concrete is already sloped so that no run-off or precipitation can infiltrate the sump. The basement floor, lower walls, troughs, and sump will be coated with a concrete sealer that is compatible with the propellant slurry and prevents migration of wastes into the concrete. In addition, all concrete joints will be sealed with a slurry compatible sealant. These measures will also prevent infiltration of moisture into the containment system from surrounding soil. Although solid propellant is a hazardous waste based on reactivity, propellant slurry does not exhibit the characteristic of reactivity or emit propellant vapors that could be ignited or explode.

X-2h Secondary Containment Leak Detection Requirements for Ancillary Equipment [40 CFR 270.16(g) and 264.193(f)]

As stated above, all ancillary equipment (valves, piping, joints, etc.) except that associated with the above-ground slurry feed line to the rotary kiln will be contained within the secondary containment system. The slurry feed line is equipped with pressure sensors that would indicate when a leak occurred and allow the operators to stop flow. The slurry feed line and associated joints, valves, etc., will be inspected daily by operating personnel anytime BEDS is in operation. These inspections will be documented in the Daily Operating Log.

X-2i Controls and Practices to Prevent Spills and Overflows [40 CFR 270.16(i) and 264.194(a) & (b)]

As stated previously in Section X-1a(3)(a) above, the slurry preparation and feed system will be operated as a batch process. Since the amount of propellant and water required to make the slurry is predetermined and programmed into the PC computer, potential for spills and overflows is greatly reduced compared to a continuous process. Specific controls, described under Section X-1a(3)(a), include interlocks between the scale and propellant feed system which prevent the automatic indexing of a container of materials from the scale if the Maximum Allowable Batch Weight (MABW) would be exceeded, and the use of a totalizing flowmeter to set and control the amount of water added to the slurry mix tank based on the MABW. Set points on the scale also allow the operator to be alerted by an alarm when the MABW is reached.

Control and monitoring systems are described in Section X-1a(4)(d). They include a three level hierarchy consisting of critical alarms, system alarms, and indication alarms. These alarms may automatically shutdown individual subsystems or activate the AWFCO. As part of this system, the process control computer system is programmed to stop the feed from the slurry mix tank to the slurry feed tank when the slurry feed tank becomes full. The slurry mix tank is equipped with high-level indicators that enable the operators to stop the flow of solid propellant and process water feed to the slurry mix tank when it becomes full.

Since the tanks are located in a building, overtopping by wave or wind action or by precipitation is not a concern.

X-2j Procedures for Handling Ignitable, reactive, and Incompatible Waste [40 CFR 270.16(j), 40 CFR 264.198, and 264.199]

The dry-bulk propellant will be mixed with water as described in Section X-1a(3)(a) above to form a slurry containing approximately 25 percent by weight bulk propellant and 75-percent water which no longer displays the characteristic of reactivity. All outdoor slurry pipelines in the system will be insulated and self-draining to prevent solids in the slurry from building up. There will be no incompatible wastes placed in tanks or treated using BEDS.

X-2k Air Emission Control Equipment [40 CFR 270.16(k), 40 CFR 270.27, and 264 Subpart CC]

The air-emission controls specified in 40 CFR 264 subpart CC are not applicable to the BEDS tank system. All hazardous waste entering the unit will be verified as having an average volatile organic (VO) concentration at the point of waste origination of less than 500 parts per million by weight (ppmw) as determined using the procedures specified in 40 CFR 264.1083(a). This determination will be reviewed and updated, as necessary, at least once every 12 months following the date of the initial determination.

X-2l Tank Inspections [40 CFR 270.14(b)(5) and 40 CFR 264.195]

At least once each operating day BEDS personnel will inspect the following: (1) overfill controls;

(2) the tank system to detect corrosion or releases of waste; (3) data gathered from monitoring and leak detection equipment (e.g., pressure, level gauges, etc.) to ensure that the tank system is being operated according to design; and (4) the construction materials and area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system, to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation). The inspection schedule and procedures are provided in Table Y-3 of Section Y, Procedures to Prevent Hazards for BEDS.

X-2m Response to Leaks or Spills and Disposition of Leaking or Unfit-For-Use Tank Systems [40 CFR 264.191(d), 264.194(c), and 40 CFR 264.196.]

In the event the tank or secondary containment system is found unfit for use as a result of an assessment conducted under Section X-2b, or if a leak or spill occurs in the system, HWAD will cease use of the system and do the following:

1 Determine the cause of the failure.
2 Remove waste from the tank(s) or secondary containment system.
3 Take action to prevent/contain visible releases to the environment.
4 Make notifications to the EPA Regional Director and NDEP (must be done within 24 hours) and prepare follow-up reports.

5 Provide secondary containment, repair, or closure.

6 Certify major repairs.

7 Take other actions required under 40 CFR 264.196.

BEDS PERFORMANCE TESTING [40 CFR 270.19(b) and 40 CFR 270.62(b)(2))]

Once installed, and during shakedown operations, a mini burn will be performed for BEDS to ensure representative operation of BEDS during the comprehensive performance test. A Comprehensive Performance Test Plan (CPTP) for BEDS is included in Appendix U. The mini burn will be conducted after the CPTP has been reviewed and approved by the EPA and NDEP. After the mini burn, the slurry feed rate and other system operating parameters will be adjusted as required to optimize the process and meet emission limits under the CAA Permit.

The CPTP has been prepared in accordance with requirements of 40 CFR Part 63 Subpart EEE and EPA guidance and is appended to this permit modification application (see Appendix U). More detailed descriptions of BEDS equipment and systems, and detail drawings of components of the system, are contained in the CPTP.

Table X-1 Representative List of Energetics to be Processed at BEDS

Energetic	Composition	Quantity	
		Bulk (lb)	Total (lb)
Black Powder	73%PN, 16% Chr, 11% S	(c)	(c)
Cordite	19% NC, 7.3% EC, 18.7% NG, 55% NQ, and <2% PS	11,400	11,400
IMR4064	93% NC, 5% DNT, and <2% DPA, PS, G		(c)
M1	84% NC, 10% DNT, 5% DBP, and <2% DPA, LC, PS	234,516	7,386,555
M2	77% NC, 19% NG, and <2% EC, BN, PN, G	(c)	(c)
M5	82% NC, 15% NG, and <2% EC, BN, PN, G	(c)	(c)
M6	87% NC, 10% DNT, 3% DBP, and <2% DPA, PS	10,530	6,696,230
M6+2	86% NC, 9% DNT, 2% DBP, 2% PS, and <2% DPA	(c)	(c)
M7	55% NC, 35% NG, 85 PP, AND <2% EC, CB		
M8	52% NC, 43% NG, 3% DEP, and <2% PN, EC		162,274
M9	58% NC, 40% NG, and <2% EC, PN, G		40,301
M10	98% NC, and <2% DPA, PS, CB	(c)	(c)
M14	89% NC, 8% DNT, 2% DBP, and <2% DPA	(c)	(c)
M15	55% NQ, 21% NC, 20% NG, 4% EC, and <2% G, Crl		
M17	55% NQ, 22% NC, 22% NG, and <2% EC, G, Crl		
M26	67% NC, 25% NG, 6% EC, and <2% BN, PN, G	120,823	120,823
M26E1	69% NC, 25% NG, 6% EC, and <2% G	(c)	(c)
M30	48%NQ, 28% NC, 22% NG, and <2% EC, G, Crl	(c)	(c)
M30A1	28% NC, 22% NG, 47% NQ, and <2% EC, PS, G		5,694
M30A2	27% NC, 23% NG, 46% NQ, 3% PN, and <2% EC, G		41,598
M31	20% NC, 19% NG, 55% NQ, 4.5% DBP, and <2% G, Crl, 2-DNPDA		99,644
M31A1	20% NC, 19% NG, 54 NQ, 4.5% DBP, and <2% DPA, PS		6,782,920
M31A1E1	22% NC, 18% NG, 55% NQ, 3% DBP, and <2% EC, PS, CB		29,580
M38	98% NC, and <2% DPA, PN, PS, G	(c)	(c)
Pyrocellulose	100% NC	(c)	(c)
SPC	95% NC, 3.8% EC, and <2% LC—possible <2% NBS		19
SPCF	94% NC, 3% BS, and <2% EC, LC, PS	3,063,229	3,065,625
SPCG F	19% NC, 19% NG, 55% NQ, 7% EC, and <2% PS	36,386	36,386
SPCG	18% NC, 19% NG, 55% NQ, 7% EC, and <2% PS	47,820	59,995
SPD	99% NC, and <2% DPA	4,398	17,932
SPDB N	99% NC, and <2% DPA	6,133	6,775
SPDF N	86% NC, 9% DNT, 3% DBP, and <2% DPA, PS	36,163	37,795
SPDF	97% NC, 2% PS, and <2% DPA	116,435	120,967

Table X-1 (contd.) Representative List of Energetics to be Processed at BEDS

Energetic	Composition	Quantity	
		Bulk (lb)	Total (lb)
SPDN B	91% NC, 7% DNT, and <2% DPA	92,911	322,133
SPDN F	91% NC, 7% DNT, <2% DPA, PS		2,964
SPDN	90% NC, 3% DNT, 3% MC, 2% PS, and <2% DPA, DBP, LC,G	603,692	1,161,588
SPDN M6	86% NC, 10% DNT, 3% DBP, and <2% DPA	(c)	(c)
SPDW	99% NC, <2% DPA	300,627	308,308
SPWF	97% NC, 2% PS, and <2% DPA	306,876	309,303
WC 872	78% NC, 10% NG, 8%DBP, and <2% DPA, PN, G, TO, SS	(c)	(c)
WC875	78% NC, 10% NG, 8% DBP, and <2% DPA, PN, G, TO, CC, SS	(c)	(c)
Explosive D	100% Ammonium Picrate	small	small

[a] Acronyms list:

2-DNPDA	2-Dinitrophenyldiamine	DNT	Dinitrotoluene	NQ	Nitroguanidine
BN	Barium Nitrate	DPA	Diphenylamine	PN	Potassium Nitrate
BS	Butyl Stearate	EC	Ethyl Centralite	PP	Potassium Perchlorate
CB	Carbon Black	G	Graphite	PS	Potassium Sulfate
CC	Calcium Carbonate	LC	Lead Carbonate	S	Sulfur
Chr	Charcoal	MC	Methyl Centralite	SS	Sodium Sulfite
Crl	Cryolite	NBS	n-Butyl Stearate	TO	Tin Oxide
DBP	Dibutylphthalate	NC	Nitrocellulose		
DEP	Diethylphthalate	NG	Nitroglycerin		

[b] The composition of the energetics is based on MIDAS data: if addition energetics are processed, a material balance will be completed to determine the waste stream and to ensure that MACT standards are achieved. [c] Material currently not at HWAD.

Table X-2 Major Equipment Specifications

	FEED SYSTEM (See Figures X-1, X-2, and X-3)
	Container Handling System
BD-1, 2, 4, 5 Inbound Conveyors BD-6, 7, 8, 9 Outbound Conveyors	Live Roller Conveyors Copeland Engineering, Inc. Hydraulic Drives TRW/ROSS MAC-06-001 Hydraulic Power Unit Racine Pump No. PSV-PSSV-10HRM-50 Atkinson 100-gal tank Lincoln Motor 25 HP - 284 TC Frame - 1800 rpm Air Logic Miller Fluid Power
BD-3 Electronic Scale	Electroscale Corp. Model 303 1000 lb base Model DR-525 Digital Weightmeter 115V/60 Hz/3 PH
BD-24 Mechanical Assist	Jib Crane Bay Area Crane & Hoist Co. Trolley Hoist Eaton Corporation
BD-28 Type II Container	United Utensils Co., Inc. No. 315-Stainless-Steel, 14-guage, 55-gal Polyethylene Snap-On lids
BD-29 Type IV Container	Mueller Co. 10-gauge, No. 316-Stainless-Steel 540-gal capacity

Slurry Preparation and Recirculation System

BD-10 Container Dumper Copeland Engineering, Inc. Miller Fluid Power, Inc.

Hydraulic Cylinders: Lift Cylinder – 2½-in B x 36-in S Miller No. C29354 Travel Cylinder – 2½-in x 48-in S Miller No. C29355 Travel Cylinder – 2½-in B x 54–in S Miller No. C29355 Clamp Cylinders (2) – 2–in B x 7/8–in S

Rotary Actuator: PHD, Inc. – No. 8180-15-60-150-P-D2-A2-H with Pilot Ring No. 2305-4

Table X-2 (contd.) Major Equipment Specifications

BD-11	Dump Hopper	MAECON, Inc.
BD-12	Grinder Feed Conveyor	Vibratory Conveyor Rexnord Vibrating Equipment Division Model IBM - 1880S Serial No. 16471 LK No. 2880 2¼ TPH Motor Data: Louis Allis Co. 3 HP - 1800 rpm - 184T Frame 230/460 Volt, 3 HP, 60 Hz, TEFC Explosion-proof CL l, DIV 1, Group D CL III, DIV 1, GROUPS E, F, and G of NFPA 70, C-2 Mounting for 4000-foot. elevation.
BD-13	Metal Detector	ITT – Industrial and Automated Systems Series MD-1225-A
BD-14	Grinder	Rotary Crusher Mitts and Merrill, Inc. Serial No. HM-7712, Model 14CSF Motor Data: 150 HP - 1200 rpm - 445TS Frame 460 Volt - 3 PH - 60 Hz
BD-15	Slurry Tank	Paul Mueller Co. 2,155-gal capacity (2,200-gal, nominal) 10-gauge, No. 316-Stainless-Steel
BD-16	Transfer Pump	Pump Data: Gallagher Co. Serial No. P77-10904 and 10905 80 gpm @ 150 ft TDH @ 1,500 rpm Motor Data: 15 HP - 254 T Frame - 1,800 rpm 460 Volt - 3 PH - 60 Hz
BD-17	Feed Tank	Paul Mueller Co. 3,030-gal capacity (3,000-gal, nominal) 10-gauge, No. 316-Stainless-Steel
BD-18	Recirculation Pumps	Pump Data: Gallagher Co. Serial No. P77-10904 and 10905 80 gpm @ 150 ft TDH Motor Data: 25 HP - 1,800 rpm - 248 T Frame 460 Volt - 3 PH - 60 Hz
BD-27	Agitators	Designed to keep the propellant slurry in suspension and mixed well.
Hydroclone		Designed to provide a particle-free stream of recycled water for sprays in the dump hopper, vibrating conveyor, grinder hopper, and grinder

Table X-2 (contd.) Major Equipment Specifications

BD-33 Spray Water Pump	Pump Data: Gallagher Co. Model 2VRG200 100 gpm @ 108 ft TDH @ 1,500 rpm Motor Data: 15 HP - 1,800 rpm - 254 T Frame 460 Volt - 3 PH - 60 Hz
I.C.W. Flowmeter	ITT Barton Co. Flow Positive Displacement Meter Model F500-2 2–in carbon steel Pulse Transmitter Model 308 1 pulse per gallon
Slurry Density Meter	Designed to measure slurry density in the appropriate range.
Slurry Flowmeters	Designed to measure slurry flow in the appropriate range.

ROTARY KILN (See Figure X-1)	
Slurry Feed Pump to Rotary Kiln	Designed to deliver slurry from the recycled slurry line to the rotary kiln with an anticipated range of 0 – 10 gpm.
Rotary Kiln	J.T. Thorpe Co
Drive data	Allen Bradley Vari-Speed Motor 5 HP, 240 VDC Worm Gear Reducer Morse No. 60 RW-B-30-1L
Ash Gate Drive Data	Double Reduction Gear Motor Morse No. 30 GCDB 300-LR 3/4 HP-1750 RPM, TEFC with brake
Burner Data	North American No. 5514-9 14.6 MMBtu per hour Capacity
Combustion Blower (Also serves Combustion Chamber)	North American No. 2416-F-T20D 16 psi rated pressure Direct Drive – 20 HP
Atomizing Air Blower (Also serves Combustion Chamber)	North American No. 2324-26/2-T 7.5D 24 psi rated pressure Direct Drive – 7½ HP
Fuel Oil Tank (Also serves Combustion Chamber.)	New above-ground fuel oil tanks will be installed. Anticipated capacity is 10,000 – 20,000 gal.
LPG Tank (Also serves Combustion Chamber.)	New above-ground propane tank will be installed. Anticipated capacity is 100 – 250 gal.

