DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH FIGHTER WING (ACC)
HOLLOMAN AIR FORCE BASE, NEW MEXICO

ENTERED

APR 26 2009

A David Budak
Deputy Base Civil Engineer
550 Tabosa Avenue
Holloman AFB NM 88330-8458

James P. Bearzi
Chief, Hazardous Waste Bureau
New Mexico Environment Department (NMED)
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Dear Mr. Bearzi

Enclosed for your review is the Holloman AFB 20,000-Pound Open Detonation Treatment Unit Permit Renewal Application (Subpart X), Revision # 2. We request your review of our response and a determination on the completeness of the renewal application.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Thank you for your consideration of this request. If you have any question or need additional information, please contact Mr. Clarence D. Scruggs, Asset Management Flight, at (575) 572-6654 or email at clarence.scruggs@holloman.af.mil.

Sincerely

A. DAVID BUDAK, YF-3, DAFC

cc:
NMED, Mr. Cornelius Amindyas

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

December 30, 2008

Ms. Debbie Hartell
Chief
Environmental Flight
49 CES/CEV
550 Tabosa Ave.
Holloman AFB, NM 88330-8458

01-05-2009 A08:54

SUBJECT: NOTICE OF DEFICIENCY # 2
OPEN DETONATION PERMIT RENEWAL APPLICATION
HOLLOMAN AIR FORCE BASE NM6572124422
HWB-HAFB-06-004

Dear Ms. Hartell:

The New Mexico Environment Department (NMED) has reviewed the Holloman Air Force Base (HAFB, the Permittee) July 7, 2008 response to the Notice of Deficiency (NOD) on its 20,000-pound Open Detonation (OD) Treatment Unit Permit renewal application. NMED finds the response to the NOD administratively and technically incomplete. This NOD lists the issues the Permittee must address, and the additional information that must be submitted to NMED before it can make a determination on the administrative completeness of the Permit renewal application.

ADMINISTRATIVE AND TECHNICAL COMMENTS

The quotations **in bold** are taken directly from the Permit Renewal Application. In your response to this NOD, please highlight information added, and ~~strikeout~~ where information has been replaced.

A. GENERAL DESCRIPTION

1. **List of Acronyms:** Provide a list of the all acronyms used in the revised Permit renewal application and add the list at the end of the Table of Contents. [The subject list was not provided in the original Permit renewal application].

2. **Attachment A,** Section A.4, Page 8 of 19, **Topographic Maps:**

   a. Provide a revised Map A-5 on which the OD Unit is written on the map, rather than just showing it in the legend. Also indicate the names of the intermittent streams on the same map. The streams at HAFB are mentioned in the body of the application but are not always illustrated on the maps.

   b. Provide a stand-alone site location map of Holloman Air Force Base showing all the solid waste management units (SWMUs) and areas of concern (AOCs) that require further corrective action. Include all the sites undergoing corrective action. HAFB may consider revising and submitting Figure 1-1 on page 1-4 of the Permittee's September 1997 document, "*Phase I RCRA Facility Investigation Report, Table 2 Solid Waste Management Units, Volume I*".

B. WASTE ANALYSIS PLAN FOR WASTES TREATED AT THE OD UNIT

3. **Attachment B, Page 20 of 54, Table B-5**, last Column: Provide the total amount of waste detonated, which includes the net explosive weight (NEW), the casings, associated contaminant devices, and detonating charges disposed of with the net explosives weight. This will help the public know the whole amount of waste treated at the OD Unit; even though the Permittee asserts that it recycles the casings (e.g., lead casings). Provide an estimated amount, in pounds, of the post-detonation fragments and unexploded ordnance (UXO) that the Permittee recycles.

C. INSPECTION SCHEDULE

4. Attachment C, Page 2 of 3, Section C.1.4, First sentence, "**A log will be kept to record inspection findings at the OD Unit as specified in Technical Orders 11A-142...**"

   The Permittee did not address the above sentence in its response to the first NOD.

   Please provide the relevant information that the Permittee will be using, from the referenced Technical Orders 11A-142 ["*A description of General Instructions for Disposal of Conventional Munitions*"] in conducting inspection of hazardous waste. Incorporate excerpts of that document into a revised and more comprehensive Section C.1.4 of the permit renewal application, providing details of the inspection *modus*

operandum.

D. CONTINGENCY PLAN

5. **Attachment F**, Page 1 of 18, Section **F.1.1, Loading/Unloading Operations,** Second paragraph: "**The Explosives Safety Standards, AFMAN 91-201, will be followed for all loading and unloading operations**."

   Provide a detailed description of the methods of loading and unloading the reactive wastes contained in Technical Orders 11A-1-42 and 11A-1-60, and AFMAN 91-201. NMED shall incorporate this information into the draft Permit, using both the application and other regulatory documents. This will assist third party readers of the application and subsequent draft Permit during review of the documents subjected to public review, rather than citing the given references. Additionally, Sections E.2.4.6 and 2.4.9 of the same documents were referenced in response to Comment # 30 of the first NOD. The Permittee should address those comments more fully in the respective sections.

6. Pursuant to 40 C.F.R. § 264.17, submit information from AFMAN 91-201["*Explosive Safety standards*"], and TO 11A-1-42 ["*General Instructions for the Disposal of Conventional Munitions*"], Section 1 that describes the standard operating procedures for the 20,000 pound open detonation treatment events.

7. a. Describe the safety procedures that will be followed by the Emergency Coordinator to prevent fires, explosions, or unplanned hazardous/explosive waste releases from occurring, or spreading to other hazardous waste management areas at Holloman Air Force Base.

   b. Explain why the use of cell phones was not mentioned as a prohibition during explosive ordnance disposal operations, to prevent static at the OD Unit.

8. Provide Exhibit F-3, which was mentioned in response to Comment 40 of the first NOD.

E. HEALTH AND SAFETY PLAN

9. Attachment F, Section **F.1.11** "**Health and Safety Plan**": Provide a Health and Safety Plan that covers personnel protection procedures, as required by the Hazardous Waste Management Regulations, 20.4.900 incorporating 40 CFR § 270.14(b)(8)(v). The Permittee asserts that the required information can be found in the document titled "AFMAN 91-201[Explosive Safety standards], and TO 11A-1-42, and HAFBEODOI 32-3001-05." Please provide excerpts of the health and safety procedures from the cited documents, and add that information to Section F.1.11 of the Permit renewal application.

F. CLOSURE SAMPLING

10. Attachment G, Page 5 of 12, Section **G.4.4, Closure Sampling, 3rd paragraph, "A 200-foot by 200-foot area centered on the depression caused by the most recent detonation event will be divided into grids for sampling ..."**

Provide a scaled diagram of the 20,000-pound OD Unit showing the proposed closure soil sampling locations for unsaturated zone monitoring that are described in Section G.4.4 of the revised permit renewal application that the Permittee submitted in response to the first NMED notice of deficiency dated July 18, 2007. Indicate also the locations from which background soil samples will be taken, as described in Section 4.5 in Attachment G of the revised Permit renewal application. These should be from areas that are unaffected by open detonation treatment activities.

The Permittee must submit the requested information by March 1, 2009.

If you have any questions on the attached NOD please contact Cornelius Amindyas of my staff at (505) 222-9543 or at the above letterhead address.

Sincerely,

James P. Bearzi
Chief
Hazardous Waste Bureau

cc: J. Kieling, HWB NMED
C. Amindyas, HWB NMED
L. King, EPA Region VI (6PD-N)
File: HAFB 2007 and Reading
HAFB-06-004

RCRA PERMIT RENEWAL APPLICATION
20,000 POUND OPEN DETONATION (OD) TREATMENT UNIT
UNITED STATES DEPARTMENT OF THE AIR FORCE
HOLLOMAN AIR FORCE BASE
OTERO COUNTY, NEW MEXICO

Includes:

Holloman Air Force Base
Part A and Part B
RCRA Permit Renewal Application
20,000 Pound OD Treatment Unit

Submitted to:
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303

Submitted by:

49 CES/CEAN
550 Tabosa Avenue
Holloman AFB
New Mexico, 88330

Revision 2.0

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LIST OF ACRONYMS

AAQS	Ambient Air Quality Standards
ACC	Air Combat Command
AFB	Air Force Base
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFMC	Air Force Materiel Command
AFSC	Air Force Systems Command
AFSC	Air Force Specialty Code
AK	Acceptable Knowledge
AMO	Authorized Military Official
AQCR	Air Quality Control Regulations
ASTM	American Society for Testing and Materials
BGS	Below Ground Surface
BLU	Bomb Loaded Units
CADs	Cartridge Actuated Devices
CES	Civil Engineering Squadron
CFR	Code of Federal Regulation
COC	Chain of Custody
COMSEC	Communications Security
DAC	Defense Ammunitions Center
DDA	Designated Disposition Authority
DoD	Department of Defense
DQOs	Data Quality Objectives
DRMO	Defense Reutilization Marketing Office
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Agency Management Agency
GPS	Global Positioning System
HAFB	Holloman Air Force Base
HAZWOPER	Hazardous Waste Operations and Emergency Response
HE	High Explosive
HEI	High Explosive Incendiary
HQ	Headquarters
ICM/CBU	Improve Conventional Munitions/Cluster Bomb Units

KOP	Knowledge of Process
LCS	Laboratory Control Sample
LDR	Land Disposal Restrictions
MC	Munitions Constituents
MDL	Method Detection Limit
MIDAS	Munitions Items Disposition and Action System
MLRS	Multiple Launch Rocket System
MMR	Military Munitions Rule
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSAs	Mutual Support Agreements
MSDS	Material Safety Data Sheet
MSG	Mission Support Group
MSL	Mean Sea Level
NAAS	National Ambient Air Quality Standard
NAVSCOLEOD	Naval School Explosive Ordnance Disposal
NEW	Net Explosive Weight
NMAC	New Mexico Administrative Code
NMAQS	New Mexico Ambient Air Quality Standard
NMED	New Mexico Environment Department
NMHHS	New Mexico Human Health Standard
NMWQCCR	New Mexico Water Quality Control Commission Regulations
OB	Open Burn
OBODM	Open Burn/Open Detonation Dispersion Model
OD	Open Detonation
OEL	Occupational Exposure Limits
OI	Operating Instructions
OPSEC	Operations Security
OSC	On-Site Coordinator
OSHA	Occupational Safety and Health Administration
PADs	Propellant Actuated Devices
PARCC	Precision , Accuracy, Representativeness, Completeness, and Comparability
PK	Process Knowledge
PPE	Personal Protective Equipment
QA	Quality Assurance
QAPP	Quality Assurance Project Plans
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
RSO	Range Safety Officer

SAP	Sampling and Analysis Plan
SCRAM	Support Center for Regulatory Air Models
SOP	Standard Operating Procedures
SSLs	Site Screening Levels
SVOCs	Semi Volatile Organic Compounds
SW	Solid Waste
TAPs	Toxic Air Pollutants
TCLP	Toxicity Characteristic Leaching Procedures
TDS	Total Dissolved Solids
TO	Technical Order
TSD	Treatment, Storage and Disposal
UHCs	Underlying Hazardous Constituents
USAF	United States Air Force
USDA	U.S. Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UTL	Upper Tolerance Limit
UTS	Universal Treatment Standard
UXO	Unexploded Ordnance
VOCs	Volatile Organic Compounds
WAP	Waste Analysis Plan
WMM	Waste Military Munitions
WSMR	White Sands Missile Range
WSNM	White Sands National Monument

PART B

RCRA PERMIT RENEWAL APPLICATION
20,000 POUND OPEN DETONATION (OD) TREATMENT UNIT
UNITED STATES DEPARTMENT OF THE AIR FORCE
HOLLOMAN AIR FORCE BASE
OTERO COUNTY, NEW MEXICO

Revision 2.0

United States
Environmental Protection
Agency

March 2005

RCRA Hazardous Waste Part A Permit Application

EPA Form 8700-23

RCRA PERMIT RENEWAL APPLICATION

20,000-POUND OPEN DETONATION (OD) TREATMENT UNIT
UNITED STATES DEPARTMENT OF THE AIR FORCE
HOLLOMAN AIR FORCE BASE
OTERO COUNTY, NEW MEXICO

EPA ID NO. NM 6572 124422

SEND COMPLETED FORM TO: The Appropriate State or EPA Regional Office.	United States Environmental Protection Agency **RCRA SUBTITLE C SITE IDENTIFICATION FORM**	
1. Reason for Submittal (See instructions on page 14.) MARK ALL BOX(ES) THAT APPLY	**Reason for Submittal:** ☐ To provide Initial Notification of Regulated Waste Activity (to obtain an EPA ID Number for hazardous waste, universal waste, or used oil activities) ☐ To provide Subsequent Notification of Regulated Waste Activity (to update site identification information) ☐ 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 # 2nd) ☐ As a component of the Hazardous Waste Report	
2. Site EPA ID Number (page 15)	**EPA ID Number** | N | M | 6 | 5 | 7 | 2 | 1 | 2 | 4 | 4 | 2 | 2 |	
3. Site Name (page 15)	**Name:** Holloman Air Force Base	
4. Site Location Information (page 15)	**Street Address:** 49 CES/CEA 550 Tabosa Avenue	
	City, Town, or Village: Holloman AFB	**State:** NM
	County Name: Otero	**Zip Code:** 88330
5. Site Land Type (page 15)	**Site Land Type:** ☐ Private ☐ County ☐ District ☑ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other	
6. North American Industry Classification System (NAICS) Code(s) for the Site (page 15)	A. | 9 | 2 | 8 | 1 | 1 | 0 |	B. | | | | | | |
	C. | | | | | | |	D. | | | | | | |
7. Site Mailing Address (page 16)	**Street or P. O. Box:** 49 CES/CEV 550 Tabosa Avenue	
	City, Town, or Village: Holloman AFB	
	State: NM	
	Country: USA	**Zip Code:** 88330
8. Site Contact Person (page 16)	**First Name:** Clarence **MI:** D.	**Last Name:** Scruggs Jr.
	Phone Number: (575) 572-3931 **Extension:**	**Email address:** clarence.scruggs@holloman.af.mil
9. Operator and Legal Owner of the Site (pages 16 and 17)	A. **Name of Site's Operator:** 49th Fighter Wing	**Date Became Operator (mm/dd/yyyy):** 02/28/1981
	Operator Type: ☐ Private ☐ County ☐ District ☑ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other	
	B. **Name of Site's Legal Owner:** United States of America	**Date Became Owner (mm/dd/yyyy):** 02/28/1991
	Owner Type: ☐ Private ☐ County ☐ District ☑ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other	

EPA ID NO: N M 6 5 7 2 1 2 4 4 2 2 OMB#: 2050-0034 Expires 11/30/2005

9. Legal Owner (Continued) Address	Street or P. O. Box: 490 First Street, Suite 1700	
	City, Town, or Village: Holloman AFB	
	State: New Mexico	
	Country: USA	Zip Code: 88330-8277

10. Type of Regulated Waste Activity
Mark "Yes" or "No" for all activities; complete any additional boxes as instructed. (See instructions on pages 18 to 21.)

A. Hazardous Waste Activities
Complete all parts for 1 through 6.

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

☑ a. LQG: Greater than 1,000 kg/mo (2,200 lbs./mo.) of non-acute hazardous waste; or

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

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

In addition, indicate other generator activities.

Y ☐ N ☑ d. United States Importer of Hazardous Waste

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

Y ☐ N ☑ **2. Transporter of Hazardous Waste**

Y ☑ N ☐ **3. Treater, Storer, or Disposer of Hazardous Waste (at your site)** Note: A hazardous waste permit is required for this activity.

Y ☐ N ☑ **4. Recycler of Hazardous Waste (at your site)**

Y ☐ N ☑ **5. Exempt Boiler and/or Industrial Furnace**
If "Yes", mark each that applies.
☐ a. Small Quantity On-site Burner Exemption
☐ b. Smelting, Melting, and Refining Furnace Exemption

Y ☐ N ☑ **6. Underground Injection Control**

B. Universal Waste Activities

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

	Generate	Accumulate
a. Batteries	☐	☐
b. Pesticides	☐	☐
c. Thermostats	☐	☐
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
Mark all boxes that apply.

Y ☐ N ☑ **1. Used Oil Transporter**
If "Yes", mark each that applies.
☐ a. Transporter
☐ b. Transfer Facility

Y ☐ N ☑ **2. Used Oil Processor and/or Re-refiner**
If "Yes", mark each that applies.
☐ a. Processor
☐ b. Re-refiner

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

Y ☐ N ☑ **4. Used Oil Fuel Marketer**
If "Yes", mark each that applies.
☐ a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
☐ b. Marketer Who First Claims the Used Oil Meets the Specifications

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EPA ID NO: | N | M | 6 | | 5 | 7 | 2 | | 1 | 2 | 4 | | 4 | 2 | 2 |

OMB#: 2050-0034 Expires 11/30/2005

11. Description of Hazardous Wastes (See instructions on page 22.)

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	D003	D005	D007	D008	D009	D018

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 for waste codes.

12. Comments (See instructions on page 22.)

13. 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 fine and imprisonment for knowing violations. For the RCRA Hazardous Waste Part A Permit Application, all operator(s) and owner(s) must sign (see 40 CFR 270.10 (b) and 270.11). **(See instructions on page 22.)**

Signature of operator, owner, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
Michael B. McGee	Michael B. McGee, Jr., Col, Commander	06/27/2008

EPA ID NO: N M 6 5 7 2 1 2 4 4 2 2

OMB #: 2050-0034 Expires 11/30/2005

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT INFORMATION FORM

1. Facility Permit Contact (See instructions on page 23)	First Name: Clarence	MI: D	Last Name: Scruggs Jr.
	Phone Number: (575) 572-3931		Phone Number Extension: clarence.scruggs@holloman.af.mil
2. Facility Permit Contact Mailing Address (See instructions on page 23)	Street or P.O. Box: 49 CES/CEA		
	City, Town, or Village: Holloman AFB		
	State: NM		
	Country: USA		Zip Code: 88330
3. Operator Mailing Address and Telephone Number (See instructions on page 23)	Street or P.O. Box: 49th Fighter Wing, 490 First Street, Suite 1700		
	City, Town, or Village: Holloman AFB		
	State: NM		
	Country: USA	Zip Code: 88330	Phone Number (575) 572-5571
4. Legal Owner Mailing Address and Telephone Number (See instructions on page 23)	Street or P.O. Box: 49th Fighter Wing, 490 First Street, Suite 1700		
	City, Town, or Village: Holloman AFB		
	State: NM		
	Country: USA	Zip Code: 88330	Phone Number (575) 572-5571
5. Facility Existence Date (See instructions on page 24)	Facility Existence Date (mm/dd/yyyy): 02/28/1981		

6. Other Environmental Permits (See instructions on page 24)

A. Permit Type (Enter code)	B. Permit Number	C. Description
R	NM6572124422-1	TSDF/DRMO
P	PSD-NM-1508M1	PSD Clean Water Act
N	NM0029971	NPDES Wastewater

7. Nature of Business (Provide a brief description; see instructions on page 24)

Holloman Air Force Base is headquarters to the Air Combat Command 49th Fighter Wing, which supports national security objectives with F-22 Stealth fighters, medical, and war readiness assets ready to rapidly mobilize and deploy worldwide to meet peacetime and wartime contingencies. The base supports over 19000 personnel, several tenants, contractors, and others. As a result of the above stated organizations and their activities, certain processes require the open detonation of waste munitions.

Process Codes and Design Capacities (See instructions on page 24) - Enter information in the Sections on Form Page 3.

A. PROCESS CODE - *Enter the code from the list of process codes in the table below that best describes each process to be used at the facility. Fifteen lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), enter the process information in Item 9 (including a description).*

B. PROCESS DESIGN CAPACITY- *For each code entered in Section 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 Section B(1), enter the code in Section 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 UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
	Disposal:	
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet; Hectare-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure in Code Table 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 Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Acres; Cubic Meters; Hectares; or Cubic Yards
S06	Containment Building Storage	Cubic Yards or Cubic Meters
S99	Other Storage	Any Unit of Measure in Code Table Below
	Treatment:	
T01	Tank Treatment	Gallons Per Day; Liters Per Day
T02	Surface Impoundment Treatment	Gallons Per Day; Liters Per Day
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Day; Liters Per Hour; or Million Btu Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; Btu Per Hour; or Million Btu Per Hour
	Treatment (continued):	
T81	Cement Kiln	For T81-T93:
T82	Lime Kiln	
T83	Aggregate 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
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 in Code Table Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Hour; Liters Per Hour; or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; or Million Btu Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

UNIT OF MEASURE	UNIT OF MEASURE CODE
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V

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

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

Process Codes and Design Capacities (Continued)

EXAMPLE FOR COMPLETING Item 8 (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 (Enter code)	C. Process Total Number of Units	For Official Use Only
X1S02		533.788	G	001	
1	X 0 1	420,000 . 00	P	001	
2		.			
3		.			
4		.			
5		.			
6		.			
7		.			
8		.			
9		.			
10		.			
11		.			
12		.			
13		.			
14		.			
15		.			

NOTE: If you need to list more than 15 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for ?other? processes (i.e., D99, S99, T04 and X99) in Item 9.

9. Other Processes (*See instructions on page 25 and follow instructions from Item 8 for D99, S99, T04 and X99 process codes*)

Line Number (Enter #s in sequence with Item 8)	A. Process Code (From list above)	B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	(2) Unit of Measure (Enter code)	C. Process Total Number of Units	D. Description of Process
X 2	T 0 4	1 0 0 . 0 0 0	U	0 0 1	In-situ Vitrification
		.			
		.			
		.			
		.			
		.			

10. Description of Hazardous Wastes (See instructions on page 25) - 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 Section A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in Section 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 Section 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 Section A, select the code(s) from the list of process codes contained in Items 8A and 9A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the listed hazardous wastes.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in Section A, select the code(s) from the list of process codes contained in Items 8A and 9A 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 10.D(1).*
3. *Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 10.E.*

2. PROCESS DESCRIPTION: *If a code is not listed for a process that will be used, describe the process in Item 10.D(2) or in Item 10.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 Section A. On the same line complete Sections B, C and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.*
2. *In Section A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In Section 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 10 (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 Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION- (If a code is not entered in 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 NO: N M 6 5 7 2 1 2 4 4 2 2

OMB #: 2050-0034 Expires 11/30/2005

10. Description of Hazardous Wastes (Continued. Use the Additional Sheet(s) as necessary; number pages as 5 a, etc.)

Line Number	A. EPA Hazardous Waste No. (Enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1	D 0 0 1	4,200	P	X	0	1							
2	D 0 0 3	6,600	P	X	0	1							
3	D 0 0 5	240	P	X	0	1							
4	D 0 0 7	240	P	X	0	1							
5	D 0 0 8	360	P	X	0	1							
6	D 0 0 9	120	P	X	0	1							
7	D 0 1 8	240	P	X	0	1							
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EPA ID NO: I N I M I 6 I I 5 I 7 I 2 I I 1 I 2 I 4 I I 4 I 2 I 2 I

OMB #: 2050-0034 Expires 11/30/2005

10. Description of Hazardous Wastes (Continued. Use this Additional Sheet(s) as necessary; number as 5 a, etc.)

Line Number	A. EPA Hazardous Waste No. (Enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	E. PROCESSES (1) PROCESS CODES (Enter code)	E. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in E(1))
4 0					

11. Map (See instructions on pages 25 and 26) Attached

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

12. Facility Drawing (See instructions on page 26) Attached

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

13. Photographs (See instructions on page 26) Attached

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).

14. Comments (See instructions on page 26)

20,000 POUND OD UNIT PHOTOGRAPHS

SUBPART X RCRA PERMIT RENEWAL APPLICATION
20,000 POUND OPEN DETONATION (OD) TREATMENT UNIT
UNITED STATES DEPARTMENT OF THE AIR FORCE
HOLLLOMAN AIF FORCE BASE
OTERO COUNTY, NEW MEXICO

Photograph A-1. View of OD Unit from the southern berm.

Photograph A-2. View of OD Unit from the southwest.

Photograph A-3. View of west portion of OD Unit.

Photograph A-4. View of OD Unit from the east.

Photograph A-5. View of OD Unit from the east.

Photograph A-6. Access gate at the south end of the OD Unit.

Photograph A-7. View to the north from the south access gate.

Photograph A-8. View of west fence from the OD Unit berm.

Photograph A-9. View of Tula Peak from the OD Unit.

PART A

RCRA PERMIT RENEWAL APPLICATION
20,000 POUND OPEN DETONATION (OD) TREATMENT UNIT
UNITED STATES DEPARTMENT OF THE AIR FORCE
HOLLOMAN AIR FORCE BASE
OTERO COUNTY, NEW MEXICO

Revision 2.0

ATTACHMENT A

FACILITY DESCRIPTION

HOLLOMAN AIR FORCE BASE
OPEN DETONATION TREATMENT UNIT

Permit No. NM6572124422

ATTACHMENT A
FACILITY DESCRIPTION

INTRODUCTION

The following information is provided in accordance with New Mexico Administrative Code (NMAC), Title 20, Chapter 4, Part 1, Subpart IX (20.4.1.900 NMAC) incorporating Title 40 Code of Federal Regulations (CFR) §270.14 (b)(1). A general description of the location of the subject OD Unit and site characteristics is included. Additions to the text in response to the NOD are highlighted in yellow.

A.1 GENERAL DESCRIPTION [20.4.1.900 NMAC §270.14(b) (1)]

Holloman Air Force Base (HAFB) is located on approximately 59,743 acres of land in Otero County, south-central New Mexico, of which 52,411 acres are deemed main base Holloman and 7,332 acres are deemed Boles Wells Water System Annex. HAFB lands are situated in the northern Chihuahuan Desert in the region known as the Tularosa Basin that is bounded ~~to~~ on the east and west by the Sacramento and San Andres Mountains respectively. HAFB is located adjacent to White Sands Missile Range (WSMR), and White Sands National Monument (WSNM) is located west of the Base. Regional water supplies are derived from Bonito Lake, located approximately 60 miles north of the base and the Boles, Douglas, and San Andres Well Fields located 14 miles to the southeast.

The nearest population center to HAFB is the city of Alamogordo, located approximately seven miles to the east. Regional metropolitan centers include El Paso, Texas, located 75 miles south-southwest, Las Cruces, New Mexico, located 65 miles to the southwest, and Albuquerque, New Mexico, located 210 miles north of the facility. The primary transportation route for the facility is Highway 70 that traverses the southern boundary of the base in a northeasterly direction. The general location of HAFB is depicted in Figure A-1.

HAFB was initiated as a temporary facility developed to provide gunnery and bomber training to aircrews during the Second World War. The Base mission was altered in the postwar years to the development of pilotless aircraft, guided missiles, and associated equipment. In the late 1950s the base was transferred to the Air Force Systems Command (AFSC) and designated as the Air Force Missile Development Center. On January 1, 1971, the base mission expanded to provide lead-in fighter training for the 479th Tactical Training Wing and its components.

Currently, HAFB hosts the Air Combat Command (ACC) 49th Fighter Wing, which includes pilot training, mobility support, and combat support operations. The primary Air Force Materiel Command (AFMC) component located at HAFB is the 46th Test Group, which is responsible for evaluation of propulsion and navigational systems for aircraft, space vehicles, and missiles. A variety of tenant organizations are assigned to HAFB, including the 4th Space Control Squadron and Detachment 4, the 50th Weather Squadron. A general layout of the facility is provided in Figure A-2. As a result of ACC readiness requirements and the 46th Test Group activities, a variety of ordnance, munitions, incendiaries, and propellants become waste because of exceedence of shelf-life, unanticipated deterioration, or failure to attain specifications that render the device non-serviceable. These waste explosives are considered characteristically hazardous under the Resource Conservation and Recovery Act (RCRA) due to reactivity (D003). Rocket motors exceeding 300 pounds are treated at the 20,000-Pound OD Unit that is subject to this permit. These units are regulated under 40 CFR §264.600, Subpart V.

The 20,000-Pound OD Unit is located at the northern boundary of HAFB, approximately 15 miles from the HAFB entrance. The OD Unit consists of a clear zone approximately 400 feet in diameter. It is located adjacent to the northern boundary of HAFB. The area to the north is part of the White Sands Missile Range. The OD Unit is 11.2 miles north of the WSNM and 15.9 miles from the closest recreational areas of WSNM. The eastern boundary of the HAFB/WSMR restricted area is approximately four miles east of the OD Unit. No human receptors are within this four mile area. There are a few rural residences six to seven miles east and seven to eight miles southeast and northeast of the OD Unit. The village of Tularosa is located nine to 10 miles to the northeast. The OD Unit is surrounded by a three-strand barbed wire fence with an overall height of four feet that defines the perimeter of the OD Unit. Warning signs in English, Spanish, German and Mescalero Apache are posted at key locations around the fence, and visible at a distance of 50 feet. The fence restricts unauthorized personnel and wild life from gaining access to the site.

The area surrounding the OD Unit was thoroughly surveyed for cultural resources by the University of New Mexico. The nearest potentially significant archaeological site (Laboratory of Anthropology number LA 67591) was identified approximately 300 meters southwest of the OD Unit. That site was excavated and reported in 1989 (Doleman, et al.) and the recovered materials are curated for future reference, which prevents the OD Unit from having any affect on those potentially significant cultural resources. No archaeological sites are in the area affected by use of the OD Unit.

No areas of specific ecological or natural environmental concern have been identified in the immediate area affected by the OD Unit. Tula pond, a man-modified natural spring, is approximately two miles north, and a population of gypsum adapted cottonwood trees (*Populus deltoides* ssp. *wislizeni*) is several miles to the southwest; neither is affected by the OD Unit. The Malone and Ritas Draws and the Lost River drainage are approximately 10 miles away from the OD Unit. These areas, classified as Essential Pupfish Habitat, are protected under the Cooperative Agreement for the Protection and Maintenance of White Sands Pupfish between the U.S. Army - WSMR, U.S. Air Force - HAFB, National Park Service - WSNM, U.S. Fish and Wildlife Service, and New Mexico Department of Game and Fish, but are not affected by the use of the OD Unit.

The 20,000-Pound OD Unit derives its name from the relevant operating procedures for this treatment activity. The net explosive weight (NEW) of solid propellant rocket motors that are, and will be simultaneously treated in the trench is limited to 20,000 pounds per treatment event. This total does not include the mass of the casings, other associated containment devices, and detonating charges. Although the precise number of treatment occurrences during any year is variable, the maximum amount of NEW treated at the unit per calendar year is 420,000 pounds. More specific information on ordnance constituents, the OD Unit, and operating procedures is provided in other attachments to this permit application.

Treatment of the wastes is accomplished according to the Automated Explosive Ordnance Disposal Publication System, T.O. 11A-1-42, T.O. 11A-1-60, AF Man 91-201 or manufacturer's disposal instructions within a 100-foot diameter area at the center of the clear zone. The waste is then treated by detonation. The force of the explosion often creates a depression in the ground, which is inspected to ensure that the waste has been completely destroyed. Unexploded ordnance (UXO) that may have been ejected from the depression is collected and returned to the depression and exploded again to treat the UXO. Casings and fragments that do not have UXO are collected and containerized. Additional detonations on the same day are performed at

locations surrounding the first depression within the 100-foot diameter detonation area. When the detonation area is covered with depressions, a bulldozer or similar heavy equipment smoothes out the site, filling in the depressions if sampling is not required. During soil sampling, the last detonation depression is not filled in, nor is any dirt work conducted, until the soil samples have been collected. A berm, with a minimum height of 2 feet, exists at the south end of the OD Unit to prevent carryover of fragments towards the test track area.

The location of the OD Unit and its surrounding area relative to the main base is provided in Figure A-2. A ~~unit~~ drawing of the area, showing dimensions of the unit, is shown in Figure A-3.

A.2 TRAFFIC INFORMATION [20.4.1.900 NMAC §270.14(B) (10)]

Access to the 20,000-Pound OD Unit is restricted to explosive ordnance disposal (EOD) personnel and personnel with appropriate security clearance and identification or escorted visitors.

A.2.1 ROUTES OF TRAVEL AND TRAFFIC VOLUME

Access to the 20,000-Pound Unit is provided by a single paved road. A dirt road provides access from the paved road to the edge of the OD Unit. The detonation area is approximately one quarter mile from the paved road. Traffic along this route is restricted to official use by the EOD personnel during explosive operations, but may be accessed by personnel using the adjacent Test Track. As a result of these restrictions, the typical traffic volume and pattern consist of several vehicles that are in transit to or from the Test Track facility each day.

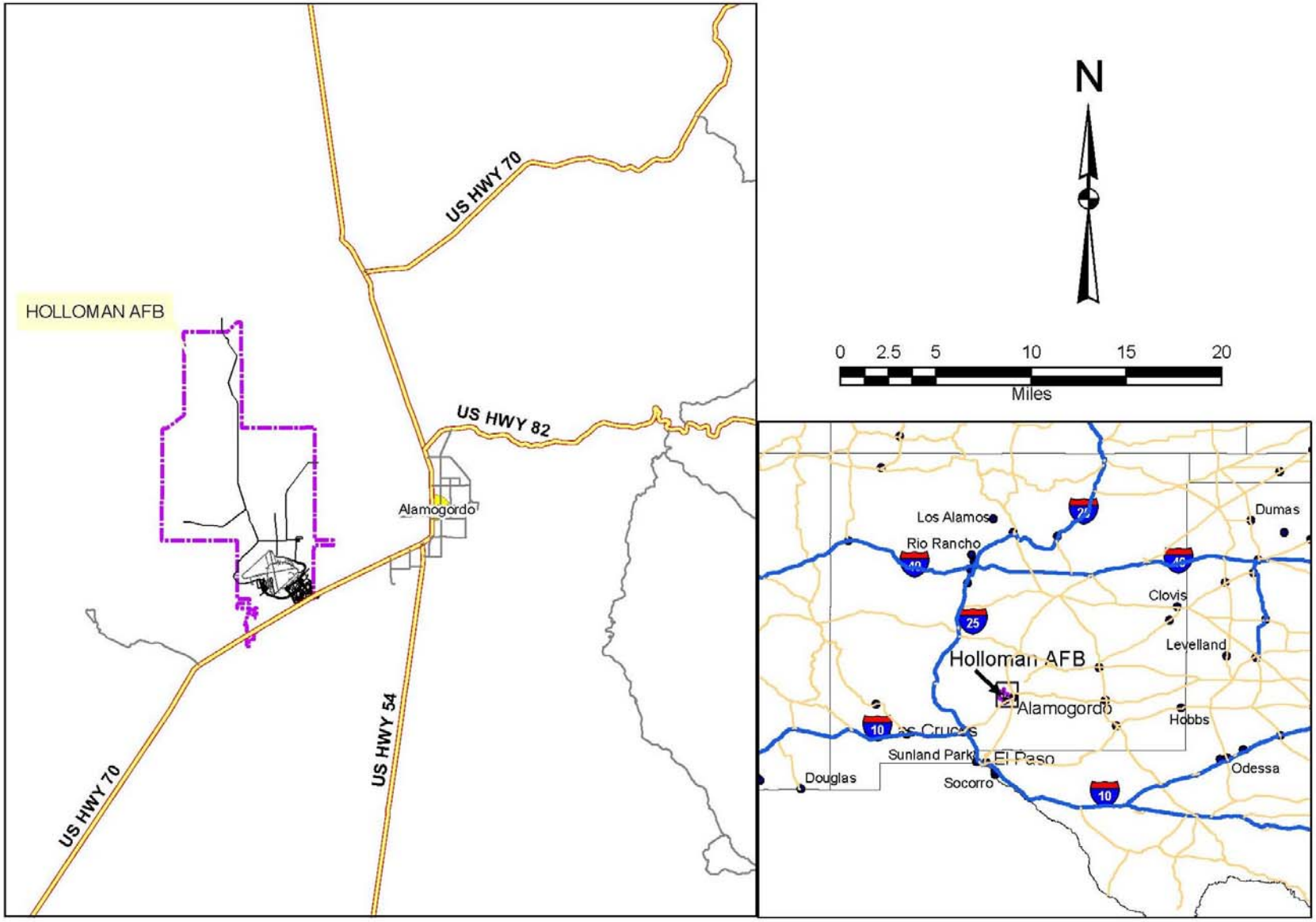
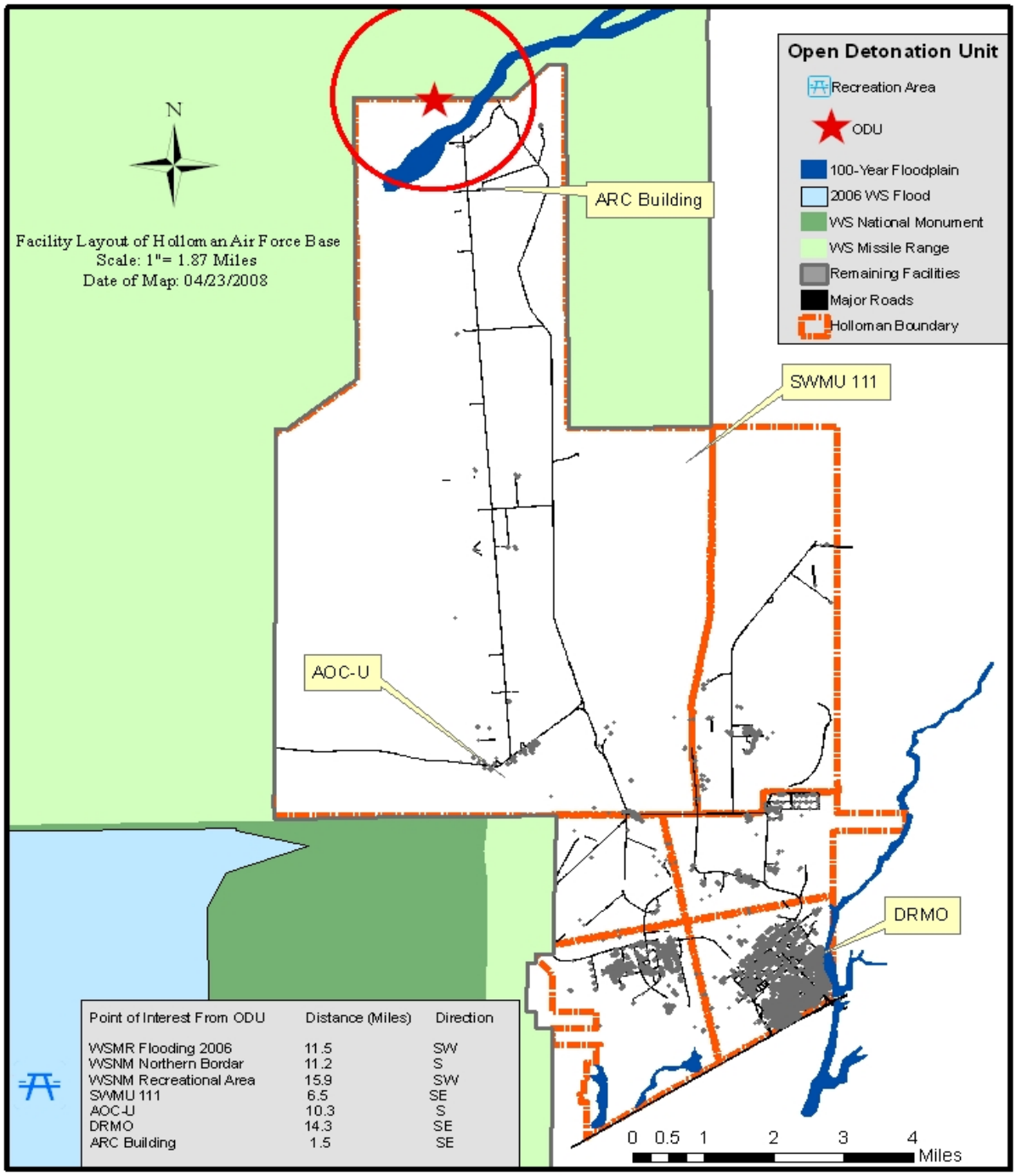


Figure A-1. General Location of Holloman Air Force Base



Point of Interest From ODU	Distance (Miles)	Direction
WSMR Flooding 2006	11.5	SW
WSNM Northern Bordar	11.2	S
WSNM Recreational Area	15.9	SW
SWMU 111	6.5	SE
AOC-U	10.3	S
DRMO	14.3	SE
ARC Building	1.5	SE

Figure A-2. Facility Layout of Holloman Air Force

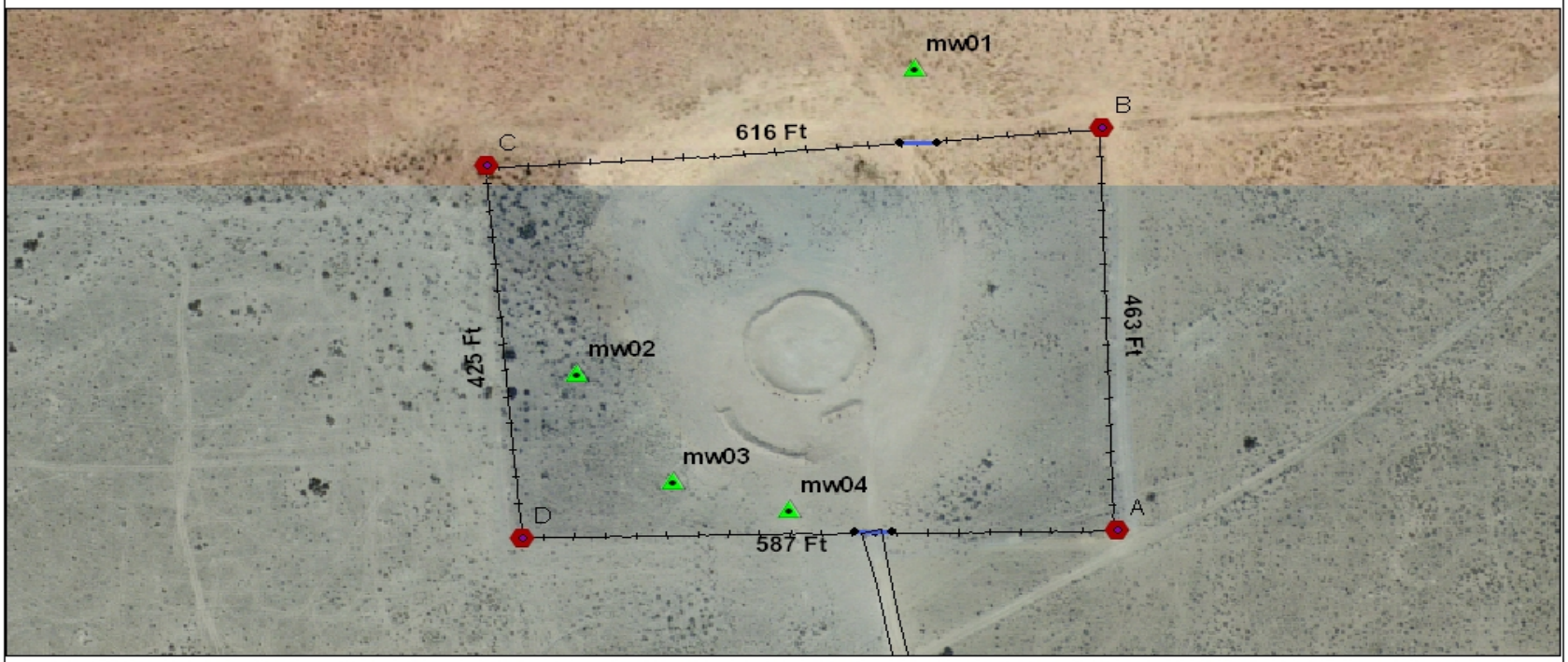
Legend

- Corner Post
- Monitor Well
- Fence
- Access Road
- Gates

N

LOCATION	NORTHING	EASTING	ELEVATION (TOC)
Corner A	739220.600	1667601.396	
Corner B	739686.309	1667587.153	
Corner C	739642.699	1666969.582	
Corner D	739212.252	1667005.816	
mw01	739755.628	1667399.133	4116.426
mw02	739403.203	1667059.957	4118.063
mw03	739278.759	1667155.705	4115.428
mw04	739246.079	1667272.462	4114.884

1. GIS Data is NAD 1983 StatePlane New Mexico Central



Feet
0 70 140 280 420 560

Figure A-3. Detailed Drawing of the 20,000-Pound Open Detonation Unit

A.2.2 ACCESS ROAD SURFACE AND LOAD BEARING CAPACITY

The only access road to the subject OD treatment unit is a paved surface. This surface is periodically maintained to prevent formation of holes, ditches, or other deformation that would increase the possibility of accidental detonation during transport.

The paved service road was graded and compacted to provide capacity for automobiles, trucks, and service vehicles. The maximum amount of waste moved per vehicle movement along the paved surface road is 40,000 pounds. This total weight includes the net explosive weight and the weight from inert casings, canisters, and other materials. See Figure A-4.

A.3 LOCATION INFORMATION [20.4.1.900 NMAC §270.14(b) (11)]

Information addressing the seismic standard and 100-year floodplain standard is presented below.

A.3.1 SEISMIC STANDARD [20.4.1.900 NMAC §§270.14(b) (11) (i and ii) and 20.4.1.500 NMAC §264.18(a)]

HAFB is an “existing” facility and is exempt from this requirement.

A.3.2 FLOODPLAIN STANDARD [20.4.1.900 NMAC §270.14(b) (11) (iii), (iv), and (v); §270.14(b) (19) (ii); and 20.4.1.500 NMAC §264.18(b)]

The FEMA floodplain map included as Figure A-5 shows that the OD Unit is not located within the 100-year floodplain which is defined in §264.18(b)(2)(i) as “any land area which is subject to a one percent or greater chance of flooding in any given year from any source."

The implications would be if the OD Unit was located in that plain, it must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood. In 2006, the WSNM was closed to the public due to flooding; however, the OD Unit is located 11.2 miles from the northern boundary of the WSNM. The OD Unit is situated on relatively flat, basin-floor upland, approximately 1000 feet north of and 27 feet in elevation above the Allen Draw channel, is surrounded by a minimum 2 foot high berm, and therefore would not be subject to washout as defined in §264.18(b) (2) (ii) as “the movement of hazardous waste from the active portion of the facility as a result of flooding.” Typically, surface water from precipitation in the area of the OD Unit is either lost to evaporation, transpiration, and infiltration.

A.4 TOPOGRAPHIC MAPS [20.4.1.900 NMAC §270.14(b) (19)

The general requirements of 20.4.1.900 NMAC §270.14(b) (19) are met in a topographic map of the 20,000-Pound OD Unit and the surrounding area in Figure A-5. The ~~topographic map (~~American National Standards Institute size E~~)~~ ANSI E map depicts the OD Unit features, sub-surface flow direction beneath the site, terrain relief, surrounding geographic features, the WSMR and HAFB boundaries, and prevailing wind direction. Elevation contour intervals and

scale per guidance are 1 meter (3.28 ft), with an absolute scale of 1:1,130 (1 inch equals 94 ft) respectively. Data indicates that the OD Unit itself and the majority of the surrounding area falls within FEMA flood designation zone X. This area is outside the 1-percent annual chance floodplain, or an area of 1% annual chance sheet flow flooding where average depths are less than 1 foot, or has 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or is protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone (FEMA 2009). The nearest interment stream Allen Draw falls within a FEMA zone A. This area has 1% annual chance of flooding and a 26% chance of flooding over a 30 year time period. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones (FEMA 2009). All within map pertinent features are labeled accordingly, with off map points of interest listed indicating both direction and distance from the ODU. ~~delineates the area relief at intervals of 2 feet, and provided as a standalone map to show correct scale and relief. HAFB and WSMR facility boundaries in the vicinity of the 20,000-Pound OD Unit are designated in the following figures:~~

- ~~Map scale and date – Figure A-5 shows a large scale topographic map of the Unit. The large-scale map is at a scale of one inch equal to 90 feet and shows topography in a 3000- by 2800 foot area around the Unit. The map is presented at that scale because all topographic contours are visible and a larger portion of the area surrounding the Unit can be seen.~~

- ~~100-year floodplain area (Figure A-5) – The topographic map indicates that the unit is located in relatively flat terrain.~~

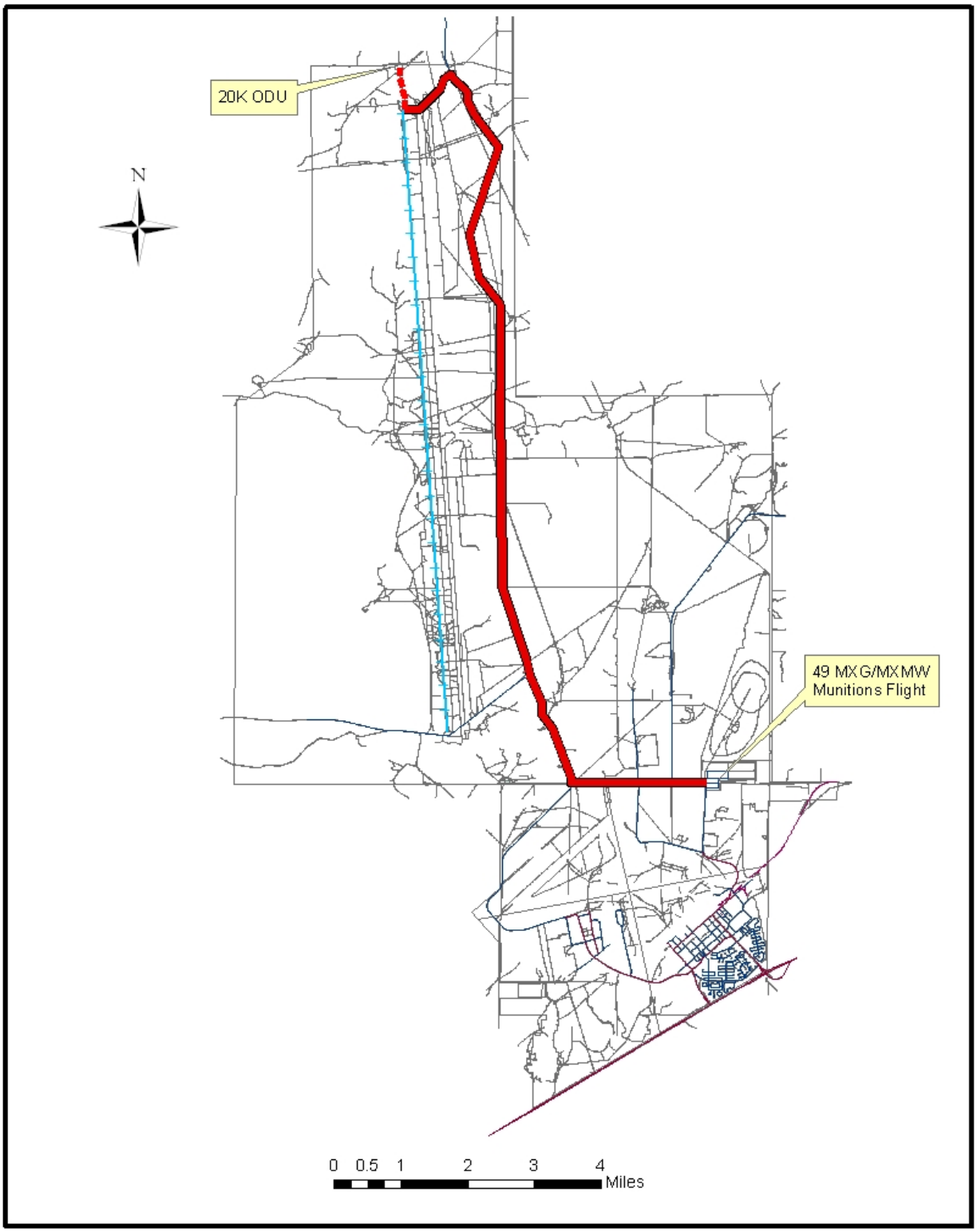


Figure A-4 Explosive Waste Hauling Route

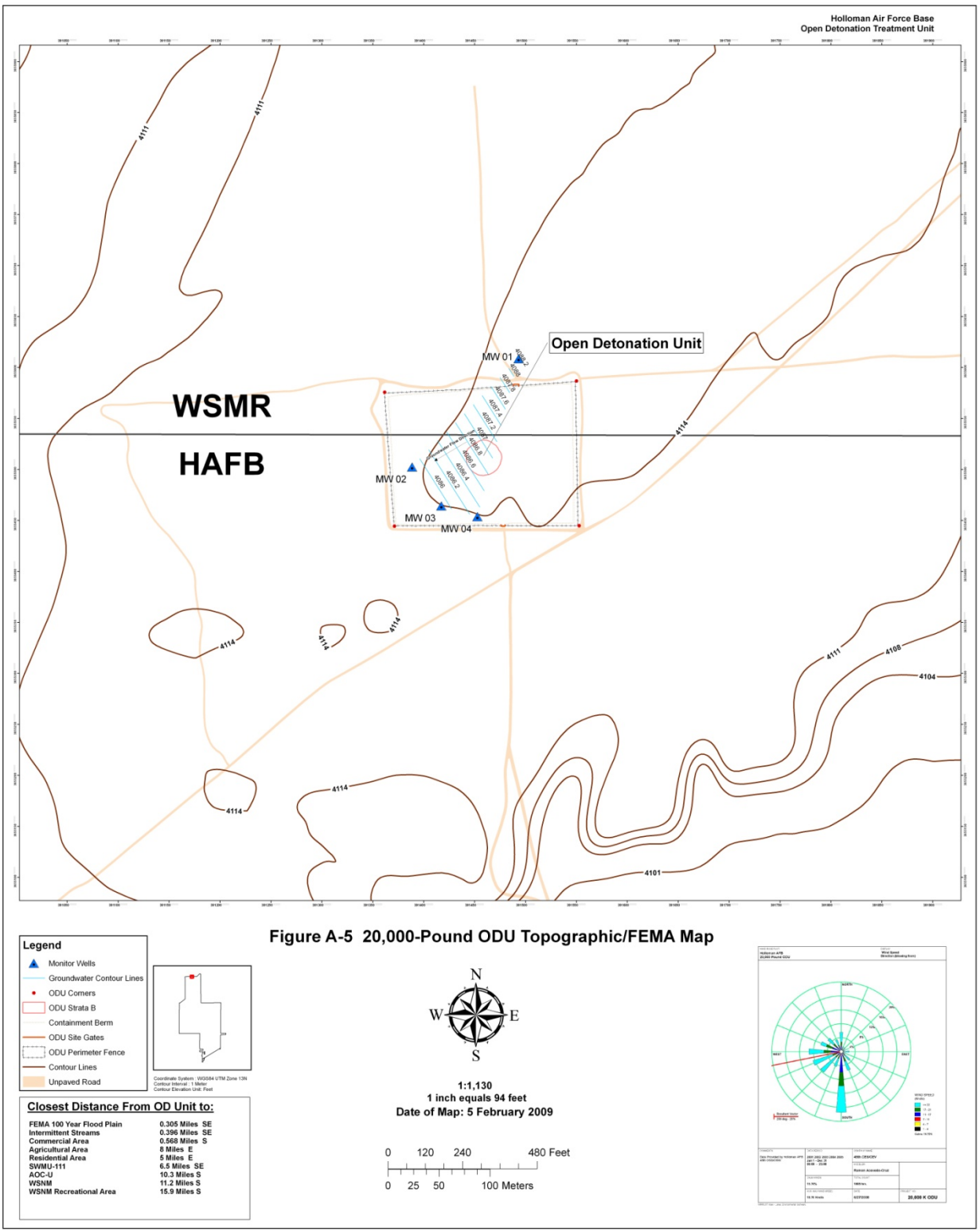


Figure A-5 20,000-Pound ODU Topographic/FEMA Map

- Surface waters including intermittent streams (Figure A-5) – No surface water of constant flow conditions is located in the area, although arroyos that contain runoff are located in the vicinity of the unit.

- A wind rose (i.e., prevailing wind-speed and direction) – Wind roses for 2000 through 2005 are shown on Figures A-6 through A-10**.** Figure A-5 shows a five year combined wind rose depicting a resultant vector from 259 degrees and an average wind speed of 18.76 knots.

- Surrounding land uses (residential, commercial, agricultural, recreational) – Due to the size of the installation, several insets are used to show the required features (Figure A-12). The 20,000-Pound OD Unit is located on the northern boundary of HAFB. White Sands Missile Range lies to the north and west of the adjacent base boundaries. The unit is situated on undeveloped grassland near areas of barren land (dunes) and arroyos and is isolated from commercial and residential land uses. The closest building (storage facility) off the OD Unit is approximately .75 mile from the OD Unit. The distances to the nearest residential buildings is 13.8 miles, to a public roadway is 9.1 miles, and to a passenger railroad is 85 miles.

- Orientation of the map (north arrow) – All maps included in the permit application show the orientation (north arrow).

- Legal boundaries of the Hazardous Waste Management facility site – The legal boundaries of HAFB are shown on Figure A-3**.**

- Access control (fences, gates) – All lands within HAFB boundaries are under the control of the U.S. Air Force. Thus, the unit is surrounded by access-controlled Federal lands for a distance of several miles in all directions.

- Injection and withdrawal wells both on-site and off-site – The location of the monitoring wells around the OD Unit are shown on Figure A-5.

- Buildings; treatment, storage, or disposal operations; or other structures (such as recreation areas, runoff control systems, access and internal roads, storm, sanitary, and process sewerage systems, loading and unloading areas, fire control facilities) – As indicated above, the area around the OD Unit is owned/controlled by the Federal government (Department of Defense). Figure A-2 shows the nearest point of interest, roads and structures. The nearest facility (storage area) is approximately .75 mile~~s~~ from the OD Unit.

- Barriers for drainage or flood control – An earthen berm provides a barrier to prevent drainage from the area of the OD Unit. The OD Unit is not located within the 100-year floodplain, and barriers for flood control are not necessary.

- Location of operational units within the hazardous waste management facility site (Solid Waste Management Units [SWMUs] and Installation Restoration Program [IRP] site), where hazardous waste is (or will be) treated, stored, or disposed (include equipment

cleanup areas) – The location of the OD Unit and other operational units are shown on Figure A-2.

