ENTERED

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY AIR DEFENSE ARTILLERY CENTER AND FORT BLISS
1733 PLEASONTON ROAD
FORT BLISS, TEXAS 79916-6816

REPLY TO
ATTENTION OF
ATZC-DOE-M

RECEIVED
APR - 1996

Mr. Cornelius Amindyas
New Mexico Environment Department
2044 Galisteo St.
Santa Fe, New Mexico 87502

Dear Mr. Amindyas:

Enclosed for your review are two "Report of Findings, Part B Permit, Open Detonation Treatment Unit Investigation, Ft. Bliss, Texas". Ft. Bliss will initiate the second verification sampling event in April 1996 and the associated Draft Report of Findings for this event is anticipated August 1996.

If you have any additional comments or questions, please do not hesitate to contact Ms. Lilia Lenhart at (915) 568-5724.

04-04-96 P03:42 OUT

Sincerely,

James R. Hartman
Director of Environment

FB 99-011

REPORT OF FINDINGS

PART B PERMIT
OPEN DETONATION (OD)
TREATMENT UNIT INVESTIGATION

FORT BLISS, TEXAS

Prepared for:

United States Army Corps of Engineers
Tulsa District
Tulsa, Oklahoma

Delivery Order 1, Modification 3
Contract No. DACA 56-93-D-0008

Submitted by:

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March 1996

REPORT OF FINDINGS
PART B PERMIT
OD TREATMENT UNIT INVESTIGATION
FORT BLISS, TEXAS

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APPENDIX	TITLE
A	Chain-of-Custody Forms and Federal Express Airbill Receipts
B	Investigation-Derived Waste (IDW) Tracking Form
C	Data Validation Reports
D	Analytical Data Summary Tables

SECTION 1
INTRODUCTION

In June 1995, a Final Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility Operational Permit (RCRA Part B Permit) (Reference 1) was issued to the U.S. Army Air Defense Artillery Center, Fort Bliss, Texas, by the New Mexico Environmental Department (NMED). This permit, EPA ID No. NM4213720101-01, authorizes treatment of hazardous waste (munitions) by open detonation at the Open Detonation (OD) Treatment Unit. Roy F. Weston, Inc. (WESTON) was contracted by the U.S. Army Corps of Engineers (USACE) (Contract No. DACA 56-93-D-0008, Modification 3 to Delivery Order 1) to perform an investigation of the OD Treatment Unit at Fort Bliss according to the requirements of the aforementioned RCRA Part B Permit.

Other ongoing and related activities include design and construction of a stormwater diversion system, installation of warning signs and access controls (gates and fences), and control of vegetation within the OD Treatment Unit. All of these activities, including the investigation, are nearing completion and are being implemented as specified in the RCRA Part B Permit.

This document represents the OD Treatment Unit Investigation Report of Findings and was prepared in accordance with the specifications provided in the USACE, Tulsa District Scope of Work (SOW), dated 18 April 1995 (Reference 2).

1.1 OBJECTIVES OF THE INVESTIGATION

WESTON provided technical assistance to USACE and Ft. Bliss for the performance of the OD Treatment Unit Investigation at Fort Bliss on 24 and 25 August 1995 and 17 November 1995. The primary objectives of this investigation were as follows:

- To determine whether contaminants related to OD activities are present at the OD Treatment Unit.
- To evaluate the nature and extent of site-related contaminants (if present) in the surface and near-surface soils in and around the OD Treatment Unit.
- To investigate the local stratigraphy and vertical extent of site-related contaminants (if present) in subsurface soils through completion of one deep soil boring.

1.2 SITE BACKGROUND AND DESCRIPTION

The OD Treatment Unit is located in the northern portion of the Fort Bliss Military Reservation on McGregor Range. A facility location map is presented in Figure 1-1. The Treatment Unit is on an active portion of the McGregor Guided Missile Range within the impact area for ballistic aerial targets, large-caliber munitions, and guided rockets. Operations at the OD Treatment Unit are only conducted when McGregor Range is inactive.

The U.S. Army Air Defense Artillery Center currently operates an Explosive Ordnance Detachment (EOD) that performs work at the OD Treatment Unit. This OD Treatment Unit (also referred to as the demolition area) has been in operation since 1965. Military chemical warfare agents and related compounds, or materials contaminated with or suspected of being contaminated with these agents or compounds are not destroyed (treated) at this unit.

