

 ENTERED



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APR 1998
RECEIVED

14 April 1998

Mr. Rick Smith
Tulsa District, Corps of Engineers
1645 South 101st East Avenue
Tulsa, OK 74128

RE: Submittal of Final Second CY97 Compliance
Sampling Results Report
Open Detonation Treatment Unit, Fort Bliss, Texas
Contract DACA 56-96-D-0011, Delivery Order 08
WESTON Work Order No.: 03886-121-003

Dear Mr. Smith:

Roy F. Weston, Inc. (WESTON®) is pleased to submit two copies of the Final Second CY97 Compliance Sampling Results Report for the Part B Permit, Open Detonation (OD) Treatment Unit, Fort Bliss, Texas. This report presents the results of the compliance sampling event that was completed in August 1997, and has been revised based on your comments. A comment-response summary is included inside the front cover of each report. One electronic copy of the text and tables has been included with this submittal as requested. Four additional paper copies and one electronic copy have been forwarded to Ms. Patricia McKernan at Fort Bliss.

WESTON® appreciates the opportunity to continue assisting the U.S. Army Corps of Engineers with this project. As always, please do not hesitate to contact me at (713) 621-1620 if you have any questions regarding this report or if you need additional copies.

Very truly yours,

ROY F. WESTON, INC.

Greg S. Braddy, P.G.
Project Manager

Enclosure

cc: Patricia McKernan - Fort Bliss DOE



**Comments On Draft Second CY97 Compliance Sampling Report
Fort Bliss OD Unit
McGregor Range, Fort Bliss, NM**

Reviewer: Richard P. Smith, Environmental Engineer, Tulsa District, U.S. Army Corps of Engineers: Design Branch

Respondent: Greg Braddy, Roy F. Weston, Inc.

Page: 1

1. Respondent concurs (C), Does not Concur (D), or takes Exception (E).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

REVIEWER COMMENT NO.	SECTION/PAGE(S)	PARAGRAPH/LINE	REVIEWER COMMENT	C,D,E ¹	RESPONSE	A OR D ²
1.	Section 2.4	General	Please verify that the coolers were properly sealed. Reference QA Comparability Report.	C	COC Forms were inspected and custody seals were used and not broken upon arrival to the laboratory. One sample shipment (batch 9708G586) did not contain an outer COC seal. This shipment contained three soil samples for inorganics, explosives, and metals analysis. With regards to explosives, no analytes were reported above the laboratory reporting limit in any of the three samples, and the sample integrity does not appear to have been compromised. As such, sample result qualification or rejection has not been performed.	
2.	Section 3	Paragraph 2	Note that data validation has only been done up to Quality Assurance Comparability Report, which has been performed by the USACE.	C	The paragraph will be revised accordingly to reflect that the QA Comparability Report is complete.	
3.	Page 3	Table 3-3	Please add the A, B, C, D qualifiers noted in the 3rd paragraph of Section 3, page 3-1, to these sample locations. This will assist in evaluating positive results by showing if the sampling location moved.	C	The qualifiers will be added as requested.	

Comments On Draft Second CY97 Compliance Sampling Report (Continued)
Fort Bliss OD Unit
McGregor Range, Fort Bliss, NM

Reviewer: Richard P. Smith, Environmental Engineer, Tulsa District, U.S. Army Corps of Engineers: Design Branch

Respondent: Greg Braddy, Roy F. Weston, Inc.

Page: 2

1. Respondent concurs (C), Does not Concur (D), or takes Exception (E).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

REVIEWER COMMENT NO.	SECTION/PAGE(S)	PARAGRAPH/LINE	REVIEWER COMMENT	C,D,E ¹	RESPONSE	A OR D ²
4.	Section 3.4.1	Paragraphs 3 & 4	Expand this to state that the stations will be sampled for these constituents in the future sampling activities and that based upon the results of those analyses, a determination will be made as to whether these findings are anomalies of this sampling event or a change in findings. If they are continued to be found in these analyses, additional information will be collected to determine if a change in usage or methods has caused this deviation.	C	The paragraphs will be expanded and clarification will be added as requested.	
5.	Page 4-2	Bullet 1	Let's explain what we mean by "these finding will be investigated further."	C	Additional explanation will be added for clarification.	
6.	Page 4-2	Bullet 4	Is the 50' boring data included in the shallow subsurface?	C	Yes, since a surface soil sample and a sample at a depth of 5' were collected from the boring.	
7.	Section 4.2	Line 3	"Investigated."	C	"Investigated" will be clarified.	