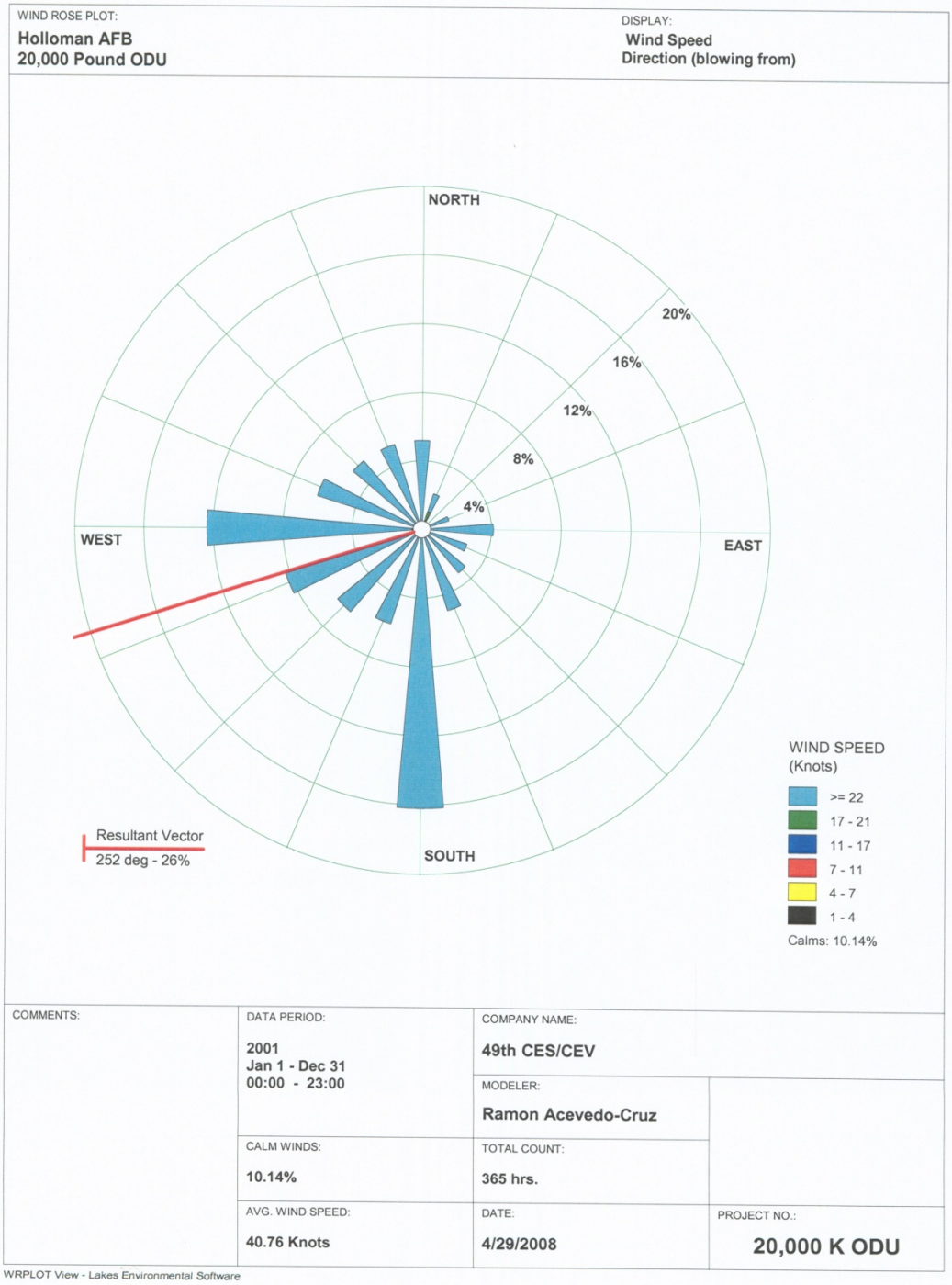


Figure A-6 Frequency (%) of Wind Speed by Direction – 2001

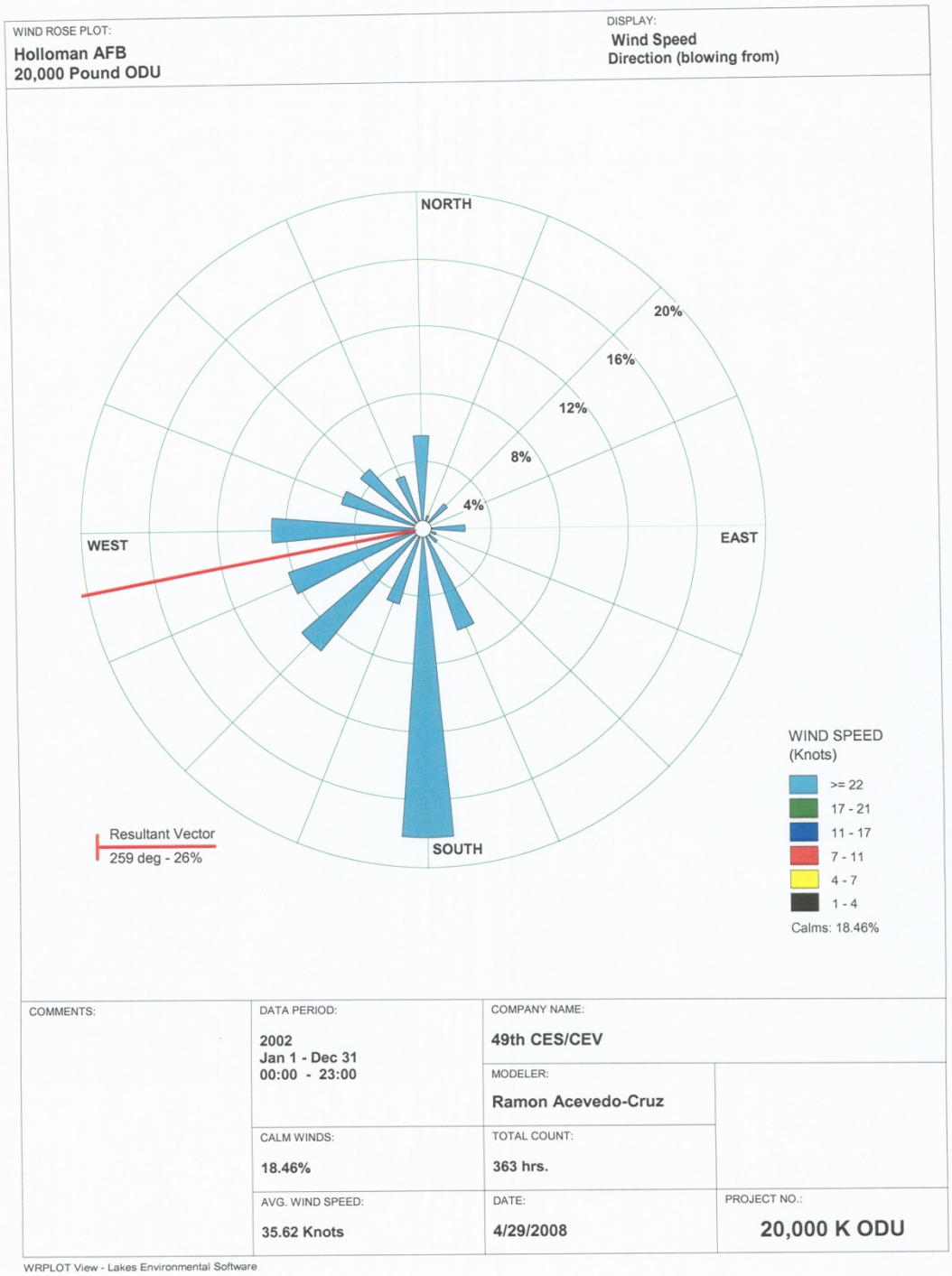


Figure A-7 Frequency (%) of Wind Speed by Direction – 2002

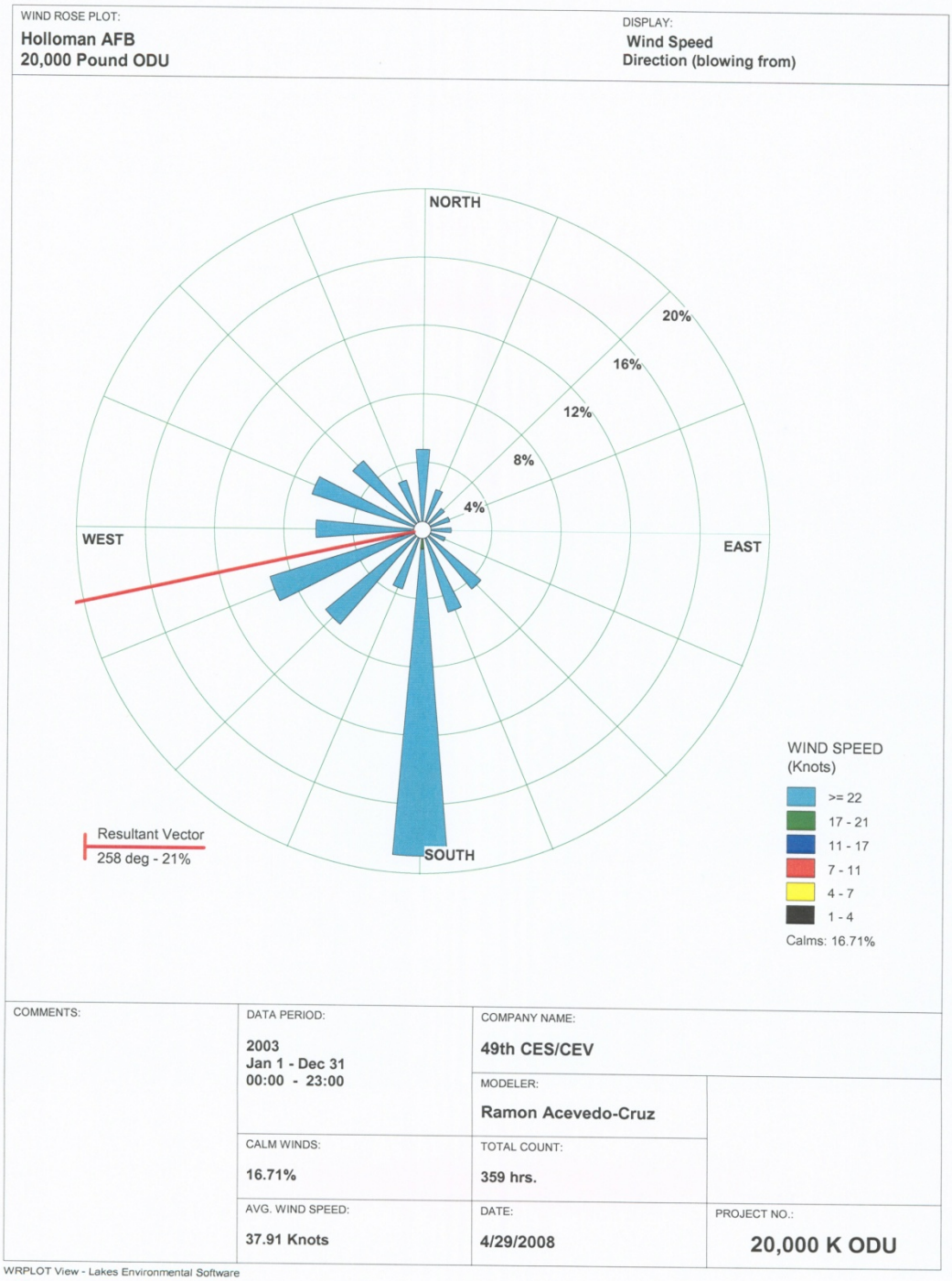


Figure A-8 Frequency (%) of Wind Speed by Direction – 2003

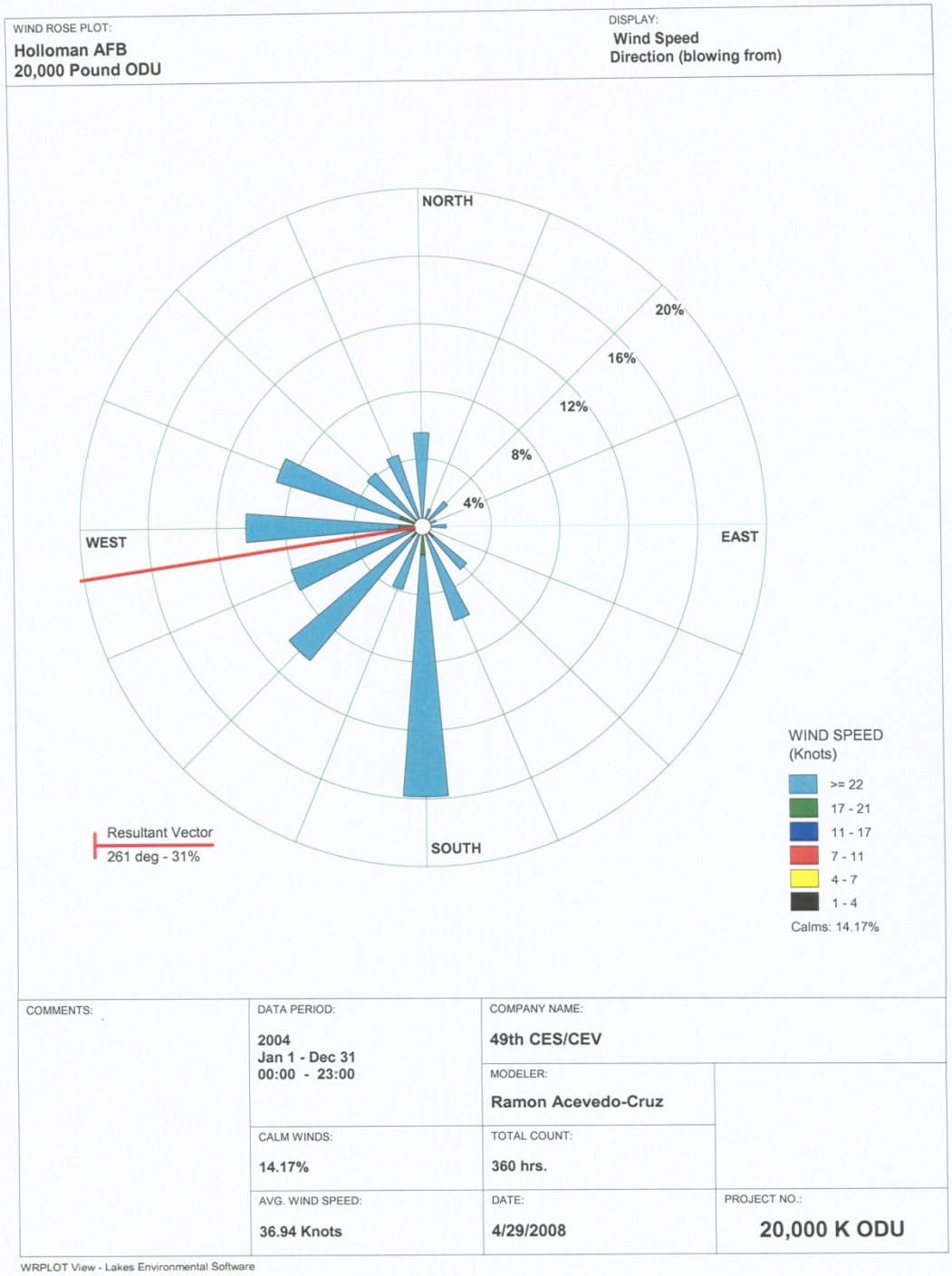


Figure A-9 Frequency (%) of Wind Speed by Direction – 2004

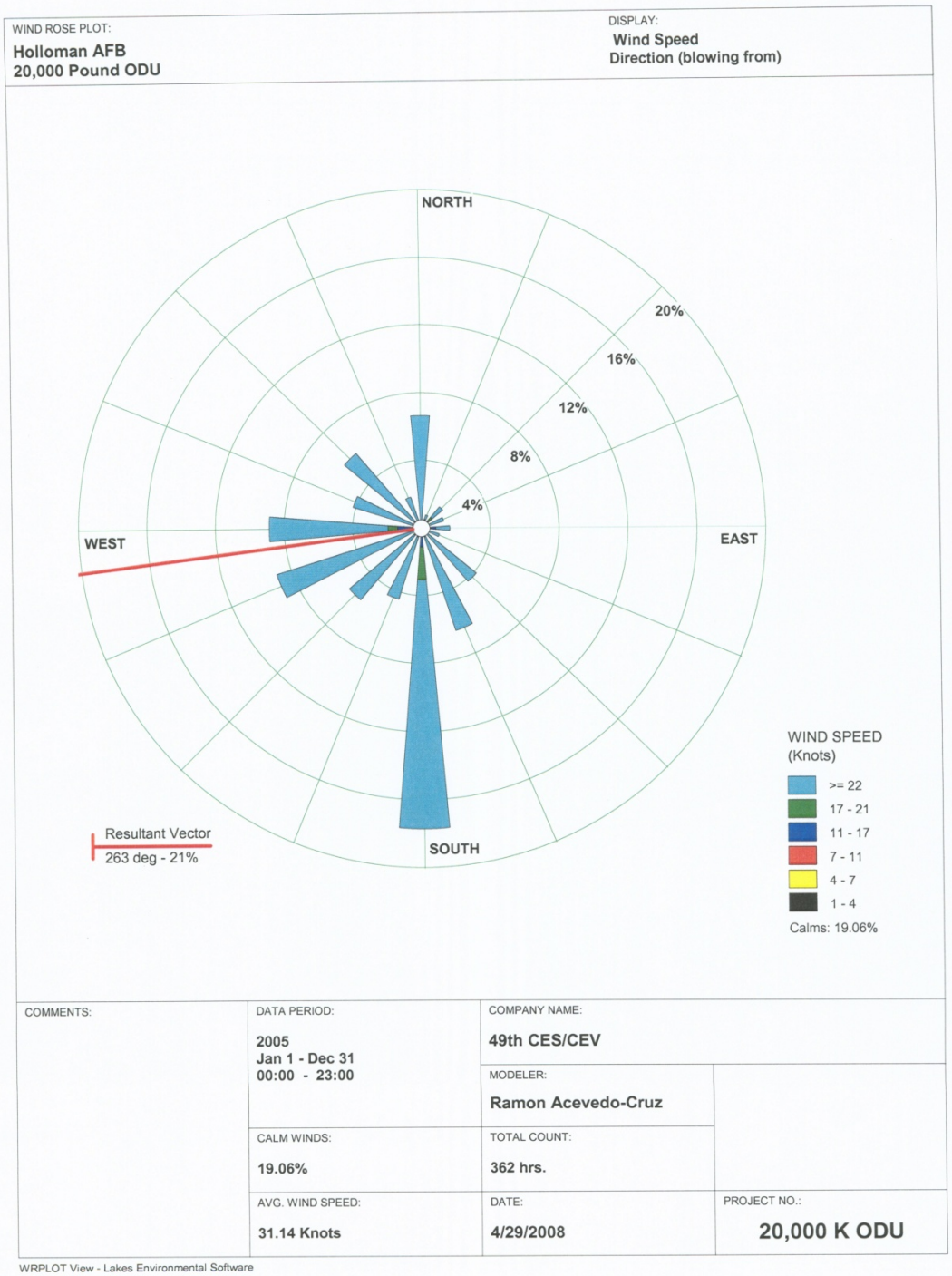
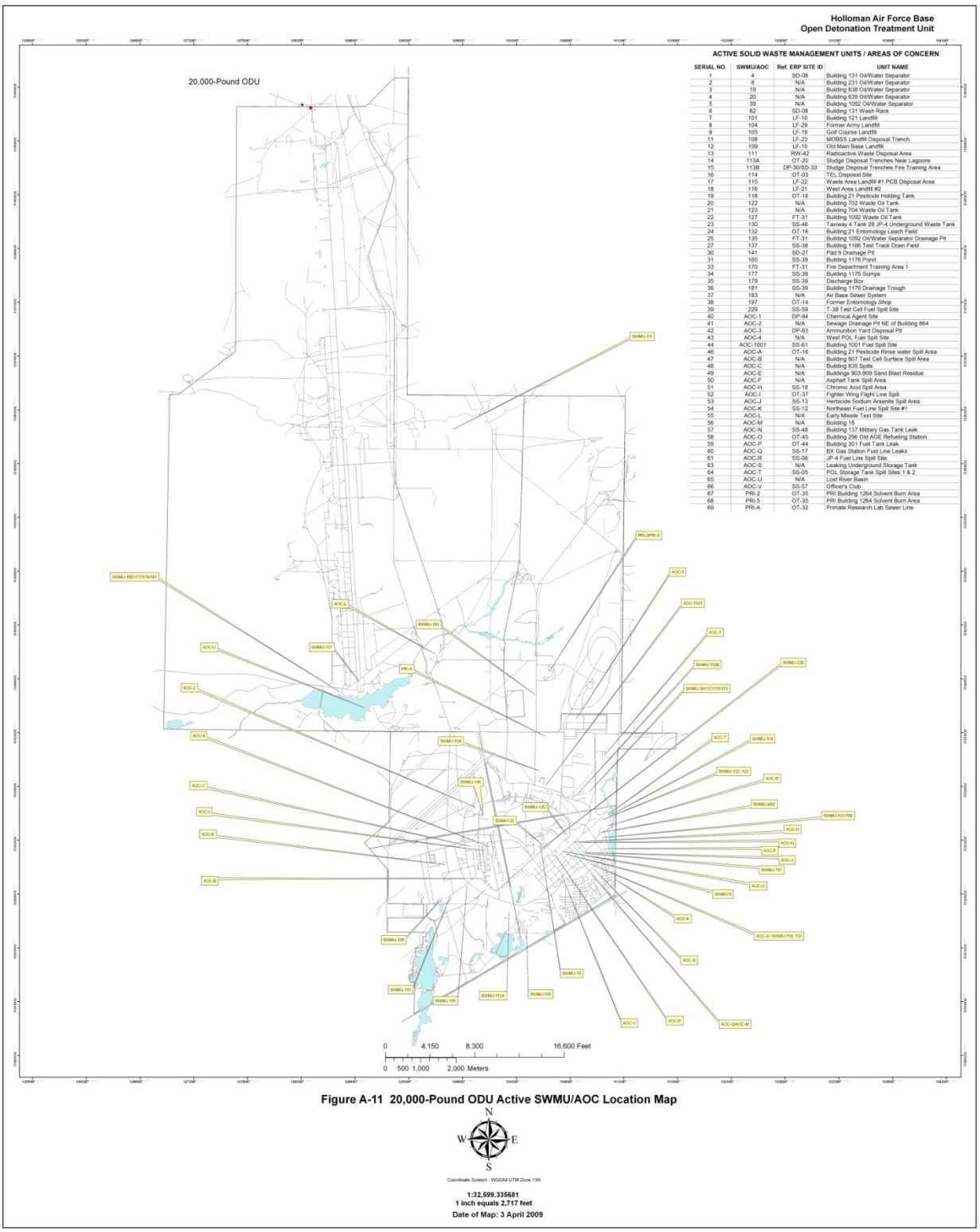


Figure A-10 Frequency (%) of Wind Speed by Direction – 2005

A.5 ADDITIONAL INFORMATION REQUIREMENTS [20.4.1.900 NMAC §270.14(c)]

Owners or operators of "regulated units" are required to provide additional information regarding protection of groundwater. Regulated units, as described in 20.4.1.500 NMAC §264.90(a) (2) include surface impoundments, waste piles, land treatment units, or landfills that receive hazardous waste after July 26, 1982. There are no "regulated units" at the HAFB; therefore, the requirements of this regulation are not applicable.

Note: Geology and meteorological information is presented in Attachment I, Environmental Protection.



ACTIVE SOLID WASTE MANAGEMENT UNITS / AREAS OF CONCERN

SERIAL NO.	SWMU/AOC	Ref. ERP SITE ID	UNIT NAME
1	4	SD-08	Building 131 Oil/Water Separator
2	8	N/A	Building 231 Oil/Water Separator
3	19	N/A	Building 638 Oil/Water Separator
4	20	N/A	Building 639 Oil/Water Separator
5	39	N/A	Building 1092 Oil/Water Separator
6	82	SD-08	Building 131 Wash Rack
7	101	LF-10	Building 121 Landfill
8	104	LF-29	Former Army Landfill
9	105	LF-19	Golf Course Landfill
11	108	LF-23	MOBSS Landfill Disposal Trench
12	109	LF-10	Old Main Base Landfill
13	111	RW-42	Radioactive Waste Disposal Area
14	113A	OT-20	Sludge Disposal Trenches Near Lagoons
15	113B	DP-30/SD-33	Sludge Disposal Trenches Fire Training Area
16	114	OT-03	TEL Disposal Site
17	115	LF-22	Waste Area Landfill #1 PCB Disposal Area
18	116	LF-21	West Area Landfill #2
19	118	OT-16	Building 21 Pesticide Holding Tank
20	122	N/A	Building 702 Waste Oil Tank
21	123	N/A	Building 704 Waste Oil Tank
22	127	FT-31	Building 1092 Waste Oil Tank
23	130	SS-46	Taxiway 4 Tank 28 JP-4 Underground Waste Tank
24	132	OT-16	Building 21 Entomology Leach Field
25	135	FT-31	Building 1092 Oil/Water Separator Drainage Pit
27	137	SS-38	Building 1166 Test Track Drain Field
30	141	SD-27	Pad 9 Drainage Pit
31	165	SS-39	Building 1176 Pond
33	170	FT-31	Fire Department Training Area 1
34	177	SS-39	Building 1176 Sumps
35	179	SS-39	Discharge Box
36	181	SS-39	Building 1176 Drainage Trough
37	183	N/A	Air Base Sewer System
38	197	OT-14	Former Entomology Shop
39	229	SS-59	T-38 Test Cell Fuel Spill Site
40	AOC-1	DP-64	Chemical Agent Site
41	AOC-2	N/A	Sewage Drainage Pit NE of Building 864
42	AOC-3	DP-63	Ammunition Yard Disposal Pit
43	AOC-4	N/A	West POL Fuel Spill Site
44	AOC-1001	SS-61	Building 1001 Fuel Spill Site
46	AOC-A	OT-16	Building 21 Pesticide Rinse water Spill Area
47	AOC-B	N/A	Building 807 Test Cell Surface Spill Area
48	AOC-C	N/A	Building 835 Spills
49	AOC-E	N/A	Buildings 903-909 Sand Blast Residue
50	AOC-F	N/A	Asphalt Tank Spill Area
51	AOC-H	SS-18	Chromic Acid Spill Area
52	AOC-I	OT-37	Fighter Wing Flight Line Spill
53	AOC-J	SS-13	Herbicide Sodium Arsenite Spill Area
54	AOC-K	SS-12	Northeast Fuel Line Spill Site #1
55	AOC-L	N/A	Early Missile Test Site
56	AOC-M	N/A	Building 18
57	AOC-N	SS-48	Building 137 Military Gas Tank Leak
58	AOC-O	OT-45	Building 296 Old AGE Refueling Station
59	AOC-P	OT-44	Building 301 Fuel Tank Leak
60	AOC-Q	SS-17	BX Gas Station Fuel Line Leaks
61	AOC-R	SS-06	JP-4 Fuel Line Spill Site
63	AOC-S	N/A	Leaking Underground Storage Tank
64	AOC-T	SS-05	POL Storage Tank Spill Sites 1 & 2
65	AOC-U	N/A	Lost River Basin
66	AOC-V	SS-57	Officer's Club
67	PRI-2	OT-35	PRI Building 1264 Solvent Burn Area
68	PRI-5	OT-35	PRI Building 1264 Solvent Burn Area
69	PRI-A	OT-32	Primate Research Lab Sewer Line

Figure A-11 20,000-Pound ODU Active SWMU/AOC Location Map

Figure A-11, 20,000-Pound ODU Active SWMU/AOC Location Map

ATTACHMENT B

WASTE ANALYSIS PLAN

HOLLOMAN AIR FORCE BASE
OPEN DETONATION TREATMENT UNIT

Permit No. NM6572124422

ATTACHMENT B
WASTE ANALYSIS PLAN

INTRODUCTION

This Waste Analysis Plan (WAP) describes the procedures used to characterize wastes that are treated and residues that are generated during treatment at the 20,000-Pound Open Detonation (OD) Unit. The WAP addresses the applicable waste analysis requirements in the Title 20, Chapter 4, Part 1, Section V New Mexico Administrative Code (20.4.1.500 NMAC, incorporating 40 Code of Federal Regulations (CFR) §§264.13, 264.602, and 270.14(b), and 20.4.1.300 NMAC, incorporating 40 CFR Part 268. The content of this WAP follows the guidance provided in "Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes: A Guidance Manual" (U.S. Environmental Protection Agency [EPA], 1994). This WAP is organized to address the six major elements recommended in the guidance, as follows:

Section B.1, Facility Description, references general descriptions of the Holloman AFB Open Detonation Treatment Unit; summarizes processes and activities that generate or are used to manage the waste; describes wastes that are treated, identifies appropriate waste accepted for treatment; and describes the hazardous waste management unit.

Section B.2, Waste Classification and Identification, addresses basic energetic chemistry and definitions; discusses various classifications of the waste military munitions; identifies typical waste treated at the OD Unit; summarizes typical waste constituents and specific physical and chemical parameters important for fate and transport; and describes the process for characterization of the waste using acceptable knowledge prior to treatment in the OD Unit. A glossary of munitions terms is included at the end of this Plan.

Section B.3, Selection of Waste Analysis Parameters, addresses munitions constituents (MC) of concern prior to treatment of the wastes at the OD Unit and post-treatment residues and soils, rationale for selection of MC, selection of analytical parameters and the rationale for the selection of these analytical parameters. The WAP also references the Sampling and Analysis Plan (SAP), included as Attachment H, which describes post-treatment sampling of residues and soil.

Section B.4, Summary of Analytical Methods and Sampling, presents information on the selection of the analytical laboratory and the methods. In addition, this section references the SAP at Appendix H for the analytical parameters for post-treatment soil sampling at the OD Unit.

Section B.5, Waste Re-Evaluation Frequencies, discusses the criteria used to determine the frequencies by which waste characterization information will be reevaluated.

Section B.6, Special Procedural Requirements, identifies the special procedures that will be followed to meet the provisions for complying with land disposal restrictions (LDR) requirements.

Section B.7, Glossary, provides definitions used throughout this document, summarized in one location.

The information collected under this WAP provides Holloman AFB (HAFB) personnel with information that is sufficient to safely manage the wastes treated at the OD Unit.

B.1 FACILITY DESCRIPTION

A general description of the HAFB OD Unit is provided in Attachment A. The facility information provided in this section is specific to processes and activities associated with the OD Unit.

B.1.1 DESCRIPTION OF FACILITY PROCESSES AND ACTIVITIES THAT GENERATE THE WASTE TREATED AT THE OD UNIT

Wastes treated at the OD Unit consist of military energetic materials that have exceeded their shelf life. Energetic materials are chemical compounds or mixtures of chemical compounds that are divided into three classes according to use: explosives, propellants, and pyrotechnics. When munitions are demilitarized because shelf lives have been exceeded, the overall chemical composition and resulting combustion products will not be affected.

The determination of when military munitions become waste military munitions (WMM) has been formalized in the DoD Regulation to ~~Implement~~ the EPA's Military Munitions Rule Implementation Plan (MRIP) issued 1 July 1998. A Designated Disposition Authority (DDA) was established and an evaluation process developed. The DDA evaluation process assigns the authority to designate military munitions as waste to the DDA, thereby introducing only two ways a military munitions becomes a WMM. Based on the ~~MRIP~~ MMR, the point of generation of WMM occurs when the military munitions are removed from storage to be transported to the OD Unit for disposal

Open detonation is a thermal treatment process used for the treatment of unserviceable, obsolete, and/or waste munitions whereby an explosive donor charge ignites the munitions to be detonated. Detonation of the energetic materials is a violent chemical reaction within a chemical compound evolving heat and pressure (exothermic redox reaction), which is self-sustaining after the initial activating energy has been applied. The reaction rate is determined by the velocity of the shock wave that moves at supersonic speeds through the explosive causing decomposition of the explosive material (TM9-1300-214, U.S. Army, 1984). The detonation process is quasi-instantaneous with temperatures ranging from 800º K (981º F) to 1000º K (1341º F) (EPA 2002). The detonation reaction renders the explosive wastes non-reactive.

B.1.2 DESCRIPTION OF WASTES TREATED

The wastes that are treated in the 20,000-Pound OD Unit are generally propellant devices and explosives with expired shelf lives. Rocket motors exceeding 300 pounds are regularly treated at the 20,000-Pound OD Unit. Similar constituents are used in the formulation of the different items, but the quantity of specific energetic materials varies. In addition to the energetic material, the waste consists of the unit metallic components associated with these devices such as the

casings. The reactive wastes to be treated at the 20,000-Pound OD Unit are solid in nature and contain no free liquid. The total mass of the energetic material is typically limited to less than 10,000 pounds per device.

Historically, the annual amount of waste treated at the OD Unit is less than the treatment event permit capacity. Explosive Reactivity Waste, D003, treated at the OD Unit and reported on the Biennial Report is listed in Table B-1.

Table B-1 Waste Treated at the OD Unit and Reported on Biennial Report

Reporting Year	Waste Code	Waste Description	Quantity Generated (pounds)
2005	D003	SPENT AND EXPIRED REACTIVE MUNITIONS AND ROCKET MOTORS FROM VARIOUS MILITARY OPERATIONS; TREATED ON SITE	6697
2003	D003	SPENT AND EXPIRED REACTIVE MUNITIONS AND ROCKET MOTORS FROM VARIOUS MILITARY OPERATIONS; TREATED ON SITE.	3751
2001	D003	SPENT AND EXPIRED REACTIVE MUNITIONS AND ROCKET MOTORS FROM VARIOUS MILITARY OPERATIONS; TREATED ON-SITE.	3305

B.1.3 DESCRIPTION OF ACCEPTABLE WASTE CATEGORIES

Wastes appropriate for Open Detonation are limited to hazardous wastes that have the explosive characteristic of reactivity (D003). These wastes meet the explosive reactivity definition specified in 20.4.1 NMAC §§261.23(a) (6 – 8). The energetic wastes must meet one or more of the following conditions:

a. The waste is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

b. The waste is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

c. The waste is considered a forbidden explosive as defined by 49 CFR 173.51.

d. The waste is one of the following Class 1 explosives as defined by 49 CFR 173.50.

- Division 1.1 (Class A) - consists of explosives that have a mass explosion hazard. A mass explosion hazard is one that affects almost the entire load instantaneously.
- Division 1.2 (Class A or B) - consists of explosives that have a projection hazard but not a mass explosion hazard.
- Division 1.3 (Class B) - consists of explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

Explosive ordnance disposal (EOD) Operating Instruction 32-3001-05 identifies the acceptable waste munitions for treatment at the OD Unit as Division 1.1. Categories of waste accepted for treatment at the OD Unit includes, but is not limited to, the propellants, explosives, and pyrotechnics further defined and identified in section B.2.

B.1.4 DESCRIPTION OF THE 20,000-POUND OD UNIT

The OD Unit consists of a cleared area approximately 400 feet in diameter within which waste explosives and propellant devices are detonated. Attachment F contains the operational procedures at the OD Unit. The actual treatment is accomplished according to the Automated Explosive Ordnance Disposal Publication System, T.O. 11A-1-42, T.O. 11A-1-60, AF Manual 91-201, or manufacturer's disposal instructions by placement of the waste items within a 100 foot diameter area at the center of the clear zone. C-4 (RDX) donor charges are attached to the waste item. An "explosive train" is constructed, and remote control detonation is initiated from the designated clear zone. The donor device consists of a series of components that are referred to as an explosive train once the individual devices are placed in combination. An explosive train consists of a primer, an initial detonating agent, and a high explosive. Explosive train detonation is achieved by step-wise detonation of the components. The detonation reaction renders the explosive wastes nonreactive and results in both solid and gaseous by-products. Depending upon combustion conditions, the gaseous by-products will consist of carbon monoxide (CO), carbon dioxide (CO_2), water (H_2O), nitrogen (N_2), and various nitrogen oxides (NO_X). Solid by-products include casings from the waste and possibly trace concentrations of incompletely oxidized reactive material. Reaction by-products that are solid will be retained in the depression created by the explosive force (except for ejected components), but the gaseous reaction by-products vent to the atmosphere. These solid by-products will be gathered and re-detonated or drummed for proper disposal. Due to the difficulties and obvious hazards associated with collection of gas samples in the immediate vicinity of the detonation zone, this plan does not address the gas phase reaction by-products. An assessment of the gaseous constituents released during combustion is provided in Permit Attachment I.

The 20,000-Pound OD Unit (as designed) derives its name from the relevant operating procedures for this thermal treatment activity. The maximum net explosive weight (NEW) that will be simultaneously treated is limited to ~~20,000~~ 11,900 pounds ~~(i.e., 20,000 pounds~~ per treatment event~~)~~., according to a memorandum dated 3 February 2005 from the Department of Defense (DoD) Explosives Safety Board (ESB). The DoD ESB memorandum is shown in Exhibit B-1. This total does not include the mass of the casings, other associated containment devices, and detonating charges. Although the precise number of treatment occurrences during any year is variable, discrete treatment events will occur at typical frequencies of at least one event per month, the total amount of treated hazardous waste will not exceed a total of 420,000 pounds NEW per calendar year.

B.2 WASTE CLASSIFICATION AND IDENTIFICATION

Process knowledge and munitions specifications are used to obtain the necessary chemical and physical data to designate waste prior to treatment of the energetic materials at the OD Unit. This section addresses basic definitions that are critical to understanding the nature of the waste stream and various classifications of military munitions based on energetic materials, munitions

categories, and munitions families. Waste military munitions will be defined based on the Military Munitions Rule (MR). Typical WMM treated at the OD Unit will be identified and basic chemical and physical properties of the constituents in the waste munitions will be briefly discussed. This information is provided as background to support the use of acceptable knowledge for characterization of the WMM prior to treatment at the OD Unit and to support rationale for selection of sampling and analysis parameters identified in Attachments G (Closure Plans), H (SAP for soil), and I (Environmental Protection).

Military Munitions are defined in 40 CFR 260.10 as all ammunition products and components produced or used by or for the DoD or the U.S. Armed Services for national defense and security, including military munitions under the control of DoD, the U.S. Coast Guard, DOE, and National Guard personnel. The definition includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries used by DoD Components, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof.

B.2.1 CLASSIFICATION OF MILITARY ENERGETIC MATERIALS (US ARMY, 1984)

Energetic materials are chemical compounds, or mixtures of chemical compounds, that are divided into three classes according to use: propellants; explosives; and pyrotechnics (PEP). Explosives and propellants, when initiated, evolve large quantities of gas in a short time. The difference between explosives and propellants is the rate at which the reactions proceed. For explosives, a fast reaction produces a very high pressure in the surrounding medium; this pressure is capable of significant destruction. In propellants, a slower reaction produces lower pressure over a longer period of time. This lower sustained pressure is used to propel objects. Pyrotechnics evolve large amounts of heat but much less gas than propellants or explosives.

Propellants cannot be distinguished from explosives by chemical composition or by chemical reaction rate alone, although propellants characteristically react (burn) at a rate much lower than the detonation rate of explosives. Propellants are characterized by the ability to burn at reproducible, controllable, and predetermined rates.

The properties of explosives are put to practical use in military munitions by an arrangement called an explosive train and an ignition train. The explosive train is used to set off a main charge and is composed of various explosive elements (initiator [primer/detonator], booster, main charge). These elements are arranged from decreasing sensitivity to high potency. The initiator consists of a small amount of primary explosive, and is highly sensitive. The booster contains a larger quantity of less sensitive but more powerful material called a secondary or high explosive. The main charge, also a secondary explosive is the least sensitive material but comprises the bulk of the explosive charge. The ignition train is used to ignite propellants. A primer ignites the igniter which in turn ignites the propellant charge. The primer consists of a mixture of fuels and oxidants.

While there are many kinds of explosive compounds, the number of explosive compounds used in military applications is relatively small. The explosives must meet specific chemical and

physical requirements associated with the intended military application. Many explosive items are designed for a minimum lifespan of ten years. Stringent tests are designed to characterize the explosives as much as possible before deployment to avoid problems during use. Table B-2 summarizes the military explosive compounds used in military munitions. The chemicals are specific, but are arranged in different compositions depending on the use of the energetic materials. The following information addresses energetic materials classified based on use.

B.2.1.1 Propellants

Propellants are low explosive agents such as explosive powder or fuel that provide the energy for propelling ordnance to the target. Propellants include both rocket and gun propellants. Propellants are classified based on composition, not use. Table B-2 lists common military propellant chemical compositions. Table B-3 identifies the specific chemical compositions of single and double base propellants that may be treated at the OD Unit.

- Single-base propellant compositions are used in cannons, small arms, and grenades. These compositions contain the propellant nitrocellulose as their chief ingredient. In addition to containing a stabilizer, they may also contain inorganic nitrates, nitro-compounds, and non-explosive materials such as metallic salts, metals, carbohydrates, and dyes.

- Double-base propellant compositions are used in cannons, small arms, mortars, rockets, and jet propulsion units. This term generally applies to compositions containing both nitrocellulose and nitroglycerine. They can also be defined as propellants containing nitrocellulose and liquid organic nitrates that will gelatinize nitrocellulose. Additives are frequently used in addition to a stabilizer.

- Triple-base propellant compositions are used in cannon units. This term is applied to propellants containing three explosive ingredients, with nitro guanidine as the major ingredient and the other two usually nitroglycerine and nitrocellulose.

- Composite propellants contain neither nitrocellulose nor an organic nitrate. They are usually physical mixtures of a fuel such as metallic aluminum, a binder (normally a synthetic rubber that is also a fuel), and an inorganic oxidizing agent such as ammonium perchlorate. Composite propellants are used primarily in rocket assemblies and jet propellant propulsion units.

B.2.1.2 Explosives

Energetic materials are classified into low and high explosives based on the speed of the explosion. High explosives are characterized by their extremely rapid rate of decomposition. When a high explosive is initiated by a blow or shock, it decomposes almost instantaneously, a process called detonation. High explosives are further divisible by their susceptibility to initiation into primary and secondary high explosives. Table B-2 contains general chemical compositions of primary and secondary high explosives.

- Primary or initiating explosives are high explosives generally used in small quantities to detonate larger quantities of high explosives. Primary explosive compositions are mixtures of primary explosives, fuels, oxidizers and other ingredients used to initiate detonation in high explosive charges or ignite propellants or pyrotechnics. In general, propellants are ignited by applying a flame (ignition train), while bursting explosives are ignited by a severe shock (explosive train). The initiating device used to set off a propellant is called a primer, and the device used to initiate the reaction of a main charge or bursting explosive is called a detonator.

- Auxiliary or booster explosives are used to increase the flame or shock of the initiating explosive to ensure that the burster charge performs properly. High explosives used as auxiliary explosives are less sensitive than those used in initiators, primers, and detonators, but are more sensitive than those used as filler charges or bursting explosives.

- Bursting explosives, burster charges, or fillers are high explosive charges that are used alone or as part of the explosive charge in mines, bombs, missiles, and projectiles.

B.2.1.3 Pyrotechnics

B.2.1.4 Energetic Materials Treated at the OD Unit. Pyrotechnics are low explosives used to send signals, to illuminate areas of interest, to simulate other weapons during training, and as ignition elements for certain weapons. Pyrotechnic compositions are considered low explosives because of their low rates of combustion. Examples of pyrotechnics are illuminating flares, signaling flares, smoke generators, tracers, incendiary delays, and photo-flash compounds.

Table B-4 contains a listing of typical military items treated at the OD Unit classified by composition and use. The table includes the chemical formula or the chemical composition for the chemical or chemical compound listed. A variety of uses are listed for many of the explosive compounds.

Table B-2: General Chemical Composition of Military Energetic Materials That May be Treated at the OD Unit (US Army, 1984)

PROPELLANTS[1]

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

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

PRIMARY EXPLOSIVES[2]

Name	Chemical Formula or Composition
Lead Azide	H_6Pb (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 Mononitroresorcinate (LMNR)	$C_6H_5NO_{4X}Pb$ (57.5% Pb)
Ingredients to Rocket Propellant**:**	
Copper Monobasic Salicylate	$C_{14}H_{12}Cu_2O_8$
Lead Salicylate	$C_{14}H_{10}O_6Pb$
Fuels:	
Lead Thiocyanate	$Pb(SCN)_2$ (64% Pb)
Antimony Sulfide	Sb_2S_5
Calcium Silicide	$CaSi_2$
Oxidizers:	
Potassium Chlorate	$KClO_3$
Ammonium Perchlorate	NH_4ClO_4
Barium Nitrate	N_2O_6Ba
Calcium Resinate	$Ca(C_{44}H_{62}O_4)_2$
Strontium Peroxide	SrO2
Barium Peroxide	BaO2
Strontium Nitrate	$Sr(NO_3)_2$
Potassium Perchlorate	$KClO_4$

[2]Primary compositions include a mixture of primary explosives listed above, fuels, oxidizers, and binders (e.g. paraffin wax).

Table B-2: Continued

BOOSTER AND SECONDARY EXPLOSIVES (High Explosives)

Name	Chemical Formula or Composition
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)	$C_6H_7(OH)_X(ONO2)_Y$ 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)	$C_7H_5N_5O_8$
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 B- 2: Continued

COMPOSITIONS

Name	Chemical Formula or Composition
Binary Mixtures:	
Amatols	[ammonium nitrate + TNT]
Composition A	[RDX + Desensitizer]
Composition B	[RDX + TNT]
Composition C	[RDX + Plasticizer]
Ednatols	[Haleite + TNT]
LX-14	[HMX (95.5%) + Estane 5702-F1]
Octols	[HMX + TNT]
Pentolite	[PETN + TNT]
Picratol	[Ammonium Picrate (52%) + TNT (48%)]
Tetrytols	[TNT + Tetryl]
Tritonal	[TNT (80%) + Flaked Aluminum (20%)]
Ternary Mixtures:	
Amatex 20	[RDX (40%) + TNT (40%) + Ammonium Nitrate (20%)]
Ammonels	[Ammonium Nitrate + Aluminum and TNT, DNT, or RDX]
HBX	High Blast Explosives: [TNT + RDX + AlD2 Wax + Calcium Chloride]
HTA-3	[HMX + TNT + Al Mixture]
Minol-2	[TNT + Ammonium Nitrate + Aluminum]
Torpex	[RDX (41.6%), TNT (39.7%), Al (18.0%) Wax (0.7%)]
Quaternary Mixtures:	
DBX	[TNT (40%), RDX (21%), Ammonium Nitrate (21%), Al (18%)
Plastic Bonded Explosives (PBX)	
Basic Explosive	[RDX, HMX, HNS, or PETN + Polymeric Binder (Polyester, Polyurethane, Nylon, Polystyrene, Rubbers, Nitrocellulose, Teflon)]

PYROTECHNICS

Combination of:

Oxidizer-Oxygen or Fluorine; Fuel - Powdered Aluminum or Magnesium; Binding Agents - Resins, Waxes, Plastics, Oils, Retardants; Waterproofing, Color Intensifier

Table B-3: Standard Compositions (%) for Single - or Double-Base Propellants that May be Treated at the OD Unit

	M-1 (a) Single Base	M-3 Single Base	M-14 Single Base	Double Base Common	Double Base Calibers 20, 30, 50	Double Base Mortar Repellant	Double Base Rocket Propellant M-Series	Double Base Rocket Propellant T-Series
Nitrocellulose	**84.2**	**79**	**89.1**	**77 – 81**	**74 – 84**	**52 – 57**	**55 – 58**	**58**
Nitroglycerin				**15 – 19**	**15 – 20**	**40 – 43**	**30 – 40**	**22 – 40**
Barium/Potassium Nitrate				**2.1**	**0.0 – 1.5**	**1.25 – 1.5**		
Potassium Perchlorate							**0.0 – 7.8**	
Graphite				**0.3**	**0.0 – 0.25**			
Dinitrotoluene	**9.9**	**15**	**7.9**					**0.0 – 2.5**
Trinitrotoluene								
Diphenylamine					**0.75**	**0.75**	**1.0 – 8.0**	**1.75 – 8.0**
Diethylphenylamine				**0.6**		**0.0 – 0.6**		
Potassium Sulfate							**0.0 – 1.5**	**0.0 – 1.5**
Tracetin		**5**	**2.0**					
Dibutylphthalate	**4.9**		**1.0**			**3.0**		
Cryolite	**1.0**	**1.0**						

Table B-4: General Chemical Composition of Military Items Treated at the OD Unit

Name	Chemical Formula	Use	Energetic Material Classification	Potential EPA Hazardous Codes
AMATOL	(ammonia nitrate/TNT)	main charge, armor piercing projectiles	Binary Mixtures	D001, D003
AMMONAL	(ammo nitrate/TNT/Al)	main charge, semi-armor piercing bombs	Ternary Mixtures	D001, D003
AMMONIUM NITRATE	NH_4NO_3	main charge, cratering charge	High Explosive	D003
BALLISTITE	(nitrocellulose /nitroglycerin/ diphenylamine/graphite)	propellant, rocket motors	Ternary Mixtures	D001, D003
BARATOL	(TNT/barium nitrate)	main charge	Binary Mixtures	D001, D003,D005
BLACK POWDER	(potassium nitrate/charcoal/sulfur)	propellant, mixtures	Propellant	D001, D003
COMP A	(RDX/wax)	boosters, fuzes	Binary Mixtures	D001, D003
COMP B	(RDX/TNT/wax)	main charge, projectiles, bombs, warheads	Binary Mixtures	D001, D003
COMP C-4	(RDX/oil/polyisobutylene/ diethylhexylsebacate)	demotion charge	Binary Mixtures	D001, D003
CYCLOTRIMETHYLENE TRINITRAMINE (RDX)	$C_3H_6N_6O_6$	mixture, detonators, demo charges	High Explosive	D001, D003
DBX	(ammo nitrate/RDX/Al)	main charge, depth bombs	Quaternary Mixture	D003
DIAZODIN1TROPHENOL (DDNP); (DINOL)	$HOC_6H_3(NO_2)_2N$	blasting caps, detonators	Primary Explosive	D003
DOUBLE BASE SMOKELESS POWDER	(guncotton/nitroglycerin)	propellant	Propellant	D001, D003

Name	Chemical Formula	Use	Energetic Material Classification	Potential EPA Hazardous Codes
EXPLOSIVE D (AMMONIUM PICRATE)	$NH_4C_6H_2N_3O_7$	bursting charge, armor piercing projectiles	High Explosive	D001, D003
GUNCOTTON	(nitrocellulose)	propellant	Propellant; High Explosive	D001, D003
HEXANITE #26	(TNT/HND/Al)	main charges	Ternary Mixtures	D001, D003
HEXITE (HEXANITRO-DIPHENYLAMINE)	$C_{12}H_5N_7O_{12}$	mixtures	High Explosive	D001, D003
HMX	$C_4H_8N_8O_8$	mixtures, boosters	High Explosive	D001, D003
H-6	(RDX/TNT/A1/CaCl)	main charges, naval bombs, depth charges	Binary Mixtures	D001, D003
HTPB (HYDROXY-TERMINATED POLYBUTADIENE)	HO-(C H) –OH	solid fuel propellant	Composite Propellant	D003
LDNR	$PbC_6H_2N_2O_6$	blasting caps	Primary Explosive	D001, D003, D008
LEAD AZIDE	N_6Pb	initiators	Primary Explosive	D001, D003, D008
LEAD STYPHNATE	$C_6H(NO_2)_3(O_2Pb)$	initiators, primers, detonators	Primary Explosive	D001, D003, D008
MANNITOL HEXANITRATE	$C_6H_8(NO_3)_6$	initiators, blasting caps	Secondary Explosive	D003
MERCURY FULMINATE	$HgC_2N_2O_2$	initiators, blasting caps	Primary Explosive	D001, D003, D009
MINOL	(TNT/ammo nitrate/Al)	main charges, bombs, projectiles	Binary Mixtures	D001, D003
NITROGLYCERIN	$C_3H_5(ONO_2)_3$	propellant compositions	Propellants; High Explosive	D001, D003

Name	Chemical Formula	Use	Energetic Material Classification	Potential EPA Hazardous Codes
PENTOLITE	(TNT/PETN)	bursting charges	Binary Mixtures	D001, D003
PETN	$C(CH_2ONO_2)_4$	mixtures, boosters, detonating cord	High Explosive	D001, D003
PICRATOL	(Explosive D/TNT)	main charges	Binary Mixtures	D001, D003
PICRIC ACID #26	$C_6H_2(NO_2)_3OH$	boosters, bombs	Primary Explosive	D001, D002, D003
PICRITE	$CH_4N_4O_2$	propellant	High Explosive	D001, D003
TETRYL	$(NO_2)_3C_6H_2N(NO_2)CH_3$	mixtures, boosters	High Explosive	D001, D003
TNPH	$C_6H_2(NO_2)_3C_2H_5$	mixtures, boosters, (sub for TNT)	High Explosive	D003
TORPEX	(RDX/TNT/Al)	main charges, mines, torpedoes	Ternary Mixtures	D003
TNT	$C_6H_2CH_3(NO_2)_3$	main charges, demo charges, boosters, mixtures	High Explosive	D001, D003
TRITONAL	(TNT/Al)	main charges, bombs	Binary Mixtures	D001, D003
TYPE 88 #26	(ammonium perchlorate/ferro-silicon/ wood meal/crude petroleum)	main charges	High Explosive	D001, D003
TYPE 91 #26	$C_6H_2OCH_3(NO)_3$	main charges	High Explosive	D003
TYPE 92 #26	(TNT/Al)	burster for Japanese bullets	High Explosive	D001, D003
TYPE 98	(trinitroanisol/hexanitro-diphenylamine)	primer, burster charge	High Explosive	D003
TNA	$C_6H_3N_5O_8$	boosters	High Explosive	D003

Name	Chemical Formula	Use	Energetic Material Classification	Potential EPA Hazardous Codes
OCTOL	(HMX/TNT)	main charge, shape charges	Binary Mixtures	D001, D003
METHYL PICRATE	$C_6H_2OCN_3(NO_2)_3$	main charge, bombs	High Explosive	D003
POTASSIUM PERCHLORATE	$KClO_4$	pyrotechnic, fireworks	Oxidizer	D001, D003
PHOTO FLASH POWDER	(barium nitrate/potassium perchlorate/Al)	ground burst simulators, photo bombs and projectiles	Pyrotechnics	D001, D003
THERMITE	Fe_2O_32Al	grenades, document destroyers	Pyrotechnics	D003
THERMATE	Fe_2O_3 Al + Ba nitrate	document destroyers	Pyrotechnics	D003, D005
HC SMOKE	ZnO_2C_6Cl Al	screening smoke	Pyrotechnics	D003
TITANIUM TETRACHLORIDE	$TiCl_4$	spotting charges	Pyrotechnics	D003
WHITE PHOSPHORUS	P_4	screening/marking smoke	Pyrotechnics	D001
PLASTICIZED WHITE PHOSPHORUS	P_4 + synthetic rubber	marking smoke	Pyrotechnics	D001

B.2.2 CLASSIFICATION BY MILITARY MUNITION TYPE AND MUNITIONS FAMILIES

B 2.2.1 Classification by Military Munitions Type

A complete military munitions item includes several components. Typical components may include a projectile, a propellant charge, and a primer that ignites the propellant. Other components such as a casing, fuzes, and bursting charge are frequently included. The munitions filler of these components, with few exceptions, contains one single energetic compound or a mixture of energetic compounds as well as non-energetic compounds. The energetic compounds consist of propellants, explosives, and pyrotechnics such as those described above. The non-energetic compounds typically serve as binders and stabilizers. Examples of these additives are ethyl cellulose, graphite, carbon black, calcium carbonate, cellulose acetate, and charcoal.

Munitions are typically classified based on five factors: type, use, filler, storage, and compatibility. Applicable munitions types are listed below:

- Hand Grenades – Hand grenades are small explosive- or chemical-type munitions that are designed to be thrown at short range. All grenades have three main parts: (1) a body, (2) a fuze with a pull ring and safety clip assembly, and (3) a filler. Grenades have metal, plastic, cardboard, or rubber bodies and may contain explosives, white phosphorus, or illumination flares, depending on their intended use.

- Mortars – Mortars range from approximately 1 to 11 ins. in diameter and can be filled with explosives, white phosphorus, or illumination flares. The mortar fuze is located in either the nose or the base.

- Projectiles/Artillery Rounds – Projectiles range from approximately 1 to 16 in. in diameter and from 2 in. to 4 ft in length. Like mortars, projectile fuzes are located in either the nose or the base.

- Rockets – Rockets can range from 1½ to more than 15 inches in diameter, and they can vary from 1 foot to over 9 feet in length. Rockets are propellant-type motors fitted with rocket heads containing high-explosive or chemical agents. The residual propellant may burn violently if subjected to sharp impact, heat, flame, or sparks.

- Missiles – Missiles consist of a warhead, a motor section, and a fuze and they are guided to their target by any number of systems, including radar and video. Missiles rely exclusively on proximity fuzes.

- Bombs – Bombs range from 1 to 3,000 lbs in weight and from 3 to 10 ft in length. Bombs consist of a metal container (the bomb body), a fuze, and a stabilizing device. The bomb holds the explosive or chemical filler.

- Demolition materials. Demolition materials consist of explosives and explosive devices designed for use in demolition and in connection with blasting for military construction.

B.2.2.2 Classification by Munitions Families

Munitions Items Disposition and Action System (MIDAS). MIDAS is a database developed and maintained by the Defense Ammunition Center (DAC) that provides chemical constituent information for munitions. Information available from MIDAS provides item-specific specifications that can be used to characterize items treated in the OD Unit. The MIDAS computerized database includes complete composition information (energetic and non-reactive components) for munitions. The MIDAS database provides information for individual munitions items but does not easily facilitate obtaining statistical summaries (e.g., average values) of the chemical compositions by munitions families.

Munitions/explosives can be grouped into MIDAS families. Only applicable families are listed below:

- High Explosive (HE) Components/Devices: HE detonators, boosters, or bursting charges that are not part of an ammunition item. Typically HE components/devices have a hazard class/division (HC/D) of 1.1 or 1.2. MIDAS Family: HA

- HE Bombs: HE-filled bombs. These items are typically air dropped, and the explosives within the HE bombs are usually tritonal, 2,4,6-trinitrotoluene (TNT), hexahydro-1,3,5-trinitro-8-triazine (HBX), or H-6 HE. MIDAS Family: HB

- HE Cartridges: Complete artillery or Navy gun ammunition with an HE projectile and propellant charge. Examples are 90MM, 3 inch/50 cal., 81MM mortar, 30MM fuzed or unfuzed cartridges, and fuzed 20MM cartridges. MIDAS Family: HC.

- Bulk HE: Bulk high explosives such as TNT, composition A, composition B, composition C-4, PBX, and RDX. MIDAS Family: HE.

- HE Grenades; Hand or rifle grenades that contain HE fillers. MIDAS Family: HG

- HE Improved Conventional Munitions/Cluster Bomb Units (ICM/CBU) and Sub Munitions: Variety of improved conventional munitions types containing sub munitions. Items may be air-dropped cluster bomb units, projectiles, or warheads containing sub munitions such as anti-tank mines, anti-personnel/material grenades, or bomb loaded units (BLUs), and Multiple Launch Rocket System (MLRS) rockets. Missiles: Complete rounds of missile ammunition configured with an explosive or practice warhead, rocket motor, and guidance system. MIDAS Family: HI

- HE Projectiles and Warheads: All projectiles, warheads, mortars or similar items that do not have a cartridge case, propellant, or rocket motor and that contain HE filler. MIDAS Family: HP

- HE Rockets: Complete rounds of rocket ammunition containing warhead, fuze, and rocket motor. MIDAS Family: HR

- HE Torpedoes: Underwater torpedoes that contain HE. MIDAS Family: HT

- Demolition Material: Demolition charges such as TNT, C-4, flexible sheet explosives, cratering charges, shaped charges, and detonating cord. MIDAS Family: HXM

- HE Land Mines: HE-filled land mines emplaced by hand or disbursing devices. This family also includes scatterable mines when they are packed separately from the disbursing unit (e.g., a dispenser, projectile body, or other system). MIDAS Family: HZT

- Large Rocket Motor: Solid propellant Inter-Continental Ballistic Missiles (ICBM), Submarine Launch Ballistic Missiles (SLBM), space launch booster motors or tactical motors greater than 20 inches in diameter. MIDAS Family: HR

- Bulk Propellants and Black Powder: Propellants and black powder in bulk form that are not assembled or configured to an ammunition item. Material is normally packaged in drums or metal-lined wooden or fiber containers. MIDAS Family: PB

- Propellant Charges and Increments: Packaged propelling charges and propellant increments. MIDAS Family: PCB

- Propellant Munitions/Components: Rocket motors, cartridge-actuated devices (CADs), propellant actuated devices (PADs), blank ammunition of more than 20MM, and expelling charges. This family also typically includes HC/D 1.3 components or munitions that do not fit into any other family. MIDAS Family: PD

- Small Caliber Ammunition: Small caliber ammunition cartridges up to 20MM with energetic filler(s). Excluded are fuzed HE or high-explosive incendiary (HEI) loaded 20MM cartridges that are assigned to family HC, and DUMMY small caliber ammunition. MIDAS Family: SAL

- Fuzes: All types of fuzes related to munitions. Examples include artillery ammunition/Navy gun fuzes, bomb fuzes, rocket fuzes, or grenade fuzes packaged separately from the munitions. MIDAS Family: SF

B.2.2.3 Wastes Treated at the OD Unit Classified by Military Munitions Type and Munitions Families

Table B-5 contains a listing of typical military munitions treated at the OD Unit classified by munitions families. The table includes NEW of the WMM and identifies typical donor explosives used in the OD Unit treatment process. Table B-6 provides composition information on a typical treatment event of rocket motors and donor charge information.

Table B-5 Typical Munitions, Classified by MIDAS Family, Used or Treated at OD Unit.

Material Classification	MIDAS Family	MIDAS Family Description	Federal Supply Class Description	Quantity	NEW (Pounds) - 2006
WMM	FP	Pyrotechnics/Illumination/Non-Fragments/Tracers	1370 - Pyrotechnics	308	41.02
WMM	HB	HE Bombs	1325 - Bombs and Components	9	5174.01
WMM	HC	HE Cartridges	1305 - Ammunition, through 30mm Includes Components	369	8.44
WMM	HM	HE Guided Missiles	1337 - Guided Missile and Space Vehicle Explosive Propulsion Units, Solid Fuel	106	641.85
WMM	HR	HE Rockets	1340 - Rockets, Rocket Ammunition, and Rocket Components	148	6807.28
WMM	HT	HE Torpedoes	1356 - Torpedoes and Components, Explosive Includes Warheads; Boosters; Detonators	576	13865.80
WMM	HZT	HE Land Mines	1345 - Land Mines	27	40.50
WMM	PD	Propellant Munitions/Components	1377 - Cartridge and Propellant Actuated Devices	2984	55.31
WMM	SF	Fuzes	1390 - Fuzes and Primers	17	0.69
Donor	HXD	Demolition Materials	1375 - Demolition Materials	5362	4373.05
			Totals	**9906**	**31007.94**

Table B-6 Composition of Specific Propellants Thermally Treated at the OD Unit (also included is the RDX detonator)

Component	Constituent*	Mass or Concentration Weight %	WMM/Donor
Rocket motor (5.0 inch)*	Nitrocellulose Nitroglycerin Diphenylamine Potassium Sulfate	11.8 kg 8.2 kg 0.6 kg 0.3 kg	WMM
Rocket motor (2.7 inch)*	Nitrocellulose Nitroglycerin Diphenylamine Potassium Sulfate	2.0 kg 1.5 kg 0.3 kg 50 grams	WMM
Propellant detonator (not always present)	Barium or Potassium Nitrate Lead Styphnate or DDNP Carbon Calcium Silicide	0.45 – 0.60 gram 0.20 – 0.40 gram 0.01 – 0.10 gram 0.10 gram	WMM
C-4 Detonating Charge (a,b) (size varies)	RDX Wax (polyisobutylenetethlhexyl-sebacate)		Donor Charge
Initial detonator cap (a) (for C-4 charge used in detonation)	Lead Styphnate Lead Azide Trinitrophenylmethylnitramine Mercury Fulminate Diazodinitrophenol (DDNP) Tetracene	0.55 – 2.5 gram 0.05 – 0.26 gram 0.1 – 0.2 gram 0.18 – 0.24 gram 0.12 – 0.28 gram 0.18 – 0.24 gram	Donor Charge
Explosive priming cap (b) (for C-4 charge used in detonation)	Potassium Chloride Antimony Sulfide or Lead Thiocyanate Lead Azide, PETN, or DDNP	0.05 – 0.05 gram	Donor Charge

(a) Primer components (oxidant/fuel) are indicated in Table B-2.
(b) Inerts include diphenylamine, potassium sulfate, and wax, and were not considered.
* May contain up to 2.5% Dinitrotoluene, but does not meet listing criteria and is present only as an appendix VIII hazardous constituent.
NOTE: The C-4 charge and its primary charges used for detonation are not wastes, but are serviceable ordnance used to initiate the reaction.

B.2.3 DESCRIPTION OF WASTE MILITARY MUNITIONS AND POINT OF GENERATION

In 1997, the Military Munitions Rule ~~(MR)~~ (MMR), an amendment to the Resource Conservation and Recovery Act (RCRA), was finalized, establishing regulations to identify when conventional and chemical military munitions become hazardous waste subject to RCRA and providing for the safe handling, management, storage, and disposal of WMM. On 1 July 1998 DoD issued its Regulation to ~~Implement~~ the EPA's ~~Military~~ Munitions Rule Implementation Plan (MRIP). Its purpose is to provide direction and establish an overarching policy for the management of WMM among DoD components. To this end, the policy incorporates requirements of the MMR into well-established DoD business practices to keep intact its proven and uniform munitions management systems. A Designated Disposition Authority (DDA) was established and an evaluation process developed. The DDA evaluation process assigns the authority to designate military munitions as waste to the DDA, thereby introducing only two ways a military munitions becomes a WMM:

- Designation by the DDA or
- By rule (i.e., is a waste by definition under the MR).

A formal process is in place that installations follow to determine disposition of military munitions and is outlined in the DoD Policy (1998). The DDA provides instructions to the requesting installation that will include the date the military munitions will be designated as WMM:

- For munitions that automatically became a waste (e.g., buried unused munitions), the date of the action that made them waste will be used.

- For munitions that become a waste upon removal from storage for treatment or disposal, the disposition instructions will state that the military munitions becomes WMM on the date it is removed from storage for treatment or disposal.

- For damaged or deteriorated munitions, the date the DDA determined the item cannot be put into serviceable condition and cannot be recycled or used for other purposes.

- For all other military munitions, the date the DDA determined them to be WMM.

Based on the MR and MRIP, the point of generation of WMM occurs when the military munitions are removed from storage to be transported to the OD Unit for disposal.

All waste that will be treated at the OD Unit will be transported to the treatment area in the original product container or other appropriate packaging. Propellants are contained within chambers that are generally cylindrical in shape and constructed of aluminum and steel. A primary consideration in the development of propellant, explosive, or pyrotechnic systems is long-term storage stability, which requires compatibility of container and the energetic material.

Receipt of the waste in the product container, combined with the fact that commonly used military propellants are compatible with one another, ensures that incompatible wastes are not mixed. The reactive wastes to be treated at the OD Unit are solid in nature and contain no free liquid.

B.2.4 WASTE CHARACTERISTICS

This section addresses the characteristics of the waste that must be known for proper management of the waste. This information is derived from published sources. Analysis to support the published data is not required because of the limited deviation allowed within the product specifications that manufacturers of military propellants must follow. The waste that is treated at the OD Unit has essentially the same composition as serviceable propellants, but is being disposed of because of shelf-life exceedence, deterioration during storage, or failure to complete exhaust during testing of motors.

B 2.4.1 Use of Acceptable Knowledge to Designate Waste Military Munitions

Characterization of hazardous waste is typically accomplished using acceptable knowledge (AK), related technical information, and/or other written documentation (e.g., an excess-explosives worksheet, LDR paperwork, Material Safety Data Sheets [MSDS]), and may be confirmed using the MIDAS or other appropriate databases. Knowledge of process (KOP) or process knowledge (PK) is a subset of AK, which can be used to meet waste analysis requirements. KOP is described in 20.4.1 NMAC §264.13(a)(2) as data developed under 20.4.1 NMAC, Subpart II, Part 261, and existing published or documented data on the hazardous waste or on hazardous waste generated from similar processes. Hazardous waste components and characteristics are known based on existing or published data. Because the munitions filler of the wastes treated are generated during known and documented formulation processes or are of the original manufacturer's chemical composition, complete with MSDSs or equivalent technical information (e.g., information from the MIDAS database), use of KOP fulfills 20.4.1 NMAC §264.13(a)(2) requirements for these wastes.

Detailed chemical and physical analyses have been performed by the DoD for all military ordnance material. These analyses have been compiled into ordnance material specifications and "Technical Supply Bulletins." Due to the vast amount of knowledge on the composition of ordnance materials that has been assembled for each particular ordnance material, and the dangers involved in deactivating a bomb or explosive, samples of the waste ordnance materials are not routinely obtained and chemically analyzed. Instead, a well-defined knowledge of the constituents used in making the ordnance materials has been compiled. This understanding of the waste constituents is presented in lieu of extremely dangerous pre-detonation sampling and analysis. A chemical analysis would not yield additional information and could pose a risk to sampling and analysis personnel

B 2.4.2 Waste Constituents, Physical and Chemical Properties.

The types of military explosives have remained relatively unchanged since 1945; what have changed are the combinations of the explosives to meet current or emerging applications. Table B-2 contains the listing of general chemical compositions of military energetic materials. This

listing was compiled from TM 9-1300-214 *Military Explosives* (US Army, 1984), which provides detailed information on the physical and chemical properties of the military energetic materials. These chemicals are present in waste military munitions/explosives typically treated at the OD Unit. To adequately describe the waste, the following information must be known:

- Presence of free liquids
- Basis for hazard designation
- Waste composition
- Ignition or explosion temperature
- Heat of combustion and/or detonation
- Sensitivity to shock or electrical ignition
- Storage stability (tendency to decompose during storage)
- Compatibility with container or other energetic material
- Solubility characteristics

It must be noted that the unique nature of these materials presents difficulties in development of these data in all instances. In some instances, the parameters are not readily measured because of the instability of the material. For many energetic materials, the particle size, degree of subdivision, compressed density of the material in the ordnance, age, and atmospheric conditions affect the value derived for these parameters. The same material may provide different values for certain parameters for no apparent reason. Thus, the published data presented in this section represent the accepted values for those parameters derived from various tests.

Table B-4 identifies all explosive compounds and other substances that will be used or treated at the OD Unit. As shown in Tables B-2, B-3, and B-4, several explosive materials are used in a variety of combinations to manufacture explosives and propellant devices. All of these explosives are solid materials that do not contain liquids.

The composition of specific propellant devices that have been treated at the OD Unit, and that are expected to require continued treatment, is provided in Tables B-4. Additives to the double-base propellant compositions are also identified in Table B-4. Single-base or composite propellants are not thermally treated at the OD Unit. In addition to the specific formulations for the propellants, Table B-4 identifies the components present in primer compositions or the initial detonating agents associated with these energetic items. The primer is not always treated in conjunction with the propellant. Table B-7 presents data on the physical and chemical characteristics of the constituent used in these propellants. These characteristics describe the characteristics of an explosive chemical. Data on the donor explosive train (that is serviceable ordnance, and not wastes) is also presented in these tables.

Single-base propellants contain nitrocellulose (with 12.5 – 13% N) as the primary constituent. In addition to nitrocellulose, single-base propellants contain organic nitro compounds, stabilizers, and metal salts. The organic nitro compounds commonly employed in single-base systems include trinitrotoluene and dinitrotoluene. Organic nitro compounds are utilized to disperse the nitrocellulose as colloidal particles. Stabilizers are required in the composition due to the tendency of nitrocellulose to decompose during storage, particularly as moisture is absorbed. Decomposition of nitrocellulose is an exothermic reaction that is indicated initially by an acid odor or condition that progresses to emission of red fumes and spontaneous ignition as the

propellant becomes unstable. Due to this condition, nitrocellulose-based propellants are stored in bulk, are vigorously monitored for pH changes, and are compounded with stabilizers used to retard decay. Typical stabilizers used to retard this condition include diphenylamine, nitro diphenylamine, diethyl diphenylurea, and petroleum jelly (cordite). As decomposition proceeds, nitrophenylamines, nitroureas, and nitro anilines are formed. This variety of the analogs will be present in waste single-based propellants. However, as the original concentration of the stabilizer seldom exceeds 1.0%, the concentration of those decomposition products will be in the parts per thousand range.

In addition to nitrocellulose fuel, nitro-based dispersion agent, and stabilizer, certain propellants incorporate small quantities of metal compounds and elements. These compounds include potassium sulfate, tin, and graphite that are not characteristically hazardous.

Double-base propellant formulations include both nitrocellulose and nitroglycerin with limited quantities of stabilizers and additives. Nitroglycerin serves as both the gelatinizing agent and a fuel in these compositions. In addition to the nitroglycerin, small quantities of dibutylphthalate, dibutylphthalate, or triacetin are compounded to enhance colloidal suspension of the nitrocellulose. The stabilizing agents for double-base compositions do not differ from the stabilizers common to single-base systems. However, the metallic additives for double-base systems may include barium or potassium nitrate, calcium sulfate, calcium carbonate, or lead stearate in addition to the metallics used in single-base compositions.