The 41st EOD conducts explosives demolition at the OD Treatment Unit approximately 3 to 4 times per year (generally every quarter). The demolition area has recently been operated under RCRA interim status as a hazardous waste thermal treatment facility. Plans are and have been implemented to operate the demolition area according to the requirements specified in the Part B Permit. Quantities of explosives that are currently allowed for treatment (detonation) according to the permit are 343 pounds or 156 kilograms (kg) per quarter.

The treatment unit is a manmade excavation and the dimensions are approximately 500 feet by 200 feet by 20 feet deep. All structures at the unit are earthen. A site plan of the OD Treatment Unit within McGregor Range is illustrated in Figure 1-2.

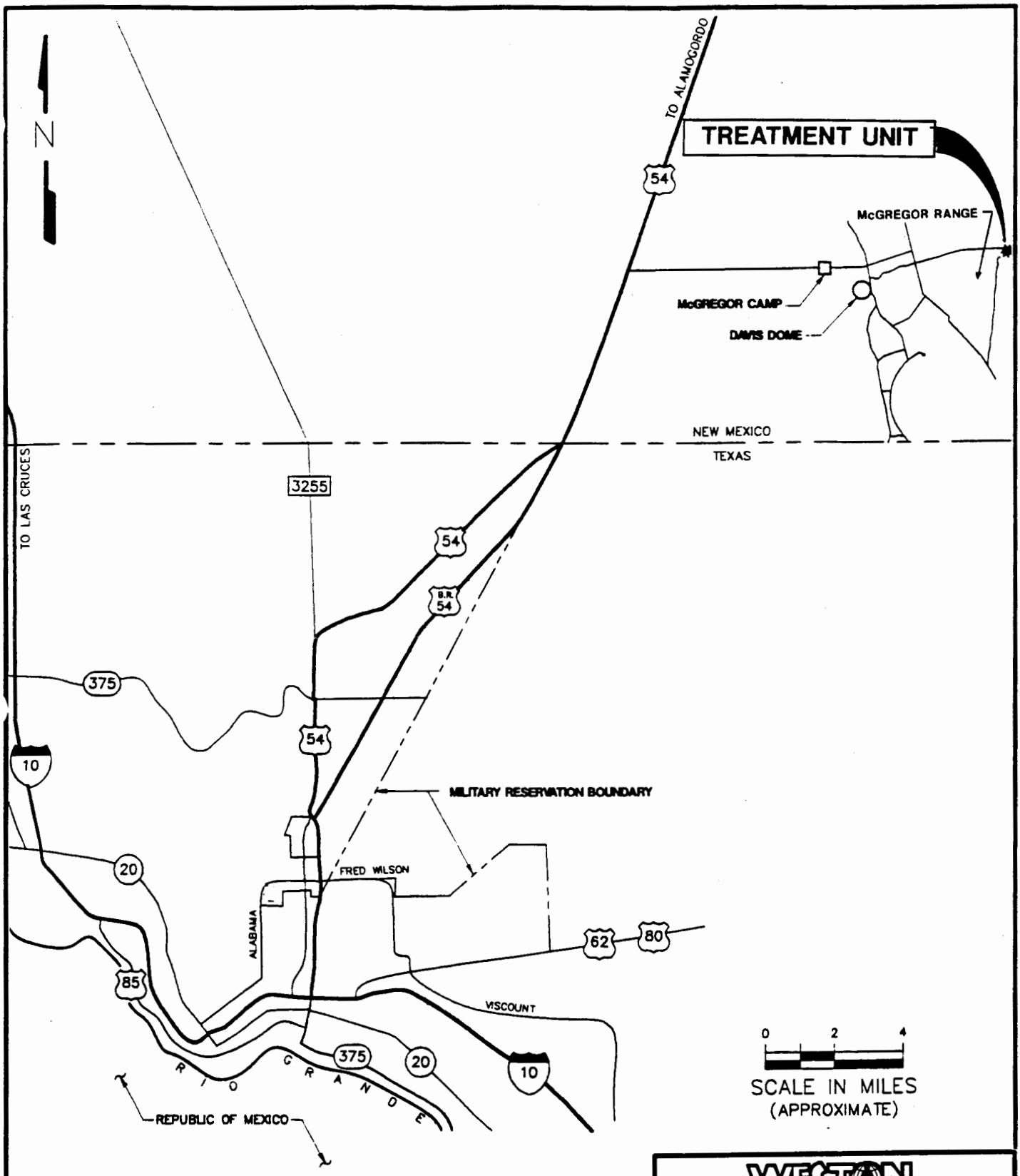
1.3 REPORT OF FINDINGS FORMAT

The Report of Findings for the OD Treatment Unit Investigation has been organized in the following format:

- Section 1-Introduction
- Section 2-Investigation Activities
- Section 3-Nature and Extent of Contamination
- Section 4-Conclusions and Recommendations
- Section 5-References

Appendices to this Report of Findings include the following:

- Appendix A-Chain-of-Custody Forms and Federal Express Airbill Receipts
- Appendix B-Investigation-Derived Waste (IDW) Tracking Form
- Appendix C-Data Validation Reports
- Appendix D-Analytical Data Summary Tables



WESTON MANAGERS DESIGNERS/CONSULTANTS

FIGURE 1-1

U.S. ARMY CORPS
OF ENGINEERS
FORT BLISS
FACILITY LOCATION MAP
FORT BLISS, TEXAS

DATE	PROJECT NO.	SCALE
JAN 96	03886121001	AS SHOWN

NOTE: CONTOURS REPRESENT SURFACE TOPOGRAPHY. CONTOUR INTERVAL = 2 FEET

SOURCE: AERIAL TOPOGRAPHY PERFORMED BY SLI ENGINEERING, EL PASO, TEXAS

0 40 80
SCALE IN FEET

WESTON MANAGERS DESIGNERS/CONSULTANTS

FIGURE 1-2
U.S. ARMY CORPS OF ENGINEERS
FORT BLISS
SITE PLAN
FORT BLISS, TEXAS

DATE	PROJECT NO.	SCALE
JAN 96	03886121001	AS SHOWN

H:\COE\FTBLISOD\MAP02.WAE 01-03-96 (MAP02.PCP)

SECTION 2
INVESTIGATION ACTIVITIES

The OD Treatment Unit Investigation included the following activities:

- Collecting surface and near-surface soil samples in and around the treatment unit.
- Completing one deep soil boring and collecting subsurface soil samples.
- Managing and sampling investigation-derived wastes (IDW).

These activities were conducted in accordance with WESTON's approved Final Work Plan for Part B Permit OD Treatment Unit Investigation (Work Plan) (Reference 3), and are described in the following subsections. The overall sampling strategy was specified in the Part B Permit and adopted for the Work Plan. The samples collected at the OD Treatment Unit were labeled in accordance with the requirements specified in Subsection B2.2.5 (Soil Sample Identification) of the Work Plan (Reference 3). For brevity, samples are identified in this report using only the sample station number (e.g., 001).

2.1 SOIL SAMPLE LOCATIONS

WESTON collected soil samples from 36 locations (sample stations 001 through 036) in and around the OD Treatment Unit. Figure 2-1 shows the approximate locations of the sample stations. The locations were not surveyed after sampling but have been placed on the figure based on references to identifiable topographic features. The sample stations shown in Figure 2-1 were based on those specified in the RCRA Part B Permit (Reference 1) and the USACE SOW (Reference 2), and were established in the field by measuring each location from the approximate center of the discernable detonation pits A and B. The sample location rationale (and corresponding sample station numbers shown on Figure 2-1) were established as follows:

- One discrete surface soil sample was collected at the bottom of each of the two OD pits (001 and 009).
- Three discrete surface soil samples were collected from the sides of each of the OD pits (002, 003, 004; and 010, 011, 012).
- Four discrete surface soil samples were collected around the perimeter of each of the OD pits (005, 006, 007, 008; and 013, 014, 015, 016).
- Eight discrete random surface and near-surface soil samples were collected outside of the pits but inside the OD Treatment Unit (017, 018, 019, 020, 021, 022, 023, 024).

NOTE: SAMPLE LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE. CONTOURS REPRESENT SURFACE TOPOGRAPHY. CONTOUR INTERVAL = 2 FEET

SOURCE: AERIAL TOPOGRAPHY BY SLI ENGINEERING, EL PASO, TEXAS

WESTON

FIGURE 2-1

U.S. ARMY
CORPS OF ENGINEERS
FORT BLISS
SAMPLE STATION MAP
FORT BLISS, TEXAS

DATE	PROJECT NO	SCALE
JAN 96	03886121001	1" = 60'

- Eight discrete random surface and near-surface soil samples were collected from the perimeter and outside of the OD Treatment Unit (025, 026, 027, 028, 029, 030, 031, 032).

- Three discrete background surface soil samples (033, 034, 035) were collected from an area away from the OD Treatment Unit that appeared not to have been affected by operations from the OD activities. These three samples were located at least 700 feet from the center of the OD Treatment Unit excavation as specified by the permit.