**FINAL
COMPLIANCE SAMPLING RESULTS REPORT
SECOND CY 1997**

**PART B PERMIT
OPEN DETONATION (OD) TREATMENT UNIT**

**McGREGOR RANGE
FORT BLISS, TX**

Prepared for

United States Army Corps of Engineers
Tulsa District
Tulsa, OK

Delivery Order 1, Modification 3
Contract No. DACA 56-96-D-0011

Submitted by

Roy F. Weston, Inc.
5599 San Felipe, Suite 700
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April 1998

**FINAL
COMPLIANCE SAMPLING RESULTS REPORT
SECOND CY 1997
PART B PERMIT
OD TREATMENT UNIT INVESTIGATION
FORT BLISS, TX**

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**FINAL
COMPLIANCE SAMPLING RESULTS REPORT
SECOND CY 1997
PART B PERMIT
OD TREATMENT UNIT INVESTIGATION
FORT BLISS, TX**

LIST OF APPENDICES

APPENDIX TITLE

- A Chain-of-Custody Forms and Federal Express Airbill Receipts
- B Investigation-Derived Waste (IDW) Tracking Form
- C Data Validation Narrative and Exception Reports
- D Analytical Data Summary Tables
- E USACE Quality Assurance Comparability Report

SECTION 1 INTRODUCTION

In June 1995, a Final Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility Operational Permit (Permit) (NMED, 1995) was issued to the U.S. Army Air Defense Artillery Center, Fort Bliss, Texas, by the New Mexico Environment Department (NMED). This Permit, EPA ID No. NM4213720101-01, authorizes treatment of hazardous waste (munitions) by open detonation at the Open Detonation Treatment Unit (OD Unit). Roy F. Weston, Inc. (WESTON®) was contracted by the U.S. Army Corps of Engineers (USACE) (Contract No. DACA 56-93-D-0008, Delivery Orders 01 and 19, and Contract DACA-56-96-D-0011, Delivery Order 08) to perform initial characterization and semiannual compliance sampling at the OD Unit according to the requirements of the aforementioned Permit.

This document represents the Second CY97 Compliance Sampling Results Report for the OD Unit and was prepared in accordance with the specifications provided in the USACE Scope of Work (SOW), dated 10 January 1997 (USACE, 1997). An initial OD Unit characterization was conducted in August 1995, and semiannual compliance monitoring has been ongoing.