The relative concentration of these components in propellants varies depending upon the intended end use. In general, nitrocellulose is the predominant constituent and is present in concentrations of 50 to 70%. Nitroglycerin is the second largest constituent in the propellant composition. These two compounds constitute greater than 95% of the standard military double-base formulations. The addition of inerts and stabilizers provides the balance to greater than 99% of the formulation, with less than 1.0% of the formulation composed of various nitrates or lead stearate.

Composite propellants consist of ammonium nitrate, an inorganic oxidant such as potassium nitrate, and an organic binder. These propellants are heterogeneous solids that may be press formed to the desired shape. Composite formulations are not handled at the 20,000-Pound OD Unit.

Although the term "colloidal suspension" has been applied to propellants, these compositions are completely solid without free liquids. Physically, propellant compositions consist of powders that are incorporated into solid or warlike binders and pressed into strips, cords, and other linear shapes. Although dry nitrocellulose is unstable, incorporation of the binders renders the mixture relatively stable. Propellants, including double-base formulations, are not sensitive to shock and cannot be ignited by ordinary shock or frictional effects. Propellants are sensitive to electric spark only if the material has been finely divided and is present as dust. Thus, propellants present a fire hazard to the degree that a sufficiently strong heat source is available to ignite the composition. Unless finely divided, ignition usually requires either open flame or detonation of a high explosive placed adjacent to the propellant material.

The composition of commonly utilized single-base and double-base propellants is provided in Table B-3. Specific propellants that have been, and will be thermally treated at the 20,000-Pound OD Unit are discussed in a future section. Nitroglycerin has been discussed previously in conjunction with propellants. In pure form, nitroglycerin is a colorless liquid with a molecular weight of 227 that fuses to the solid state at approximately 13°C. The specific gravity of nitroglycerin is 1.5962, and the liquid viscosity is 36 Centipoises at 20°C. Nitroglycerin decomposes with gas evolution at temperatures of 145°C. The published explosion temperature for nitroglycerin is 222°C, with evolution of approximately 368 Kcal/mol of heat and 715 mL of gas per gram of charge. Nitroglycerin is extremely sensitive to shock, being detonated by a 2 kg weight dropped from a height of 16 cm in the Bureau of Mines reactivity tests. For this reason, nitroglycerin is compounded with other energetics or inerts to facilitate handling. In pure form, it may be absorbed through the skin into the circulatory system and causes increased pulse rate and blood pressure.

Nitrocellulose is a mixture of esters formed by the nitration of cellulose with a mixture of sulfuric and nitric acids. As used in military formulations, nitrocellulose contains a minimum of 12.2% nitrogen. Although nitrocellulose is not truly soluble in any solvent, certain alcohols, ketones, and aromatic nitro compounds will disperse nitrocellulose as a colloidal suspension. Water has no solvent action upon nitrocellulose, but is absorbed to between 2 and 3%, with the resultant deterioration to the unstable form. Cellulose nitrate has a specific gravity of 1.65. The explosive temperature for cellulose nitrate is approximately 230°C with evolution of 661 Kcal/mol of heat upon combustion or 272 Kcal/mol of heat upon detonation that is accompanied by evolution of approximately 700 mL of gas per gram charge. Nitrocellulose is extremely sensitive to spark ignition if handled in dry form. The shock sensitivity of nitrocellulose is greater than that of nitroglycerin and is listed as detonation by a 2 kg weight dropped from a height of 9 cm in the Bureau of Mines test.

Three waste characteristics relevant to proper handling and treatment are not addressed in these tables: (1) the presence of free liquids, (2) compatibility of these wastes with the container, and (3) compatibility with other energetic materials. As previously indicated, the energetic compositions used for these military applications contain no free liquid and consist of finely divided powders or wax-like materials compressed to a variety of shapes. These wastes are managed in the original product container, and the materials of the casing were specifically selected at the time of design to be compatible with the energetic material to ensure longevity during storage. Thus, further consideration of these compatibility concerns is not warranted and is prohibitive because of the dangers inherent in any attempt to re-package these materials. Furthermore, these wastes are not re-packaged or stored at the unit. The energetic formulations that are thermally treated at the OD Unit are mutually compatible as demonstrated by the fact that these materials are often blended together in a single formulation or conjointly packaged in a single device. In addition to their mutual compatibility, the energetic materials are not removed for blending purposes and, therefore, mixing of incompatible wastes does not occur. Although some limited data concerning reactivity toward water and other reagents are provided in this section, the wastes treated at the OD Unit are not mixed with any reagents incidentally or to effect treatment. Such data are provided solely for informational purposes.

B 2.4.3 EPA Waste Codes

Energetic materials are chemical compounds or mixtures of chemical compounds composed primarily of carbon, hydrogen, and nitrogen, and in all cases will be reactive. Various external stimuli, such as a blow, shock, electrostatic, or heat, can cause the release of energy contained in the energetic materials. The sensitivity of the energetic waste to external stimuli is the explosive characteristic of reactivity and is the basis for assigning the EPA Hazardous Waste Code D003. For LDR requirements and to aid in identification of constituents that may reside in the environment, underlying characteristic codes are identified and listed in Table B-4.

B.2.4.4 Treatment Effectiveness

Based on BangBox and full scale field testing, the effectiveness of OD treatment is dependent on a number of factors: type of method, type of energetic, and soil interaction (EPA, 2002). In general, OD treatment exceeds 99 percent destruction and removal efficiency (DRE) for energetics. This DRE is due in part to a secondary combustion in the fireball resulting from the detonation as well as ejected material. The detonation of trinitrotoluene (TNT) results in a DRE of 99.9996 percent with the residue consisting of 2,4-dinitrotoluene and soot. Approximately 2 percent of the OD residue was recovered within 225 m of the detonation site. Energetic materials with a higher oxygen content resulted in higher DREs. That is, molecules that contained most of the oxygen required for complete combustion have higher conversion efficiencies. In general, propellants have higher oxygen balances and resulting conversion efficiencies than explosives. The presence of soil interferes with the flow of ambient air into the fireball region of the detonation for OD.

Open detonation results in 97 percent of the carbon in the explosives being converted to carbon dioxide. Comparison between BangBox and full-scale field test data indicate that the conversion of TNT carbon to carbon dioxide is more efficient under the controlled conditions of the BangBox than in large-scale detonations in the field. Specifically, more volatile organic compounds (VOCs) are generated under field conditions than in BangBox Testing. However, semi volatile organic compound (SVOC) generation appears to be very similar under either BangBox or full-scale testing conditions.

In general, OD will render energetic materials nonreactive. (The Bureau of Mines reactivity test classifies energetic concentrations of 30,000 mg/kg or less as not reactive) and results in both solid and gaseous by-products.

B.2.4.5 Fate and Transport Parameters.

Although the treatment efficiency by OD is high (>99%), the detonation of energetic materials produces a wide range of air and surface pollutants, including carbon monoxide, nitrogen oxides, VOCs, acid gases, and particulate matter. These emissions, including undecomposed or partially decomposed energetic materials, may lead to atmospheric pollution or groundwater contamination. Table B-8 and Table B-9 identify propellant compounds and common nitrogen-based explosives and their breakdown products, respectively. The speciation and amounts of these emitted pollutants depend on the identity and amount of energetic material detonated, the detonation order, the detonation mode (air burst, surface detonation, buried detonation), and the

munitions type (shell, mine, detonation charge, etc.). Solid by-products include casings from the waste and possibly trace concentrations of incompletely oxidized reactive material. Reaction by-products that are solid will be retained in the depression created by the explosive force (except for ejected components), but the gaseous reaction by-products vent to the atmosphere. These solid by-products will be gathered and visually inspected by an EOD expert, who will determine if re-detonation is necessary. The Permittee shall characterize the debris collected after each detonation in accordance with 40 CFR §261, Subpart C. This will be accomplished by sampling and analysis, MSDS review, or generator knowledge. Based on this characterization, the Permittee shall manage the fragments collected in accordance with 40 CFR §261 as applicable to the waste. ~~or if the scrap can be drummed for recycling through the Defense Reutilization and Marketing Office (DRMO) or Government contractor.~~

The term "fate and transport" is, in general, referred to as the outcome of a contaminant in the environment as a result of its potential to be transported, transformed (physically, chemically, or biologically), or accumulated in one or more media. The environmental fate and transport of a contaminant is controlled by the compound's physical and chemical properties and the nature of the media through which the compound is migrating. Specific physicochemical parameters of interest include: 1) molecular weight (g/mole), 2) octanol-water partition coefficient (Kow), 3) water solubility, 4) vapor pressure, 5) Henry's law constant, and 6) molecular diffusivity in air and water. ERDC (2005) completed research to identify available information and to calculate missing information. This information is being developed for use in various military munitions modules for determining fate and transport.

Table B-10 contains chemical and physical properties and partitioning factors commonly used to describe mobility of chemicals through the air, water, and soil. Information contained in this table was derived from various research documents focused on the fate and transport of energetic materials (ERDC/CERL, 2002; 2005). The chemical and physical properties are important for understanding how a chemical moves in the environment. The molecular weight of a compound is measured in g/mole. Generally, the higher the molecular weight, the less soluble in water. Molecular weight also affects the density of a compound. Water solubility is the measurement of the maximum concentration of a chemical that will dissolve in pure water at a specific temperature, measured in mg/L. Water solubility plays a large role in movement and distribution of a chemical through soil and groundwater. The water solubility temperature is the temperature corresponding to the water solubility value. Water solubility is usually defined at 25 ºC. The vapor pressure of a chemical is the pressure exerted by its vapor, at a given temperature, in equilibrium with the pure compound (liquid or solid). Vapor pressure represents the tendency of a compound to evaporate. High vapor pressures (mm Hg) mean that the compound is more likely to volatilize out of solution. The vapor pressure temperature is the temperature corresponding to the vapor pressure value.

Partitioning factors help predict the behavior of a chemical in the environment. The Henry's Law constant is a property of a chemical that expresses its partition between the air and water phases. It helps to predict the behavior of an organic compound in the environment and in remediation procedures such as air stripping processes. These values also describe the movement of a chemical from water to air and vice versa. High values mean that the chemical will move more toward the gas phase whereas low values indicate stronger partitioning into the aqueous phase (atm m^3/mole). The octanol-water partitioning coefficient (Kow) is a ratio of the equilibrium

concentration of a dissolved substance in a system of two immiscible liquids–water and octanol. After a chemical has been mixed in an octanol and water solution, the system is allowed to reach equilibrium. The two phases will partition and a ratio of the concentration of the chemicals in the octanol and water phases is taken. This ratio provides an indication of chemical accumulation in water. More polar compounds will tend to partition into the aqueous phase, thus have a low Kow. This is also a measurement of the hydrophobicity of an organic. The more hydrophobic, the more the contaminant will adsorb to soil or organics or biomass and have a low solubility (mL/mL). The organic carbon partition coefficient (Koc) describes the partitioning of a chemical between the aqueous phase and organic material, such as that present in soil. The Koc is used as a measure of the tendency for organics to be adsorbed by soil. It is largely independent of soil properties (mL/g).

Energetic compounds in propellant mixtures and explosives exhibit a range of aqueous solubilities (Table B-10). Oxidizers generally are nitramine compounds or inorganic salts that have high aqueous solubilities measured in the parts-per-thousand range (grams per liter, g/L). Stabilizers are aliphatic nitramines that have low to moderate aqueous solubility, in the parts-per-million range (milligrams per liter, mg/L). Burning-rate modifiers cited here are lead-substituted aromatic and aliphatic compounds which are sparingly soluble. Plasticizer and binder compositions are diverse, including the phthalates (aromatic carboxylic acids), and alcohols that contain nitrogen (EGDN, nitroglycerin). Most plasticizers are moderately water-soluble.

Sorption processes involve the association of a solute with a solid at the solid-solution interface. The specific reaction and the rate at which it occurs depend on the nature of the molecule in solution (hydrophobic or hydrophilic; ionic or neutral) and the nature of the surface (organic, mineral, oxide).

Vapor pressure and the Henry's law constant are two parameters to quantify the volatility of a compound. The pressure of a gas in equilibrium with pure liquid at a known temperature is its vapor pressure. The Henry's law constant for a compound is the ratio of dissolved gas concentration (solution) divided by gas partial pressure (vapor). Greater volatility from dry surfaces is suggested by larger vapor pressure values. More extensive partitioning from water or moist soil to gas is indicated by greater Henry's law constant values. Compounds that are volatile have a greater likelihood of photochemical reactions, which will be discussed in the following section. Literature values for vapor pressure and Henry's law constant are listed in Table B-10.

Volatilization from dry surfaces is an important transport pathway for the following compounds: nitro guanidine, EGDN, and nitroglycerin. Volatility is indicated by large vapor pressures generally greater than 10^{-3} torr (equal to 10^{-3} mm Hg at 0 ºC, or 0.13328 Pascals (SI), or 1.3168 x 10^{-6} atmospheres). Significant partitioning to the atmosphere is indicated by larger Henry's law constants (greater than 10^{-6} atm•m^2/mol). Partitioning from water or moist soil surfaces to air is an important transport pathway for EGDN, and nitroglycerin.

Photochemical transformations may be one of the most important influences on propellant fate in surface and ground water environments. Many energetic compounds are photosensitive, with absorption maxima in the UV-visible range (240 to 290 nm). Products of photochemical transformations of energetic compounds in aqueous solution can be pink or black in color. The

US Army has been developing data on the environmental fate and transport of energetic materials (Brannon and Pennington, 2002; Mirecki et.al. 2006)

Microbe-mediated transformation reactions can reduce some energetic compound concentrations in soil and subsurface environments. Microbes facilitate electron transfer reactions between carbon-rich electron donors and electron acceptors such as oxygen, nitrate, sulfate, or ferric iron to obtain energy. Some energetic compounds can serve as carbon-rich substrates, or are co-metabolized with other carbon molecules in the environment. Microbe-mediated transformation reactions can occur in virtually all environments, though the specific reaction mechanism and microbial population affecting the reactions will vary. Extensive research is currently on-going to better understand the various transformation pathways of military munitions in the environment (Mirecki et.al. 2006).

Table B-7 Characteristics of Constituents in Propellants or Explosives Thermally Treated at the OD Unit

	Explosion Temperature (°C)	Heat of Detonation	Heat of Combustion (Kcal/mol)	Gas Volume on Detonating	Impact Sensitivity (cm)	Spark Sensitivity	Storage Stability	Solubility (mg/L)
Nitrocellulose	230	272	661	700	9	High	Hydrolysis	Insoluble Hygroscopic (3%)
Nitroglycerin	222	337	368	715	16	Moderate	Stable	1600
RDX	260	285	507	908	32	Moderate	Stable	50
PETN	215	439	600	790	17	Sensitive	Stable	Unknown
Lead Azide	340	106	183	0.3308	10	Sensitive	Stable	500
Lead Styphnate	282	15213	585	368	17	Sensitive	Stable	1000
Tetryl	257	324	839	760	26	Sensitive	Stable	75
Mercury Fulminate	210	122	267	243	5	Sensitive	Stable	700
DDNP	195	172	681	865	10	Sensitive	Stable	Insoluble
Barium Nitrate	NA	NA	NA	NA	NA	NA	Stable	8.7×10^4
Potassium Nitrate	NA	NA	NA	NA	NA	NA	Stable	1.3×10^4
Potassium Chlorate	NA	NA	NA	NA	NA	NA	Stable	7.1×10^4
Antimony Sulfide	NA	NA	NA	NA	NA	NA	Stable	1.7
Lead Thiocyanate	NA	NA	NA	NA	NA	NA	Stable	500

Table B- 8: Propellant compounds and their transformation products. (Propellant compounds in bold text, transformation products in normal text) (ERDC/CERL, 2006).

Compound	CAS Registry Number	Acronym
Oxidizers and their Transformation Products		
Nitroguanidine	556-88-7	NQ
Cyanamide	420-04-2	
Guanidine (as hydrochloride)	50-01-1	
Melamine	108-78-1	
n-Nitrosoguanidine	674-81-7	
Ammonium perchlorate	7790-98-9	
Potassium chlorate	3811-04-9	
Potassium perchlorate	7778-74-7	
Stabilizers and their Transformation Products		
Diphenylamine	122-39-4	DPA
N -Nitrosodiphenylamine	86-30-6	NNODPA
2,4-Dinitrodiphenylamine	961-68-2	2,4DNDPA
2-Nitrodiphenylamine	119-75-5	2NDPA
4-Nitrodiphenylamine	836-30-6	4NDPA
Methyl centralite, 1,3-dimethyl-1,3-diphenylurea	611-92-7	
Ethyl centralite 1,3-diethyl-1,3-diphenylurea	85-98-3	
Burning-Rate Modifiers		
Lead salicylate	15748-73-9	
Lead resorcylate	20936-32-7	
Lead stearate	7428-48-0	
Plasticizers		
Dimethyl phthalate	131-11-3	DMP
Diethyl phthalate	84-66-2	DEP
Di-n-butyl phthalate	84-74-2	DNBP
Butylbenzyl phthalate	85-68-7	BBP
Bis(2-ethylhexyl)phthalate	117-81-7	DEHP
Energetic Plasticizers and Binders		
2,4-Dinitrotoluene	121-14-2	2,4DNT
Diethylene glycol dinitrate	693-21-0	DEGDN
Ethylene glycol dinitrate	628-96-6	EGDN
Nitrocellulose	9004-70-0	NC
Nitroglycerin	55-63-0	NG
Note: Shaded cells indicated “no data		.”

Table B- 9: Common Nitrogen-Based Explosives, Co-Contaminants, and Breakdown Products (US Army, 1984).

Compound	Description	Abbreviation	CAS Number
Octahydro-1, 3, 5, 7-tetranitro-1,3,5,7-tetrazocine	Nitramine explosive; also RDX co contaminant	HMX	2691-41-0
Hexahydro-1,3,5-trinitro-1,3,5- triazine	Nitramine explosive; also HMX co contaminant	RDX	121-82-4
1,3,5-Trinitrobenzene	TNT co-contaminant and breakdown product	1,3,5-TNB	99-35-4
1,3-Dinitrobenzene	DNT breakdown product and TNT co contaminant	1,3-DNB	99-65-0
Methyl-2,4,6- trinitrophenylnitramine	Nitramine explosive	Tetryl	479-45-8
Nitrobenzene	DNT co-contaminant	NB	98-95-3
2,4,6-Trinitrotoluene	Nitroaromatic explosive	2,4,6-TNT	118-96-7
4-Amino-2,6-dinitrotoluene	TNT breakdown product	4-Am-DNT	1946-51-0
2-Amino-4,6-dinitrotoluene	TNT breakdown product	2-Am-DNT	355-72-78-2
2,4-Dinitrotoluene	Nitroaromatic explosive/ propellant; also TNT co-contaminant	2,4-DNT	121-14-2
2,6-Dinitrotoluene	Nitroaromatic explosive/ propellant, also TNT co-contaminant	2,6-DNT	606-20-2
2-Nitrotoluene (o-Nitro toluene)	DNT co-contaminant	2-NT	88-72-2
3-Nitrotoluene (m-Nitro toluene)	DNT co-contaminant	3-NT	99-08-1
4-Nitrotoluene (p-Nitro toluene)	DNT co-contaminant	4-NT	99-99-0
Nitroglycerine	Nitrate ester explosive/propellant	NG	55-63-0

Table B- 10: Physical and Chemical Properties of Military Munitions of Concern (ERDC/CERL, 2005)

Constituent	CAS Number	Molecular Weight (g)	Melting Point Deg C	Boiling Point Deg C	Vapor Pressure		Henry's Law Constant (H) atm m^3 /mole	Water Solubility		Log Kow	Log Koc
					mm Hg	Temp Deg C		mg/L	Temp Deg C		
1,3,5-TNB	99-35-4	213.11	122.5	315	3.20E-06	20	[3.08E-9]	340	20	1.1	[104; 178]
1,3-DNB	99-65-0	168.11	89-90	302.6	2.00E-04	25	4.90E-08	533	25	1.49	[150]
2,4,6-TNT	118-96-7	227.18	80.1	240 (explodes)	1.99E-04	20	4.57E-07	130	20	1.6	1600
2,4-DNT	121-14-2	182.14	71	300	1.47E-04	22	1.30E-07	270	22	1.98	[360]
2,6-DNT	606-20-2	182.14	66	285	5.67E-04	25	9.26E-08	180	20	2.1	19 ; 72
EGDN	628-96-6							5.2 - 5.6	25		
HMX	2691-41-0	296.2	276-287	NR	3.33E-14	25	2.60E-15	6.63	20	0.26 ; .06	0.54
Nitrobenzene	98-95-3	123.11	5.7	210.8	0.245	25	2.40E-05	1.80E +03	25	1.85	30-6 - 370
Nitrocellulose NC	9004-70-0							immiscible			

Constituent	CAS Number	Molecular Weight (g)	Melting Point Deg C	Boiling Point Deg C	Vapor Pressure		Henry's Law Constant (H) atm m^3 /mole	Water Solubility		Log Kow	Log Koc
					mm Hg	Temp Deg C		mg/L	Temp Deg C		
Nitroglycerin NG	55-63-0	227.09	2.8-13.5	218 (explodes)	2.00E-04	20	[4.30E-08]	1800	25	1.62	180
Nitroguanidine NQ	556-88-7				3.00E-02	25	4.50E-12	Slightly soluble		-0.83	
PETN	78-11-5	316.15	140	180	1.04E-10	25	[1.20E-11]	43	25	1.61	179-1720
RDX	121-82-4	222.26	205-206	decomposes	4.10E-09	NR	[6.30E-08]	59.8	25	0.87	42-167
Tetryl	479-45-8	287.5	130-132	187 (explodes)	4.00E-10	20	[1.00E-11]	75	20	2.4	[406]

Value in brackets reported as estimated; NR = Not Reported; shaded block indicates data not available

B.3 SELECTION OF WASTE ANALYSIS PARAMETERS

This section addresses the parameters of concern for WMM that will be treated at the OD Unit. The rationale for the selection of these parameters, sampling methods, analytical protocols, and frequency of analysis are described. Parameters and rationale for characterization of waste are discussed below in sections that cover pre-detonation and post detonation, respectively.

HAFB has never been used for the research and development of nuclear, chemical warfare, or other exotic warfare types of weapons. The OD Unit is used solely for the disposal/treatment of conventional waste-ordnance, munitions, incendiaries, propellants, and rocket motors. The only munitions delivered or disposed of at HAFB have been conventional live and training munitions. Therefore, the chemical components and combustion by-products are consistent with typical materials for military munitions items; thus, the emphasis of sampling and analysis for the 20,000-Pound OD Unit will be to search only for the constituents present in these types of wastes.

Because combustion products may be present as residues in the treatment unit or ejected soils, the collection and analysis of samples are required to characterize contaminants and determine the concentrations of compounds in the OD Unit and surrounding media. The nature of the treatment by-products is dependent upon the category of device from which the waste is derived. Propellant constituents will be converted largely to the gaseous products CO_2, CO, H_2O, N_2, and, to some degree, NO_x. Some extremely limited possibility exists that these materials may fail to entirely decompose. Tables B-8 and B-9 identify these compounds.

The nitrate oxidant from primers or detonators will convert to sodium or potassium nitrite ($NaNO_2$, KNO_2). Other oxidants are converted to the oxide. Fuels such as antimony sulfide or thiocyanate are converted to the oxide or sulfate.

The SAP outlined in Permit Attachment H focuses on solid reaction products because of the hazards associated with plume sampling in the vicinity of the treatment zone.

B.3.1 PARAMETERS AND RATIONALE (PRE-DETONATION)

Only WMM will be treated at the OD Unit. This designation is made by DDA. All waste munitions treated at the OD Unit are standard military end items with well-defined physical and chemical characteristics.

Waste analysis will not be performed prior to the treatment of these wastes due to the nature of the waste stream; rather AK will be used. Section B.2.3.1 provides justification for using AK.

Sampling waste energetic items prior to treatment would greatly increase the potential for accidental detonation, with resultant property damage and personal injury, that such efforts are not warranted. The containers that hold these energetic materials (product or waste) are sealed in accordance with exceedingly specific manufacturing specifications designed to prolong storage stability and reduce the potential for unplanned detonation or ignition from impact. For example, nitrocellulose propellant mixtures are hygroscopic to 3 to 4 weight percent if exposed to moist air. The hydrolysis that accompanies exposure of nitrocellulose to air (even at low relative

humidity values) renders the material unstable, and evolution of NO_2, or auto combustion occurs. Dismantling of the devices (that would be required for sampling) not only increases hazard by exposure of material but also increases the potential for detonation due to the friction and shock sensitivity of the materials.

Additionally, the composition of these materials is well defined on the basis of published literature and tightly controlled manufacturing specifications. Thus, these materials are analogous to pure discarded commercial products for which sampling would only prove redundant. Prior to treatment of any waste not specifically identified in earlier pages, a complete listing of all ingredients common to that energetic item will be obtained to determine its suitability for treatment in the OD Unit.

The use and handling of these materials is tightly controlled and the device is sealed; therefore, the possibility of mixing unspecified items with the energetic materials does not exist. No other wastes are treated in conjunction with these devices in the OD Unit because joint treatment is specifically prohibited by Technical Orders.

B.3.2 PARAMETERS AND RATIONALE (POST DETONATION)

This section will identify sources of typical munitions constituents and identify analytical methods for detection of these constituents. The purpose of this section is to justify the parameters selected for analysis and provide summary tables of EPA methods and analytes. Detailed sampling and analysis procedures are covered in Attachments G (Closure Plans), H (SAP for soil) and I (environmental protection).

Post treatment analysis of residuals presents less risk to sampling and analytical personnel than attempts to perform predetonation sampling because successful treatment renders the waste non-reactive. Thermal treatment of propellants converts the alkoxynitrates to gaseous products. However, because it is technically impractical to sample evolved gas in the treatment zone, the focus of this plan is the solid residuals that may remain in the pit. This sampling will provide information on the nature and extent of chemical contamination. Permit Attachment H contains a detailed SAP that covers all aspects of post-detonation waste sampling at the OD Unit. Specific topics covered in the SAP include sampling approach and rationale, sampling procedures and methodology, health and safety procedures, sample handling and chain of custody (COC), sample documentation, laboratory procedures, quality assurance/quality control (QA/QC), and data evaluation methods.

B.3.3 PARAMETERS RECOMMENDED FOR ANALYSIS (POST DETONATION)

OD is a thermal treatment process used to remove the hazard characteristic of reactivity. This treatment technology, know as Deactivation, removes the reactivity characteristic of the explosive material by decomposition during the exothermic, supersonic reaction. The most conclusive means of measuring the effectiveness of OD thermal treatment is through a periodic sampling program that can be applied to all potentially affected media. A sampling and analysis program is capable of determining whether any media have been adversely impacted by treatment operations. Potential contaminants in the various media may contain energetic materials and their breakdown products of the PEP treated at the OD Unit and listed in Tables B-

8 and B-9. Metals are found in all military munitions and perchlorates are in solid fuel rockets, mines, torpedo warheads, and fuzes. Based on the PEP treated at the OD Unit, the potential contaminants that will be selected for analysis are listed in Table B-11.

Table B – 11: Parameters Selected for Analysis and Rationale

TEST METHOD	PARAMETERS	CONSTITUENTS	CAS	RATIONALE
	METALS			Metals are found in all military munitions. Certain munitions only contain metals (i.e., incendiaries).
SW6010B		Antimony	7440-36-0	constituent in fuels for propellants
SW6010B		Arsenic	7440-38-2	
SW6010B		Barium	7440-39-3	constituent in oxidizer in propellants
SW6010B		Beryllium	7440-41-7	
SW6010B		Cadmium	7440-43-9	
SW6010B		Chromium	7440-47-3	
SW6010B		Copper	7440-50-8	constituent in rocket propellant
SW6010B		Lead	7439-92-1	constituent of primary explosive
SW6010B		Nickel	7440-02-0	
SW6010B		Selenium	7782-49-2	
SW6010B		Silver	7440-22-4	
SW7471A		Mercury	7439-97-6	constituent of primary explosive
SW6860	PERCHLORATES			DoD munitions, munitions components, and training devices that may have contained perchlorate include the following: Solid fuel rockets, mines, torpedo warheads, smoke-generating compounds, signal flares, parachute flares, thermite type incendiaries, incendiary bombs, fuzes, jet-assisted takeoff devices.
		Ammonium Perchlorate	7790-98-9	
		Potassium Perchlorate	7778-74-7	
SW8095	ENERGETICS			Explosives used in Military Munitions
		1,3,5-TNB	99-35-4	
		1,3-DNB	99-65-0	
		2,4,6-TNT	118-96-7	
		2,4-DNT	121-14-2	
		2,6-DNT	606-20-2	
		2-NT	88-72-2	
		3-NT	99-08-1	
		EGDN	628-96-6	
		HMX	2691-41-0	
		Nitrocellulose NC	9004-70-0	
		Nitroglycerin NG	55-63-0	
		Nitroguanidine NQ	556-88-7	
		PETN	78-11-5	
		RDX	121-82-4	

TEST METHOD	PARAMETERS	CONSTITUENTS	CAS	RATIONALE
		Tetryl	479-45-8	
SW7580	PHOSPHOROUS	White Phosphorus WP	7723-14-0	Used in smoke rounds.

B.4 SUMMARY OF ANALYTICAL METHODS AND SAMPLING FREQUENCY

All waste streams treated at the OD Unit are energetic materials that have been manufactured in accordance with military specifications and strict manufacturing requirements. As such, these waste streams consist of PEP materials that are known. Therefore, as discussed above, no pre-treatment analyses will be performed on the energetic waste streams treated at OD Unit. The nature of OD treatment allows for the complete destruction of the energetic materials. The Permittee shall characterize the debris collected after each detonation in accordance with 40 CFR §261, Subpart C. This will be accomplished by sampling and analysis, MSDS review, or generator knowledge. Based on this characterization, the Permittee shall manage the fragments collected in accordance with 40 CFR §261 as applicable to the waste. ~~leaving only waste metal fragments which are collected and recycled through the DRMO. Therefore, no sampling of this material is proposed to be conducted. Soil sampling and analysis will be conducted to demonstrate treatment effectiveness and compliance with soil environmental performance standards.~~

Samples of the solid residuals and underlying soils will be prepared and analyzed according to protocols from the current edition of the EPA Publication SW-846, *Test Methods for Evaluating Solid Waste, Physical and Chemical Methods*. Samples will be analyzed for all toxic metals including priority pollutant metals (listed at 20.4.1.500 NMAC Part 264 Appendix IX), explosive residues, and soil moisture. Permit Attachment H, Sampling and Analysis Plan, contains the specific test methods and lists of analytes that will be measured, as well as the rationale for their selection. In addition, details of laboratory protocols and quality assurance/quality control procedures are also discussed in the SAP, Attachment H.

B.4.1 RECOMMENDED ANALYTES AND METHODS

All analytical tests are performed by an EPA certified laboratory and are conducted in accordance with the protocol found in the most recent edition of EPA SW-846. As new methods are developed and become available, they will be used accordingly.

White Phosphorous (WP) (CAS 7723-14-0, P_4) reacts with air and requires special handling for sampling and analysis. Fixed laboratory tests for WP are all based on gas chromatography. The only published method for WP is SW7580, a GC method with a nitrogen-phosphorus detector (NPD). A Gas Chromatography/Mass Spectrometry (GC/MS) method is also available, but is not published. Due to increased regulation of WP by the Drug Enforcement Agency, the standard is currently unavailable. Therefore, analytical capabilities for this compound are very limited. The following tables summarize tests available for the other chemical selected for analysis.

Table B-12. Laboratory Tests for Metals

Method Number	Title
SW6010B	Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)
SW6020	Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)
SW7000 series	Individual Metals by GFAA
SW7470A/SW7471A	Mercury by Cold Vapor Atomic Absorption (CVAA)

Table B -13 Perchlorate Laboratory Test

Method (Technique)	Applicability	Reporting Limits
SW6860 (IC/MS or IC/MS/MS)	1) Aqueous samples, to include those with high TDS	0.01 µg/L for water; (by IC/MS/MS)
	2) Soil and sludge samples	0.1µg/kg for soil (by IC/MS/MS)

Table B-14. Fixed Laboratory Tests for Nitrogen-Based Explosives, Co-Contaminants, and Breakdown Products

Method No.	Title
SW8330A	Nitro aromatics and Nitramines by High Performance Liquid Chromatography (HPLC)
SW8332	Nitroglycerine by HPLC
SW8095	Explosives by Gas Chromatography (GC)
SW8321A [1)]	Explosives by HPLC/Mass Spectrometry (MS)
EPA 529	Determination of Explosives and Related Compounds in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS)
(1) This method is typically cited for HPLC/MS of explosives. However, no published version includes explosives	

B.4.2 SAMPLING METHODS

Samples will be collected using appropriate sampling equipment, as recommended in SW-846 or other approved sampling guidance. Specific sampling requirements are provided in Attachments G (Closure Plans), H (SAP for soil) and I (environmental protection). Disposable field equipment will be used where practical to eliminate the potential for cross-contamination. Therefore, maintaining and decontaminating the field equipment for these activities will not be necessary. The sample size will be determined by the amount required for the analytical method(s). Sample containers are immediately sealed after sample collection. Sample seals are used to preserve the integrity of the samples from the time they are collected until they are opened in the laboratory.

All required information is recorded on the sample bottle and COC record including the preservation method and maximum holding time. All sample labels will be marked with the following information using indelible ink: name of the sampler, date and time of collection,

sample collection location, and sample identifier that uniquely identifies the sample. The COC record, at a minimum, includes the following information:

- Sample collection location
- Date and time of collection
- Sample type (grab or composite)
- Sample description (media type)
- Analyses to be performed
- Signatures of the personnel involved in the custody of the samples

The samples will be collected in clean containers and preserved, as appropriate, to ensure that their integrity remains intact during transport to the analytical laboratory. Container types, preservation techniques, and holding times for the potential analyte of interest are provided in Attachments G (Closure Plans), H (SAP for soil), and I (environmental protection)

Samples will be delivered to the laboratory as soon as practical. The COC record accompanies the samples. Samples are properly packaged to avoid leakage or breakage during shipment. Sampling devices and containers are cleaned before use. All used non-disposable containers and samplers are washed with warm detergent solution, rinsed at least three times with tap water, rinsed with distilled water, and air dried or wiped dry. All clean samplers, containers, etc., are placed in clean plastic bags and sealed. The cleaned and packaged equipment is stored in an appropriate area away from all new sampling equipment.

B.4.3 FREQUENCY OF SAMPLING

Samples of the treatment residuals and underlying soils will be taken annually to demonstrate the effectiveness of the treatment and to ensure that hazardous wastes are not present. This frequency was selected to ensure effectiveness of treatment. The sampling methodology used to collect representative samples, is explained in detail in the sampling methodologies contained in Attachments G (Closure Plans), H (SAP for soil), and I (environmental protection)

All samples will be compared to the Universal Treatment Standards (UTS) (20.4.1 NMAC §268.48) to ensure conformance with the Land Disposal Restrictions (20.4.1 NMAC Part 268). Non-conforming wastes will receive further treatment prior to disposal.

B.5 WASTE RE-EVALUATION

As stated in Section B.3.1, only WMM will be treated at the OD Unit. This designation is made by DDA. All waste munitions treated at the OD Unit are standard military end items with well-defined physical and chemical characteristics. Acceptable waste is detailed in Section B.1.3. A re-evaluation of waste characterization data will be conducted, as necessary, to ensure that the data are current and up to date, in accordance with 20.4.1 NMAC §264.13(a) (3). Updates of waste characterization information are required when:

- A change occurs in the process or operation generating the hazardous waste
- The hazardous waste received from an off-site facility does not match the waste specified on the accompanying manifest or shipping paper

Waste characterization data (e.g., KOP) for the wastes treated at the OD Unit will be reevaluated annually. This information will be used to determine the appropriateness of current waste management practices and characterization methods.

B.6 SPECIAL PROCEDURE REQUIREMENT

Procedures for receiving wastes generated off site and for managing ignitable and reactive wastes are summarized below. In addition, provisions for ensuring compliance with LDR requirements are presented in this section.

B.6.1 PROCEDURES FOR RECEIVING WASTES GENERATED OFF SITE

HAFB does not accept waste from off-site for treatment at the OD Unit.

B.6.2 PROCEDURES FOR IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTES

Hazardous wastes that exhibit the characteristic of reactivity (D003) are treated at the OD Unit. Incompatible wastes are not managed at the Unit.

B.6.3 PROVISIONS FOR COMPLYING WITH LDR REQUIREMENTS

There are special waste analysis requirements under the LDR program for hazardous waste generators and treatment facilities. Generators of hazardous waste must determine if the waste, at the point of generation, must be treated before it can be land disposed; this determination can be made either by testing the waste or using KOP. Generally, hazardous wastes must meet applicable treatment standards prior to land disposal. These treatment standards are expressed in two ways:

- As constituent concentrations in the waste, either as an extract of the waste (as determined by the Toxicity Characteristic Leaching Procedure (TCLP), or as total waste analysis, or
- As specified treatment technologies.

Wastes that have concentration-based treatment standards must be evaluated to determine if applicable constituent concentration levels have been attained. This can be accomplished by testing the waste, or applying knowledge of the process or materials used to produce the waste (generators only). The TCLP method is generally used to evaluate whether treatment standards expressed as concentrations in the waste extract are met, and total waste analysis methods are used to evaluate whether treatment standards based on total waste concentrations are met. Characteristic wastes that have treatment standards expressed as specified technologies in 20.4.1 NMAC §268.40 must also meet the UTS in 20.4.1 NMAC §268.48 prior to land disposal. Special rules regarding wastes that exhibit a characteristic are also presented in 20.4.1 NMAC

§268.9. In 20.4.1 NMAC §268.9(c), it states that no prohibited waste that exhibits a characteristic under 20.4.1 NMAC, Chapter 2, Part 261, Subpart C may be land disposed unless the waste complies with the treatment standards under 20.4.1 NMAC, Chapter 8, Part 268, Subpart D. In addition, for wastes that exhibit a hazardous characteristic, the generator must determine the underlying hazardous constituents (UHCs), as required in 20.4.1 NMAC §268.9(a). The UHC are reported in Table B-4.

For the reactive hazardous wastes treated at the OD Unit, the specified treatment technology in 20.4.1 NMAC §268.40 is DEACT (deactivation). Deactivation is accomplished by treatment in the OD Unit, which removes the hazardous characteristics of reactivity. OD is not considered by EPA as a method constituting land disposal, and they concluded that the LDR program is not applicable to OD (51 *Federal Register* 40580). OD is a treatments that satisfies the LDR treatment standard for DEACT, but the process itself is not land disposal. Only the remaining residue, if any, resulting from treatment by OD is subject to LDR.

B.7 GLOSSARY

Amatol is a mixture of ammonium nitrate and TNT that is commonly used as a substitute for TNT in bursting charges. The most common mixture of amatol is 80/20 (80% ammonium nitrate and 20% TNT). Because of its ammonium nitrate content, Amatol is highly hygroscopic and must be kept in a waterproof container.

Ammonal is an explosive made up of ammonium nitrate, trinitrotoluene, and aluminum powder mixed in a ratio of roughly 22:67:11. The ammonium nitrate functions as an oxidizer and aluminum as a power enhancer. The mixture is highly hygroscopic. Ammonal burns vigorously when open to the air, but detonates when confined inside some form of casing.

Ammonium nitrate is the least sensitive of military explosives and must be initiated by a booster charge to ensure successful detonation. Ammonium nitrate is commonly used in composite explosives where it is combined with a more sensitive explosive. Ammonium nitrate is highly hygroscopic (readily absorbs moisture) and must be kept in a waterproof container.

Ant materiel is designed to cause deterioration of or damage to selected materiel.

Antipersonnel means designed to kill, wound, or obstruct personnel.

Antitank means designed to be used against tanks.

Arming device is a device designed to perform the electrical and/or mechanical alignment necessary to initiate an explosive train.

Auxiliary or booster explosives are used to increase the flame or shock of the initiating explosive to ensure that the burster charge performs properly. High explosives used as auxiliary explosives are less sensitive than those used in initiators, primers, and detonators, but are more sensitive than those used as filler charges or bursting explosives.

Ballistite is a double-base powder used as a rocket propellant. It is composed of two explosive substances, nitrocellulose and nitroglycerin, blended together with diphenylamine, which acts as a stabilizer. It burns with a considerable amount of flash and smoke, and generates a great volume of gas. Ballistite burns progressively, but at a rate dependent upon the composition and physical characteristics of the powder grain, the temperature of the powder grain before ignition and the pressure during reaction. It is produced in various shapes to fit the rocket motor housing.

Baratol is a slow explosive and is composed of barium nitrate and TNT. TNT is typically 25-33% of the mixture with 1% wax as a binder. The high density of barium nitrate gives baratol a density of at least 2.5.

Black powder is the oldest known explosive material. It is a composite material made from saltpeter (potassium nitrate), charcoal, and sulfur. It is a lower powered explosive and is commonly used in time fuses, igniters, and detonators.

Bombs range in weight from 1 to 3,000 pounds and in length from 3 to 10 feet. Generally, all bombs have the same components--a metal container, a fuze, and a stabilizing device. The metal container, or bomb body, holds the explosive or chemical filler and may consist of one piece or multiple pieces. Bombs use either mechanical or electrical fuzes, typically located in the nose or tail section, either internally or externally. Mechanical fuzes are generally armed by some type of arming vane. The arming vane operates like a propeller to line up all the fuze parts and thus arm the fuze. The fuzes may be configured as impact, proximity, or delay fuzes. Bombs are stabilized during flight by fin or parachute assemblies attached to the rear section of the bomb. These assemblies often detach from the bomb after impact.

Brisance is the speed at which the explosive develops its maximum pressure.

Bursting explosives, burster charges, or fillers - Bursting explosives, burster charges, or fillers are high explosive charges that are used alone or as part of the explosive charge in mines, bombs, missiles, and projectiles.

Caliber is the diameter of a projectile or the diameter of the bore of a gun or launching tube. Caliber is usually expressed in millimeters or inches.

Casing is the fabricated outer part of ordnance designed to hold an explosive charge and the mechanism required to fire this charge.

Composition A is a wax-coated, granular explosive consisting of RDX and plasticizing wax. Composition A is used by the military in land mines and 2.75 and 5 inch rockets. Composition A-3 explosives are made from RDX and wax. Composition A-3 is a wax-coated, granular explosive, consisting of 91% RDX and 9% desensitizing wax. Composition A-3 is not melted or cast. It is pressed into projectiles. It is no hygroscopic and possesses satisfactory stowage properties. Composition A-3 may be white or buff, depending upon the color of the wax used to coat the powdered RDX. Composition A-3 is used as a filler in projectiles that contain a small burster cavity, such as antiaircraft projectiles. It can be used as compressed fillers for medium-caliber projectiles.

Composition B is a composite explosive containing 60% RDX and 39% TNT, and is wax. Because of the high RDX content, Composition B is more sensitive than TNT and is primarily used as the main charge in shaped charges.

Composition B-4 is a composite explosive that is very similar to Composition B with 60% RDX, 39.5% TNT, and 0.5% calcium sulfate. This explosive is used in newer shaped charges and bangalore torpedoes.

Composition C-4 is a composite explosive containing 91% RDX and 9% nonexplosive plasticizers. Composition C-4 is very stable over a wide range of temperatures and is only slightly water soluble. This explosive is used mainly as a bursting charge.

Composition C-3 is a composite explosive containing 91% RDX and 9% wax. The wax coats the RDX particles and acts as a desensitizer, as well as a binder material. Composition C-3 is used as a booster charge in newer charges and torpedoes, as well as in high explosive plastic projectiles.

Cyclotrimethylene trinitramine (RDX) is very sensitive and, like PETN, is one of the most powerful of military explosives. It is often used alone as the base charge in M6 (electric) and M7 (non-electric) blasting caps. RDX can also be desensitized and used for sub-boosters, boosters, bursting charges, and demolition charges. RDX is commonly used in the manufacture of Composition A, B, and C explosives.

dBX is a specially formulated, high density, high energy, detonator sensitive seismic explosive designed exclusively to meet the rigid requirements and environmental extremes associated with geophysical exploration.

Designated Disposition Authority (DDA): The only personnel in the DoD authorized to declare unused military munitions as WMM except in the case of an explosives or munitions emergency, abandoned munitions, or a declaration by the Authorized Military Official (AMO). Each Service has at least one DDA and may elect to have more (e.g., a DDA for a particular program or command). The single manager for conventional ammunition (SMCA) is the single DDA at the DoD level. DDAs are responsible for evaluating munitions that are excess to current requirements or otherwise no longer part of the active inventory for safety; other uses; resource, recovery, and recycling (R3) possibilities; and treatment.

Delay fuze is any impact fuze incorporating a means of delaying its action after contact with the target. Delay fuzes are classified by the length of time of the delay.

Diazodinitrophenol (2-Diazo-4,6-dinitrophenol, DDNP, or Dinol) is widely used as an initiating charge in detonators and caps. DDNP is a yellowish brown powder. It is soluble in acetic acid, acetone, strong hydrochloric acid, and most of the solvents but is insoluble in water. DDNP may be desensitized by immersing it in water, as it does not react in water at normal temperature. DDNP is used with other materials to form priming mixtures, particularly where a high sensitivity to flame or heat is desired. DDNP is often used as an initiating explosive in propellant primer devices.

Dispenser is an item designed to be mounted, but not permanently fixed, on aircraft to carry and eject small ordnance.

Explosive D (Ammonium picrate) is used as a bursting charge for armor-piercing shells and in other types of projectiles that must withstand severe shock and stress before detonating.

Explosive is a substance or mixture of substances that can undergo a rapid chemical change generating large quantities of energy generally accompanied by hot gases.

Fragmentation is the term applied to military munitions indicating that it is primarily intended to produce a fragmentation effect. Also, the breaking up of the confining material of a chemical compound or mechanical mixture when an explosion occurs. Fragments may be complete items, subassemblies, or pieces thereof, or pieces of equipment or buildings containing the items.

Fuze has two definitions: 1. A device with explosive components designed to initiate a train of fire or detonation in ordnance. 2. A nonexplosive device designed to initiate an explosion in ordnance.

Gradiometer is a magnetometer for measuring the rate of change of a magnetic field.

Ground penetrating radar (GPR) is a system that uses pulsed radio waves to penetrate the ground and measure the distance and direction of subsurface targets through radio waves that are reflected back to the system.

Guncotton is a nitrocellulose of high nitrogen content that is employed extensively in the manufacture of single-base propellants. It is also used in electric primers and in electrically initiated detonators. In most propellants, guncotton is blended with pyrocellulose where an increase in nitrogen content is desired. It is sometimes referred to by various names, such as pyropowder, pyrocellulose, or nitrocellulose.

Guided missiles are similar to rockets however; they are guided to their target by various systems. Some are wire-guided, and others are guided by internal or external radar or video. Guided missiles are usually stabilized by fins controlled by internal electronics. Internal proximity fuzes are used in guided missiles, which makes approaching them extremely dangerous. Also, fired guided missiles may still contain residual propellant that could ignite and burn violently.

H-6 is a binary explosive that is a mixture of RDX, TNT, powered aluminum, and D-2 wax with calcium chloride added.

Hand grenades are small explosive- or chemical-type munitions that are designed to be thrown at short range. All grenades have three main parts: a body, a fuze with a pull ring and safety clip assembly, and a filler. Various classes of grenades may be encountered as UXO, including fragmentation, smoke, and illumination grenades. Fragmentation grenades are the most common type of grenade used. They have a metal or plastic body filled with an explosive material. When the filler explodes, the body of the grenade or a metal fragmentation sleeve breaks into small, lethal, high velocity fragments. Other grenades may be made of metal, plastic, cardboard, or

rubber and may contain explosives, white phosphorus, chemical agents, or illumination flares, depending on their intended use.

Hexachloroethane (HC) smoke is a mixture of equal amounts of hexachloroethane, zinc oxide, and approximately 7% grained aluminum or aluminum powder. Upon combustion, the mixture produces zinc chloride, which rapidly absorbs moisture from the air to form a grayish white smoke. More humid air results in thicker smoke.

High Melting Explosive (HMX, octogen, cyclotetramethylene-tetranitramine, or 1,3,5,7-tetranitro-1,3,5,7-tetrazocane), is a powerful and relatively insensitive nitro amine high explosive, chemically related to RDX. HMX is the highest-energy solid explosive produced on a large scale in the United States. HMX explodes violently at high temperatures (534°F and above). Because of this property, HMX is used exclusively for military purposes to implode fissionable material in nuclear devices, as a component of plastic-bonded explosives, as a component of rocket propellant, as a high explosive burster charge, in propellants, and in maximum-performance explosives. HMX is a white crystalline solid with a melting point of 281°C. HMX is non-hygroscopic and is practically insoluble in water.

Hydroxyl-terminated polybutadiene (HTPB) is used to bind the fuel and oxidizer into a solid mass for solid rocket motors. It is also used as a hybrid rocket fuel. HTPB is a clear, viscous liquid. The properties cannot be precisely stated, because HTPB is manufactured in various grades to meet specific requirements. HTPB is thus a generic name for a class of compounds.

Illumination is a term applied to ordnance indicating that it is primarily intended to produce light of high intensity. Such ordnance usually contains a flare and may contain a parachute for suspension in the air.

Impact fuze is a fuze in which detonation is initiated by the force of impact and that usually functions instantaneously or after a short delay.

Incendiary is any flammable material that is used as a filler in ordnance intended to destroy a target by fire.

Lead dinitroresorcinate (LDNR) is used in blasting caps. LDNR is capable of detonation or explosive decomposition under ambient conditions.

Lead styphnate (lead 2,4,6-trinitroresorcinate, $C_6HN_3O_8Pb$), whose name is derived from styphnic acid, is a toxic explosive used as a component in primer and detonator mixtures for less sensitive explosives, such as nitroglycerine.

Magnetometer is an instrument for measuring the intensity and direction of magnetic fields.

Mannitol hexanitrite (**nitromannite)** is a powerful explosive. The chemical name is hexanitromannitol, but it is also known by Mannitol hexanitrate (MHN), Nitromannitol, Nitromannite, Nitranitol, or Mannitrin. It is less stable than nitroglycerin, and it is used in detonators. Mannitol hexanitrite is a secondary explosive formed by the nitration of mannitol (Manna Sugar, mannite), a sugar alcohol. The product is used in medicine as a vasodilator, and

as an explosive in blasting caps. Its sensitivity is considerably high, particularly at high temperatures (>75°C) where it is even more sensitive than nitroglycerine.

Materiel are all items necessary for the equipment, maintenance, operation, and support of military activities without distinction as to their application for administrative or combat purposes; excludes ships or naval aircraft.

Munition means ordnance or any and all supplies and equipment required to conduct warfare.

Mortars range from approximately 1 inch to 11 inches in diameter and can be filled with explosives, toxic chemicals, white phosphorus, or illumination flares. Mortars generally have thinner metal casing than projectiles, but use the same types of fuzing and stabilization.

Material Potentially Presenting an Explosive Hazard (MPPEH) is material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Mercury fulminate ($Hg(ONC)_2$) is a primary explosive. It is highly sensitive to friction and shock. It is mainly used in blasting caps. Mercury(II) cyanate, though its formula is identical ($HgC_2N_2O_2$), is a different compound; cyanate and fulminate are isomers.

Military dynamite is a composite explosive that contains 75% cyclotrimethylene trinitramine (RDX), 15% TNT, and 10% desensitizers and plasticizers. Military dynamite is considerably more stable than commercial dynamites due to the absence of nitroglycerin.

Military munitions means all ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the U.S. Coast Guard, the U.S. Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components of the above.

The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed.

Minol is an is an explosive developed late in World War II as a substitute for TNT and RDX, which were in short supply. It is made by mixing roughly 80% amatol and 20% aluminum powder. It is not as powerful as TNT or RDX.

Munitions Constituents (MC) are any materials originating from unexploded ordnance (UXO), discarded military munitions (DMM), or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

Munitions debris are remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Net explosive weight (NEW) is the actual weight in pounds of explosive mixtures or compounds, including the trinitrotoluene equivalent of energetic material, which is used in determination of explosive limits and explosive quantity data arcs.

Nitroglycerin is a highly powerful explosive and is comparable to RDX and PETN. It is commonly used as the base material for commercial dynamites. Nitroglycerin is highly sensitive and is affected by extreme temperatures. Due to its sensitivity, nitroglycerin is not typically used as a military explosive.

Octol is a melt-castable, high explosive mixture consisting of HMX and TNT in different weight proportions. Two formulations are commonly used: 70% HMX/30% TNT and 75% HMX/25% TNT.

Open Burn (OB) is an open-air combustion process by which excess, unserviceable, or obsolete munitions are destroyed to eliminate their inherent explosive hazards.

Open Detonation (OD) is an open-air process used for the treatment of excess, unserviceable or obsolete munitions whereby an explosive donor charge initiates the munitions being treated.

Ordnance has two definitions: 1. Military weapons collectively, along with ammunition and the equipment to keep them in good repair. 2. Explosives, chemicals, pyrotechnics, and similar stores, e.g., bombs, guns and ammunition, flares, smoke, napalm.

Pentaerythrite Tetranitrate (PETN) is very sensitive and is one of the most powerful military explosives. PETN is used in boosters, detonating cords, blasting caps, and in composite explosives. PETN is not water soluble.

Pentolite is a mixture of PETN and TNT. The most common mixture of pentolite is 50% PETN and 50% TNT. This explosive is very powerful, has a high detonation rate, and is used in certain shaped charges.

Pictratol is a binary explosive composed of 52% ammonium picrate and 48% TNT; it can be melt-loaded; less sensitive than TNT, it was developed for use in armor-piercing bombs.

Picric acid (2,4,6-trinitrophenol, TNP) is a yellow crystalline solid. Like other highly nitrated compounds (e.g. trinitrotoluene), picric acid is an explosive. Modern safety precautions

recommend storing picric acid wet. When picric acid is dry, it is relatively sensitive to shock and friction, so laboratories that use it store it in bottles under a layer of water, rendering it safe. Glass or plastic bottles are required, as picric acid can form metal picrate salts that are even more sensitive and hazardous than the acid.

Potassium perchlorate ($KClO_4$) is a strong oxidizer. It is a colorless, crystalline substance that melts at about 610 °C. It is one of the most common oxidizers used in fireworks, ammunition percussion caps, explosive primers, and is used variously in propellants, flash compositions, stars, and sparklers.

Photo flash powder is used as a ground burst simulator (used to create battle noises and flash effects during training). It produces a high-pitched whistle that lasts 2 to 4 seconds. The detonation produces a flash and loud report.

Picrite (nitro guanidine, 1-Nitroguanidine, $CH_4N_4O_2$, $H_2NC(NH)NHNO_2$) is a white, crystalline solid. It melts at 255°C, decomposes at 250°C, and is not flammable. Picrite has a low sensitive explosive but detonation velocity is high. Picrite is used as an explosive propellant, notably in mixture as the smokeless powder *triple-base* - the nitro guanidine reduces the propellant's flash and flame temperature.

Projected grenades are grenades which are projected from a specially designed gun platform.

Primary or Initiating Explosives - Primary or initiating explosives are high explosives generally used in small quantities to detonate larger quantities of high explosives. Initiating explosives will not burn, but if ignited, they will detonate. In general, propellants are ignited by applying a flame, while bursting explosives are ignited by a severe shock. The initiating device used to set off a propellant is called a primer, and the device used to initiate the reaction of a bursting explosive is called a detonator. Examples of primary explosives are lead azide and mercury fulminate.

Projectile is an object projected by an applied force and continuing in motion by its own inertia, as a bullet, bomb, shell, or grenade. The term is also applied to rockets and to guided missiles.

Propellants – Propellants are low explosive agents such as explosive powder or fuel that provide the energy for propelling ordnance to the target. Propellants include both rocket and gun propellants. In general, propellants are ignited by applying a flame.

Proximity fuze is a fuze wherein primary initiation occurs by remotely sensing the presence, distance, and/or direction of the target through the characteristics of the target itself or its environment.

Pyrotechnics are low explosives used to send signals, to illuminate areas of interest, to simulate other weapons during training, and as ignition elements for certain weapons. Pyrotechnic compositions are considered low explosives because of their low rates of combustion. Examples of pyrotechnics are illuminating flares, signaling flares, smoke generators, tracers, incendiary delays, and photo-flash compounds.

RDX – see Cyclotrimethylene trinitramine.

Rifle grenades look like mortars and range from about 9 to 17 inches in length. They may be filled with high explosives, white phosphorus, riot-control agent, illumination flares, or chemicals that produce colored screening smoke. Rifle grenades are fired from standard infantry rifles. They have an opening at the far end of a tube near the fin assembly that allows the rifle grenade to be placed on the barrel of a rifle. Rifle grenades rely on impact fuzing, which is located on the nose or internally behind the warhead.

Rockets use gas pressure from rapidly burning material (propellant) to transport a payload (warhead) to a desired location. Rockets can range from 1½ to more than 15 inches in diameter, and they can vary from 1 foot to over 9 feet in length. All rockets consist of a warhead section, a motor section, and a fuze. They are unguided after launch and are stabilized during flight by canted nozzles at the base of the motor or fins attached to the motor. The warhead section of the rocket is the portion that produces the intended effect; it can be filled with explosives, toxic chemicals, white phosphorus, sub munitions, riot-control agent, or illumination flares. Fuzes may be located in the nose of the rocket or internally between the warhead and motor. The fuzing on rockets can be impact, time-delay, or proximity fuzing.

Secondary explosives are generally less sensitive to initiation than primary explosives and are typically used in booster and main charge applications. A severe shock is usually required to trigger a reaction. Examples are TNT, cyclo-1,3,5-trimethylene-2,4,6-trinitramine (RDX or cyclonite), HMX, and tetryl.

Self-destruct fuze is a fuze designed to burst a projectile before the end of its flight.

Small arms munitions contain projectiles that are 0.5 inches or less in caliber and no longer than approximately 4 inches. They are fired from various sizes of weapons, such as pistols, carbines, rifles, automatic rifles, shotguns, and machine guns. Generally, the shell casings of small arms munitions are made from brass or steel. Although the hazards associated with these UXO are much less than for other munitions, unexploded small arms munitions may explode if thrown into a fire or struck with a sharp object such as a nail.

Smokeless powder consists of nitrocellulose (**single-base powders**), frequently combined with up to 50 percent nitroglycerin (**double-base powders**), and sometimes nitroglycerin and nitro guanidine (**triple-base**), corned into small spherical balls or extruded into cylinders or flakes using solvents such as ether. Other minor ingredients, such as stabilizers and ballistic modifiers, are also added. Double-base propellants are common in handgun and rifle ammunition. Triple-base propellants are more common in artillery guns. The reason that they are smokeless is that the combustion products are mainly gaseous, compared to around 55% solid products for black powder (potassium carbonate, potassium sulfate etc).

Submunitions include bomblets, grenades, and mines filled with explosives or chemical agents. They may be antipersonnel, antimateriel, antitank, dual-purpose, incendiary, or chemical sub munitions. Submunitions are typically spread over a large area by dispensers, missiles, rockets, or projectiles. Each of these delivery systems disperses the sub munitions while still in flight, scattering the sub munitions over an area. Submunitions are activated in a variety of ways, depending on their intended use. Some are activated by pressure, impact, or movement or disturbance. Others are activated in flight or when they come near metallic objects. Some sub

munitions contain a self-destruct fuze as a backup. The self-destruct time can vary from a couple of hours to several days.

Smoke has two meanings: 1. Filling for ordnance such as bombs, projectiles, and grenades. 2. Term applied to ordnance indicating that it is primarily intended to produce smoke of the types or colors specified.

Tetryl is commonly used alone as a booster charge. It can also be used as a bursting or demolition charge and, at times, can be used in composite charges. Tetryl is more powerful and more sensitive than TNT. Tetryl explosives are being replaced with RDX and PETN explosives due to the increased power and shattering effects of these two latter explosives.

Thermate is an incendiary compound used for military applications. Thermate, whose primary component is thermite, also contains sulfur and possibly barium nitrate, both of which increase its thermal effect, create flame in burning, and significantly reduce the ignition temperature.

Thermite grenades are used as incendiary devices to quickly destroy enemy equipment. Additionally, thermite grenades are used by friendly forces to destroy their own items and equipment when there is imminent danger of them being captured. Because of the difficulty in igniting standard iron-thermite, plus the fact that it burns with practically no flame and has a small radius of action, standard thermite is rarely used on its own as an incendiary composition. It is more usually employed with other ingredients added to enhance its incendiary effects.

Titanium tetrachloride (titanium (IV) chloride) is an important intermediate in the production of titanium metal and other titanium compounds. It is an unusual example of a liquid metal halide that is very volatile in air, where it forms opaque clouds of titanium dioxide and hydrogen chloride.

Trinitroaniline (TNA, picramide) is an explosive compound with a detonation velocity of 7,300 m/s.

Trinitrophenol (TNPH) is used in boosters as a substitute for TNT.

Trinitrotoluene (TNT) is the most commonly used military explosive. It is used alone or in conjunction with other explosives for composite explosives. TNT is commonly used for boosters, bursting charges, or demolition charges. TNT is a yellow solid. The explosive yield of TNT is considered the standard measure of strength of bombs and other explosives.

Tritonal is a mixture of 80% TNT and 20% aluminum powder, used in several types of ordnance e.g., air-dropped bombs. The aluminum improves the brisance of the TNT. Tritonal is approximately 18% more powerful than TNT alone.

Unexploded ordnance (UXO) is explosive ordnance that has been primed, fuzed, armed, or otherwise prepared for action, and that has been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard, and that remains unexploded by malfunction, design, or any other cause.

Warhead means that part of a missile, projectile, rocket, or other munition that contains the explosive system, chemical or biological agents, or inert materials intended to inflict damage.

Waste military munitions is an unused munitions that has been abandoned by being disposed of, removed from storage for purposes of disposal or treatment prior to disposal; is deteriorated, leaking, or damaged to the point that it is unserviceable; or has been determined by an authorized military official to be solid waste. Also, a used or fired military munitions that has been removed from its landing spot and then either managed off-range or disposed of on-range.

White phosphorous (WP) is a chemical that when exposed to air, burns spontaneously, producing dense clouds of white smoke. WP bombs and shells are essentially incendiary devices, but can also be used as an offensive anti-personnel flame compound capable of causing serious burns or death. It is used in bombs, artillery shells, and mortar shells which burst into burning flakes of phosphorus upon impact.

B.8 REFERENCES

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EXHIBIT B-1

DoD Explosives Safety Board Memorandum

DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD
2461 EISENHOWER AVENUE
ALEXANDRIA, VIRGINIA 22331-0600

DDESB-KO

0 3 FEB 2005

MEMORANDUM FOR HEADQUARTERS AIR FORCE SAFETY CENTER
(ATTENTION: SEW)

SUBJECT: Routine Explosives Site Plan Request, Site Existing EOD Disposal Range, Holloman AFB, NM (ACC-Holloman-02-S40)

References: (a) AFSC/SEW Memorandum, 13 December 2004, Subject as above

(b) DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards, 5 October 2004

The subject site plan, submitted by reference (a), has been reviewed with respect to explosives safety criteria contained in reference (b). Based on the information furnished, site and final safety approvals are granted for an Explosives Ordnance Disposal (EOD) Disposal Range at the north end of base boundary, Holloman AFB, New Mexico. This approval is based on the following:

a. The EOD Disposal Range will be limited to 11,900 lbs of Hazard Division (HD) 1.1 explosive materials. In accordance with reference (a), non-related personnel will be at K328 distance. Personnel necessary for the operations will be withdrawn to 2,400 feet (K105 separation distance) with the pill boxes used for added overhead and frontal protection from fragmenting items.

b. For multiple munitions detonations, the maximum case fragment size shall not exceed 19.3 inches in diameter with a maximum fragment distance of 7,500 feet in accordance with paragraph C9.8.4.2.2.2.2.5.1 and Table C9.T35 of reference (b). For single munitions detonations, the maximum case size shall not exceed 29.4 inches in diameter in accordance with paragraph C9.8.4.2.2.2.2.5.1 and Table C9.T35 of reference (b).

c. Per reference (a):

(1) Concurrent operations between the Test Facility and EOD operations will not be authorized.

(2) All roads and trails within the clear-zone will be closed prior to testing and operations. Only authorized personnel will be permitted to transit these areas to and from working locations.

(3) There are no future construction projects planned for this area.

(4) No explosives operations will be conducted when lightning is within 5 nautical miles. In the event of unexpected lightning activity, operations will cease and all personnel will be evacuated to a minimum public traffic route distance of 750 feet from the disposal range until lightning has cleared and local weather office has been contacted.

(5) Fragmenting munitions will be buried or covered with a minimum of 4 feet of earth cover in all directions.

(6) Air Force accepts the risk of possible damage to the Magnetic Levitation Test Track, Impact Point and its associated support equipment caused by intentional or unintentional firings, detonations, failure of equipment or unexpected characteristics of the test.

A copy of the complete site plan package and this letter of approval must be retained as a permanent record at the installation. Master planning documents and installation drawings must be updated to show the approved clear zones.

Point of contact is Mr. Ernie Natividad at commercial: 703-428-0439; DSN: 328-0439; or E-mail: Ernest.Natividad@ddesb.osd.mil.

William E Wright

WILLIAM E. WRIGHT
Captain, US Navy
Chairman

ATTACHMENT C

INSPECTION SCHEDULE

HOLLOMAN AIR FORCE BASE
OPEN DETONATION TREATMENT UNIT

Permit No. NM6572124422

ATTACHMENT C
INSPECTION SCHEDULE

INTRODUCTION

The information in this attachment addresses requirements contained in the New Mexico Administrative Code (NMAC), Title 20, Chapter 4, Part 1, Subpart IX (20.4.1.900 NMAC), incorporating Title 40 Code of Federal Regulations (CFR) §§270.14(b)(5) and 20.4.1.500 NMAC, incorporating 40 CFR §§264.15, and 264.602. In accordance with §264.15(a), the 20,000-Pound Open Detonation (OD) Unit is inspected for malfunctions, deterioration, operator errors, and discharges that may cause or lead to a release of hazardous waste constituents to the environment or a threat to human health. The inspection schedules and checklists presented in this Attachment are used by the EOD Team Chief for conducting inspections to ensure the OD Unit and related safety and emergency equipment, security devices, and treatment zones are monitored and checked to prevent, detect, and respond to environmental or human health hazards.