- Ten subsurface soil samples were collected from the deep soil boring (036).

2.2 SAMPLING PROCEDURES

2.2.1 Surface and Near-Surface Soil Samples

Prior to conducting sampling activities, WESTON obtained clearance from the Ft. Bliss 41st Explosives Ordinance Detachment (EOD) personnel at each sample station. Additionally, the EOD personnel were present during all sampling activities and completion of the deep soil boring. Soil from each of the surface and near-surface sample stations were collected using disposable plastic scoops. Soil for surface samples was collected from a depth interval of approximately 0 to 6 inches, and soil for near-surface samples was collected from a depth interval of approximately 6 to 12 inches. A shovel was used to dig some of the near-surface holes; then the disposable scoops were used to collect the soil sample. After the soil sample was collected, the hole was backfilled with the remaining material.

After collection, the sample containers were sealed and labeled with the sample identification number (as specified in Section B2.2.5 [Soil Sample Identification] of the Work Plan [Reference 3]), date, time, required analyses, and the company name (WESTON). The sample containers were then placed in plastic bags on ice in a cooler. The analytical approach for the soil samples is discussed below in Subsection 2.3.

2.2.2 Subsurface Soil Samples - Completion of Deep Soil Boring

Prior to conducting drilling activities, WESTON obtained clearance from the 41st EOD personnel. The deep soil boring was completed with hollow-stem auger drilling techniques and terminated at a depth of 50 feet. A magnetometer was used during the first few feet of drilling to identify any nearby metallic materials characteristic of explosive munitions or other similar objects. Continuous lithologic samples were collected using a 5-foot split barrel sampler throughout the boring. The lithologic samples were screened with a flame-ionization detector (e.g., organic vapor analyzer [OVA]), and visually logged and classified using the Unified Soil Classification System (USCS). Soil screening for volatile organic content was accomplished by cutting small cracks in the recovered soil samples, inserting the OVA probe, and recording the instrument response. This information, along with a visual description and the USCS classification, were used to construct the geologic boring log presented as Figure 2-2.

GEOLOGIC DRILL LOG	PROJECT NAME/LOCATION	PAGE NO.	BORING NO.
	FORT BLISS OPEN DETONATION TREATMENT UNIT	1 of 1	SB01

DATE STARTED	DATE FINISHED	DRILLER	DRILL METHOD	BOREHOLE DIA. (in)	TOTAL DEPTH (ft)
8/25/95	8/25/95	TIERRA DRILLING	HSA	7	50.00

GEOLOGIST	GROUND ELEV. (ft. MSL)	STATE PLANAR COORDINATES (ft)	SITE COORDINATES
DENNIS HAYES	4299.00		

ELEVATION	SAMPLE INTERVAL	RECOVERY (%)	SAMPLE TYPE	SAMPLE ID	MINIRAM	USCS	BLOW COUNTS	DEPTH	GRAPHICS LOG	VISUAL DESCRIPTION
		85		36-51 1	0/.14 0/.14 0/.3					SILTY, SANDY GRAVEL: light brown, very fine to fine grained sand, gravel size up to 1/4 inch, loose, dry
		85								
4294		80	A	36-51 2	0/.1	GM		5		NOTE: switched to 5' split spoon sampler at 5.0' due to large sample volume required.
4289		60	A	36-51 3	0/0	GM		10		gravel content and size increasing up to 2 inches and becoming dark gray silstone below 10.0'
4284		60	A	36-51 4	0/0			15		sand becoming medium grained with occasional caliche present below 15.0'
4279		60	A	36-51 5	0/.31			20		sand becoming fine to medium grained below 20.0'
4274		70	A	36-51 6	0/0	GM		25		
4269		20	A	36-51 7	0/.41			30		
4264		25	A	36-51 8	.4/.3	GM		35		
4259		60	A	36-51 9	0/.45	ML GM		40		Sharp contact with underlying lithology CLAYEY SILT: brown, moist, stiff to very stiff, non-plastic SILTY, SANDY GRAVEL: light brown, dry, loose, gravel up to 2 inches, dark gray siltstone, fine to medium grained sand, occasional caliche
				36-52 9		GM				
4254		90	A	36 51 10	0/.41	ML		45		Sharp contact CLAYEY SILT: light brown, slightly moist, non-plastic, stiff to very stiff
						GM				Sharp contact SILTY, SANDY GRAVEL: light brown, dry, loose, fine to medium grained sand, gravel up to 2 inches, dark gray siltstone, caliche present
4249								50		medium strength due to caliche
										TOTAL DEPTH = 50.0 FEET