Table X-2 (contd.) Major Equipment Specifications

COMBUSTION CHAMBER (See Figure X-1)	
Combustion Chamber	J.T. Thorpe Co.
Burner Data	North American No. 5422-7-A 3.3 MMBtu per hour Capacity

POLLUTION ABATEMENT SYSTEM (PAS) (See Figure X-1)	
Evaporative Cooler	8 ft-6 in diameter x 43 ft-6 in overall height – custom built by Bundy Environmental Technology, Inc. (BET)
Atomizing Nozzles	10 gpm Dual Fluid – Hastelloy C276 Delevan 31325
Bulk Bag Unloader	Bulk to deliver dry reagent form 1-ton super sacks – Custom by BET
Reagent Feeded	Volumetric screw feeder – Tecweigh-CR12
Injection Venturi	Designed to deliver reagent to gas stream – custom by BET
Baghouse	ePTFE membrane laminated on woven fiberglass backing, 17.7 oz./sq.yd. – 6-in nominal diameter x 16-ft effective length – Custom by BET
Baghouse Rotary Airlock	12-in x 12-in heavy duty square flange - Myer
Induced Draft Fan	Radial blade industrial exhauster, variable speed drive
Continuous Emissions Monitoring System (CEMS)	Designed to measure NO_x, CO, SO_2, and O_2, and comply with all federal and state requirements including monitoring and reporting – provided by BET
Continuous Opacity Monitoring Systems (COMS)	Designed to measure opacity of the stack gases.
Exhaust Stack	26 in ID x 60 ft tall, 3/16-inch A36 steal
Process Control Computer	Designed to integrate slurry preparation, slurry feed, incineration, and pollution abatement to the greatest extent possible, with monitor process functions, display process status, sound alarms as needed, and control AWFCO as required – Programmed by BET
PLC Control Panel	Allen-Bradley SLC-500
HMI	PC with RSVIEW

Table X-3 Proposed AWFCO Parameters and Set-points

Operating Parameter Limit causing AWFCO	**AWFCO Set-point**	**Averaging Period**
Energetics Slurry Feed Rate	550 lb/hr (max)	1 hr
Gauge Pressure in Rotary Kiln	0 inch WG (max)	instantaneous
Combustion Chamber Temperature	1800°F (min)	1 hr
Baghouse Inlet Temperature	400°F (max)	1 hr
Combustion Gas Velocity	stack velocity as determined during CPT (min)	1 hr
Venturi Injection Pressure Differential	pressure differential as determined during CPT (min)	1 hr
Baghouse Differential Pressure	pressure differential as determined during CPT (min)	1 hr
Stack Carbon Monoxide Concentration	100 ppm (max) [corrected to 7% O_2]	1 hr
Sorbent/Chloride Feed Ratio	ratio as determined during CPT (min)	1 hr
Low-Volatile Metals (LVM) Feed Rate	per MTEC* calculation	12 hr
Semi-Volatile Metals (SVM) Feed Rate	per MTEC calculation	12 hr
High-Volatile Metals (HVM) Feed Rate	per MTEC calculation	12 hr
*Maximum Theoretical Emission Concentration		

Table X-4 Alarms

DESCRIPTION	LEVEL	AUTOMATIC RESPONSE
Energetic Batch Weight for Slurry Prep High	System	Stop scale transfer conveyor
Metal Detector Positive Reading	System	Stop grinder feed conveyor, stop grinder
Grinder Malfunction	System	Stop grinder, shut off dump hopper spray water
Both Slurry Prep Tank Agitators Malfunction	System	Stop grinder feed conveyor, stop container dumper, stop grinder
Slurry Prep Tank Level High	Indicator	None
Both Feed Tank Agitators Malfunction	System	Stop slurry recirculation pump
Feed Tank Level High	System	Stop mix tank transfer pump
Energetic Feed Rate to Incinerator	Critical	Stop incinerator slurry feed pump
Combustion Air Blower Malfunction	Critical	Shut down burners, stop slurry feed
Atomizing Air Blower Malfunction	Critical	Shut down burners, stop slurry feed
Fuel Pump Malfunction	Critical	Shut down burners, stop slurry feed
Fuel Pressure to Burners High	Critical	Shut down burners, stop slurry feed
Rotary Kiln CCTV Cooling Water Flow Low	Critical	Shut down burners, stop slurry feed
Rotary Kiln Temperature High	Critical	Shut down burners, stop slurry feed
Rotary Kiln Pressure High	Critical	Shut down burners, stop slurry feed
Rotary Kiln Rotation Malfunction	Indicator	None
Combustion Temperature Low	Critical	Shut down burners, stop slurry feed
Combustion Temperature High	Critical	Shut down burners, stop slurry feed
Loss of One Combustion Burner	System	Stop fuel feed to lost burner
Evaporative Cooler Air Pressure Low	Critical	Bypass baghouse, stop process feed to incinerator, shut down ID fan
Evaporative Cooler Water Pressure Low	System	Start back-up water pump
Evaporative Cooler Water Pressure Low-Low	Critical	Bypass baghouse, stop process feed to incinerator, shut down ID fan
Reagent Level Low	Indication	None
Reagent Downspout Level High	System	Stop reagent feeder, stop process feed to incinerator

Table X-4 (contd.) Alarms

DESCRIPTION	LEVEL	AUTOMATIC RESPONSE
Venturi Injection Pressure Differential Low	Critical	Stop slurry feed to incinerator, shut down incinerator
Baghouse Differential Pressure Low	Critical	Stop slurry feed to incinerator
Baghouse Differential Pressure High-High	Indication	None
Baghouse High Hopper Level	Indication	None
Baghouse Inlet Temperature High	Indication	None
Baghouse Inlet Temperature High-High	Critical	Bypass baghouse, stop process feed to incinerator, shut down ID fan
Baghouse Module Valve Failure	System	May prevent bypass valve from closing (Must be a path for the flue gas.)
Instrument Air Pressure Low	System	Stop baghouse cleaning
Water Pump Run Failure	System	Switch to stand-by pump
Rotary Airlock Run Failure	Indication	None
CO Concentration High	Critical	Stop slurry feed
Stack Gas Velocity Low	Critical	Stop slurry feed
ID Fan Malfunction	Critical	Shutdown burners, stop slurry feed

Figure X-1

Flow Diagram for BEDS

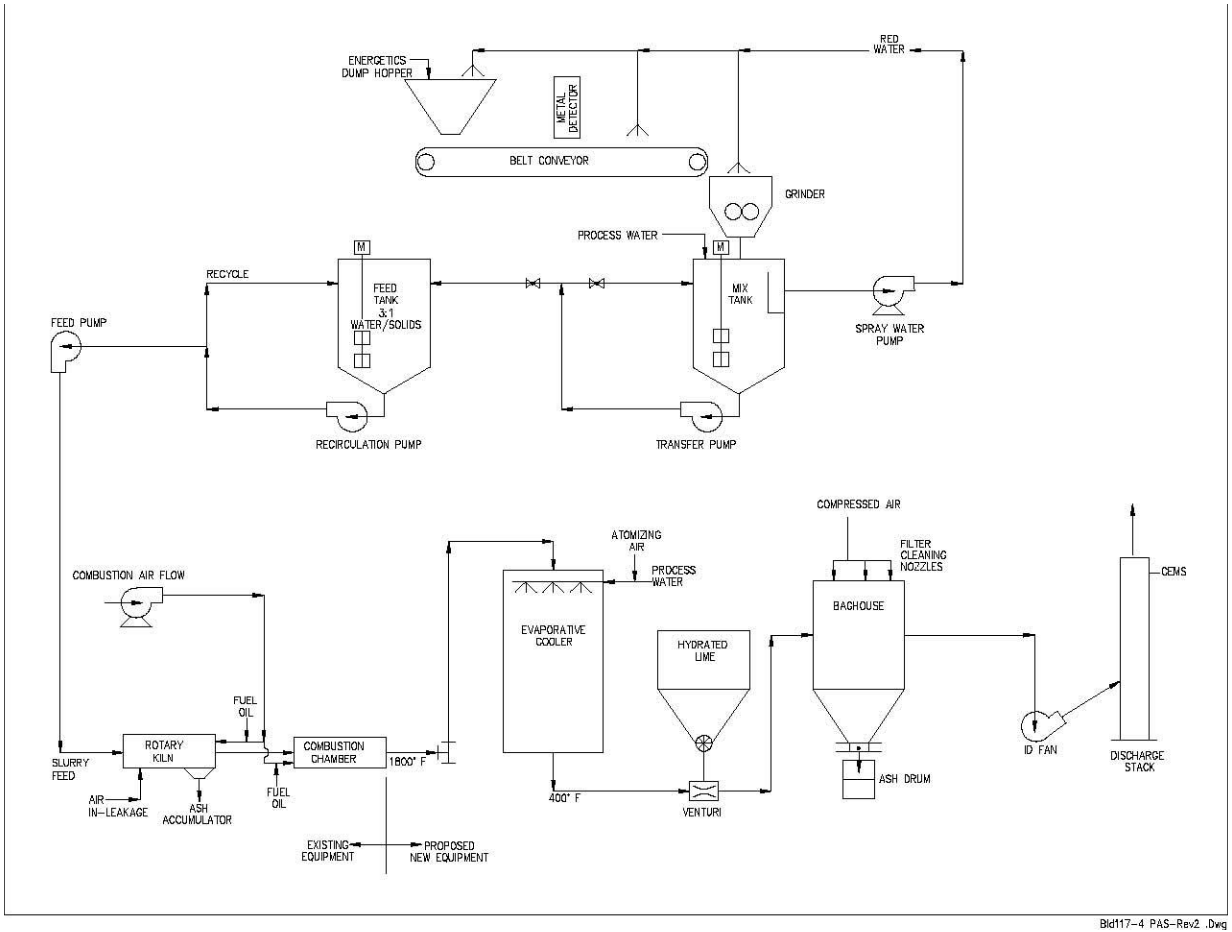


Figure X-2

Container Handling System Process Flow Diagram

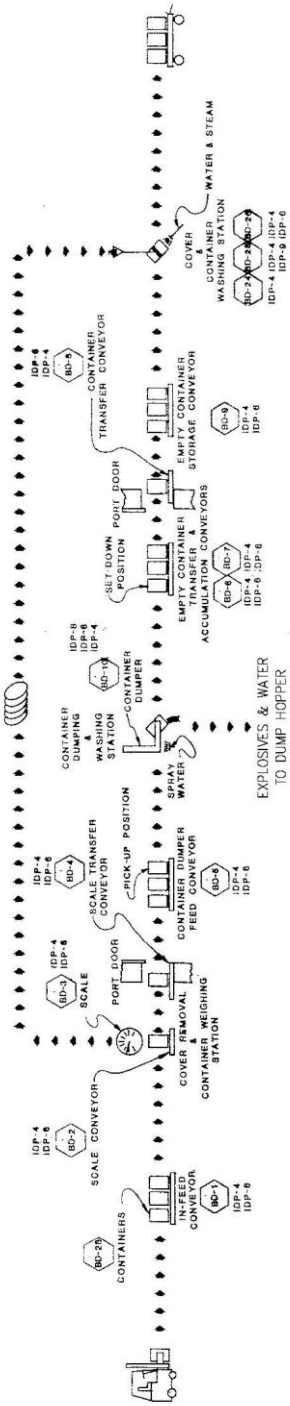
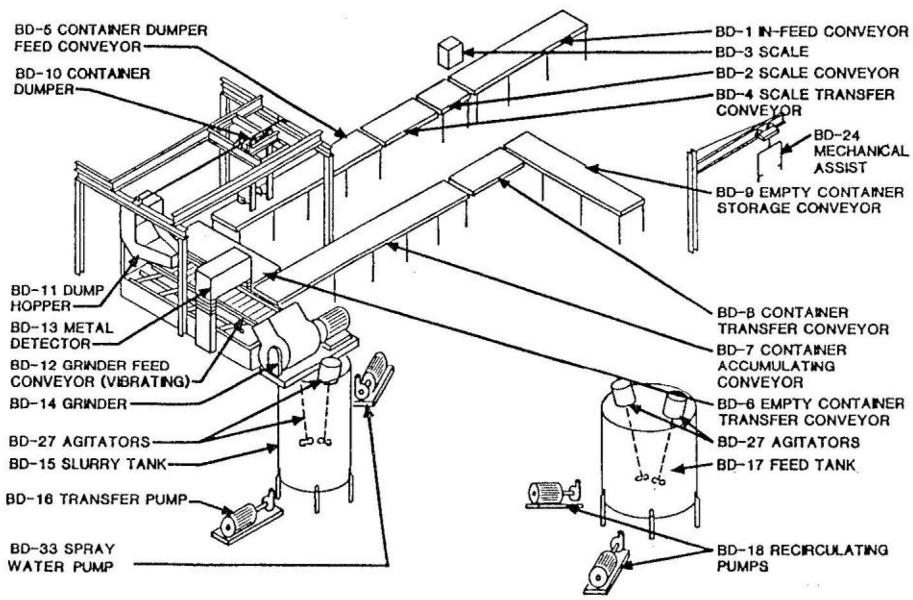