The complexity and special nature of the activities conducted at Holloman Air Force Base (HAFB) result in delegation of responsibility for general inspection requirements among various groups. Corrective action for deficiencies found during these routine inspections, repair and preventive maintenance of various items of equipment, and maintenance of inspection records are also delegated among these various groups. Among the areas covered by the routine inspection and maintenance activities are:

- Fire Control Equipment: fire extinguishers, pump truck equipment (pumps, hoses, horns and sirens, etc.), fire alarms, and self-contained apparatus. In accordance with AFMAN 91-201, *Explosive Safety Standards*, a minimum of two serviceable fire extinguishers, suitable for the hazards involved, are required for immediate use at any location where explosives are being handled. Each explosives-laden vehicle used for transport must be equipped with at least two portable 2A:10BC rated fire extinguishers.

- Emergency Equipment: ~~protective clothing,~~ safety glasses, gloves~~face shields~~, hard hat, ~~emergency eyewashes,~~ chemical respirators, etc. Measures for personnel and equipment safety and emergency response will be conducted at the OD Unit in accordance with AFMAN 91-201, *Explosive Safety Standards*, and TO 11A-1-42, G*eneral Instructions for Disposal of Conventional Munitions*.

- Security Equipment: ~~facility lighting,~~ warning signs, perimeter fence, etc. The OD Unit is within a cleared area and is surrounded by a 4-foot high, three-stranded barbed wire fence that restricts access to the unit. In accordance with TO 11A-1-42, G*eneral Instructions for Disposal of Conventional Munitions*, "Danger - Explosive Disposal Range - Keep Out" signs will be posted at entrances and at 300-foot intervals around the perimeter of the disposal range.

- Structures: road surfaces, vegetation-free zones, firebreaks. In accordance with TO 11A-1-42, *General Instructions for Disposal of Conventional Munitions*, all dry grass, leaves, and other combustible materials within a radius of 61 meters (200 feet) and the site will be free of deep cracks in which unburned explosives or agents may lodge.

- Communication Systems: land mobile radios, vehicle radios~~base intercom, base evacuation system~~, etc. In accordance with TO 11A-1-42, *General Instructions for Disposal of Conventional Munitions*, communications equipment will be in good working order prior to commencing any disposal operation.

- Vehicular Equipment: transport vehicles.

C.1 INSPECTION SCHEDULE AND CHECKLISTS [20.4.1.500 NMAC §264.15 (b)(1) and (2)]

In accordance with §264.15(b)(1), an inspection program has been established to routinely inspect all components of the treatment units for malfunctions, deteriorations, signs of contaminant release that indicate potential for migration of hazardous waste constituents to the environment, or the potential for human endangerment. These inspections are performed prior to treatment, after treatment, and at regular intervals during inactivity to permit the use of corrective measures that will minimize such problems.

Vehicles used to transport demolition materials, explosives, and personnel are inspected daily, and inspections documented on Air Force (AF) Form 1800, *Operator's Inspection Guide and Trouble Report.*

In accordance with §264.15(b)(2), Exhibits C-1 and C-2 present~~s~~ the inspection schedules and checklists for inspecting safety and emergency equipment, security devices, treatment zones including loading/unloading areas, clear zone/general areas, firebreak, roads, structural equipment, communications equipment, mobile equipment, and range areas. Also listed is inspection of the clear zones around these units for vegetation. Clearing operations of the natural vegetation and other deficiencies found are addressed based on these inspections.

C.1.1 TYPES OF PROBLEMS [20.4.1.500 NMAC §264.15 (b)(3)]

The inspections schedule and the checklists identify the types of problems (e.g., malfunctions or deteriorations) that are checked during inspections.

C.1.2 FREQUENCY OF INSPECTION [20.4.1.500 NMAC §264.15(b)(4)]

Inspection of all materials, security devices, safety equipment, and communication devices will be performed before each explosive ordnance disposal (EOD) operation. This frequency of inspection will determine equipment deteriorations and malfunctions between inspections.

The inspection schedule used for the OD Unit is provided as Exhibit C-1 and Exhibit C-2. This inspection plan addresses unit-specific structures, emergency equipment, operational equipment, safety equipment, communications systems, transport vehicles, and the treatment zone (including the cleared area).

Prior to detonation on the day of detonation, the EOD Team conducts a physical inspection of all munitions brought for treatment to the OD Unit and compares the inventory list with letter of disposal request to ensure all items are accounted for. Only items identified on the letter of request can be treated; all others will be refused and returned to munitions storage for reschedule.

C.1.3 REMEDIAL ACTION [20.4.1.500 NMAC §264.15(c)]

If inspections reveal that nonemergency maintenance is needed, then HAFB personnel will initiate immediate action(s) to preclude further damage and reduce the need for emergency repairs. If a hazard is imminent, or has already occurred during the course of an inspection, or any time between inspections, then remedial action will immediately be taken. Appropriate authorities will be notified according to the 20,000-Pound OD Unit Site Contingency Plan, Permit Attachment E. In the event of an emergency involving the release of hazardous constituents to the environment, efforts will be directed towards containing the hazard, removing it, and subsequently decontaminating the affected area as outlined in the Site Contingency Plan. The general nature of the remedial action to be taken will be noted on the Inspection Checklist.

C.1.4 INSPECTION RECORDS [20.4.1.500 NMAC §264.15(d)]

The EOD Flight maintains all inspection findings at the OD Unit. The EOD Team and Team Chief use the inspection checklists shown in Exhibits C-1 and C-2 to document the date and time of inspections, the name of the inspector, and corrective actions taken. The completed checklists are maintained as a summary of OD Unit inspections and are maintained at the EOD Flight office for a period of three years in accordance with §264.15(d).

Exhibit C-1 Inspection Schedule and Checklist

11,900 Lb Range Monthly Inspection Checklist

Month: _____

Area & Equipment	Specific Item	Types of Problems	Frequency of Inspection	SAT	UN-SAT
Safety and Emergency Equipment	Face shields and extra protective eyeglasses	Broken and dirty equipment	Monthly		
	Disposable respirators	Out of stock, not required, filter types for materials being handled	Monthly		
	Fire Extinguishers (Min. of 2)	In need of recharging	Monthly/ After use		
Security Devices	Signs	Illegible	Monthly		
Treatment Zones	Clear Zone/ General Area	Vegetation, burrowing, corrosion, signs of run-on/runoff	Monthly		
	Firebreak	Vegetation, scrap, debris	Monthly		
	Roads	Settlement, holes, ditches	Monthly		
	Perimeter Fence	Broken poles, broken wires	Monthly		
	Detonation Berm	Eroding	Monthly		

Inspector: _____ **Date:** _____

Time Completed: _____

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Exhibit C-1 Inspection Schedule and Checklist (continued)

11,900 Lb Open Detonation Range Checklist

Event #: _____

Operation Type: _____

Dates: _____

Team Chief: _____

I, _____, certify that all items/actions required by permit for the 11,900-pound open detonation treatment unit have been completed.

_____
(Team Chief Signature)

_____
(Management Signature)

Exhibit C-2 Pre- and Post-Detonation Schedule and Checklists

Weather Log

Base Weather Service: _____

Name of Person Entering Data: _____

Date and Time Data is entered: _____

Date of Detonation Event: _____

Exact Time of Detonation: _____

Record of Weather Data Collected before Detonation

Qualitative description of the Weather (e.g. sunny, warm, rain)	
Temperature	
Wind Speed	
Wind Direction	
Atmospheric Stability	
Precipitation (e.g., no precipitation, light rain, snowing)	
Other Comments	

Pre- and Post- Detonation Checklists

Two Weeks in Advance of Scheduled Detonation

Checklist Items	Name: Date: Time:	Corrective Action
EOD Team Chief calls Test Track to confirm date will not conflict with Track mission. **679-2181**		
EOD Team Chief selects EOD team		
EOD Team Chief conducts briefing with team (including hazards involved with OD, treatment procedures, T.O.s, safety, and transportation procedures)		
EOD Team: • Conducts a range inspection for free standing liquids, unexploded munitions, vegetation, burrowing, and signs of runon/runoff to OD unit		
• Inspects the road to the OD unit for holes, ditches, and settling that could cause problems during the transportation of munitions		
• Identifies items listed for treatment		
• Identifies proper disposal techniques		
• Calculates the total mass being detonated, ensuring total doesn't exceed 11,900 lbs NEW per event		
• Contacts flight munitions custodian to notify of explosive requirements (how much C-4 needed)		
• Ensure that explosives will be on hand prior to scheduled operation		
EOD Team Inspections: • Emergency response equipment • Safety equipment • Security devices • EOD vehicles • Operating equipment		

Note: If it is the first detonation of the quarter, contact 49 CES/CEV and Dave Rizuto at cell: 430-3965, fax: 679-2148 within 24hrs after each detonation to schedule soil sampling.

Pre- and Post- Detonation Checklists

One Week in Advance of Scheduled Detonation

Checklist Items	Name: Date: Time:	Corrective Action
EOD Team: • Verifies items that will be treated.		
• Makes sure Munitions has a sufficient supply of explosives for the operation.		
• Checks calculations on the amount of necessary explosives and Net Explosive Weight.		
• Verifies with Test Track Control no conflicts with missions **679-2181**		

Note: If it is the first detonation of the quarter, contact 49 CES/CEV and Dave Rizuto at cell: 430-3965, fax: 679-2148 within 24hrs after each detonation to schedule soil sampling.

Pre- and Post- Detonation Checklists

Day Before Scheduled Detonation

Checklist Items	Name: Date: Time:	Corrective Action
EOD Team Chief • Briefs team on pending operations and team assignments		
EOD Team • Contacts Munitions to draw explosive materials and ensure delivery time of munitions and waste will be met **1500 and 1622**		
• Inspects all necessary equipment to ensure operability		
• Notifies Test Track Control **679-2181**		
• Notifies Base Fire Department **7228/7229**		
• Notifies Base Ambulance Response **3260**		
• Notifies Security Police **7171/3784/5810**		
• Notifies Base Operations Staff **5410/5411**		
• Notifies Base Environmental Coordinator **3931**		
• Contacts base meteorology team to obtain a forecast of predicted weather conditions for the following day and notify them of the operation **3924/3925**		
• Ensure that explosives will be on hand prior to scheduled operation		
EOD Team Inspections: • Emergency response equipment • Safety equipment • Security devices • EOD vehicles • Operating equipment		

Note: If it is the first detonation of the quarter, contact 49 CES/CEV and Dave Rizuto at cell: 430-3965, fax: 679-2148 within 24hrs after each detonation to schedule soil sampling.

Pre- and Post- Detonation Checklists

Day of Detonation

Checklist Items	Name: Date: Time:	Corrective Action
EOD Chief:		
• Conducts a safety briefing will all team members including review of requirements and procedures for safely transporting explosives		
• Provides arms to personnel who will be transporting explosives and conduct a briefing on the use of the firearms		
• Ensures that radio comm. lines are open with the EOD Team during the drawing and transportation of explosive materials		
• Supervises the munitions loading operations		
• Monitors and identifies deficiencies and refuse treatment if discovered		
• Ensures that all Emergency Equipment (first aid kit, shovels, fire extinguishers, etc.) are on hand or on standby ready to respond		
EOD Team:		
• Contacts base meteorology team to ensure that all weather conditions meet permit terms (i.e., wind speed, direction, temp., precipitation) **3924/3925**		
• Records weather conditions as shown in the weather log		
• Transports munitions and explosives to OD unit		
• Conducts final inspection of the OD unit		
• Makes radio contact with Test Track Control and EOD ops center		
• Ensures mobile two-way radios are placed in appropriate locations (with team members, track control net, team chief, and safety observer)		

Note: If it is the first detonation of the quarter, contact 49 CES/CEV and Dave Rizuto at cell: 430-3965, fax: 679-2148 within 24hrs after each detonation to schedule soil sampling.

• Conducts a physical inspection of all munitions brought for treatment		
• Compares inventory list with letter of disposal request to ensure all items are accounted for. Only items identified on the letter of request can be treated-all others will be refused and returned to Munitions storage for reschedule		
• Places items in the area for treatment		
• Segregates initiation explosives		
• Sets up dual-primed firing systems to initiate the main charge		
• Checks firing systems in primed positions		
• Obtains approval for detonation from the Holloman tower via Test Track Control		

Note: If it is the first detonation of the quarter, contact 49 CES/CEV and Dave Rizuto at cell: 430-3965, fax: 679-2148 within 24hrs after each detonation to schedule soil sampling.

Pre- and Post- Detonation Checklists

Within 72 Hours after Detonation Occurs

Checklist Items	Name: Date: Time:	Corrective Action
EOD Team Chief • Signs required documentation (i.e., expenditure report) within 24 hours of the OD event and place a copy in the facility file		
EOD Team: • Collects any UXO and re-detonates it immediately		
• Collects any metals fragments and remnants		
• Places fragments in a container and handles items as hazardous waste		
• Cleans and inspects all EOD vehicles and other equipment		
• Arranges to backfill depressions and grade area (unless OD event is the last event in the quarter)		
• Prepares EOD report including an inventory list of what items were detonated, Net Explosive Weight, and names of participating EOD personnel		

Note: If it is the first detonation of the quarter, contact 49 CES/CEV and Dave Rizuto at cell: 430-3965, fax: 679-2148 within 24hrs after each detonation to schedule soil sampling.

ATTACHMENT D

PERSONNEL TRAINING

HOLLOMAN AIR FORCE BASE
OPEN DETONATION TREATMENT UNIT

Permit No. NM6572124422

ATTACHMENT D
PERSONNEL TRAINING

INTRODUCTION

This attachment provides information on the training program for Explosive Ordnance Disposal (EOD) personnel at Holloman Air Force Base (HAFB) in accordance with the requirements of New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart V (20.4.1.500 NMAC), incorporating Title 40 Code of Federal Regulations (CFR) §264.16 and 20.4.1.900 NMAC, incorporating 40 CFR §270.14(b)(12).

The objective of the HAFB training program for EOD personnel is to ensure that operations are conducted in a safe manner and to ensure the facility's compliance with the requirements of §264.16. Facility personnel who handle hazardous wastes must successfully complete a program of classroom instruction and on-the-job-training in order to prepare them to operate and maintain the facility/unit in a manner that ensures the facility's compliance with Resource Conservation and Recovery Act (RCRA) training requirements.

D.1 TRAINING PROGRAM [20.4.1.500 NMAC §264.16 (a)(1)]

All HAFB EOD personnel attend the Naval School Explosive Ordnance Disposal (NAVSCOLEOD) located at Eglin Air Force Base, in Florida. NAVSCOLEOD is a Navy-managed command, jointly staffed by Army, Navy, Air Force, and Marine Corps personnel. Its mission is to train officers and enlisted personnel of the Air Force and other branches of the armed services in the most current procedures for the location, identification, render safe, recovery, technical evaluation, and disposal of conventional surface and underwater ordnance and incorporates hazardous waste management training for the specific wastes that are treated in the unit. This is the single training center for all military personnel in the EOD career field. Senior EOD personnel also support this training with on-the job training and close supervision. All EOD personnel must pass the basic course, and supervisory personnel must pass the EOD Operations Supervisory Course (J5AZN3E871)

Training for EOD personnel includes formal classroom instruction, on-the-job training, and training on written procedures and plans. EOD personnel must meet the requirements in the Officer Classification Directory and Enlisted Classification Directory respectively, and must be assigned to a valid EOD position on a Unit Manning Document to perform EOD duties. Personnel must maintain competency in all aspects of the EOD mission. Completion of the minimum training requirements listed in the 3E8X1 Career Field Education Training Program, Section G; AF EOD Standard Training Package, is required to maintain proficiency. Table D-1 provides a summary of required training for EOD personnel by job title and frequency.

Table D-1 Personnel Training Schedule for HAFB OD Unit

Job Titles					
Required Training	Apprentice Skill Level 3	Journeyman Skill Level 5	Craftsman Skill Level 7	Flight Chief	Frequency
EOD Operations Basic Course (J5ABN3E831) Skill Level 3	X	X	X	X	Initial ~~and Annual~~or as required by AFI32-3001
Hazardous Waste Operations & Emergency Response (HAZWOPER)	X	X	X	X	Initial – 40 hours course Annual – 8 hours course
Skill Level 5 – On the Job Training		X	X	X	Progression Training as required by AFI32-3001
EOD Operations Supervisory Course (J5AZN3E871) Skill Level 7			X	X	Progression Training as required by AFI32-3001~~and Annual~~
Hazardous Waste Management and RCRA Regulations	X	X	X	X	Initial and Annual
~~Emergency Response Procedures and Contingency Plan~~	~~X~~	~~X~~	~~X~~		~~Initial and Annual~~

D.1.1 TRAINING PROGRAM DIRECTION [20.4.1.500 NMAC §264.16 (a)(2)]

The HAFB EOD supervisor is responsible for ensuring that assigned personnel receive and successfully complete adequate training in handling potentially hazardous wastes. Training personnel at the NAVSCOLEOD are highly trained career specialists who provide the EOD training for all Department of Defense (DoD) personnel. The EOD and training directors at the EOD school have the training and experience required for their respective positions as required by §264.16(a)(2). In addition, HAFB management requires and ensures all EOD flight members receive initial and annual RCRA training to include a training session dealing with the requirements of the OD Unit Permit to perform operations on the permitted range.

D.1.2 HAZARDOUS WASTE MANAGEMENT AND EMERGENCY PROCEDURES TRAINING [20.4.1.500 NMAC §264.16 (a)(2) and (3)]

All EOD personnel are trained in handling explosive ordnance and potentially hazardous waste and in responding to emergency situations. The training is designed to ensure that personnel are familiar and able to respond effectively to emergencies including emergency procedures set forth in Attachment 1 of the EOD Operating Instruction 32-3001-05, emergency equipment, hazardous waste management, including Contingency Plan implementation. Also training includes procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment, emergency communications systems, response to fires or explosions, response to groundwater contamination incidents, and shutdown of operations. All EOD personnel are

required to complete initial and annual RCRA training according to HAFB EOD Operating Instruction 32-3001-05.

D.1.3 TRAINING PROGRAM CONTENT AND FREQUENCY [20.4.1.500 NMAC §264.16 (b) and (c)]

The EOD supervisor and Flight Training Program Manager will ensure that all EOD personnel have met the training requirements ~~within six months of their assignment at the facility~~ prior to participating in any detonation operations at the OD Unit. Due to the nature of the operations at the OD Unit, personnel involved in treatment operations are required to have training in the following areas:

- EOD Operations
- Hazardous Waste Management
- Emergency Response

EOD Operations Training

An outline of the NAVSCOLEOD course is provided in Table D-3 at the end of this attachment.

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EOD personnel must re-attend the basic EOD course when:

- Assigned 48 months or longer in a non-EOD position (unless advanced EOD training is accomplished during that time).
- There is a 36-month or longer break in service.

Hazardous Waste Management Training

All EOD personnel responsible for management and operations at the OD Unit are required to complete the initial and annual refresher RCRA training program offered at HAFB. Personnel responsible for management and operations at the OD Unit are required to complete the training ~~within six months after assignment to the facility~~ prior to participating in any detonation operations at the OD Unit. The course outline is provided as follows:

Hazardous Waste (RCRA) Training Outline

A. Introduction to RCRA
B. Definition of Hazardous Waste – Characteristic and Listed wastes
C. Accumulation point managers
D. Container use, marking, labeling, and on-base transportation; and
~~E.~~ E. Contingency planning and emergency response

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Emergency Response Training

All EOD personnel responsible for operations at the OD Unit are provided training in emergency response as a portion of the Holloman AFB training program. The NAVSCOLEOD training program ensures that personnel receive emergency response training. In addition, EOD Flight unit training and on-the-job training incorporates emergency response training. The emergency response and contingency publications and plans that are included in the EOD training program include:

Emergency Response Training Outline

A. Holloman AFB Emergency Management Plan (Holloman AFB EM Plan 10-2)
B. Civil Engineer Contingency Response Plan (CRP)
C. OD Unit Operating Instruction 32-3001-05
D. AFMAN 10-2503 Emergency Management Operations
E. AFMAN 32-4004 Emergency Response Operations (Being replaced by AFMAN 10-~~F.~~2503)
~~G.~~F. AFMAN 32-4013, Hazardous Material Emergency Planning and Response Guide

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Annual reviews and updates are required for EOD, emergency response, and hazardous waste management training portions of the program.

D.1.4 JOB TITLES AND DUTIES [20.4.1.500 NMAC §264.16 (d)(1) and (2)]

In accordance with §§264.16(d)(1) and (2), the EOD office maintains a USAF Career Educational Training Program (CFETP) dated August 2007 depicting job title related to hazardous waste management at the 20,000-Pound Open Detonation (OD) Unit, and a job description for each job title. The job descriptions include hazardous waste management job duties, required skills, qualifications, experience, and educational requirements. Table D-2 provides a list of EOD job title, job descriptions, hazardous waste management duties, required skills, qualifications, and educational and /background requirements outlined in Table D-1 according to §264.16(d).

Table D-2 EOD Personnel

Job Title	Job Description	Skills, Qualifications, Experience and Education	Hazardous Waste Management Duties
EOD Apprentice/ Journeyman	EOD operations at the OD Unit	Skill Level 3/5 - special training in procedures on explosive ordnance.	EOD operations
Craftsman	Responsible for the conduct of personnel and verifies inventory listing	Skill Level 7	EOD team leader or range safety officer

EOD Supervisor/ Flight Chief	Plans, coordinates, and directs all explosive ordnance events and disposal operations.	Skill Level 7/9	EOD supervision

Functional area responsibilities and authorities for EOD operations by EOD units and personnel are set forth in Air Force Instruction 32-3001, Explosive Ordnance Disposal Program, and EOD Operating Instruction 32-3001-05, EOD Disposal (11.9K) Range Procedures.

D.1.5 RELEVANCE OF TRAINING TO JOB POSITION [20.4.1.500 NMAC §264.16 (a)(3) and §270.14(b)(12)]

The EOD training program is designed to ensure personnel is qualified to meet their actual job tasks. EOD personnel must meet the requirements in AFI 36-2105, Officer Classification and AFI 36-2108, Airmen Classification, respectively and as stated in AFI32-3001.

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EOD supervisory personnel at HAFB are directly responsible for the proper handling of explosive ordnance. The duties, responsibilities, and qualifications for various positions are maintained at the EOD office. The position description for the EOD supervisor is presented below:

Air Force EOD Supervisor Responsibilities: Directs the operations at the EOD Flight at HAFB and has overall responsibility for the training of EOD personnel. The EOD supervisor provides assistance and guidance on explosive ordnance disposal and management of the Flight.

Duties: The HAFB EOD Supervisor:

- Plans, coordinates, and directs all EOD operations at HAFB
- Interprets regulations and develops necessary operating procedures as required
- Determines requirements for manpower, space, and equipment and initiates actions as needed
- Determines the need for modifications to existing facilities and initiates action to improve economy, efficacy, safety, and physical security of operations.
- Develops appropriate requirements and initiates requests for work.
- Coordinates with the Environmental Flight any changes or modifications of the OD Unit permit
- Maintains personal contacts with local and state government agencies and military commands.
- Assigns work to subordinate employees based on priorities.

- Makes decisions on work problems referred by subordinate supervisors.

- Ensures that workload and project responsibilities are specifically delegated and assigned to subordinates.

D.1.6 TRAINING PROGRAM RECORDS [20.4.1.500 NMAC §264.16 (d) and (e)]

The HAFB EOD Flight office maintains the following training program records for the OD Unit:

- Job title and a written job description for each position at the OD Unit and a list of personnel assigned to each job title.
- Rank, skill, education, and duties of EOD personnel assigned to each position
- Written description of the type and amount of basic and continuing training required for each position.

The Flight Training Program Manager keeps the training and service records for EOD personnel assigned to the flight. Training records, emergency response, and RCRA/OD Unit Permit portions of the program are maintained at the EOD Flight -and 49 ~~Environmental Flight~~ Natural Resources Element.

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Training records on current personnel will be kept until the OD Unit is closed. Training records for former personnel assigned to the OD Unit are kept for at least three years from the date the person last worked at the facility.

Annual reviews and updates are required for EOD, emergency response, and hazardous waste management portions of the program.

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References:

Air Force Instruction (AFI) 32-3001, Explosive Ordnance Disposal Program, 8 October 2004.

EOD Operating Instruction 32-3001-05, EOD Disposal (11.9K) Range Procedures, 49th Civil Engineering Squadron

(TO) 11-1-42, *General Instructions for the Disposal of Conventional Munitions*

AFI 36-2105, Officer Classification

AFI 36-2108, Airmen Classification

Table D-3 Career Field Education and Training Plan

I. Explosive Ordnance Disposal (EOD) Specialist/Technician Career Field:
- A. Progression in career ladder 3E8X0 B. Duties of Air Force Specialty Codes

II. Participate in USAF Graduate Evaluation Program

III. EOD Flight Management
- A. EOD unit management
  - (1) Organizational structure
  - (2) Functions and responsibilities
- B. Inspection system
- C. Material deficiency reporting

IV. Applied Principles of Physics
- A. Properties of matter
- B. Laws of motion
- C. Simple machines
- D. Measurement systems
  - (1) English
  - (2) Metric
  - (3) Conversion from one system to another

V. Fundamentals of Electricity
- A. Demolition circuitry
- B. Perform grounding procedures
- C. Apply electromagnetic radiation precautions

VI. EOD Tools and Equipment
- A. Maintain tools
- B. Common hand tools
  - (1) Select proper tools
  - (2) Use tools properly
- C. Special tools and equipment
  - (1) Select proper tools
  - (2) Use tools properly
- D. EOD Mark (MK)-Series tools
  - (1) Select proper tools
  - (2) Use tools properly

VII. Military Explosives and Propellants
- A. Identification
- B. Effects
- C. Application and use

VIII. Destruction of Explosive Material and Related Hazardous Materials

A. Transportation
B. Firing systems
   (1) Electric
   (2) Non-Electric
C. Disposal procedures
   (1) Routine
   (2) Emergency
D. Munitions residue
   (1) Inspect
   (2) Certify
   (3) Disposition
E. Environmental protection
   (1) Considerations
   (2) Use of U.S. Environmental Protection Agency (EPA) 8700-22 manifest
   (3) EPA permits and applications
   (4) Identify environmental impacts caused by EOD
   (5) Identify EPA regulations and directives pertaining to EOD operations
   (6) Determine EPA documentation requirements
   (7) Identify responsibilities of interfacing agencies

IX. Render Safe Techniques

A. Immobilize fuses
B. Remove fuses
C. Disable electrical components
D. Disrupt firing trains
E. Use shaped charges and demolition techniques

X. Chemical and Biological Warfare Agents

A. Classification
   (1) Types
   (2) Physical state
   (3) Physiological action
   (4) Persistency
B. Use protective clothing and equipment
C. Seal and package leaking munitions
D. Use detection and identification kits
E. Apply first aid/self air procedures
F. Use decontaminants and decontamination equipment

XI. Placed Munitions

A. Land mine and fuses
   (1) Location
   (2) Identification
   (3) Observe safety precautions
   (4) Render safe

(5) Perform disposal procedures

B. Booby traps and fuses
(1) Classification
(2) Identification

XII. Projected Munitions, Rockets, and Grenades

A. Projected munitions and their fuses
(1) Observe safety precautions
(2) Identification
(3) Locate
(4) Render safe
(5) Disposal

B. Projected munitions, rockets, and grenades of foreign countries
(1) Observe safety precautions
(2) Identification
(3) Locate
(4) Render safe
(5) Disposal

XIII. Dropped Munitions

A. Bombs and bomb fuses
(1) Observe safety precautions
(2) Identification
(3) Render safe
(4) Disposal

B. Dispensers and payload
(1) Observe safety precautions
(2) Identification
(3) Render safe
(4) Disposal

XIV. Aircraft Weapons Systems and Explosives

A. Aircraft egress/weapons systems
(1) Aircraft/egress
(2) Gun systems
(3) Release and launching systems
(4) Missile/rocket launching systems
(5) Miscellaneous explosive-actuated devices

B. Aircraft explosive devices
(1) Locate
(2) Identify
(3) Observe safety precautions
(4) Render safe

XV. Pyrotechnics
- A. Identify
- B. Observe safety precautions
- C. Render safe
- D. Disposal

XVI. Guided Missiles
- A. Classification
- B. Identification
- C. Propulsion Systems
  - (1) Identification
  - (2) Characteristics
- D. Hazardous missile components and propellants
  - (1) Identification
  - (2) Render safe
  - (3) Removal
  - (4) Disposal
- E. Guided missiles of foreign countries

XVII. Explosive Ordnance Reconnaissance
- A. Recognition of terrain changes due to unexploded ordnance (UXO)
- B. Locate, mark, and report UXOs
- C. Estimate collateral damage
- D. Technical intelligence
  - (1) Use photographic equipment
  - (2) Reporting

XVIII. Access and Recovery
- A. Characteristics of soils
- B. Effects of weather on soils
- C. Methods of gaining access
- D. Performing field rigging and improvised hoisting
- E. Tie knots, bends, and hitches

XIX. Ranges
- A. Decontaminate ranges
  - (1) Active
  - (2) Inactive
  - (3) Excess
- B. Proficiency training and demolition ranges
  - (1) Establish
  - (2) Maintain

XX. Improvised Devices
- A. Locate
- B. Gain access

C. Identify
D. Interpret radiographs
E. Observe safety precautions
F. Render safe
G. Perform disposal procedures

XXI. Base Recovery after Attack
A. Concept
B. Responsibilities
C. Pre-attack EOD procedures
D. Post-Attack EOD procedures
E. Munitions clearance vehicle Concept of Operations (CONOPS)

XXII. Peace Time Operations
A. Develop plans for range clearance operations
B. Develop plans for ammunition disposal report operations
C. Use of demolition techniques

XXIII. Communications/Electronics
A. Tactical radios
B. Global positioning system
C. Frequency management requirements

XXIV. Render Safe Techniques
A. Immobilize fuses
B. Remove fuses
C. Disable electrical components
D. Disrupt firing trains
E. Use shaped charges and other explosive techniques

XXV. Case Attack Procedures
A. Use Stand-Off Munitions Disruption (SMUD) techniques
B. Use thermal techniques
C. Use shaped charges and other explosive techniques

XXVI. US and Foreign Underwater ordnance
A. Identify
B. Observe safety precautions

XXVII. New EOD Developments

ATTACHMENT E

CONTINGENCY PLAN

HOLLOMAN AIR FORCE BASE
OPEN DETONATION TREATMENT UNIT

Permit No. NM6572124422

ATTACHMENT E
CONTINGENCY PLAN
20,000-POUND OPEN DETONATION UNIT

E.1 INTRODUCTION

This 20,000-Pound Open Detonation (OD) Unit Contingency Plan (Contingency Plan) outlines procedures for responding to an emergency involving hazardous waste at the OD Unit. This Contingency Plan was prepared in accordance with the requirements of 20 New Mexico Administrative Code (NMAC) Title 20, Chapter 4, Part 1, Subpart V (20.4.1.500 NMAC) §264.50 to §264.56.

E.1.1 PURPOSE AND IMPLEMENTATION

The purpose of this OD Unit Contingency Plan is to define responsibilities, ensure coordination of response activities, and minimize hazards to human health or the environment from fire, explosions or any unplanned sudden or non-sudden release of hazardous wastes to the environment.

This Contingency Plan is designed to minimize hazards to human health and the environment from emergencies that may occur as a result of managing hazardous wastes (ordnance materials) at the HAFB OD Unit. The ordnance materials are solids that demonstrate the hazardous characteristics of reactivity. Emergency events that could occur would be an uncontrolled explosion, an accidental fire, or a diesel fuel spill from a vehicle.

This Contingency Plan will be reviewed and, if necessary, amended whenever any of the following occurs:

- The facility permit is revised
- The plan fails in an emergency
- Design or operation of the facility changes significantly such that implementation of the Contingency Plan would be affected
- List of emergency coordinators changes
- List of emergency equipment changes

The overall approach for emergency response at HAFB is through a hierarchy of personnel for responding to emergencies throughout the Base as detailed in the Holloman Emergency Management Plan 10-2 and numerous HAFB plans (i.e., emergency response, evacuation, contingency response). These documents are maintained and available for review at HAFB. The procedures outlined in this Contingency Plan are developed to specifically detail the procedures for an emergency involving hazardous waste at the OD Unit.

Copies of this Contingency Plan, as well as updates, are maintained at the explosive ordnance disposal (EOD) office; with primary and secondary emergency coordinators (identified in Section E.1.4); and security forces, fire departments, and medical facilities responsible for responding to emergencies.

E.1.2 OD UNIT OPERATIONS

Activities at the OD Unit consist of detonation of ordnance materials that are considered to be hazardous wastes due to their exhibiting the characteristics of reactivity (U.S. Environmental Protection Agency [EPA] Hazardous Waste Code D003). As evidenced by the chemical composition information contained in the Waste Classification and Identification section, Attachment B, the ordnance materials contain relatively few hazardous constituents that would persist after detonation, and the constituents are relatively immobile. Consequently, the only immediate threat to human health or the environment as a result of activities at the OD Unit is an uncontrolled explosion, an accidental fire, or a diesel fuel spill from a vehicle.

The primary mission of the OD Unit is to render safe reactive materials at HAFB that have exceeded their shelf life, deteriorated unexpectedly, are damaged, or failed to attain specifications. In the event that an uncontrolled explosion occurred at the OD Unit, the exploded materials would not present a danger to human health or the environment outside the immediate area of the OD Unit. In that event, additional EOD personnel would be dispatched to the OD Unit to render safe any unexploded ordnance material that may be present following an uncontrolled explosion. In case a treatment event at the OD Unit is aborted, the waste will be removed and sent back to the generator.

There is a fire response station located at HAFB. Fires that occur at HAFB are handled by Civil Engineer~~ing~~ Squadron (CES) Fire Protection Flight. Additionally, HAFB maintains a Disaster Control Group that can also respond to fire emergencies. For fire emergencies that are extremely large, HAFB has agreements with Alamo West and the cities of Alamogordo and Cloudcroft to use their volunteer fire departments.

In the event of a diesel fuel spill from a vehicle, fire protection personnel will respond. EOD personnel maintain additional spill response supplies and equipment, and are trained in diesel fuel spill response.

E.1.3 COORDINATION AGREEMENTS

HAFB maintains a full spectrum of emergency response services at the installation including a fully equipped fire response station, emergency medical services, and security forces. As there is now only an on-post clinic, the base has arrangements with the Gerald Champion Regional Medical Center. These organizations have been contacted to familiarize responders with operations and contingency planning for the OD Unit.

Although the capabilities of HAFB exceed those of local emergency response services, HAFB has agreements with various outside facilities pursuant to 20.4.1.500 NMAC §264.37. These Mutual Support Agreements (MSAs) have been established between HAFB and local communities for major accidents, hazardous materials incidents, fire protection and rescue, medical care and security/public safety (Exhibit E-1). These agreements are maintained at the

HAFB facility (49th CES Explosive Ordnance Disposal Flight) in accordance with 20.4.1.500 NMAC §264.50 through §264.52(c). These facilities include the local volunteer fire departments in Alamo West and the cities of Alamogordo and Cloudcroft.

E.1.4 EMERGENCY COORDINATORS

The primary Emergency Coordinator (as required by 20.4.1.500 NMAC §264.55) at HAFB is the Commander of the 49th Mission Support Group. The Commander has a detailed knowledge of hazardous waste operations at HAFB, layout and operations at the OD Unit, and the emergency response procedures of the Contingency Plan. The Emergency Coordinator is authorized to commit all resources necessary for emergency response activities.

The secondary Emergency Coordinator at HAFB is the Base Civil Engineer. EOD personnel are the primary support for an emergency situated at the OD Unit. HAFB fire protection and disaster control groups assist in emergency situations at the OD Unit. The Emergency Coordinator is reached by calling the Command Post at 572-7575.

E.1.5 IMPLEMENTATION OF THE CONTINGENCY PLAN

The Contingency Plan will be implemented immediately whenever there is an accidental fire, spill, or uncontrolled explosion that could threaten human health or the environment. Such a fire would be defined as one that had spread outside the boundaries of the OD Unit to an extent that HAFB personnel and equipment could not provide adequate containment.

E.1.5.1 Emergency Response Procedures (20.4.1.500 NMAC §264.56)

During an event not requiring implementation of the OD Unit Contingency Plan, EOD personnel will alert Test Track personnel and the fire protection group via portable radio.

Notification

The EOD team members discovering a potential emergency incident at the OD Unit will notify the Range Safety Officer (RSO). The RSO will activate the internal alarm system to notify or evacuate personnel, if appropriate. In addition, the RSO will notify the Base Fire Chief, CES ~~Environmental Flight~~ Asset Management Flight, Natural Resources Element and Medical Services as required.

During an emergency situation that requires implementation of this Contingency Plan, the emergency coordinator would implement the following first level response procedures:

- Activate internal communications systems to alert emergency response personnel
- Identify the character, exact source, amount, and areal extent of the released materials
- Assess possible hazards to human health and the environment (both on-installation and off-installation)
- Take steps to mitigate the spread or reoccurrence of the fire

- Notify appropriate state or local agencies, if needed
- Remove/transport any untreated ordnance material if the emergency occurs while ordnance material is still present at the site

If, based on the assessment of possible hazards, the emergency coordinator determines that the fire could threaten human health or the environment on the installation; he/she would immediately notify the security forces. If evacuation is considered necessary, the emergency coordinator would confer with military police on which areas should be evacuated. If, in the unlikely event that the emergency coordinator determines that the fire could threaten human health or the environment off-installation, he would immediately notify local authorities. If evacuation is considered necessary, the emergency coordinator would confer with local authorities and with security forces on which areas should be evacuated. The ~~Environmental Flight~~ Natural Resources Element will notify the National Response Center at 1-800-424-8802 and provide the Center with the following information:

- Name and telephone number of the emergency coordinator making the notification
- Name and address of the facility (Holloman Air Force Base, Alamogordo, New Mexico)
- Time and type of incident (fire)
- Name and quantity of materials involved
- The extent of injuries, if any
- The possible hazards to human health or the environment outside the facility

According to HAFB EODOI 32-3001-05, during an emergency, personnel will evacuate the OD Unit through the south gate toward the range flag or other pre-designated location such as the Test Track area or the ARC building (building 1025) that is located 1.5 miles south east of the OD Unit. The team leader will take accountability of all personnel, and the Range Safety Officer (Senior EOD member) will coordinate with HAFB organizations for assistance.

E.1.6 EMERGENCY RESPONSE EQUIPMENT (20.4.1.500 NMAC §264.32)

HAFB maintains a large inventory of equipment that can be used as emergency response equipment. Although this equipment is not dedicated solely for hazardous waste service, it can be used in response to a fire involving hazardous waste. A listing of the available equipment, number of items, and the locations of the equipment is included in Section E.2.4.9. After use, all durable emergency response equipment must be cleaned, inspected, and fit for its intended use prior to resuming operations at the OD Unit. All non-durable emergency response equipment that is disposed of must be replaced as soon as practicable.

E.1.7 POST EMERGENCY REPORTS [20.4.1.500 NMAC §264.56(j)]

HAFB will note in their operating record the time, date, and details of any incident that requires implementation of the Contingency Plan. Within 15 days after an event requiring implementation of the Contingency Plan, an incident report will be prepared detailing the event and submitted to the Region VI Regional Administrator of the EPA and the NMED as required by 20.4.1.500 NMAC §264.56(j). The report will include the following information:

- Name, address, and telephone number of HAFB
- Date, time, and type of incident (e.g., fire, explosion)
- Name and quantity of material(s) involved
- The extent of injuries, if any
- An assessment of actual or potential hazards to human health or the environment, where applicable
- Estimated quantity and disposition of recovered material that resulted from the incident

Before operations are resumed at the OD Unit, NMED will be notified that the OD Unit is in compliance with 20.4.1.500 NMAC §264.56(h) and (j). The notification will verify that wastes incompatible with the released material are treated until cleanup procedures are completed and that all emergency equipment is cleaned and ready for its intended use.

E.2 CONTINGENCY RESPONSE PLAN

The information contained in the following paragraphs is adopted from the HAFB Emergency Management Plan 10-2. The Plan is divided into six sections that identify:

- Overall mission
- Designated parties and their responsibilities
- Emergency response, control, and countermeasures
- Contingency plan requirements and actions
- Contingency training
- Plan review and update

E.2.1 GENERAL INFORMATION

This Contingency Plan will be reviewed continually and revised if any of the following occur:

- the facility permit is revised
- the plan is inadequate in an emergency
- the procedures herein can be improved
- facility operations change in a way that alters the plan
- the emergency coordinator changes
- the emergency equipment list changes

Amendments to this Contingency Plan can be initiated by any responsible party. Proposed changes may be submitted to the 49th CES as the office with primary responsibilities to represent both EOD personnel and other contingency response personnel. Adopted changes will be provided to all record holders of this permit.

Copies of the Contingency Plan will be available at the 49th CES and the base EOD office.

The facility name, address, owner/operator ID number and permit number are provided below:

Name:	Holloman Air Force Base
Address:	550 Tabosa Avenue, Building 55, HAFB, New Mexico 88330-8458
Owner:	United States Air Force
Operator:	Holloman AFB
EPA ID No:	NM6572124422
Permit No:	NM6572124422-OD

E.2.2 EMERGENCY COORDINATORS

The emergency coordinators will coordinate and direct control and cleanup efforts at the scene in case of an incident involving the transportation, handling, or detonation of explosive waste items. The emergency coordinators can designate other personnel to assist them in the event of an emergency and have the full authority to obtain fire and medical support service should the need arise.

Prior to operations by EOD personnel, the EOD supervisor contacts the following base offices:

- meteorology
- munitions
- medical services
- security forces
- base operations
- 49 CES/CEAN
- fire chief.

Therefore, these organizations are alerted in the event that potential emergencies occur during EOD treatment operations.

The primary OSC for HAFB is the Commander, 49th Mission Support Group. The title and work phone number of the primary OSC and designated alternates are provided below:

Title	**Base Phone No.**
Commander (MSG)	(575) 572-5541
Base Civil Engineer (CE)	(575) 572-3071
Fire Chief	(575) 572-7228

Assistant Fire Chief on Duty (575) 572-7288

E.2.3 IMPLEMENTATION

The decision to implement the Contingency Plan for the OD Unit depends upon whether an imminent or actual incident could threaten human health or the environment.

The purpose of this section is to provide guidance to the emergency director in making this decision by providing decision-making criteria.

The Contingency Plan will be implemented in the following situations:

- An unplanned fire or unplanned explosion occurs at the OD Unit such that:
  - the potential for human injury exists
  - toxic fumes that could endanger human health or the environment are released
  - the fire could spread on-site or off-site and possibly ignite other flammable materials or cause heat-induced explosions
  - the use of water and/or chemical fire suppressants could result in contaminated run-off that could endanger human health or the environment
  - an imminent danger exists that an explosion could ignite other hazardous wastes at the facility and possibly results in the release of toxic material
- A spill or unplanned release of hazardous material occurs at the unit such that:
  - The spill could cause the release of toxic liquids or fumes that could endanger human health or the environment
  - The spill cannot be contained in the immediate area resulting in potential off-site soil contamination and/or ground or surface water pollution that could endanger human health or the environment
  - The spilled material inadvertently detonates or is combustible
  - A fire or explosion occurs during transportation of the waste or residuals to or from the unit
- A planned treatment event results in:
  - An imminent release due to damage to the unit beyond damage that is typical to such treatment event
  - Any structure, road surface, or other item is ignited in the vicinity

– During rupture of a cylinder, the cylinder is released from its securing device

E.2.4 EMERGENCY RESPONSE PROCEDURES

E.2.4.1 Notification [20.4.1.500 NMAC §264.56(a)(1) and (2)]

The EOD team members discovering a potential emergency incident at the OD Unit will notify Fire Protection and the Range Control Supervisor. The Range Control Supervisor will, in turn, notify the OSC or alternate. The OSC or alternate will immediately activate the internal alarm system to notify or evacuate personnel, if appropriate. In addition, the OSC or alternate will notify the Base Fire Chief, Environmental Coordinator, Base Civil Engineer, Chief of Operations, Readiness Flight, ~~Environmental Flight~~ Natural Resources Element, Public Affairs, and Medical Services, as required.

The appropriate local agencies with designated response roles will be notified by the OSC if their help is needed. The appropriate state agencies will be notified if their assistance is needed, or the incident requires reporting at this level.

The evacuation routes to be used in the event of an emergency are the OD Unit entrances, provided that the extent of the incident is limited to the immediate vicinity but temporary evacuation is required. Evacuation from the main base area, if required, is designated in the HAFB Emergency Management Plan 10-2.

E.2.4.2 Identification of Hazardous Wastes [20.4.1.500 NMAC §264.56(b)]

The OSC will immediately identify the character, exact source, amount, and extent of the material involved in the unplanned incident. The initial identification method will be by visual inspection of the incident's effects, spilled material, and location of the release. Plan records, including physical inventories, process and waste log sheets, and biennial reports are available at the EOD Administrative Office to aid in estimating the composition and quantity of released material. EOD personnel at the OD Unit also conduct a physical inventory of all munitions brought for treatment by Munitions Storage Area personnel.

Qualified personnel will sample the released material to verify hazardous material identification, to determine boundaries of contaminated areas and contaminant concentrations, and to verify that proper cleanup activities are completed.

E.2.4.3 Hazard Assessment [20.4.1.500 NMAC §264.56 (c) and (d)]

Possible hazards to the environment and public health will be assessed by the OSC, and the need for local evacuation and notification of local authorities will be determined. In assessing the situation, the OSC will consult with the ~~Environmental Flight~~ Natural Resources Element, Bioenvironmental Engineer, and Base Fire Chief. These parties will consider direct and indirect effects of the event on human health, welfare, and natural resources. In assessing the event, the potential for direct and indirect effects will indicate, but not be limited to, fire, explosion, further release occurrence, toxic gases, or injection by run-on and run-off. Action will be taken to control releases and minimize effects during such an emergency if the situation involves the release or potential release of toxic effluent.

The OSC, in conjunction with the noted personnel, will determine whether the OD Unit has had a release that could threaten human health or the environment outside the base. Bioenvironmental Engineering personnel will survey the area and advise the OSC in the establishment of protective boundaries around the contaminated areas.

If a release results in a vapor cloud, several methods are available for assessing the hazards. Portable equipment for direct air monitoring can be used to make a rapid determination of the most volatile organics.

Meteorological data, including wind speed, and direction, temperature, dew point, barometric pressure, and an automatically calculated stability factor are continuously available from HAFB meteorological towers. These data, along with information about the source of an atmospheric release, can be used to predict the direction, extent, and estimated concentration profile of a contaminated release.

If the assessment of the incident indicates that evacuation of areas downwind of the unit may be advisable, the OSC will immediately notify Headquarters Air Combat Command and the appropriate local authorities. The OSC will consult with these officials to help decide whether local areas should be evacuated. The OSC or the ~~Environmental Flight~~ Natural Resources Element will immediately notify the National Response Center (using their 24-hour toll free number, 1-800-424-8802).

E.2.4.4 Control Procedures [20.4.1.500 NMAC §264.56(e)]

Potential accidents at the OD Unit can be considered as an unplanned fire/explosion, inadvertent facility damage, or spill material release. Natural disasters such as earthquakes, hurricanes, or tornadoes are not assumed to cause actions that fall into one of these categories. Procedures for responding to these incidents are contained in this Contingency Plan, HAFB Emergency Management Plan 10-2, and Technical Orders 11A-1-60 and 11A-1-42. Prompt action will be taken to control any hazard. If an immediately dangerous explosive item is encountered, all operations in the immediate vicinity will be shut down, personnel evacuated to a safe location, and EOD personnel called to render assistance in eliminating the hazard. Operations will not be resumed until the hazard has been eliminated. In the event that a spill occurs while transporting any of the explosive, reactive wastes or munitions to the OD Unit, the following actions will be taken:

Ordnance Transportation Vehicles

- Explosion. In the event of an explosion, personnel will immediately withdraw to a safe distance and evaluate the situation. NOTE: This does not apply to detonation during transport, which requires immediate implementation of the Emergency Management Plan 10-2. Heavy-bodied trucks have been specifically chosen for this task due to the inherent risk associated with these materials. Transport limits and requirements are specified in EOD technical orders.

- Fire. In the event of a fire involving a transport vehicle with ordnance onboard, an attempt to control the fire with available extinguishers may be permissible if the fire is

initially away from the ordnance. If not, personnel will withdraw to a safe distance and advise appropriate authorities.

E.2.4.5 Prevention of Recurrence or Spread of Fires, Explosions, or Releases [20.4.1.500 NMAC §264.56(e) and (g)]

In the event of a fire, explosion, release or spill, the Emergency Coordinator will ensure that the initial response is executed in accordance with the Holloman AFB Emergency Management Plan 10-2. This includes identification and containment of releases following actions to save lives, reduce injuries, and protect the environment; evacuation of nonessential personnel; cordoning off the danger area; performing fire and rescue operations; stopping the release (if possible); and preventing the spread of spilled substance into the environment (storm drains, sewers, natural drainage areas and groundwater). To prevent the recurrence or spread of fires, explosions, or releases, at a minimum, the follow-up actions are as follows:

- Start actions to collect, treat, and dispose of non-explosive waste or other materials as appropriate. This will be a joint operation involving EOD, Fire Protection, and Bioenvironmental Engineering personnel.

- Ensure that EOD, Fire Protection, and Safety personnel investigate the cause of the emergency and provide a technical report to the Commander, 49th Mission Support Group within 72 hours.

- Ensure that proper restoration actions are started as soon as possible after appropriate decontamination procedures for explosives have been completed. This will be a joint operation between Safety and Civil Engineer~~ing~~ personnel for Air Force incidents. All decontamination actions will be documented, and the records will be permanently maintained at Air Force EOD, Safety, and Real Property offices.

- Ensure that equipment repaired or replaced as a result of the incident is recertified, as necessary, prior to being returned to service.

E.2.4.6 Storage and Treatment of Released Material [20.4.1.500 NMAC §264.56(g)]

After a detonation event, EOD personnel will collect ~~The storage and treatment of~~ any released material or debris within 72 hours. ~~will be managed in accordance with the Holloman AFB Emergency Management Plan 10-2, TO 11A-1-42 - *General Instructions for the Disposal of Conventional Munitions*, and the HAFB Waste Management Plan.~~ No wastes that may be incompatible with the released material is treated, stored, or disposed of until clean-up procedures are completed. OD Unit operations will not resume until hazards are eliminated. The collection, treatment, and disposal of non-explosive waste will be a joint operation involving EOD, ~~Environmental Flight~~ Natural Resources Element , Fire Protection, and Bioenvironmental Engineering personnel. The Permittee shall characterize the debris collected after each detonation in accordance with 40 CFR §261, Subpart C. This will be accomplished by sampling and analysis, MSDS review, or generator knowledge. Based on this characterization, the Permittee shall manage the fragments collected in accordance with 40 CFR §261 as applicable to the waste.

E.2.4.7 Post-Emergency Equipment Maintenance [20.4.1.500 NMAC §264.56(h)]

Post-emergency equipment maintenance will be performed in accordance with the HAFB Emergency Management Plan 10-2. After use, all durable emergency response equipment must be cleaned, inspected, and fit for its intended use prior to resuming operations at the OD Unit. All emergency equipment is cleaned and inspected to ensure it is fit for its intended use before facility operations are resumed. All non-durable emergency response equipment that is disposed of must be replaced as soon as practicable.

E.2.4.8 Container Spills and Leakage

Any container spills or leakage that might occur at the OD Unit will be managed in accordance with the HAFB Emergency Management Plan 10-2.

E.2.4.9 Emergency Equipment

According to ~~Air Force Manual 91-201, *Explosives Safety Standards*, Air Force Technical Order (TO) 11A-142, *General Instructions for Disposal of Conventional Munitions*, and the~~ HAFB EOD Operating Instruction 32-3001-05, the following ~~safety items~~ equipment will be immediately available during EOD operations:

- First aid kit (NSN-654500-116-1410) or suitable substitute
- Demolition tools and equipment
- Explosives and demolition materials
- Pioneer and hand tools as required
- ~~Ambulance or first aid vehicle, manned by personnel trained to handle casualties that may occur during disposal of specific munitions, on-hand or on-call~~
- Fire extinguishers, two 2A 10B/C
- Disposal Range Guide and applicable technical data
- Radio for emergency communications and/or contact with range control – at least two (i.e., hand-held, vehicular, cell phones)
- Range flag
- Specialized EOD tool as required
- Fire extinguisher in vehicles carrying class B/C explosives
- Vehicles with placards

All emergency response and personal protection equipment is routinely inspected and tested to ensure equipment is maintained in good working order. Emergency response equipment is inspected and tested in accordance with the Inspection Schedule and Checklist provided in Attachment C. Inspections are conducted monthly as well as two weeks in advance of scheduled detonation, the day before a scheduled detonation, and the day of detonation. Corrective actions to address deficiencies are immediately implemented and documented on the Inspection Checklist.

Table E-1 provides a comprehensive list of emergency response and personal protection equipment available for use at the OD Unit.

Table E-1 Emergency Response Equipment Available for Use at the HAFB OD Unit

Response Equipment	Description/Capabilities	Location
Firefighting Vehicles	Firefighting vehicles equipped for fire suppression, emergency response and personal protection including self-contained breathing apparatuses (SCBAs). Available for immediate response and transport to emergency incidents.	49 CES Fire Protection Flight
Security Vehicles	Equipped with communications equipment and utilized for transportation of personnel and equipment. Available for immediate response and transport to emergency incidents.	49 Security Forces Squadron
Emergency Medical and First Aid Equipment and Supplies	Equipment for movement of injured personnel (e.g., stretchers, Stokes litter) blankets, emergency first-aid supplies, and medical-grade oxygen in compressed cylinders equipped for personnel use.	49 CES Fire Protection Flight, 49 Medical Group
Self Contained Breathing Apparatus (SCBA)	SCBA equipped with positive pressure mode for use by personnel entering hazardous atmospheres and monitoring instruments.	49 CES Fire Protection Flight
Fire extinguishers	Minimum of two 2A 10B/C fire extinguishers on-site at the OD Unit.	EOD Flight
Radio and communications equipment	Hand-held and vehicle-mounted two-way radios for emergency communications.	EOD Flight; 49 CES, 49 CES Fire Protection Flight, 49 Security Forces Squadron
Emergency response and release clean-up equipment and materials	Personal protective equipment (Tyvek coveralls, nitrile gloves, foot coverings, face shields, and protective eyeglasses) for use by emergency response personnel. Decontamination equipment (portable eyewash, shower, brushes) Clean-up equipment and materials (absorbents, booms, shovels, brooms, drums)	49 CES

Procedures for decontamination of personnel, equipment, or areas are conducted according to the HAFB Emergency Management Plan 10-2. These procedures are designed to render persons, equipment, or areas safe by absorbing, destroying, neutralizing, making harmless, or removing chemical or biological agents, or by removing radioactive material. Immediate decontamination is carried out by individuals upon becoming contaminated, to save life and minimize casualties and may include decontamination of some personal clothing or equipment. Operational decontamination may be carried out by an individual or a unit, restricted to specific parts of operationally essential equipment, material, and/or working areas, in order to minimize contact and transfer hazards and to sustain operations. This may include decontamination of the individual beyond the scope of immediate decontamination, as well as decontamination of mission-essential spares and limited terrain decontamination. Thorough decontamination may be carried out by a unit, with or without external support, to reduce contamination on personnel, equipment, material, and/or working areas to the lowest possible levels, to permit the partial or

total removal of individual protective equipment and to maintain operations with minimum degradation. This may include terrain decontamination beyond the scope of operational decontamination.

E.2.4.10 Coordination Requirements

In addition to the Base organizations and personnel assigned to the response effort, provisions have been made for including off-base organizations in the response organization when on-base response resources and expertise are insufficient, and when off-base water, land, or air are adversely affected. Some of the significant off-base response resources that can be incorporated, as needed, include the following.

a. ACC/A7V:

   Major Command office responsible to ensure environmental protection including spill response matters. This office is located at Langley AFB, Virginia and can be reached at DSN 574-9342 or commercial 757-764-9342.

b. Air Force Center for Environmental Excellence (AFCEE):

   AFCEE is assigned the responsibility to provide technical guidance and assistance to major commands and bases in contingency operations and environmental planning. Technical expertise can be provided to the Air Force OSC on hazardous material identification, control, cleanup, and disposal. AFCEE is located at Brooks City-Base in San Antonio, Texas. The contact information for AFCEE is as follows:

   AFCEE Spill Response Management
   DSN Phone: 240-3517 or commercial (210) 536-3517.

   AFCEE Hazardous Materials Management
   DSN Phone: 240-4220 or commercial (210) 536-4220

c. State of New Mexico Response Team:

   NMED has developed an Emergency Response Team to respond to spills occurring within the state boundaries. The state OSC will be briefed fully by the HAFB OSC on the spill response. The state OSC will be familiar with the available sources of spill response equipment and materials within New Mexico. The NMED emergency response team phone number is (505) 827-9329.

d. City of Alamogordo Fire Department:

   HAFB has a mutual aid agreement with the city of Alamogordo Fire Department (located about 7 miles east of HAFB to provide assistance in the event it should be needed. The phone number of the Alamogordo Fire Department is (575) 439-4300.

e. White Sands Missile Range:

   HAFB has a mutual aid agreement with the White Sands Missile Range Fire Department located approximately 40 miles west.

f. National:

The following information services are also available to assist in the event of an emergency:

- CHEMTREC® (Chemical Transportation Emergency Center)
- Chemical Hazard Response Information System Manual
- ERIS (Emergency Response Information System)
- OHMTAPS (Oil and Hazardous Materials/Technical Assistance Data System)
- U.S. Air Force Occupational and Environmental Health Laboratory.

E.2.4.11 Evacuation Plan

It is extremely unlikely that emergency operations at the OD Unit would require evacuation of other areas at HAFB since the OD Unit is isolated from any other area or office buildings.

The general base evacuation plan is provided in Appendix 2 to Annex B of the HAFB Emergency Management Plan 10-2.

E.2.4.12 Reporting and Recordkeeping [20.4.1.500 NMAC §264.56 (i)]

The emergency coordinator will notify the ~~Environmental Flight~~ Natural Resources Element, who will report pollution incidents as necessary, as follows:

1. All pollution incidents will be reported as soon as practicable, by telephone during duty hours or by message during off-duty hours, to the following agencies:

   a. HQ ACC/A7V

   Defense Switched Network (DSN) 574-9342; commercial (757) 764-9342

   b. Regional Response Center (RRC)

   Environmental Protection Agency
   Region VI First Interstate Bank Tower
   1445 Ross Avenue, Dallas, TX 75202-2733
   (214) 767-2666/2720, or Telex 910-861-4125

2. New Mexico Environment Department (NMED) (505) 827-9329. Verbal notification will be provided to NMED as soon as possible after learning of a discharge, but in no event more than twenty-four (24) hours thereafter. Notification of releases of any amount of any material in such quantity as may with reasonable probability injure or be detrimental to human health, animal or plant life, or property; or may unreasonably interfere with the public welfare or the use of property must be reported to the NMED. This includes chemical, bio-hazardous, petroleum-product, and sewage spills and incidents. In addition to recent spills, the discovery of evidence of previous unauthorized discharges, such as contaminated soil or ground water, will be reported.

3. Major spills or potentially major spills will immediately be reported by telephone and email or facsimile to the RRC (l.b above) and:

National Response Center
Environmental Protection Agency
Nasiff Building
400 7th Street, SW, Washington, DC 20590
1-800-424-8802 or Telex 426-0014

4. Medium-sized spills will be reported to the above agencies as soon as practical.

HAFB will note in their operating record the time, date, and details of any incident that requires implementation of this Contingency Plan. Within 15 days after an event requiring implementation of this Contingency Plan, an incident report detailing the event will be prepared and submitted to the EPA Region VI Regional Administrator and the NMED as required by 20.4.1.500 NMAC §264.56(i). The report will include the following information:

- Name, address, and telephone number of HAFB
- Date, time, and type of incident (e.g., fire, explosion)
- Name and quantity of material(s) involved
- The extent of injuries, if any
- An assessment of actual or potential hazards to human health or the environment, where applicable
- Estimated quantity and disposition of recovered material that resulted from the incident

Before operations are resumed at the OD Unit, NMED and the Regional Administrator will be notified that the OD Unit is in compliance with 20.4.1.500 NMAC §264.56(h) and (i). The notification will verify that wastes incompatible with the released material are treated until cleanup procedures are completed and that all emergency equipment is cleaned and ready for its intended use.

EXHIBIT E-1: Memorandum of Understanding for Off-Installation Emergency Action

NEW MEXICO & HOLLOMAN AFB
MEMORANDUM OF UNDERSTANDING FOR
OFF-INSTALLATION EMERGENCY ACTIONS INVOLVING
EXPLOSIVES AND EXPLOSIVE DEVICES

1. Parties: The parties to this Memorandum of Understanding (MOU) are the Department of Defense (DoD) Explosive Ordnance Disposal (EOD) unit located on Holloman Air Force Base, NM, the Department of Public Safety, Alamogordo, NM, New Mexico State Police, Otero County Sheriff's Office and the New Mexico Environment Department Hazardous and Radioactive Materials Bureau.

2. Background:

a. EOD organizations have personnel specially trained to handle all types of explosives, including improvised explosive devices. Other Federal agencies request assistance from EOD organizations in emergencies involving explosives. These situations call for immediate action to abate the safety threat by treatment in place or removal to a safe location for treatment.

b. US EPA's Military Munitions Rule (MR) (62 FR 6622, Feb. 12, 1997) has made it clear that EOD personnel engaged in an explosives or munitions emergency response are exempt from the generator, transporter, and treatment, storage and disposal unit requirements of the Solid Waste Disposal Act (423 USC Sec 6901, et seq.). The terms of this MOU are governed by the standards established on the MR, whether the MR or the Solid Waste Act is being administered by the federal or state government, in whole or part.

c. Except for providing temporary storage or treatment of explosives in order to provide emergency life-saving assistance to civilian authorities, or to assist law enforcement agencies in accordance with established agreements between DoD and the Federal agency concerned, the DoD is prohibited by law (10 USC 2692) from using DoD installations for the storage or treatment of non-DoD owned hazardous materials.

3. Purpose: This MOU addresses the parties' roles and responsibilities regarding notification responsibilities during emergency response operations, and is intended to:

a. Minimize the risk to public safety from EOD operations.

b. Maximize the efficiency, safety and speed of any explosive treatment or retrieval operation.

c. Establish a framework for mutual assistance and consultation among the parties with respect to EOD explosives or munitions emergency response operations.

4. Scope: This MOU applies to EOD explosive or munitions response operations in the public sector.

5. Definitions:

a. ***Explosives or Munitions Emergency*** - a situation involving the suspected or detected presence of unexploded ordnance, damaged or deteriorated explosives or munitions, an improvised explosive device (IED), other potentially explosive material or device, or other potentially harmful military munitions or devices, that creates an actual or potential imminent threat to human health, including public safety or the environment, including property, as determined by an EOD specialist. Such situations may require immediate and expeditious action as determined by the EOD specialist to control, mitigate or eliminate the threat.

b. ***Explosives or munitions emergency response*** - all immediate response activities by an EOD response specialist to control, mitigate or eliminate the actual or potential threat encountered during an explosive or munitions emergency. An explosives or munitions emergency response may include in place render safe procedures, treatment or destruction of the explosives or munitions and/or transporting those items to another location to be rendered safe, treated or destroyed. Any reasonable delay in the completion of an explosives or munitions emergency response caused by a necessary, unforeseen or uncontrollable circumstance will not terminate the explosives or munitions emergency response. Explosives or munitions emergency response can occur on either private or public lands and are not limited to responses to Resource Conservation and Recovery Act facilities.

c. ***Explosive or munitions emergency response specialist*** - an individual trained in munitions and explosives render safe procedures, handling, transportation and destruction techniques. Explosive and munitions emergency response specialists include DoD EOD and Technical Escort Unit personnel.

d. ***Military munitions*** - all ammunition products and components produced by or used by the US DoD or the US Armed Forces for the National Defense and security, including military munitions under the control of the DoD, Department of Energy (DoE), the National Guard and the US Coast Guard. The term military munitions includes: gaseous, liquid and solid propellants, explosives, pyrotechnics, chemicals and riot control agents, smokes and incendiaries used by DoD components, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition devices and components thereof. Military munitions do not include wholly inert items, improvised explosive devices and nuclear weapons, nuclear devices and nuclear components thereof. However, the term does include non-nuclear components of nuclear devices, managed under the DoE's nuclear weapons program after all sanitized operations as required by the Atomic Energy Act of 1954, as amended, have been completed.

e. ***An EOD response*** - in the public sector is a response to an event that occurs outside of a military installation.

6. Roles and Responsibilities;

a. EOD Organization.

(1) Will have all necessary training and literature to meet EOD mission requirements. The EOD organization will be knowledgeable in explosives and explosive effects.

(2) Provide a telephone point of contact for the explosives or munitions emergency response or EOD technical support to civil authorities.

(3) Provide emergency response military munitions or IED-related information necessary for civil authorities to complete post-incident reports, conduct investigations, and other requirements, as well as meeting other information needs.

