



DEPARTMENT OF THE AIR FORCE

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

ENTERED

3 OCT 2001

MEMORANDUM FOR NEW MEXICO ENVIRONMENT DEPARTMENT

Attn: Mr. James Bearzi  
Hazardous Waste Bureau  
2905 Rodeo Park Drive East Bldg 1  
Santa Fe NM 87505-6303

K



RED HAF B/2001

FROM: 49 CES/CD  
550 Tabosa Ave  
Holloman AFB, NM 88330-8458

SUBJECT: Submittal of Fourth Quarter 2000 Monitoring Report, 20,000-Pound  
Open Detonation Unit (ODU) and Quality Assurance/Quality Control Report

1. Attached are the 20,000-pound ODU *Fourth Quarter 2000 Monitoring Report* and the *Fourth Quarter 2000 Monitoring Report Quality Assurance/Quality Control* (Atchs 1 and 2, respectively).
2. The quarterly monitoring report contains the results of soil sampling following the detonation events of 11 Sep 00 and 10 Oct 00. These results were then compared to decision criteria specified in Attachment J of the operating permit. Results from these analyses show that the ODU operations are effective.
3. If you have any questions or require additional information, please contact Ms. Debbie Hartell or Mr. Darvin St. John at (505) 572-3931.

*Howard E. Moffitt*  
HOWARD E. MOFFITT  
Deputy Base Civil Engineer

Attachments:

1. Fourth Quarter 2000 Monitoring Report 20,000-Pound Open Detonation Unit
2. Fourth Quarter 2000 Monitoring Report Quality Assurance/Quality Control Results

cc w/Atch:

Mr. Cornelius Amindyas  
New Mexico Environment Department  
Hazardous waste Bureau  
4131 Montgomery Blvd NE  
Albuquerque, New Mexico 87109



LIBRARY COPY

*Headquarters, Air Combat Command  
Langley Air Force Base,  
Virginia*

---

*Final*

*Fourth Quarter 2000 Monitoring Report  
20,000-Pound Open Detonation Unit*

*Holloman Air Force Base,  
New Mexico*

*September 2001*

---



*49 CES/CEV  
Holloman Air Force Base,  
New Mexico*

**FINAL  
FOURTH QUARTER 2000 MONITORING REPORT  
20,000-POUND OPEN DETONATION UNIT**

Prepared for:

Holloman Air Force Base  
49 CES/CEV  
550 Tabosa Avenue  
Holloman AFB, New Mexico 88330

Prepared by:

Foster Wheeler Environmental Corporation  
143 Union Boulevard, Suite 1010  
Lakewood, CO 80228

Under Contract No. DACW45-94-D-0003

Delivery Order 32, Work Authorization Directive 7

U.S. Army Corps of Engineers  
Omaha District  
Omaha, Nebraska

September 2001

## TABLE OF CONTENTS

	<b>Page</b>
LIST OF FIGURES.....	iii
LIST OF TABLES .....	iii
LIST OF ACRONYMS .....	iv
1.0 INTRODUCTION.....	1
2.0 FIELD OPERATIONS.....	1
3.0 ANALYTICAL RESULTS.....	3
3.1 QUALITY ASSURANCE/ QUALITY CONTROL SUMMARY .....	3
3.2 RESULTS SUMMARY.....	5
3.2.1 Explosives Results .....	5
3.2.2 Metals Results.....	7
4.0 EVALUATION OF POTENTIAL RISK.....	8
4.1 METHODOLOGY.....	8
4.2 RESULTS OF RISK EVALUATION .....	10
5.0 CONCLUSION.....	12
6.0 REFERENCES .....	13

### APPENDICES

APPENDIX A Analytical Results

APPENDIX B Risk Evaluation Calculation Sheet

## LIST OF FIGURES

<b>Figure</b>		<b>Page</b>
Figure 2-1	Sample Locations .....	4

## LIST OF TABLES

<b>Table</b>		<b>Page</b>
Table 2-1	Fourth Quarter 2000 Sample Locations .....	2
Table 3-1	Analytical Methods and Parameters.....	6
Table 3-2	Maximum Detected Concentrations, Frequency of Detections, and UTLs for Explosives and Metals .....	8
Table 4-1	Hazard Index and Cancer Risk.....	11

## LIST OF ACRONYMS

AFB	Air Force Base
DQO	data quality objective
EOD	explosive ordnance disposal
EPA	United States Environmental Protection Agency
IRIS	Integrated Risk Information System
mg/kg	milligrams per kilogram
NCEA	National Center for Environmental Assessment
NCP	National Contingency Plan
OD	open detonation
QA	quality assurance
QC	quality control
RfD	reference dose
USAF	United States Air Force
UTL	upper tolerance limit
Work Plan	Final Work Plan Addendum

## 1.0 INTRODUCTION

During the fourth quarter of 2000, Holloman Air Force Base (AFB) performed the 10<sup>th</sup> quarterly sampling event at the 20,000-Pound Open Detonation (OD) Unit in accordance with Attachment J of the operating permit Sampling and Analysis Plan (USAF, 1996). Twelve locations were sampled for metals and explosive compounds and the analytical results were compared to the decision criteria outlined on page 33 of Attachment J of the operating permit. None of the sample results exceeded the decision criteria, and therefore, no changes to operations at the 20,000-Pound OD Unit are recommended. The following report summarizes the field operations, analytical results, potential risk, and conclusions from the 10<sup>th</sup> quarterly sampling event.

## 2.0 FIELD OPERATIONS

The fourth quarter 2000 detonation and sampling events occurred on October 10, 2000. A total of 12 soil samples were collected from 3 different strata within the boundaries of the 20,000-Pound OD Unit. Samples, including quality assurance/quality control (QA/QC) samples, were obtained following the procedures outlined in the Final Work Plan Addendum for the 20,000-Pound Open Detonation Unit (Work Plan) (Foster Wheeler, 1999). Samples were analyzed for metals and explosive compounds as specified in the Work Plan.

During the field operations, the dimensions of each stratum were measured and recorded, and a grid developed based on these measurements. Random sampling locations were determined following the guidelines established in the Work Plan. Sample locations are listed in Table 2-1.