A = ANALYTICAL SAMPLE
G = GEOTECHNICAL SAMPLE
R = ARCHIVED SAMPLE

WESTON

PAGE NO.	BORING NO.
1 of 1	SB01

WESTON MANAGERS DESIGNERS/CONSULTANTS

FIGURE 2-2

U.S. ARMY CORPS OF ENGINEERS
FORT BLISS
GEOLOGIC DRILL LOG
FORT BLISS, TEXAS

DATE	PROJECT NO.	SCALE
JAN 96	03886121001	NOT TO SCALE

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WESTON did not detect organic vapors with the OVA, nor observe visually affected material in any samples. Therefore, soil samples were collected at the specified 5-foot intervals for laboratory analyses. A 6-inch section of the soil core was peeled or scraped with a clean stainless-steel knife to remove the outer layer in contact with the sampler, and placed in the appropriate sample containers. These containers were sealed, labeled, and placed in plastic bags. The analytical approach for the subsurface soil samples is discussed below in Subsection 2.3.

Once the boring was completed, bentonite chips were placed in the bottom of the borehole and hydrated with water. A grout mixture consisting of portland cement, bentonite powder, and water was prepared in an aboveground container and pumped through a tremie pipe from the bottom of the borehole to the surface.

The soil cuttings and decontamination water generated during the drilling activities were contained in labeled drums and managed as discussed in Subsection 2.5.

2.2.3 Quality Assurance/Quality Control Samples

WESTON collected additional samples during the investigation for quality assurance/quality control (QA/QC) purposes to verify precision (e.g., the degree of reproducibility) of the laboratory results and effectiveness of the decontamination procedures. At six of the sample locations, three times the normal sample volume was collected as three separate samples for QA/QC purposes, as follows:

- One volume was designated as the normal sample, and was sent to WESTON's Environmental Metrics, Inc. (EMI) Laboratory in University Park, Illinois, or the Lionville Analytical Laboratory in Lionville, Pennsylvania for the requested analyses.

- One of the extra sample volumes was sent to WESTON's laboratories as a blind field duplicate QC sample (e.g., the sample was identified in such a way that the laboratory was unaware it was a duplicate of another sample).

- The other extra sample volume was sent as a QA sample to the USACE Southwestern Division (SWD) laboratory in Dallas, Texas, for analysis to obtain independent results to compare to those produced by the WESTON laboratories.

Since visual observations and field screening with the OVA did not result in identifying contamination, the six QA and six QC samples were collected at a rate of approximately one QA/QC sample per ten normal samples. Soil for the QA/QC samples was placed in a clean plastic bag, mixed with a plastic scoop, then divided into the appropriate sample jars to make sure each split portion represented the sampled interval.

The laboratory performed matrix spike/matrix spike duplicate (MS/MSD) analyses on three soil samples. WESTON collected one additional sample volume for the laboratory MS/MSD analyses. In addition, WESTON prepared one equipment rinsate blank during the investigation to verify completeness of the decontamination procedures. The rinsate blank was prepared by

pouring distilled water over a decontaminated split-spoon sampler, and collecting the rinse water in the appropriate sample container. The rinsate blank was designated as Station 037.

2.2.4 Decontamination Procedures

Decontamination activities were performed in the field at a location approved by the 41st EOD personnel. Nondisposable sampling equipment was decontaminated before and between each use. Small nondisposable equipment (e.g., shovels and stainless-steel knives) was scrubbed in a mixture of phosphate-free detergent (e.g., Liquinox) and potable water, then rinsed with distilled water. Large nondisposable equipment (e.g., drill rods, drilling tools, and split-spoon samplers) was steam-cleaned with a pressure washer in a clean 55-gallon drum. Fluids generated during the decontamination process were managed as discussed in Subsection 2.5.

2.3 ANALYTICAL APPROACH

The available data and information used to prepare the Part B permit application and subsequently contained in the Part B Permit dictated the analytical approach for the OD Treatment Unit Investigation. The specified analyses and the associated analytical methods are summarized in Table 2-1. It should be noted that there are no approved methods for analysis of picric acid and nitroglycerin. WESTON's Lionville Laboratory conducted a method detection limit (MDL) study involving a modification to the standard EPA SW-846 Method 8330 using high performance liquid chromatography (HPLC). The results of the MDL study and the proposed methodology were submitted to USACE on 11 August 1995 and approved on 7 September 1995.