(4) While performing explosives or munitions emergency responses the EOD organization is not responsible, under any condition, for any environmental remediation action. As a general rule, however, if the object of the emergency response is a military munition, then the DoD EOD Organization retains the responsibility.

b. Agencies Requesting Assistance:

(1) Upon identification of an emergency, contact the cognizant environmental regulatory authority regarding emergency notification requirements.

(2) Complete reports/notifications required by the environmental regulatory authority. Request incident information from the responding EOD organization, as necessary, to complete the required reports.

(3) Responsibility for environmental remediation of any residual contamination. If the object of the explosives or munitions emergency response is a non-military item, then the local requesting authorities are responsible for the site remediation.

(4) Request, in writing, the assistance of the Holloman AFB EOD team. The written request is to be addressed to the Commander, 49th Fighter Wing, 490 First Street, Suite 1700, Holloman AFB, NM 88330. The document should be accomplished at the time of the actual request; however, the next day following the incident is acceptable.

(5) Complete the Explosive Ordnance Disposal Civil Support Release and Reimbursement Agreement, (DD Form 1926) which is provided by the responding team. Signatures of the Department of Public Safety and an authorized representative (i.e., landlord, personal property owner/lease holder, etc.) must be obtained prior to commencing DoD EOD emergency actions.

c. Environmental Regulatory Authorities:

(1) Provide a telephone point of contact for emergency response calls.

(2) Assist in expediting issuance of emergency permits that may be required.

7. Duration/Amendment/Withdrawal: This MOU will remain in force and effect until amended or terminated by mutual agreement of the parties. Any party may withdraw from the MOU upon 60-days written notice to the other parties.

8. Coordination of concerned parties:

49 CES/CED — Date: 28 MAR 01

49 CES/CEV — Date: 28 Mar 01

49 CES/CC — Date: 29 Mar 01

49 FW PA — Date: 9 Jul 01

49 SPTG/CC — Date: 11/7/01

49 FW/CC — Date: 14/7/01

New Mexico Environment Department — Date: 4/4/02

Alamogordo Department of Public Safety — Date: 10-17-01

New Mexico State Police — Date: 6-14-02

Otero County Sheriff's Office — Date: 10-22-01

ATTACHMENT F

20,000-POUND OPEN DETONATION UNIT MANAGEMENT

HOLLOMAN AIR FORCE BASE
OPEN DETONATION TREATMENT UNIT

Permit No. NM6572124422

ATTACHMENT F
20,000-POUND OPEN DETONATION UNIT MANAGEMENT

INTRODUCTION

This attachment addresses the requirements of Title 20, Chapter 4, Part 1, Subpart V New Mexico Administrative Code (NMAC), (20.4.1.500 NMAC), incorporating Title 40 Code of Federal Regulations (CFR) Part 264, Subpart X and 20.4.1.900 NMAC incorporating 40 CFR §§270.23 and 270.73.

F.1 OPERATIONAL PROCEDURES AND WASTE MANAGEMENT PRACTICES

F.1.1 LOADING/UNLOADING OPERATIONS

Procedures to prevent accidental detonation of the waste are also applicable to spill prevention during pretreatment operations. EOD procedures to prevent accidental detonation are detailed in Air Force Manual (AFMAN) 91-201 - *Explosive Safety Standards*, ~~Technical Orders (TOs) 11A-1-42 *General Instructions for Disposal of Conventional Munitions* and 11A-1-60 *General Instructions Inspections of Reusable Munitions Containers and Scrap Material Generated from Items Exposed to, or Containing Explosives*,~~ and Holloman Air Force Base (HAFB) Explosive Ordnance Disposal (EOD) Operating Instruction (EODOI) 32-3001-05. In general, these procedures specify use of no sparking tools, encasement to reduce impact, use of certain clothing materials, and, most importantly, removal of primers and initial detonators from the device. The explosive nature of the waste indicates the greater hazard to be incidental detonation during transfer of waste into the detonation zone. None of the energetic waste contains free liquid.

The Explosives Safety Standards, AFMAN 91-201, will be followed for all loading and unloading operations. The absence of a safety requirement in this manual or in a technical order covering a given item does not necessarily indicate that no safeguards are required. Prompt action will be taken to control any hazard. If an immediately dangerous explosive item is encountered, all operations in the immediate vicinity will be shut down, personnel evacuated to a safe location, and EOD personnel called to render assistance in eliminating the hazard. Operations will not be resumed until the hazard has been eliminated.

AFMAN 91-201, paragraphs 8.27, 8.28 and 8.29, has a detailed description of the methods of loading and unloading the reactive waste to be treated. These are:

- Chock explosives loaded vehicles during loading and unloading operations
- Inspect motor vehicles to determine that a fire extinguisher is available and serviceable, the electric wiring is in good condition, brakes, steering light, horns, etc. are functioning properly, and tires are inflated and serviceable as stated in TO 36-1-191
- Ensure lifting devices on vehicles or handling equipment have a serviceable mechanism designed to prevent sudden dropping of the load in the event of power failure

- Ensure explosives loaded on all types of vehicles and handling equipment are stable and secure before movement. Load stability is required for movements, to include re-warehousing or other activities conducted between one or more storage magazines, storage pads or other operating locations. For on base movements, explosives containers must be restrained, blocked, braced, tied down or otherwise secured to the vehicle to prevent movement and must not damage explosives or containers. "Secure" means the load is protected by an effective restraining system. Restraining devices may include chains and binders, cargo nets and tie-down straps, sideboards and tailgates, etc
- To the maximum extent possible, position munitions cargo vehicles to permit loading and unloading from each side of the cargo be. Munitions will be accessed from the side closest to the load unless access can only be obtained from one side
- Except as required in the event of an electrical storm, do not leave explosives-laden vehicles unattended unless they are parked in a properly designated area such as the weapons storage area, holding yard, or flight line munitions holding area
- Do not load or unload explosives from a motor vehicle while the engine is running, except under the following conditions:
    - Where the engine is required to provide power to vehicle mechanical handling equipment used in loading and unloading the vehicle
    - Where necessary for emergency operations or timing for exercises simulating execution of emergency plans. In this case, small loads or packages of explosives delivered to aircraft, requiring only momentary unloading time, may be removed from a vehicle while the motor is running
    - Engines of diesel-powered vehicles may continue to run during loading or unloading of explosives except when exposed explosives or hazardous locations are involved
    - Adequate ventilation is provided to prevent unnecessary build-up of exhaust gases
- Do not leave vehicles at aircraft storage locations longer than needed to complete explosives loading or unloading. If a delay occurs, move the vehicle from the location
- Refuel trucks before loading explosives

All vehicles will be inspected before loading. Deficiencies will be corrected at the time of inspection, if such correction is considered necessary for safe delivery to the unloading point. During loading or unloading of vehicles, the brakes must be set and if the vehicle is on a grade, at least one wheel must be chocked.

No explosives or ammunition will be loaded into or unloaded from vehicles while the motor is running unless the motor is required to provide power to vehicle accessories, such as mechanical handling equipment utilized in the loading and unloading of the vehicles.

A holding area will be provided to accept initial deliveries of munitions for disposal and demolition materials. The holding area will be located within the disposal range, but at a

suitable distance from disposal sites to preclude uncontrolled destruction of the material by flying fragments, grass fires or burning embers. All dry grass, leaves and combustible material will be removed within a 15 meter (50 foot) radius of the holding area. Munitions to be disposed of, demolition material, and blasting caps be will be separated by a minimum of 7.6 meters (25 feet) within the holding area. After initial delivery to the holding area, munitions for disposal and the necessary demolition material will be delivered to the actual disposal site as required. If a disposal range is not large enough to provide an absolutely safe holding area, munitions will only be delivered to the disposal site in quantities for immediate disposal.

Handling and Preserving Explosives

a. Improper, rough, and careless handling of explosives may result in undue accidents that could result in loss of life, injury, or property damage. The history of accidents that have occurred in the use, handling, shipping, and storing of ammunition shows that in many instances where the cause was determined, the accidents have been due to human error and circumstances that were avoidable.

b. If hazardous conditions present immediate danger to life and property, operations will not be continued until the hazard has been removed.

c. Explosives and ammunition will be handled and transported carefully. Containers will not be tumbled, dragged, thrown, dropped on each other, rolled, walked over, or dropped from tailboards of trucks.

d. Explosive containers should not be opened unnecessarily and should remain sealed until needed.

Procedures to ensure safe handling of these reactive wastes are detailed in AFMAN 91-201, TOs 11A-1-42 and 11A-1-60, and HAFB EODOI 32-3001-05 (Exhibit F-1). All operations are performed by fully trained EOD personnel under the direction of the EOD Supervisor. These personnel are familiar with procedures to be followed for the material being handled.

Only trained personnel under the supervision of an individual who understands the hazards and risks involved in the operation are to handle explosives. This applies to handling explosives and movement of explosives within the immediate vicinity of the operation. The following procedures are followed for handling explosives:

a. Handle detonators, initiators, squibs, and other such electrically or mechanically initiated devices in protective containers. Use containers designed to prevent item-to-item contact. Mark to identify the contents.

b. Do not use bale hooks to handle explosives.

c. Do not use nails to secure covers or make repairs on explosives containers unless there is no hazard to the explosive item or danger of penetrating protective coverings. Exercise special care when using pneumatic or cartridge activated nail guns.

d. Do not tumble, drag, drop, throw, roll, or "walk" munitions. Containers designed with skids may be pushed or pulled for positioning.

e. Do not roll unpalletized conventional high explosive bombs or other explosives authorized by the item technical order unless lugs or other projections have been removed or if they are protected by dunnage rails.

f. Do not use conveyors, chutes, hand trucks, or forklifts in atmospheres and locations where they will create hazards. Interlock and support sections of roller conveyors that are used to move explosives.

g. Do not use boxes containing explosives or munitions to support conveyors.

h. Always consider vehicle and handling equipment type, type of load, and prevailing weather and surface conditions when determining if safe movement is feasible.

i. Restraining devices designed for use with vehicle and handling equipment will be used in accordance with applicable technical orders.

F.1.2 TRANSPORTATION OF EXPLOSIVE WASTES TO THE OD UNIT

The waste energetic items are transported in accordance with AFMAN 91-201, HAFB EODOI 32-3001-05, TOs 11A-1-42 and 11A-1-60, and other relevant orders. Prior to transport, the EOD supervisor briefs all members of the team on hazards associated with specific items, pertinent technical data, TOs, specified treatment procedures, safety precautions, and transport procedures.

These waste munitions are transported to the OD Unit in their original containers or casings, which are designed for long-term stability and thus ensure that no wastes are inadvertently released to the environment prior to treatment. In addition, no free liquids are included among the wastes treated at the OD Unit. Free liquids in waste have a much higher potential of infiltrating into the soil and migrating vertically.

A map showing the explosive waste hauling route from storage to the OD Unit is provided in Attachment A, Figure A-4.

F.1.3 TREATMENT PROCESS

The 20,000-Pound OD Unit provides thermal treatment to waste propellant devices identified as hazardous waste due to reactivity. Certain constituents that may be present in these wastes could potentially pose a risk to those exposed to them. In order to render the wastes non-reactive and eliminate this risk, they are thermally treated. Once the wastes have been successfully treated, they are no longer considered hazardous. Thermal treatment is accomplished by placing the waste within the aboveground cleared OD Unit and detonating it. Open detonation is a thermal treatment process used for the treatment of unserviceable, obsolete, and/or waste munitions whereby an explosive donor charge initiates the munitions to be detonated. Detonation of the

energetic materials is a violent chemical reaction within a chemical compound evolving heat and pressure (exothermic redox reaction), which is self-sustaining after the initial activating energy has been applied. The reaction rate is determined by the velocity of the shock wave that moves at supersonic speeds through the explosive, causing decomposition of the explosive material (TM9-1300-214). The detonation process is quasi-instantaneous with temperatures ranging from 800ºK (981º F) to 1000ºK (1341º F) (EPA 2002). The detonation reaction renders the explosive wastes non-reactive. All hazardous explosive wastes treated at the OD Unit have the potential to detonate as described in Attachment B and no highly unstable wastes are treated at OD Unit.

The OD Unit consists of a clear zone approximately 400 feet in diameter (see Figure A-3 of Attachment A), and ~~OD~~ treatment operations are conducted within a single graded area at the OD Unit, as described in Permit Attachment A. Treatment of the wastes is accomplished according to the Automated Explosive Ordnance Disposal Publication System, T.O. 11A-1-42, T.O. 11A-1-60, AF Man 91-201 or manufacturer's disposal instructions by placing the explosive ordnance ~~on top of the ground~~ within a 100-foot diameter area at the center of the clear zone. ~~All OD Unit waste treatment activities are conducted on the ground surface~~. The waste is then treated by detonation. Detonation charges that consist of Cyclotrimethylenetrinitramine (RDX) explosives are added to the waste pile in order to detonate the wastes. The force of the explosion often creates a depression in the ground, which is inspected to ensure that the waste has been completely destroyed. Unexploded ordnance (UXO) that may have been ejected from the depression is collected and returned to the depression and exploded again to treat the UXO. Casings and fragments that do not have UXO are collected and containerized. Subsequent detonations are performed at locations surrounding the first depression within the 100-foot diameter detonation area. After a detonation, a bulldozer or similar heavy equipment levels the detonation area, and repairs the berm around the pit as needed. During soil sampling, the detonation depression is not filled in, nor is any dirt work conducted, until the soil samples have been collected. An earthen berm, with a height of approximately 18 inches provides a barrier to prevent surface water run-on and run-off from the area of the OD Unit. A unit drawing of the area, showing dimensions of the OD Unit, is shown in Attachment A, Figure A-3.

Potential contaminants that may be released during thermal treatment are generally limited to trace amounts of explosive compounds or metals. The thermal treatment process generally ensures complete destruction of the wastes. After a detonation, any unexploded fragments of the original ordnance are collected and re-exploded to further ensure that complete destruction of the original waste ordnance has occurred. Larger metallic fragments are picked up after each detonation for proper disposal. ~~Because the wastes are treated on the ground surface, a thorough collection of the waste fragments and unexploded ordnance is possible.~~

F.1.4 OPERATING PRACTICES

Operational procedures at the OD Unit are governed by Department of the Air Force Publication TO 11A-1-42, and HAFB EODOI 32-3001-05. TO 11A-1-42 provides EOD personnel with instructions for disposal of unserviceable, serviceable excess, or obsolete

munitions and explosive items except nuclear or hazardous items. HAFB EODOI 32-3001-05 prescribes and explains procedures while conducting operations at the OD Unit.

TO 11A-1-42 specifies certain atmospheric conditions for OD treatment operations. In summary, these conditions are:

- **Temperature:** general (>55°F); winter (not specified)
- **Wind speed:** general (4 to 15 miles per hour); winter (7 to 15 miles per hour)
- **Precipitation:** no treatments allowed; cloud cover: none or limited
- **Time:** 7:00 am to 5:00 pm (daily)

The climatic conditions at HAFB generally allow detonations to be conducted under conditions specified as "excellent" in TO 11A-1-42.

Personnel who perform operations at the OD Unit are specifically EOD-trained staff members. The total number of EOD personnel is limited to those required to perform the operation.

A minimum of two personnel, one of which is an EOD supervisor, are required for all operations. These personnel are provided both initial training at the Eglin Air Force Base school for ordnance and annual reviews concerning ordnance items and Resource Conservation and Recovery Act (RCRA) requirements. Permit Attachment D outlines the required training.

During all operations, the EOD supervisor operates as the range manager and controls initiation of the thermal treatment. Prior to initiation of the treatment event, all other EOD personnel are required to move and take cover south of the OD Unit outside the danger area.

Several efforts are performed prior to the thermal treatment event. All waste energetic items destined for treatment are inspected, logged, and accounted for prior to removal from stock or other designation as waste. It should be noted that these items become waste primarily through shelf-life exceedance or inequalities noted during inspections of serviceable items. A complete inventory of items to be treated is compiled on the advance disposal request, which requires headquarters approval before treatment can proceed. Additionally, an inventory of items to be treated is recorded on the EOD Report (AF Form 3579). Prior to the scheduled treatment event, the EOD supervisor notifies the following base agencies:

- Meteorological service (for imminent weather conditions)
- 49 MXS Munitions Flight
- Base medical service
- Security forces
- Base operations
- On-site coordinator
- Base environmental coordinator

Upon arrival at the unit, all waste energetic items are inspected and accounted for by comparison with the previously prepared inventory. During transport and operations, all nearby roads are cleared, posted, and maintained free of traffic.

To limit the potential for incidental detonations, all primer and detonating items are removed from the waste energetic items. No attempt is made to remove these items if they are integral parts of the device.

F.1.4.1 Explosive Open Detonation Treatment

The actual treatment is accomplished by placement of the waste items on the ground within the OD Unit and attachment of C-4 (RDX) donor charges to the waste item. An "explosive train" is constructed, and remote control detonation is initiated from the designated clear zone. The donor device consists of a series of components that are referred to as an explosive train once the individual devices are placed in combination. An explosive train consists of a primer, an initial detonating agent, and a high explosive. Explosive train detonation is achieved by step-wise detonation of the components. Detailed munitions disposal procedures are provided in TO 11A-1-42.

F.1.4.2 Standard Operating Practices

EOD has standard operating procedures (SOPs) that define uniform standard procedures, instructions, and safety precautions to be employed during EOD operations conducted at the OD Unit. These SOPs ensure that HAFB will implement the OD activities in a manner protective of human health and the environment.

The HAFB EODOI 32-3001-05 implements AFI 32-3001 and ACC SUP 1 to AFI 32-3001. It prescribes and explains procedures to be followed while conducting operations on the EOD Disposal Range and applies to all members of the 49th Civil Engineer Squadron, EOD Flight. According to this document, the following minimum safety guidelines are followed at the OD Unit:

- The range flag will be flown when explosives are on the range
- The basic and specific safety precautions of the items to be disposed of are briefed to OD Unit personnel
- Ensure all personnel know the type, quantity and location of all explosives (25 ft minimum separation between initiating and other explosives)
- Cap check out and test burns will be conducted 50 ft downwind of other explosives
- Smoking will be allowed only in designated area 50 ft downwind of all explosives
- All matches, lighters, and spark-producing devices will be secured in a designated area
- Personnel will wear gloves when handling bare explosives or propellant and wash hands after each operation
- Personnel are prohibited from carrying explosives or explosive components in pockets or elsewhere on the body

- Radios and cell phones will not be used near electro explosive devices (EEDs) (25 ft for handheld radios/cell phones and 50 ft for vehicle mounted radios at a minimum)

- Remove all rings, watches, and jewelry before handling explosives

- Firing device and/or blasting machine will be controlled by the team chief

- The senior EOD will be the Range Safety Officer

- Track Control will give the final clearance for all detonations

- Misfires, wait 1 hour after expected detonation for non-electric and 30 minutes for electric

- Misfire procedures will be briefed during the wait time (IAW 60A-1-1-31 and MX 22 T.O. if used)

- The blast area will be inspected for unconsumed explosives after each detonation by the team chief and one additional person

The SOPs require specific actions at time intervals listed below prior to and after treatment at the OD Unit:

- Two Weeks in Advance of Scheduled Detonation
- One Week in Advance of Scheduled Detonation
- Day Before Scheduled Detonation
- Day of Detonation
- Within 72 Hours After Detonation Occurs

A checklist that lists specific activities to be performed at the intervals listed above is included in Attachment C, Inspection Schedule.

F.1.4.3 Two Weeks in Advance of Scheduled Detonation

The following procedures are conducted two weeks in advance of the scheduled detonation by the EOD Team Chief and the EOD team.

Two weeks in advance of the scheduled detonation, the EOD Team Chief: selects EOD team and conducts a briefing with team (including hazards involved with OD, treatment procedures, TOs, safety, and transportation procedures). In addition, the EOD Team:

1. Conducts a range inspection for free-standing liquids, unexploded munitions, vegetation, burrowing, and signs of run-on/runoff to OD unit

2. Inspects the road to the OD unit for holes, ditches, and settling that could cause problems during the transportation of munitions

3. Identifies items listed for treatment

4. Identifies proper disposal techniques

5. Calculates the total mass being detonated, ensuring total doesn't exceed 20,000 lbs Net Explosive Weight (NEW) per event

6. Contacts 49 MXS Munitions Flight custodian to notify of explosive requirements (how much C-4 needed)

7. Ensure that explosives will be on hand prior to scheduled operation

8. Conducts inspections of emergency response equipment, safety equipment, security devices, EOD vehicles, and operating equipment

F.1.4.4 One Week in Advance of Scheduled Detonation

At one week in advance of the scheduled detonation, the EOD Team verifies items that will be treated, makes sure Munitions Flight has a sufficient supply of explosives for the operation, and checks calculations on the amount of necessary explosives and NEW.

F.1.4.5 Day Before Scheduled Detonation

The day before the scheduled detonation, the EOD Team Chief:

1. Briefs team on pending operations and team assignments EOD Team

2. Contacts Munitions Flight to draw explosive materials and ensure delivery time of munitions and waste will be met

3. Inspects all necessary equipment to ensure operability

4. Notifies Base Fire Department

5. Notifies Base Medical ~~Services~~ Group

6. Notifies Security Forces

7. Notifies Base Operations Staff

8. Notifies Base Environmental Coordinator

9. Contacts base meteorology team to obtain a forecast of predicted weather conditions for the following day and notify them of the operation

10. Ensures that explosives will be on hand prior to scheduled operation

The day before the scheduled detonation, the EOD team inspects:

1. Emergency response equipment

2. Safety equipment

3. Security devices

4. EOD vehicles

5. Operating equipment

F.1.4.6 Day of Detonation

The day of the detonation, the EOD Team Chief:

1. Conducts a safety briefing will all team members including review of requirements and procedures for safely transporting explosives

2. Provides arms to personnel who will be transporting explosives and conducts a briefing on the use of the firearms

3. Ensures that radio communication lines are open with the EOD Team during the drawing and transportation of explosive materials

4. Supervises the munitions loading operations

5. Monitors and identifies deficiencies and refuse treatment if discovered

6. Ensures that all Emergency Equipment (first aid kit, shovels, fire extinguishers, etc.) are on hand or on standby ready to respond

The day of the detonation, the EOD Team will:

1. Contact the 49 OSS Weather Flight or the Test Track weather station to ensure that all weather conditions meet permit terms (i.e., wind speed, direction, temp., precipitation)

2. Records weather conditions as shown in the weather log

3. ~~Transport~~ Coordinate with ~~m~~Munitions Flight personnel the transportation of munitions and explosives to the OD Unit

4. Conducts final inspection of the OD Unit

5. Makes radio contact with Test Track Control and EOD operations center

6. Ensures that mobile two-way radios are placed in appropriate locations (with team members, track control net, team chief, and safety observer)

7. Conducts a physical inspection of all munitions brought for treatment

8. Compares inventory list with letter of disposal request to ensure all items are accounted for. Only items identified on the letter of request can be treated-all others will be refused and returned to Munitions Flight storage for reschedule

9. Places items in the area for treatment

10. Segregates initiation explosives

11. Sets up dual-primed firing systems to initiate the main charge

12. Checks firing systems in primed positions

13. Obtains approval for detonation from the HAFB tower via Test Track Control

F.1.4.7 Within 72 Hours After Detonation Occurs

Within 72 hours after detonation occurs, the EOD Team Chief signs required documentation (i.e., expenditure report) within 24 hours of the OD event and places a copy in the facility file.

The EOD Team will:

1. Collect~~s~~ any UXO and re-detonates it immediately

2. Collect~~s~~ any metals fragments and remnants~~;~~ greater than 2 inches in length

3. Places fragments in a container for proper disposal ~~and handles items as hazardous waste~~.

4. Clean~~s~~ and inspects all EOD vehicles and other equipment

5. Arrange~~s~~ to backfill depressions and grade area

6. Prepare~~s~~ EOD report including an inventory list of the detonated items, NEW, and names of participating EOD personnel

F.1.5 WASTE STAGING

Wastes to be treated are transported to the OD Unit by 49 MXS Munitions Flight trained ~~EOD~~ personnel. Waste is not stored at the OD Unit and is transported prior to a scheduled treatment event. If the treatment event is aborted due to any reason, the waste is removed and transported back to the generator.

F.1.6 IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTES

In accordance with the requirements of 20.4.1.500 NMAC §264.17(a), EOD personnel take precautions to prevent accidental ignition or reaction of ignitable or reactive waste. The waste is kept separated and protected from sources of ignition or reaction such as open flames, cutting

and welding, and hot surfaces. "No Smoking" signs are placed in waste storage and waste handling areas.

Each waste item that is destined for treatment at the OD Unit will be handled in accordance with TOs 11A-1-42 and 11A-1-60. Waste energetic items will not be opened at any time due to the potential for accidental detonation. Post-detonation residues will be inspected to ensure that no untreated waste remains in the OD nit. These measures meet the requirements of 20.4.1.500 NMAC §264.17(b).

The Waste Analysis Plan included as Attachment B provides information on waste characterization (process knowledge, Material Safety Data Sheets, and other technical information) required to document compliance with 20.4.1.500 NMAC §264.17(c).

Incompatible wastes are not handled at the OD Unit. Therefore the requirements of 20.4.1.500 NMAC §264.177 are not applicable. Waste munitions are brought to the OD Unit in their original containers or casings. Containers used for storage of treatment residue (metal fragments) are compatible with the wastes stored.

F.1.7 SECURITY AND ACCESS

The security procedures outlined in this section have been provided by HAFB in compliance with New Mexico Hazardous Waste Management Regulations 20.4.1.500 NMAC §264.14 and 20.4.1.900 NMAC §§270.14(b)(4) and 270.14(b)(19)(viii).

The following sections address security procedures, inspection requirements, preparedness requirements, procedures taken to prevent accidental detonation, prevention of the mixing of incompatible waste, and means to reduce personnel exposure.

F.1.7.1 Security [20.4.1.500 NMAC §264.14(b)(1)]

The primary mission of HAFB is to provide upgrade and continuation training for aircrews assigned to the installation. Additionally, solid base propulsion systems for military devices are tested at the area identified as the Test Track. The general nature of these activities is such that portions of the base facility are under constant surveillance.

In particular, such areas include the Test Track Facility, flight line areas, and the 49 MXS Munitions Flight building. In addition to these surveillance measures, the main base area and any base area adjacent to these secure zones are patrolled at intervals day and night.

Traffic access to HAFB is possible from three routes. These include Highway 70 at the southern boundary of the base; the La Luz gate between Alamogordo and Tularosa; and, through White Sands Missile Range. The main gate is manned by armed guards 24 hours per day, and the other gates are manned and open Monday through Friday from 0600 until 1800 hours. White Sands Missile Range is also under continuous surveillance. These general surveillance practices provide 24-hour surveillance of the OD Unit. Additionally, during explosive open detonation events, constant surveillance of the OD Unit is provided by Test Track personnel and the Security Forces.

F.1.7.2 Barrier and Means to Control Entry [20.4.1.500 NMAC §264.14(b)(2)(i) and (ii)]

The OD Unit is located at the end of a single access road that runs approximately 10 miles along the length of the test track. Entrance to the test track area is strictly controlled by Test Track personnel and the Security Forces. Entrance to the~~se~~ Unit~~s~~ is restricted to authorized visitors on approval of the EOD supervisor. Visitors to the OD Unit must be accompanied by EOD personnel. No visitors are allowed during detonation events. Additionally, the OD Unit is provided with only a single entrance. During detonation events, the area is routinely patrolled to prevent access to the OD Unit.

The OD Unit is a restricted-access area, with the entire area boundary fenced and posted with warning signs at 400 feet intervals.

F.1.7.3 Warning Signs [20.4.1.500 NMAC §264.14(c)]

HAFB has posted warning signs within 100 feet (30.5 meters) of the perimeter of the OD Unit. These signs are printed in English, Spanish, German, and Apache to read as follows (for example, English and Spanish):

"DANGER, NO UNAUTHORIZED PERSONNEL, KEEP OUT"
"PELIGRO, NO PERMITIDA LA ENTRADA SIN AUTORIZACION"

These signs are posted at the road entry point and where the perimeter fence approaches roads or active areas. The gate is marked with a sign which reads, "Danger, Explosives" and is situated to prevent unauthorized access to the active portion of the OD Unit. Monthly security inspections are conducted and recorded by the HAFB Security Forces.

F.1.8 PREPAREDNESS AND PREVENTION [20.4.1.500 NMAC PART 264 SUBPART C]

The following subsections provide information on how operations at the OD Unit comply with the preparedness and prevention requirements of 2.4.1.500 NMAC 264, Subpart C.

F.1.8.1 Required Equipment [20.4.1.500 NMAC §264.32]

In accordance with the requirements of 20.4.1.500 NMAC §264.32, the OD Unit is equipped with or has access to internal communication equipment, fire extinguishers, and fire control and decontamination equipment. Emergency equipment available for use at the OD Unit is discussed in this section and listed in the Contingency Plan included as Attachment E.

F.1.8.2 Internal Communications [20.4.1.500 NMAC §264.32(a)]

Personnel that enter the treatment zone for inspection of operations are provided with hand-held two-way radios. Radio contact with Track Control is maintained at all times while in the restricted area.

F.1.8.3 External Communications [20.4.1.500 NMAC §264.32(b)]

External communications capabilities are provided through the base operator. Communications systems include Defense Switched Network (DSN), Base Telephone System (BTS), and the Qwest System.

F.1.8.4 Emergency Equipment [20.4.1.500 NMAC §264.32(c)]

Emergency equipment available at the OD Unit during operations includes fire extinguishers, two-way radios, and personnel protective equipment such as gloves and respirators. A list of available equipment is presented in the Contingency Plan included as Attachment E.

F.1.8.5 Water for Fire Control [20.4.1.500 NMAC §264.32(d)]

Due to the isolated location of the OD Unit, water for fire control is not available at this unit. However, HAFB fire department trucks are on call during treatment operations and are available for emergency response. The fire trucks can respond within minutes and provide water at adequate pressure and volume to fight any fires that may occur.

F.1.8.6 Testing and Maintenance of Equipment [20.4.1.500 NMAC §264.33]

Communications, fire protection, spill control, and decontamination equipment associated with the OD Unit are tested and maintained according to the inspection schedule detailed in Attachment D.

F.1.8.7 Access to Communication or Alarm Systems [20.4.1.500 NMAC §264.34]

Personnel performing treatment operations at the OD Unit have immediate access to an emergency communication device, either directly or through visual or voice contact with another individual, in accordance with 20.4.1.500 NMAC §264.34. In the event of an emergency, two-way radios and cellular phones allow personnel to contact the EOD office or the HAFB Fire Department.

F.1.8.8 Aisle Space Requirements [20.4.1.500 NMAC §264.35]

The OD unit is a vacant area that allows unobstructed movement of personnel, fire-protection equipment, and decontamination equipment to any area of the unit in the event of an emergency.

F.1.8.9 Support Agreements with Outside Agencies [20.4.1.500 NMAC §264.35]

Information on support agreements with outside agencies, as required by 20.4.1.500 NMAC §264.35 is presented in the Contingency Plan included as Attachment E.

F.1.8.10 Preventive Procedures, Structures, and Equipment [20.4.1.900 NMAC §270.14(b)(8)]

In accordance with 20.4.1.900 NMAC §270.14(B)(8), a description of preventive procedures, structures, and equipment at the OD Unit is presented below.

Wastes are loaded or unloaded by properly trained Munitions Flight or EOD personnel using appropriate equipment, such as forklifts or other heavy equipment. The vehicles are driven to the locations where detonation will occur, and the wastes unloaded. Procedures to prevent incidental detonation of the waste are also applicable to spill prevention during pretreatment operations. EOD procedures to prevent accidental detonation are detailed in Air Force Publications TOs 11A-1-42 and 11A-1-60. In general, these procedures specify the use of non-sparking tools, encasement to reduce impact, use of certain clothing materials, and, most importantly, removal of primers and initial detonators from the device. The explosive nature of the waste indicates the greater hazard to be incidental detonation during transfer of waste into the detonation zone. None of the energetic waste contains free liquid.

An earthen berm that is at least 2 feet in height surrounding the OD Unit prevents surface water run-on to the unit and run-off to other areas of the facility or environment. Typically, surface water from precipitation in the area of the OD Unit is either lost to evaporation, transpiration, or infiltration. In 2006, the White Sands National Monument (WSNM) was closed to the public due to flooding. This flooding was not a result of run-on from arroyos; it resulted from rising ground water due to unusually high regional precipitation. The HAFB OD Unit is 11.2 miles from the northern boundary of WSNM. The OD Unit is not located within the 100-year floodplain (Figure A-5). The unit is situated on relatively flat, basin-floor upland, approximately 1000 feet north of and 27 feet in elevation above the Allen Draw channel. The intermittent streambeds (very old arroyo channels) in the vicinity of the OD Unit discharge westward to the flats and dune fields of the Salt Creek/Salt Lake drainage 10 to 11 miles north. There are no surface water resources in the vicinity of the OD Unit.

The OD Unit has the following stormwater protective measures in place:

- The terrain of the Unit naturally forms stormwater retention locations at the north eastern and south eastern boundaries. Stormwater flows away from the detonation pit and the unit boundaries into these locations
- There is an earthen berm around the entire facility. This berm is approximately eighteen inches high and one foot wide. At the northern entrance, the berm extends inward approximately ten feet on both the eastern and western sides
- The morphology of the dirt in the site naturally allows the soil to retain a high degree of water.

In addition to these protective measures, the entire area drains into White Sands Missile Range (WSMR), where the ground water is of extremely poor quality and very high salinity. With respect to the local topology, the OD Unit is on a slightly elevated mesa. Sheet flow associated with an extremely heavy rainfall will travel around the ODU via an arroyo (Allen Draw) located to the south of the OD Unit.

The OD Unit will be incorporated into the Holloman 2008 NPDES MSGP SWPPP. The inspection criteria for the site will call for a visual inspection of the berm to ensure that its integrity has been maintained. No further stormwater protective measures are required.

F.1.9 Operating Record

As required by 20.4.1.500 NMAC §264.73, HAFB will keep a written open detonation operating record of OD Unit activities at the EOD administrative office. The following records will be maintained at the HAFB EOD Office:

- A description and the quantity of each hazardous waste received, as listed in Tables B-2 through B-6, Attachment B, Waste Analysis Plan
- Operating log that describes the type and quantity of hazardous waste treated in the OD Unit and the date the waste was detonated
- Records and results of waste analyses performed as specified in 20.4.1.500 NMAC §264.13
- Reports of any incidents that required the activation of the Contingency Plan
- Inspection logs for the last three years
- Records of monitoring, testing, analytical data, and any corrective actions taken to prevent or mitigate releases of hazardous waste to the environment
- Training records for EOD personnel
- Disposal requests and Land Disposal Restriction Certifications for hazardous waste transported to a permitted facility
- Correspondence and other documents from governmental agencies that affect the OD Unit

F.1.9.1 Additional Reports

In compliance with 20.4.1.500 NMAC §§264.56(j) and 265.56(j), any release, fire, explosion, or other unusual occurrence that results in implementation of the Contingency Plan will be noted in the OD Unit operating record and reported in writing within 15 days to NMED.

F.1.9.2 Biennial Report

In accordance with 20.4.1.500 NMAC §264.75, a biennial report on OD treatment activities will be prepared and submitted to the Secretary of the NMED. The report will be prepared and submitted to cover facility activities at the OD Unit during the previous calendar year. The EPA identification number, name, and address of the facility will be included in the report. A description and the quantity of each RCRA-regulated explosive hazardous waste treated at the OD Unit will be listed. The method of treatment and disposal for each RCRA-regulated explosive hazardous waste will be described.

F.1.10 WASTE MINIMIZATION AND ALTERNATIVE TECHNOLOGIES

F.1.10.1 Waste Minimization [§262.41(a)(6-7) and §264.75(h) and (i)]

HAFB employs a comprehensive, base-wide strategy to prevent pollution and safeguard the installation's environment. The Pollution Prevention (P2) Program focuses on eliminating and/or reducing dependence on hazardous materials, reducing hazardous and solid waste streams, and reusing generated wastes. The program encompasses Affirmative Procurement, Compliance Through Pollution Prevention (CTP2) Environmental Action Committee, Recycling Program, Composting Program, Household Chemical Reuse Program, Green Zia Program, P2 Regional Partnering Program, Pollution Prevention (P2) Bulletin and Training. The HAFB Pollution Prevention Management Action Plan contains the following information:

- The HAFB policy statement that outlines goals, objectives, and/or methods for source reduction and recycling of hazardous waste at HAFB
- Personnel training, outreach, and incentive programs designed to identify and implement source reduction and recycling opportunities
- Source reduction and/or recycling measures implemented in the last five years or planned for the near future
- Capital expenditures and operating costs devoted to source reduction and recycling of hazardous waste
- Factors that have prevented implementation of source reduction and/or recycling;
- Information on source reduction and/or recycling received (e.g., local government, trade associations, suppliers)
- An investigation of additional waste minimization efforts which could be implemented including an analysis of the potential for reducing the quantity and toxicity of each waste stream through production reformulation, recycling, and all other appropriate means, and an assessment of the technical feasibility, and potential waste reduction for each option
- Process flow charts detailing all hazardous wastes generated at HAFB, by quantity and type and by building/area
- A written determination that demonstrates the need to use those processes which produce a particular explosive waste due to a lack of alternative processes, available technology, or available alternative processes that would produce less volume of hazardous waste

The decision on the applicability of waste minimization technologies is based on munition-specific safety, technical, and cost factors. Currently, HAFB conducts routine shrapnel collection operations at the OD Unit as a resource recovery and recycling measure.

F.1.10.2 Alternative Technologies

The current alternatives to OD treatment for the waste munitions at HAFB can be characterized as follows:

- Disassembly of munitions items to reduce the gross weight subject to further treatment

- Removal of the inert portions of munitions items prior to treatment or conversely the removal of energetic prior to subsequent treatment. This approach may also involve the application of disassembly technologies
- Thermal treatment at a deactivation furnace or energetic waste incinerator (EWI)

The available alternatives, however, do not provide a universal substitute for OD treatment at this time. These current technologies all have significant safety, technical, and cost factors, which limit their applicability on a munitions-specific and site-specific basis. The configuration of some munitions items does not facilitate the disassembly and/or removal of inert portions prior to treatment. The type and energetic content of munitions can also limit the use of deactivation furnaces and incinerators.

The use of alternative technologies to OD will be considered whenever technically and economically practical, and worker safety is not jeopardized.

The Munitions Items Disposition Action System (MIDAS) Program provides a central source of demilitarization and disposal information for munitions items and can be used to identify alternatives to OD treatment. The five areas for demilitarization technologies currently under development by the U.S. Army, Navy, Air Force, Marine Corps, and private industry worldwide derived from the MIDAS Program are:

- Destructive technologies (e.g., contained burn unit with filters, and pyrotechnic incinerators)
- Disassembly technologies (e.g., advanced munitions cutting and disassembly technologies)
- Resource recovery and recycling (e.g., use of energetic material derived fuels in boilers, propellant conversion to fertilizer)
- Removal technologies (e.g., high pressure water washout of large rocket motors)
- Waste stream treatment technologies (e.g., hydrothermal processing of energetic materials)

These technologies, however, are still in the development phase and not available as technically and economically practical alternatives to routine OD operations at HAFB.

Because of the simplicity of the process and the large throughput per event, OD is currently the safest of the technologies. The primary physical hazard when dealing with energetic wastes is bodily injury or death from spontaneous combustion or detonation of the waste items. The most effective way of mitigating this hazard is to minimize exposure to and handling of the energetic wastes. OD requires, by far, the least exposure to and the least handling of the energetic wastes. While the efficiency of the OD process can be somewhat dictated by skilled stacking of the energetic wastes and donor and by choosing optimal weather conditions, OD emits a predetermined and unalterable quantity of effluents to the air, water, and land. Although, alternative technologies allow some control over the final disposition of the process effluents to the air, water, and land, this control may result in a trade-off of one type of effluent or risk for another. OD is the preferred method for cost effective demilitarization of many items and

remains a safe, reliable, cost effective and environmentally acceptable method for select munitions demilitarization, and should remain as a future U.S. demilitarization capability.

F.1.11 HEALTH AND SAFETY PLAN [§270.14(b)(8)(v)]

OD Unit operations are conducted according to AFMAN 91-201, Section 1 - Safety and Accident Prevention of TO 11A-1-42, and HAFB EODOI 32-3001-05 in order to prevent undue exposure of personnel to hazardous waste. Exhibit F-2 shows excerpts concerning Health and Safety Plan.

F.1.12 NOISE CONSIDERATIONS [§270.23(e)]

The OD Unit is located in a uninhabited and undeveloped area approximately 5 miles from residential areas and 15.9 miles from the closest recreational areas of WSNM, therefore noise impacts are not expected. In accordance with TO 11A-1-42, EOD supervisory personnel are required to be thoroughly familiar with the influence of weather conditions on disposal operations. The EOD Team operating the OD Unit is responsible for contacting base meteorology team or the Test Track weather station the day of detonation events to ensure that all weather conditions meet permit terms (i.e., wind speed, direction, temperature, precipitation) and the Weather Log is completed prior to detonation events (see Attachment C). Wind speed will not be less than 3 miles per hour and will not exceed 15 miles per hour.

Groundwater monitoring wells are located at a sufficient distance from the OD Unit to prevent damage to them as a result of detonation of waste (see Attachment A, Figure A-3).

References:

Air Force Manual (AFMAN) 91-201 - *Explosive Safety Standards*

Evaluation of Alternative Technologies to Open Detonation for Treatment of Energetic Wastes at the Naval Air Weapons Station, China Lake, California, January 2004

Holloman Air Force Base (HAFB) Explosive Ordnance Disposal (EOD) Operating Instruction (EODOI) 32-3001-05.
Munition Items Disposition Action System (MIDAS) https://midas.dac.army.mil/

OB/OD Treatment Effectiveness, Alternative Technologies and Waste Minimization, Tooele Army Depot

Technical Order 11A-1-42 *General Instructions for Disposal of Conventional Munitions*

Technical Order 11A-1-60 *General Instructions Inspections of Reusable Munitions Containers and Scrap Material Generated from Items Exposed to, or Containing Explosives*

EXHIBIT F-1

EOD Operating Instruction 32-3001-05

BY ORDER OF THE COMMANDER 49TH CIVIL ENGINEER SQUADRON (ACC)

EOD OPERATING INSTRUCTION 32-3001-05

Operations

EOD DISPOSAL (11.9K) RANGE PROCEDURES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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Supersedes:

This Explosive Ordnance Disposal (EOD) Operating Instruction (EODOI) implements AFI 32-3001 and ACC SUP 1 to AFI 32-3001. It prescribes and explains procedures while conducting operations on the EOD Disposal Range. It applies to all members of the 49th Civil Engineer Squadron, EOD Flight.

1. RESPONSIBILITIES. It is the responsibility of flight members to comply with this OI. Furthermore, the following individuals/activities are tasked as follows.

1.1. Management. Ensure flight members receive initial and annual RCRA training to perform operations on the permitted range.

1.2. Senior EOD Technician. The senior EOD Technician present is responsible for the conduct of personnel involved in the operation.

2. EOD DISPOSAL RANGE EXPLOSIVE LIMITS. The Holloman AFB permitted disposal range facility is environmentally cleared for 20K lbs NEW of 1.1; however, the explosive limit during any one single detonation will not exceed 11.9K lbs NEW of 1.1 as determined by DDESB (3 Feb 05 certification). This value includes the total NEW of the items to be disposed plus the value of the added demolition charge.

3. PERSONNEL LIMITS. Personnel limits are based on the type of operations being conducted. At no time will the number of personnel exceed the number that can be effectively and safely controlled or supervised. A one-to-five ratio (EOD Techs-to-observers), at a minimum, must be maintained at all times.

3.1. Minimum. Two EOD Technicians, at least one 7-level or two 5-levels.

3.2. Casuals. Will be permitted to ride in vehicles transporting explosives as long as the passenger capacity of the vehicle is not exceeded.

3.3. Vehicles. No personal vehicles will be authorized within the locked gates of the range. If personal vehicles are used for transportation to the range, they will be left at the ARC building.

4. MINIMUM EQUIPMENT REQUIREMENTS.

4.1. Demolition tools and equipment.

4.2. Explosives and demolition materials.

4.3. First Aid Kit.

4.4. Fire extinguishers, two 2A 10B/C.

4.5. Pioneer and hand tools as required.

4.6. Disposal Range Guide and applicable technical data.

4.7. Radio, at least two.

4.8. Range flag.

4.9. Specialized EOD tools as required.

4.10. Vehicle with placards.

5. LOCATION. The EOD disposal treatment facility is located on Holloman AFB on the northern end of the Test Track Area, MGRS grid coordinates 13S CS 91456 55523

6. SAFETY

6.1. Observe applicable safety precautions outlined in AFMAN 91-201, T.O. 11A-1-42, T.O. 11A-1-66, T.O. 60A-1-1-22, T.O. 60A-1-1-31 and any other applicable T.O. dealing with the operation or specific ordnance items involved.

6.2. Brief and observe safety precautions listed in applicable publications.

7. ENVIRONMENTAL

7.1. Adhere to guidance directed by the Open Detonation Treatment Unit permit. This information is maintained in the EOD Operations Section.

8. EMERGENCY PROCEDURES. In the event of a fire or accident/incident, follow procedures outlined in the Attachment 1.

9. OPERATIONS.

NOTE: Tasks in 9.1 may not be accomplished for Emergency Disposal operations.

NOTE: EOD personnel may not accept custody or accountability for munitions for the sole purpose of treatment by burning or detonation. Instead, the accountable officer for the munitions to be treated must retain custody and accountability until treatment is complete.

NOTE: Inert items will not be treated.

NOTE: Electrical initiation is required on the disposal range to allow for positive control.

NOTE: Vehicle used for transporting explosive materials must be equipped IAW AFMAN 91-201 and inspected.

9.1. PRE-OPERATION PROCEDURES:

9.1.1. Conduct a range inspection IAW permit requirements (Operations Monthly Inspection).

9.1.2. Contact Track Control to schedule range use and clearance. The 11.9K range will not be utilized simultaneously with a High Speed Test Track mission or during a White Sands Missile Range test where the cordon impedes the disposal range or airspace.

9.1.3. Check items listed with technical data to ensure proper disposal and calculate the total NEW.

9.1.4. Notify the flight munitions custodian of explosive requirements to ensure items are on hand or will be prior to operation. Schedule for munitions pull within required amount of time.

9.1.5. Assign a team and brief on pending operation.

9.1.6. Draw and inspect required equipment to ensure operability. Ensure placards and required equipment are available in the vehicle.

9.2. SCHEDULED OPERATION PROCEDURES:

9.2.1. Range Calls. On the day of the operation, EOD team chief will ensure all range notifications are accomplished IAW Attachment 2.

9.2.2. Ensure teams dispatched to draw explosive materials have and maintain communications with the EOD Operations Center. Team Chief will make contact with EOD Operations Center and Track Control prior to arrival at disposal range. EOD Range Safety Officer will also monitor radio communications on Test Track Channel and assist as required.

9.2.3. Conduct safety briefing to team members IAW Attachment 3.

9.2.4. Inspect the pit prior to operation.

9.2.5. Segregate initiation explosives and prepare firing set-up.

9.2.6. Ammunition Disposal Requests: A physical inventory will be conducted of all munitions brought for treatment by Munitions Storage Area (MSA) personnel. Compare inventory listing with letter of request to ensure all items are accounted for. Only items identified on the letter of request can be treated; all others will be refused and returned to MSA for reschedule. Team chief will refuse treatment if any deficiencies are noted.

9.2.7. Once inventory is completed, team members may place items in the pit for treatment.

9.2.8. Coordinate road closure (Range Road 9, Track Road 50, Tula Peak Road and any camera pad access roads) with Track Control, as required.

9.2.9. Team members will set up dual primed firing systems to initiate the main charge.

9.2.10. Team chief will check each primed position and withdraw to the safe area.

9.2.11. Initiate firing train only after obtaining approval from the Holloman Tower via Test Track Control.

9.2.12. Once detonation is evident, the team chief will make a long-range reconnaissance of the surrounding area to determine the presence of possible kick-outs and/or possible fires. The team chief will dispatch two team members down range to inspect the shot. Once the site is determined clear, remaining team members can return to the detonation site.

9.3. POST OPERATION PROCEDURES:

9.3.1. Notify the airfield control tower when operation is complete, as required.

9.3.2. Gather and remove trash and residue. Large pieces of scrap metal must be collected.

9.3.3. Notify EOD Operations of completion.

9.3.4. First Detonation of Every Quarter. Make immediate arrangements for soil sampling IAW established EPA permit requirements.

9.3.4.1. EOD Operations must monitor soil sampling schedule established by the EPA permit requirements, THEN arrange for immediate filling of detonation hole.

9.3.5. Team Chief shall make arrangements for immediate filling of detonation hole if no soil sampling is needed.

9.3.6. Team chief will ensure that AF Form 2005, Issue/Turn-In Request, is properly filled out and turned in to supply/munitions personnel for processing within 24 hours following operation. Team chief will complete the required EOD report.

9.3.7. Operation is terminated once documentation and 11.9K Activities Log is updated with the Operations.

9.3.8. All equipment and vehicles used must be cleaned and returned to ready status.

ANDRA B. CLAPSADDLE, Lt Col, USAF
Commander, 49 CES

Attachments
1. Range safety briefing guideline.
2. Emergency procedures.
3. Range calls.

49 FW / SEW
Review Date: 20 Jun 07
Signature:

49 FW / SEW
Review Date: 28 Jun 07
Signature:

49 FW / SEW
Review Date: 25 Nov 08
Signature:

ATTACHMENT 1

EMERGENCY PROCEDURES

A2.1. Emergencies. Emergencies consist of fire, accidental detonation, personal injury, and any other situation deemed hazardous by the team chief.

A2.2. In the event of an emergency.

A2.2.1. All personnel will meet at the range flag or other pre-designated meeting location.

A2.2.2. The team chief will take accountability for all personnel.

A2.2.3. The Range Safety Officer will contact the necessary agency for assistance (fire dept, ambulance, etc.).

A2.2.4. First Aid will be rendered by all SABC-trained personnel, if necessary.

A2.3. Lightning. If lightning approaches within 5 nautical miles during an explosive operation, all operations will cease immediately and all personnel will evacuate to a safe area. After the lightning has dissipated, the team chief and one additional person will proceed down range and ensure the safety of the operation site.

ATTACHMENT 2

RANGE CALLS

A3.1. Range calls. The following offices/agencies will be notified prior to any explosive operation on the 11.9K Disposal Range.

A3.1.1. 49 CES Commander, ext 2-3071.

A3.1.2. 49 FW Command Post, ext 2-7575.

A3.1.3. Fire Department, ext 2-7228.

A3.1.4. Ambulance Response, ex 2-3260

A3.1.5. LE Desk, ext 2-7171.

A3.1.6. Track Control, 679-2105.

A3.1.7. Base Operations, ext 2-5410.

A3.1.8. Explosive Safety, ext 2-3793.

A3.1.9. Tower Captain, ext 2-7307.

A3.1.10. 49 FW Public Affairs, ext 2-5406.

A3.1.11. Holloman Weather, ext 2-3924.

ATTACHMENT 3

RANGE SAFETY BRIEFING GUIDELINES

A1.1. Guidelines. These guidelines will be followed at a minimum when giving a safety briefing on the11.9K disposal range.

A1.1.1. The range flag will be flown when explosives are on the range.

A1.1.2. Brief the basic and specific safety precautions of the items to be disposed of.

A1.1.3. Ensure all personnel know the type, quantity and location of all explosives (25' minimum separation between initiating and other explosives).

A1.1.4. Cap check out and test burns will be conducted 50 ft downwind of other explosives.

A1.1.5. Smoking will be allowed only in designated area 50' downwind of all explosives.

A1.1.6. All matches, lighters and spark-producing devices will be secured in a designated area.

A1.1.7. Wear gloves when handling bare explosives or propellant and wash hands after each operation.

A1.1.8. Do not carry explosives or explosive components in pockets or elsewhere on the body.

A1.1.9. Radios and cell phones will not be used with near EED's (25 ft for handheld and 50 ft for vehicle mounted at a minimum).

A1.1.10. Remove all rings watches and jewelry before handling explosives.

A1.1.11. Firing device and/or blasting machine will be controlled by the team chief.

A1.1.12. The senior EOD will be the Range Safety Officer.

A1.1.13. Track Control will give the final clearance for all detonations.

A1.1.14. Misfires, wait 1hour after expected detonation for Non-electric and 30 min for electric

A1.1.15. Misfire procedures will be briefed during the wait time (IAW 60A-1-1-31 and MX 22 T.O. if used).

A1.1.16. The blast area will be inspected for unconsumed explosives after each detonation by the team chief and one additional person.

EXHIBIT F-2

Health and Safety Plan Information

References:

AF MAN 10-100 - Airman's Manual

AF MAN 91-201 – Explosives Safety Standards

EODOI 32-3001-05 – EOD Disposal (11.9K) Range Procedures

Explosives Safety General Instructions - It is Air Force policy consistent with operational requirements to:

- Provide the maximum possible protection to personnel and property, both inside and outside the installation, from the damaging effects of potential accidents involving ammunition and explosives (AE).
- Expose the minimum number of people to the minimum amount of AE for the minimum amount of time consistent with safe and efficient operations. This maxim is known as the cardinal principle of explosives safety.
- Ammunition and explosives safety standards herein should be considered minimum standards. Greater protection should be provided when practicable.
- Observe explosives safety practices during all operations that include the use of live explosives.
- Comply with DoD and Air Force explosives safety and environmental standards.

EOD Operations

- **EOD Procedures -** Performance of EOD procedures requires a minimum of two EOD qualified people (one worker and one for safety back-up and to detect errors in procedures). If deployed on a mission where performance of EOD procedures is likely, deploy a minimum of two EOD-qualified people. One EOD-qualified person (with an appropriate safety backup capable of rescue actions) can provide site assessments, evaluations, and other on-site analysis as long as no procedures are performed and ordnance or explosives are not disturbed.
- **Casuals -** Casuals are persons not normally part of an explosives operation but have duties that require their presence, such as quality assurance, medical, safety or inspection personnel.
- **Emergency Medical Support -** When conducting live explosive operations, (e.g., EOD operations, range clearance, or other demolition and munitions destruction) emergency medical support must be available within 30 minutes while the operations are being

performed. The medical support must be analogous to the expected trauma resulting from an accident. For minor injuries, the EOD team will have a first aid kit available.

- **Visitors -** Visitors are non-essential personnel with limited access. Stop operations when visitors are present.
- **Explosives Limits** - Design explosives operations to ensure minimum exposure of personnel to explosives in compliance with the cardinal principle (see paragraph 1.1.2). Only the explosives needed to ensure a safe and efficient work flow will be present in an operating location when operations are being conducted; this should normally be limited to a one day supply. Supervisors are responsible for enforcing explosives limits.

Housekeeping - The following are minimum precautions:

- Non-explosives Waste Materials.
- Do not commingle non-explosives waste materials (e.g., oily rags, combustible scrap, wood, paper, and flammable packing materials) with explosives residue.
- Place non-explosives waste materials in approved, properly marked containers.
- Place non-explosives waste material containers outside of explosives facilities, except for containers required at work locations during operations.
- Empty non-explosives waste material containers at working locations as often as needed, but at least once each workday or shift.
- Contact the base environmental management office for additional guidance for hazardous materials.

Ground Safety and Health Programs - Occupational Safety and Health requirements are listed in AFOSHSTD 91-501, Air Force Occupational, Safety and Health Standard. AF Form 55, Employee Safety and Health Record is used to document completion of requirements for each EOD team member.

EOD Flights must participate in the following health and safety programs:

- Environmental Management System, Hazardous Communication (HAZCOM).
- Respiratory Protection Program.
- Blood Borne Pathogen (BBP) - With use of established control procedures (use of personal protective equipment (PPE) and good hygiene); normal home-station EOD duties do not warrant participation in the BBP program.
  - If local or deployed special EOD missions create a high potential for exposure to BBP, then EOD flights will coordinate with Bioenvironmental Engineering and Public Health flights to determine whether enrollment in this program is appropriate. Refer to Title 29 Code of Federal Regulations (CFR), Part 1910, subpart Z, Standard 910-1030, *Blood borne Pathogens* (29 CFR 1910-1030), for requirements on training and a written exposure control plan (see also the sample guides in the EOD Mortuary Support CONOP).
  - As-Low-As-Reasonably-Achievable (ALARA).
  - Hearing conservation.

Smoking - AFOSH 91-100, *Aircraft Flight Line - Ground Operations and Activities*, Chapter 1, governs smoking on the flight line. For all other explosives locations, the following requirements apply:

- Allow smoking in an explosives storage area or operating location only in specifically designated locations, where "authorized smoking areas" signs are posted.
- In an explosives storage area or operating location containing exposed explosives, include a notice that flame-producing devices must be turned over to the entry controller or placed in a container provided.
- Requirements for Designated Smoking Locations.
- Do not place within 50 feet of any explosives locations (to include conveyances or material handling equipment loaded with explosives items).
- Persons wearing clothing contaminated with flammables, explosives or other hazardous materials are not allowed in designated smoking areas.
- Do not smoke in, on, or within 50 feet of any conveyance or material handling equipment loaded with explosives items.

Handling of Explosives - This paragraph applies to the handling of explosives and movement of explosives within the immediate vicinity of an explosives operation.

- Only trained personnel under the supervision of an individual who understands the hazards and risks involved in the operation are to handle explosives.
- Handle detonators, initiators, squibs, and other such electrically or mechanically initiated devices in protective containers during storage, transportation, and inspection. Use containers designed to prevent item-to-item contact. Mark to identify the contents.
- Do not use bale hooks to handle explosives.
- Do not use nails to secure covers or make repairs on explosives containers unless there is no hazard to the explosive item or danger of penetrating protective coverings. Exercise special care when using pneumatic- or cartridge-activated nail guns (see AFI 21-201, *Conventional Munitions Maintenance Management*).
- Do not tumble, drag, drop, throw, roll, or "walk" munitions. Containers designed with skids may be pushed or pulled for positioning.
- Do not roll un-palletized conventional high explosive bombs or other explosives unless authorized by the item TO and lugs or other projections have been removed or if they are protected by dunnage rails.
- Always consider vehicle and handling equipment type, type of load, and prevailing weather and surface conditions when determining if safe movement is feasible.
- Restraining devices designed for use with vehicle and handling equipment will be used in accordance with applicable TOs.
- Do not move explosives rapidly across any non-conductive surface.

Static Grounding

- **Static Electricity -** Static electricity is created when two different materials come in contact and then are separated again; this includes when the two materials are rubbed against each other. Separated charges accumulate on the two materials, creating a voltage potential that can be discharged when either of the materials is moved close to an uncharged or grounded object. This discharge can cause a mishap if it occurs through, or in the presence of, a hazardous substance susceptible to electrostatic initiation. For this reason, precautions shall be taken against performing unnecessary actions that lead to the buildup of static voltages, actions shall be taken to avoid the prolonged storage of static voltages on personnel or equipment, and actions shall be taken to discharge static voltages in a safe and controlled manner during operations involving explosives.
- **Methods to Reduce the Hazards of Static Electricity -** Personnel can minimize the possibility and severity of both the buildup and discharge of hazardous static electric potentials by observing the following guidance.
- Whenever possible, personnel should avoid using rags or wearing outer garments made of materials which have high static-generating characteristics (e.g., 100% polyester, nylon, rayon, silk, wool, etc.). Wool socks, glove inserts, and caps as well as undergarments of synthetic fabrics are less of a hazard than outer garments such as jackets or pants.
- **Warning**–do not transmit or key radios within 25 feet from the hazardous waste when using a hand held radio, 10 feet when using a cellular telephone, and 100 feet when using a vehicle radio. It may cause a detonation.
- **Safe Separation Distance (SSD) -** The SSD is the calculated distance from an emitter beyond which the radiated power density from that emitter has decreased to a level which is too low to couple enough energy into an electro explosive device (EED) to initiate detonation. Measurement of the SSD may take into account the vertical difference in height between the emitter and the EED or weapon meant to be protected.
- **Cellular telephones -** The SSD for all cellular telephones is 10 ft from all EEDs, regardless of configuration. This guidance assumes all cellular phones are in compliance with Title 47 CFR 22.905 which defines the allowable frequency range for cellular phones as 824 MHz to 849 MHz and Title 47 CFR 22.913 which requires a maximum EIRP of 7 Watts. (Ref: AF MAN 91-201, Paragraph 9.30.4.1).

NOTE: At HAFB, use of cell phones is prohibited in the bermed area.

Transportation of Explosives

- Take precautions to ensure minimum exposure of people and property during all phases of transportation. The time munitions and explosives are in the transportation mode must be limited to the absolute minimum necessary to complete the task.

- **Explosives Movement Routes on Base -** Designate the safest possible primary and alternate explosives movement routes to cover all phases of movement. Avoid built-up areas and key, mission-oriented facilities and equipment to the maximum extent possible.
- **Motor Vehicle Inspection -** Prior to use, inspect motor vehicles used to transport explosives according to AFMAN 91-201 to determine that:
    - Fire extinguishers are available, filled, and in good working order.
    - Electric wiring is in good condition and properly attached.
    - Chassis, motor, pan, and underside of body is reasonably free of oil, grease, and fuel.
    - Fuel tank and feed lines are secure and not leaking.
    - Brakes, steering, lights, horn and windshield wipers are functioning properly.
    - Tires are properly inflated and serviceable IAW T.O. 36-1-191.

Load Protection and Stability.

- Fasten safety chains between towing vehicles and trailers carrying explosives when lunette and pintle fastenings are used. Safety chains are not required when using specifically designed breakaway control safety features prescribed by the pertinent T.O.
- Ensure explosives loaded on all types of vehicles and handling equipment are stable and secure before movement. For on base movements, explosives containers must be restrained, blocked, braced, tied down or otherwise secured to the vehicle to prevent movement and must not damage explosives or containers. “Secure” means the load is protected by an effective restraining system. Restraining devices may include chains and binders, cargo nets and tie-down straps, sideboards and tailgates, etc.
- Consider vehicle and handling equipment type, type of load, and the prevailing weather and road conditions when determining if safe transport is feasible. This guidance pertains to munitions storage area as well as applicable flight line operations.

Loading and Unloading.

- Chock explosives loaded vehicles during loading or unloading.
- To the maximum extent possible, position munitions cargo vehicles to permit loading and unloading from each side of the cargo bed. Munitions will be accessed from the side closest to the load unless access can only be obtained from one side.
- Do not load or unload explosives from a motor vehicle while the engine is running, except under the following conditions:
    - Where the engine is required to provide power to vehicle mechanical handling equipment used in loading and unloading the vehicle.
    - Engines of diesel-powered vehicles may continue to run during loading or unloading of explosives except when exposed explosives or hazardous locations are involved.

- Adequate ventilation is provided to prevent unnecessary build-up of exhaust gases.
- Refuel trucks before loading explosives.

Maintenance of Vehicles Carrying Explosives.

- Only operator inspection and maintenance normally related to the operation of a vehicle will be done on explosives-laden vehicles. Such maintenance includes servicing with fuel, oil, air, lubrication and water, changing tires, fuses, hoses and drive belts, etc.
- No maintenance will be done on an explosives-loaded vehicle or trailer that would increase the probability of fire or would require the use of heat-producing equipment.
- No restrictions are imposed on tractor maintenance when the tractor is separated by at least 100 feet from an explosives-loaded trailer.
- When tires are being changed, the vehicle or trailer must not be elevated so as to shift the load or place an excessive strain on the tie downs.
- Vehicles used for transporting explosive materials must be equipped as stated in AFMAN 91-201.

Firefighting, Emergency Planning and Fire Prevention Equipment

- **Fire Extinguishers - U**nless otherwise directed by the Base Fire Chief, provide a minimum of two serviceable fire extinguishers, suitable for the hazards involved, for immediate use at any location where AE is being handled.
- Disposal Range Guide and applicable technical data.
- A minimum of two Land Mobile Radios.
- Range flag.
- Specialized EOD tools as needed.
- Provide each explosives-laden vehicle used for transport with at least two portable 2A-10B/C rated extinguishers.
- Vehicle with placards
- **Areas Used for Intentional Detonations -** Check environmental compliance and Resource Conservation and Recovery Act (RCRA) requirements and permits for this operation.

Contingencies, Combat Operations, Military Operations Other Than War, and Associated Training

Contingencies are emergencies involving military forces caused by natural disasters, terrorists, subversives, or by required military operations. Due to the uncertainty of the situation, contingencies require plans, rapid response, and special procedures to ensure the safety and readiness of personnel, installations, and equipment.

ATTACHMENT G

CLOSURE AND POST-CLOSURE PLAN

HOLLOMAN AIR FORCE BASE
OPEN DETONATION TREATMENT UNIT

Permit No. NM6572124422

ATTACHMENT G
CLOSURE AND POST-CLOSURE CARE PLANS

INTRODUCTION

This Closure Plan describes the activities necessary to close the 20,000-Pound Open Detonation (OD) Unit at Holloman Air Force Base (HAFB). This Closure Plan has been prepared in accordance with New Mexico Hazardous Waste Management Regulations in Title 20, Chapter 4, Part1, Subpart V of the New Mexico Administrative Code (20.4.1.500 NMAC), incorporating Title 40 Code of Federal Regulations (CFR) §§264.110 through 264.115, Subpart B and 20.4.1.900 NMAC, incorporating 40 CFR §§270.14(b)(13) and 270.14(b)(15) through (18). A copy of the Closure Plan will be kept on file at HAFB until final closure of the unit is completed and certified in accordance with 20.4.1.500 NMAC, incorporating 40 CFR §264.115.