**Table 2-1. Fourth Quarter 2000 Sample Locations**

<b>Stratum: A</b>			
<b>Number of Samples: 4</b>			
<b>Number of Potential</b>			
<b>Sampling Locations (n): 16</b>			
<b>Scale Factor (n-1): 15</b>			
<b>Sample Number</b>	<b>Random Number</b>	<b>Scaled Random Number</b>	<b>Grid-to-Node Sample</b>
1	0.139	2.1	A2
2	0.989	14.8	A15
3	0.565	8.5	A8
4	0.648	9.7	A10

<b>Stratum: B</b>			
<b>Number of Samples: 4</b>			
<b>Number of Potential</b>			
<b>Sampling Locations (n): 20</b>			
<b>Scale Factor (n-1): 19</b>			
<b>Sample Number</b>	<b>Random Number</b>	<b>Scaled Random Number</b>	<b>Grid-to-Node Sample</b>
1	0.934	17.7	B18
2	0.301	5.7	B6
3	0.742	14.1	B14
4	0.608	11.6	B12

<b>Stratum: C</b>			
<b>Number of Samples: 4</b>			
<b>Number of Potential</b>			
<b>Sampling Locations (n): 24</b>			
<b>Scale Factor (n-1): 23</b>			
<b>Sample Number</b>	<b>Random Number</b>	<b>Scaled Random Number</b>	<b>Grid-to-Node Sample</b>
1	0.066	1.5	C2
2	0.988	22.7	C23
3	0.313	7.2	C7
4	0.494	11.4	C11



Samples were labeled according to the following number sequence: OD-SO-s-x, where:

OD = open detonation

SO = soil

s = stratum (A, B, or C)

x = sequential sample number within each stratum (01, 02, 03, 04)

The area sampled was based on wind data recorded at the time of the September 11 and October 10, 2000 detonations. The assumption was made that any small particles from the detonation events would settle downwind of the detonation location. Figure 2-1 illustrates the strata layout and the sample locations associated with the October 10, 2000 sampling event. The wind data are presented below:

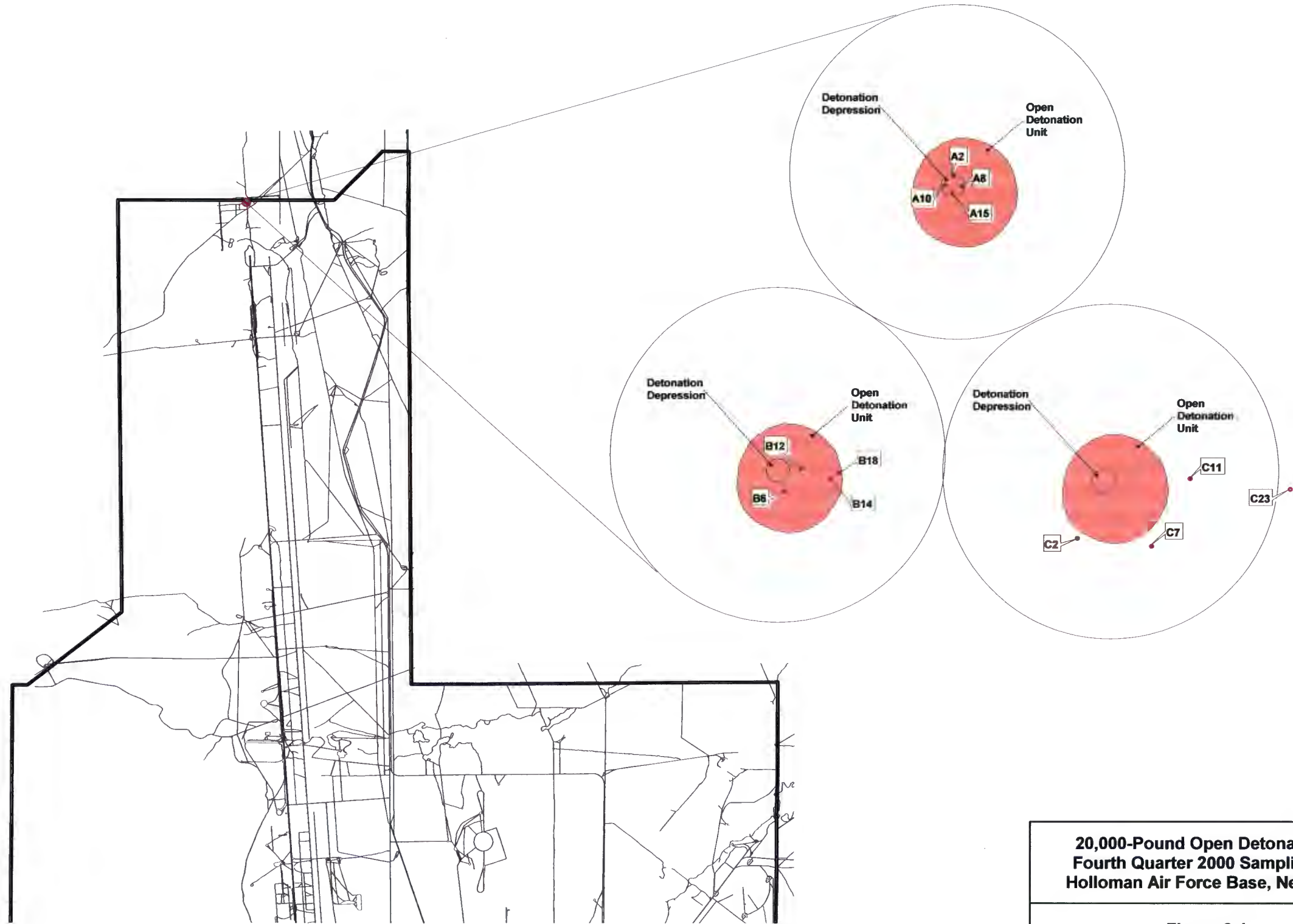
- September 11, 2000—wind direction 330 degrees/wind speed 8 knots
- October 10, 2000—wind direction 290 degrees/wind speed 4 knots

### 3.0 ANALYTICAL RESULTS

This section presents an evaluation of the QA/QC data associated with the analytical results for the fourth quarter 2000 monitoring event. Analytical methods for chemical analysis were taken from the latest revision of United States Environmental Protection Agency (EPA) Test Methods for Evaluating Solid Waste, SW-846, Third Edition and Updates (EPA, 1986).

#### 3.1 QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

The QC data were reviewed to determine usability and achievement of project data quality objectives (DQOs). The review focused on laboratory method blanks, matrix and control sample spikes, surrogate recoveries, and holding times. Overall, QC data associated with this sampling event indicate that project measurement data are reliable and fulfill project DQOs.



**LEGEND**

-  Sample Locations
-  Open Detonation Unit
-  Roads
-  Boundary

**20,000-Pound Open Detonation Unit  
Fourth Quarter 2000 Sampling Event  
Holloman Air Force Base, New Mexico**

**Figure 2-1  
Sample Locations**

file: 20k.apr ; revised October 2000



Foster Wheeler Environmental Corporation

The explosives data (EPA SW-846 Methods 8330 and 8332) for this monitoring event are reported to the method detection limit. A "J" qualifier signifying an estimated concentration was assigned to concentrations reported below the sample-specific detection limit and above the method detection limit. Explosive compounds that were not detected are reported with a "U" qualifier accompanying the sample detection limit.

The reported metals results are uncensored; all instrument response measurements are reported as measured concentrations. A "B" qualifier was assigned to reported concentrations that were less than the sample detection limit and indicates that there is less confidence associated with the reported concentration (i.e., estimated quantitation). Metals that were not detected are reported with a "U" qualifier accompanying the sample detection limit.