Figure X-3

Slurry Preparation and Recirculation System Arrangement



BULK INCINERATOR SLURRY PREPARATION SYSTEM ARRANGEMENT

Figure X-4

Diagram of Tank System Piping and Instrumentation

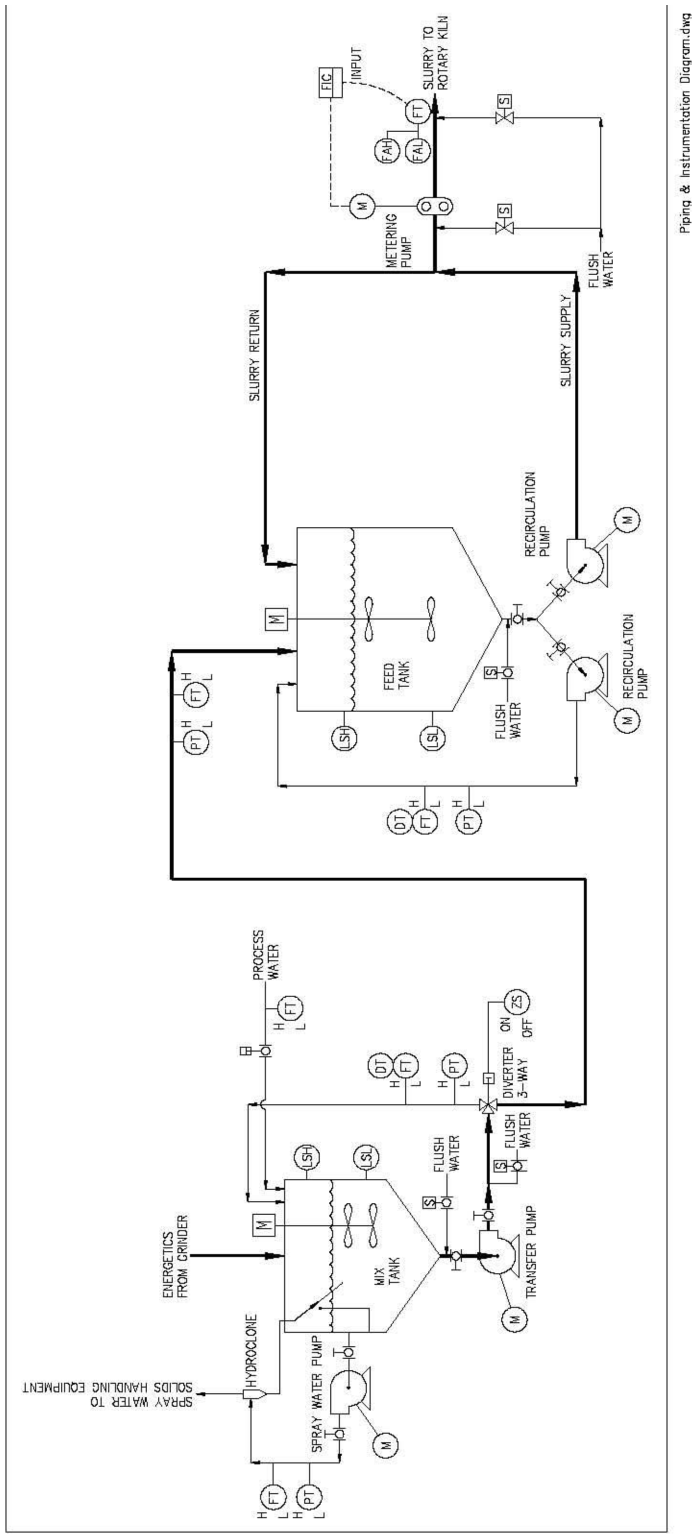
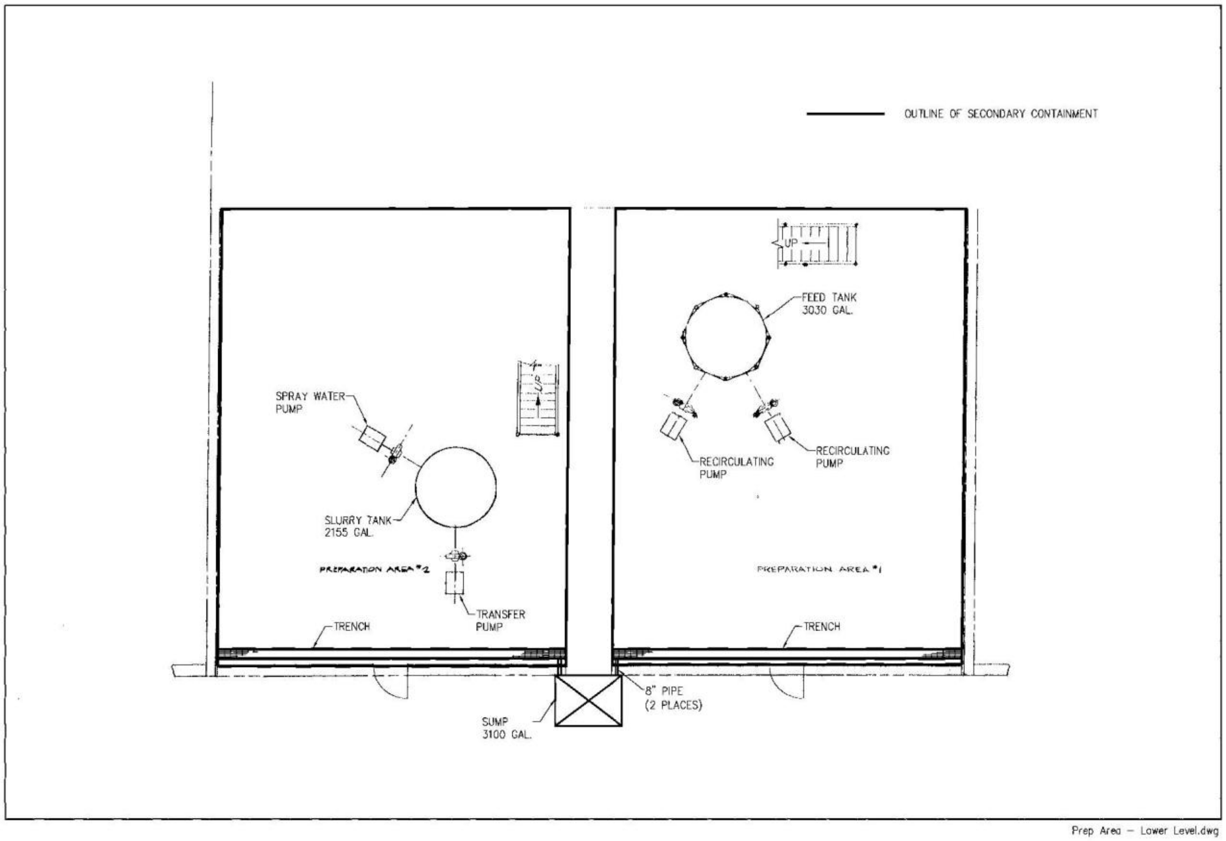


Figure X-5

Schematic of Secondary Containment System



SECTION Y: PROCEDURES TO PREVENT HAZARDS FOR BEDS

PERSONNEL TRAINING [40CFR 270.14(b)12]

An outline of the training program for BEDS is included in Appendix V of this permit modification. Specific training on operations and maintenance of the BEDS will be provided by contractors, the Tennessee Valley Authority and/or Bundy Environmental Technology during the proposed comprehensive performance test. Thereafter, training will be provided by the Training Director or his/her designated personnel as and when required.

General Inspection Requirements [40 CFR 264.15(a) & (b)]

Table Y-1 is an inspection schedule for safety, emergency, and security equipment that is considered important in preventing, detecting, or responding to environmental or human health hazards associated with potential discharges of hazardous waste materials. The schedule is maintained at the BEDS facility and is in effect whenever equipment/facilities are in operation or whenever waste is present.

Types of Problems [40 CFR 264.15(b)(3)]

Table Y-1 lists the types of problems that may be found for each of the specific items to be inspected at each facility or for each area of concern. See Table Y-2 for a copy of the safety, emergency, and security equipment inspection log sheet and Table Y-3 for the inspection and maintenance schedule specific to BEDS.

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TABLE Y-1 INSPECTION SCHEDULE - SAFETY/EMERGENCY/SECURITY EQUIPMENT

FACILITY/EQUIPMENT	SPECIFIC ITEM	TYPES OF PROBLEMS	FREQUENCY
Safety & Emergency Equipment	Lightning protection systems (visual) Lightning protection wiring continuity and grounding (testing) Accident prevention; unsafe work practice and unsafe physical and mechanical conditions Electrical equipment and installation Static electricity grounding of equipment (testing) Personnel protective clothing and equipment General fire inspection Fire extinguishers Fire blackouts Emergency shower and eyewash Face-shields and goggles Generators Emergency lighting system Crane operators	Lack of continuity and ground Lack of continuity and ground Unsafe working environment Electrical circuitry/power, shorts Lack of continuity and ground Loss of integrity, normal wear and tear, inadequate inventory Poor housekeeping, smoking violations, blocked fire doors Need recharging Dispersing Water pressure, leaking, drainage Broken or dirty, out of stock Fuel supply, spark plugs, oil Battery failure, lights inoperative Failure to lift proper weight	Semiannually Annually Daily/Monthly Annually Annually Monthly/As used Daily Monthly/After each use As used Weekly Monthly/As needed Annually/As used Per NFPA Annually

TABLE Y-1 (contd.) INSPECTION SCHEDULE - SAFETY/EMERGENCY/SECURITY EQUIPMENT

FACILITY/EQUIPMENT	SPECIFIC ITEM	TYPES OF PROBLEMS	FREQUENCY
Inspection Schedule-Security Equipment	Area/Facility fences and barriers Warning signs Gates and locks Two-way radios	Corrosion, damage to fences, barbed wire or barriers Damaged, missing Corrosion, damage to fencing or barbed wire, sticking or corroding locks Transmitter, receiver, batteries inoperative	Monthly Monthly Monthly As used/Upon failure

TABLE Y-2 SAFETY/EMERGENCY/SECURITY EQUIPMENT INSPECTION LOG SHEET

INSPECTOR=S NAME/TITLE ____ DATE OF INSPECTION __________________________ TIME OF INSPECTION ________________________

ITEM	TYPES OF PROBLEMS	ACCEPTABLE	UNACCEPTABLE	OBSERVATIONS	REMEDIAL ACTION
Area/Facility fences and barriers Warning signs Gates and locks Two-way radios Lightning protection system (visual) Lightning protection wiring and grounding (testing) Accident prevention Electrical equipment and installation Personal protective clothing and equipment General fire inspection Fire extinguishers	Corrosion, damage to fences barbed wire or barriers Damaged, missing Corrosion, damage to fencing, sticking or corroded locks Transmitter, receiver, batteries Lack of continuity and ground Lack of continuity and ground Unsafe working environment Electrical circuitry, power, shorts Wear and tear, loss of integrity Poor housekeeping, smoking violations, blocked fire doors Recharging				

TABLE Y-2 (contd.) SAFETY/EMERGENCY/SECURITY EQUIPMENT INSPECTION LOG SHEET

INSPECTOR NAME/TITLE ____
DATE OF INSPECTION ____________________________ TIME OF INSPECTION ______

ITEM	TYPES OF PROBLEMS	ACCEPTABLE	UNACCEPTABLE	OBSERVATIONS	REMEDIAL ACTION
Emergency shower and eyewash	Water pressure, leaking, drainage				
Face-shields and goggles Crane operations Generators Emergency lighting system First aid equipment and supplies Decontamination facilities	Broken or dirty, out of stock Failure to lift proper weight Fuel supply, oil, spark plugs Battery failure, lighting Out of stock, lack of integrity, inoperative Housekeeping, leaks, drainage				

TABLE Y-3 BEDS INSPECTION AND MAINTENANCE SCHEDULE

SUBSYSTEM	ITEM/ COMPONENT	PROCEDURE DESCRIPTION	FREQUENCY
System Controls System Controls System Controls System Controls Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem	Control Console Control Console Control Console Control Console Container Dumper Container Dumper Container Dumper Container Dumper Container Dumper Container Dumper Container Dumper Container Dumper	Position the OPERATOR/OFF/MAINTENANCE selector switch to the ―ON” position. Depress ―Lamp Test” switch to test all panel lights. With the OPERATOR/OFF/MAINTENANCE selector switch in the ―ON” position, check the indicating lights of the programmable controller. The three (3) ruby lights on the main frame should be illuminated. With the OPERATOR/OFF/MAINTENANCE selector switch in the ―OFF” position, clean the interior of the Control Console. With the OPERATOR/OFF/MAINTENANCE selector switch in the ―OFF” position, check all ―push-on” type terminals and firmness of ―plugin” relays in the back of the Control Console panel. With the equipment ―ON”, conduct a general inspection for unusual noise and to confirm smooth operation. With the equipment ―ON”, check the hydraulic lines for leaks. With the equipment ―ON”, check the pneumatic lines for leaks. With the equipment ―ON”, check the air regulator and filter With the equipment ―ON”, check the hydraulic supply tank level and filter. With the equipment ―OFF”, check all air filters. With the equipment ―OFF”, check the hydraulic actuators, connections and shafts. With the equipment ―ON”, check the hydraulic oil pressure and temperature.	Daily Daily Weekly Weekly Daily Daily Daily Daily Monthly Monthly Monthly Monthly

TABLE Y-3 (contd.) BEDS INSPECTION AND MAINTENANCE SCHEDULE

SUBSYSTEM	ITEM/ COMPONENT	PROCEDURE DESCRIPTION	FREQUENCY
Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem	Container Dumper Container Dumper Container Dumper Container Dumper Grinder Feed Conveyor Grinder Feed Conveyor Grinder Feed Conveyor Grinder Feed Conveyor Grinder Feed Conveyor Grinder Feed Conveyor Grinder Feed Conveyor Grinder Feed Conveyor Metal Detector Grinder	With the equipment –OFF”, check and lube the rollers. With the equipment —ON‖, check the pneumatic control panels. With the equipment –OFF”, clean the rubber rollers on the overhead track with a grease-cutting solvent (e.g., Windex®) With the equipment –OFF”, check the integrity of the grounding system. With the equipment –ON”, conduct a general inspection to detect unusual noise or platform vibration. With the equipment –ON”, check that the pan stroke is ¾ inch. With the equipment —ON‖, check the leaf springs. With the equipment —ON‖, check the air mount supports. With the equipment –OFF”, check the pan. With the equipment –OFF”, check the drive V-belts, and sheaves. With the equipment –OFF”, check the electrical connections. With the equipment –ON”, lube the bearings. With the equipment –ON”, check the operation and sensitivity of the sensor. Re-adjust if necessary. With the equipment –OFF”, check for material build-up on the grinder knives, throat bars, and housing.	Monthly Monthly Monthly Monthly Daily Weekly Monthly Monthly Monthly Monthly Monthly Quarterly Weekly Daily

TABLE Y-3 (contd.) BEDS INSPECTION AND MAINTENANCE SCHEDULE

SUBSYSTEM	ITEM/ COMPONENT	PROCEDURE DESCRIPTION	FREQUENCY
Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem	Grinder Grinder Grinder Grinder Grinder Grinder Grinder Grinder Grinder Grinder Transfer Pump, Recirculation Pumps, and Spray Water Pump Transfer Pump, Recirculation Pumps, and Spray Water Pump	With the equipment ―OFF", check to ensure that knives and throat bars are sharp, tight, and properly adjusted. With the equipment ―OFF", check to ensure that the cylinder cover and cleanout door are properly secured. With the equipment ―OFF", check the bearing hold down bolts for tightness. With the equipment ―OFF", inspect all moving parts for defects and fatigue. With the equipment ―OFF", check the thermocouples and vibration probes. With the equipment ―OFF", sharpen and adjust knives and throat bars. With the equipment ―OFF", check the torque of the knife bolts. With the equipment ―OFF", lube the bearings. With the equipment ―OFF", check the brake for excessive wear. With the equipment ―OFF", lube the coupling. With the equipment ―ON", conduct a general inspection for leakage, unusual noise, or excessive vibration. With the equipment ―OFF", check the drive V-belts and sheaves.	Daily Daily Weekly Weekly Weekly Weekly Weekly Monthly Monthly Annually Daily Monthly

TABLE Y-3 (contd.) BEDS INSPECTION AND MAINTENANCE SCHEDULE

SUBSYSTEM	ITEM/ COMPONENT	PROCEDURE DESCRIPTION	FREQUENCY
Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem	Transfer Pump, Recirculation Pumps, and Spray Water Pump Transfer Pump, Recirculation Pumps, and Spray Water Pump Transfer Pump, Recirculation Pumps, and Spray Water Pump Agitators Agitators Ticket Printer Ticket Printer Tank System Tank System	With the equipment ―OFF", check the oil level and replace if dirty. With the equipment ―OFF", lube the bearing caps. With the equipment ―OFF", check the seal water flow. With the equipment ―ON", conduct a general inspection for unusual noise or excessive vibration. With the equipment ―OFF", check the housing cap screws, chuck screw, and mounting bolts for tightness. With the equipment ―OFF", check the following for freedom of movement and adequate lubrication: • Bevel gears between stepper motor and printer • Variable identifier bevel gears • Vertical bearing on variable identifier drive shaft With the equipment ―OFF", check the following for security: • Stepper motor mounting screws • Printer motor mounting screws • Solenoid mounting screws • Set screws on variable identifier drive shaft Inspect overfill controls to ensure that they are in good working order. Inspect the system for corrosion or releases of waste.	Monthly Monthly Monthly Daily Monthly Semiannually Semiannually Daily Daily