The explosives analyses were conducted by WESTON's Lionville laboratory and the remaining analyses were conducted by WESTON's EMI laboratory. All of the collected soil samples were submitted for inorganic, metals, and explosives analyses. The duplicate (QC) samples were submitted for the same analyses as the normal samples, and the QA samples were submitted to the USACE SWD laboratory requesting the same analyses as the normal and QC samples. The rinsate blank was submitted for explosives analysis only.

To comply with the analytical approach in the Part B Permit, six stations with resampled for characterization purposes. These six sample stations consisted of the background stations (033, 034, and 035) and the stations exhibiting the highest total explosive concentrations (013, 014, and 027) from the initial sampling event. The samples collected during the resampling event were submitted for PCBs and dioxins/furans as required by the Part B Permit. Pesticides/PCBs analysis was performed by WESTON EMI in accordance with EPA SW-846 Method 8081, and dioxin/furans analysis was performed by WESTON's Lionville in accordance with EPA SW-846 Method 8280.

2.4 SAMPLE HANDLING AND MANAGEMENT

As previously stated, samples for chemical analyses were placed into clean sample jars and bottles and labeled with information including the date and time of collection, company name (WESTON), sample identification, and required analysis. Sample nomenclature followed the guidelines listed in Subsection B2.2.5 of the approved Work Plan (Reference 3). The sample containers were then individually bagged and sealed, and placed in a cooler full of ice and

TABLE 2-1
ANALYTICAL METHODS AND COLLECTED SAMPLES

OD Treatment Unit Investigation
Fort Bliss, Texas

Parameter	Analytical Methods[1]	Number of Collected Samples[2]
METALS		
Antimony	SW846 6010A	67 - Soil
Arsenic	SW846 7060A	
Barium	SW846 6010A	
Cadmium	SW846 6010A	
Chromium	SW846 6010A	
Copper	SW846 6010A	
Iron	SW846 6010A	
Lead	SW846 6010A	
Mercury	SW846 7471A	
Potassium	SW846 6010A	
Selenium	SW846 7740	
Silver	SW846 6010A	
Strontium	SW846 6010A	
Zinc	SW846 6010A	
INORGANICS		
Free Liquids (paint filter)	SW846 9095	67 - Soil
Ignitibility	SW846 1010	
pH	SW846 9045C	
Nitrate-Nitrite (as N)	EPA 353.2	
ORGANICS (EXPLOSIVES)		
Picric Acid	SW846 8330[3]	67 - Soil
HMX	SW846 8330	2 - Water
RDX	SW846 8330	
Nitroglycerin	SW846 8330[3]	
2,4,6 trinitrotoluene (2,4,6 TNT)	SW846 8330	
2,4 dinitrotoluene (2,4 DNT)	SW846 8330	
2,6 dinitrotoluene (2,6 DNT)	SW846 8330	
PCBs	SW846 8081	6 - Soil
Dioxins/Furans	SW846 8280	6 - Soil

[1] SW846 = "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods", Environmental Protection Agency, SW846.
EPA600 = "Methods for Chemical Analysis of Water and Wastes", Environmental Protection Agency.

[2] The sample numbers are maximum values and include QA/QC samples.

[3] Picric acid and nitroglycerin methods based on MDL study constituting an adaption of method 8330 that was approved by USACE on 7 September 1995.

packing material. The coolers were then sealed and delivered to Federal Express for overnight shipment to the appropriate laboratories. Proper chain-of-custody (COC) procedures were implemented for all collected samples, and COC documentation accompanied each sample shipment. Copies of the COC forms and Federal Express airbill receipts for each shipment are included in Appendix A.

2.5 WASTE MANAGEMENT

Soil cuttings and decontamination water derived from the sampling activities were contained in DOT-approved 55-gallon drums that were temporarily staged inside the OD Treatment Unit. Once filled, the drums were sealed and labeled by WESTON personnel. Disposable sampling equipment and used gloves were placed in garbage bags and disposed of in appropriate solid waste containers on-post. Information such as site and drum number, media, date generated, quantity, date sampled, and staging location is provided on the investigation-derived waste (IDW) tracking form included in Appendix B. A copy of this form was submitted to the appropriate Fort Bliss personnel following completion of investigation activities.

WESTON personnel collected one IDW sample (designated as Station 038) from the liquid waste (decontamination water) contained in the IDW drums. This sample was submitted to WESTON's Lionville laboratory for explosives analysis only.

SECTION 3
NATURE AND EXTENT OF CONTAMINATION

A brief summary of the nature and extent of contaminants, based on the results of the soil sampling at the OD Treatment Unit, is presented in this section. As previously stated, samples are referred to using only the sample station number (e.g., 001).