Until final closure of the OD treatment unit is complete and has been certified in accordance with 20.4.1.500 NMAC, incorporating 40 CFR §264.115, one copy of the approved plan and all approved revisions will be on file at the HAFB 49 CES/CEAN~~V~~ as required by 40 CFR 264.1 18(b)(3). Copies will be made available to the Secretary of the New Mexico Environment Department (NMED) or the U.S. Environmental Protection Agency (EPA) Regional Administrator upon request. The HAFB 49 CES/CEAN~~V~~ Flight Chief is responsible for storing and updating facility copies of the Closure and Post-Closure Plans and for ensuring all other copies of the plans are updated accordingly. The contact for the OD Unit during the post-closure care period is the HAFB 49 CES/CEAN~~V~~.

G.1 CLOSURE PERFORMANCE STANDARD

This 20,000-Pound OD Unit will be closed to meet the following performance standards:

- Ensure that the 20,000-Pound OD Unit will not require further maintenance and controls
- Minimize and eliminate threats to human health and the environment, prevent the release of hazardous wastes, hazardous constituents, or waste decomposition products to soils, surface waters, groundwater or the atmosphere
- Comply with the applicable closure and post-closure requirements of 20.4.1.500 NMAC Part 264, Subparts G and X

In order to achieve this standard, measures taken during the active life and those that will be conducted during closure have been formulated specifically to address these criteria.

G.2 SUMMARY OF SAMPLING ACTIVITIES CONDUCTED DURING ACTIVE LIFE

During the active life of the OD Unit, the post-treatment residuals and soils will be sampled annually to demonstrate treatment effectiveness and ensure that residuals are nonhazardous. During the interim period between treatment events, the unit will be periodically graded, and residuals in the soil, if any, will remain covered to retard leachate formation and prevent wind

dispersal. Soils in the OD Unit will be sampled annually for characteristics of hazardous waste and suspected hazardous constituents, as specified in the Sampling and Analysis Plan (SAP), Permit Attachment H. The SAP documents all of the protocols used during active-life sampling events.

G.3 SUMMARY OF CLOSURE ACTIVITIES

G.3.1 FINAL CLOSURE ACTIVITIES

At the conclusion of the final OD treatment event, the site will be inspected and all debris will be removed. Following these activities, representative samples from across the entire 20,000-Pound OD Unit will be collected and analyzed to determine the residual concentrations of any toxic metals and explosive compounds, if any. These analytical results will be compared with NMED Site Screening Levels (SSLs) and background levels for metals, or risk-based criteria deemed to be protective of human health. If all levels are determined to be below background (for metals) or SSLs, the closure will be considered clean closure. If levels are detected in excess of background or SSLs, but are below risk-based criteria, the closure will be considered a risk-based closure.

In the event that an area of the unit is determined to contain levels in excess of risk-based criteria, further action will be taken as necessary in coordination with NMED prior to completing closure, such as risk assessment, delineation of the extent of the exceedence, analysis of corrective measures, and corrective measures implementation. When all such activities have been completed as required, and all samples show that the residual levels of contamination are below the risk-based criteria, all remaining closure and post-closure activities will be completed, including grading and decontamination. Certification of closure will be submitted to NMED within 60 days of completion of closure activities. More detailed descriptions of the specific activities that will be conducted to ensure that the closure performance standard is met are presented in the following sections.

G.3.2 PARTIAL CLOSURE ACTIVITIES

Since it is anticipated that the unit will be 100 percent in use during the life of the unit, there will be no partial closure of the OD Unit and only the complete closure of this facility will be addressed.

G.3.3 MAXIMUM WASTE INVENTORY

Operating practice precludes the storage of hazardous wastes at the 20,000-Pound OD Unit. Standard Operating Procedures are detailed in permit Attachment F. For safety reasons, waste munitions will be treated as received or as generated and no other wastes are stored at the site. During operation, the maximum amount of hazardous wastes treated during a single OD event at any time during the life of the facility is 20,000 pounds net explosive weight of waste munitions. No waste munitions will be present at the site upon initiation of closure activities.

G.3.4 SCHEDULE FOR CLOSURE

As specified in 20.4.1.200 NMAC §261.113(b), closure activities at the 20,000-Pound OD Unit will be completed within 180 days of treating the final volume of hazardous waste. No extension beyond the 180 days provided is being requested at this time; however, if it is determined that an extension is needed, this plan will be modified. Notification of intent to close will be submitted to the NMED, Hazardous Waste Bureau. Table G-1 presents an estimated closure schedule.

At this time, we are not contemplating a future closure of the OD Unit. It has proven to be a cost effective and a safe operation. Also, the Unit has provided personnel assigned to the Explosive Ordnance Disposal Flight with a valuable training program while treating hazardous waste.

G.3.5 AMENDMENT OF THE CLOSURE PLAN

In the event an amendment of the Closure Plan is necessary, HAFB will submit a written notification of a request for a permit modification in accordance with 20.4.1.500 NMAC §264.112(c). HAFB will submit a notification to NMED or request a permit modification to revise the approved closure plan if:

- There are changes in the operating plans, procedures, or facility design that affect the closure plan
- There is a change in the expected year of closure
- During implementation of closure activities, unexpected events require a modification of the approved closure plan

In accordance with 20.4.1.500 NMAC §264.112(c)(3), HAFB will submit a permit modification request along with a copy of the amended Closure Plan at least 60 days prior to the proposed change in facility or operation, or no later than 60 days after the occurrence of an unexpected event that affects the closure plan. If an unexpected event occurs during the final closure period, the permit modification will be requested no later than 30 days after the unexpected event. If NMED requests modifications to the plan under the conditions described in 20.4.1.500 NMAC §264.112(c)(4), HAFB will submit the modified plan within 60 days of the request or within 30 days if the change in facility condition occurs during the final closure period.

G.3.6 CLOSURE AND POST-CLOSURE COST ESTIMATE, FINANCIAL ASSURANCE, AND LIABILITY REQUIREMENTS

As a federal facility HAFB is exempt from the cost estimate, financial assurance, and liability insurance requirements of 20.4.1.500 NMAC Part 264, Subpart H. According to 20.4.1.500 §264.140 (c), federal facilities are exempt from this requirement.

G.4 CLOSURE PROCEDURES

When the decision is made to close the OD Unit, all hazardous waste present at the site will be treated or removed before closure activities commence. As outlined in Section G.3.2 above, the steps to achieve the closure standard include site reconnaissance, removal of scrap materials and

debris, closure sampling and analysis, risk-based screening, corrective action (if needed), surface grading, decontamination, and closure certification. Appropriate personal protective equipment (PPE) will be worn during each of these steps. Each step is discussed in detail below.

G.4.1 SITE RECONNAISSANCE

The first phase of closure will consist of a hazards survey or visual site inspection (VSI) of the OD Unit conducted by HAFB EOD and industrial hygiene personnel. The purpose of the survey will be to identify potential contamination concerns that may present hazards to workers during the closure activities and to specify any control measures necessary to reduce worker risk. The hazards survey will consist of a VSI to identify the location of any scrap materials, debris, or any other substances that may impede closure of the unit. All materials that need to be removed prior to proceeding with closure will be documented in a field inspection logbook. The VSI will provide the information necessary for industrial hygiene personnel to identify worker qualifications, PPE, safety awareness, work permits, exposure control programs, and emergency coordination that will be required to perform closure. All workers involved in the closure activities will be required to have training and medical monitoring as required by applicable regulations. Personnel performing closure activities will be required to wear PPE as specified by industrial hygiene personnel.

G.4.2 REMOVAL, DISPOSAL, AND DECONTAMINATION OF EQUIPMENT

Based on the VSI, any identified scrap, debris, or other substance that could impede closure of the unit will be removed and disposed of in accordance with applicable regulatory requirements. Because treatment may not render all the treated waste munitions nonhazardous, all fragments of unexploded ordnance, scrap materials and debris will be containerized and managed as appropriate. Disposable PPE will also be placed in containers and managed appropriately. Tools and equipment used during the decontamination of the OD Unit will be scraped if necessary to remove residue. Following this, the equipment will be cleaned with detergent and water solution and rinsed with clean water. The wash and rinse water will be containerized and samples collected for analyses. Sampling and analysis methods and procedures are discussed in Attachment H - Sampling and Analysis Plan.

G.4.3 WASTE MANAGEMENT

Wastes potentially generated during closure activities at the OD Unit include excess soil from sampling, decontamination water, PPE, and potentially excavated soil. To minimize the amount of waste generated during closure activities, excess soil cuttings from borings will be replaced in the auger holes. Liquid wastes generated from cleaning equipment will be minimized by using only the amount of wash and rinse water necessary to achieve successful decontamination.

Wastes generated from closure activities at the OD Unit will be managed as follows:

- Wastes will be stored in appropriate containers that are compatible with the wastes and that are in good condition
- Waste containers will remain under the control of the personnel generating the waste
- Waste containers will be segregated according to compatibility and chemical waste type

- Wastes will be stored in containers that remain closed, except when adding or removing wastes
- Waste containers bearing free liquid will be provided with secondary containment
- Waste containers will be managed in such a way as to prevent ruptures and leaks
- Waste containers will be labeled appropriately, pending receipt of analytical results
- Labels will be filled out appropriately and marked using a permanent marker or pen
- Label information will include waste source, suspected contaminants, contents, depth (if appropriate), the date on which accumulation began, and a contact name

If analytical results indicate that a waste is hazardous, appropriate storage and disposal procedures will be followed. The hazardous waste from closure activities will be stored appropriately, pending determination of final disposal. Non-hazardous wastes will be evaluated to determine the appropriate disposal method.

G.4.4 CLOSURE SAMPLING

In the event that the OD Unit is closed, a final round of sampling will be completed. This round of sampling will be conducted after the last detonation event, prior to any site work (grading, construction, landscaping, etc.).

Discreet soil samples will be collected from the OD Unit. All samples will be taken using a non-sparking (plastic) scoop, hand auger, or other sampling device if so directed by the EOD. Sampling personnel will record the location of each sample with respect to permanent stations (or through global positioning system surveying), the date, names of sampling personnel, and other pertinent information.

A 200-foot by 200-foot area centered on the depression caused by the most recent detonation event will be divided into grids for sampling. The area will be divided into 100-foot by 100-foot grids, and each of the 100-foot grids subdivided into 50-foot by 50-foot grids. A total of 16 grids (50 by 50 feet) will be established and one random surface soil sample collected from each grid. A total of 17 soil samples that includes one sample per grid and one sample from the most recent depression (at the center of the 200-foot by 200-foot grid) will be collected and submitted for the explosive residues and metals listed in Table H-2 in Attachment H (Sampling and Analysis Plan).

Surface soil samples will be collected from the most recent blast depression at a depth between surface and 12 inches, and from the surrounding area at the following locations:

- One discrete sample at the bottom of the depression from most recent detonation event
- Three discrete samples from the sides of the depression from the most recent detonation event
- Four discrete samples from the area within a 100-foot radius of the depression from the most recent detonation event to evaluate the effect of kick-out

- Four discrete samples from the area between a 100-foot radius and 250-foot radius from the depression caused by the most recent detonation event
- A minimum of one duplicate sample and one matrix spike/matrix spike duplicate (MS/MSD) sample

Observations from the VSI, as well as historical quarterly sampling results, will be used to determine sample locations in the area outside the depression. This approach will account for the spacing of previous samples and identify areas where additional sampling will be required. Once sampling locations have been determined, samples will be collected from the surface interval (0 to 1 foot) at each of these locations and sent to an approved laboratory for analysis.

QA/QC procedures, documentation requirements, laboratory protocols, and all other requirements applicable to operations sampling will be followed for the closure sampling.

Analyses to be performed will include:

- SW6010B Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES); Antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, selenium, and silver;
- SW7471 Mercury by Cold Vapor Atomic Absorption (CVAA)
- SW8095 Explosives by Gas Chromatography (GC)
- SW8260B Volatile Organic Compounds by Gas Chromatography / Mass Spectrometry (GC/MS)
- SW8270C Semi-Volatile Organic Compounds by Gas Chromatography / Mass Spectrometry (GC/MS)
- SW7580 White Phosphorus (P4) by Solvent Extraction and Gas Chromatography
- SW6860 Perchlorate in Water, Soils and Solid Wastes Using Ion Chromatography /Electrospray Ionization/Mass Spectrometry

Because no materials other than waste munitions will be treated at the OD Unit, no other analyses will be required. A complete description of the sampling and analysis protocol and rationale, including that to be followed during closure, is provided in Attachment H.

G.4.5 BACKGROUND COMPARISON AND RISK-BASED SCREENING

Following sampling and analysis, the analytical results will be compared with the latest update to the NMED industrial SSLs for soils and the site-specific background results for metals. In the event that a sample or area of the OD Unit is determined to contain hazardous constituent levels in excess of these standards, NMED will be contacted to discuss further action prior to completing closure, such as risk assessment, confirmation sampling, delineation of the extent of the exceedence, analysis of corrective measures, and corrective measures implementation. When all such activities have been completed (as required) and all sample results show that the residual

levels of contamination are below the risk-based criteria or are protective of human health and the environment, all remaining closure activities will be completed.

G.4.6 CORRECTIVE ACTION

If any sample or area is determined to contain contaminant concentrations in excess of the risk-based or cleanup levels, HAFB will submit a Corrective Action Work plan to NMED. Possible corrective actions could include risk assessment, confirmation sampling, delineation of the extent of the exceedence (i.e., contamination plume), analysis of corrective measures, and corrective measures implementation. Any hazardous investigation-derived waste and/or remediation waste that is generated and exceeds the risk-based criteria will be stored at the HAFB Defense Reutilization and Maintenance Organization facility prior to shipment to an authorized disposal facility using an authorized transporter.

G.4.7 SITE RESTORATION

Once all scrap materials and any other debris have been removed, and sampling results indicate that all remaining analytes are below health-based criteria, the unit will be graded to manage surface water infiltration and run-off while controlling erosion. Specifically, surface grading will reduce ponding and run-off velocities that can contribute to soil erosion, and will roughen and loosen soils to facilitate natural revegetation.

In addition to the closure activities specified in earlier paragraphs, other tasks will be performed to ensure that the closure activities satisfy the closure performance standard. These tasks include periodic regrading, if needed, maintenance to retard erosion and run-on/run-off, and continued posting and security measures.

G.4.8 CLOSURE REPORT

Following completion of closure activities, a closure report will be submitted to the Secretary of NMED. The report will document the closure and will include the following:

- Certification of closure as described in Section G.4.9
- A summary of closure activities
- A summary of the sampling performed
- Analytical results and comparison of the results with NMED SSLs, and background (for metals)
- Quality assurance/quality control measures
- Any significant deviations from the Closure Plan and reasons for the change
- Documentation on disposal of wastes generated during closure
- A certification of the accuracy of the report

G.4.9 CLOSURE CERTIFICATE

Within 60 days after completion of closure activities for the OD Unit, HAFB will submit to the Secretary of NMED, via certified mail, a certification that the unit has been closed in accordance with the specifications of this Closure Plan. The certification will be signed by an authorized official of HAFB and by an independent New Mexico registered professional engineer.

G.4.10 CONTINGENT POST-CLOSURE PLAN

Because some residues may remain in place, this contingent post-closure plan provides a description of the activities that may be conducted to ensure long-term reliability and effectiveness of the closure.

G.4.10.1 Post-Closure Care and Use of Property

The following sections describe the post-closure care period, site security during the post-closure period, and the post-closure use of the subject OD Unit.

G.4.10.2 Post-Closure Care Period

If any waste residues are left in place, contingent post-closure care activities will be required to ensure the long-term integrity of the closure and continued protection of human health and the environment. However, several factors suggest that the duration of any post-closure activities might be limited, including the following:

- The treatment activities render the waste munitions non-hazardous
- The risk-based closure activities ensure that no residues remain in concentrations exceeding established health-based criteria
- The nature of the treatment, the waste residues, and the closure approach substantially minimize the likelihood of any contaminant migration
- Groundwater beneath HAFB has been designated by NMED as unfit for human consumption due to levels of total dissolved solids that exceed human health standards

Therefore, post-closure care of the OD Unit and groundwater monitoring at the site may continue for a period of up to 30 years after closure certification verification and issuance of a Post-Closure Care Permit under the provisions of 20.4.1.500 NMAC §264.117.

G.4.10.3 Post-Closure Security

Although the closure plan will ensure that all contaminants are reduced to levels protective of human health and the environment and will minimize the potential for contaminant migration, because some residual contamination may remain in place, security that was used for the management of hazardous wastes will be provided during the contingent post-closure period to prevent access to the OD Unit.

The security mechanisms that will be in-place during the contingent post-closure period will include the following:

- Use HAFB's existing 24-hour security system (i.e., security forces making routine rounds) to provide periodic monitoring of the unit
- Access control to the Base via fence, gate, and other entry control devices

In addition to these measures, the 20,000-Pound OD Unit will be clearly posted with signs that state, "DANGER -- UNAUTHORIZED PERSONNEL KEEP OUT." These signs will be posted at all entrances and at other locations so as to be seen from any approach to the unit. The legend will be written in English, Spanish, German, and Apache and will be legible from a distance of 25 feet.

G.4.10.4 Post-Closure Use of Property

Uses of the property during the Post-Closure Care period will be in compliance with 20.4.1.500 NMAC §264.117(c) and may not result in the disturbance of the final grading or vegetative cover. Post-closure use resulting in any disturbance will require a modification to the Post-Closure Care Permit and be allowed only to protect human health and the environment.

G.4.10.5 Post-Closure Care Plan and Groundwater Monitoring

Post-Closure care of the OD Unit will be conducted when it has been established that clean closure cannot be achieved. Four groundwater monitoring wells MW-01 (up gradient) and MW-02, MW03, and MW-04 (down gradient) will be used for sampling and monitoring of groundwater. The groundwater monitoring will be conducted for 30 years from the time of closure completion. Based on the results of monitoring, HAFB may request termination or reduction of the monitoring period.

G.4.10.6 Post-Closure Maintenance Requirements

The majority of maintenance activities will be contingent upon the results of routine (quarterly) inspections. Maintenance activities include maintaining all site markings and other benchmarks, access control devices, and postings. Table G-2 outlines these activities and frequency of occurrence.

G.4.10.7 Certification of Post-Closure Care

As with the closure plan, certification that all contingent post-closure activities for the 20,000-Pound OD Unit were performed in accordance with the specifications in the approved Post-Closure Care Plan will be submitted by registered mail to NMED no later than 60 days following completion of all post-closure activities (20.4.1.500 NMAC §264.120). The certification will be signed by an authorized official of HAFB and an independent New Mexico registered professional engineer. Documentation supporting the independent professional engineer's certification will be furnished to the NMED upon request.

G.4.10.8 Survey Plat and Post-Closure Notices

As specified in 20.4.1.500 NMAC §§264.116 and 264.119, a survey plat and deed notification will be necessary to satisfy the closure and any contingent post-closure care requirements. Therefore, upon completion of all closure activities, a survey plat delineating the boundary of the closed 20,000-Pound OD Unit with the certification of closure will be submitted to the local zoning authority, the NMED, and the EPA. Following closure and post-closure care activities, HAFB's deed will be amended to record the closed unit. This deed recordation will, in perpetuity, notify any potential purchaser of the property that the land has been used in the management of hazardous waste and its use is restricted as specified in 20.4.1.500 NMAC §264.119.

Table G-1 Estimated Closure Schedule for the 20,000-Pound OD Unit

Closure Activity	Closure Period (Days)
Receive and treat final volume of waste	-10 to 0
Closure begins	0
Perform site reconnaissance	0 to 5
Remove scrap	5 to 15
Perform soil sampling and analysis	15 to 50
Address any exceedences of standard (if any)	50 to 130
Grade	130 to 140
Decontaminate equipment	140 to 150
Prepare closure certification/post-closure documentation	150 to 180
Submit closure certification/post-closure documentation	180
NMED issues post-closure permit	180 to 235
Conduct post-closure care activities	To Be Determined

Table G-2 Required Maintenance Activities and Schedule

Area/Equipment	Specific Items	Types of Problems	Corrective Action	Frequency of Inspection
Security Devices	Fence	Broken/Damaged	Repair immediately if damaged	Quarterly
	Access Gate	Locking mechanism jammed	Repair/replace	Quarterly
	Signs	Illegible	Replace	Quarterly
Final Cover/Grading	Cover/Grading Integrity	Subsidence, excessive bare soil, rodent burrows	Restore site to grade	Quarterly (immediately following any 10-year, 24-hour intensity rainfall event)
Run-on/Run-off Drainage Control	Drainage sloping and channels	Settlement, ponded water, blockage, erosion	Repair settlement and erosion, remove blockages	Quarterly
Benchmarks	Not applicable	Damaged	Replace if damaged	Quarterly

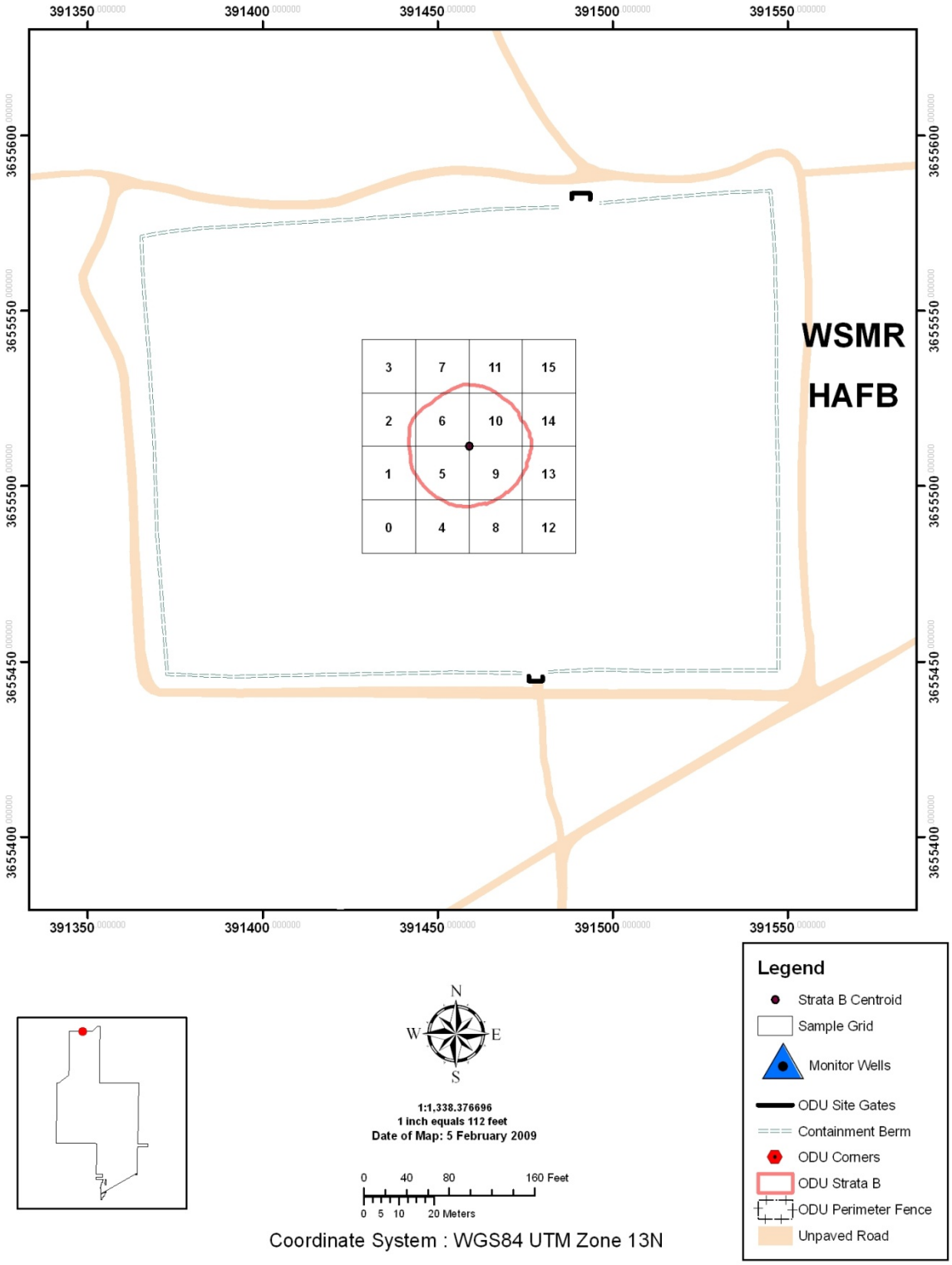

Figure G-1 Closure Sampling Grid

ATTACHMENT H

SAMPLING AND ANALYSIS PLAN

HOLLOMAN AIR FORCE BASE
OPEN DETONATION TREATMENT UNIT

Permit No. NM6572124422

PERMIT ATTACHMENT H
SAMPLING AND ANALYSIS PLAN

The SAP addresses the applicable waste analysis requirements in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart V (20.4.1.500 NMAC), incorporating Title 40 Code of Federal Regulations (CFR) §§264.13 and 264.602, 20.4.1.900 NMAC, incorporating 40 CFR §270.14(b), and 20.4.1.800 NMAC, incorporating 40 CFR Part 268. The Waste Analysis Plan (WAP) included as permit Attachment B describes the procedures for characterization of the wastes treated at the OD Unit. This SAP describes the methodology for sampling and analysis of the soil disturbed by OD activities and the waste residues from OD events, detection of contaminants in groundwater monitoring wells and methodology used for closure of the OD Unit site.

This Sampling and Analysis Plan (SAP) describes

- the procedures used to characterize soil disturbed by open detonation (OD) activities at the Holloman Air Force Base (HAFB) 20,000-Pound OD Unit
- the procedures used for detection monitoring of potential contaminants in groundwater wells sited at the OD Unit
- the procedures used for closure sampling of the OD Unit site

H.1 INTRODUCTION

The OD Unit at HAFB is permitted as a Subpart X miscellaneous unit, and is used to treat explosive hazardous waste to remove the hazardous characteristics of reactivity and ignitability. Environmental sampling is necessary for HAFB to demonstrate that the OD Unit is being operated in such a manner that residual waste constituents are not contaminating soils above risk-based cleanup levels and/or background levels. Background sampling to establish site-specific background constituent concentrations was performed following approval of the original permit in 1997. During the operational life of the OD Unit, soil sampling and analysis will be performed on an annual basis in accordance with the procedures of this SAP. This SAP contains sampling and analysis protocols for the following three distinct phases of environmental sampling at the subject OD Unit:

1. Routine, or operations sampling to test the soils at the OD Unit for the effectiveness of the treatment process and to ascertain whether any contamination has impacted ambient soils.

2. Groundwater detection monitoring to detect and characterize any releases of energetic materials and their breakdown products of the propellants, explosives, and pyrotechnics (PEP) treated at the OD Unit into the uppermost aquifer. At a minimum, four samples will be taken from each well annually.

3. Closure sampling to be completed in the event that HAFB terminates operations at the OD Unit.

H.1.1 SITE DESCRIPTION

The physical description of the OD Unit, location, and the environmental conditions, including geology, hydrogeology, topographic and drainage features, and climate at HAFB, are described in Permit Attachment A, Facility Description.

H.1.2 TECHNICAL APPROACH

This SAP design is based on U.S. Air Force (USAF) OD operational procedures, knowledge of the waste munitions characteristics, and the environmental conditions at HAFB. In addition, the procedures and quality assurance/quality control (QA/QC) techniques in the U.S. Environmental Protection Agency's (EPA's) *Test Methods for Evaluating Solid Waste* (SW-846) have been used to prepare this SAP. Other applicable methods in SW-846 (November 2004, Revision 6 and approved updates) may be used if these are shown to be more appropriate based on site conditions and experience.

H.2 BACKGROUND SAMPLING

Background sampling was performed following approval of the OD Unit permit in February 1997. The sampling included the collection of six soil samples at a distance of between 500 feet and 1000 feet from the OD Unit boundary. These samples were used to characterize conditions of soil similar to the OD Unit, but unaffected by past OD activities. Based on the background sampling performed in December 1997, background concentrations were established for explosive compounds and metals. The established background levels are listed in Table H-1.

Table H-1 Site-Specific Background Levels,
20,000-Pound Open Detonation Unit Holloman Air Force Base

Parameter	Site-Specific Background Level [1] mg/kg	NMED SSL[2]
Antimony	3.5279	31.3
Arsenic	1.4963	3.9
Barium	79.4971	5450
Beryllium	0.42	156
Cadmium	0.5417	74.1
Chromium	9.5027	234
Copper	9.1595	3130
Lead	7.6508	400
Nickel	6.5898	1560
Selenium	2.2645	391
Silver	0.7328	391
Mercury	0.0269	6.11
1,3,5-Trinitrobenzene	NA	NA
1,3-Dinitrobenzene	NA	NA
2,4-Dinitrotoluene	NA	120000
2,6-Dinitrotoluene	NA	NA
2-Amino-4,6 dinitro	NA	NA
4-Amino-2,6-dinitro	NA	NA
HMX	NA	3000000
m-Nitrotoluene	NA	410000

Parameter	Site-Specific Background Level [1] mg/kg	NMED SSL[2]
Nitrobenzene	NA	21800
Nitroglycerine	93677.2	347000
o-Nitrotoluene	NA	410000
PETN	61300	NA
p-Nitrotoluene	NA	410000
RDX	NA	4420
Tetryl	NA	NA
TNT	NA	30000

[1] Final Background Study, 20,000-Pound Open Detonation Unit, 1997.
[2] New Mexico Environment Department Soil Screening Levels, February 2004, Revision 2.

H.3 SUMMARY OF HISTORIC OPERATIONAL SAMPLING DATA

HAFB has been performing quarterly sampling of soils at the OD Unit for the past 8 years. As required by the permit, soil sampling is performed following the first OD event of each quarter. Soil samples are analyzed for explosive compounds and metals. Analytical results are compared with established site background concentrations and New Mexico Environment Department (NMED) Site Screening Levels (SSLs), which are health-based action levels established by NMED. Based on the sampling performed, analytical results for all constituents are below the SSLs. The analytical data suggest that constituent concentrations in soils at the OD Unit are below levels that are protective of human health. Analytical data for the past six sampling events is presented in Exhibit H-1.

Groundwater monitoring has not been required under the existing permit and historic operational sampling data does not exist.

H.4 SELECTED ANALYTICAL METHODS

Target analytes/constituents were selected based on known potential contaminates of similar OD operations. OD is a thermal treatment process used to remove the hazard characteristic of reactivity. This treatment technology, known as Deactivation, removes the reactivity characteristic of the explosive material by decomposition during the exothermic, supersonic reaction. The most conclusive means of measuring the effectiveness of OD thermal treatment is through a periodic sampling program that can be applied to all potentially affected media. A sampling and analysis program is capable of determining whether any media have been adversely impacted by treatment operations. Potential contaminants in the soil and groundwater may contain energetic materials and their breakdown products of the propellants, explosives, and pyrotechnics (PEP) treated at the OD Unit. Potential contaminants are listed in Attachment B WAP Tables B-8 and B-9. Metals are found in all military munitions and perchlorates are in solid fuel rockets, mines, torpedo warheads, and fuzes. Based on the PEP treated at the OD Unit, the potential contaminants that will be selected for analysis are listed in Attachment B, WAP Table B-11, Parameters Selected and Rationale.

Table H-2 identifies analytical methods selected for routine soil analysis, groundwater detection monitoring and OD Unit closure sampling. Method applicability to the various phases of environmental sampling is also indicated in the table. All analytical methods are from EPA

SW846, Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, Rev. 6, November 2004 (as amended), unless otherwise noted.

Table H – 2 Analytical Methods for Operational Soil Sampling, Groundwater Detection Monitoring, and OD Unit Closure Sampling.

Parameter/Constituent	EPA Hazardous Waste Number	Test Method	Test Method Description	Applicability		
				Soils	Ground water	Closure
EXPLOSIVE COMPOUNDS	D003	SW8095	Explosives by Gas Chromatography (GC)	**X**	**X**	**X**
HMX RDX 1,3,5-Trinitrobenzene (TNB) 1,3-Dinitrobenzene (DNB) Tetryl EGDN PETN Nitrobenzene (NB) Nitrocellulose (NC) Nitroglycerine (NG) Nitroguanidine NQ 2,4,6-TNT 2,4-DNT 2,6-DNT 2-Nitrotoluene (NT) 3-NT 4-NT						
VOLATILE ORGANIC COMPOUNDS (VOC)		SW8260B	Volatile Organic Compounds by Gas Chromatography / Mass Spectrometry (GC/MS)	**X**	**X**	**X**
SEMI-VOLATILE ORGANIC COMPOUNDS (SVOC)		SW8270C	Semi-Volatile Organic Compounds by Gas Chromatography / Mass	**X**	**X**	**X**

Parameter/Constituent	EPA Hazardous Waste Number	Test Method	Test Method Description	Applicability		
				Soils	Ground water	Closure
			Spectrometry (GC/MS)			
TOXIC METALS						
Antimony Arsenic Barium Beryllium Cadmium Chromium Copper Lead Nickel Selenium Silver	--- D004 --- --- D006 D007 --- D008 --- D010 D011	SW6010B	Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)	**X**	**X**	**X**
Mercury	D009	SW7470A (aqueous)	Mercury by Cold Vapor Atomic Absorption (CVAA)		**X**	**X**
		SW7471A (solid)	Mercury by Cold Vapor Atomic Absorption (CVAA)	**X**		**X**
WHITE PHOSPHORUS	D001; D003	SW7580	White Phosphorus (P_4) by Solvent Extraction and Gas Chromatography	**X**	**X**	**X**
PERCHLORATE		SW6860	Perchlorate in Water, Soils and Solid Wastes Using Ion Chromatography/Electrospray Ionization/Mass Spectrometry	**X**	**X**	**X**
SOIL MOISTURE	---	SW3550	Ultrasonic Extraction	**X**		**X**

H 5 FIELD SAMPLING OPERATIONS

Planning for field sampling operations is critical to the success of the sampling event. Having trained personnel, established procedures for field documentation, sample collection and identification, and prevention of cross-contamination help ensure the integrity of the sample. This section addresses personnel training requirements and health and safety requirements. Specific sample collection of the various media will be discussed in later sections as will the chain of custody and records management.

H.5.1 SAMPLING PERSONNEL

Sampling personnel will be trained in hazardous waste and soil sampling, and have a minimum of one year of sampling experience. Personnel will also have 40-hour 29 CFR 1910.120 Occupational Safety and Health Administration (OSHA) training and appropriate medical monitoring and certification. Sampling personnel will also be informed by HAFB EOD personnel on the hazards of sampling soil disturbed by explosive compounds.

Sampling at the OD unit will be performed by qualified personnel whose qualifications include the following:

- At least a high school diploma, and the sampler must have successfully completed an EPA-approved Hazardous Waste Operations and Emergency Response Course
- An annual review of the initial training or refresher training for all personnel who continue in explosive ordnance disposal (EOD) assigned duties.

H.5.2 HEALTH AND SAFETY

Personnel performing sampling activities will use personal protective equipment such as rubber gloves, boots, aprons, Tyvek coveralls, and eye protection. Personnel will not be permitted to conduct any sampling until they have been cleared by EOD personnel and the high-speed test track control.

H.5.3 FIELD LOGISTICS

Shipping or transporting of samples to a laboratory will be coordinated prior to the sampling event to ensure that recommended holding times are met. Samples will be packaged, labeled, preserved (e.g., preservative added, iced, etc.), and documented in an area which is free of contamination and provides for secure storage.

Storage areas for solvents, reagents, standards, and reference materials will be identified and will be adequate to preserve their identity, concentration, purity, and stability prior to use. Decontamination of sampling equipment will be performed at the location where sampling occurs, prior to going to the sampling site, or in designated areas near the sampling site. Project documentation will specify where and how this work is accomplished. The method of accomplishing decontamination, including the required materials, solvents, and water purity will be documented in the field logbook.

H.6 ROUTINE SOIL SAMPLING

H.6.1 SAMPLING STRATEGY

Surface soil samples will be collected in accordance with USAF operational procedures and guidelines, EPA’s SW-846, American Society for Testing and Materials procedures, or other NMED-approved methods. A sampling approach has been chosen for annual routine sampling at the OD Unit because of the unique contaminant distribution associated with detonation sites. The sampling strategy chosen for the OD Unit differs from a simple random sampling procedure,

which is employed at other hazardous waste sites, because concentrations of contaminants are stratified horizontally. That is, the concentration of potential contaminants is greater and most variable at the detonation center and decreases with distance away from the detonation center.

In general, a stratified random sample is obtained by separating a population into non-overlapping groups, called strata, and then selecting a discrete simple random sample from each stratum. In the case of the OD Unit, the "population" to be sampled is the potentially affected surface soils in the vicinity of the OD Unit. The term "strata," used in this context, refers to discrete horizontal zones of surface soil, not vertical geologic strata.

Initially, sampling locations will include the area where the unexploded ordnance is placed for destruction and all areas within the OD Unit. The OD area will be divided into two strata for sampling purposes: (1) Stratum A, and (2) Stratum B. In addition, samples may also be collected from a Stratum C if concentrations in Strata B are found to exceed the NMED SSL. The strata are described in the next section.

H.6.2 DETONATION EVENT SAMPLE LOCATION/STRATA DESCRIPTIONS

For the purpose of sampling, the OD Unit will be divided into three strata, as follows.

- Stratum A: The depression caused by the detonation event will be identified as Stratum A. It is assumed that this area possesses a normal contaminant distribution and is representative of soil directly affected by detonation events. A cross-sectional view of the OD Unit and Stratum A are shown in Figure H-1

- Stratum B: The area of detonations is identified as Stratum B. This is the area between the depression and the edge of the active detonation area. Stratum B encompasses an area with a 100-foot diameter around the depression caused by the detonation

- Stratum C: The area between the edge of the active detonation and the boundary of the OD Unit

Samples from the depression (Stratum A) would be representative of soil directly affected by detonation events. Samples from Statum B would contain fallout close to the detonation area. Since the detonations are positioned at different locations during each event, this strategy will allow evaluation of a large portion of the site over time as sampling grids and craters (and thus sampling locations) are positioned at different locations. In addition, this overall strategy will result in collection of samples that are representative of the site.

H.6.3 SAMPLING FREQUENCY

Surface soil sampling at the OD Unit will be performed annually after the first detonation event of the calendar year. The operational monitoring sampling must occur within 72 hours after the first detonation of the calendar year and no site work (backfill, excavation, or construction) will be performed during the time between the detonation event and the sampling.

If no treatment events occur within a 12-month period after the last annual sampling event, annual sampling will not be conducted for that period. HAFB will notify NMED if such a situation arises.

H.6.4 SAMPLING AND SAMPLE HANDLING PROCEDURES

Samples will be collected using equipment and procedures appropriate to the matrix, parameters, and sampling objective. The volume of the sample collected must be sufficient to perform the laboratory analysis requested. Samples must be stored in the proper types of containers and preserved in a manner appropriate to the analysis to be performed.

All clean, decontaminated sampling equipment and sample containers will be maintained in a clean, segregated area. All samples will be collected with clean decontaminated equipment. All samples collected for laboratory analysis will be placed directly into pre-cleaned, unused glass or plastic containers as appropriate based on the particular analytical method. Sampling personnel will change gloves between each sample collection/handling. All samples will be assembled and catalogued prior to shipping to the designated laboratory.

H.6.5 CONTAMINATION CONTROL PROCEDURES

Sampling tools and equipment will be protected from contamination sources before sampling and decontaminated before and between sampling points. Sample containers will also be protected from contamination sources. Sampling personnel will wear clean chemical-resistant gloves when handling the sampling equipment and samples. Gloves will be decontaminated or disposed of between samples.

To prevent cross-contamination, non-disposable sampling equipment will be subject to decontamination procedures following each sample collected at each location. Sampling equipment will be decontaminated in a decontamination zone by being:

- Brush-scrubbed in tap water and Liquinox detergent wash in a tub to remove any soil from the equipment
- Rinsed in tap water in a separate tub
- Rinsed with deionized water
- Rinsed with isopropanol
- Air-dried in an area upwind of the decontamination process
- Stored for future sampling after being wrapped in aluminum foil (shiny side out)

In addition, sampling will first occur in those areas suspected as having the least contamination (Stratum B) and proceed to those areas suspected of having a greater possibility of contamination (Stratum A).

H.6.6 SAMPLE COLLECTION

H.6.6.1 Methodology

Prior to the sampling event, the detonation center from the most recent detonation event will be located. The detonation center will be used to determine the exact position of the three strata for

that sampling event. Using the strata definitions given above, the three strata (A, B, and C) will be delineated based on prior wind directions and the specified unit dimensions.

Surface soil samples will be collected at nine locations and analyzed for the parameters listed in Table H-2. Surface soil samples will be collected from the most recent depression (blast pit) at a depth between the surface and 6 inches deep, and from the same depth in the area around the depression at the following locations (nine normal samples, one field duplicate, and one matrix spike/matrix spike duplicate [MS/MSD] sample):

Stratum A:

- One discrete sample at the bottom of the most recent depression caused by the detonation
- Four discrete samples from the sidewalls of the most recent depression (one sample from each of the compass directions)

Stratum B:

- Four discrete surface soil samples from random locations within a 100-foot diameter area around the depression to evaluate the effect of kick-out. The sample depth will be in the 0- to 6-inch interval as in Stratum A

Sampling will progress from the least contaminated area (Stratum B) to the most contaminated area (Stratum A, bottom of depression) to reduce the potential for cross contamination. The collection order for routine soil analytes is as follows:

- Volatile Organics (VOCs)
- Perchlorates
- Semivolatile Organics (SVOC)
- White Phosphorous
- Explosive Compounds
- Metals

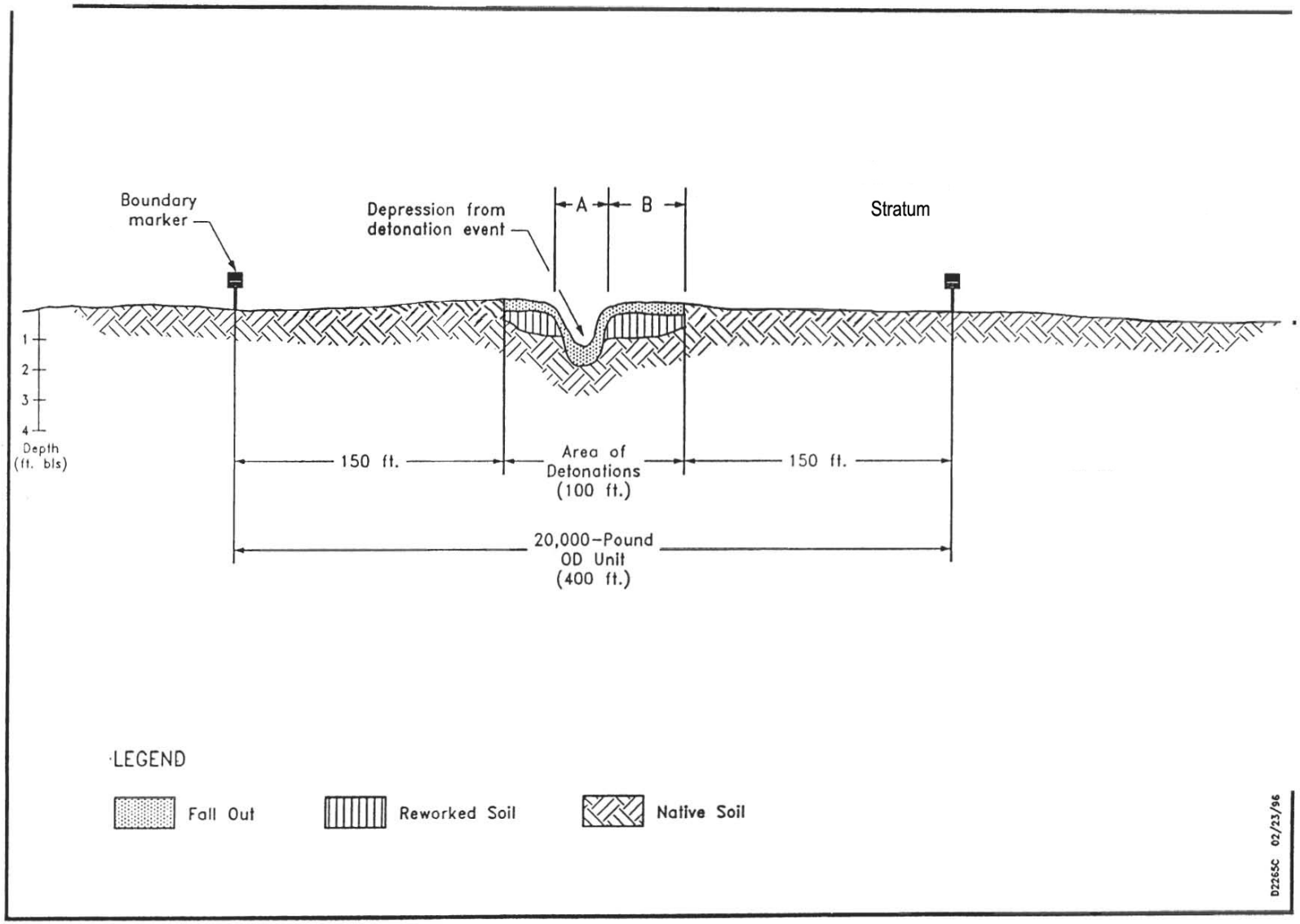

Figure H-1 Cross-Sectional View of OD Unit and Strata

H 6.6.2 Sample Collection Procedure

All sample collection activities will conform to USAF operational procedures and SW-846 procedures, which include:

- Schedule with EOD Range Control
- Obtain clearance from an EOD Technician/Specialist at the location of each sample
- Sampling personnel will move aside debris, rocks, and other material from the sampling location
- Don clean gloves before collecting each individual sample
- Surface soil samples will be collected using clean metal or plastic scoops, trowels, or similar equipment. Nonsparking equipment will be used, if required by EOD personnel for worker safety. (Note: An unused, disposable sampler may be presumed clean if still in a factory-sealed wrapper. Reusable samplers will be scraped to remove any loose material, washed with a detergent and water solution, rinsed several times with tap water, rinsed with deionized water, drained of excess water, and air-dried or wiped dry.)
- Collect grab samples from the 0- to 6-inch depth. Samples collected for analysis of white phosphorous must follow the special sample collection procedures in SW-846 Method 7580 to ensure that multiple representative samples of the soil are obtained, carefully homogenized, and subsampled
- Collect field duplicate and MS/MSD for Field QC
- Place each sample in a clean, unused container appropriate for the required analysis
- Cap the container, attach a label and seal, preserve as required, record in field logbook, complete the request-for-analysis and chain-of-custody forms, and deliver the samples to an EPA-certified laboratory for analysis
- Clear each sample for shipment to the analytical laboratory by an EOD Technician/Specialist
- Check out with EOD Range Control

H.6.7 SAMPLE CONTAINER AND PRESERVATION REQUIREMENTS

Samples will be collected in pre-cleaned sampling containers and will be kept cold during transportation and shipping. Table H-3 summarizes the containers, preservation, and holding time requirements for the soil samples to be collected. Laboratory-specific container requirements will be verified with the contracted analytical laboratory prior to sample collection.

Table H-3 Summary of Sample Container, Preservative, and Holding Time Requirements for Soil Samples

SW-846 Method	Analyte	Container	Preservative	Holding Time
6010	Metals (As, Sb, Ba, Be, Cd, Cr, Cu, Pb, Ni, Ag, Se)	500-mL wide-mouthed glass or plastic jar.	None, cool, 4°C	6 months for digestion and analysis except for mercury, which must be digested and analyzed in 28 days?
7471	Mercury	500-mL wide-mouthed glass or plastic jar.	None, cool, 4°C	6 months for digestion and analysis except for mercury, which must be digested and analyzed in 28 days.
6860	Perchlorate	4-oz. amber glass bottle	None, cool, 4°C	28 days
8095	Explosive Residues	250-ml wide-mouthed glass container with Teflon-lined Lid	None, cool to 4°C	Samples extracted within 14 days and extracts analyzed within 40 days following extraction
8260B	VOC	125-ml wide-mouthed glass container with Teflon-lined Lid	None, cool to 4°C	14 days
8270C	SVOC	250-ml wide-mouthed glass container with Teflon-lined Lid	None, cool to 4°C	Samples extracted within 14 days and extracts analyzed within 40 days following extraction

H.6.8 PACKAGING AND TRANSPORTATION

At the end of each sampling day, samples will be packaged in shipping containers with double-bagged ice packs to maintain a temperature of less than 4°C. The samples will be carefully packaged so that they will not break during shipping, and packaging will contain absorbent material capable of containing all liquid. Each shipping container will be sealed with custody seals and shipped to the analytical laboratory by an overnight delivery service.

H.6.9 QUALITY CONTROL (QC) SAMPLES FOR POST DETONATION ROUTINE SOIL SAMPLING

Quality control in the field begins with adherence to the specified sampling protocols, but is monitored by a variety of samples taken with sufficient frequency to test the quality of measurement results. To measure field related components of quality (i.e., versus laboratory components), duplicates and matrix spike/matrix spike duplicate (MS/MSD) pairs will be collected. Table H-3 explains the field QC requirements and procedures.

Table H- 4 QC Routine Soil Sample Requirements

Sample Type	Frequency	Purpose	Method
Field Duplicate	10%	To ensure that sampling procedures are reproducible and that the sample is representative of the location.	Collect twice the normally required sample volume. Split the sample into two aliquots. Treat each portion as if it were a separate sample and submit for analysis.
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One pair per 20 samples; or minimum one per sampling event	Assess the efficiency of extraction, accuracy of the analysis, and possible matrix effects. The MSD assesses the precision at known concentrations.	Collect twice the normally required sample volume and specify MS/MSD analysis at laboratory.
Trip Blank	One set of two per shipping cooler containing samples	Documents contamination attributable to shipping and field handling procedures	
Field Blank	One sample per batch of 20 samples	Document bias of a method in a given sample matrix. Spiking occurs prior to sample preparation and analysis	

1 Standard rounding conventions will be used. For example, 10% of 14 samples equal 1 field duplicate; 10% of 15 samples equal 2 field duplicates, etc. A minimum of one field duplicate, and one MS/MSD sample will be collected per sampling event.

2 Location will be selected from one of the two strata. A different location and strata will be selected for each sampling event.

3 Analytical methods, sample container requirements, and holding times are listed in Table H-4.

H.6.10 CHAIN OF CUSTODY AND RECORDS MANAGEMENT

Chain-of-custody (COC) procedures will be followed to track possession of the samples from the time they are collected in the field until the analytical data from the samples are received and recorded. For all, procedures will begin once sampling is complete. A sample will be considered under custody if it is:

- In the possession of the sampling team
- In view of the sampling team
- Placed in a secure area by the sampler
- Transferred to a secure area

An area is considered secure only when it is locked and access is controlled. The sampling team leader is responsible for custody of the collected samples in the field until they have been properly transferred to the shipping coordinator, who is responsible for sample custody until the samples are properly packaged, documented, and released to a courier or directly to the contract analytical laboratory. A triplicate COC record form will be used for the sampling effort.

H.6.10.1 Basic COC procedure

Each sample will be labeled, sealed, and accompanied by a COC and a request-for analysis form. A COC form will be used to track samples from collection through analysis to ensure that analytical results can be attributed to specific sampling activities or specific areas. This form will be initiated at the point of sample collection and will then remain with the sample during transfer to the analytical laboratory. The form will be completed upon receipt at the laboratory and the original or a copy returned to the HAFB ~~Environmental Flight~~ Natural Resources Element ~~O~~ office for inclusion in facility records. The COC form will include a request for-analysis form that lists all analyses to be performed for the identified samples and all special instructions related to sample management or analysis. Potential hazards posed by the samples will be listed on the request-for-analysis form.

The sample container will be sealed with a gummed paper seal or tag attached to the container in such a way that the seal must be broken in order to open the container. The seal and sample tag must be completed with a waterproof pen or affixed to the sample container using transparent waterproof tape.

Documentation of sample acceptance at the analytical laboratory will be provided to the ~~Environmental Flight~~ Natural Resources Element ~~O~~office following sample screening and completion of analysis. This documentation may consist of signed copies of the COC form, or documentation (e.g., a letter or memo) detailing the field sample numbers accepted. The analytical laboratory is required to have procedures for minimizing cross-contamination of samples and securing sample custody within the laboratory.

H.6.10.2 Sample Identification Number

Sample containers will be uniquely identified to indicate the site, the sample type (composite or grab), the individual sample's location, the treatment unit, and date. Examples of a sample code are listed below:

- 20K-AO1-010506 (20,000-Pound OD Unit soil sample number 01 taken within Stratum A on January 5, 2006)
- 20K-BOl-010506 (Sample number 01 from Stratum B of the OD Unit taken on January 5, 2006)

Sample locations will be recorded using global positioning system (GPS) so that the exact location can be identified, if necessary, at a later date. This information will be recorded in the field sampling log book.

H.6.10.3 Sample Labels

The sample label is necessary to prevent misidentification of samples. The labels will be durable to remain legible even when wet. The samples collected will be identified by an adhesive label containing the following information:

- Name and Collector's initials

- Sample ID Number
- Analytical methods requested
- Date sample taken
- Time sample taken
- Place of collection (facility and location)

Any other information required by the laboratory or deemed necessary by project personnel will also be added to the label.

H.6.10.4 Sample Custody Seal

Sample custody seals are used when the sample leaves the sampling team's immediate control. Custody seals provide prevention or easy detection of sample tampering. The seals are placed on the shipping container and individual bottles. The seal will be signed and dated by the sample team leader.

H.6.10.5 Field Sampling and Unit Operation Logbooks

All the methodology, procedures, and events pertaining to sample and data acquisition will be recorded in bound, water-resistant field logbooks with a black or blue waterproof ink pen. The logbooks will be considered formal documents representing a complete and organized record of all field activities. The entries will include, but are not limited to the following:

- Personnel present
- Name of sampler(s)
- Date and time of every recording
- Work location
- Description of work and treatment process
- Purpose of sampling
- Soil sample descriptions
- Description and location of area sampled
- Sample numbers
- Field QC data
- Other important notes on field activities, conditions, or problems
- Initials/signature of person entering data

Entries made in the logbook should be of sufficient detail to enable a third party to reconstruct the sampling event and sample location by reading the entries and information recorded in the logbook. No erasures or deletion marks will be permitted. If a mistake is made in a logbook, it must be corrected by marking a line through the error and initialing. The correction may be made in the space available on the page.

H.6.10.6 Chain of Custody (COC) Record

The tracing of sample possession is accomplished by use of A COC record. The COC is completed and accompanies every sample shipment. The COC record typically includes:

- Sample number

- Signature of sample collector
- Date and time of sample collection
- Type of sample (e.g., soil)
- Location at which sample was collected
- Number of containers
- Analyses requested
- Preservatives used
- Signature of persons who have samples in their possession
- Dates and times of possession
- Remarks section to identify potential hazards or to relay other information to the laboratory

H.6.10.7 Sample Analysis Request Sheet

A sample analysis request sheet will accompany the samples and chain of custody record on delivery to the laboratory and clearly identify which sample containers have been designated for each requested parameter. The sample analysis sheet typically includes:

- Name of person receiving the sample
- Name and addresses of analytical laboratory
- Laboratory sample number if different from the field number
- Date of sample receipt
- Analyses requested
- Preservatives added in the field.

H.7 GROUNDWATER DETECTION MONITORING

H.7.1 STRATEGY

Four monitoring wells were installed during the 1993 OD Unit Investigation (HAFB/EOD-MW01, 02, 03, and 04. Location of monitoring wells is described in Attachment I. Based on groundwater elevation measurements collected in May 1993, the direction of groundwater flow beneath the OD Unit is to the southwest. These monitoring wells will be utilized for the groundwater detection monitoring. Attachment B WAP discusses fate and transport of partially decomposed energetic materials due to incomplete combustion. Tables B-8 and 9 contain explosive compounds and their breakdown products that might be expected in groundwater samples.

H.7.2 GROUNDWATER DETECTION MONITORING FREQUENCY

Groundwater detection monitoring will take place at least semi-annually (40 CFR 264.98(d) and 264.99(f)) to characterize the chemistry of the background and down gradient groundwater.

H.7.3 PRE SAMPLING

The static water level elevation in each well will be measured prior to each sampling event. Measuring the water elevation on a regular basis will indicate if changed in the horizontal and vertical components of the hydraulic gradient has changed since the 1993 OD Unit Investigation.

Well depth will also be measure each time the groundwater is sampled. Because water standing in the monitoring well may not represent in-situ groundwater quality, stagnant water will be purged and the well allowed recharging prior to sample collection.

H.7.4 GROUNDWATER SAMPLING EQUIPMENT SELECTION

A portable groundwater sampling device will be selected based on the organic and inorganic analytes of interest.

H.7.5 DECONTAMINATING SAMPLING EQUIPMENT

When dedicated equipment is not used for sampling (or well purging) or when dedicated equipment is stored outside of the well, equipment will be disassembled and cleaned before each use at each well. The recommended cleaning procedure for sampling equipment used when organic constituents are of interest is as follows (Barcelona et al., 1990; Keeley and Boateng, 1987; USEPA, 1986a):

1. Wash the equipment with a nonphosphate detergent.
2. Rinse the equipment with tap water.
3. Rinse the equipment with pesticide-grade hexane or methanol (methyl alcohol).
4. Rinse the equipment with reagent grade acetone.
5. Rinse the equipment with organic-free reagent water.

The recommended cleaning procedure for sampling equipment used when inorganic constituents are of interest is as follows (Barcelona et al., 1990; Keeley and Boateng, 1987;USEPA, 1986a):

1. Wash the equipment with a nonphosphate detergent.
2. Rinse the equipment with tap water.
3. Rinse the equipment with dilute (0.1N) hydrochloric or nitric acid.
4. Rinse the equipment with reagent water.

Dilute hydrochloric acid is preferred over nitric acid when cleaning stainless steel because nitric acid may oxidize the steel. In all cases, waste decontamination fluids will be containerized until it is determined (e.g., through analytical testing) whether the fluids should be treated or disposed of as hazardous waste.

All equipment will be allowed to dry thoroughly in a dust-free environment. If the equipment is not to be used again immediately, it s will be packaged and properly stored to protect it from dust and dirt. Equipment may be wrapped in aluminum foil (shiny side on the outside) and placed in a plastic bag. A label should be affixed to the outside wrapping summarizing the decontamination procedure and stating the date of decontamination.

Decontaminated sampling equipment will not be placed on the ground or on other contaminated surfaces prior to insertion in the well.

H. 7.6 COLLECTING GROUND-WATER SAMPLES

Monitoring well sampling will progress from the well that is expected to be least contaminated to the well that is expected to be most contaminated, to minimize the potential for cross-contamination of samples that may result from inadequate decontamination of sampling equipment. Samples should be collected and containerized according to the volatility of the target analytes. The preferred collection order for some of the more common ground-water analytes is as follows (Barcelona et al., 1985b):

1. Volatile organics (VOCs)
2. Semivolatile organics (SVOCs)
3. Explosive Constituents
4. Perchlorates
5. White Phosphorous
6. Metals

H.7.7 GROUNDWATER SAMPLE CONTAINER AND PRESERVATION REQUIREMENTS

Samples will be collected in pre-cleaned sampling containers and will be kept cold during transportation and shipping. Table H-5 summarizes the containers, preservation, and holding time requirements for the soil samples to be collected. Laboratory-specific container requirements will be verified with the contracted analytical laboratory prior to sample collection.

Table H-5 Summary of Sample Container, Preservative, and Holding Time Requirements for Groundwater Samples

SW-846 Method	Analyte	Container	Preservative	Holding Time
6010	Metals (As, Sb, Ba, Be, Cd, Cr, Cu, Pb, Ni, Ag, Se)	600-mL wide-mouthed glass or plastic jar.	HNO_3 to pH <2	180 days
7471	Mercury	400-mL wide-mouthed glass or plastic jar.	HNO_3 to pH <2	28 days.
6860	Perchlorate	100 ml plastic or glass bottle	None, cool, 4°C	Samples extracted within 7 days and extracts analyzed within 40 days following extraction
8095	Explosive Residues	4 one liter amber glass containers with Teflon-lined Lid	None, cool to 4°C	Samples extracted within 7 days and extracts analyzed within 40 days following extraction
8260B	**VOC**	2 x 40-ml glass container with Teflon-lined septum caps	HCl or H_2SO_4 to pH <2; Cool to 4°C	14 days
8270C	**SVOC**	4 one liter amber glass containers with Teflon-lined Lid	None, cool to 4°C	Samples extracted within 7 days and extracts analyzed within 40 days following extraction

H.7.8 PACKAGING AND TRANSPORTATION

At the end of each sampling day, samples will be packaged in shipping containers with double-bagged ice packs to maintain a temperature of less than 4°C. The samples will be carefully packaged so that they will not break during shipping, and packaging will contain absorbent material capable of containing all liquid. Each shipping container will be sealed with custody seals and shipped to the analytical laboratory by an overnight delivery service.

H.7.9 QUALITY CONTROL (QC) SAMPLES FOR GROUNDWATER DETECTION MONITORING

Quality control in the field begins with adherence to the specified sampling protocols, but is monitored by a variety of samples taken with sufficient frequency to test the quality of measurement results. To measure field related components of quality (i.e., versus laboratory components), duplicates and matrix spike/matrix spike duplicate (MS/MSD) pairs will be collected. Table H-6 explains the field QC requirements and procedures. Because volatile or semi-volatile constituents may be present, trip blanks and field blanks will be collected.

Table H-6 QC Groundwater Sample Requirements

Sample Type	Frequency	Purpose	Method
Field Duplicate	10%	To ensure that sampling procedures are reproducible and that the sample is representative of the location.	Collect twice the normally required sample volume. Split the sample into two aliquots. Treat each portion as if it were a separate sample and submit for analysis.
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	One pair per 20 samples; or minimum one per sampling event	Assess the efficiency of extraction, accuracy of the analysis, and possible matrix effects. The MSD assesses the precision at known concentrations.	Collect twice the normally required sample volume and specify MS/MSD analysis at laboratory.
Trip Blank	One set of two per shipping cooler containing samples	Documents contamination attributable to shipping and field handling procedures	
Field Blank	One sample per batch of 20 samples	Document bias of a method in a given sample matrix. Spiking occurs prior to sample preparation and analysis	

1 Standard rounding conventions will be used. For example, 10% of 14 samples equal 1 field duplicate; 10% of 15 samples equal 2 field duplicates, etc. A minimum of one field duplicate, and one MS/MSD sample will be collected per sampling event.

2 Location will be selected from one of the two strata. A different location and strata will be selected for each sampling event.

3 Analytical methods, sample container requirements, and holding times are listed in Table H-4.

H.7.10 CHAIN OF CUSTODY AND RECORDS MANAGEMENT

Chain-of-custody (COC) procedures will be followed to track possession of the samples from the time they are collected in the field until the analytical data from the samples are received and recorded. For all, procedures will begin once sampling is complete. A sample will be considered under custody if it is:

- In the possession of the sampling team
- In view of the sampling team
- Placed in a secure area by the sampler
- Transferred to a secure area

An area is considered secure only when it is locked and access is controlled. The sampling team leader is responsible for custody of the collected samples in the field until they have been properly transferred to the shipping coordinator, who is responsible for sample custody until the samples are properly packaged, documented, and released to a courier or directly to the contract analytical laboratory. A triplicate COC record form will be used for the sampling effort.

H.7.10.1 Basic COC procedure

Each sample will be labeled, sealed, and accompanied by a COC and a request-for analysis form. A COC form will be used to track samples from collection through analysis to ensure that analytical results can be attributed to specific sampling activities or specific areas. This form will be initiated at the point of sample collection and will then remain with the sample during transfer to the analytical laboratory. The form will be completed upon receipt at the laboratory and the original or a copy returned to the HAFB ~~Environmental Flight~~ Natural Resources Element ~~O~~ office for inclusion in facility records. The COC form will include a request for-analysis form that lists all analyses to be performed for the identified samples and all special instructions related to sample management or analysis. Potential hazards posed by the samples will be listed on the request-for-analysis form.

The sample container will be sealed with a gummed paper seal or tag attached to the container in such a way that the seal must be broken in order to open the container. The seal and sample tag must be completed with a waterproof pen or affixed to the sample container using transparent waterproof tape.

Documentation of sample acceptance at the analytical laboratory will be provided to the ~~Environmental Flight~~ Natural Resources Element ~~O~~office following sample screening and completion of analysis. This documentation may consist of signed copies of the COC form, or documentation (e.g., a letter or memo) detailing the field sample numbers accepted. The analytical laboratory is required to have procedures for minimizing cross-contamination of samples and securing sample custody within the laboratory.

H.7.10.2 Sample Identification Number

Sample containers will be uniquely identified to indicate the site, the sample type (composite or grab), the individual sample's location, the treatment unit, and date. Examples of a sample code are listed below:

- MW01-01-010506 (Groundwater monitoring well 01, sample 01 taken on January 5, 2006)
- MW02-02-010506 (Sample number 02 from monitoring well 02 taken on January 5, 2006)

Sample locations will be recorded using global positioning system (GPS) so that the exact location can be identified, if necessary, at a later date. This information will be recorded in the field sampling log book.

H.7.10.3 Sample Labels

The sample label is necessary to prevent misidentification of samples. The labels will be durable to remain legible even when wet. The samples collected will be identified by an adhesive label containing the following information:

- Name and Collector's initials
- Sample ID Number
- Analytical methods requested
- Date sample taken
- Time sample taken
- Place of collection (facility and location)

Any other information required by the laboratory or deemed necessary by project personnel will also be added to the label.

H.7.10.4 Sample Custody Seal

Sample custody seals are used when the sample leaves the sampling team’s immediate control. Custody seals provide prevention or easy detection of sample tampering. The seals are placed on the shipping container and individual bottles. The seal will be signed and dated by the sample team leader.