TABLE Y-3 (contd.) BEDS INSPECTION AND MAINTENANCE SCHEDULE

SUBSYSTEM	ITEM/ COMPONENT	PROCEDURE DESCRIPTION	FREQUENCY
Slurry Preparation and Recirculation Subsystem Slurry Preparation and Recirculation Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem	Tank System Tank System Incinerator Feed Pump Incinerator Feed Pump Incinerator Feed Pump Incinerator Feed Pump Incinerator Incinerator Incinerator Incinerator Incinerator Incinerator Incinerator Incinerator Incinerator Incinerator Incinerator	Inspect data gathered from monitoring and leak detection equipment (e.g., pressure or temperature gauges, etc.) to ensure that the tank system is being operated according to its design. Inspect the construction materials and the area immediately surrounding the tank system, including the secondary containment system, for erosion or signs of releases of hazardous waste. With the equipment –ON”, conduct a general inspection for leakage, unusual noise, or excessive vibration. With the equipment –OFF”, grease the bearings. With the equipment –OFF”, lube the timing gears. With the equipment –OFF”, disassemble the pump and inspect all parts for wear and fatigue With the equipment –ON”, conduct a general inspection for leakage, or unusual noise. With the equipment –OFF”, check and drain fuel filters at each cold start. With the equipment –ON”, check all fuel and air gauges for proper readings. With the equipment –ON”, check the incinerator rotation speed adjustment control for proper operation. With the equipment –ON”, check support and thrust rollers. With the equipment —ON, check for loose bolts on the drive. With the equipment –ON”, check the drive alignment. With the equipment –OFF”, clean the U-V sensors at the burners. With the equipment –OFF”, clean the pipeline strainers With the equipment –ON”, check the electric heat tracing thermostat control for the ICW pipelines. With the equipment –OFF”, lube the billow block bearings, main drive reducer, and ash gate reducer grease fittings.	Daily Daily Daily Weekly Monthly Semiannually Daily Daily Weekly Weekly Weekly Weekly Weekly Weekly Weekly Weekly Weekly Biweekly

TABLE Y-3 (contd.) BEDS INSPECTION AND MAINTENANCE SCHEDULE

SUBSYSTEM	ITEM/ COMPONENT	PROCEDURE DESCRIPTION	FREQUENCY
Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem	Incinerator Incinerator Incinerator Incinerator Incinerator Incinerator Incinerator Incinerator Incinerator Combustion Blower, and Atomizing Blower Combustion Blower, and Atomizing Blower Combustion Blower, and Atomizing Blower Air Ejector Blower, Combustion Blower, and Atomizing Blower Fuel Oil Pump Fuel Oil Pump	With the equipment –OFF”, check the interior of the incinerator for broken refractory bricks. With the equipment –ON”, check the exterior for hot spots. With the equipment –ON”, perform a flame current check on the flame relays. With the equipment –OFF”, Remove and clean the burner tip with torch cleaner. With the equipment –OFF”, replace the oil in the main drive reducer and the ash gate reducer. With the equipment –OFF”, check the thermocouples. With the equipment –OFF”, clean the contacting surface of the L & N drive mechanism slide wire With the equipment –OFF”, clean the CCTV lenses and viewing port. With the equipment –ON”, perform the flame failure check and pilot turndown check for each burner With the equipment –ON”, conduct a general inspection for unusual noise or excessive vibration. With the equipment –OFF”, lube the motor bearings and couplings. With the equipment –OFF”, clean the air intake screen filters. With the equipment –OFF”, lube the fuel supply port valves. With the equipment –ON”, conduct a general inspection for unusual noise, excessive vibration, or leaks. With the equipment –OFF”, check the electrical connections	Biweekly Biweekly Monthly Monthly Semiannually Semiannually Semiannually Semiannually Annually Daily Semiannually Semiannually Semiannually Daily Monthly

TABLE Y-3 (contd.) BEDS INSPECTION AND MAINTENANCE SCHEDULE

SUBSYSTEM	ITEM/ COMPONENT	PROCEDURE DESCRIPTION	FREQUENCY
Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Incinerator Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem	Fuel Oil Pump Fuel Oil Pump Propane Tank Propane Tank Evaporative Cooler Evaporative Cooler Evaporative Cooler Evaporative Cooler Evaporative Cooler Hydrated Lime Feeder Hydrated Lime Feeder Hydrated Lime Feeder	With the equipment –ON”, check the gauge operation and condition. With the equipment –OFF”, lube the motor bearings. With the equipment –ON”, conduct a general inspection for leaks. With the equipment –ON”, check the gauge and valve. With the equipment –OFF”, grease rotating equipment per manufacturers recommendations, including the following: • I.D. fan and motor • Baghouse rotary airlock • Evaporative cooler pumps • Lime feeder • Lime bulk bag agitators With the equipment –ON”, check the air and water pressure at each evaporative cooler spray lance. With the equipment –ON”, check the air and water pressure at each evaporative cooler pump skid. With the equipment –OFF”, switch use of evaporative cooler pumps to keep all pumps lubricated. With the equipment –OFF”, remove and inspect evaporative cooler spray lances. With the equipment –OFF”, inspect and clean out the evaporative cooler bottom. With the equipment –ON”, verify lime feed into the system. With the equipment –OFF”, clean reagent injection pipe. With the equipment –OFF”, remove and inspect reagent injection pipe.	Monthly 7 Years Daily Monthly Weekly Daily Daily Weekly Quarterly Quarterly Daily Weekly Quarterly

TABLE Y-3 (contd.) BEDS INSPECTION AND MAINTENANCE SCHEDULE

SUBSYSTEM	ITEM/ COMPONENT	PROCEDURE DESCRIPTION	FREQUENCY
Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem Pollution Abatement Subsystem	Baghouse Baghouse Baghouse Baghouse Baghouse Baghouse Baghouse Baghouse Baghouse Baghouse Baghouse Baghouse	With the equipment –ON”, check baghouse differential pressure. With the equipment –OFF”, drain condensate from all compressed air filters. With the equipment –OFF”, check oil level in compressed air lubricators. With the equipment –ON”, check for access door seal leaks. With the equipment –ON”, check for compressed air leaks. With the equipment –OFF”, inspect ash removal system. With the equipment —ON", check all baghouse pulse hoses With the equipment –ON”, check baghouse pulse header air pressure. With the equipment –OFF”, fill compressed air lubricators. With the equipment –OFF”, blow the baghouse differential pressure taps clean. With the equipment –OFF”, open the baghouse clean air plenum access doors and inspect for broken bags. Replace any failed bags. With the equipment –OFF”, inspect inside of the baghouse module hopper to verify that ash buildup is not occurring.	Daily Daily Daily Daily Daily Daily Weekly Weekly Weekly Quarterly Quarterly Quarterly

SECTION Z CLOSURE PLAN FOR BEDS

Closure Performance Standard [40 CFR 264.111 and 264.112]

As closure of the active hazardous waste treatment unit at HWAD is not contemplated at this time, detailed sampling and analysis plans have not been prepared. The closure performance standard will be determined at such time that closure of the hazardous waste management unit at HWAD is contemplated. The closure performance standard will be defined to ensure the following:

- The need for continuing maintenance (i.e., post-closure maintenance) will be minimized.
- The closure activities will control, minimize, or eliminate, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere.
- The closure activities will comply with the provisions of 40 CFR Part 264 Subpart G.

The closure performance standard will be defined and proposed by HWAD and will be submitted to the USEPA and NDEP for approval before implementation of the closure plan.

A copy of This Closure Plan will be kept at HWAD until closure is completed and certified. If changes in operating plans or facility design affect the closure plan, this plan will be amended in accordance with the provisions of 40 CFR 264.112. HWAD will be responsible for expanding upon and updating the facility's copies of closure plans when revisions are necessary due to changes in the operations, facility design, and schedule. The USEPA Region IX and NDEP will be notified at least 45 days prior to the date closure activities are scheduled to begin. All closure activities will be completed within 180 days after the closing units receive the final volume of waste for treatment.

Within 60 days of completion of closure activities, the owner/operator and an independent registered Professional Engineer will certify that closure of the facilities was completed in accordance with the specification contained in the approved Closure Plan. This certification will be forwarded to the Regional Administrator, USEPA.

Partial Closure Activities [40 CFR 264.112(b)]

Partial closure is not anticipated for the HWAD BEDS at this time. If future circumstances require HWAD to close a portion of the BEDS unit, or close the unit for a period of time, revisions in the closure plan will be submitted to the appropriate regulatory agencies within the required time limit.

Closure of Bulk Energetics Demilitarization System (BEDS) [40 CFR 264.351]

BEDS will treat hazardous waste and contaminated materials generated at HWAD through thermal treatment. Closure activities for BEDS must, therefore, meet the requirements for closing hazardous waste incinerators. The closure of BEDS will meet closure performance standards and will be implemented in accordance with the approved closure plan. Any inventories of wastes will be removed and disposed of in accordance with the approved plan. BEDS includes equipment and structures; removal and/or decontamination of the equipment and structures will meet the closure performance standards, and be implemented in accordance with the approved closure plan. See Closure Plan for a description of planned closure activities, including inventory removal and removal and/or decontamination of equipment and structures.

CLOSURE PLAN [40 CFR 270.14(b)(13)]

This closure plan has been prepared for the BEDS. The plan is designed to meet the performance standard of 40 CFR 264.111 as follows:

1. Minimizes the need for further post-closure maintenance.
2. Controls, minimizes or eliminates, to the extent necessary to prevent threats to human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.

The Closure Plan for BEDS includes the following:

1. Necessary steps to completely close the facility at the end of its intended operating life.
2. An estimate of the maximum inventory of wastes in treatment at any time during the life of the facility.
3. A description of the steps needed to decontaminate facility equipment during closure.
4. An estimate of the expected year of closure and a schedule for final closure which

includes the total time required to close the facility.

Within ninety (90) days after receiving the final volume of hazardous wastes, the facility will treat or remove from the site, all hazardous wastes in accordance with the approved closure plan. Because the installation is a federal facility, no closure cost estimates or financial assurance mechanisms are necessary according to 40 CFR 264.140(c).

Copies of the Closure Plan are maintained at the installation. If any operational changes occur that will affect the Closure Plan, an amendment to the plan will be submitted to the NDEP and EPA.

BULK ENERGETICS DEMILITARIZATION SYSTEM (BEDS) DESCRIPTION

BEDS is designed to safely destroy energetic materiel emerging from demilitarization operations in an environmentally acceptable and safe manner. Primary feedstock will be bulk propellants in the form of fine powders, grains, extrusions, sticks, rolls, and other shapes. Propellants may be single-based (nitrocellulose only) or multibased (nitrocellulose with nitroglycerine and/or nitro guanidine). Additional propellants that are currently loaded in munitions which might later be demilitarized could also be included as feedstock. Small quantities of secondary explosives that have no recycle value, such as Explosive D, might also be processed. This feedstock will be referred to throughout this document by the general term of ―propellant." These materials are considered RCRA hazardous waste due to the explosive (reactive) components. Some materials may also be considered hazardous due to metal content, such as lead. This system is designed to meet the MACT emissions criteria of the US-EPA's Hazardous Waste Combustor standards for incinerators. A simplified flow diagram of the BEDS process is shown in Figure Z-1.

BEDS consists of a slurry feed system, rotary kiln, combustion chamber, and air pollution-control equipment.

Slurry Feed System

The slurry feed system is used to reduce the size of propellant and prepare a water-based slurry for feeding to the rotary kiln.

Solid propellant loaded in specially designed drums is delivered to Building 117-4. Energetic material is weighed and then moved into the slurry preparation area through an airlock. In each step of the solids handling in the slurry preparation area, a water spray is used to wet these solids so as to avoid accidentally detonating the propellant. Drum contents are fed into the feed hopper which is equipped with vibratory means for uniformly feeding energetic solids onto a conveyor through a bottom opening. The conveyor moves energetic solids through a metal detection device wherein any tramp metal can be detected. If metal is detected, the conveyor is stopped and the metal is manually removed. Propellant is conveyed into a wet grinder at a controlled rate. In the wet grinder, the energetic material is ground in the presence of water. Resulting solids have a maximum dimension of 0.1 of an inch or less.

Ground particles of energetic material, water used during grinding, and additional water as required to develop a mixture of three-parts water to one-part explosive (by weight) are directed into the slurry mixing tank where agitation and recirculation are provided to keep these particles in suspension. A hydroclone provides particle-free liquid for recycle to the balance of the system as needed (including sprays in the dump hopper, the vibratory conveyor, the grinder hopper, and the grinder).

This suspension is then pumped to the slurry feed tank and subsequently pumped through a slurry feed line. Flow through the feed line is maintained in the turbulent range to ensure particles remain in suspension. In addition, the slurry is constantly re-circulated through the loop and back to the tank to prevent solids from settling. A pump pulls a slip-stream from the slurry feed line and discharges it to the rotary kiln.

Rotary Kiln

The rotary kiln is a refractory-lined rotary furnace. It is approximately 5.5 feet in internal diameter and 11-feet long. The kiln has a single burner assembly at the discharge end of the kiln, which is the opposite end from where the wastes are fed. A low-sulfur Diesel Fuel No. 2 Burner is used during the combustion of waste material to sustain the operation temperature. Fuel consumption varies with the specific waste material to be processed. When a high heat content material is incinerated, less oil may be required. At maximum firing, fuel consumption may be increased up to 15 million British thermal units per hour. The burner is equipped with all accessory equipment necessary for the burner operation. A flame sensor detects the presence of flame by sensing ultraviolet light emissions and acts as a flame-failure safety device. The control system will not allow wastes to be fed to the rotary kiln unless this sensor detects a flame from the burner.

The kiln is supported and rotated by rollers at a variable speed (0.5-6.0 revolutions per minute). Ash drops from the discharge end of the kiln to an ash gate, for intermittent removal if needed. Gases leaving the kiln are ducted to the combustion chamber.

Combustion Chamber Description

The combustion chamber provides final combustion of kiln exhaust gases. This chamber is capable of heating exhaust gases up to 2000°F, providing approximately two seconds of residence time, and achieving highly turbulent flow to ensure good mixing for effective destruction of waste gases. The combustion chamber is constructed of carbon steel and internally insulated with a refractory liner. Normal exhaust temperature will be 1800°F; maximum expected temperature is 2000°F.

A forced-draft fan supplies air to fuel-oil burners in the combustion chamber. The combustion chamber burners are equipped with an UV-flame sensor to monitor ignition and assure a flame is present before waste is fed. Additional combustion air is provided by the combustion air blower, as needed.

Pollution Abatement System

A PAS completes the pollution control function of the combustion chamber. Exhaust gases from the combustion chamber are routed to the evaporative cooler where gases are quenched from approximately 1800°F to approximately 350°-400°F with injected water. Temperature of the exhaust gas from the evaporative cooler is maintained by controlling the flow of quench-water. Only enough water is added to cool the stream. No liquid water is carried in the gas stream. Just downstream of the evaporative cooler, hydrated lime will be continuously fed into the gas stream to react with HCl or SO_2 gases to form calcium salts. An excess stoichiometric ratio will be used to ensure that a high percentage of HCl, SO_2, and other acid gases are removed. If the evaporative cooler exit temperature exceeds the high-temperature limit, an automatic waste feed cutoff to the rotary kiln will be activated, assuring protection of the equipment.

The next stage of the air pollution control system is the baghouse. The baghouse is designed so that all bags operate in parallel. Injected lime is carried over to the baghouse in gas stream. Particulate matter is collected on the fabric filter bags to achieve a highly efficient removal of solids, including fly ash, reaction products, and reagent. Although the primary function of the baghouse is to remove particulates, an additional acid scrubbing action takes place there. Un-reacted reagent collecting on the bags reacts with any un-reacted HCl or SO_2 in the evaporative cooler effluent gases.

A pulse-jet cleaning system operating on compressed air cleans the bags. Dust composed of reaction products, fly ash, and un-reacted reagent, is collected in the bottom section of the baghouse. Manually-operated valves transfer collected dust to the collection containers for ultimate disposal. Nonhazardous waste will be disposed on-site at a permitted landfill or equivalent, and hazardous waste will be sent off-site for disposal at a permitted hazardous waste landfill.