## 3.2 RESULTS SUMMARY

Soil samples were collected and analyzed for the parameters specified in the operating permit and outlined in Table 3-1. Complete analytical results and the associated chain-of-custody record for the fourth quarter monitoring event are provided in Appendix A. This section summarizes the analytical results and provides a comparison of the sample results with the site-specific background values.

### 3.2.1 Explosives Results

Explosive compounds detected for this monitoring event were reported below the sample-specific detection limit and were therefore assigned a "J" qualifier. The following explosive compound was detected:

- Nitroglycerin in one sample within Stratum A (sample OD-SO-A-04)

Because no site-specific background upper tolerance limits (UTLs) exist for explosives at this site (Radian, 1997), the detected compound was carried forward to the risk evaluation phase. The maximum detected concentrations of explosive compounds for the fourth quarter 2000 monitoring event are presented in Table 3-2. The risk-evaluation is described in Section 4.0 of this report.

**Table 3-1. Analytical Methods and Parameters**

<b>EPA SW-846 Method 6010B (Metals)</b>
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium (total)
Copper
Lead
Nickel
Selenium
Silver
<b>EPA SW-846 Method 7471A</b>
Mercury
<b>EPA SW-846 Method 8330 (Explosives)</b>
2-Amino-4,6-dinitrotoluene
4-Amino-2,6-dinitrotoluene
1,3,5-Trinitrobenzene
1,3-Dinitrobenzene
2,4,6-Trinitrotoluene
2,4-Dinitrotoluene
2,6-Dinitrotoluene
2-Nitrotoluene
3-Nitrotoluene
4-Nitrotoluene
HMX
Nitrobenzene
RDX
Tetryl
PETN
<b>EPA SW-846 Method 8332 (Nitroamine Explosives)</b>
Nitroglycerin

**Notes:**

EPA	United States Environmental Protection Agency
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
PETN	pentaerythritol tetranitrate
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
Tetryl	methyl-2,4,6-trinitrophenylnitramine

### 3.2.2 Metals Results

Metals detected for this monitoring event were reported above the sample detection limit (no laboratory qualifier) and below the sample detection limit, but above the method detection limit ("B" qualifier). Metals that were not detected were reported at the sample detection limit accompanied by a "U" qualifier, signifying a nondetect value. The following metals were detected:

- Antimony in three samples below the sample detection limit (samples OD-SO-A-02, OD-SO-A-04, OD-SO-C-04)
- Barium, chromium, copper, lead, and nickel in all samples above the sample detection limit
- Arsenic in nine samples above the sample detection limit and in two samples below the sample detection limit
- Beryllium in three samples above the sample detection limit and in nine samples below the sample detection limit
- Cadmium in one sample above the sample detection limit and in 10 samples below the sample detection limit
- Silver in one sample below the sample detection limit (sample OD-SO-A-01)
- Mercury in one sample below the sample detection limit (sample OD-SO-C-02)

The metals analytical results were compared to the site-specific background UTLs listed in Table 3-2. Cadmium and copper detections exceeded the UTLs. Since no UTL or toxicity values exist for lead, lead detections were compared to the EPA Region 6 Human Health Medium-Specific Screening Levels (EPA, 2000 [November]). The maximum detected concentrations for the fourth quarter 2000 monitoring event are presented in Table 3-2.

**Table 3-2. Maximum Detected Concentrations, Frequency of Detections, and UTLs for Explosives and Metals**

<b>Constituent</b>	<b>Maximum Detected Concentration</b>	<b>Frequency of Detections</b>	<b>Site-Specific Background UTLs<sup>1</sup></b>
<b>Metals</b>	<b>mg/kg</b>		<b>mg/kg</b>
Antimony	1.11 J	3/12	7.3
Arsenic	2.22	11/12	37
Barium	61.7	12/12	84
Beryllium	0.382	12/12	0.4
Cadmium	1.63	11/12	1.0
Chromium (total)	6.58	12/12	6.6
Copper	63.8	12/12	4.8
Lead <sup>2</sup>	5.29	12/12	na
Nickel	3.89	12/12	5.6
Mercury	0.023 J	1/12	na
Silver	0.442 J	1/12	0.73
<b>Explosives</b>	<b>µg/kg</b>		<b>µg/kg</b>
Nitroglycerin	2210 J	1/12	NA

**Notes:**

- <sup>1</sup> UTLs are taken from 20,000-Pound Open Detonation Unit Background Study and Quarterly Monitoring Work Plan, Part II–Background Study (Radian, 1997).
- <sup>2</sup> A discussion of lead toxicity is included in the text
- J Estimated concentration reported below the sample detection limit
- µg/kg micrograms per kilogram
- mg/kg milligrams per kilogram
- na Background value not available in Background Study (Radian, 1997)
- NA Background values not applicable to organic constituents

**4.0 EVALUATION OF POTENTIAL RISK**

Inorganic constituents that exceeded background UTLs and all detected organic constituents were evaluated to determine if the levels present at the site pose a potential risk to human health. This section describes the methodology that was used for this evaluation, as well as the results of the noncarcinogenic and carcinogenic risk evaluations.

**4.1 METHODOLOGY**

The 20,000-Pound OD Unit is located in an isolated area of Holloman AFB. Access to the area is restricted to authorized explosive ordnance disposal (EOD) personnel working at the site during a detonation, and unauthorized entry is prevented by security fences and continuous surveillance in addition to warning signs. The evaluation of potential risk was based on the

amount of soil ingested by the EOD personnel in a realistic, but conservative, exposure scenario. This exposure scenario considered the frequency of detonations, the amount of time spent at the 20,000-Pound OD Unit for each detonation, and the length of time personnel would be assigned to this duty.

It was assumed that a maximum of 10 detonations would be conducted in 1 year. This is a conservative estimate because the actual number of detonations is approximately 7 per year. It was also assumed that EOD personnel are at the 20,000-Pound OD Unit for 2 days during each detonation. Typically, the site is inspected on the day after detonation, and so personnel are at the site 2 days for each detonation. Thus, 20 days per year was used as the exposure frequency in the risk assessment calculations. This estimate of exposure is still a very conservative assumption because the personnel are there for only a portion of each day before and after detonation. It was therefore assumed that only half of the soil that is incidentally ingested during those 20 days is obtained at the site. Finally, the exposure scenario assumed that the same personnel attend every detonation for 5 years. Since only military personnel staff the EOD office, 5 years is a conservative estimate because military personnel are frequently reassigned to different units or duties. The exposure scenario is further defined in the Risk Evaluation Calculation Sheet in Appendix B.

The maximum detected concentrations of antimony, arsenic, barium, beryllium, total chromium, nickel, and silver did not exceed the site-specific background UTLs, so these analytes were not carried forward to the risk evaluation phase (see Table 3-2). Cadmium and copper were the only metals that exceeded site-specific background UTLs, so they were evaluated in the risk evaluation phase. Lead and mercury do not have site-specific background UTLs, so comparisons to background were not made. Mercury was carried forward to the risk evaluation phase.