H.7.10.5 Field Sampling and Unit Operation Logbooks

All the methodology, procedures, and events pertaining to sample and data acquisition will be recorded in bound, water-resistant field logbooks with a black or blue waterproof ink pen. The logbooks will be considered formal documents representing a complete and organized record of all field activities. The entries will include, but are not limited to the following:

- Well identification
- Well depth

- Static water level depth and measurement technique
- Presence and thickness of immiscible layers and detection method
- Well yield (high or low) and well recovery after purging (slow, fast)
- Well purging procedure and equipment
- Purge volume and pumping rate
- Time well purged
- Collection method for immiscible layers
- Sample withdrawal procedure and equipment
- Date and time of collection
- Well sampling sequence
- Types of sample bottles used and sample identification numbers
- Preservatives used
- Parameters requested for analysis
- Field observations of sampling event
- Name of collector
- Weather conditions, including air temperature
- Internal temperature of field and shipping containers

Entries made in the logbook should be of sufficient detail to enable a third party to reconstruct the sampling event and sample location by reading the entries and information recorded in the logbook. No erasures or deletion marks will be permitted. If a mistake is made in a logbook, it must be corrected by marking a line through the error and initialing. The correction may be made in the space available on the page.

H.7.10.6 Chain of Custody (COC) Record

The tracing of sample possession is accomplished by use of A COC record. The COC is completed and accompanies every sample shipment. The COC record typically includes:

- Sample number
- Signature of sample collector
- Date and time of sample collection
- Type of sample (e.g., soil)
- Location at which sample was collected
- Number of containers
- Analyses requested
- Preservatives used
- Signature of persons who have samples in their possession
- Dates and times of possession
- Remarks section to identify potential hazards or to relay other information to the laboratory

H.7.10.7 Sample Analysis Request Sheet

A sample analysis request sheet will accompany the samples and chain of custody record on delivery to the laboratory and clearly identify which sample containers have been designated for each requested parameter. The sample analysis sheet typically includes:

- Name of person receiving the sample
- Name and addresses of analytical laboratory
- Laboratory sample number if different from the field number
- Date of sample receipt
- Analyses requested
- Preservatives added in the field.

H.8 CLOSURE SAMPLING

In the event that the OD Unit is closed, a final round of sampling will be completed. This round of sampling will be conducted after the last detonation event, prior to any site work (grading, construction, landscaping, etc.).

A 200-foot by 200-foot area centered on the depression caused by the most recent detonation event will be divided into grids for sampling. The area will be divided into 100-foot by 100-foot grids, and each of the 100-foot grids subdivided into 50-foot by 50-foot grids. A total of 16 grids (50 by 50 feet) will be established and one random surface soil sample collected from each grid. A total of 17 soil samples that includes one sample per grid and one sample from the most recent depression (at the center of the 200-foot by 200-foot grid) will be collected and submitted for the explosive residues and metals listed in Table H-2.

QA/QC procedures, documentation requirements, laboratory protocols, and all other requirements applicable to operations sampling will be followed for the closure sampling.

Because the Closure Plan contained in Permit Attachment G may be modified or amended during the operational life of the OD Unit, the closure sampling protocols in this section will be modified, as necessary, in conjunction with changes made to the Closure Plan presented in Permit Attachment G.

H.9 ANALYTICAL PARAMETERS AND RATIONALE

As indicated in Permit Attachment B, Waste Analysis Plan, the only constituents of concern based on the wastes treated at the OD Unit are explosives and metals. Therefore, soil samples will be analyzed for toxic metals, including priority pollutant metals (listed in the New Mexico Hazardous Waste Management Regulations 20.4.1.500 NMAC Part 264 Appendix IX), perchlorate, explosive residues, and soil moisture. Groundwater samples will be analyzed for toxic metals, perchlorates, explosive residues, VOCs and SVOCs to determine if contaminates are migrating from the OD Unit. Table H-2 lists all analytes that will be measured along with their EPA SW-846 test methods. Table B-11 in Attachment B contains additional rationale for selection of parameters.

H.10 LABORATORY OPERATIONS

H.10.1 LABORATORY SPECIFICATIONS

Design and execution of the testing program will be coordinated with an analytical chemist experienced in contaminated soil testing and groundwater detection monitoring. . The laboratory

procedures and QA/QC specifications will follow those described above. The following is a summary of these laboratory specifications and procedures.

At a minimum, the laboratory report will state the following:

- Unique laboratory ID
- Field sample ID
- Sampling date
- Preparation date
- Analysis date
- Preparation batch
- Preparation method
- Analysis batch
- Analysis method
- Analyte
- Results
- Footnotes
- Units
- Sample matrix
- Sample-specific detection limit
- Dilution factor
- Matrix spike recoveries
- Surrogate spike recoveries (for all samples, blanks, and laboratory QC samples)
- Case narrative (if necessary)
- Dry weight
- Blank sample results
- Laboratory control sample (LCS) results

The laboratory will be required to achieve the required detection limits as specified in SW-846. Equivalent analytical methods may be used following approval by NMED.

The contracted laboratory will report uncensored data for all analytical results. Regardless of the analytical measurement result, it will be reported without qualitative descriptors such as "not detected," "less than," or others.

H.10.2 QA/QC PROTOCOLS

As a quality assurance measure, the contracted laboratory will also be required to participate in the EPA Water Pollution and Water Supply studies that include blinded performance evaluation samples.

For all inorganic tests, the samples will be spiked with known quantities of the hazardous constituent, and spike concentration and percent recovery will be reported. For organic tests, the samples will be spiked with a subset of target analytes. The surrogate spike recoveries will be reported for all organic tests. Results from method blanks on the samples will be submitted. Blank results will not be subtracted. The method of how the reported lower detectable limit was determined must also be reported. To ensure that the established data quality objectives (DQOs)

can be attained, the level of analytical quality achieved will be at least Level III. Data will be sufficiently documented to allow personnel to review and evaluate data quality and have all reporting requirements to achieve Level III data quality. Level III data will allow HAFB to determine whether, based on the results, the OD treatment process is affecting the environment.

Because important decisions will be based on the data collected as part of this Sampling and Analysis Plan, a program to ensure reliability of the data is essential. Data reliability will be ensured by documenting sample management so that analyses are traceable to specific areas of potential contamination, and by following a QA/QC program that mandates documentation of the precision and accuracy of laboratory analyses.

Field QC activities will include collection of QC samples in addition to field documentation requirements. For each sampling event, one duplicate field QC sample will be collected. Duplicate samples will be collected to monitor the performance of the data collection process. Because only disposable sampling equipment is anticipated to be used, collection of equipment rinsate blanks will not be required. Field duplicate samples will be collected at a frequency of one per sampling day. These duplicate samples will be identified and treated as separate samples. Acceptance criteria for QA/QC sample analyses will be compatible with the most recent version of SW-846 or other applicable EPA guidance.

The analytical laboratory will operate under a QA Program Plan (QAPP) that meets the requirements of SW-846. QC procedures in the analytical laboratory are guided by the laboratory's QAPP. Laboratory QC samples are required to establish the accuracy and precision of analytical data in order to determine the quality of the data.

The laboratory will use the following criteria for data validation:

- Completeness of data deliverable
- Collection, extraction, and analysis holding times
- Blank data
- LCS results
- MS/MSD results
- Laboratory duplicate sample results
- Overall data assessment and usability

Data not meeting the minimum QC requirements are qualified by the laboratory using the data-qualifier flags. Standard data qualifiers, which are to be used by laboratories only, are listed below. Additional data qualifiers (e.g., an R-flag for rejected data) may be used by data validators when they evaluate data usability.

All analytical data were usable to determine that the operation of the 20,000-Pound OD Unit was not imposing environmental impacts to soil above the risk-based cleanup levels.

Following the data validation procedure, appropriate validation qualifiers are appended to the project analytical data. The qualifiers added as part of the validation for the 20,000-Pound OD Unit included the following:

- **B** – This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. The value is between the MDL and the reporting limit (metals only). The analyte was detected above one-half the reporting limit in an associated blank.

- **BN** – A combination of the B and the N flags

- **J** – Estimated: The analyte was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample. The quantity is estimated (e.g., matrix interference, below standard, outside the calibration range). The value is between the reporting limit and the MDL.

- **JB** – A combination of the J and the B flags

- **N** – This laboratory flag indicates that an analyte is present, and there are strong indications that the identity is correct. Confirmation of the analyte requires further analysis.

- **U** – The analyte was analyzed for and is considered not present above the level of the numerical value to the left of the flag on the laboratory's data reporting form. The numerical value indicates that approximate concentration necessary to detect the analyte in the sample. The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

- **UN** – A combination of the U and the N flags

Based on the QC sample data, the appropriate data qualifiers are appended to the analytical data results. The QC data indicate whether that control mechanisms were effective in ensuring measurement data reliability within the expected limits of sampling and analytical error.

"Estimated" results are still usable to achieve the project DQOs. "J" and "B" flagged data are still suitable for the intended data usage.

H.10.3 SAMPLE RETURN OR DISPOSAL

Unless directed otherwise by HAFB, the laboratory will dispose of all soil samples following analysis. The laboratory will provide certification that its facilities qualify for the exemption in 20.4.1.200 NMAC §261.4(d), which excludes waste samples from many hazardous waste management requirements. In addition, all laboratories will provide HAFB with an explanation of the disposal practices used with respect to sample residuals.

H.11 DATA EVALUATION METHODS

To determine if operations at the HAFB OD Unit are adversely affecting the soil at the subject site, the sampling results will be compared with site-specific action levels. If constituent concentrations in the strata exceed action levels, further evaluation will be triggered. The following sections explain the action level determination, describe the comparison process, and list the potential remedial responses in the event of an exceedence of action levels.

H.11.1 Action Level Determination

The action levels for the potential contaminants at the OD Unit are derived from two sources: (1) Established site-specific background concentrations; and (2) NMED SSLs. In the event the SSLs are exceeded, risk-based values will be calculated in accordance with the most current NMED/EPA guidance and toxicity data.

H.11.2 Comparison of Sampling Results to Decision Criteria

All valid analytical data from sampling activities will be compared with the action levels to determine if a significant release of the targeted explosive and metal compounds has occurred. Analytical results will first be compared with background levels and if an exceedence occurs, the concentration will then be compared with the NMED SSLs.

Sampling results will be evaluated against actions levels after the analysis has been performed and the data have undergone QA/QC evaluation (typically 30 to 60 days from the time of sampling).

H.11.3 Data Resolution and Remedial Response

In the event that soil sampling results show that an action level has been exceeded at any sampling point, the sampling point will be immediately resampled to confirm the presence of contamination. If resampling confirms constituent concentrations in excess of the action level, the occurrence will be noted, NMED will be duly notified in writing, and a report describing the occurrence will be submitted to NMED within seven days of the sample confirmation.

For areas where contamination has been verified to exceed action levels, HAFB, in accordance with NMED regulations, may choose to further evaluate the exceedence using a site-specific risk-based approach; additional samplings results, or remediate affected soils. To prevent future contamination, the HAFB OD Unit operations will be reevaluated and modified, as appropriate.

Each of these potential solutions will require coordination with NMED and will be completed in a timely manner to help minimize the potential spread of contamination and risk to human health and the environment.

H.12 NOTIFICATIONS/REPORTING

HAFB will submit annual reports to the NMED. Two identical copies of each annual report will be provided to the NMED. Annual reports will include:

- A summary cover letter

- Copies of the laboratory reports associated with the sampling event, including the analytical results for each sample
- A summary of any constituents detected at concentrations exceeding background levels or SSLs at a 0.01 confidence level
- A summary of field and laboratory QC sample results
- A figure showing the location of the sampling grid (if any), craters (if any), and all sample locations

H.13 REFERENCES

Cochran, William G., 1977. *Sampling Techniques.* Pages 89-149.

EPA 1993. *Guidance for Planning for Data Collection in Support of Environmental Decision Making Using the Data Quality Objectives Process, EPA QA/G-4.* U.S. EPA, October 1993.

Mendenhall, William, et al., 1971. *Elementary Survey Sampling*. Pages. 53-64.

Radian 1995. *Draft Closure Plan, 300-lb Open Burn Area.* Radian Corporation. April, 1995.

SW-846. *Test Methods for Evaluating Solid Waste, SW-846, Revision 6,* U.S. EPA, November 2004. Office of Solid Waste and Emergency Response, Washington, D.C.

EXHIBIT H-1

HISTORICAL SOIL SAMPLING RESULTS

20,000-Pound Open Detonation Unit

Holloman Air Force Base

ATTACHMENT I
ENVIRONMENTAL PROTECTION

HOLLOMAN AIR FORCE BASE
20,000-POUND OPEN DETONATION TREATMENT UNIT

Permit No. NM6572124422

ATTACHMENT I
ENVIRONMENTAL PROTECTION

INTRODUCTION

The environmental performance standards in New Mexico Administrative Code, Title 20, Chapter 4, Part 1, Subpart V (20.4.1.500 NMAC), incorporating Title 40 Code of Federal Regulations (CFR) Part 264, require Miscellaneous Units to be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment. The Holloman Air Force Base (HAFB) 20,000-Pound Open Detonation (OD) Unit is located in an isolated area in the explosive ordnance disposal (EOD) Range with no developments or habitation within an approximately 5-mile radius from the unit. The OD Unit is designed and operated to prevent adverse human health and environmental impacts. Waste management practices are detailed in Attachment F. The OD Unit will be operated, maintained, and closed in a manner that will continue to ensure protection of human health and the environment. The Waste Analysis Plan included in Attachment B includes information on the volume and physical and chemical characteristics of wastes treated at the OD Unit. A Contingency Plan describing emergency response actions that will be implemented to minimize adverse impacts of unexpected spills or releases is included in Attachment E.

I.1 SITE CHARACTERISTICS [20.4.1.500 NMAC §264.601]

The geologic, hydrologic, and meteorological characteristics for the HAFB region are described in the following sections as required by 20.4.1.500 NMAC §264.601. Information on land use within HAFB and surrounding areas is presented in Attachment A, General Facility Description.

I.1.1 GEOLOGY [20.4.1.500 NMAC §264.601(a)(2)]

HAFB is located within the northern Chihuahuan Desert, in the region known as the Tularosa Basin. The basin is approximately 120 miles long and 28 miles wide. It is bounded on the east by the Sacramento Mountains and on the west by the San Andres Mountains. The basin was formed when the surrounding mountains were uplifted, creating an elongated, faulted valley known as a graben. Elevations within the Tularosa Basin range from 4400 feet above mean sea level (MSL) at the northeast corner to 4000 feet above MSL in the southwest corner. The OD Unit is located down slope of the Sacramento Mountains at an approximate elevation of 4100 feet above MSL.

The surrounding Sacramento and San Andres Mountains are composed of Precambrian to Permian granite, limestone, dolomite, and gypsum with interbedded clays, sands, and gravels. Eroded sediments from these mountains were deposited by streams, filling the Tularosa Basin. Since these sediments were carried by water into a closed basin, they are called bolson deposits. These bolson deposits are approximately 4,000 feet thick in the vicinity of HAFB. Only the uppermost bolson deposits are of significance to this permit text. A generalized geologic cross-section of the present-day Tularosa Basin is presented in Figure I-1.

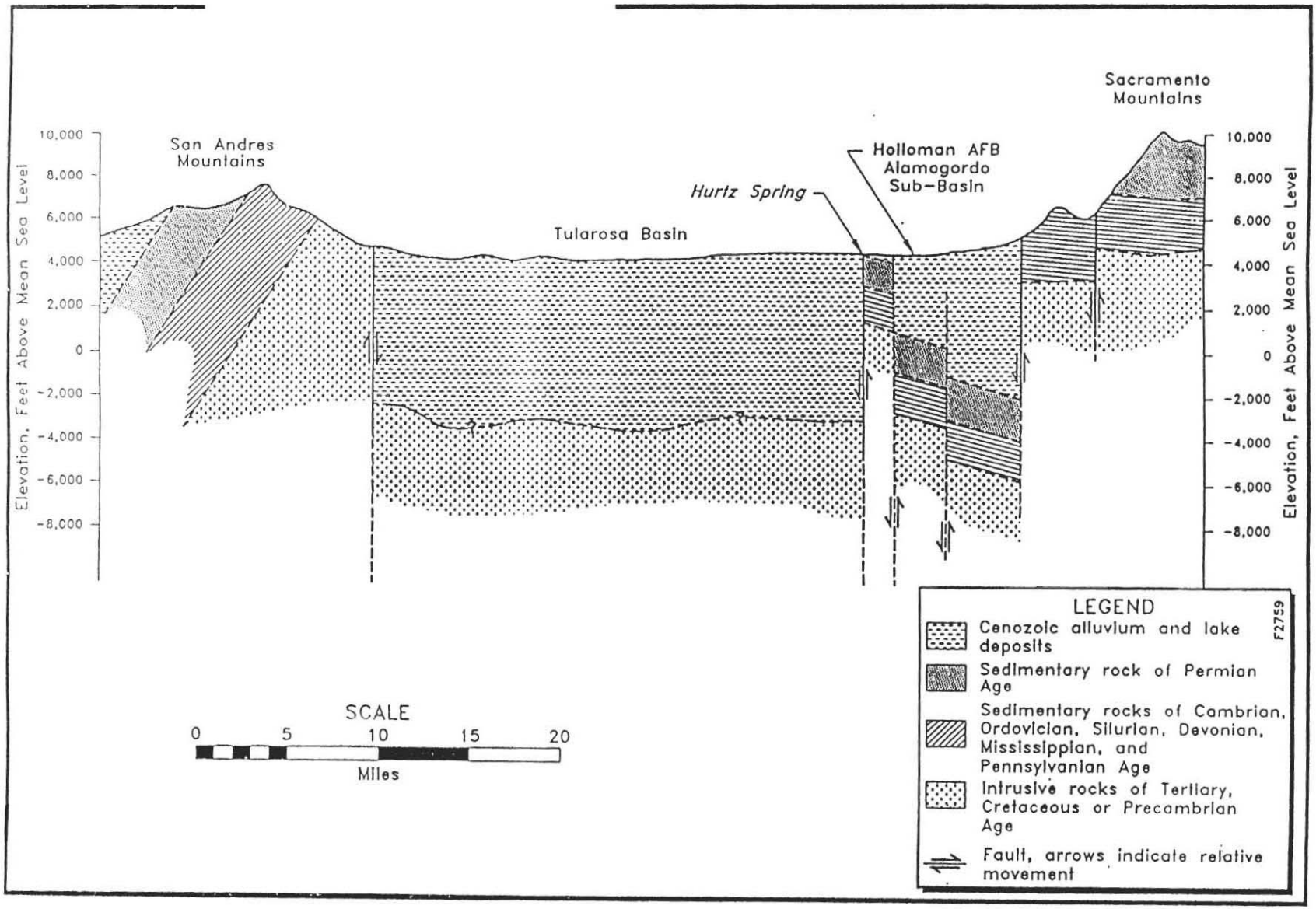

Figure I-1 Generalized Geologic Cross Section of the Tularosa Basin

I.1.1.1 Soils

Two soil types were identified on the installation. The main soil type is the Holloman-Gypsum Land-Yesum complex, 0 to 5 percent slopes. The other soil type is Mead silty clay loam, 0 to 1 percent slopes. This soil type is located only across the main drainage area for the installation.

The Holloman-Gypsum Land-Yesum complex, 0 to 5 percent slopes soil consists of large areas of shallow and deep, well drained soils and areas of exposed gypsum. The Holloman soil makes up about 35 percent of the complex. Typically, the surface layer is light brown very fine sandy loam about 3 inches thick. The upper 13 inches of the substratum is pink very fine sandy loam that is very high in gypsum. Below that, the substratum is white gypsum to a depth of more than 60 inches. This soil is calcareous and mildly alkaline to moderately alkaline throughout. Permeability is moderate, and available water capacity is very low.

Gypsum land makes up about 30 percent of the Holloman-Gypsum land-Yesum complex, 0 to 5 percent slopes. Typically, less than 1 inch of very fine sandy loam overlies soft to hard, white gypsum. The deep Yesum very fine sandy loam makes up about 20 percent of the complex. Typically, the surface layer is light brown very fine sandy loam about 3 inches thick. The upper 9 inches of the substratum is light brown fine sandy loam that is very high in gypsum. Below that, the substratum is pink very fine sandy loam to a depth of more than 60 inches. The soil is calcareous throughout and is mildly alkaline. Permeability is moderate, and available water capacity is moderate. Many fine gypsum crystals are found throughout the profile.

The remaining soil type on the installation is Mead silty clay loam, 0 to 1 percent slopes. This deep, poorly drained, nearly level soil is on outer fringes of alluvial fans. This soil formed in fine textured alluvium over lacustrine lake sediment. It is very high in salt content because of periodic flooding and poor drainage. Slopes are smooth and concave. Typically, the surface layer is reddish brown silty clay loam and clay loam about 5 inches thick. The substratum, to a depth of 48 inches, is light reddish brown clay that has a high content of salts. Below that, the substratum is lacustrine material of variable texture and color to a depth of more than 60 inches. Included with this soil are areas of Holloman soils and Gypsum land along the margins of the unit of steep, short gully sides and knolls. These inclusions make up about 15 percent of the map unit for this soil type. Individual areas are generally smaller than 10 acres. This soil is moderately calcareous throughout and is moderately to strongly alkaline. It has a layer of salt that is more soluble than gypsum. Permeability is very slow, and available water capacity is low.

Subsurface soils were investigated in 1993 during installation of four monitoring wells (HAFB/EODMW-01, -02, -03, and -04) near the OD Unit. Lithologies encountered during the investigation are presented in a generalized geologic log (Table I-1) and illustrated in a geologic cross-section of the OD Unit (Figure I-2). An analysis of the geologic cross-section presented in Figure I-2 shows a slight change in depositional environments across the OD Unit. The thickest sequence of silty clay (playa-lacustrine deposits) is shown in HAFB/EOD-MW-01, while HAFB/EOD-MW-02 shows the thickest sequence of sand and silty sand mixtures (eolian deposits). The eolian deposits are predominantly interdune deposits consisting of fine sand and silt. Below 30 feet the geologic interpretation becomes more complex. The geologic logs show litho logic changes across the site between silty clay, silty sand, and sand at the down gradient wells (HAFB/EOD-MW-02, -03, and -04). Meanwhile, the up gradient well (HAFB/EOD-MW-

01) shows massive silty clay with stringers or lenses of sand. It is highly probable that these sand zones are interconnected.

Table I-1 Generalized Geologic (Soil Boring) Log[1]

DEPTH	GENERALIZED DESCRIPTION
0 and 10 feet	**SAND** – Light tan, yellowish tan and light brown fine- grained well sorted sand with layers of silt-sand, porous, loose to slightly firm and dry to trace moisture present. This upper zone represents eolian-type deposits. The sands are most likely dunes, and the silt-sand represents an interdune sequence.
10 to 12 feet (Extends to 16 feet at HAFB/EOD-MW-02)	**SILT to SILTY CLAY** – Reddish brown (HAFB/EOD-MW-02 also has alternating layers of gray green and light gray to white), slightly firm, low to moderately plastic and dry to trace moisture. Most likely represents a small playa at the site.[2,3]
12 to 30 feet (Extends to 40 feet at HAFB/EOD-MW-02)	**SAND** – Light tan, yellowish tan and light brown with reddish brown and brown layers, predominantly a fine-grained, well-sorted sand and with occasional layers of medium-to-coarse grained sands slightly firm to firm and trace moisture present.
30 to 50 (HAFB/EOD-MW-02 starts at 40 feet)	**SILTY CLAY with interbedded SAND** – A gradational change of depositional environments can be observed in the logs. Reddish brown silty clay representing playa/lacustrine deposits[2] with dune and interdunal deposits merge in and out of the clay, or back and forth across the playa. The occasional thin layers of sand in the larger clay units may represent wind-blown particulate across the playa or an occasional sheet flood that are common in this type of environment. The clay deposits are thickest at HAFB/EOD-MW-01. These deposits are reddish brown silty clay with light gray or green gray mottling[4] in the upper 2 feet, moderate to high plasticity, slightly firm to firm, ranting in moisture from trace to wet. At 50 feet, 1 to 2 mm gypsum crystals were found. Sands found below 30 feet are fine to medium grained, medium grain predominant. At HAFB/EOD-MW-02 flowing sands were encountered at 42 feet.

[1] Modified from ICF Kaiser and Labat-Anderson, 1993.

[2] The reddish brown color associated with the playas is common and suggest an oxidizing environment of the iron present in the sediments. The coloration may also imply well-drained soils.

[3] Poorly drained soils which are saturated most of the time are generally gray in color because the iron has been reduced or removed. This is true for humid climates; however, not always true in arid environments.

[4] A mottled gray and reddish brown color suggests the subsoils are subjected to alternating or seasonable periods of saturation.

I.1.2 HYDROLOGY [20.4.1.500 NMAC §264.601(a)(2)]

I.1.2.1 Surface Water

OD Unit Area Surface Drainage

Surface drainages near the OD Unit include the Allen Draw, the Reagan Draw, and the Guilez Draw. In the vicinity of the OD Unit, surface water flow is associated only with infrequent heavy rainfall or snow melt events. The OD Unit is located on relatively flat terrain far above the 100-year floodplain boundaries and approximately 1000 feet north of and 27 feet in elevation above the Allen Draw channel. A minimum 2 foot high berm surrounds the OD Unit which prevents surface water run-on and run-off and subsequent migration of waste constituents

following intermittent/seasonal thunderstorms from the area of the OD Unit. Typically, surface water from precipitation in the area of the OD Unit is lost to evaporation, transpiration, and infiltration.

I.1.2.2 Water Balance

Low annual precipitation rates coupled with the high evapotranspiration rate means that minimal water infiltrates into the subsurface. With minimal infiltrating water there is minimal potential for leaching of constituents to the uppermost saturated zone.

I.1.2.3 Unsaturated Zone Soil Characteristics

The U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) has identified soil as the Holloman-Gypsum Land-Yesum complex.

The Holloman-Gypsum Land-Yesum complex, identified by USDA SCS is representative of the surface soil found throughout HAFB (including the OD Unit area). The soils of this association are formed from alluvial and eolian (wind blown) gypsiferous sediments. The Holloman unit makes up about 35 percent of the complex. It is a very fine grained, sandy loam with high gypsum content. The soil is moderately permeable, calcareous, and mildly alkaline.

I.1.2.4 Depth to the Uppermost Saturated Zone

The depth to the uppermost saturated zone decreases from 270 feet below the ground surface (BGS) (or more) near the base of the mountains to less than 40 feet BGS at HAFB. The water table depth beneath the OD Unit ranges from approximately 27 to 31 feet BGS.

I.1.2.5 Saturated Zone Characteristics

Hydrogeologic Characterization

Groundwater occurs in unconfined conditions in the unconsolidated bolson deposits beneath HAFB. The primary source of recharge for groundwater in the bolson fill is percolation of rainfall and stream runoff through the coarse, unconsolidated alluvial fan deposits along the western flank of the Sacramento Mountains. Water migrates downward into the bolson fill and flows down gradient through progressively finer-grained sediments into the basin. The hydraulic gradient is steep along the recharge zones at the base of the mountains, but then flattens out as groundwater migrates into the valley. Groundwater discharge occurs either through evapotranspiration, springs or seeps along steep-sided arroyos, or into closed playa lakes such as Lake Lucero, the regional groundwater discharge area approximately 30 miles southwest of the OD Unit. The regional groundwater flow beneath the OD Unit is southwesterly toward the center of the basin.

Saturated Zone Physical Properties

The saturated zone beneath the OD Unit begins approximately 27 to 31 feet BGS. The cross-section in Figure I-2 shows that the top of the saturated zone at HAFB OD monitoring well MWO1 is located within the upper portion of the silty clay unit. The wells to the south and

southwest show that the top of the water table is within the eolian sediments (fine to medium grained silty sand), above the silty clay. This indicates that the down gradient wells are in coarser grained material, with greater permeability and porosity.

Four aquifer slug tests were conducted in the four wells installed during the May 1993 OD Unit investigation (HAFB/EODMW-01, MW-02, MW-03, and MW-04). The data collected were from rising head tests. The Bouwer and Rice analytical method was chosen to analyze the hydraulic conductivity. The computer-generated hydraulic conductivity results are as follows:

- HAFB/EOD-MW-01 = 2.42×10^{-4} feet/minute (ft/min)
- HAFB/EOD-MW-02 = 5.30×10^{-4} ft/min
- HAFB/EOD-MW-03 = 1.03×10^{-4} ft/min
- HAFB/EOD-MW-04 = 1.46×10^{-4} ft/min

Holloman Air Force Base
Open Detonation Treatment Unit
NMED Control Copy

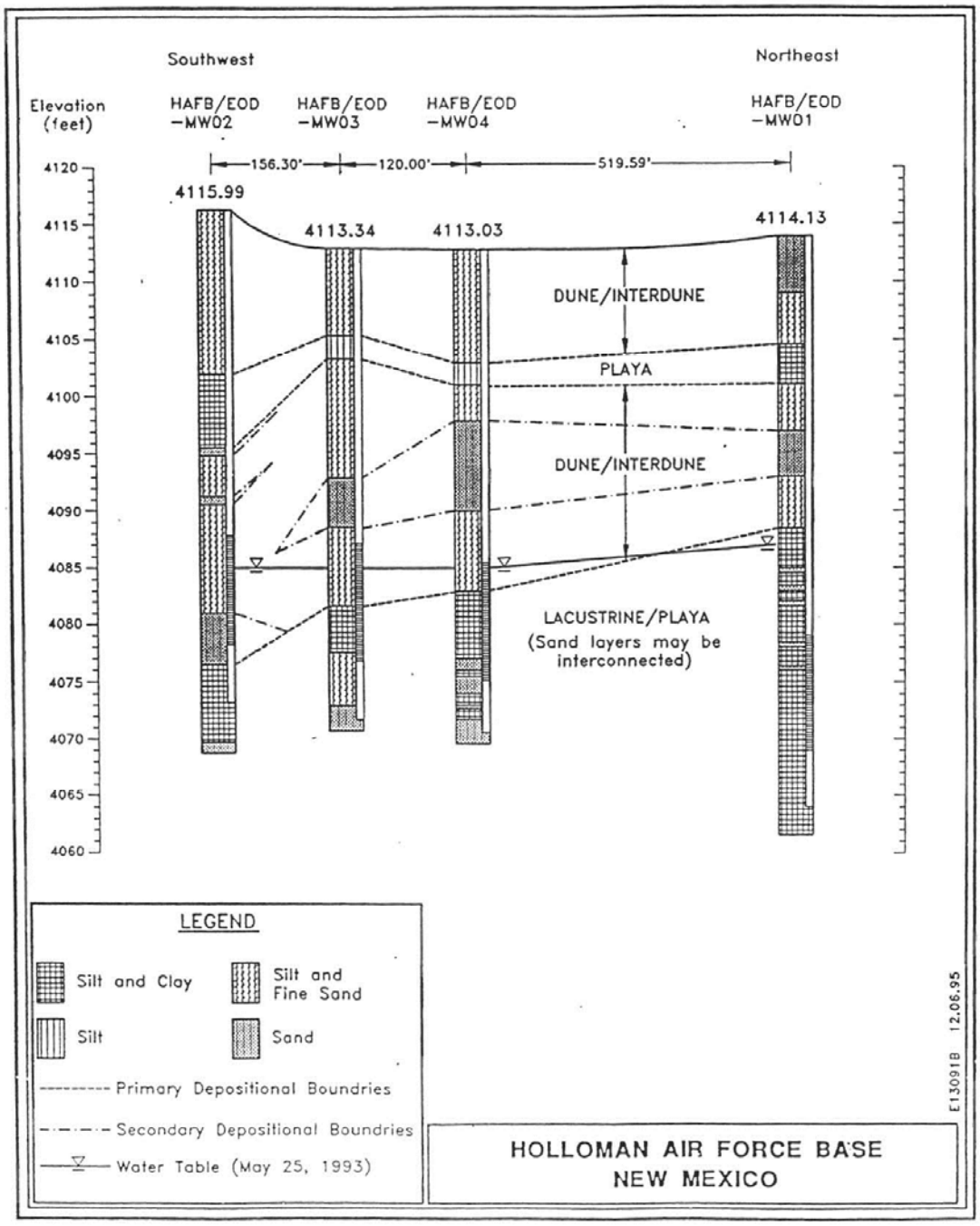

Figure I-2 Geologic Cross Section of the OD Unit Area (After Labat-Anderson, 1993)

I.1.2.6 Existing Groundwater Quality [20.4.1.500 NMAC §264.601(a)(3) and (b)(5)]

Overall water quality in the Tularosa Basin varies with the distance from the recharge areas. Regions of groundwater recharge near the mountain escarpments have the best water quality. Wells installed in the alluvial fans that surround the valley floor are used for domestic and agricultural purposes. Water percolating through sediments high in gypsum, limestone, and dolomite becomes highly mineralized. Groundwater in the Tularosa Basin beneath HAFB contains concentrations of total dissolved solids (TDS) ranging from 3,100 milligrams per liter (mg/L) to 41,000 mg/L. Sulfate concentrations range from 1,700 mg/L to 6,700 mg/L. In general, the high concentrations of TDS and sulfate in the Tularosa Basin make groundwater unusable for domestic or agricultural water supplies and can be classified as Class III B groundwater (not considered a source or potential source of drinking water) under EPA guidelines.

Groundwater samples were collected from the four wells (HAFB/EOD-MW-01, -02, -03, and -04) on 16 August 2007 by TestAmerica Laboratories, Inc. Table I-2 shows the TDS by each monitoring well.

TDS at the OD Unit were all found to exceed New Mexico Human Health Standards (NMHHS). TDS analytical results from the OD Unit monitoring wells are presented in Table I-2.

According to the New Mexico Water Quality Control Commission Regulations (20.6.1 NMAC, December 1, 1995), the groundwater below the OD Unit is designated as unfit for human consumption because it exceeds NMHHS for TDS.

Table I-2 Summary of Results 20,000-Pound OD Unit Investigation

TDS by Monitoring Well (MW)	CONCENTRATION RANGE (mg/L) OD UNIT MONITORING WELLS	NEW MEXICO HUMAN HEALTH STANDARD (mg/L)
MW- 01	5500	1,000
MW-02	6500	1000
MW-03	5300	1000
MW-04	5100	1000

I.1.2.7 Groundwater Direction and Flow Rate [20.4.1.500 NMAC §264.601(a)(4) and (b)(5)]

Based on groundwater elevation measurements collected in May 1993, the direction of groundwater flow beneath the OD Unit is to the southwest. An OD Unit groundwater contour map is presented in Figure I-3. The hydraulic gradient shows that the groundwater drops one vertical foot for every 41.4 feet traversed horizontally. No surface features were found to have an effect on the groundwater flow direction.

Groundwater flow velocity was calculated using a basic advective transport equation derived from Darcy's Law. To compensate for the increasing hydraulic conductivity values southwest of the OD Unit, an average hydraulic conductivity was calculated between the finer grained

material (HAFB/EOD-MW-01, -03, and -04) and the coarser grained material (HAFB/EOD-MW-02). Using an average hydraulic conductivity value of 3.47 x 10^{-4} feet/minute, a groundwater flow velocity of 2.79 x 10^{-5} feet/minute was calculated. Groundwater at this velocity will flow approximately 14.7 feet per year to the southwest.

I.1.2.8 Proximity to Groundwater Withdrawal Points [20.4.1.500 NMAC §264.601(a)(5)]

No water supply wells are located on HAFB because of the poor water quality. Base potable water supplies are obtained from Bonito Lake and from 21 wells in three separate well fields (Boles, San Andres, and Douglas) located on the western slope of the Sacramento Mountains approximately 10 miles east of HAFB. Production wells in that area intercept groundwater at depths ranging from 250 to 300 feet BGS. The nearest production well down gradient of HAFB is a livestock well located approximately 3.5 miles southwest of the Base. No other down gradient or near-Base potable or irrigation wells exist.

Other chief water users in the Tularosa Basin include the city of Alamogordo and White Sands Missile Range (WSMR) Headquarters. The city of Alamogordo obtains its water from several sources, including Lake Bonito, 60 miles northeast of the basin; developed springs in La Luz, Alamo, and Fresnal Canyons in the Sacramento Mountains; and from wells drilled in alluvial fan deposits at the base of the Sacramento Mountains between Alamogordo and La Luz (located more than 10 miles southeast of the OD Unit). WSMR obtains its fresh water supply from alluvial deposits between the Organ and San Andres Mountains, and along the mountain front on the west side of the basin.

It is extremely unlikely that the water in the uppermost saturated zone beneath the OD Unit would ever be used for drinking water, domestic purposes, or irrigation.

I.1.3 WETLANDS [20.4.1.500 NMAC §264.601(b)(3)]

Jurisdictional wetlands are a subcategory of Waters of the U.S. and have been defined by the U.S. Army Corps of Engineers as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions.

No wetlands are located in the vicinity of the OD Unit.

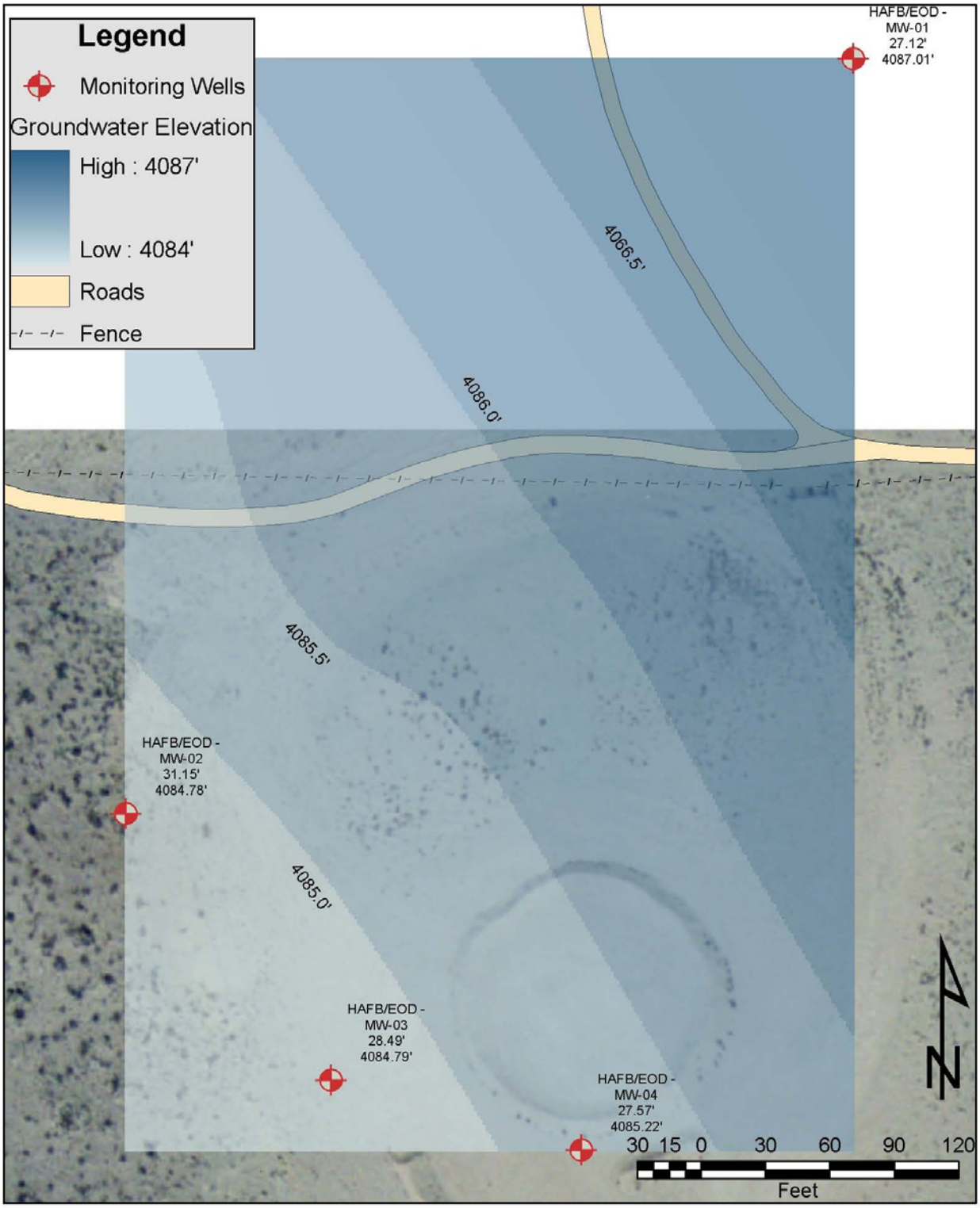

Figure I-3 Potentiometric Groundwater Surface Map at the OD Unit (after Labat-Anderson, 1993)

I.1.4 METEOROLOGICAL CHARACTERISTICS [20.4.1.500 NMAC §264.601(b)(4) and (c)(4)]

Estimated Annual Precipitation [20.4.1.500 NMAC §264.601(b)(4)]

The annual precipitation at Holloman AFB averages 7.9 inches, with annual extremes from 2.5 inches to 13.5 inches. The mean annual lake evaporation rate, commonly used to estimate the mean annual evapotranspiration rate, averages an estimated 67 inches per year. The annual net precipitation for the area is approximately -59 inches per year.

Diurnal Temperature Variation

The mean daily temperature variation in the HAFB OD Unit area ranges from an average daily low of 26°F in December to an average daily high of 93°F in July.

Wind roses for the five most recent years are provided in Attachment A, Figures A-7 through A-11.

I.1.5 AIR QUALITY [20.4.1.500 NMAC §264.601(c)]

Federal ambient air quality primary and secondary standards are defined in 40 CFR §50.2b as follows:

> "National primary ambient air quality standards define levels of air quality which the Administrator judges are necessary, with an adequate margin of safety, to protect the public health. National secondary ambient air quality standards define levels of air quality which the Administrator judges necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant" (1976).

EPA has established federal air quality standards for carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2). These standards are termed the National Ambient Air Quality Standards (NAAQS) and may not be exceeded more than once a year, except for the annual standards, which may never be exceeded. The State of New Mexico has developed the New Mexico Ambient Air Quality Standards (NMAAQS) and has also adopted the NAAQS to regulate some pollutant levels in New Mexico. None of the NAAQS or the NMAAQS has consistently been exceeded at HAFB. Attachment J presents the air dispersion modeling results showing that NMAAQS and NAAQS are not exceeded by the open detonation unexploded ordnance at the HAFB OD Unit.

HAFB is located in the State of New Mexico Air Quality Control Region 6. Particulates (primarily windblown dust) are the only air pollutants of concern in the HAFB area. While ambient pollutant concentrations at HAFB are not monitored, HAFB generally has very low concentrations of air pollutants because of good atmospheric dispersion conditions and the absence of continuous emissions. HAFB is in attainment, meaning that no pollutant

concentrations exceed the designated federal and State air quality standards. Presently, HAFB and the surrounding areas are in attainment for all of the NAAQS.

I.1.6 VEGETATION AND WILDLIFE [20.4.1.500 NMAC §264.601(a)(9), (b)(11) and (c)(7)]

I.1.6.1 Flora

HAFB is dominated by xerophytic shrubland and grassland communities having plant assemblages biogeographically related to the Great Basin and Chihuahuan Desert.

I.1.6.2 Fauna

A wide variety of fauna can be found at HAFB as it provides a relatively diverse range of habitats for both aquatic and terrestrial species. Habitats found on the installation provide ideal environments for a variety of reptiles and amphibians, mammals, and birds. Available habitats include upland grasslands, xerophytic shrublands, brackish marshlands, playas, and surface water habitats.

Previously performed wildlife inventories have identified numerous species of wildlife throughout the installation.

Native big game mammals are uncommon in the project area and include mule deer (*Odocoileus hemionus*) and pronghorn (*Antilocapra americana*). Predators include bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), and coyote (*Canis latrans*). Badger (*Taxidea taxus*) and striped skunk (*Mephitis mephitis*) are uncommon predators and omnivores, respectively. No classes of fauna are negatively impacted by operation of the OD Unit.

Malone and Ritas Draws and the Lost River drainage are approximately 10 miles away from the OD Unit. These areas, classified as Essential Pupfish Habitat, are protected under Cooperative Agreement for the Protection and Maintenance of White Sands Pupfish between the U.S. Army - WSMR, U.S. Air Force - HAFB, National Park Service - White Sands National Monument, U.S. Fish and Wildlife Service (USFWS) and New Mexico Department of Game and Fish, but are not affected by the use of the OD Unit.

I.1.7 THREATENED AND ENDANGERED AND SPECIAL STATUS SPECIES

For purposes of this assessment, sensitive biological resources are defined as those plant and animal species listed as threatened or endangered by the USFWS or the State of New Mexico. There are no federally-listed endangered or threatened species in the vicinity of the OD Unit. Therefore, the Endangered Species Act (ESA) is not applicable to the OD Unit activities. A copy of the response from the USFWS regarding this issue is included in Exhibit I-1. There are no state-listed threatened or endangered species in the vicinity of the OD Unit.

Species with protected status are included in Table I-3: (1) federally listed threatened and endangered species; and (2) state listed species.

- Federally Listed Threatened and Endangered Species. The ESA of 1973 provides protection to species federally listed as endangered or threatened. Endangered species are those species that are at risk of extinction in all or a significant portion of their range. Threatened species are those that could be listed as endangered in the near future.

- State Listed Wildlife and Plants. The State of New Mexico maintains its own list of state endangered, threatened, and sensitive wildlife species.

Table I-3 Threatened and Endangered Species in Vicinity of Holloman

Common Name	Scientific Name	Status	Potential for occurrence
Mammals			
Spotted bat	*Euderma maculatum*	ST	Present on HAFB; very unlikely to occur in project area based on habitat associations
Birds			
American peregrine falcon	*Falco peregrinus anatum*	ST	Present on HAFB (documented at Lake Holloman); occurrence in project area is possible, unlikely to be affected.
Northern aplomado falcon	*Falco femoralis septentrionalis*	SE, FE, Sec10(j)	Nonessential Experimental Population (NES). Present on HAFB; occurrence in project area is possible (has been documented about 3-5 miles to the north)
Snowy plover	*Charadrius alexandrinus*	FE	Present on HAFB; occurrence in project area is possible, unlikely to be affected.
Interior least tern	*Sterna antillarum athalassos*	SE, FE	Present on HAFB. Occurrence in project area is unlikely.
Southwestern willow flycatcher	*Empidonax traillii extimus*	SE, FE	Unlikely to be present on HAFB
Bell's vireo	*Vireo bellii*	ST	Unlikely to be present on HAFB
Gray vireo	*Vireo vicinior*	ST	Possibly present on HAFB. Occurrence in project area is unlikely.
Baird's sparrow	*Ammodramus bairdii*	ST	Present on HAFB; occurrence in project area is possible, unlikely to be affected.
Fish			
White Sands pupfish	*Cyprinodon tularosa*	ST	Present on HAFB but not in project area

FE = Federal Endangered; FT = Federal Threatened; SE = State Endangered; ST = State Threatened. Sources: HAFB 1998a; Pers. Comm. Dye.

I.2 EXPOSURE PATHWAYS AND RECEPTORS [20.4.1.500 NMAC §264.601]

There are no permanent natural surface waters within the HAFB boundary; therefore, surface water is not considered an exposure pathway. None of the surface water features (lakes, canals, or wastewater lagoon) are located in the vicinity of the OD Unit. The OD Unit is situated on relatively flat, basin-floor upland, approximately 1000 feet north of and 27 feet in elevation above the Allen Draw channel. A minimum of 2 foot high berm surrounds the OD Unit which prevents surface water run-on and run-off and subsequent migration of waste constituents following intermittent/seasonal thunderstorms from the area of the OD Unit. Typically, surface water from precipitation in the area of the OD Unit is lost to evaporation, transpiration, and infiltration.

The OD Unit area is cleared of vegetation and fenced to keep wildlife from intruding. Therefore, wildlife and vegetation are not considered as receptors.

Because the OD Unit is located in a remote, sparsely populated area and access is controlled, human receptors are limited to personnel performing work at the unit. As described in Attachment H, Sampling and Analysis Plan, HAFB will perform periodic soil sampling at the OD Unit as required by the OD Subpart X permit in order to ensure that contaminants have not been released to the surface at levels that could endanger human health or the environment.

I.3 ENVIRONMENTAL PERFORMANCE STANDARDS

In accordance with 20.4.1.500 NMAC §264.601, a miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment. This section presents information on site conditions and measures implemented at the OD Unit to ensure protection of human health and the environment.

I.3.1 PROCEDURES TO PREVENT EXPOSURE [20.4.1.500 NMAC §264.601]

Waste handling and other operational procedures designed to ensure protection of human health are detailed in Attachment F, OD Unit Management, of this permit renewal application. A summary of the procedures and measures implemented is presented below.

- Access to the OD Unit: The public is denied access to the OD Unit by a number of mechanisms, including HAFB Security Forces and the remoteness of the OD Unit from human habitation. Access is provided to the HAFB EOD personnel only during OD operations. No one is allowed at the OD Unit during open detonation activities.

- Waste Detonation: Before each OD activity, the propellants, explosives, and pyrotechnics (PEP) hazardous wastes are expeditiously placed in the appropriate above ground treatment area, initiation materials are applied, and after retreat by the EOD personnel to a specified safe distance, the ignition is accomplished by remote control. The precise times between PEP arrival and placement, initiator placement and ignition, vary. However, because no waste is stored at the unit, all activities will occur between 7:00 am and 5:00 pm of the same day.

- Post Detonation Inspection: After the OD operation, EOD personnel will return to the treatment unit within 24 hours to inspect for unexploded ordnance (UXO) and kick-outs, when it has been determined that it is safe to do so. This drive time and the required wind speed (greater than 3 knots [5.6 kilometers per hour]) is considered sufficient by EOD procedures to protect the EOD specialists from any gases, vapors, or airborne particulates resulting from the OD operations.

Management of Waste Residues: Any metal fragments and remnants greater than 2 inches in length resulting from OD operations will be collected within 72 hours after every treatment activity. The Permittee shall characterize the debris collected after each detonation in accordance with 40 CFR §261, Subpart C. This will be accomplished by sampling and analysis, MSDS review, or generator knowledge. Based on this characterization, the Permittee shall manage the

fragments collected in accordance with 40 CFR §261 as applicable to the waste. The fragments so collected will be placed into appropriate containers, and handled accordingly ~~as scrap metal~~. The OD Unit currently has no visual indication of ash or other chemical residue.

I.3.2 PROTECTION OF GROUNDWATER [20.4.1.500 NMAC §264.601(a)]

The following site conditions and operational procedures ~~that~~ minimize the potential for migration of hazardous waste constituents to the vadose zone and uppermost saturated zone and minimize the effects of explosive open detonation events on geologic units and groundwater flow under the OD Unit.

- Waste munitions are transported to the OD Unit in their original containers or casings, which are designed for long-term stability and thus ensure that no wastes are inadvertently released to the environment prior to treatment. In addition, no free liquids are included among the wastes treated at the OD Unit.

- All OD Unit waste treatment activities are conducted on the ground surface, or according to specific TOs, AF Man 91-201 or manufactures suggestions. ~~No trenches or pits will be excavated to contain the wastes.~~

- The OD Unit thermal treatment process generally ensures complete destruction of the waste. Residual waste munitions compounds become nonhazardous once detonation occurs. Organic constituents of the wastes are converted to gaseous products such as CO, CO_2, and NO during thermal treatment, thereby eliminating the hazardous characteristics of the wastes. Explosive compounds generally have very limited solubility in water, further minimizing potential for vertical leaching.

- The metal debris remaining after thermal treatment of the wastes is typically present in elemental states or as oxides that are insoluble or of limited solubility in water, thus eliminating the potential for metallic compounds to migrate through the soil or into surface water or groundwater. An inspection of the OD Unit is conducted 24 hours after detonation. During the inspection, metal fragments are collected and placed in appropriate containers for disposal or recycling as appropriate.

- The low precipitation rate for the area results in a negligible driving force for hazardous waste contaminant migration. The annual precipitation at HAFB averages 7.9 inches. The mean annual evapotranspiration rate averages an estimated 67 inches per year, resulting in a net annual precipitation rate for the area of approximately -59 inches per year.

- At all four monitoring well locations near the OD Unit (Figure A-3 and Figure I-3), a low permeability silt/silty clay unit was encountered between 10 to 15 feet deep. Drilling records indicate that this unit ranges from approximately 2 to 7 feet thick. This low permeability unit acts as a barrier that prevents or minimizes any potential vertical hazardous waste contaminant migration.

- The depth to the uppermost saturated zone beneath the OD Unit ranges from 27 to 31 feet BGS. Because the net annual precipitation rate averages an estimated -59 inches per year, it is extremely unlikely that hazardous waste contaminants could migrate to the uppermost saturated zone.

1.3.2.1 Assessment of Groundwater Migration Potential [20.4.1.500 NMAC §264.601(a)]

This section presents information on the potential for migration of contaminants within the uppermost saturated zone. In summary, migration of contaminants within the uppermost saturated zone is considered negligible because of the following:

- An approximate groundwater flow velocity of 14.7 feet per year and hydraulic conductivity values averaging 3.47 x 10^{-4} feet/minute suggest an extremely low potential for hazardous waste contaminant migration in the uppermost saturated zone. Contaminants seldom move at the advective transport velocity of groundwater and generally move at much slower rates because of adsorption to soil particles and other processes

- Natural TDS, chloride, and sulfate concentrations at the OD Unit all exceed the NMHHS. According to the New Mexico Water Quality Control Commission Regulations (20.6.1 NMAC, December 1, 1995), the groundwater below the OD Unit is designated as unfit for human consumption because it exceeds NMHHS for TDS, sulfate, and chloride. Furthermore, based on the Base-Wide Background Study (Radian, 1993), the upper tolerance limit for selenium also naturally exceeds NMHHS standards for groundwater

- No water supply wells are located on the Base due to poor water quality. The nearest well of any kind is a livestock water supply well located approximately 3.5 miles southwest of the Base

- There is no risk associated with the groundwater in the vicinity of the OD Unit since the resource is not used as a domestic, industrial, or agricultural water supply and in all likelihood will never be used as a resource

I.3.3 PROTECTION OF SURFACE WATER, WETLANDS AND SOIL SURFACE [20.4.1.500 NMAC §264.601(b)]

Exposure of humans or other environmental receptors to hazardous waste or hazardous constituents via surface water, wetlands, or the soil surface is unlikely based on the following factors:

- Hazardous wastes treated at the OD Unit are in solid form and transported to the unit in their original containers or casings minimizing the potential for spills

- The maximum quantity of hazardous waste to be treated during any detonation event is limited to 20,000 pounds of net explosive weight (NEW)

- The OD Unit is located in a secure area within HAFB, and only authorized personnel have access to the unit

- There are no surface water bodies in the vicinity of the OD Unit. The nearest surface water body is Lake Holloman located approximately 10 miles (16 kilometers) from the OD Unit

- Soils at the OD Unit are sampled periodically and analyzed for constituents of concern. Historical analytical data (presented in Attachment H) indicate that analytical results are below New Mexico Soil Screening Levels

- There are no wetlands within the HAFB installation boundary

Based on these factors, the potential for adverse effects on human health and the environment, including damage to flora, fauna, and physical structures, due to migration of hazardous waste or hazardous constituents or exposure to the treatment events is not likely.

I.3.4 PROTECTION OF THE ATMOSPHERE [20.4.1.500 NMAC §264.601(c)]

Exposure of humans or other environmental receptors to hazardous waste or hazardous constituents via the air due to OD Unit operations is unlikely. This subsection presents information that supports this conclusion.

Potential for Emission

There is minimal potential for the release of any gases, aerosols, or particulates from the OD activities into the air that would adversely affect human health or the environment. At least a 5-mile (8-km) radius surrounding the OD treatment unit is barren, undeveloped, and uninhabited. The primary concern is the impact of the waste constituents on soil around the OD Unit.

However, since minimal potential exists for particulates in soil to be released into the air, perimeter soil samples will be collected surrounding the area of operation, as described in Attachment H, Sampling and Analysis Plan. If contaminant concentration levels above background are reported for soil samples, a risk assessment as described in the permit Module III, Section E, will be completed, and air and ground water monitoring will be conducted. The results of air modeling are presented in Attachment J.

Effectiveness of Control

Current OD operations are conducted in designated areas within the OD Unit. The destruction of the explosive and propellant devices is nearly 100 percent because they are designed to explode or burn. Unlike other installations that treat explosive contaminated materials, for example, this unit treats only explosive and propellant products. OD treatment efficiency is sufficient that these control systems should protect human health and the environment. To prove this, the Waste Analysis Plan and Sampling and Analysis Plan described in Permit Attachments B and H, respectively, will be implemented to establish soil quality and minimize the potential spread of contamination.

Operational Conditions

OD operations are conducted only during favorable wind conditions as described below.

No treatment operation will be conducted during an electrical storm or when such a storm is approaching within 10 miles (16 kilometers) of the OD Unit. Additionally, disposal by

detonation using an electrical firing system will not be conducted during sand, dust, or snow storms.

It is recognized that weather factors are interdependent. The following safety precaution will be observed:

1. Wind speed will not be less than 3 miles per hour and will not exceed 15 miles per hour (5 and 24 kilometers per hour, respectively).

Existing Air Quality/Other Sources/Receptors

The air quality in Otero County, New Mexico where the subject site is located is in compliance with air quality standards. Otero County is in attainment with the NAAQS. The 20,000-Pound OD Unit at HAFB is in an attainment area, and the surrounding air quality is good.

Operations at the OD Unit are not expected to adversely impact the air quality of Otero County. OD treatment activities are very efficient and, particularly at this remote site, are not expected to degrade air quality so as to impact the environment or human health.

The potential public receptors in the area are far removed (at least 5 miles [8 kilometers]) from the site. The HAFB EOD team members who will conduct the treatment operations will be at safe distances for the OD Unit. Vehicle traffic due to OD operations has negligible impact on air quality.

In conclusion, OD operations are very efficient due to the reactive nature of the hazardous PEP, and there are no receptors in close proximity to the OD Unit. Current air quality is excellent and will not be significantly impacted by OD Unit operations.

I.3.5 MONITORING, INSPECTION, AND REPORTING [20.4.1.500 NMAC §264.602]

Monitoring, inspection, and reporting activities performed at HAFB in compliance with the regulatory requirements of 20.4.1.500 NMAC §264.602 are described in this section.

I.3.5.1 Monitoring

Monitoring activities performed at the OD Unit include routine inspections and sampling that is reported in annual environmental monitoring reports to the NMED. Quarterly soil sampling performed at the OD Unit during the past five years has not indicated contamination attributable to OD Unit operations.

The treatment process at the OD Unit effectively destroys the wastes. In order to monitor potential contamination from treatment residues, HAFB will continue to sample soils at the OD Unit as indicated in the Sampling and Analysis Plan (Attachment H). ~~of this Part B permit renewal application).~~

I.3.5.2 Inspection

The OD Unit is inspected on a regular basis according to the the requirements of 20.4.1.500 NMAC §§264.15 and 264.33. The Inspection Schedule included as Attachment C of this

application details the types and frequency of inspections performed to assure the integrity, maintenance and safe operation of the OD Unit.

I.3.5.3 Recordkeeping and Reporting [20.4.1.500 NMAC §264.602]

Operating records and documents associated with the OD Unit and required by 20.4.1.500 NMAC §264.602 are maintained at the HAFB Environmental Department office. The following is list of the documents:

- Operating log that describes the type and quantity of hazardous waste treated in the OD Unit and the date the waste was detonated
- Records and results of waste analyses performed as specified in 20.4.1.500 NMAC §264.13
- Reports of any incidents that required the activation of the contingency plan
- Facility closures, as specified in 20.4.1.500 NMAC §264.115
- Closure and Post-Closure Care Plan as required by 40 C.F.R. 264.1 18(b)(3)
- Inspection logs for the last three years
- Records of monitoring, testing, analytical data, and any corrective actions taken to prevent or mitigate releases of hazardous waste to the environment
- Disposal requests and Land Disposal Restriction Certifications for hazardous waste transported to a permitted facility
- A copy of the Contingency Plan
- A copy of the OD Unit permit
- Correspondence and other documents from governmental agencies that affect the OD Unit
- Biennial Report in accordance with 20.4.1.500 NMAC §264.75

Additionally, training records for EOD personnel are maintained at the EOD office.

I.4 REFERENCES

CH2MHill, 1992

Freehling, et al., 1999

Frey and Yates, 1996

HAFB, 1998a (endangered species table)

HAFB, Integrated Natural Resources Management Plan

ICF Kaiser and Labat Anderson, 1993

Johnson, et al., 1997a

Johnson, et al., 1997b

Mehlhop, et al., 1998

Radian, 1993

Root and Demarais, 1997

Suminski, 1977

Turner, 1987

United States Air Force, 1996. Delineation of Jurisdictional Waters of the United States and Wetlands on Holloman Air Force Base, New Mexico.

United States Department of Interior, 1996

ATTACHMENT J
AIR QUALITY DISPERSION MODELING ANALYSIS

HOLLOMAN AIR FORCE BASE
20,000-POUND OPEN DETONATION TREATMENT UNIT

Permit No. NM6572124422

ATTACHMENT J
AIR QUALITY DISPERSION MODELING ANALYSIS

J.1 INTRODUCTION

Holloman AFB (HAFB) maintains and operates an Open Detonation (OD) treatment unit, rated for up to 20,000 pounds net explosive weight (NEW), north of the Test Track, west of Range Road 9, and near the 1952 demarcation between White Sand Missile Range (WSMR) and HAFB administrative units of the Joint Service Range.

The dispersion modeling conducted for renewal of the permit indicates that criteria pollutant emissions will not exceed the National Ambient Air Quality Standards (NAAQS) at approximately 2,000 meters distance north from the HAFB property boundary. This distance overlaps onto the WSMR side of the 1952 division of the Alamogordo Bombing and Gunnery Range that separated the administration of the range into WSMR and HAFB units. HAFB has operational control over the restricted access area equivalent to the unsurveyed Sections 1, 2, and 3 of Township 15 South, Range 8 East, and the South ½ of the South ½ of Section 35, Township 14 South, Range 8 East, New Mexico Prime Meridian (NMPM).

This attachment presents the results of the air quality dispersion modeling analysis performed for HAFB and describes specific procedures used in the analysis. The analysis was conducted to determine the impacts of the emissions from the 20,000-Pound OD Unit located at the site. The following sections describe the modeling approach followed by a description of the results.

J.2 DESCRIPTION OF AIR QUALITY MODELS USED

The Open Burn/Open Detonation Dispersion Model (OBODM 1.3) was selected to evaluate the potential air quality impacts of open burning and detonation of energetic waste at HAFB. OBODM is used to predict peak concentration, time-mean concentration, dosage, and gravitational deposition for emissions from open burn and detonation sources for either a single event or up to one year of sequential hourly sources and meteorological inputs.

EPA's air quality modeling guidance is documented in 40 Code of Federal Regulations Part 51 Appendix W. These guidelines specify recommended modeling approaches and models to be used for typical industrial source modeling situations. Section 3.2 of Appendix W discusses the use of alternative models and allows for the selection of an alternative model under certain conditions where the recommended models do not provide the best modeling approach for all situations. Since the modeling of openly detonated material is not a typical modeling scenario, the use of an alternative model that is designed to simulate this process is appropriate and thus the OBODM model was selected.

OBODM is intended for use in evaluating the potential air quality impacts of the open-air burning and detonation (OB/OD) of obsolete munitions and solid propellants at Department of Defense and Department of Energy installations. OBODM can use either the theoretical emissions factors predicted by a product of combustion model (for example, Baroody, 1994) or empirical emissions factors such as those derived from measurements in the Dugway Proving Ground BangBox™. These emission factors define the quantities of pollutants released per unit

mass of material burned or detonated for each major type of material. OBODM predicts the downwind transport and dispersion of these pollutants using cloud rise and dispersion model algorithms from existing dispersion models such as the Rocket Exhaust Effluent Dispersion Model (REEDM) (Bjorklund et al., 1982; Bjorklund, 1990a), Dugway Proving Ground's Real-Time Volume Source Dispersion Model (RTVSM) (Bjorklund, 1990b), and the U.S. Environmental Protection Agency's Industrial Source Complex (ISC) Dispersion Model (Bowers et al., 1979).

The algorithms used by OBODM are too extensive to list here, however, are available in the document, Open Burn/Open Detonation Dispersion Model (OBODM) User's Guide, Volume II Technical Description, Report # DPG-TR-96-008b, Strategic Environmental Research and Development (SERDP), April 1998, accessible at the link:

http://www.epa.gov/scram001/userg/nonepa/obodmvol2.pdf.

J.3 SOURCE CHARACTERISTICS

The OD Unit at HAFB is currently operated on an intermittent basis for treatment of energetic hazardous waste items. Nearly all of the energetic wastes are transformed into gaseous or particulate form. The time required for the detonation process consists of two components:

- Waste placement and stacking (1 to 8 hours)
- Detonation inspection (1 hour)

The emissions associated with the process are nearly instantaneous due to the nature of the treatment process. The maximum permitted annual detonation mass is 420,000 pounds NEW, and the maximum single permitted detonation mass is 20,000 pounds NEW. Based upon the time required for completion of the detonation process, one 20,000-pound NEW detonation per day at 9:00 a.m. was used in the modeling analysis. TNT (2,4,6-Trinitrotoluene) was chosen to represent the worst case 20,000-pound NEW.

J.4 MODEL OPTIONS

OBODM has various options to simulate a variety of dispersion conditions for emissions from an open burning or open detonation event. The OBODM options used in the dispersion modeling analysis for HAFB are as follows:

- Final cloud rise height used for all calculation distances
- Instantaneous sources can use both stable and adiabatic plume rise
- Hours with calm wind speeds result in zero dispersion/deposition
- Missing meteorological data hours result in zero dispersion/deposition
- Flat terrain
- Grid system origin is added to source rectangular coordinates
- Instantaneous release (2.5 second burn time)
- 9:00 a.m. detonation time
- Material or fuel/explosive = TNT

The type of ordnance, amount detonated, duration and time of detonation are the parameters that are entered in the OBODM air dispersion model. The OBODM model uses these parameters and the five years of meteorological data to predict the downwind transport and dispersion of these pollutants using cloud rise and dispersion model algorithms from existing dispersion models such as the Rocket Exhaust Effluent Dispersion Model (REEDM) (Bjorklund et al., 1982; Bjorklund, 1990a), Dugway Proving Ground's Real-Time Volume Source Dispersion Model (RTVSM) (Bjorklund, 1990b), and the U.S. Environmental Protection Agency's Industrial Source Complex (ISC) Dispersion Model (Bowers et al., 1979).