The baghouse is sized to accommodate the full flow of quenched flue gas. The baghouse will only be bypassed in the event that evaporative cooler exit gas exceeds maximum operating temperature of approximately 450°F. An interlock shall be provided to activate automatic waste feed cutoff if the bypass valve is opened. Emissions released during bypass operations will be minimal, since waste feed is stopped and the facility goes into shutdown mode to correct the conditions which resulted in opening the bypass valve.

The baghouse exhaust duct includes a bag leak detector capable of sensing <0.001 grains of particulates per cubic foot of flue gas. This bag leak detector includes a prewired output signal that will be used in the controls system to warn the operator of a leak in a fabric filter bag.

An induced draft fan provides the system draft control, using a variable frequency drive to modulate fan speed based on a pressure signal at the rotary kiln exhaust gas manifold duct. The induced draft fan discharges all gases to an adjacent exhaust stack, which contains a gas sampling system to provide continuous analysis for particulates, carbon monoxide (CO), oxygen (O_2), sulfur dioxide (SO_2), and oxides of nitrogen (NO_x).

BEDS HAZARDOUS WASTE INVENTORY

Waste materials are not stored at BEDS. Propellants are stored in appropriate buildings at the installation. When the decision to destroy propellants is made, propellants are moved from the storage area to the BEDS facility. Once propellants are removed from the storage magazine, they are considered a hazardous waste. The maximum amount of material allowed on-site at one time at Building 117-4 is the equivalent of 5000 pounds of Hazard Class 1.1 Material.

Operating BEDS will generate one major waste stream: the collection of waste from the baghouse (see Figure Z-1). Baghouse wastes will be produced at a rate of approximately 24 pounds per ton of propellant slurry processed and collected in drums from the bottom of the baghouse. These wastes include the carryover ash from the rotary kiln and combustion chamber, calcium salts from the reaction of acidic gases (such as SO_2 and HCL with hydrated lime), un-reacted lime, and trace amounts of solids from the evaporative cooler. Negligible sources of waste will be heavier ash from the rotary kiln (collected in drums from the downstream side of the rotary kiln), and evaporative cooler wastes.

Each waste stream will be sampled and analyzed pursuant to the Waste Analysis Plan, which is detailed in Appendix EE. These wastes will be disposed in compliance with state and federal regulations. It is not anticipated that BEDS will generate any liquid waste streams.

BEDS CLOSURE PROCEDURES

Performance Standards

BEDS components will be decontaminated to the "XXX" (3X) condition, as described by the Department of Army Technical Bulletin TB 700-4 on the Decontamination of Facilities and Equipment. The 3X condition is a military standard which indicates that equipment or facilities have been examined and decontaminated by approved procedures and that no contamination can be detected by appropriate instruments, test solutions, or visual inspection. Facilities classified as 3X are considered safe for the intended government use. Department of Defense Manual DOD 4145.26-M "Contractors' Safety Manual for Ammunition and Explosives" also prescribes policies and procedures relating to the decontamination and disposal of contaminated items.

Decontamination of Surfaces, Structures, and Components

Slurry Feed System

All wet grinders, tanks, pumps, hoppers, piping, and components will be steam cleaned and flushed of processing residue. The flush residue and all excess solids and materials from the cleanout of the equipment will be collected and analyzed, if necessary, to determine if it is a hazardous waste.

The feed conveyors will be dry-brushed to remove any large quantities of contamination that may exist. The brushings will be collected and analyzed, if necessary, to determine if they are hazardous. Any waste from the decontamination of the slurry feed system will be containerized.

Rotary Kiln, Combustion Chamber, and Off Gas Ductwork/Piping

The rotary kiln is a refractory lined furnace with parts made of carbon steel. The discharge end of the kiln at the ash gate may contain a residue of ash. A layer of particulate from the process will cover all refractory and may contain metals from propellant processing.

The combustion chamber is constructed of carbon steel and the internally insulated with a refractory liner. The refractory liner will be covered by a layer of particulate from the processing operation which may contain metals that are the same as those contained in the processed propellants.

The off-gas ductwork/piping is expected to contain contaminants similar to those found in the rotary kiln and combustion chamber.

Decontamination will occur by removing all refractory and residue from within the kiln, combustion chamber, and ductwork/piping and properly containerizing the residue. The kiln and combustion chamber will then be disassembled and placed upon containment liners for physically and manually removing remaining residue that may be in sections of the vessels. If residue and containment liners are characterized as hazardous waste, these will be containerized and managed as such.

Pollution Abatement System

The pollution abatement system is comprised of an evaporative cooler, lime hopper, venturi, baghouse, induced draft fan, stack, and associated pumps, compressors, and piping.
Filter bags will be removed from the baghouse and containerized. Any remaining dust in the baghouse and downstream ductwork will be removed and containerized.

The interior surfaces of equipment will be decontaminated by detergent/water rinse. Gates and other ancillary devices will be vacuumed. Further decontamination, such as scrubbing, solvent rinse, etc., will depend upon analysis of the samples.

All equipment will be dry brushed or cleaned on the exterior surface. Brushings and cleaning wipes will be collected and tested for toxic residue.

Disposal

If determined by generator knowledge or testing to be hazardous, debris, wastewater, and other contaminated residues or materials will be disposed as hazardous waste at an off-site, permitted hazardous waste disposal facility. All filter bags from the baghouse and contaminated refractory from the kiln and chamber, and contaminated off-gas piping will be containerized and disposed as hazardous waste, if required. Any equipment which is difficult or too time consuming to decontaminate adequately, will also be disposed as hazardous waste, if required. Any soil that contains hazardous constituents or is shown to contain contamination will be treated as hazardous waste if it exceeds the applicable RCRA limits.

All residues that are hazardous waste will be placed in DOT approved drums and must be removed from the incinerator area within 72 hours after the drum has been filled**.** Full drums of hazardous waste must be stored at the installation in a temporary or permitted storage facility prior to disposal, if not shipped directly to a permitted off-site treatment, storage, or disposal facility. Wastewater may be accumulated in tanks or tank trucks during decontamination prior to disposal. If hazardous, it too will be managed as hazardous waste.

Prior to any materials being disposed as nonhazardous waste or sold as scrap metal, these materials must be certified decontaminated by analyses.

SUBMISSION OF SAMPLING AND ANALYSIS PLAN

Brushings, rinse water, and rust will be tested to determine if these are hazardous in accordance with 40 CFR § 261, Appendices II and III and EPA Report No. SW-846. Samples will be analyzed for metals from propellants destroyed in the incinerator using TCLP.

After decontamination operations, equipment, floors, and walls will be sampled and analyzed for possible contamination. A wipe sampling technique will be used to determine the surface concentration of metals remaining on BEDS components and surrounding areas.

The wipe sampling technique involves wiping selected measured areas on the surface area to be sampled with Kimwipe tissues (or equivalent) wetted with distilled water. The proposed sampling protocol will generally conform to EPA Standard Operating Procedure No. 2011 for wipe samples presented in the Compendium of Environmental Response Team Waste Sampling Procedures (EPA/540/P-91/008) January 1991, or other applicable guidance, as appropriate. Each wipe sample location will be thoroughly wiped with one Kimwipe to remove all residues within the specific measured area to be sampled. Each individual Kimwipe will be placed in a separate container and transported to the laboratory for analysis.

The laboratory will determine the total metal content of the Kimwipe in each sample bag. Sample metal contents will be divided by the corresponding total wipe area to determine the area metal concentration for the surface which has been sampled.

Soil boring samples, 2 feet in depth, will be collected at 10-foot intervals at the BEDS. Samples will be taken at the edge of equipment support structures (e.g., concrete slab, footer). Then, samples will be taken around the entire BEDS building concrete pads perimeter and extend outwards for a minimum of 50 feet, or up to other installation buildings. Analyses will be conducted for reactivity and toxicity (TCLP).

Background soil-boring samples will be collected from multiple locations and depths. Background levels will be determined by averaging the analyses of nearby unaffected soil samples from the multiple locations and depths, eliminating analytical results which are found to be significantly different.

In the event that all background samples show a parameter to be non-detectable, the decontamination objective shall then be less than, or equal to, two times the detection limit for that parameter. However, in the event that only some background samples indicate a parameter to be non-detectable, concentration of the parameter in those samples will be assumed to be equal to one-half the detection limit.

If necessary, the potential contaminated area will be tested at greater depths and farther distances to determine the nature and extent of contamination.

If the groundwater is found to be contaminated during soil sampling, a sampling and analysis plan will be submitted to the EPA. This plan would include procedures and techniques for sample collection, sample presentation and shipment, analytical procedures, and chain of custody control.

SAMPLING AND ANALYSIS PLAN

This sampling plan has been developed for the Resource Conservation and Recovery Act (RCRA) closure activities for the Bulk Energetics Demilitarization System (BEDS) located at the Hawthorne Army Depot (HWAD) in Hawthorne, Nevada. The plan describes the sampling and analysis activities required to complete closure of the BEDS unit. The closure plan requires equipment and surface sampling and analysis to demonstrate that decontamination procedures were effective. This plan describes the sampling strategies for the closure project, provides detailed procedures for sampling, and establishes quality assurance (QA) and quality control (QC) procedures.

Plan Organization

This sampling plan has been prepared generally following the United States Environmental Protection Agency's (USEPA's) *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) *Chapter Nine, Sampling Plan*. The plan will serve as an essential guidance by which the closure samples will be collected and handled. The plan defines all aspects of QA/QC procedures and establishes sampling and analytical quality indicators that will demonstrate achievement of the sampling objectives.

Sampling Objectives

During the closure activities, sampling will be performed to verify that the closure performance standards have been achieved. The performance standards have been developed to control, minimize, or eliminate, to the extent necessary to prevent threats to human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.

This sampling plan addresses the sampling requirements for closure. The following performance standards will be achieved for closure:

- The exterior of all APC equipment that is located outdoors will be cleaned to the point that no hazardous residue is indicated.
- all process equipment, will be sealed or protected to prevent the infiltration of rainwater and contamination of runoff.
- The walls and floors of the primary BEDS building will be cleaned such that no visible residue remains on them. The building will then be closed in place.

Sampling will be used to verify that cleaning procedures were effective for the exterior of the APC equipment that is located outdoors and for the walls and floors of the BEDS building. The closure plan specifies that wipe sampling will be performed. Wipe samples will be collected and analyzed to verify that the equipment and surfaces are free of hazardous residues. Comparison of wipe sample analytical results to an unused wipe media sample (blank) will be used to determine the presence or absence of contamination.

Sampling Design

A judgmental sampling design has been chosen for the closure sampling activities. This sampling design is described in USEPA's Guidance on Choosing a Sampling Design for Environmental Data Collection, December 2002. Judgmental sampling refers to the selection of sample locations based on professional judgment alone, without any type of randomization. Judgmental sampling was chosen based on the following criteria:

- Relatively small-scale features or conditions are under investigation;
- There is reliable historical and physical knowledge about the feature or condition under investigation; and
- The objective of the investigation is to screen an area(s) for the presence or absence of contamination at levels of concern.

In judgmental sampling, the selection of sampling units (i.e., the number and location of samples) is based on knowledge of the feature or condition under investigation and on professional judgment. This method is appropriate for the closure sampling because the current condition of the equipment and area is known and the sampling is only being used to indicate possible contamination after cleaning.

This sampling plan addresses wipe sampling for the exterior of the BEDS equipment and for the walls and floors of the BEDS building. For sampling purposes, the BEDS equipment has been separated into two regions: the interior process equipment, and the APC equipment that is located outdoors (the Combustion Chamber, Evaporation Cooler, and Baghouse). The two interior walls closest to the BEDS equipment will be sampled, and the floor in the vicinity of the BEDS equipment will be sampled. Sample locations will be chosen based on visual observations and process knowledge. Any visibly stained areas on equipment, walls, and floor will be chosen as sampling locations. In the absence of such visual indication, process knowledge will be used to select locations most likely to have been contaminated during unit operation. Table Z-1 summarizes the sampling locations and defines the number of samples to be taken for each location

TABLE Z-1 SAMPLE LOCATIONS AND NUMBER OF SAMPLES

SAMPLE LOCATION [1]	NUMBER OF SAMPLES		NOTES
	METALS (INCLUDING MERCURY)	ORGANICS (EXPLOSIVES)	
BEDS process equipment	3	3	Samples should be distributed over the surface of the BEDS process equipment, with preference given to those areas most likely to be contaminated (via visual indication or process knowledge).
Dump Hopper	2	2	Samples should be distributed over the surface of the Dump Hopper.
BEDS feed conveyors	2	2	Samples should be distributed over the surface of the feed conveyors.
Grinder	2	2	Samples should be distributed over the surface of the Grinder.
Mix Tank	2	2	Samples should be distributed over the surface of the Mix Tank.
Feed Tank	2	2	Samples should be distributed over the surface of the Feed Tank.
Rotary Kiln	2	2	Samples should be distributed over the surfaces of the Rotary Kiln.
Combustion Chamber	2	2	Samples should be distributed over the surfaces of the Combustion Chamber.
Evaporation Cooler	2	2	Samples should be distributed over the surface of the Evaporation Cooler.
Baghouse	4	4	Samples should be distributed over the surface of the baghouse.
Building walls	6	6	Samples should be distributed over surface of the two walls closest to BEDS equipment.
Building floor	3	3	Samples should be distributed over the surface of the floor surrounding and under the BEDS equipment
Field duplicates	2	2	Collected immediately adjacent to one of the samples at two designated locations. The baghouse and the building floor have been chosen as the field duplicate sampling locations.
Blanks	3	3	Carried to site, unopened, labeled as blank in field.
Total Number of Samples to Be Analyzed	37	37	

[1] When collecting wipe samples of equipment or building surfaces, preference should be placed on sampling areas with stains or other indications of possible contamination. Absence such evidence, select areas most likely to be contaminated based on process knowledge. If no such areas can be identified, distribute the samples randomly over the surface of the item to be sampled.

Sampling Procedures

The sampling procedures for this project will conform to the following ASTM standards:

- D6966–08, Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Determination of Metals; and
- D6661–10, Standard Practice for Field Collection of Organic Compounds from Surfaces Using Wipe Sampling.

Copies of the referenced procedures are provided in Appendix W. An overview of each procedure is provided herein. This section is only intended to provide a basic overview of the standards. The actual standards in the appendix should be referenced when performing the sampling.

Wipe Sampling for Metals Determination

The procedures of ASTM Standard D6966–08 Section 7 are summarized in Table Z-2. Each sampling area will be defined as a 10 centimeter (cm) by 10 cm square. A template will be developed prior to sampling to ensure uniform sample areas.

TABLE Z-2
WIPE SAMPLING PROCEDURE FOR METALS DETERMINATION

STEP	PROCEDURE
1	Don a pair of clean, powderless, plastic gloves
2	Carefully place a clean template on the surface to be sampled. Tape the outside edge of the template and outline it with a Sharpie® marker to indicate the position of the template and make sure it does not move.
3	Clean the outside of the wipe container to ensure that the wipe does not become contaminated with dust.
4	Remove the wipe from its container, and inspect the wipe.
5	Using an open flat hand with the fingers together, place the wipe on the surface to be sampled. Wipe the selected surface area, side to side, in an overlapping "S" or "Z" pattern. Wipe the surface so that the entire selected surface area is covered.
6	Inspect wipe for significant shape change or tearing. If any significant changes noted, restart sampling procedures with a different type of wipe at a new sampling location.
7	Fold the wipe in half with the collected dust side folded inward and repeat the wiping procedure (step 5) within the selected sampling area using an up and down overlapping "S" or "Z" pattern at right angles to the first wiping.
8	Fold the wipe in half again with the collected dust side folded inward and repeat the wiping procedure (step 5) one more time, concentrating on collecting settled dust from edges and corners within the selected surface area.
9	Fold the wipe again with the collected dust side folded inward and insert the wipe into a sample container.
10	Label the sample container, identify the sample location, record dimensions of sampling area.
11	Discard gloves.