The maximum detection of lead, 5.29 milligrams per kilogram (mg/kg), was compared to the EPA Region 6 Human Health Medium-Specific Screening Level (EPA, 2000) value for the industrial outdoor worker exposure scenario (2,000 mg/kg), since no background UTL or toxicity values have been established. Because the maximum detection is considerably less than 2,000 mg/kg, no risk attributed to lead exposure is anticipated at this site.

Nitroglycerin was the only organic constituent detected, and was included in the risk evaluation, although "J" qualified (i.e., the estimated concentration was below the sample detection limit and above the method detection limit).

The maximum detected concentrations for cadmium, copper, mercury, and nitroglycerin, listed in Table 3-2, were used to calculate risk; it was conservatively assumed that personnel are exposed to this maximum concentration throughout the length of the exposure scenario described above.

#### 4.2 RESULTS OF RISK EVALUATION

Table 4-1 presents the noncancer risk (i.e., hazard quotient) and cancer risk estimates for each of the constituents, as well as the cumulative hazard index (sum of the hazard quotients) and cancer risk. The National Contingency Plan (NCP) risk range goal is a hazard index of less than 1.0 and a cancer risk estimate less than  $1.0 \times 10^{-6}$  (Title 40 of the Code of Federal Regulations, Part 300). Below these levels, no significant adverse effects are anticipated. At the 20,000-Pound OD Unit, all of the hazard quotients are well below 1.0, and the hazard index is 0.0001 (see Table 4-1). The total cancer risk for the site of  $8.6 \times 10^{-11}$  is well below the NCP goal of  $1.0 \times 10^{-6}$ . The cancer risk was based solely on the cancer risk for nitroglycerin, which was the only constituent classified as a carcinogen.

All constituents met the decision criteria specified in Attachment J of the operating permit. Inorganic constituents were either below site-specific background levels or the site-specific risk estimates calculated for the inorganic constituents that exceeded site-specific background levels, and all risk estimates are well below the NCP goals. The results of the site-specific risk estimates indicate that no adverse effects are anticipated from exposure during detonation events at the 20,000-Pound OD Unit.



**Table 4-1. Hazard Index and Cancer Risk**

Constituent	Non-carcinogenic Intake (mg/kg/day)	Carcinogenic Intake (mg/kg/day)	Oral RfD (mg/kg/day)	Oral RfD Source	Oral Slope Factor (mg/kg/day) <sup>-1</sup>	Oral Slope Factor Source	Hazard Quotient <sup>2</sup>	Cancer Risk
<b>Metals</b>								
Cadmium	6.4E-08	NC	0.001	IRIS	na	na	0.000064	NC
Copper	2.5E-06	NC	0.037	EPA R6	na	na	0.000067	NC
Mercury <sup>1</sup>	9.0E-10	NC	0.0001	IRIS	na	na	0.000009	NC
<b>Explosives</b>								
Nitroglycerin	8.6E-08	6.2E-09	na	na	0.14	NCEA in EPA R3	na	8.6E-11
Total =							0.0001	8.6E-11

**Notes:**

- 1 The oral RfD for methyl mercury was conservatively used as a surrogate.
- 2 The sum of the hazard quotients (HQs) is the hazard index (HI).

1.0E-03 The designation of 1.0E-03 is equivalent to  $1.0 \times 10^{-3}$  or 0.001  
 EPA R3 EPA Region 3. Risk Based Concentrations (RBCs). May 8, 2001 (current as of June 19, 2001).  
 EPA R6 EPA Region 6. Human Health Medium-Specific Screening Levels. November 15, 2000 (current as of June 19, 2001).  
 IRIS EPA Integrated Risk Information System. Online. June 19, 2001.  
 mg/kg/day milligrams per kilogram per day  
 na not available  
 NC Not calculated; constituent is non-carcinogenic  
 NCEA National Center for Environmental Assessment  
 RfD reference dose

## 5.0 CONCLUSION

The results of comparing the fourth quarter 2000 monitoring data (10<sup>th</sup> quarterly event) with the decision criteria specified in Attachment J of the operating permit indicate that the treatment operations at the 20,000-Pound OD Unit are effective. A statistical analysis will be performed on the risk evaluation results from the first eight quarterly monitoring events to determine whether further quarterly monitoring at the 20,000-Pound OD Unit will be recommended.

## 6.0 REFERENCES

### EPA (United States Environmental Protection Agency)

1986 SW-846, Test Methods for Evaluating Solid Waste, Third Edition and Updates.

2000 (November). Region 6. Human Health Medium Specific Screening Levels.

2001 (June). Integrated Risk Information System. On-line.

### Foster Wheeler (Foster Wheeler Environmental Corporation)

1999 (January). Final Work Plan Addendum for the 20,000-Pound Open Detonation Unit, Holloman Air Force Base, New Mexico.

### Radian (Radian Corporation)

1997 (December). 20,000-Pound Open Detonation Unit Background Study and Quarterly Monitoring Work Plan. Part II—Background Study, Holloman Air Force Base, New Mexico.

### USAF (United States Air Force)

1996. Holloman Air Force Base Open Detonation Treatment Unit Permit Attachment J, Sampling and Analysis Plan.

**APPENDIX A**  
**Analytical Results**

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>
OD-SO-A-01	10/10/00	CLP_SOLIDS	Percent Solids		83.6	%	
		SW6010B	Antimony	U	1.44	mg/kg	UJ
			Arsenic		1.5	mg/kg	J
			Barium		53	mg/kg	
			Beryllium		0.292	mg/kg	
			Cadmium		1.63	mg/kg	
			Chromium		5.43	mg/kg	
			Copper		7.75	mg/kg	
			Lead		2.72	mg/kg	J
			Nickel		3.89	mg/kg	J
			Selenium	U	1.2	mg/kg	
			Silver	B	0.442	mg/kg	
		SW7471A	Mercury	U	0.04	mg/kg	
		SW8330	1,3,5-Trinitrobenzene	U	100	ug/kg	
			1,3-Dinitrobenzene	U	100	ug/kg	
			2,4,6-Trinitrotoluene	U	100	ug/kg	
			2,4-Dinitrotoluene	U	100	ug/kg	
			2,6-Dinitrotoluene	U	100	ug/kg	
			2-Amino-4,6-Dinitrotoluene	U	100	ug/kg	
			4-Amino-2,6-Dinitrotoluene	U	100	ug/kg	
			HMX	U	200	ug/kg	
			m-Nitrotoluene	U	200	ug/kg	
			Nitrobenzene	U	100	ug/kg	
			o-Nitrotoluene	U	200	ug/kg	
			p-Nitrotoluene	U	200	ug/kg	
			Pentaerythritol Tetranitrate	U	500	ug/kg	UJ
			RDX	U	200	ug/kg	
			Tetryl	U	200	ug/kg	
		SW8332	Nitroglycerin	U	5840	ug/kg	
OD-SO-A-02		CLP_SOLIDS	Percent Solids		85.9	%	
		SW6010B	Antimony	B	0.812	mg/kg	J
			Arsenic		1.39	mg/kg	J