Prior to compiling this Report of Findings, WESTON submitted two copies of the complete raw analytical data (grouped by Roy F. Weston, Inc. [RFW] laboratory batch numbers) for the samples collected at the OD Treatment Unit to USACE for comparison. Laboratory summary sheets are included in the data validation reports in Appendix C, and raw data summary tables are provided in Appendix D. Each data validation report has an assigned Roy F. Weston, Inc. (RFW) laboratory batch number that corresponds to the raw analytical data batch number. A table is provided in Appendix C that lists the batch numbers and analytical data they contain.

3.1 EVALUATION METHODS

The analytical data are summarized in the tables included in Appendix D. Explosive results were compared directly to the laboratory reporting limits (e.g., the shaded entries indicate concentrations at or greater than the laboratory detection limit) because reportable concentrations were not detected in the three background samples.

Metals and nitrate-nitrite results were compared to three times the maximum background concentrations of those constituents. Three background samples were collected from the OD Treatment Unit for establishing background values. Other statistical methods of evaluating the data were not conducted due to the inherent low confidence (and high error/uncertainty percentages). Therefore, background values were defined as three times the maximum background result. In addition, the naturally occurring range of concentrations of the metals were used to evaluate the significance of the metals results that were reported above the defined background values. A table showing naturally occurring concentrations of metals in soils (common range and average concentration) is included in Appendix D.

3.2 ORGANIC RESULTS

Only two explosive compounds were detected in the soil samples collected from the OD Treatment Unit. Nitroglycerin and 2,4 dinitrotoluene (2,4 DNT) were reported at concentrations ranging from 5.0 milligrams per kilogram (mg/kg) (014) to 98 mg/kg (026), and 0.260 mg/kg (028) to 120 mg/kg (013), respectively. Most of the sample stations with reportable concentrations of explosives were in the vicinity of the active Pit A area. Nitroglycerin was reported in two Pit B samples at concentrations of 1.9 mg/kg (030) and 5.6 mg/kg (002), and 2,4 DNT was detected in one Pit B sample at a concentration of 0.330 mg/kg (002). These concentrations are significantly less than those reported around Pit A and confirm the lack of use

of Pit B. Sample locations that contained reported concentrations of explosive compounds are summarized on Table 3-1 and shown on Figure 3-1.

No explosive constituents were detected in the samples collected from the deep boring (036), the equipment rinsate blank, the background samples, or the IDW sample. These results suggest that vertical or downward migration of explosives compounds has not occurred past the upper two or three feet of soil. Additionally, wind dispersion of explosive constituents appears minimal due to the lack of reportable concentrations in the background samples.

Reportable concentrations of explosives were not reported in the IDW sample (038) collected from the contained soil boring drill cuttings, nor any of the samples collected from the deep soil boring (036). Therefore, the soil cuttings were disposed of on the ground at the OD Treatment Unit.

Nitrate-nitrite concentrations ranged from 1.2 mg/kg (029) to 299 mg/kg (010) in the vicinity of Pit A, and 1.1 mg/kg (025) to 152 (021) mg/kg in the vicinity of Pit B. Soil samples collected from the deep soil boring contained nitrate-nitrite concentrations ranging from 1.1 mg/kg (45 feet) to 175 mg/kg (surface). The maximum reported nitrate-nitrite concentration for the background samples was 1.7 mg/kg (034). Sample locations that contained concentrations of nitrate-nitrite exceeding three times this background concentration (5.1 mg/kg) are summarized on Table 3-1 and shown on Figure 3-2.

The flash point for the samples around pit A was reported at > 190 degrees Fahrenheit, and the pH ranged from 7.7 (010) to 8.7 (029). The flash point for the pit B samples ranged from > 190 to > 195 degrees Fahrenheit, and the pH ranged from 7.6 (021) to 8.8 (032). Samples collected from the boring reported a flash point of > 190 degrees Fahrenheit and a pH range of 7.7 (surface) to 9.3 (45 feet). This data indicates that the surface and subsurface soils at the OD Treatment Unit are not characteristically hazardous.

Only one dioxin/furan compound was detected in the pit A soil samples collected from the OD Treatment Unit. Octachlorinated dibenzo dioxin (OCDD) was reported at concentrations ranging from 1.2 nanograms per gram (ng/g) (014) to 3.5 ng/g (027). According to the 1989 International Toxicity Equivalence Factors (Reference 5), OCDD is one-thousand times less toxic than the most toxic dioxin/furan, 2378-TCDD. Reportable concentrations of PCBs were not found in the soil samples collected from the OD Treatment Unit.