Wipe Sampling for Organics Determination

The procedures of ASTM Standard D6661–10 Section 7 are summarized in Table Z-3. Each sampling area will be defined as a 10 cm by 10 cm square. A template will be developed prior to sampling to ensure uniform sample areas.

TABLE Z-3
WIPE SAMPLING PROCEDURE FOR ORGANICS DETERMINATION

STEP	PROCEDURE
1	Don a pair of clean, powderless, plastic gloves
2	Carefully place a clean template on the surface to be sampled. Tape the outside edge of the template and outline it with a Sharpie® marker to indicate the position of the template and make sure it does not move.
3	Clean the outside of the wipe container to ensure that the wipe does not become contaminated with dust.
4	Remove the wipe from its container, and inspect the wipe.
5	Wipe the entire surface to be sampled using firm strokes by pressing with the fingertips. Wipe vertically and then horizontally to ensure there is complete coverage in both directions with minimal overlap of the previous stroke.
6	Fold the wipe with the sampled side inward, place it in the sample container, and cap the container.
7	Label the sample container, identify the sample location, record dimensions of sampling area.
8	Discard gloves.

Blank Samples

The objective of the sampling activities is to verify that cleaning procedures were effective for the exterior of the APC equipment and for the walls and floors of the BEDS building. In order to determine the presence or absence of contamination, blank samples must be analyzed to provide a point of comparison.

Unused wipe media samples will be used as the blanks for this sampling program. ASTM Method D6966–08 requires that field blanks field are collected at a minimum frequency of five percent, with a minimum number of three samples for each batch. A total of 37 samples will be collected for this sampling event. Three blank samples will collected.

Blank samples will travel to the site with the other sample media. The containers will not be opened. The blank containers will be labeled onsite and shipped to the laboratory with the collected surface samples.

Field Duplicate Samples

A field duplicate will be collected for two sampling locations, an outside location and an inside location. The sampling locations chosen for the field duplicates are the baghouse and the building floor. For each chosen sampling location, one duplicate sample will be collected. The duplicate sample will be collected immediately adjacent to one of the regular samples for that location.

Other Miscellaneous Samples

Other miscellaneous samples will be collected as necessary to satisfy sampling conditions of other permits or to determine the method of proper disposal. Details on this sampling and the required analyses can be found in the source permits.

Sampling Equipment

The following equipment will be required for the sampling:

- Disposable, powderless, plastic gloves;
- Plastic or cardboard templates for metals sampling;
- Stainless steel, aluminum, disposable heavy-duty aluminum foil or other inert material templates for organics sampling;
- Adhesive tape to secure templates;
- Cleaning cloths to clean templates and other equipment between samples;
- Pre-wetted sampling wipes (material and solution to be selected by laboratory);
- Rigid, sealable sample containers; and
- Preprinted labels, sample log forms, and chain of custody forms.

Analytical Procedures

The analytical methods to be used for this sampling effort are detailed in Table Z-4. The table presents the referenced analytical method and sample preparation method.

TABLE Z-4
SAMPLE PREPARATION AND ANALYSIS PROCEDURES

PARAMETER	PREPARATION/ANALYTICAL METHOD
Metals (except mercury)	SW-846 Method 6010B
Mercury	SW-846 Method 7470A or 7471A
Organics (explosives)	SW-846 Method 8330

Table Z-5 specifies the target analytes for each analytical method.

TABLE Z-5
TARGET ANALYTES

ANALYTE	CAS NO.	ANALYTE	CAS NO.
SW-846 Method 6010B (Metals)			
Arsenic	7440–38–2	Lead	7439–92–1
Barium	7440–38–2	Selenium	7782–49–2
Cadmium	7440–43–9	Silver	7440–22–4
Chromium	7440–47–3		
SW-846 Method 7470A or 7471A (Mercury)			
Mercury	7439-97-6		
SW-846 Method 8330 (Explosives)			
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	19406-51-0	Nitrobenzene (NB)	98-95-3
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	35572-78-2	2-Nitrotoluene (2-NT)	88-72-2
1,3-Dinitrobenzene (1,3-DNB)	99-65-0	3-Nitrotoluene (3-NT)	99-08-1
2,4-Dinitrotoluene (2,4-DNT)	121-14-2	4-Nitrotoluene (4-NT)	99-99-0
2,6-Dinitrotoluene (2,6-DNT)	606-20-2	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	1,3,5-Trinitrobenzene (1,3,5-TNB)	99-35-4
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	2,4,6-Trinitrotoluene (2,4,6-TNT)	118-96-7

Quality Assurance and Quality Control

The HWAD is committed to ensuring that the data generated during this project are scientifically valid, defensible, complete, and of known precision and accuracy. This section discusses the QA procedures that will be in place for sample collection and handling. In addition, QC objectives for the analytical methods are established.

Sample Identification

The sampling contractor will be responsible for ensuring that sample tracking documentation procedures are followed for the field sampling efforts. Documentation of all sample collection activities will be recorded on pre-printed data collection forms and sample labels. Table Z-6 provides a summary of sample documentation requirements.

TABLE Z-6
SAMPLE DOCUMENTATION REQUIREMENTS

DOCUMENT	REQUIRED INFORMATION
Sample identification label	Time and date of sampling
	Description of sample (equipment name, location, etc.)
	Unique identifier for sample
	Target analytes (metals or organics)
	Sampler's name
Sample data forms	List of all samples taken
	Time and date of sampling
	Description of sample (equipment name, location, etc.)
	Unique identifier for sample
	Sampling technique (ASTM Standard D6966–08 or D6661–10)
	Target analytes (metals or organics)
	Sampler's name

Chain of Custody

- An essential part of any sampling and analysis program is ensuring the integrity of the sample from collection to data reporting. The possession and handling of samples should be traceable from the time of collection through analysis and final disposition. chain of custody procedures will be used to ensure the integrity of the samples by tracking possession from the time of collection to delivery to the laboratory. The custody of all samples is tracked using chain of custody forms. The following procedures will be employed: All samples will be properly labeled. Labels will be affixed to the sample container. Sample labels will be completed using waterproof ink.
- A chain of custody form will accompany all samples. When transferring the possession of samples, the individuals relinquishing and receiving the sample(s) will sign, date, and note the time on the form. This form will document sample custody transfer from the sampler, often through at least one other person, to the laboratory.
- The chain of custody form will specify the preservation requirements and the preparation and analysis methods to be used for each sample, as well as any additional information related to the sample.

- Authorized personnel will maintain chain of custody for all samples. The history of each sample and its handling will be documented from the time it is collected through all transfers of custody, until it is relinquished to the laboratory. The laboratory will then maintain internal custody according to the laboratory's procedures.

A sample will be considered to be in a person's custody if:

- It is in one's actual physical possession;
- It is in one's view, after being in one's physical possession;
- It is in one's physical possession and locked or otherwise sealed so tampering will be evident; or
- It is kept in a secure area, restricted to authorized personnel only.

Sample Handling

Samples will be collected, transported, and stored in new, unused containers, such as glass jars, which are constructed of materials inert to the analytical matrix. Only containers that allow airtight seals, such as containers with Teflon-lined lids, will be used.

Table Z-7 outlines the holding times for the analytical parameters for wipe samples. All sample holding times will be consistent with the requirements of the method(s), or an equivalent method, if the prescribed method does not specify a holding time. The holding times begin on the day of sample collection, not on the day that samples arrive at the laboratory. Samples are typically hand-delivered or shipped via overnight mail to the contract laboratory.

TABLE Z-7
SAMPLE HOLDING TIME REQUIREMENTS

PARAMETER	HOLDING TIME FROM SAMPLE TO EXTRACTION	HOLDING TIME FROM EXTRACTION TO ANALYSIS
Metals (except mercury)	180 days	180 days
Mercury	28 days	28 days
Organics (explosives)	14 days	40 days

Quality Control Parameters

QC objectives include precision, accuracy, representativeness, comparability, and completeness. Typical QC parameters include matrix spike (MS) and MS duplicate (MSD) samples, laboratory control sample (LCS) and LCS duplicate (LCSD) samples, surrogates, and duplicates. Tables Z-8 provides the project specific QC procedures for assessing accuracy and precision. The table lists the parameter of analysis, QC parameter, QC procedure, frequency at which accuracy and precision are determined, and objective.

TABLE Z-8

QUALITY CONTROL OBJECTIVES

ANALYTICAL PARAMETERS	QC PARAMETER	QC PROCEDURE	FREQUENCY	OBJECTIVE [1]
Metals (except mercury)	Accuracy	LCS	1 per batch	80-120% recovery
	Precision	Field duplicate	1 per chosen sampling location [2]	<25% RPD
Mercury	Accuracy	LCS	1 per batch	80-120% recovery
	Precision	Field duplicate	1 per chosen sampling location [2]	<25% RPD
Organics (explosives)	Accuracy	Surrogates	Every sample	50-130% recovery [3]
	Accuracy	MS	1 per batch	50-130% recovery [3]
	Precision	Surrogates	Calculate RSD for batch	<35% RSD of recovery
	Precision	MSD	1 per batch	<50% RPD [3,4]
	Precision	Field duplicate	1 per chosen sampling location [2]	<20% RPD [3]

1 RPD refers to relative percent difference. RSD refers to relative standard deviation.

2 The chosen sampling locations for the field duplicates are the baghouse and building floor.

3 Limits specified are generally applicable. Actual limits are determined by the laboratory and are compound specific.

4 If the concentrations are less than five times the reporting limit, the laboratory will be unable to control these limits.

Precision

Precision is a measure of the reproducibility of results under a given set of conditions. It is expressed in terms of the distribution, or scatter, of replicate measurement results, calculated as the relative standard deviation (RSD) or, for duplicates, as relative percent difference (RPD). RPD and RSD values are calculated using the following equations:

$$\mathrm{RPD} = \left(\frac{|X_1 - X_2|}{\text{avg } X} \right) \times 100$$

$$RSD = \left(\frac{STDEV}{avg\ X}\right) x\ 100$$

Where X_1 and X_2 represent each of the duplicate results.

Blanks

Blanks will be collected for the sampling event. Blanks will be used to evaluate the effects of contamination on results and also to define background levels for target analytes.

Table Z-9 provides the type and acceptance criteria for each stack gas blank to be analyzed. All of these blanks, as well as the laboratory method blanks for the waste samples, provide critical information on the potential contamination that may occur in test program samples. The results of blank analyses can prove very useful when attempting to understand anomalies in data, or generally higher than expected test results.

TABLE Z-9
BLANK ANALYSIS OBJECTIVES

ANALYTICAL PARAMETERS	BLANK TYPE	FREQUENCY	OBJECTIVE
Metals (except mercury)	Initial calibration blank	Following initial calibration verification	<Reporting limit
	Continuing calibration blank	Following continuing calibration verification	<Reporting limit
	Field blank	Three per sampling event	<Reporting limit
	Method blank	One per batch	<Reporting limit
Mercury	Initial calibration blank	Following initial calibration verification	<Reporting limit
	Continuing calibration blank	Following continuing calibration verification	<Reporting limit
	Field blank	Three per sampling event	<Reporting limit
	Method blank	One per batch	<Reporting limit
Organics (explosives)	Field blank	Three per sampling event	<Reporting limit
	Method blank	One per batch	<Reporting limit

Detection Limits

The sampling program will rely on comparisons to background concentrations (i.e., blanks) to assess contamination. Analytical results are expected to be at or below detection limits. Therefore, it is imperative that consistent detection limits be achieved across all samples.

Table Z-10 presents the expected detection limits for each analyte. The values in the table are laboratory reporting limits (RLs). The laboratory will be instructed to ensure that RLs are consistent for all samples for each analyte.

TABLE Z-10
REPORTING LIMITS

ANALYTE	REPORTING LIMIT (PPM)
SW-846 Method 6010B (Metals)	
Antimony	0.05 ppm
Arsenic	0.05 ppm
Barium	0.05 ppm
Beryllium	0.05 ppm
Cadmium	0.05 ppm
Chromium	0.05 ppm
Lead	0.05 ppm
Nickel	0.05 ppm
Selenium	0.05 ppm
Silver	0.05 ppm
Thallium	0.05 ppm
SW-846 Method 7470A or 7471A (Mercury)	
Mercury	0.05 ppm
SW-846 Method 8330 (Explosives)	
4-Amino-2,6-dinitrotoluene (4-Am-DNT)	1 ppm (aqueous), 10 ppm (solids)
2-Amino-4,6-dinitrotoluene (2-Am-DNT)	1 ppm (aqueous), 10 ppm (solids)
1,3-Dinitrobenzene (1,3-DNB)	1 ppm (aqueous), 10 ppm (solids)
2,4-Dinitrotoluene (2,4-DNT)	1 ppm (aqueous), 2.5 ppm (solids)
2,6-Dinitrotoluene (2,6-DNT)	1 ppm (aqueous), 10 ppm (solids)
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	1 ppm (aqueous), 10 ppm (solids)
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	1 ppm (aqueous), 10 ppm (solids)
Nitrobenzene (NB)	1 ppm (aqueous), 10 ppm (solids)
2-Nitrotoluene (2-NT)	1 ppm (aqueous), 10 ppm (solids)
3-Nitrotoluene (3-NT)	1 ppm (aqueous), 10 ppm (solids)
4-Nitrotoluene (4-NT)	1 ppm (aqueous), 10 ppm (solids)
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	1 ppm (aqueous), 10 ppm (solids)
1,3,5-Trinitrobenzene (1,3,5-TNB)	1 ppm (aqueous), 10 ppm (solids)
2,4,6-Trinitrotoluene (2,4,6-TNT)	1 ppm (aqueous), 10 ppm (solids)

Data Validation and Reporting

This section presents the approaches to be used to reduce, validate, and report measurement data. The project team will make certain that:

- All raw data packages are paginated and assigned a unique project number. Each project number will reflect the type of analyses performed (*i.e.*, metals, organics).
- The data packages contain a case narrative, sample description information, sample receipt information, COC documentation, and summary report. All associated QA/QC results, run/batch data, instrument calibration data, sample extraction/preparation logs, and chromatograms, etc., will be included in the final laboratory report.
- These data are assigned to a specific appendix in the sampling report for easy reference and data review.

Data Validation

Validation demonstrates that a process, item, data set, or service satisfies the requirements defined by the user. For this program, review and evaluation of documents and records will be performed to assess the validity of samples collected, methodologies used, and data reported. This review comprises three parts: review of field documentation, review of laboratory data reports, and evaluation of data quality.

Review of Field Documentation

Sample validation is intended to ensure that the samples collected are representative of the population under study. Criteria for acceptance include positive identification, documentation of sample shipment, preservation, and storage, and documentation demonstrating adherence to sample collection protocols and QC checks.

As part of the review of field documentation, field data sheets and master logbooks will be checked for completeness, correctness, and consistency. The following specific items will be checked:

- Sample collection date;
- Sample identification;
- Any comments that may affect interpretation of results;
- Number of required field QC samples (*i.e.*, field blanks, field duplicates); and
- Sample tracking documentation.

Review of Data Reports

The representative from each laboratory will approve all data results. The representative's signature will be included in the report. This signature will indicate that all QA/QC expectations were met. If expectations were not met, the discrepancies will be explained in the laboratory case narrative. The laboratory representatives will discuss the QA/QC issues and include the impact of these issues on the data results in the case narrative.

The project team will perform a qualitative evaluation of the reported data to verify:

- Adherence to holding time requirements;
- Completeness of target analyte lists;
- Correctness of reporting limits;
- Correctness and consistency of measurement units;
- Inclusion of necessary flags and meaningful comments regarding data;
- Adherence to specified analytical methodologies; and
- Sample tracking documentation.