EPA Qualifier J = estimated detect based on QC criteria

EPA Qualifier UJ = estimated non-detect based on QC criteria

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>			
OD-SO-A-02	10/10/00	SW6010B	Barium		31.8	mg/kg				
			Beryllium	B	0.157	mg/kg				
			Cadmium	B	0.573	mg/kg				
			Chromium		2.85	mg/kg				
			Copper		2.34	mg/kg				
			Lead		1.3	mg/kg	J			
			Nickel		2.07	mg/kg	J			
			Selenium	U	1.16	mg/kg				
			Silver	U	0.698	mg/kg				
			Mercury	U	0.038	mg/kg				
		SW8330	1,3,5-Trinitrobenzene	U	100	ug/kg				
			1,3-Dinitrobenzene	U	100	ug/kg				
			2,4,6-Trinitrotoluene	U	100	ug/kg				
			2,4-Dinitrotoluene	U	100	ug/kg				
			2,6-Dinitrotoluene	U	100	ug/kg				
			2-Amino-4,6-Dinitrotoluene	U	100	ug/kg				
			4-Amino-2,6-Dinitrotoluene	U	100	ug/kg				
			HMX	U	200	ug/kg				
			m-Nitrotoluene	U	200	ug/kg				
			Nitrobenzene	U	100	ug/kg				
			o-Nitrotoluene	U	200	ug/kg				
			p-Nitrotoluene	U	200	ug/kg				
			Pentaerythritol Tetranitrate	U	500	ug/kg	UJ			
			RDX	U	200	ug/kg				
			Tetryl	U	200	ug/kg				
			Nitroglycerin	U	5680	ug/kg				
			OD-SO-A-02D		CLP_SOLIDS	Percent Solids		85.8	%	
					SW6010B	Antimony	U	1.35	mg/kg	UJ
					Arsenic	B	0.983	mg/kg	J	
					Barium		31.6	mg/kg		
					Beryllium	B	0.148	mg/kg		
					Cadmium	B	0.517	mg/kg		

EPA Qualifier J = estimated detect based on QC criteria

Page 2 of 12

EPA Qualifier UJ = estimated non-detect based on QC criteria

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>		
OD-SO-A-02D	10/10/00	SW6010B	Chromium		2.7	mg/kg			
			Copper		2.6	mg/kg			
			Lead		1.22	mg/kg	J		
			Nickel		1.85	mg/kg	J		
			Selenium	U	1.12	mg/kg			
			Silver	U	0.672	mg/kg			
			SW7471A	Mercury	U	0.038	mg/kg		
			SW8330	1,3,5-Trinitrobenzene	U	100	ug/kg		
				1,3-Dinitrobenzene	U	100	ug/kg		
				2,4,6-Trinitrotoluene	U	100	ug/kg		
				2,4-Dinitrotoluene	U	100	ug/kg		
				2,6-Dinitrotoluene	U	100	ug/kg		
				2-Amino-4,6-Dinitrotoluene	U	100	ug/kg		
		4-Amino-2,6-Dinitrotoluene		U	100	ug/kg			
		HMX		U	200	ug/kg			
		m-Nitrotoluene		U	200	ug/kg			
		Nitrobenzene		U	100	ug/kg			
		o-Nitrotoluene		U	200	ug/kg			
		p-Nitrotoluene		U	200	ug/kg			
		Pentaerythritol Tetranitrate		U	500	ug/kg	UJ		
		RDX	U	200	ug/kg				
		Tetryl	U	200	ug/kg				
		SW8332	Nitroglycerin	U	5830	ug/kg			
		OD-SO-A-03		CLP_SOLIDS	Percent Solids		82.7	%	
				SW6010B	Antimony	U	1.42	mg/kg	UJ
					Arsenic	B	1.11	mg/kg	J
Barium					36.8	mg/kg			
Beryllium	B				0.183	mg/kg			
Cadmium	B				0.285	mg/kg			
Chromium					3.57	mg/kg			
Copper					4.45	mg/kg			
Lead					2.19	mg/kg	J		

EPA Qualifier J = estimated detect based on QC criteria

EPA Qualifier UJ = estimated non-detect based on QC criteria

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>		
OD-SO-A-03	10/10/00	SW6010B	Nickel		2.33	mg/kg	J		
			Selenium	U	1.19	mg/kg			
			Silver	U	0.711	mg/kg			
				SW7471A	Mercury	U	0.04	mg/kg	
				SW8330	1,3,5-Trinitrobenzene	U	100	ug/kg	
					1,3-Dinitrobenzene	U	100	ug/kg	
					2,4,6-Trinitrotoluene	U	100	ug/kg	
					2,4-Dinitrotoluene	U	100	ug/kg	
					2,6-Dinitrotoluene	U	100	ug/kg	
					2-Amino-4,6-Dinitrotoluene	U	100	ug/kg	
					4-Amino-2,6-Dinitrotoluene	U	100	ug/kg	
					HMX	U	200	ug/kg	
					m-Nitrotoluene	U	200	ug/kg	
					Nitrobenzene	U	100	ug/kg	
					o-Nitrotoluene	U	200	ug/kg	
					p-Nitrotoluene	U	200	ug/kg	
					Pentaerythritol Tetranitrate	U	476	ug/kg	UJ
					RDX	U	200	ug/kg	
					Tetryl	U	200	ug/kg	
				SW8332	Nitroglycerin	U	6050	ug/kg	
OD-SO-A-04		CLP_SOLIDS	Percent Solids		83.8	%			
		SW6010B	Antimony	B	1.11	mg/kg	J		
			Arsenic		1.75	mg/kg	J		
			Barium		31.7	mg/kg			
			Beryllium	B	0.182	mg/kg			
			Cadmium	B	0.585	mg/kg			
			Chromium		3.3	mg/kg			
			Copper		2.82	mg/kg			
			Lead		1.53	mg/kg	J		
			Nickel		2.32	mg/kg	J		
			Selenium	U	1.17	mg/kg			
Silver	U	0.702	mg/kg						