The maximum detonation event in a 24-hr period would be 20,000 lb of TNT. It would not be possible to do more than a single event in this time period due to safety and manpower constraints. Also, since no detonation is permitted at night, it is impossible to setup two events to occur in a single 24-hour period. The maximum for the year will be 420,000 lb of TNT. The facility can have any variety of explosive materials for these large scale detonations. The C-4 that is used to initiate the detonation will make up only a very small portion of the net explosive weight used for these large worst case detonations (20,000 lb). The materials destroyed can range from munitions to rocket motors, however the use of TNT would be the most conservative approach and consistent with how the site is managed. During the course of a year, 9:30 am is the typical detonation time. The plume rise calculation is done by OBODM algorithms based upon hourly meteorological conditions. This is an internal calculation done by OBODM that is used to predict the ambient air concentration at selected receptor locations around the detonation pit.

J.5 TOPOGRAPHIC SETTING

HAFB is located in Otero County, New Mexico. The OD Unit is located near the northern HAFB property boundary, surrounded by the WSMR. The base elevation at the OD Unit is approximately 1,250 meters (m) above mean sea level (amsl). The area surrounding the OD Unit is relatively flat. As a result, terrain elevations were not incorporated into the air quality modeling analysis.

J.6 LAND USE DETERMINATION AND DISPERSION COEFFICIENTS

The Auer land use classification method is typically used to determine the dispersion characteristics. The purpose of the analysis is to determine whether to use rural or urban dispersion coefficients with the modeling analysis. The Auer technique established four primary land use types: industrial, commercial, residential, and agricultural. Industrial, commercial, and compact residential areas are classified as urban, while agricultural and common residential areas are considered rural. For modeling purposes, an area is defined as urban if more than 50 percent of the surface within 3 kilometers of the source is classified as an urban land use type. Otherwise, the area is determined to be rural. A qualitative review of the United States Geological Survey (USGS) 7.5-minute quadrangle of the area surrounding the HAFB OD Unit revealed that the area is clearly rural. Therefore, rural dispersion coefficients were used for this analysis. Figure J-1 shows the area within 3 kilometers of the OD Unit.

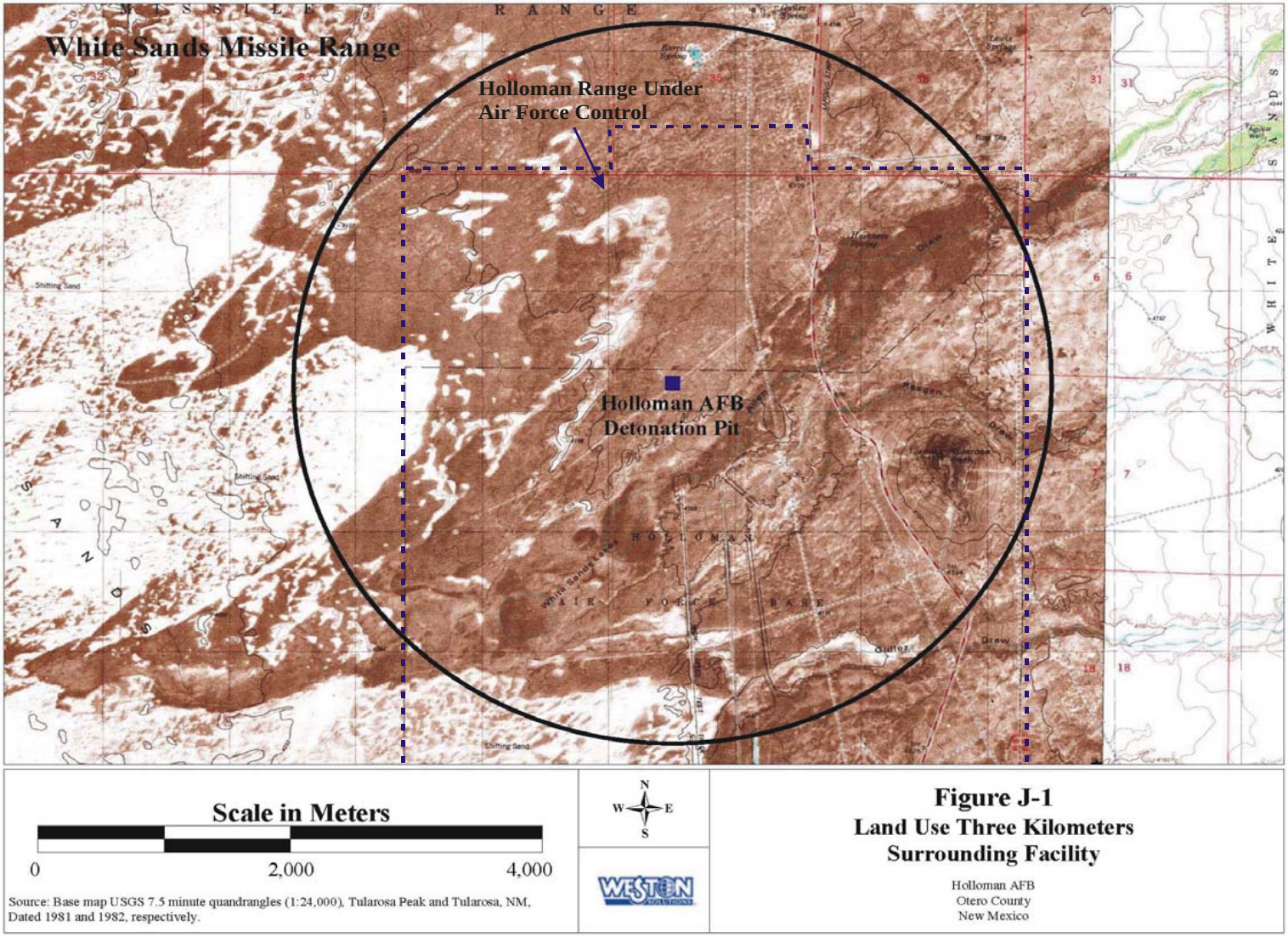

Figure J-1 Land Use Three Kilometers Surrounding Facility

J.7 RECEPTOR GRID SELECTION

A Cartesian receptor grid was used as the main receptor grid. Receptors were spaced as follows:

- 100 meter spacing from OD Unit location to 1,500 meters
- 500 meter spacing from 1,500 meters to 3,000 meters
- 1,000 meter spacing from 3,000 meters to 10,000 meters.

In addition, the above spacing was used along the HAFB northern, eastern, and western property boundaries surrounding the OD Unit.

J.8 METEOROLOGICAL DATA

The meteorological database for the OBODM consisted of five years (1985, 1987, 1988, 1990, and 1991) of surface data collected at Roswell, New Mexico. Coincident mixing heights were derived by merging surface temperatures with concurrent twice-daily rawinsonde data obtained from El Paso, Texas. The surface and upper air data were obtained directly from the USEPA Support Center for Regulatory Air Models (SCRAM) website. The surface and upper air files were processed using the EPA's meteorological pre-processor PCRAMMET (version 99169).

J.9 BACKGROUND

Background concentrations for total suspended particulate (TSP) and particulate matter less than 10 micrograms in diameter (PM10) were obtained directly from the New Mexico Air Quality Bureau (NMAQB) Air Dispersion Modeling Guidelines, February 2006. Background values for the other criteria pollutants modeled were not available. The background values are presented in Table J-1.

Table J-1 Background Values
($\mu g/m^3$)

Pollutant	Annual	24-hour
TSP	26.6	26.6
PM_{10}	20	20

J.10 SUMMARY OF AIR QUALITY MODELING RESULTS

The maximum modeling results are presented in Table J-2. Table J-2 shows that the predicted maximum concentrations of carbon monoxide (CO) (8-hour and 1-hour averaging periods), nitrogen dioxide (NO2) (annual averaging period), lead (Pb) (quarterly averaging period), and sulfur dioxide (SO2) (annual, 24-hour and 3-hour averaging periods) will not exceed the NAAQS or the NMAAQS. TSP and PM10 (annual averaging period) do not exceed the NAAQS or NMAAQS at off-site receptors.

The high second high (HSH) 24-hour TSP and PM10 concentrations do not exceed the NAAQS or NMAAQS at off-site receptors. The concentrations shown in Table J-2 for TSP and PM10 are the largest modeled annual and HSH 24-hour concentrations at the HAFB property boundary.

Annual concentrations are based on the annual limit of 420,000 pounds. HAFB has operational control over all areas with air quality impacts. Figure J-1 shows the area of HAFB operational control. The concentrations of all other criteria pollutants shown in Table J-2 are the maximum predicted off-site concentrations. None of the maximum predicted values are at off-site receptors.

The NAAQS and NMAAQS were established for pollutants considered harmful to public health and the environment and set limits to protect human and environmental health, including the health of "sensitive" populations such as asthmatics, children, and the elderly, and to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The OBODM air dispersion modeling results show that the NMAAQS or NAAQS will not be exceeded. The area surrounding the OD Unit location is a remote part of the HAFB and the WSMR. This area is off-limits to the public. The WSNM is approximately 11.2 miles from the open detonation pit. As shown in Table J-2, the NMAAQS or NAAQS were not exceeded beyond 700 meters of the detonation pit.

A Cartesian receptor grid was used to locate the worst case maximum ambient air impacts starting at the detonation pit and extending out as follows: 100 meter spacing from OD unit location to 1,500 meters; 500 meter spacing from 1500 meters to 3,000 meters; and 1,000 meter spacing from 3,000 meters to 10,000 meters. As shown in Table J-2 the NMAAQS and NAAQS were not exceeded.

EOD personnel remotely charging the explosive wastes are located at a minimum separation distance based on the NEW to be treated. The normal distances are 7,920 feet (2,414 meters) or 2,640 feet (804 meters), and occasionally 5,280 feet (1,609 meters). The minimum separation distance is 1,000 feet in accordance with AFMAN 91-201 *Explosive Safety Standards*. Protective structures are required only when personnel cannot be located at double the required 500 feet minimum distance.

No areas of specific ecological or natural environmental concern have been identified in the immediate area affected by the OD Unit. Tula pond, a man-modified natural spring, is approximately two miles north, and a population of gypsum adapted cottonwood trees (*Populus deltoides* ssp. *wislizeni*) is several miles to the southwest; neither is affected by the OD Unit. The Malone and Ritas Draws and the Lost River drainage are approximately 10 miles away from the OD Unit. These areas, classified as Essential Pupfish Habitat, are protected under the Cooperative Agreement for the Protection and Maintenance of White Sands Pupfish between the U.S. Army - WSMR, U.S. Air Force - HAFB, National Park Service - WSNM, U.S. Fish and Wildlife Service, and New Mexico Department of Game and Fish, but are not affected by the use of the OD Unit.

The eastern boundary of the HAFB/WSMR restricted area is approximately 4 miles east of the OD Unit. No human receptors are within this four mile area. There are a few rural residences 6 to 7 miles east and 7 to 8 miles southeast and northeast of the OD Unit. The village of Tularosa is located 9 to 10 miles to the northeast.

Table J-2 OBODM Modeling Results from Open Detonation Unit[a]
Holloman AFB, New Mexico

	Pollutant											
	CO		Lead (Pb)	NO_2		TSP[b]		PM_{10}		SO_2		
	8-hr	1-hr	Quarterly	Annual	24-hr	Annual[f]	24-hr[g]	Annual[f]	24-hr[g]	Annual	24-hr	3-hr
	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)
Facility	88.5	702	1.21E-03	0.075	2.2	0.19	101	0.19	101	0.014	0.41	3.3
Background[c]	-	-	-	-	-	26.6	26.6	20	20	-	-	-
Total[d]	88.5	702	1.21E-03	0.075	2.2	27	128	20	121	0.014	0.41	3.3
NAAQS	10,000	40,000	1.5	100	-	-	-	50	150	80	365	1,300
NMAAQS[e]	8,681	13,072	-	82	164	60	150	-	-	46	228	-

Notes:
a Open Burn/Open Detonation Dispersion Model (OBODM). Ambient air concentrations shown are the OBODM predicted ambient air concentrations of a 20,000 lb TNT detonation at 9:30 am, at the HAFB OD Unit using the meteorological database of five years (1985, 1987, 1988, 1990, and 1991) of surface data collected at Roswell, New Mexico. Coincident mixing heights were derived by merging surface temperatures with concurrent twice-daily rawinsonde data obtained from El Paso, Texas. The surface and upper air data were obtained directly from the USEPA SCRAM website. The surface and upper air files were processed using the USEPA's meteorological pre-processor PCRAMMET (version 99169).Assumed worst case of instantaneous 20,000-pound TNT detonation per day, 365 days/year. Detonation occurred at 9:30 a.m. each day. Five years (1985, 1987, 1988, 1990, 1991) of meteorogical data used, surface measurements from Roswell, NM merged with upper air soundings from El Paso, TX.
b OBODM only models PM_{10}, assumed TSP=PM_{10}.
c Background values from New Mexico Air Quality Bureau (NMAQB) Air Dispersion Modeling Guidelines, February 2006.
d Total = Facility predicted concentration + Background.
e Approximate equivalent concentration, based upon Section 2.5.1 of NMAQB Air Dispersion Modeling Guidelines, February 2006.
f Maximum at the property boundary.
g High Second High (HSH) at the property boundary.

References:

Air Force Manual 91-201, Explosives Safety Standards, 18 October 2001

New Mexico Air Quality Bureau (NMAQB) Air Dispersion Modeling Guidelines, February 2006. (http://www.nmenv.state.nm.us/aqb/modeling/modelingpubs.html)

Open Burn/Open Detonation Dispersion Model (OBODM) User's Guide, Volume II Technical Description, Report # DPG-TR-96-008b, Strategic Environmental Research and Development (SERDP), April 1998 (http://www.epa.gov/scram001/userg/nonepa/obodmvol2.pdf)

1.0 CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Michael B. McGee, Jr.
Colonel, USAF
Commander, 49th Fighter Wing

27 JUN 08
Date Signed

Exhibit H-1 (Table 1)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	Nitroglycerine	<	3,200.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-02	Nitroglycerine	<	3,200.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-03	Chromium		14.6000	B	mg/kg	9.5027	234	YES	NO	No Action: result flagged "B"
OD-SO-A-03	Nickel		7.6000	B	mg/kg	6.5898	1560	YES	NO	No Action: result flagged "B"
OD-SO-A-03	Nitroglycerine		6,300.0000		µg/kg	93.6772	347000	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Nitroglycerine	<	3,200.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Antimony		17.1000		mg/kg	3.5279	31.3	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-01	Cadmium		0.7300		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-01	Chromium		34.3000	B	mg/kg	9.5027	234	YES	NO	No Action: result flagged "B"
OD-SO-B-01	Copper		137.0000	B	mg/kg	9.1595	3130	YES	NO	No Action: result flagged "B"
OD-SO-B-01	Lead		11.0000	B	mg/kg	7.6508	400	YES	NO	No Action: result flagged "B"
OD-SO-B-01	Nitroglycerine		11,000.0000		µg/kg	93.6772	347000	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-02	Nitroglycerine	<	3,100.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Cadmium		1.4000		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-03	Lead		7.9000	B	mg/kg	7.6508	400	YES	NO	No Action: result flagged "B"
OD-SO-B-03	Nitroglycerine	<	3,100.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-03A	Cadmium		1.2000		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-03A	Copper		10.8000	B	mg/kg	9.1595	3130	YES	NO	No Action: result flagged "B"
OD-SO-B-03A	Lead		10.7000	B	mg/kg	7.6508	400	YES	NO	No Action: result flagged "B"
OD-SO-B-03A	Nitroglycerine	<	3,200.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-04	Nitroglycerine	<	2,700.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-01	Arsenic		3.0000		mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Barium		90.8000	B	mg/kg	79.4971	5450	YES	NO	No Action: result flagged "B"
OD-SO-C-01	Beryllium		0.5100		mg/kg	0.42	156	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Chromium		11.9000	B	mg/kg	9.5027	234	YES	NO	No Action: result flagged "B"
OD-SO-C-01	Copper		14.6000	B	mg/kg	9.1595	3130	YES	NO	No Action: result flagged "B"
OD-SO-C-01	Lead		12.2000	B	mg/kg	7.6508	400	YES	NO	No Action: result flagged "B"
OD-SO-C-01	Nickel		8.1000	B	mg/kg	6.5898	1560	YES	NO	No Action: result flagged "B"
OD-SO-C-01	Nitroglycerine	<	3,000.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-02	Nitroglycerine	<	2,900.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-03	Cadmium		1.1000		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-03	Nitroglycerine	<	2,800.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Arsenic		2.1000		mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-04	Barium		79.7000	B	mg/kg	79.4971	5450	YES	NO	No Action: result flagged "B"
OD-SO-C-04	Cadmium		0.7300		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-04	Chromium		10.3000	B	mg/kg	9.5027	234	YES	NO	No Action: result flagged "B"
OD-SO-C-04	Copper		16.3000	B	mg/kg	9.1595	3130	YES	NO	No Action: result flagged "B"
OD-SO-C-04	Lead		14.5000	B	mg/kg	7.6508	400	YES	NO	No Action: result flagged "B"
OD-SO-C-04	Nickel		7.2000	B	mg/kg	6.5898	1560	YES	NO	No Action: result flagged "B"
OD-SO-C-04	Nitroglycerine	<	3,100.0000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-01	Antimony		0.3600		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Arsenic		1.2000		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Barium		34.6000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 1)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	Beryllium		0.0610		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Cadmium		0.5000		mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Chromium		3.3000	B	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Copper		3.9000	B	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Lead		2.9000	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nickel		2.1000	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Selenium	<	0.3000	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Silver	<	0.0530	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Mercury	<	0.0200	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	HMX		1,000.0000		µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nitrobenzene	<	10.0000	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-01	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	RDX		1,300.0000		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Antimony		0.4600		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Arsenic		1.1000		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Barium		27.5000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Beryllium		0.0250		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Cadmium		0.0990		mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Chromium		2.5000	B	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Copper		2.2000	B	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Lead		2.7000	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nickel		1.4000	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Selenium	<	0.2600	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Silver	<	0.0470	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Mercury	<	0.0190	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 1)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-02	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nitrobenzene		65.0000		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-02	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	RDX	<	79.0000	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Antimony		0.5600		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Arsenic		1.2000		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Barium		29.6000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Beryllium		0.0350		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Cadmium		0.3400		mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Copper		3.4000	B	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Lead		3.7000	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Selenium	<	0.2700	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Silver	<	0.0480	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Mercury	<	0.0200	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nitrobenzene		73.0000		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-03	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	RDX	<	79.0000	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Antimony		0.5500		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Arsenic		1.2000		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Barium		35.4000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Beryllium		0.0690		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Cadmium		0.3200		mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Chromium		3.6000	B	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Copper		3.7000	B	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Lead		3.0000	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nickel		2.0000	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Selenium	<	0.2900	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 1)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-04	Silver	<	0.0520	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Mercury	<	0.0180	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nitrobenzene	<	10.0000	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-04	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	RDX	<	79.0000	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Arsenic		1.1000		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Barium		35.5000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Beryllium		0.0590		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nickel		2.4000	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Selenium	<	0.2900	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Silver		0.0510		mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Mercury	<	0.0210	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nitrobenzene		460.0000		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-01	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	RDX	<	79.0000	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Antimony		0.4800		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Arsenic		0.4900		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Barium		27.1000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Beryllium	<	0.0100	U	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 1)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-02	Cadmium		0.0350		mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Chromium		2.0000	B	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Copper		2.0000	B	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Lead		1.6000	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nickel		1.3000	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Selenium	<	0.2900	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Silver	<	0.0520	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Mercury	<	0.0200	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nitrobenzene	<	10.0000	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-02	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	RDX		290.0000		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Antimony		0.4300		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Arsenic		1.4000		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Barium		37.1000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Beryllium		0.0810		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Chromium		4.4000	B	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Copper		8.2000	B	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nickel		2.6000	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Selenium	<	0.2900	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Silver		0.0840		mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Mercury	<	0.0190	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nitrobenzene		100.0000		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-03	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 1)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-03	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	RDX	<	79.0000	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Antimony		0.5000		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Arsenic		1.2000		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Barium		39.4000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Beryllium		0.0890		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Chromium		4.3000	B	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Nickel		2.5000	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Selenium	<	0.2800	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Silver	<	0.0510	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Mercury	<	0.0200	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2,4-Dinitrotoluene		100.0000		µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Nitrobenzene		290.0000		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	RDX	<	79.0000	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Antimony	<	0.2000	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Arsenic		0.6200		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Barium		25.4000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Beryllium		0.0270		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Cadmium		0.0480		mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Chromium		2.0000	B	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Copper		2.4000	B	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Lead		1.9000	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nickel		1.4000	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Selenium	<	0.2400	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Silver	<	0.0430	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Mercury	<	0.0150	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 1)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-04	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nitrobenzene	<	10.0000	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-04	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	RDX	<	79.0000	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Antimony		0.5200		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Cadmium		0.3500		mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Selenium	<	0.2500	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Silver	<	0.0440	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Mercury		0.0230		mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nitrobenzene	<	10.0000	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-01	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	RDX	<	79.0000	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Antimony		0.4300		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Arsenic		1.0000		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Barium		43.9000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Beryllium		0.1100		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Cadmium		0.1900		mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Chromium		3.9000	B	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Copper		6.8000	B	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Lead		3.6000	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nickel		2.6000	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Selenium		0.3100		mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 1)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-02	Silver	<	0.0440	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Mercury	<	0.0190	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nitrobenzene		39.0000		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-02	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	RDX	<	79.0000	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Antimony		0.6300		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Arsenic		1.1000		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Barium		36.1000	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Beryllium		0.1000		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Chromium		3.9000	B	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Copper		6.5000	B	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Lead		5.9000	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nickel		2.6000	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Selenium	<	0.2400	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Silver		0.0860		mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Mercury	<	0.0170	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	HMX	<	18.0000	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nitrobenzene		45.0000		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-03	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	RDX		250.0000		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 1)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-04	Antimony		0.6000		mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Beryllium		0.4200		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Selenium	<	0.2600	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Silver	<	0.0460	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Mercury	<	0.0190	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3,5-Trinitrobenzene	<	29.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3-Dinitrobenzene	<	12.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2-Amino-4,6-Dinitrotoluene	<	19.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	4-Amino-2,6-Dinitrotoluene	<	36.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,4-Dinitrotoluene	<	24.0000	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,6-Dinitrotoluene	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	HMX		94.0000		µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	m-Nitrotoluene	<	25.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nitrobenzene	<	10.0000	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-04	o-Nitrotoluene	<	20.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Pentaerythritol Tetranitrate	<	210.0000	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	p-Nitrotoluene	<	48.0000	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	RDX	<	79.0000	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Tetryl	<	26.0000	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,4,6-Trinitrotoluene (TNT)	<	18.0000	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded

[1] 20,000 UTL: Final Background Study, 20000-Pound Open Detonation Unit, December 1997
[2] NMED SSL: New Mexico Environment Department Soil Screening Levels, February 2004, Revision 2

First Quarter 2004
20,000-Pound OD Unit
Monitoring Evaluation Report

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	Mercury	<	0.04	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-01	Nitroglycerine	<	6400.00	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-02	Mercury	<	0.04		mg/kg	0.0269	6.11	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-02	Nitroglycerine	<	6300.00	B	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "B"
OD-SO-A-03	Chromium		14.60	B	mg/kg	9.5027	234	YES	NO	No Action: result flagged "B"
OD-SO-A-03	Mercury	<	0.04		mg/kg	0.0269	6.11	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-03	Nickel		7.60		mg/kg	6.5898	1560	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-03	Nitroglycerine		6300.00		µg/kg	93.6772	347000	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Mercury	<	0.04	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-04	Nitroglycerine	<	6400.00		µg/kg	93.6772	347000	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-01	Antimony		17.10	U	mg/kg	3.5279	31.3	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Cadmium		0.73	U	mg/kg	0.5417	74.1	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Chromium		34.30	U	mg/kg	9.5027	234	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Copper		137.00	U	mg/kg	9.1595	3130	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Lead		11.00	U	mg/kg	7.6508	400	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Mercury	<	0.04	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Nitroglycerine		11000.00	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-02	Mercury	<	0.04	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-02	Nitroglycerine	<	6300.00	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Cadmium		1.40	U	mg/kg	0.5417	74.1	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Lead		7.90	U	mg/kg	7.6508	400	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Mercury	<	0.04	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Nitroglycerine	<	6200.00	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-03A	Cadmium		1.20	U	mg/kg	0.5417	74.1	YES	NO	No Action: result flagged "U"
OD-SO-B-03A	Copper		10.80	U	mg/kg	9.1595	3130	YES	NO	No Action: result flagged "U"
OD-SO-B-03A	Lead		10.70	U	mg/kg	7.6508	400	YES	NO	No Action: result flagged "U"
OD-SO-B-03A	Mercury	<	0.04	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-03A	Nitroglycerine	<	6400.00	B	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "B"
OD-SO-B-04	Mercury	<	0.03	B	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "B"
OD-SO-B-04	Nitroglycerine	<	5500.00		µg/kg	93.6772	347000	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Arsenic		3.00	B	mg/kg	1.4963	3.9	YES	NO	No Action: result flagged "B"
OD-SO-C-01	Barium		90.80	B	mg/kg	79.4971	5450	YES	NO	No Action: result flagged "B"
OD-SO-C-01	Beryllium		0.51		mg/kg	0.42	156	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Chromium		11.90	*	mg/kg	9.5027	234	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Copper		14.60		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Lead		12.20	U	mg/kg	7.6508	400	YES	NO	No Action: result flagged "U"
OD-SO-C-01	Nickel		8.10		mg/kg	6.5898	1560	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Nitroglycerine	<	5900.00	U	µg/kg	93.6772	347000	YES	NO	No Action:UTL exceeded but not SSL

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-02	Mercury	<	0.04	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-02	Nitroglycerine	<	5900.00	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-03	Cadmium		1.10	U	mg/kg	0.5417	74.1	YES	NO	No Action: result flagged "U"
OD-SO-C-03	Mercury	<	0.03	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-03	Nitroglycerine	<	5500.00	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Arsenic		2.10	U	mg/kg	1.4963	3.9	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Barium		79.70	U	mg/kg	79.4971	5450	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Cadmium		0.73	U	mg/kg	0.5417	74.1	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Chromium		10.30		mg/kg	9.5027	234	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-04	Copper		16.30	U	mg/kg	9.1595	3130	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Lead		14.50	U	mg/kg	7.6508	400	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Mercury	<	0.04	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Nickel		7.20	U	mg/kg	6.5898	1560	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Nitroglycerine	<	6200.00	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-01	Antimony		0.36	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Arsenic		1.20		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Barium		34.60	U	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Beryllium		0.06	U	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Cadmium		0.50	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Chromium		3.30	B	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Copper		3.90		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Lead		2.90	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nickel		2.10	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Selenium	<	2.10		mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Silver	<	0.32	*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3,5-Trinitrobenzene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3-Dinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,4-Dinitrotoluene	<	100.00		µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2-Amino-4,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	4-Amino-2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	HMX		1000.00	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	m-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nitrobenzene	<	100.00	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-01	o-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Pentaerythritol Tetranitrate	<	500.00	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	RDX		1300.00	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	Tetryl	<	200.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	TNT	<	100.00	J	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Antimony		0.46	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Arsenic		1.10	U	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Barium		27.50	U	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Beryllium		0.03	U	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Cadmium		0.10	U	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Chromium		2.50	U	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Copper		2.20	U	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Lead		2.70	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nickel		1.40	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Selenium	<	1.90		mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Silver	<	0.28	B	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3,5-Trinitrobenzene	<	100.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3-Dinitrobenzene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,4-Dinitrotoluene	<	100.00	*	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,6-Dinitrotoluene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2-Amino-4,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	4-Amino-2,6-Dinitrotoluene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	HMX	<	200.00	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	m-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nitrobenzene		65.00	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-02	o-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Pentaerythritol Tetranitrate	<	500.00	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	RDX	<	200.00	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Tetryl	<	200.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	TNT	<	100.00	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Antimony		0.56	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Arsenic		1.20	U	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Barium		29.60	J	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Beryllium		0.04	J	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Cadmium		0.34	U	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Copper		3.40	U	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Lead		3.70	U	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Selenium	<	1.90	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Silver	<	0.29	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3,5-Trinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-03	1,3-Dinitrobenzene	<	100.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,4-Dinitrotoluene	<	100.00	B	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,6-Dinitrotoluene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2-Amino-4,6-Dinitrotoluene	<	100.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	4-Amino-2,6-Dinitrotoluene	<	100.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	HMX	<	200.00		µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	m-Nitrotoluene	<	200.00	*	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nitrobenzene		73.00		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-03	o-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Pentaerythritol Tetranitrate	<	500.00		µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	RDX	<	200.00	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Tetryl	<	200.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	TNT	<	100.00	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Antimony		0.55	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Arsenic		1.20	U	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Barium		35.40	U	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Beryllium		0.07	U	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Cadmium		0.32	U	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Chromium		3.60	U	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Copper		3.70	U	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Lead		3.00	U	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nickel		2.00	U	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Selenium	<	2.10	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Silver	<	0.31	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3,5-Trinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3-Dinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,4-Dinitrotoluene	<	100.00	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2-Amino-4,6-Dinitrotoluene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	4-Amino-2,6-Dinitrotoluene	<	100.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	HMX	<	200.00		µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	m-Nitrotoluene	<	200.00	B	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nitrobenzene	<	100.00		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-04	o-Nitrotoluene	<	200.00		µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Pentaerythritol Tetranitrate	<	500.00	*	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	p-Nitrotoluene	<	200.00		µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	RDX	<	200.00	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-04	Tetryl	<	200.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	TNT	<	100.00	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Arsenic		1.10	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Barium		35.50	U	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Beryllium		0.06	U	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nickel		2.40	U	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Selenium	<	2.00	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Silver		0.05	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3,5-Trinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3-Dinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,4-Dinitrotoluene	<	100.00	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2-Amino-4,6-Dinitrotoluene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	4-Amino-2,6-Dinitrotoluene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	HMX	<	200.00	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	m-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nitrobenzene		460.00	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-01	o-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Pentaerythritol Tetranitrate	<	500.00	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	RDX	<	200.00	B	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Tetryl	<	200.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	TNT	<	100.00		µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Antimony		0.48	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Arsenic		0.49	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Barium		27.10		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Beryllium	<	0.21	*	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Cadmium		0.04		mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Chromium		2.00	U	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Copper		2.00		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Lead		1.60	U	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nickel		1.30	U	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Selenium	<	2.10	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Silver	<	0.31	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3,5-Trinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3-Dinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,4-Dinitrotoluene	<	100.00	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-02	2-Amino-4,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	4-Amino-2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	HMX	<	200.00	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	m-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nitrobenzene	<	100.00	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-02	o-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Pentaerythritol Tetranitrate	<	500.00	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	RDX		290.00		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Tetryl	<	200.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	TNT	<	100.00	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Antimony		0.43	B	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Arsenic		1.40	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Barium		37.10		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Beryllium		0.08	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Chromium		4.40		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Copper		8.20		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nickel		2.60	*	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Selenium	<	2.00		mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Silver		0.08	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3,5-Trinitrobenzene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3-Dinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,4-Dinitrotoluene	<	100.00	B	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2-Amino-4,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	4-Amino-2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	HMX	<	200.00	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	m-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nitrobenzene		100.00	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-03	o-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Pentaerythritol Tetranitrate	<	500.00	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	RDX	<	200.00		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Tetryl	<	200.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	TNT	<	100.00	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Antimony		0.50	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Arsenic		1.20	U	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Barium		39.40	U	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-03A	Beryllium		0.09	U	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Chromium		4.30	U	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Nickel		2.50	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Selenium	<	2.00	B	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Silver	<	0.30		mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	1,3,5-Trinitrobenzene	<	100.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	1,3-Dinitrobenzene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2,4-Dinitrotoluene		100.00		µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2,6-Dinitrotoluene	<	100.00	*	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2-Amino-4,6-Dinitrotoluene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	4-Amino-2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	HMX	<	200.00		µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	m-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Nitrobenzene		290.00	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	o-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Pentaerythritol Tetranitrate	<	500.00	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	RDX	<	200.00		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Tetryl	<	200.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	TNT	<	100.00	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Antimony	<	1.70	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Arsenic		0.62	U	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Barium		25.40	U	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Beryllium		0.03		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Cadmium		0.05	U	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Chromium		2.00	U	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Copper		2.40	U	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Lead		1.90	U	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nickel		1.40	U	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Selenium	<	1.70	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Silver	<	0.26	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3,5-Trinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3-Dinitrobenzene	<	100.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-04	2,4-Dinitrotoluene	<	100.00		µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,6-Dinitrotoluene	<	100.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2-Amino-4,6-Dinitrotoluene	<	100.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	4-Amino-2,6-Dinitrotoluene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	HMX	<	200.00	*	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	m-Nitrotoluene	<	200.00		µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nitrobenzene	<	100.00	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-04	o-Nitrotoluene	<	200.00		µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Pentaerythritol Tetranitrate	<	500.00	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	RDX	<	200.00	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Tetryl	<	200.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	TNT	<	100.00	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Antimony		0.52	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Cadmium		0.35	U	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Mercury		0.02	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Selenium	<	1.80	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Silver	<	0.26	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3,5-Trinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3-Dinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,4-Dinitrotoluene	<	100.00	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2-Amino-4,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	4-Amino-2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	HMX	<	200.00	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	m-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nitrobenzene	<	100.00	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-01	o-Nitrotoluene	<	200.00	B	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Pentaerythritol Tetranitrate	<	500.00		µg/kg	61300	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-01	p-Nitrotoluene	<	200.00		µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	RDX	<	200.00		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Tetryl	<	200.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	TNT	<	100.00		µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Antimony		0.43	*	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Arsenic		1.00		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Barium		43.90	B	mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Beryllium		0.11		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Cadmium		0.19	U	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Chromium		3.90	U	mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Copper		6.80	U	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Lead		3.60	U	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nickel		2.60	U	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Selenium		0.31	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Silver	<	0.27	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3,5-Trinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3-Dinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,4-Dinitrotoluene	<	100.00	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2-Amino-4,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	4-Amino-2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	HMX	<	200.00	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	m-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nitrobenzene		39.00	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-02	o-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Pentaerythritol Tetranitrate	<	500.00	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	RDX	<	200.00	B	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Tetryl	<	200.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-02	TNT	<	100.00		µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Antimony		0.63	B	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Arsenic		1.10	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Barium		36.10		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Beryllium		0.10	*	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Chromium		3.90		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Copper		6.50	U	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Lead		5.90		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nickel		2.60	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Selenium	<	1.70	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Silver		0.09	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3,5-Trinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3-Dinitrobenzene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,4-Dinitrotoluene	<	100.00	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2-Amino-4,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	4-Amino-2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	HMX	<	200.00	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	m-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nitrobenzene		45.00	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-03	o-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Pentaerythritol Tetranitrate	<	500.00	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	RDX		250.00	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Tetryl	<	200.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	TNT	<	100.00	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Antimony		0.60	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Beryllium		0.42	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Selenium	<	1.90	B	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 2)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-04	Silver	<	0.28		mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3,5-Trinitrobenzene	<	100.00	B	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3-Dinitrobenzene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,4-Dinitrotoluene	<	100.00		µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,6-Dinitrotoluene	<	100.00	*	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2-Amino-4,6-Dinitrotoluene	<	100.00		µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	4-Amino-2,6-Dinitrotoluene	<	100.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	HMX		94.00		µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	m-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nitrobenzene	<	100.00	B	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-04	o-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Pentaerythritol Tetranitrate	<	500.00	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	p-Nitrotoluene	<	200.00	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	RDX	<	200.00	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Tetryl	<	200.00	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	TNT	<	100.00	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
[1] 20,000 UTL:	Final Background Study, 20000-Pound Open Detonation Unit, December 1997									
[2] NMED SSL:	New Mexico Environment Department Soil Screening Levels, February 2004, Revision 2									

Exhibit H-1 (Table 3)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	Mercury	<	0.037	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-01	Nitroglycerine	<	6,100	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-02	Mercury	<	0.037	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-02	Nitroglycerine	<	5,900	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-03	Nitroglycerine	<	6,200	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-04	Lead		8.1		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Mercury	<	0.039	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-04	Nitroglycerine	<	6,200	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Arsenic		2.2		mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-01	Barium		81.6		mg/kg	79.4971	5450	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-01	Beryllium		0.5		mg/kg	0.42	156	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-01	Chromium		9.7		mg/kg	9.5027	234	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-01	Copper		9.4	*	mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-01	Mercury	<	0.036	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Nitroglycerine	<	5,900	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-02	Mercury	<	0.04	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-02	Nitroglycerine	<	6,500	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Mercury	<	0.035	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Nitroglycerine	<	5,900	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-03A	Mercury	<	0.036	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-03A	Nitroglycerine	<	5,700	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-04	Mercury	<	0.035	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-04	Nitroglycerine	<	5,900	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-01	Mercury	<	0.036	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-01	Nitroglycerine		160,000		µg/kg	93.6772	347000	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-02	Copper		932	*	mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-02	Nitroglycerine	<	5,800	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-03	Mercury	<	0.035	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-03	Nitroglycerine	<	5,800	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Mercury	<	0.035	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Nitroglycerine	<	6,000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-01	Antimony	<	2.1	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Arsenic		0.78	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Barium		31		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Beryllium		0.13	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Cadmium		0.14	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Chromium		2.6		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Copper		5.4	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Lead		1.9		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 3)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	Nickel		1.8		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Selenium	<	2.1	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Silver	<	0.32	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-01	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	RDX		250		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Antimony	<	2.1	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Arsenic		0.68	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Barium		33		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Beryllium		0.15	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Cadmium		0.14	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Chromium		2.9		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Copper		3.5	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Lead		1.6		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nickel		1.5		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Selenium	<	2.1	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Silver	<	0.32	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 3)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-02	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	RDX		100	J	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Antimony		0.4	B	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Arsenic		0.8	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Barium		38.7		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Beryllium		0.13	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Cadmium		0.18	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Chromium		2.8		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Copper		4.8	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Lead		5.5		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nickel		2.5		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Selenium	<	2.2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Silver	<	0.32	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Mercury		0.022	B	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	HMX		190	J	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-03	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	RDX		510		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Antimony	<	2.1	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Arsenic		0.96	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Barium		37.7		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Beryllium		0.14	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Cadmium		0.2	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Chromium		3		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Copper		5.5	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 3)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-04	Nickel		1.9		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Selenium	<	2.1	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Silver	<	0.32	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	HMX		670		µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nitrobenzene		410		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-04	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	RDX		320		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Antimony	<	2	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Cadmium		0.39	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Lead		6.8		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nickel		6.4		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Silver	<	0.3	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nitrobenzene		63	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-01	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 3)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-02	Antimony	<	2.2	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Arsenic		1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Barium		33.7		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Beryllium		0.12	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Cadmium		0.13	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Chromium		2.4		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Copper		4.2	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Lead		3		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nickel		1.7		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Selenium	<	2.2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Silver	<	0.34	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	HMX		99	J	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-02	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	RDX		730		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Antimony	<	1.9	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Arsenic		0.54	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Barium		24.3		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Beryllium		0.093	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Cadmium		0.092	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Chromium		3		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Copper		2.4	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Lead		1.2		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nickel		1		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Selenium	<	1.9	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Silver	<	0.28	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 3)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-03	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-03	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Antimony	<	2	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Arsenic		0.58	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Barium		25.3		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Beryllium		0.083	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Cadmium		0.054	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Chromium		2		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Copper		1.4	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Lead		0.87	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Nickel		0.91	B	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Silver	<	0.3	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 3)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-04	Antimony	<	2	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Arsenic		0.96	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Barium		40.4		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Beryllium		0.19	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Cadmium		0.2	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Chromium		4.2		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Copper		4.7	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Lead		2		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nickel		2.2		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Silver	<	0.29	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nitrobenzene		86	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-04	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Antimony		0.37	B	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Arsenic		0.85	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Barium		43.8		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Beryllium		0.19	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Cadmium		0.34	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Chromium		4		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Copper		7.2	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Lead		4.5		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nickel		2.8		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Selenium	<	2.1	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Silver	<	0.31	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 3)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-01	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-01	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Antimony	<	2	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Arsenic		1.1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Barium		49.2		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Beryllium		0.23		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Cadmium		0.21	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Chromium		4.5		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Lead		3.2		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nickel		2.9		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Silver	<	0.29	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Mercury		0.02	B	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nitrobenzene		65	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-02	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 3)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-03	Antimony	<	2	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Arsenic		0.96	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Barium		37.4		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Beryllium		0.14	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Cadmium		0.24	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Chromium		3.1		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Copper		4	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Lead		2.1		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nickel		1.9		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Silver	<	0.31	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-03	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Antimony	<	1.9	U	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Arsenic		1.3	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Barium		45.5		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Beryllium		0.18	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Cadmium		0.19	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Chromium		4.5		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Copper		5.2	*	mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Lead		2.6		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nickel		2.6		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Selenium	<	1.9	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Silver	<	0.29	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 3)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-04	2,4,6-Trinitrotoluene	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2-Amino-4,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	4-Amino-2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-04	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Pentaerythritol Tetranitrate	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
[1] 20,000 UTL:	Final Background Study, 20000-Pound Open Detonation Unit, December 1997									
[2] NMED SSL:	New Mexico Environment Department Soil Screening Levels, February 2004, Revision 2									

Exhibit H-1 (Table 4)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	Mercury	<	0.033	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-01	Nitroglycerine	<	5,900	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-02	Cadmium		2.2		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-02	Copper		98.3		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-02	Lead		9		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-02	Silver		2.1		mg/kg	0.7328	391	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-02	Mercury	<	0.036	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-02	Nitroglycerine	<	5,700	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-03	Chromium		15.9		mg/kg	9.5027	234	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-03	Copper		17.7		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-03	Lead		8.4		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-03	Nickel		9.7	E	mg/kg	6.5898	1560	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-03	Mercury	<	0.033	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-03	Nitroglycerine	<	5,800	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-04	Arsenic		1.7	B	mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Cadmium		1.1		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Chromium		12.8		mg/kg	9.5027	234	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Copper		52.1		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Lead		12		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Silver		0.75		mg/kg	0.7328	391	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Mercury	<	0.034	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-04	Nitroglycerine	<	5,900	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Lead		7.8		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-01	Mercury	<	0.031	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-01	Nitroglycerine	<	6,000	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-02	Selenium	<	2.3	U	mg/kg	2.2645	391	YES	NO	No Action: result flagged "U"
OD-SO-B-02	Mercury	<	0.035	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-02	Nitroglycerine	<	6,400	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Mercury	<	0.034	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Nitroglycerine	<	5,900	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-04	Mercury	<	0.033	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-04	Nitroglycerine	<	6,300	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-01	Arsenic		2.3		mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Beryllium		0.43		mg/kg	0.42	156	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Cadmium		1.2		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Copper		18.9		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Lead		15.1		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Mercury	<	0.033	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"

Exhibit H-1 (Table 4)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-01	Nitroglycerine	<	6,100	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-02	Mercury	<	0.028	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-02	Nitroglycerine	<	6,200	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-03	Mercury	<	0.031	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-03	Nitroglycerine	<	5,400	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Mercury	<	0.033	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Nitroglycerine	<	5,800	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-C-04A	Mercury	<	0.03	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-04A	Nitroglycerine	<	5,800	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-01	Antimony	<	2.1	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Arsenic		0.76	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Barium		30.7		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Beryllium		0.13	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Cadmium		0.13	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Chromium		3.4		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Copper		8.1		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Lead		2.5		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nickel		1.9	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Selenium	<	2.1	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Silver	<	0.32	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nitrobenzene		140		µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-01	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Antimony	<	2	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Arsenic		1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Barium		49.3		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 4)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-02	Beryllium		0.23		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Chromium		8.1		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nickel		4.3	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-02	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Antimony		0.35	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Arsenic		1.3	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Barium		64.8		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Beryllium		0.39		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Cadmium		0.28	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Silver	<	0.3	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-03	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 4)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-03	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Antimony	<	2	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Barium		56.1		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Beryllium		0.33		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nickel		5.6	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-04	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Antimony	<	2.1	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Arsenic		0.66	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Barium		29		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Beryllium		0.1	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Cadmium		0.043	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Chromium		2.7		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Copper		5.3		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nickel		2.5	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Selenium	<	2.1	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Silver	<	0.31	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 4)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-01	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-01	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Antimony		0.54	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Arsenic		0.65	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Barium		31.9		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Beryllium		0.15	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Cadmium		0.069	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Chromium		3.3		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Copper		3.7		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Lead		2.1		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nickel		2.1	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Silver	<	0.34	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-02	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Antimony	<	2	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Arsenic		0.54	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Barium		30.9		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 4)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-03	Beryllium		0.11	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Cadmium		0.089	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Chromium		2.7		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Copper		3.6		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Lead		1.5		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nickel		1.6	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Silver	<	0.3	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-03	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Antimony	<	2.1	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Arsenic		0.87	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Barium		35.6		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Beryllium		0.13	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Cadmium		0.18	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Chromium		3.5		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Copper		5.9		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Lead		3.3		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nickel		2.2	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Selenium	<	2.1	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Silver	<	0.31	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 4)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-04	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-04	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Antimony		0.5	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Barium		74.8		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Chromium		9.3		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nickel		6.2	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Silver	<	0.29	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-01	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Antimony	<	2	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Arsenic		1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Barium		38.5		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Beryllium		0.17	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Cadmium		0.14	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Chromium		4		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 4)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-02	Copper		5.4		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Lead		3.4		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nickel		2.5	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Silver	<	0.3	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-02	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	RDX		480		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Antimony	<	2	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Arsenic		0.84	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Barium		39.4		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Beryllium		0.12	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Cadmium		0.4	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Chromium		3.2		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Copper		5.8		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Lead		3.8		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nickel		2.3	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Silver	<	0.29	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 4)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-03	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-03	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Antimony	<	1.9	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Arsenic		1.1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Barium		30.5		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Beryllium		0.098	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Cadmium		0.33	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Chromium		2.5		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Copper		3.1		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Lead		1.8		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nickel		1.6	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Selenium	<	1.9	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Silver	<	0.28	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-04	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Antimony	<	1.8	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Arsenic		1.1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Barium		29.6		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Beryllium		0.089	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 4)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-04A	Cadmium		0.31	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Chromium		2.1		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Copper		3		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Lead		1.4		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Nickel		1.5	E	mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Selenium	<	1.8	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Silver	<	0.26	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04A	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
[1] 20,000 UTL:	Final Background Study, 20000-Pound Open Detonation Unit, December 1997									
[2] NMED SSL:	New Mexico Environment Department Soil Screening Levels, February 2004, Revision 2									

Exhibit H-1 (Table 5)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	Arsenic		2.2		mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-01	Barium		81.2		mg/kg	79.4971	5450	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-01	Copper		9.6		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-03	Arsenic		2.3		mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-03	Barium		89.5		mg/kg	79.4971	5450	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Arsenic		3.2		mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Beryllium		0.76		mg/kg	0.42	156	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Cadmium		0.76		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Chromium		15.9		mg/kg	9.5027	234	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Copper		44.5		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Lead		8.2		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Nickel		12.6		mg/kg	6.5898	1560	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Silver		1.5	*	mg/kg	0.7328	391	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Mercury	<	0.032	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-04	Nitroglycerine	<	5800	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-A-04A	Arsenic		2.2		mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04A	Barium		96.9		mg/kg	79.4971	5450	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04A	Beryllium		0.52		mg/kg	0.42	156	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04A	Cadmium		1.3		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04A	Chromium		13.3		mg/kg	9.5027	234	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04A	Copper		33.5		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04A	Nickel		11.6		mg/kg	6.5898	1560	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04A	Silver		2.9	*	mg/kg	0.7328	391	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04A	Mercury	<	0.032	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-04A	Nitroglycerine	<	5800	U	µg/kg	93.6772	347000	YES	NO	No Action: result flagged "U"
OD-SO-B-02	Copper		12.2		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-03	Mercury	<	0.034	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Nitroglycerine		4000	J	µg/kg	93.6772	347000	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-03	Arsenic		2.1		mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-03	Cadmium		0.59		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-03	Copper		13.4		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-03	Lead		10		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-04	Cadmium		0.57	B	mg/kg	0.5417	74.1	YES	NO	No Action: result flagged "B"
OD-SO-A-01	Antimony		0.54	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Beryllium		0.41		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Cadmium		0.25	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Chromium		8.7		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Lead		4.3		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nickel		6.4		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 5)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	Selenium	<	0	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Silver		0.28	B*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Mercury	<	0	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3,5-Trinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3-Dinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,4-Dinitrotoluene	<	0	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,6-Dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2-Amino-4,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	4-Amino-2,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	HMX	<	0	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	m-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nitrobenzene		60	JB	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-01	o-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	PETN	<	0	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	p-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	RDX	<	0	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Tetryl	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	TNT	<	0	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nitroglycerine	<	0	U	µg/kg	93.6772	347000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Antimony		0.42	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Arsenic		1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Barium		34.1		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Beryllium		0.17	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Cadmium		0.18	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Chromium		3.6		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Copper		3		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Lead		2.1		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nickel		2.4		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Selenium	<	0	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Silver		0.28	*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Mercury	<	0	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3,5-Trinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3-Dinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,4-Dinitrotoluene	<	0	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,6-Dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2-Amino-4,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	4-Amino-2,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	HMX	<	0	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	m-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 5)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-02	Nitrobenzene		50	B	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-02	o-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	PETN	<	0	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	p-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	RDX	<	0	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Tetryl	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	TNT	<	0	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nitroglycerine	<	0	U	µg/kg	93.6772	347000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Antimony		0.48	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Beryllium		0.41		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Cadmium		0.27	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Chromium		8.6		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Copper		6.2		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Lead		4.2		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nickel		6.2		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Selenium	<	0	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Silver	<	0	U*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Mercury	<	0	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3,5-Trinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3-Dinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,4-Dinitrotoluene	<	0	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,6-Dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2-Amino-4,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	4-Amino-2,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	HMX	<	0	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	m-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nitrobenzene		0	B	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-03	o-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	PETN	<	0	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	p-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	RDX		20		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Tetryl	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	TNT	<	0	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nitroglycerine	<	0	U	µg/kg	93.6772	347000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Antimony		0.79	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Barium		15		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Selenium	<	1.8	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 5)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-04	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nitrobenzene		50	B	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-04	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	Antimony		0.45	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	Lead		7.3		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	Selenium	<	1.9	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	Nitrobenzene		100	B	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04A	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Antimony		0.42	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Arsenic		0.7	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Barium		36		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Beryllium		0.15	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Cadmium		0.19	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Chromium		5.8		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Copper		4.1		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Lead		2.2		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 5)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-01	Nickel		3.1		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Selenium	<	0	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Silver		0.17	B*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Mercury	<	0	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3,5-Trinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3-Dinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,4-Dinitrotoluene	<	0	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,6-Dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2-Amino-4,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	4-Amino-2,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	HMX	<	0	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	m-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nitrobenzene		90	B	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-01	o-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	PETN	<	0	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	p-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	RDX	<	0	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Tetryl	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	TNT	<	0	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nitroglycerine	<	0	U	µg/kg	93.6772	347000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Antimony		0.58	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Arsenic		1.2	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Barium		35.1		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Beryllium		0.16	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Cadmium		0.21	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Chromium		4.2		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Lead		2.2		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nickel		2.2		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Selenium	<	0	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Silver	<	0	U*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Mercury	<	0	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3,5-Trinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3-Dinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,4-Dinitrotoluene	<	0	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,6-Dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2-Amino-4,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	4-Amino-2,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	HMX	<	0	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	m-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 5)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-02	Nitrobenzene		85	JB	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-02	o-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	PETN	<	0	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	p-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	RDX		0		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Tetryl	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	TNT	<	0	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nitroglycerine	<	0	U	µg/kg	93.6772	347000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Antimony		0.44	B	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Arsenic		1.1		mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Barium		48		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Beryllium		0.24		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Cadmium		0.37	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Chromium		4.9		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Copper		9.1		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Lead		4.3		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nickel		3.3		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Selenium	<	1.9	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Silver		0.29	U*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3,5-Trinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2-Amino-4,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	4-Amino-2,6-dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-03	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	p-Nitrotoluene		360	B	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	RDX		3800		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Tetryl	<	30	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Antimony		0.38	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Arsenic		0.97	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Barium		35.8		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Beryllium		0.14	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Cadmium		0.22	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 5)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-04	Chromium		3.4		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Copper		6.9		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Lead		3.3		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nickel		2.7		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Selenium	<	0	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Silver	<	0	U*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Mercury	<	0	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3,5-Trinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3-Dinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,4-Dinitrotoluene	<	0	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,6-Dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2-Amino-4,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	4-Amino-2,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	HMX	<	0	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	m-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nitrobenzene		0	B	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-04	o-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	PETN	<	0	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	p-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	RDX		50	J	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Tetryl	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	TNT	<	0	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nitroglycerine	<	0	U	µg/kg	93.6772	347000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Antimony		0	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Arsenic		1.3	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Barium		59.6		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Beryllium		0.31		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Cadmium		0.29	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Chromium		6.4		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Copper		9		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Lead		5.5		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nickel		4.4		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Selenium	<	0	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Silver		0.15	B*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Mercury	<	0	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3,5-Trinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3-Dinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,4-Dinitrotoluene	<	0	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,6-Dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 5)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-01	2-Amino-4,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	4-Amino-2,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	HMX	<	0	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	m-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nitrobenzene		71	JB	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-01	o-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	PETN	<	0	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	p-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	RDX	<	0	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Tetryl	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	TNT	<	0	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nitroglycerine	<	0	U	µg/kg	93.6772	347000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Antimony	<	0	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Arsenic		1.3	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Barium		29.1		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Beryllium		0.12	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Cadmium		0.11	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Chromium		2.7		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Copper		3.9		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Lead		1.5		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nickel		1.7		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Selenium	<	0	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Silver		0.13	B*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Mercury	<	0	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3,5-Trinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3-Dinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,4-Dinitrotoluene	<	0	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,6-Dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2-Amino-4,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	4-Amino-2,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	HMX	<	0	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	m-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nitrobenzene		40	B	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-02	o-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	PETN	<	0	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	p-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	RDX	<	0	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Tetryl	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	TNT	<	0	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 5)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-02	Nitroglycerine	<	0	U	µg/kg	93.6772	347000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Antimony	<	0	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Barium		70.7		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Beryllium		0.4		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Chromium		8.2		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nickel		5.9		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Selenium	<	0	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Silver		0.17	B*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Mercury	<	0	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3,5-Trinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3-Dinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,4-Dinitrotoluene	<	0	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,6-Dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2-Amino-4,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	4-Amino-2,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	HMX	<	0	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	m-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nitrobenzene		46	JB	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-03	o-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	PETN	<	0	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	p-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	RDX	<	0	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Tetryl	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	TNT	<	0	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nitroglycerine	<	0	U	µg/kg	93.6772	347000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Antimony		0.39	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Arsenic		1.1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Barium		56.6		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Beryllium		0.25		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Chromium		5.5		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Copper		8.5		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Lead		5		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nickel		3.8		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Selenium	<	0	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Silver		0.18	B*	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Mercury	<	0	U	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3,5-Trinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3-Dinitrobenzene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,4-Dinitrotoluene	<	0	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 5)
Analytical Sample Results

Location	Parameter	Value		Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-04	2,6-Dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2-Amino-4,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	4-Amino-2,6-dinitrotoluene	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	HMX	<	0	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	m-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nitrobenzene		85	JB	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-04	o-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	PETN	<	0	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	p-Nitrotoluene	<	0	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	RDX	<	0	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Tetryl	<	0	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	TNT	<	0	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nitroglycerine	<	0	U	µg/kg	93.6772	347000	NO	NO	No Action: No standard exceeded
[1] 20,000 UTL:	Final Background Study, 20000-Pound Open Detonation Unit, December 1997									
[2] NMED SSL:	New Mexico Environment Department Soil Screening Levels, February 2004, Revision 2									

Exhibit H-1 (Table 6)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	Mercury	<	0.039	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-02	Copper		13.4		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-02	Mercury	<	0.036	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-03	Copper		14.1		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-03	Mercury	<	0.034	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-A-04	Cadmium		2.5		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Copper		9.3		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-04	Mercury		0.04		mg/kg	0.0269	6.11	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-B-01	Mercury	<	0.033	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-02	Mercury	<	0.036	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-03	Mercury	<	0.033	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-03A	Mercury	<	0.037	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-B-04	Mercury	<	0.036	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-01	Arsenic		1.5	B	mg/kg	1.4963	3.9	YES	NO	No Action: result flagged "B"
OD-SO-C-01	Cadmium		1.8		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Copper		11.4		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Lead		11.4		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-01	Mercury	<	0.036	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-02	Cadmium		0.94		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-02	Lead		7.8		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-02	Mercury	<	0.037	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-03	Copper		37.5		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-03	Mercury	<	0.042	U	mg/kg	0.0269	6.11	YES	NO	No Action: result flagged "U"
OD-SO-C-04	Arsenic		2.2		mg/kg	1.4963	3.9	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-04	Beryllium		0.47		mg/kg	0.42	156	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-04	Cadmium		0.6		mg/kg	0.5417	74.1	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-04	Copper		13.9		mg/kg	9.1595	3130	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-C-04	Lead		12.3		mg/kg	7.6508	400	YES	NO	No Action:UTL exceeded but not SSL
OD-SO-A-01	Antimony		0.39	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Arsenic		1.1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Barium		33.6		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Beryllium		0.13	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Cadmium		0.31	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Chromium		5.5		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Copper		9		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Lead		4.2		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nickel		4.1		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Selenium	<	2.1	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Silver	<	0.31	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,4-Dinitrotoluene		55	J	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 6)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-01	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	HMX		90	J	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nitrobenzene		39	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Nitroglycerine	<	6,300	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-01	RDX		1,400		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-01	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-01	TNT		590		µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Antimony	<	1.8	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Arsenic		1.1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Barium		31.5		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Beryllium		0.13	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Cadmium		0.21	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Chromium		4.4		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Lead		5.5		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nickel		2.2		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Selenium	<	1.8	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Silver	<	0.27	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Nitroglycerine		9,700		µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-02	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-02	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-02	TNT		95	J	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Antimony		0.45	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Arsenic		1.2	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Barium		29.5		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Beryllium		0.12	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Cadmium		0.2	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 6)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-03	Chromium		3.9		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Lead		2.4		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nickel		2.4		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Silver	<	0.31	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nitrobenzene		38	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Nitroglycerine	<	5,900	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-03	RDX		500		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-03	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-03	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Antimony		0.58	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Arsenic		1.1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Barium		30.8		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Beryllium		0.16	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Chromium		3.9		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Lead		7.3		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nickel		2.6		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Silver	<	0.29	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nitrobenzene		53	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Nitroglycerine	<	5,900	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-A-04	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 6)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-A-04	RDX		2,100		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-A-04	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-A-04	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Antimony	<	1.9	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Arsenic		0.87	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Barium		27.2		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Beryllium		0.11	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Cadmium		0.17	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Chromium		2.4		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Copper		4.3		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Lead		5.1		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nickel		1.5		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Selenium	<	1.9	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Silver	<	0.28	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,4-Dinitrotoluene		270		µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Nitroglycerine	<	5,500	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-01	RDX		970		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-01	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-01	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Antimony		0.46	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Arsenic		0.93	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Barium		27.7		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Beryllium		0.13	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Cadmium		0.084	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Chromium		2.5		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Copper		2.5		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Lead		0.97	B	mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nickel		1.5		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Selenium	<	2.2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Silver	<	0.32	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 6)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-02	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Nitroglycerine	<	5,800	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-02	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-02	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-02	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Antimony		0.49	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Arsenic		0.81	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Barium		29.2		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Beryllium		0.11	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Cadmium		0.14	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Chromium		3.1		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Copper		3.8		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Lead		3.3		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nickel		1.6		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Selenium	<	2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Silver	<	0.3	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Nitroglycerine	<	5,600	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03	RDX		1,300		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-03	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Antimony	<	1.9	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Arsenic		0.87	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 6)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-03A	Barium		31.4		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Beryllium		0.13	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Cadmium		0.26	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Chromium		3.8		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Copper		6.1		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Lead		3.8		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Nickel		2.5		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Selenium	<	1.9	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Silver	<	0.29	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	HMX		78	J	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Nitrobenzene		49	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Nitroglycerine	<	5,800	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	RDX		2,900		µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-03A	TNT		290		µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Antimony		0.43	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Arsenic		1	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Barium		28.7		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Beryllium		0.1	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Cadmium		0.086	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Chromium		2.5		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Copper		1.8		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Lead		2		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nickel		1.3		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Selenium	<	1.9	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Silver	<	0.29	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 6)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-B-04	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nitrobenzene	<	100	U	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Nitroglycerine	<	5,900	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-B-04	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-B-04	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-B-04	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Antimony		0.52	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Barium		46.6		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Beryllium		0.25		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Chromium		5.8		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nickel		4		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Selenium	<	2.1	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Silver	<	0.31	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nitrobenzene		38	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Nitroglycerine	<	5,900	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-01	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-01	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-01	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Antimony		0.46	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Arsenic		0.9	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Barium		35.3		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Beryllium		0.14	B	mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Chromium		5		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Copper		7.5		mg/kg	9.1595	3130	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nickel		2.4		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Selenium	<	2.1	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Silver	<	0.31	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 6)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-02	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nitrobenzene		35	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Nitroglycerine	<	6,000	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-02	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-02	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-02	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Antimony	<	2.2	UN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Arsenic		1.2	B	mg/kg	1.4963	3.9	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Barium		60		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Beryllium		0.29		mg/kg	0.42	156	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Cadmium		0.29	B	mg/kg	0.5417	74.1	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Chromium		6.7		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Lead		7.2		mg/kg	7.6508	400	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nickel		4		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Selenium	<	2.2	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Silver	<	0.33	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nitrobenzene		63	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Nitroglycerine	<	6,700	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-03	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-03	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-03	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Antimony		0.72	BN	mg/kg	3.5279	31.3	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Barium		76.4		mg/kg	79.4971	5450	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Chromium		9.5		mg/kg	9.5027	234	NO	NO	No Action: No standard exceeded

Exhibit H-1 (Table 6)
Analytical Sample Results

Location	Parameter		Value	Flags	Units	20,000 UTL[1]	NMED SSL[2]	>UTL?	>SSL?	Evaluation
OD-SO-C-04	Mercury		0.019	B	mg/kg	0.0269	6.11	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nickel		6.4		mg/kg	6.5898	1560	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Selenium	<	1.9	U	mg/kg	2.2645	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Silver	<	0.29	U	mg/kg	0.7328	391	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3,5-Trinitrobenze	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	1,3-Dinitrobenzene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,4-Dinitrotoluene	<	100	U	µg/kg	NA	120000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2,6-Dinitrotoluene	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	2-Amino-4,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	4-Amino-2,6-dinitro	<	100	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	HMX	<	200	U	µg/kg	NA	3000000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	m-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nitrobenzene		68	J	µg/kg	NA	21800	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Nitroglycerine	<	6,000	U	µg/kg	93677.2	347000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	o-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	PETN	<	500	U	µg/kg	61300	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	p-Nitrotoluene	<	200	U	µg/kg	NA	410000	NO	NO	No Action: No standard exceeded
OD-SO-C-04	RDX	<	200	U	µg/kg	NA	4420	NO	NO	No Action: No standard exceeded
OD-SO-C-04	Tetryl	<	200	U	µg/kg	NA	NA	NO	NO	No Action: No standard exceeded
OD-SO-C-04	TNT	<	100	U	µg/kg	NA	30000	NO	NO	No Action: No standard exceeded
[1] 20,000 UTL:	Final Background Study, 20000-Pound Open Detonation Unit, December 1997									
[2] NMED SSL:	New Mexico Environment Department Soil Screening Levels, February 2004, Revision 2									

EXHIBIT I-1

Letter from the U.S. Fish and Wildlife Service Regarding Endangered Species

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-----Original Message-----
From: Eric_Hein@fws.gov [mailto:Eric_Hein@fws.gov]
Sent: Thursday, July 20, 2006 1:39 PM
To: Dye Jeanne L Civ 49 CES/CEV
Subject: Re: FW: Figure G-4(mod-For Jeanne).pdf

Ms. Dye:

I received your July 19, 2006, request for our review of the proposed permit renewal for Holloman AFB Open Detonation (OD) operation. It is my understanding this site has been operating for about 10 years and that surveys in the project area have not located any threatened or endangered species or their habitat.

You requested that we provide you with any concerns regarding environmental impacts from your proposed action. Based on the location of the proposed project we have no concerns regarding impacts to threatened and endangered species. There are no listed species or habitat present on or near the project location. However, we appreciate your asking for our input on this and other projects. If you have any questions in regard to our review of the project, please contact me.

Thank you.

Eric

Eric W. Hein
U.S. Fish and Wildlife Service
2105 Osuna NE
Albuquerque, New Mexico 87113
505-761-4735; 346-2542 (fax)

"Dye Jeanne L Civ 49 CES/CEV" <Jeanne.Dye@hollo man.af.mil>

To <Eric_Hein@fws.gov>

cc

07/19/2006 03:56 PM

Subject FW: Figure G-4(mod-For Jeanne).pdf