Evaluation of Data Quality

The project team will review field and laboratory documentation to assess the following indicators of data quality:

- Integrity and stability of samples;
- Performance of instruments used for analysis;
- Possibility of sample contamination;
- Identification and quantitation of analytes;
- Precision; and
- Accuracy.

Data Reporting

All data will be reported in the appropriate units as applicable to the sample and the method of analysis. Wipe sample results will be reported as concentrations per unit area (e.g., µg/cm2). The same unit area (10 cm by 10 cm square = 100 cm2) will be used to calculate the concentration for each sample and the blanks. The results of each sampling location will be compared to the results of the blanks to assess possible contaminant.

CLOSURE SCHEDULE

As closure of BEDS is not contemplated at this time, specific dates for closure cannot be determined. Final closure will be implemented when the Army decides to close the facility. Closure shall then commence after the 45-day notification period required by 40 CFR 264.112(d)(1).

Within 90 days of receiving the final volume of hazardous waste, HWAD will treat and remove from BEDS all hazardous waste in accordance with the approved closure plan. Closure will be completed within 180 days after receiving the final volume of hazardous waste. A general schedule for closure activities is presented in Table Z-11.

CERTIFICATION OF CLOSURE

Within 60 days of completion of final closure, the owner/operator and a registered independent professional engineer will certify that closure of the facilities was completed in accordance with the specification contained in the approved closure plan and with 40 CFR 264.115. This certification will be forwarded to the U.S. EPA.

DRAWINGS

Section V (―Facility Description for the BEDS") provides a map of WADF showing the location of Building 117-4 (Figure V-1), a schematic showing the locations of BEDS components in and around Building 117-4 (Figure V-2), and a map showing topography in the vicinity of BEDS (Figure V-3). These maps demonstrate the size, dimensions, layout and contours of the BEDS facility.

TABLE Z-11
CLOSURE SCHEDULE

TIME PERIOD (WEEKS)	ACTIVITY DESCRIPTION
Weeks 1 through 6	Perform testing and analyses in accordance with approved plan.
Weeks 3 through 10	Decontamination and/or removal of equipment, appurtenances, and structures in accordance with approved plan.
Weeks 11 through 16	Prepare Post Closure Plan (if required) and submit to the NDEP for approval.
Weeks 12 through 21	Remediation of contamination in accordance with approved plan.
Weeks 22 through 23	Prepare and file closure certification with the NDEP.
Weeks 24 through 25	If required, commencement of the Post Closure activities defined in the Post Closure Plan.

Extensions for Closure Time [40 CFR 264.113]

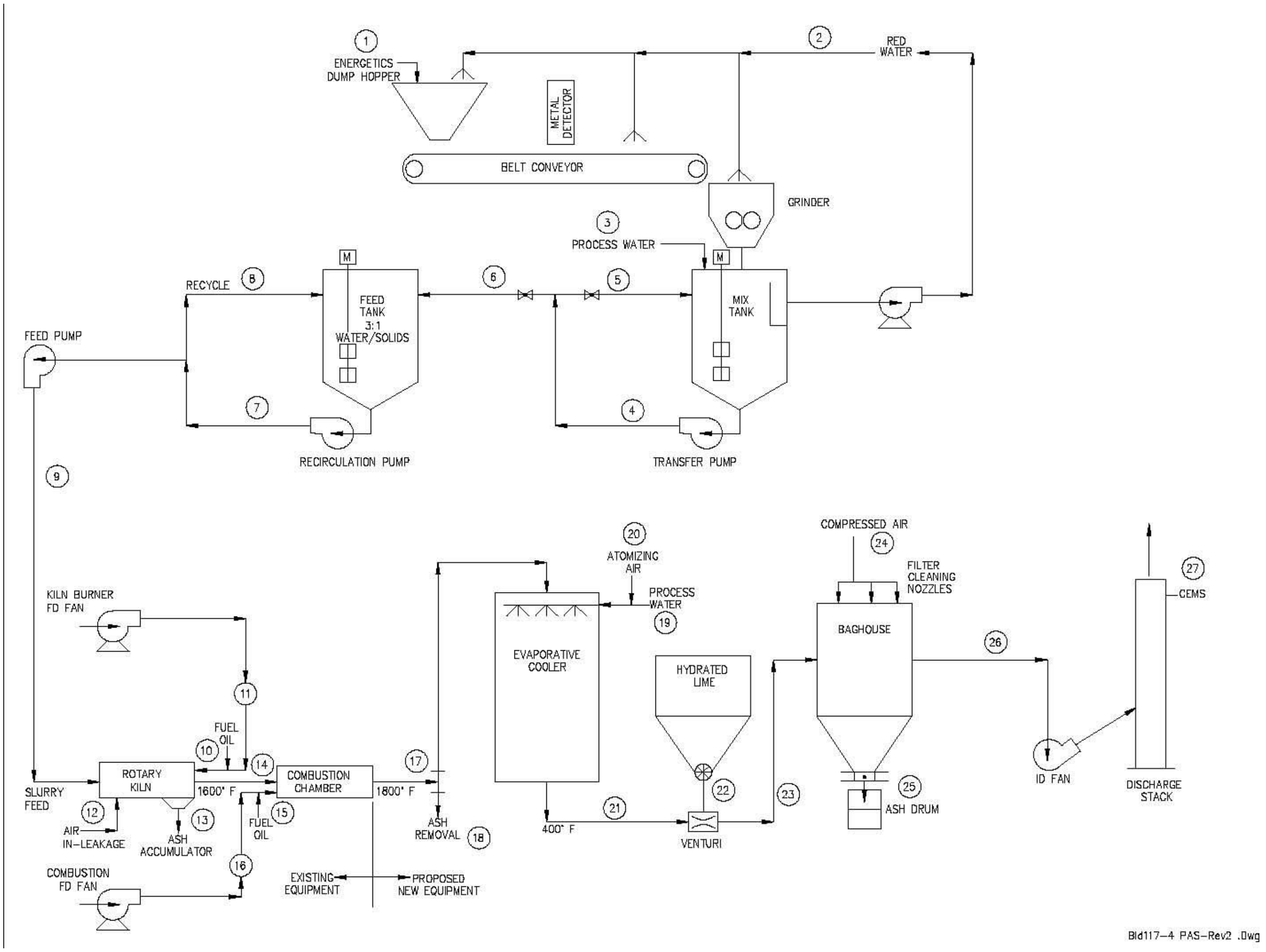
Within 90 days of receiving the final volume of hazardous waste, HWAD will treat and remove from BEDS all hazardous waste in accordance with the approved Closure Plan. Closure activities will be completed within 180 days of receiving the final volume of hazardous waste for treatment.

POST-CLOSURE PLAN [40 CFR 270.14(b)(13)]

In accordance with 40 CFR 270.14(b)(13), post-closure plans are required as part of Part B Permit Application, as applicable under 40 CFR 264.110(b). Since BEDS is neither a hazardous waste disposal facility, nor a waste pile, nor a surface impoundment, post-closure requirements for these types of facilities do not apply. The tank system will be closed as required under 40 CFR 264.197(a). Since the tank system will have a secondary containment, contamination of the soil is highly unlikely. Therefore, post-closure care under 40 CFR 264.197(b) is not likely to be required.

FIGURE Z-1

BEDS PROCESS FLOW DIAGRAM



SECTION AA. CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS

SOLID WASTE MANAGEMENT UNIT

Solid waste management units (SWMUs) at HWAD are listed in Section AA, Tables AA-1, AA-2, and AA-3. The Tables listed currently have ongoing changes and are up to date as of July 2012.

Table AA-1: List of Solid Waste Management Units (SWMUs) In Corrective Action (Operation):

SWMU	SWMU Name	Unit Comment	ARMY SITE ID
B-04	101-44 IMPOUNDMENT	Site phase in AEDB-r is currently CMI(O)	HWAAP-B04
B24A	BLDG 336: FUEL STORAGE		HWAAP-B24A
B27A	103-16 CATCHMENT PIT	Site phase in AEDB-r is currently CMI(O) - DD with State	HWAAP-B27A
I09	49-10 PIT/LANDFILL #1 & #2	CMI(O) THRU 2012 THEN LTM	
J29	BUILDING 103-5 LANDFILL		HWAAP-J29

Table AA-2: List of Solid Waste Management Units (SWMUs) Requiring a RCRA Facility Investigation:

SWMU	SWMU Name	Unit Comment	ARMY SITE ID
B-04	101-44 IMPOUNDMENT	Site phase in AEDB-r is currently CMI(O)	HWAAP-B04
B26	103-6 POL Pit	Site phase in AEDB-r is currently CMI(O)	HWAAP-B26
B27A	103-16 CATCHMENT PIT	Site phase in AEDB-r is currently CMI(O) moving to LTM in201208	HWAAP-B27A
B27B	103-8/10 OXIDATION DITCH		HWAAP-B27B CCHWAAP-B27B
B27C	103-8/10 OXIDATION DITCH		HWAAP-B27C CCHWAAP-B27C
B29	103-41 UNLINED PONDS	Site phase in AEDB-r is currently CMI(O) moving to LTM in 201208 Dd submitted to state April 2012	HWAAP-B29 CCHWAAP-B29
H02	Waste Lumber Open Burn Pit		HWAAP-H02 CCHWAAP-H03
I02	110 GROUP OPEN BURNING PIT	NFA 5 YEAR REVIEW - suppose to be RC Mar 2012 - DD provided to State?	HWAAP-I02
I09/10	49-10 PIT/LANDFILL #1 & #2		HWAAP-I09 HWAAP-I10
I15	101-42 CATCHMENT PIT		HWAAP-I15 CCHWAAP-I15

Table AA-3 - List of Solid Waste Management Units (SWMUs) Requiring No Further Action (NFA) at This Time:

SWMU	SWMU Name	Unit Comment	NFA Documentation	Restrictions - Land Use Controls						ARMY SITE ID
				No Restrictions	Master Plan	Dig Restrictions	Construction	Barriers	Monitoring	
A03	COAL ASH LANDFILL		Closure Decision Document - Coal Ash Landfill SWMU-A03, 21 July 1999	X						HWAAP-A03
A04	BABBITT CLOSED LANDFILL	Land Transferred to Mineral County	Closure Decision Document - Babbitt Closed Landfill SWMU-A04, 30 November 2001				X			HWAAP-A04
A05	MUSTARD GAS DISPOSAL AREA		Closure Decision Document - SWMU-A05,18 December 2001		X	X		X		HWAAP-A05
A08	CONSTRUCTION DEBRIS LANDFILL		Closure Decision Document - SWMU-A08 Construction Debris Landfill, 30 November 2001	X	X					HWAAP-A08
A09A	AMMO CAN PILES		Closure Decision Document - Ammo Can Piles SWMU-A09A,4 August 2000	X						HWAAP-A09A
A09B	BATTERY DISPOSAL AREA		Closure Decision Document - Battery Disposal Pit SWMU-A09B, 22 March 2000	X						HWAAP-A09B
A11	MAG 18-5 DISPOSAL PIT		Closure Decision Document - MAG 18-5 Disposal Pit SWMU-A11, 14 January 2002			X				HWAAP-A11
B05	101-15 IMPOUNDMENT		Closure Decision Document - SWMU-B5 Building 101-15 Impoundment, 22 November 1999				X			HWAAP-B05
B06	101-13 IMPOUNDMENT		Closure Decision Document - SWMU-B6 Building 101-13 Impoundment, 30 November 2001		X	X				HWAAP-B06
B07	101-1 EAST CATCHMENT PIT		Closure Decision Document - SWMU-B10 Building 101-1 East Catchment Pit, 30 November 2001		X					HWAAP-B07

B08	101-1 SOUTHWEST CATCHMENT PIT		Closure Decision Document - SWMU-B10 Building 101-1 Southwest Catchment Pit, 4 August 2000		X					HWAAP-B08
B09	101-32 CATCHMENT PIT		Closure Decision Document - SWMU-B10 Building 101-32 Catchment Pit, 4 August 2000		X					HWAAP-B09
B10	101-3 CATCHMENT PIT		Closure Decision Document - SWMU-B10 Building 101-3 Catchment Pit, 4 August 2000		X					HWAAP-B10
B11A	101-31 CATCHMENT PIT		Closure Decision Document - SWMU-B11A Building 101-31 Catchment Pit, 14 February 2001		X		X			HWAAP-B11A
B11B	101-34 CATCHMENT PIT		Closure Decision Document - SWMU-B11B Building 101-34 Catchment Pit, 6 December 1999		X		X			HWAAP-B11B
B12	101-10 CATCHMENT PIT		Closure Decision Document - SWMU-B12 Building 101-10 Catchment Pit, 4 August 2000		X		X			HWAAP-B12
B13	101-29/36 CATCHMENT PIT		Closure Decision Document - SWMU-B13 Building 101-29/36 Catchment Pit, 6 December 1999				X			HWAAP-B13
B14	101-29/36 CATCHMENT PIT		Closure Decision Document - SWMU-B14 Building 101-29/36 Catchment Pit, 9 March 2001		X		X			HWAAP-B13
B15	101-16 CATCHMENT PIT		Closure Decision Document - SWMU-B15 Building 101-16 Catchment Pit, 22 March 2000	X	X					HWAAP-B15
B16	101-18 CATCHMENT PIT		Closure Decision Document - SWMU-B16 Building 101-18 Catchment Pit, 20 April 2001		X		X			HWAAP-B16
B17A	101-20 CATCHMENT PIT		Closure Decision Document - SWMU-B17A Building 101-20 South Catchment Pit, 24 April 2000		X		X			HWAAP-B17A
B17B	101-20 CATCHMENT PIT		Closure Decision Document - SWMU-B17B Building 101-20 East Catchment Pit, 4 August 2000		X		X			HWAAP-B17B
B18	101-62 CATCHMENT PIT		Closure Decision Document - SWMU-B18 Building 101-62 Catchment Pit, 9 March 2001		X		X			HWAAP-B18

B19	101-11 CATCHMENT PIT		Closure Decision Document - SWMU-B19 Building 101-11 Catchment Pit, 20 April 2001	X	X					HWAAP-B19
B20	101-41 CATCHMENT PIT		Closure Decision Document - SWMU-B20 101-41 Catchment Pit, 16 July 2009						X	HWAAP-B20
B21	101-41/42 CATCHMENT PIT									HWAAP-B21 CCHWAAP-B21
B22A	101-44 CATCHMENT PIT		Closure Decision Document - SWMU-B22A Building 101-44 West Catchment Pit, 13 March 2001	X	X					HWAAP-B22A
B22B	101-44 CATCHMENT PIT		Closure Decision Document - SWMU-B22B Building 101-44 East Catchment Pit, 9 March 2001	X	X					HWAAP-B22B
B23	103-30 CATCHMENT PIT		Closure Decision Document - SWMU-B23 Building 103-30 Production Area, 30 November 2001		X		X			HWAAP-B23
B24	102-52 ACID PIT		Final Closure Report/Decision Document 102-52 Acid Pit, 6 October 2009	X						HWAAP-B24
B25	103-7 INERT WASTE IMPOUNDMEN		Closure Decision Document - SWMU-B25 Building 103-7 Inert Waste Impoundment, 29 March 2000	X	X					HWAAP-B25
B28A	108-20 PO SPILL CATCHMENT		Closure Decision Document - 108-20a Ethylene Oxide Spill Impoundment SWMU-B28A, 22 November 1999	X						HWAAP-B28A
B28B	108-20 PO SPILL CATCHMENT		Closure Decision Document - 108-20b Ethylene Oxide Spill Impoundment SWMU-B28B, 22 November 1999	X						HWAAP-B28B
B28C	104-8 EO SPILL Impoundment		Closure Decision Document - 104-8 Ethylene Oxide Spill Impoundment SWMU-B28C, 22 November 1999	X						HWAAP-B28C
B28D	104-10 EO SPILL BASIN		Closure Decision Document - 104-8 Ethylene Oxide Spill Impoundment SWMU-B28D, 22 November 1999	X						HWAAP-B28D
B30	101-16 CATCHMENT BASIN		Closure Decision Document - SWMU-B30 Building 101-16 Catchment Pit, 22 November 1999				X			HWAAP-B30
B31	101-65 CATCHMENT PIT		Closure Decision Document - SWMU-		X		X			HWAAP-