EPA Qualifier J = estimated detect based on QC criteria

Page 4 of 12

EPA Qualifier UJ = estimated non-detect based on QC criteria



**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>		
OD-SO-A-04	10/10/00	SW7471A	Mercury	U	0.039	mg/kg			
		SW8330	1,3,5-Trinitrobenzene	U	100	ug/kg			
			1,3-Dinitrobenzene	U	100	ug/kg			
			2,4,6-Trinitrotoluene	U	100	ug/kg			
			2,4-Dinitrotoluene	U	100	ug/kg			
			2,6-Dinitrotoluene	U	100	ug/kg			
			2-Amino-4,6-Dinitrotoluene	U	100	ug/kg			
			4-Amino-2,6-Dinitrotoluene	U	100	ug/kg			
			HMX	U	200	ug/kg			
			m-Nitrotoluene	U	200	ug/kg			
			Nitrobenzene	U	100	ug/kg			
			o-Nitrotoluene	U	200	ug/kg			
			p-Nitrotoluene	U	200	ug/kg			
			Pentaerythritol Tetranitrate	U	455	ug/kg	UJ		
			RDX	U	200	ug/kg			
			Tetryl	U	200	ug/kg			
			SW8332	Nitroglycerin	J	2210	ug/kg		
			OD-SO-B-01		CLP_SOLIDS	Percent Solids		80.8	%
		SW6010B			Antimony	U	1.46	mg/kg	UJ
					Arsenic		1.25	mg/kg	J
Barium					32.3	mg/kg			
Beryllium	B				0.178	mg/kg			
Cadmium	B				0.099	mg/kg			
Chromium					2.96	mg/kg			
Copper					3.01	mg/kg			
Lead					1.84	mg/kg	J		
Nickel					2	mg/kg	J		
Selenium	U				1.21	mg/kg			
Silver	U				0.728	mg/kg			
SW7471A	Mercury				U	0.041	mg/kg		
SW8330	1,3,5-Trinitrobenzene	U	95.2	ug/kg					
	1,3-Dinitrobenzene	U	95.2	ug/kg					

EPA Qualifier J = estimated detect based on QC criteria

EPA Qualifier UJ = estimated non-detect based on QC criteria

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>	
OD-SO-B-01	10/10/00	SW8330	2,4,6-Trinitrotoluene	U	95.2	ug/kg		
			2,4-Dinitrotoluene	U	95.2	ug/kg		
			2,6-Dinitrotoluene	U	95.2	ug/kg		
			2-Amino-4,6-Dinitrotoluene	U	95.2	ug/kg		
			4-Amino-2,6-Dinitrotoluene	U	95.2	ug/kg		
			HMX	U	190	ug/kg		
			m-Nitrotoluene	U	190	ug/kg		
			Nitrobenzene	U	95.2	ug/kg		
			o-Nitrotoluene	U	190	ug/kg		
			p-Nitrotoluene	U	190	ug/kg		
			Pentaerythritol Tetranitrate	U	500	ug/kg	UJ	
			RDX	U	190	ug/kg		
			Tetryl	U	190	ug/kg		
			SW8332	Nitroglycerin	U	6190	ug/kg	
			OD-SO-B-02		CLP_SOLIDS	Percent Solids		81.9
SW6010B	Antimony	U			1.46	mg/kg	UJ	
	Arsenic	B			1.12	mg/kg	J	
	Barium				41	mg/kg		
	Beryllium	B			0.227	mg/kg		
	Cadmium	B			0.246	mg/kg		
	Chromium				4.15	mg/kg		
	Copper				5.7	mg/kg		
	Lead				3.7	mg/kg	J	
	Nickel				2.75	mg/kg	J	
	Selenium	U			1.22	mg/kg		
	Silver	U			0.732	mg/kg		
	SW7471A	Mercury			U	0.04	mg/kg	
	SW8330	1,3,5-Trinitrobenzene			U	100	ug/kg	
		1,3-Dinitrobenzene			U	100	ug/kg	
2,4,6-Trinitrotoluene		U	100	ug/kg				
2,4-Dinitrotoluene		U	100	ug/kg				
2,6-Dinitrotoluene		U	100	ug/kg				

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>	
OD-SO-B-02	10/10/00	SW8330	2-Amino-4,6-Dinitrotoluene	U	100	ug/kg		
			4-Amino-2,6-Dinitrotoluene	U	100	ug/kg		
			HMX	U	200	ug/kg		
			m-Nitrotoluene	U	200	ug/kg		
			Nitrobenzene	U	100	ug/kg		
			o-Nitrotoluene	U	200	ug/kg		
			p-Nitrotoluene	U	200	ug/kg		
			Pentaerythritol Tetranitrate	U	476	ug/kg	UJ	
			RDX	U	200	ug/kg		
			Tetryl	U	200	ug/kg		
		SW8332	Nitroglycerin	U	6100	ug/kg		
OD-SO-B-03		CLP_SOLIDS	Percent Solids		85.8	%		
		SW6010B	Antimony	U	1.33	mg/kg	UJ	
			Arsenic	U	1.11	mg/kg	UJ	
			Barium		28.2	mg/kg		
			Beryllium	B	0.131	mg/kg		
			Cadmium	U	0.666	mg/kg		
			Chromium		2.27	mg/kg		
			Copper		2.2	mg/kg		
			Lead		1.28	mg/kg	J	
			Nickel		1.46	mg/kg	J	
			Selenium	U	1.11	mg/kg		
			Silver	U	0.666	mg/kg		
			SW7471A	Mercury	U	0.038	mg/kg	
			SW8330	1,3,5-Trinitrobenzene	U	100	ug/kg	
				1,3-Dinitrobenzene	U	100	ug/kg	
				2,4,6-Trinitrotoluene	U	100	ug/kg	
				2,4-Dinitrotoluene	U	100	ug/kg	
				2,6-Dinitrotoluene	U	100	ug/kg	
				2-Amino-4,6-Dinitrotoluene	U	100	ug/kg	
				4-Amino-2,6-Dinitrotoluene	U	100	ug/kg	
			HMX	U	200	ug/kg		

EPA Qualifier J = estimated detect based on QC criteria

Page 7 of 12

EPA Qualifier UJ = estimated non-detect based on QC criteria

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>	
OD-SO-B-03	10/10/00	SW8330	m-Nitrotoluene	U	200	ug/kg		
			Nitrobenzene	U	100	ug/kg		
			o-Nitrotoluene	U	200	ug/kg		
			p-Nitrotoluene	U	200	ug/kg		
			Pentaerythritol Tetranitrate	U	500	ug/kg	UJ	
			RDX	U	200	ug/kg		
			Tetryl	U	200	ug/kg		
OD-SO-B-04		SW8332	Nitroglycerin	U	5830	ug/kg		
		CLP_SOLIDS	Percent Solids		81.4	%		
		SW6010B	Antimony	U	1.42	mg/kg	UJ	
			Arsenic		1.39	mg/kg	J	
			Barium		30.3	mg/kg		
			Beryllium	B	0.158	mg/kg		
			Cadmium	B	0.165	mg/kg		
			Chromium		2.92	mg/kg		
			Copper		63.8	mg/kg		
			Lead		1.45	mg/kg	J	
			Nickel		2.17	mg/kg	J	
			Selenium	U	1.18	mg/kg		
			Silver	U	0.708	mg/kg		
			SW7471A	Mercury	U	0.04	mg/kg	
			SW8330	1,3,5-Trinitrobenzene	U	100	ug/kg	
		1,3-Dinitrobenzene		U	100	ug/kg		
		2,4,6-Trinitrotoluene		U	100	ug/kg		
		2,4-Dinitrotoluene		U	100	ug/kg		
		2,6-Dinitrotoluene		U	100	ug/kg		
		2-Amino-4,6-Dinitrotoluene		U	100	ug/kg		
		4-Amino-2,6-Dinitrotoluene		U	100	ug/kg		
		HMX		U	200	ug/kg		
		m-Nitrotoluene		U	200	ug/kg		
		Nitrobenzene		U	100	ug/kg		
		o-Nitrotoluene		U	200	ug/kg		