3.3 INORGANIC RESULTS

Seven metals were detected in the soil samples at concentrations exceeding three times the maximum corresponding background value. A summary table containing the metals results and associated sample stations is contained at the end of Appendix D.

TABLE 3-1
SUMMARY OF REPORTED EXPLOSIVES AND NITRATE-NITRITE CONCENTRATIONS

OD Treatment Unit Investigation
Fort Bliss, Texas

Sample Station	Analyte Detected and Concentration (mg/kg)		
	2,4 Dinitrotoluene	Nitroglycerin	Nitrate-Nitrite
950824-001-51-1	ND	ND	5.3
950824-001-52-1	ND	ND	5.3
950824-002-51-1	0.33	5.6	40.6
950824-003-51-1	ND	ND	31.1
950824-004-51-1	ND	ND	55.3
950824-005-51-1	ND	ND	17.3
950824-006-51-1	ND	ND	78
950824-007-51-1	ND	ND	111
950824-008-51-1	ND	ND	35.3
950824-009-51-1	ND	ND	18.1
950825-010-51-1	0.5	ND	317
950825-101-52-1	ND	ND	299
950825-011-51-1	0.34	ND	62.5
950824-012-51-1	0.28	ND	28.3
950825-013-51-1	120	ND	35.6
950824-014-51-1	4.7	ND	127
950824-014-52-1	0.29	5	97.3
950825-015-51-1	ND	ND	30.4
950824-016-51-1	0.26	ND	96
950824-017-51-1	ND	ND	5.8
950824-017-51-2	ND	ND	79.5
950824-018-51-1	ND	ND	115
950824-018-51-2	ND	ND	142
950824-019-51-1	ND	ND	65.7
950824-019-51-2	ND	ND	151
950824-020-51-1	0.43	13	36.7
950824-020-51-2	ND	ND	21.2
950824-021-51-1	ND	ND	37.6
950824-021-51-2	ND	ND	152
950824-022-51-1	ND	ND	5.5
950824-022-51-2	ND	ND	10.3
950825-024-51-1	ND	ND	18.2
950825-024-51-2	ND	ND	77.8
950825-026-51-1	0.3	98	ND
950825-027-51-1	88	ND	ND
950825-028-51-1	0.26	ND	ND
950825-028-51-2	0.47	9.3	ND
950825-030-52-1	ND	1.9	ND
950825-036-51-1	NA	NA	175
950825-036-51-2	ND	ND	22.7

ND = Not detected above the laboratory detection limit. NA = Not analyzed.

LEGEND

- ● SAMPLE LOCATION WHERE EXPLOSIVES WERE DETECTED
- ▲ SAMPLE LOCATION WHERE NO EXPLOSIVES WERE DETECTED

NOTE: SAMPLE LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE. CONTOURS REPRESENT SURFACE TOPOGRAPHY. CONTOUR INTERVAL = 2 FEET

SOURCE: AERIAL TOPOGRAPHY BY SLI ENGINEERING, EL PASO, TEXAS

WESTON

FIGURE 3-1

U.S. ARMY
CORPS OF ENGINEERS
FORT BLISS
EXPLOSIVES RESULTS
FORT BLISS, TEXAS

DATE	PROJECT NO.	SCALE
JAN 96	03886121001	1" = 60'

OD TREATMENT UNIT ACCESS ROAD

OD TREATMENT UNIT PERIMETER

ENTRANCE RAMP

PIT A

PIT B

N

LEGEND

- ● SAMPLES WITH NITRATE-NITRITE CONCENTRATIONS GREATER THAN 3 TIMES MAX BACKGROUND (5.1 MG/KG)
- ▲ SAMPLES WITH NITRATE-NITRITE CONCENTRATIONS LESS THAN 3 TIMES MAX BACKGROUND

NOTE: SAMPLE LOCATIONS WERE NOT SURVEYED AND ARE APPROXIMATE. CONTOURS REPRESENT SURFACE TOPOGRAPHY. CONTOUR INTERVAL = 2 FEET

SOURCE: AERIAL TOPOGRAPHY BY SLI ENGINEERING, EL PASO, TEXAS

WESTON

FIGURE 3-2

U.S. ARMY
CORPS OF ENGINEERS
FORT BLISS
NITRATE-NITRITE RESULTS
FORT BLISS, TEXAS

DATE	PROJECT NO	SCALE
JAN 96	03886121001	1" = 60'