			B31 Building 101-65 Catchment Pit, 24 April 2000							B31
B32	101-41 CATCHMENT PIT		Closure Decision Document - SWMU-B32 Building 101-41 Catchment Pit, 20 April 2001		X		X			HWAAP-B32
B33	102-51 CATCHMENT PIT		Closure Decision Document - 102-51 Catchment Pit SWMU B33, 29 March 2000	X						HWAAP-B33
C01A	BUILDING 102-31 ROTARY DEACTIVATION FURNACE		Closure Decision Document - SWMUs-C01A/C01B Building 102-31 Rotary Deactivation Furnaces, 30 November 2001		X					HWAAP-C01A/B
C01B	BUILDING 102-31 ROTARY DEACTIVATION FURNACE		Closure Decision Document - SWMUs-C01A/C01B Building 102-31 Rotary Deactivation Furnaces, 30 November 2001		X					HWAAP-C01A/B
H03	ROAD & GROUNDS WASTE OB PIT		Closure Decision Document - SWMU-J12 Landscape Landfill, 19 April 2001 H03 30 November 2001		X					HWAAP-H03 CCHWAAP-H03
H04	NAVYSIDE LANDFILL		Closure Decision Document - SWMU-H04 Navyside Landfill, 15 February 2002	X						HWAAP-H04
H05	OLD DEPOT LAUNDRY WASHOUT		Closure Decision Document - SWMU-H05 Depot Laundry Washout, 14 January 2002	X						HWAAP-H05
I03	104-7 PIT #1		Closure Decision Document - SWMU I03 Building 104-7 Catchment Pits, 22 November 1999	X						HWAAP-I03
I04	104-7 PIT #2		Closure Decision Document - SWMU I03 Building 104-7 Catchment Pits, 22 November 1999	X						HWAAP-I04
I05	33-16 LANDFILL		Closure Decision Document - SWMU I05 33-16 Landfill, 22 November 1999	X						HWAAP-I05
I06	SPILL SITE 30-5		Closure Decision Document - SWMU I06 30-5 Spill Site, 15 September1999	X						HWAAP-I06
I11	49-9 PIT/LANDFILL		Closure Decision Document - SWMU I11 Building 49-9 Pit/Landfill, 30 November 2001		X		X			HWAAP-I11

I13	BLDG 10 LANDFILL/DISCHARGE		Closure Decision Document - SWMU I13 Building 10 Landfill/Discharge, 22 November 1999	X						HWAAP-I13
I14	BLDG 46 OIL SPILL		Closure Decision Document - Building 46 Spill Site SWMU I14, 31 October 2001	X						HWAAP-I14
I17	104-10 LANDFILL		Closure Decision Document - SWMU I17 Building 104-10 Landfill, 13 October 1999	X						HWAAP-I17
I18	104-2 HYDROCARBON SPILL		Closure Decision Document - SWMU I18 Building 104-2 Hydrocarbon Spill, 5 July 2002		X	X				HWAAP-I18
J02	115 GROUP BURN AREA/LANDFILL		Closure Decision Document - SWMU-J02 115 Group Burn Area/Landfill, 13 October 1999	X						HWAAP-J02
J03/K04	BLDG 70 DIESEL FUEL LEAK		Closure Decision Document - SWMU-J02 Building 70 Diesel Fuel Leak, 16 July 2009	X						HWAAP-J03 HWAAP-K04
J04	107 AREA DRUM STORAGE/LANDFILL		Closure Decision Document - SWMU-J04 107 Drum Storage, 22 November 1999	X						HWAAP-J04
J05	DOCK 1 LANDFILL		Closure Decision Document - Dock 1 Landfill SWMU-J05, 13 October 1999	X						HWAAP-J05
J06	DOCK 2 LANDFILL		Closure Decision Document - Dock 2 Landfill SWMU-J06, 13 October 1999	X						HWAAP-J06
J07	DOCK 3 LANDFILL		Closure Decision Document - Dock 3 Landfill SWMU-J07, 13 October 1999	X						HWAAP-J07
J08	DOCK 4 LANDFILL		Closure Decision Document - Dock 4 Landfill SWMU-J08, 13 October 1999	X						HWAAP-J08
J09	DOCK 5 LANDFILL		Closure Decision Document - Dock 5 Landfill SWMU-J09, 13 October 1999	X						HWAAP-J09
J10	DOCK 6 LANDFILL		Closure Decision Document - Dock 6 Landfill SWMU-J10, 13 October 1999	X						HWAAP-J10
J11	103-16 LANDFILL/PILE		Closure Decision Document - SWMU-J11/15 Building 103-16 Landfill/Pile, 4 August 2000		X					HWAAP-J11
J12	LANDSCAPE LANDFILL		Closure Decision Document - SWMU-J12 Landscape Landfill, 19 April 2001		X					HWAAP-J12
J13	WADF SOUTH DUMP		Closure Decision Document - WADF South Dump SWMU-J13, 22 November	X						HWAAP-J13

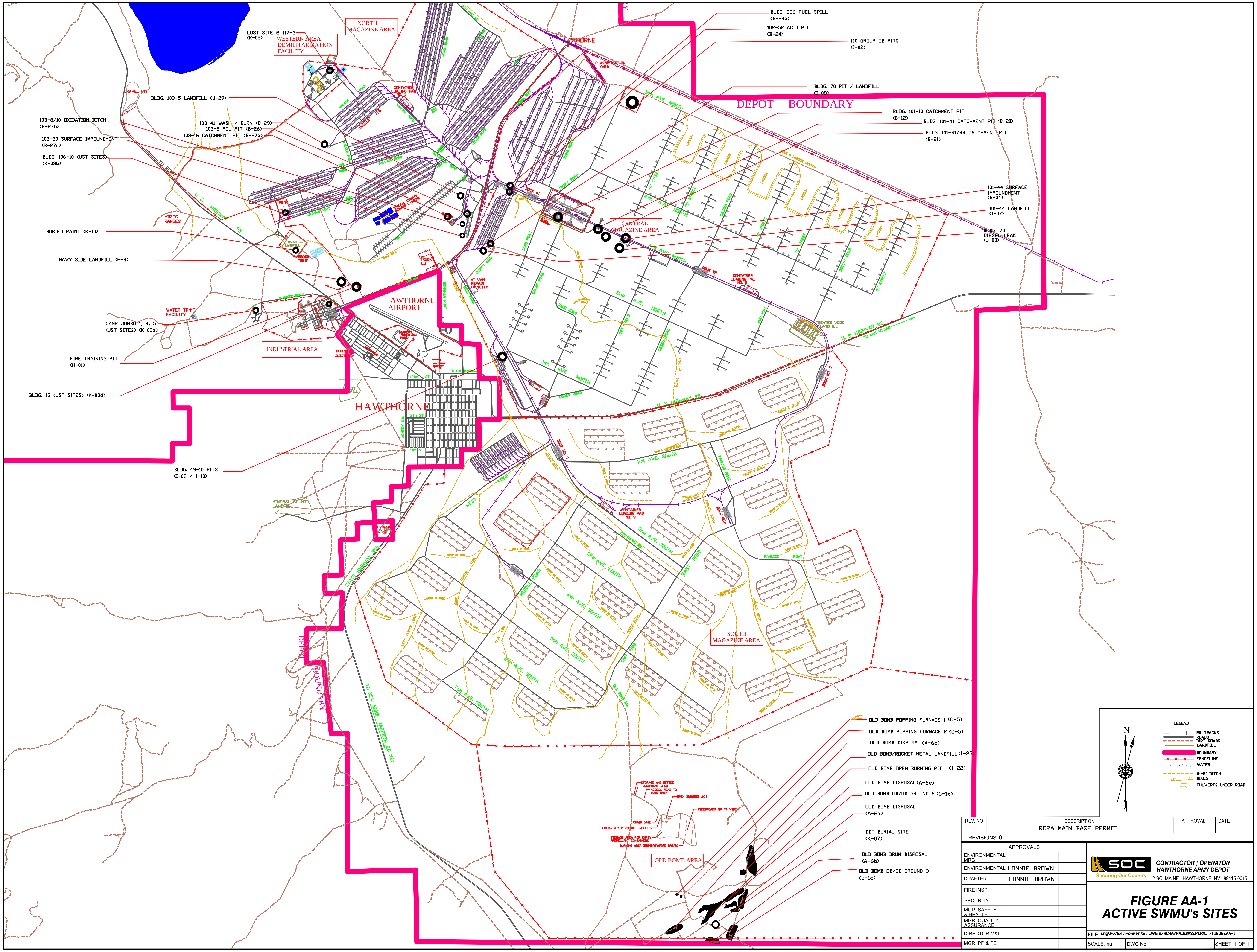
			1999							
J14	103-6 TRENCH		Closure Decision Document - SWMU-J14 Building 103-6 Trench, 19 November 2002		X					HWAAP-J14
J15	103-16 LANDFILL		Closure Decision Document - SWMU-J11/15 Building 103-16 Landfill/Pile, 4 August 2000		X					HWAAP-J15
J16	111-113 GROUP BURN AREA/LANDFILL		Closure Decision Document - SWMU-J16 111-113 Group Burn Area/Landfill, 13 October 1999	X						HWAAP-J16
J17	THORNE DRUM AREA		Closure Decision Document - Thorne Drum Area SWMU-J17, 22 March 2000	X						HWAAP-J17
J21	BLDG 97 OLD DOCK AREA		Closure Decision Document - Building 97 Old Dock Area SWMU-J21, 22 November 1999	X						HWAAP-J21
J22	50 GROUP PITS		Closure Decision Document - 50 Group Pits SWMU-J22, 22 November 1999		X					HWAAP-J22
J23	TRENCH AT DUSTY ACRES AREA		Closure Decision Document - SWMU-J23 Trench Dusty Acres Area, 22 March 2000	X						HWAAP-J23
J24	TRENCH NEAR 50-60		Closure Decision Document - Trench Near 50-60 SWMU-J24, 22 November 1999	X						HWAAP-J24
J25	THORNE AREA LANDFILL		Closure Decision Document - SWMU-J25 Thorne Area Landfill, 24 April 2000	X	X					HWAAP-J25
J26	LANDFILL TURN TABLE AREA		Closure Decision Document - Landfill Turn Table Area SWMU-J26, 4 August 2000	X						HWAAP-J26
J27	LANDFILL CAMP JUMBO AREA		Closure Decision Document - Landfill Camp Jumbo Area SWMU-J27, 4 August 2000	X						HWAAP-J27
J28	108-3 CATCHMENT PITS		Closure Decision Document - SWMU-J28 Building 108-3 Catchment Pits, 30 November 2001		X		X			HWAAP-J28
K03A	UST at Building 101-25		Closure Decision Document - SWMU-K03A, 16 June 2009	X						HWAAP-K03
K03B	UST at Building 103-6		Closure Report/Decision Document - SWMU-K03B, 21 April 2011	X						HWAAP-K03

K03C	UST at Building 106-10		Closure Decision Document - Building 106-10 Underground Storage Tank Site, 3 October 1996	X						HWAAP-K03
K03D	UST at Building 13		Closure Decision Document - SWMU-K03D, 16 June 2009	X						HWAAP-K03
K03E	UST at Building 20-21		Final Decision Document No Further Action SWMU K03G Building 20-21, 3 October 1996	X						HWAAP-K03
K03G	UST at Camp Jumbo		Final Decision Document No Further Action SWMU K03G Camp Jumbo, 12 September 1996	X						HWAAP-K03
K04/J03	BLDG 70 DIESEL FUEL LEAK		Closure Decision Document - SWMU-J02 Building 70 Diesel Fuel Leak, 16 July 2009	X						HWAAP-J03 HWAAP-K04
K05	LUST Site at Building 117-3		Closure Decision Document - SWMU-K05, 16 June 2009	X						HWAAP-K05
K08	PAINT STORAGE LOCKER SHEDS		Final Closure Decision Document, Paint Storage Locked Sheds K08, 6 May 2003	X						HWAAP-K08
K09	SUMP AND DISCHARGE PIPE		Final Closure Decision Document, Sump and Discharge Pipe, 6 May 2003	X						HWAAP-K09
K11	SKEET RANGE		Final Closure Decision Document, Skeet Range K11, 6 May 2003	X						HWAAP-K11
B21	101-41/42 CATCHMENT PIT									HWAAP-B21 CCHWAAP -B21
B27A	103-16 CATCHMENT PIT									HWAAP-B27A
B29	103-41 Ordnance Washout Impoundment		DD Submitted to St April 2012							HWAAP-B29
B34	104-3 CATCHMENT PIT		Not in CA portion of Permit, not IRP elgibile in-R							HWAAP-B34
H01	FIRE TNG PIT		AEDBR says DD signed 7/21/11							HWAAP-H01
I07	101-44 LANDFILL		AEDB-R says St wants additional soil samples by Jan 2012							HWAAP-I07

I08	BLDG 70 PIT/LANDFILL		affected soils have not affected the groundwater in the vicinity; therefore, no groundwater remediation is necessary.INTERIM DD SIGNED BY NDEP 2/26/02							HWAAP-I08
J29	BUILDING 103-5 LANDFILL		Site combined with B29 should be included in 2012 DD							
K03F	UST at Building 94									HWAAP-K03F
K10	BURIED PAINT									HWAAP-K10

Figure AA-1

Active SWMU Sites



REV. NO.	DESCRIPTION	APPROVAL	DATE
	RCRA MAIN BASE PERMIT		
REVISIONS 0			

APPROVALS	
ENVIRONMENTAL MRG	
ENVIRONMENTAL	LONNIE BROWN
DRAFTER	LONNIE BROWN
FIRE INSP.	
SECURITY	
MGR. SAFETY & HEALTH	
MGR. QUALITY ASSURANCE	
DIRECTOR M&L	
MGR. PP & PE	

SOC Securing Our Country
CONTRACTOR / OPERATOR HAWTHORNE ARMY DEPOT
2 SO. MAINE HAWTHORNE, NV. 89415-0015

FIGURE AA-1
ACTIVE SWMU's SITES

FILE: Eng04\Environmental DWG's\RCRA\MAINBASEPERMIT\FIGUREAA-1
SCALE: na | DWG No: | SHEET 1 OF 1

SECTION BB: OTHER FEDERAL LAWS

The requirements of the following federal laws must be met when they apply to the Old Bomb Unit, RF-9, and PODS at HWAD.

THE WILD AND SCENIC RIVERS ACT [40 CFR 270.3(a)]

This act does not apply to the above facilities at HWAD because they are not part of, or related to, any water resources project. Therefore, this section is not applicable.

THE NATIONAL HISTORIC PRESERVATION ACT OF 1966 [40 CFR 270.3(b)]

Operation of RF-9 and PODS at HWAD does not have any effect on properties listed or eligible for listing in the National Register of Historic Places. Therefore, this section is not applicable.

THE ENDANGERED SPECIES ACT [40 CFR 270.3(c)]

The above-named facilities are not expected to affect or impair endangered or threatened species or their habitat. Aquatic and terrestrial ecological risk assessments have been performed for RF-9 (HHERA Appendix E, Volume 3) and for PODS (HHERA Appendix E to estimate potential hazards to sensitive biota).

THE COASTAL ZONE MANAGEMENT ACT [40 CFR 270.3(d)]

This act does not apply to operations at HWAD because they are not in the coastal zone. Therefore, this section is not applicable.

THE FISH AND WILDLIFE COORDINATION ACT [40 CFR 270.3(e)]

Operation of these facilities at HWAD does not result in the impoundment, diversion, control, or modification of surface water bodies. Therefore, this section is not applicable