EPA Qualifier J = estimated detect based on QC criteria

Page 8 of 12

EPA Qualifier UJ = estimated non-detect based on QC criteria

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>	
OD-SO-B-04	10/10/00	SW8330	p-Nitrotoluene	U	200	ug/kg		
			Pentaerythritol Tetranitrate	U	500	ug/kg	UJ	
			RDX	U	200	ug/kg		
			Tetryl	U	200	ug/kg		
OD-SO-C-01		SW8332	Nitroglycerin	U	6140	ug/kg		
		CLP_SOLIDS	Percent Solids		86	%		
		SW6010B	Antimony	U	1.34	mg/kg	UJ	
			Arsenic		1.16	mg/kg	J	
			Barium		28.8	mg/kg		
			Beryllium	B	0.153	mg/kg		
			Cadmium	B	0.595	mg/kg		
			Chromium		2.63	mg/kg		
			Copper		3.09	mg/kg		
			Lead		2.57	mg/kg	J	
			Nickel		1.72	mg/kg	J	
			Selenium	U	1.12	mg/kg		
			Silver	U	0.671	mg/kg		
			SW7471A	Mercury	U	0.037	mg/kg	
			SW8330	1,3,5-Trinitrobenzene	U	100	ug/kg	
				1,3-Dinitrobenzene	U	100	ug/kg	
				2,4,6-Trinitrotoluene	U	100	ug/kg	
				2,4-Dinitrotoluene	U	100	ug/kg	
				2,6-Dinitrotoluene	U	100	ug/kg	
				2-Amino-4,6-Dinitrotoluene	U	100	ug/kg	
				4-Amino-2,6-Dinitrotoluene	U	100	ug/kg	
				HMX	U	200	ug/kg	
				m-Nitrotoluene	U	200	ug/kg	
				Nitrobenzene	U	100	ug/kg	
				o-Nitrotoluene	U	200	ug/kg	
				p-Nitrotoluene	U	200	ug/kg	
				Pentaerythritol Tetranitrate	U	500	ug/kg	UJ
				RDX	U	200	ug/kg	

EPA Qualifier J = estimated detect based on QC criteria

Page 9 of 12

EPA Qualifier UJ = estimated non-detect based on QC criteria

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>	
OD-SO-C-01	10/10/00	SW8330	Tetryl	U	200	ug/kg		
		SW8332	Nitroglycerin	U	5810	ug/kg		
OD-SO-C-02		CLP_SOLIDS	Percent Solids		86	%		
		SW6010B	Antimony	U	1.4	mg/kg	UJ	
			Arsenic		2.22	mg/kg	J	
			Barium		61.7	mg/kg		
			Beryllium		0.382	mg/kg		
			Cadmium	B	0.205	mg/kg		
			Chromium		6.58	mg/kg		
			Copper		7.19	mg/kg		
			Lead		5.29	mg/kg	J	
			Nickel		4.45	mg/kg	J	
			Selenium	U	1.16	mg/kg		
			Silver	U	0.698	mg/kg		
			SW7471A	Mercury	B	0.023	mg/kg	
			SW8330	1,3,5-Trinitrobenzene	U	100	ug/kg	
				1,3-Dinitrobenzene	U	100	ug/kg	
				2,4,6-Trinitrotoluene	U	100	ug/kg	
				2,4-Dinitrotoluene	U	100	ug/kg	
				2,6-Dinitrotoluene	U	100	ug/kg	
				2-Amino-4,6-Dinitrotoluene	U	100	ug/kg	
				4-Amino-2,6-Dinitrotoluene	U	100	ug/kg	
				HMX	U	200	ug/kg	
				m-Nitrotoluene	U	200	ug/kg	
				Nitrobenzene	U	100	ug/kg	
				o-Nitrotoluene	U	200	ug/kg	
				p-Nitrotoluene	U	200	ug/kg	
				Pentaerythritol Tetranitrate	U	476	ug/kg	UJ
				RDX	U	200	ug/kg	
				Tetryl	U	200	ug/kg	
		SW8332	Nitroglycerin	U	5670	ug/kg		
OD-SO-C-03		CLP_SOLIDS	Percent Solids		81.3	%		

EPA Qualifier J = estimated detect based on QC criteria

Page 10 of 12

EPA Qualifier UJ = estimated non-detect based on QC criteria

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>			
OD-SO-C-03	10/10/00	SW6010B	Antimony	U	1.48	mg/kg	UJ			
			Arsenic		1.92	mg/kg	J			
			Barium		53	mg/kg				
			Beryllium		0.282	mg/kg				
			Cadmium	B	0.171	mg/kg				
			Chromium		4.9	mg/kg				
			Copper		4.89	mg/kg				
			Lead		3.07	mg/kg	J			
			Nickel		3.58	mg/kg	J			
			Selenium	U	1.23	mg/kg				
			Silver	U	0.738	mg/kg				
		SW7471A	Mercury	U	0.04	mg/kg				
		SW8330	1,3,5-Trinitrobenzene	U	95.2	ug/kg				
			1,3-Dinitrobenzene	U	95.2	ug/kg				
			2,4,6-Trinitrotoluene	U	95.2	ug/kg				
			2,4-Dinitrotoluene	U	95.2	ug/kg				
			2,6-Dinitrotoluene	U	95.2	ug/kg				
			2-Amino-4,6-Dinitrotoluene	U	95.2	ug/kg				
			4-Amino-2,6-Dinitrotoluene	U	95.2	ug/kg				
			HMX	U	190	ug/kg				
			m-Nitrotoluene	U	190	ug/kg				
			Nitrobenzene	U	95.2	ug/kg				
			o-Nitrotoluene	U	190	ug/kg				
			p-Nitrotoluene	U	190	ug/kg				
			Pentaerythritol Tetranitrate	U	500	ug/kg	UJ			
			RDX	U	190	ug/kg				
			Tetryl	U	190	ug/kg				
			SW8332	Nitroglycerin	U	6150	ug/kg			
			OD-SO-C-04		CLP_SOLIDS	Percent Solids		81	%	
					SW6010B	Antimony	B	0.727	mg/kg	J
						Arsenic		1.75	mg/kg	J
		Barium					37.9	mg/kg		

EPA Qualifier J = estimated detect based on QC criteria

EPA Qualifier UJ = estimated non-detect based on QC criteria

**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Analytical Sample Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	<u>EPA Qualifier</u>	
OD-SO-C-04	10/10/00	SW6010B	Beryllium	B	0.237	mg/kg		
			Cadmium	B	0.119	mg/kg		
			Chromium		3.78	mg/kg		
			Copper		4.92	mg/kg		
			Lead		1.6	mg/kg	J	
			Nickel		2.57	mg/kg	J	
			Selenium	U	1.22	mg/kg		
			Silver	U	0.733	mg/kg		
			Mercury	U	0.041	mg/kg		
		SW7471A	SW8330	1,3,5-Trinitrobenzene	U	100	ug/kg	
				1,3-Dinitrobenzene	U	100	ug/kg	
				2,4,6-Trinitrotoluene	U	100	ug/kg	
				2,4-Dinitrotoluene	U	100	ug/kg	
				2,6-Dinitrotoluene	U	100	ug/kg	
				2-Amino-4,6-Dinitrotoluene	U	100	ug/kg	
				4-Amino-2,6-Dinitrotoluene	U	100	ug/kg	
				HMX	U	200	ug/kg	
				m-Nitrotoluene	U	200	ug/kg	
				Nitrobenzene	U	100	ug/kg	
				o-Nitrotoluene	U	200	ug/kg	
				p-Nitrotoluene	U	200	ug/kg	
				Pentaerythritol Tetranitrate	U	508	ug/kg	UJ
				RDX	U	200	ug/kg	
				Tetryl	U	200	ug/kg	
				SW8332	SW8332	Nitroglycerin	U	6170



**Holloman Air Force Base  
20,000-Pound Open Detonation Unit  
Fourth Quarter 2000  
Equipment Blank Results**

<u>Location</u>	<u>Sample Date</u>	<u>Method</u>	<u>Parameter</u>	<u>Flag</u>	<u>Value</u>	<u>Units</u>	
OD-EB-01	10/10/00	SW6010B	Antimony	B	3.99	ug/L	
			Arsenic	B	4.34	ug/L	
			Barium	B	2.35	ug/L	
			Beryllium	U	1	ug/L	
			Cadmium	U	3	ug/L	
			Chromium	U	5	ug/L	
			Copper		5.66	ug/L	
			Lead	U	3	ug/L	
			Nickel	U	5	ug/L	
			Selenium	U	5	ug/L	
		Silver	B	1.28	ug/L		
		SW7470A	Mercury	U	0.2	ug/L	
		SW8330	1,3,5-Trinitrobenzene	U	0.26	ug/L	
			1,3-Dinitrobenzene	U	0.26	ug/L	
			2,4,6-Trinitrotoluene	U	0.26	ug/L	
			2,4-Dinitrotoluene	U	0.26	ug/L	
			2,6-Dinitrotoluene	U	0.26	ug/L	
			2-Amino-4,6-Dinitrotoluene	U	0.26	ug/L	
			4-Amino-2,6-Dinitrotoluene	U	0.26	ug/L	
			HMX	U	0.519	ug/L	
			m-Nitrotoluene	U	0.519	ug/L	
			Nitrobenzene	U	0.26	ug/L	
			o-Nitrotoluene	U	0.519	ug/L	
			p-Nitrotoluene	U	0.519	ug/L	
			Pentaerythritol Tetranitrate	U	1.3	ug/L	
			RDX	U	0.519	ug/L	
			Tetryl	U	0.519	ug/L	
			SW8332	Nitroglycerin	U	2000	ug/L



## Chain-of-Custody Record

<b>AFID:</b> Holloman AFB	<b>Project:</b> 20K Burn	<b>Sample Date:</b> 10/10/00
<b>Samplers:</b> Rafe Jones		

Location Identification	Time (Military Standard)	Samp. Type	Preservative		Analysis Required																Sample Number																			
			NONE	Other	Sampling Method	No. of Containers	See Attachment	1	2	3	4	5	6	7	8	9	10	11	12	13		14	15	16																
OD-SO-A-01	1335	Soil	X		G	1	X																																	
OD-SO-A-02	1340	Soil	X		G	1	X																																	
OD-SO-A-03	1343	Soil	X		G	1	X																																	
OD-SO-A-04	1349	Soil	X		G	1	X																																	
OD-SO-B-01	1354	Soil	X		G	1	X																																	
OD-SO-B-02	1359	Soil	X		G	1	X																																	
OD-SO-B-03	1403	Soil	X		G	1	X																																	
OD-SO-B-04	1408	Soil	X		G	1	X																																	
OD-SO-C-01	1412	Soil	X		G	1	X																																	
OD-SO-C-02	1416	Soil	X		G	1	X																																	
OD-SO-C-03	1422	Soil	X		G	1	X																																	
OD-SO-C-04	1427	Soil	X		G	1	X																																	
OD-SO-A-02D	1431	Soil	X		G	1	X																																	
OD-EB-01	1520	Water	X		G	2	X																																	

Relinquished by: (Signature)	11 OCT 04 1600hrs	Received by: (Signature)	Date/Time
Relinquished by: (Signature)		Received by: (Signature)	Date/Time
Relinquished by: (Signature)		Received by: (Signature)	Date/Time
			20/10/00 09:15
Remarks:	PLEASE FAX RESULTS TO (505) 479-2081		

LABORATORY USE ONLY		Y	N
Package Received/Custody Seals Intact	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sample Labels/C-O-Cs Agree	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Temperature Within Specification <u>3.0 °C</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Corrected Copy Attached	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Problems or Discrepancies	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

UPS SHIPPING # 1Z5290W42210024685

ST

**APPENDIX B**

**Risk Evaluation Calculation Sheet**

## EOD Exposure Scenario

### Noncarcinogenic Risk:

$$Intake (mg / kg / d) = \frac{C \cdot EF \cdot ED \cdot \frac{IRS_a}{10^6} \cdot FC}{BW_a \cdot AT_n}$$

$$HQ = \frac{Intake}{RfD_o}$$

### Carcinogenic Risk:

$$Intake (mg / kg / d) = \frac{C \cdot EF \cdot ED \cdot \frac{IRS_a}{10^6} \cdot FC}{BW_a \cdot AT_c}$$

$$CR = Intake \cdot CSF_o$$

Exposure Variables	Value	Symbol
Conversion factor (mg/kg)	10 <sup>6</sup>	10 <sup>6</sup>
Body weight, adult (kg)	70	BW <sub>a</sub>
Constituent concentration in soil (mg/kg)	Constituent-specific	C
Cancer risk	Calculated	CR
Oral Slope factor [(mg/kg/d) <sup>-1</sup> ]	Constituent-specific	CSF <sub>o</sub>
Exposure duration, total (y)	5	ED
Exposure frequency (d/y)	20	EF
Fraction of soil ingested from contaminated area (unitless)	0.5	FC
Hazard quotient	Calculated	HQ
Ingestion rate of soil, adult (mg/d)	100	IRS <sub>a</sub>
Oral Reference dose (mg/kg/d)	Constituent-specific	RfD <sub>o</sub>
Averaging time carcinogens (d) (70 yrs × 365 days)	25550	AT <sub>c</sub>
Averaging time noncarcinogens (d) (5 yrs × 365 days)	1825	AT <sub>n</sub>

d = day

kg = kilograms

mg = milligrams

y = year