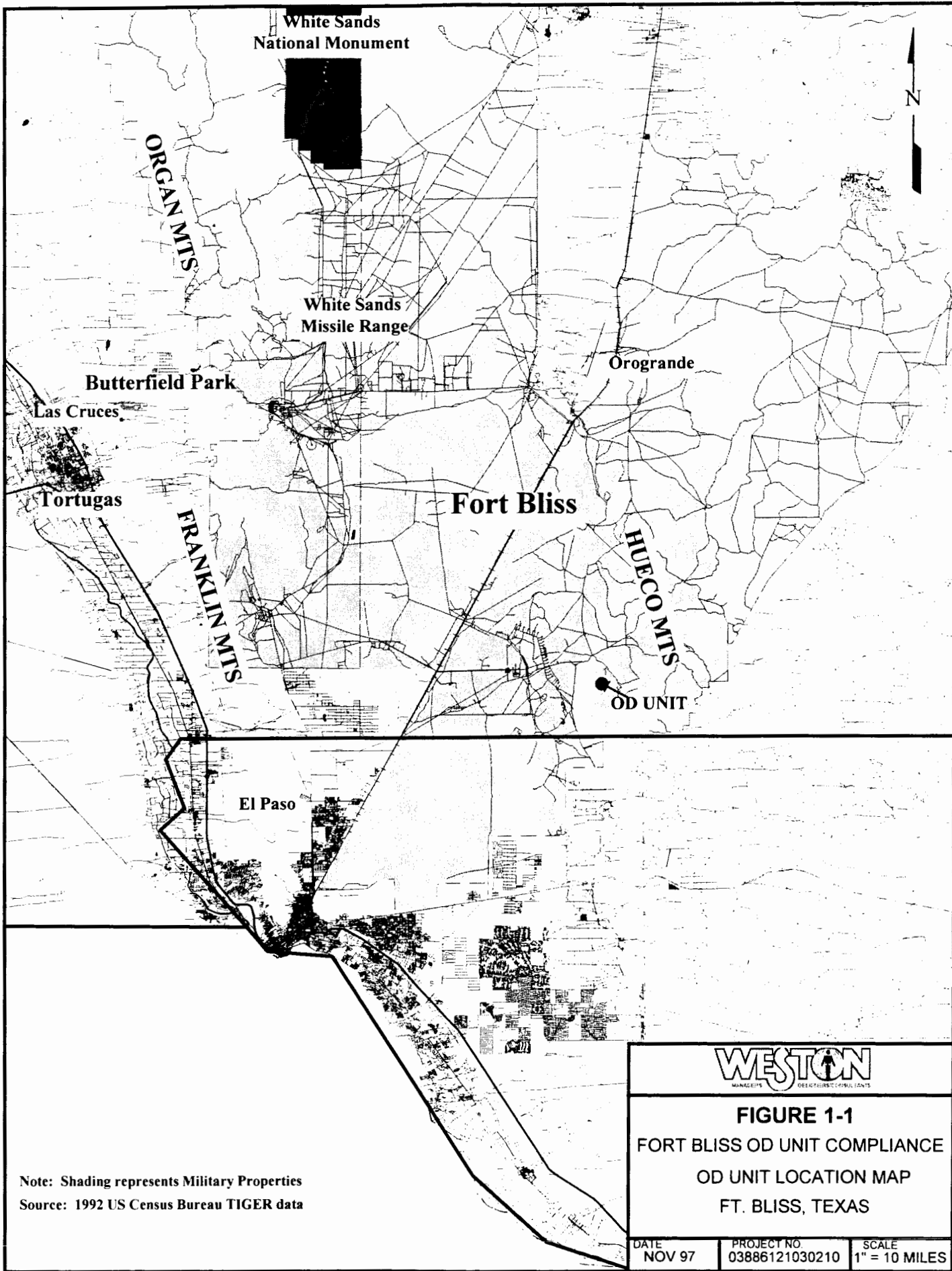
1.1 OBJECTIVE OF COMPLIANCE SAMPLING

WESTON provided technical assistance to USACE and Fort Bliss by conducting the OD Unit compliance sampling at Fort Bliss on 24 and 25 August 1997. Compliance sampling is required by the Permit to evaluate site conditions with respect to ongoing and future treatment activities conducted at the OD Unit. The semiannual compliance sampling results will be compared to historical sampling results to determine if changes in the presence, magnitude, or location of site-related contaminants has occurred as a result of continued treatment activities.


1.2 SITE BACKGROUND AND DESCRIPTION

The OD 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 OD 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. There are no structures within approximately four miles of the OD Unit. Operations at the OD Unit are only conducted when McGregor Range is inactive.

The U.S. Army Air Defense Artillery Center currently operates an Explosive Ordinance Detachment (EOD) that performs work at the OD Unit. This OD Unit has been in operation since 1965. The 41st EOD conducts explosives demolition at the OD Unit approximately 3 to 4 times per year (generally every quarter) or on an as needed emergency basis. The OD Unit was historically operated under RCRA interim status as a hazardous waste thermal treatment facility



Note: Shading represents Military Properties
 Source: 1992 US Census Bureau TIGER data

		
FIGURE 1-1 FORT BLISS OD UNIT COMPLIANCE OD UNIT LOCATION MAP FT. BLISS, TEXAS		
DATE NOV 97	PROJECT NO. 03886121030210	SCALE 1" = 10 MILES

until the Operational Permit was granted and issued in 1995. The unit is now utilized according to the requirements specified in the Part B Permit. Quantities of explosives (net explosive weight) that are currently allowed for treatment (detonation) according to the Permit (modification dated 9 May 1996) are 2,500 pounds or 1,135 kilograms (kg) per quarter. 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 OD Unit is a manmade excavation and the dimensions are approximately 500 feet by 200 feet by 20 feet deep. All structures at the OD Unit are earthen. Prior to the first compliance sampling event, the bottom of the OD Unit was regraded to remove vegetation and provide for an emergency exit road for trucks that carry the munitions to the OD Unit. A 6-foot chain link fence with lockable gates was constructed around the OD Unit to control access. In June 1996, a stormwater diversion and control system was constructed to prevent stormwater from the surrounding area to enter the Unit. A site plan of the OD Unit is illustrated in Figure 1-2.

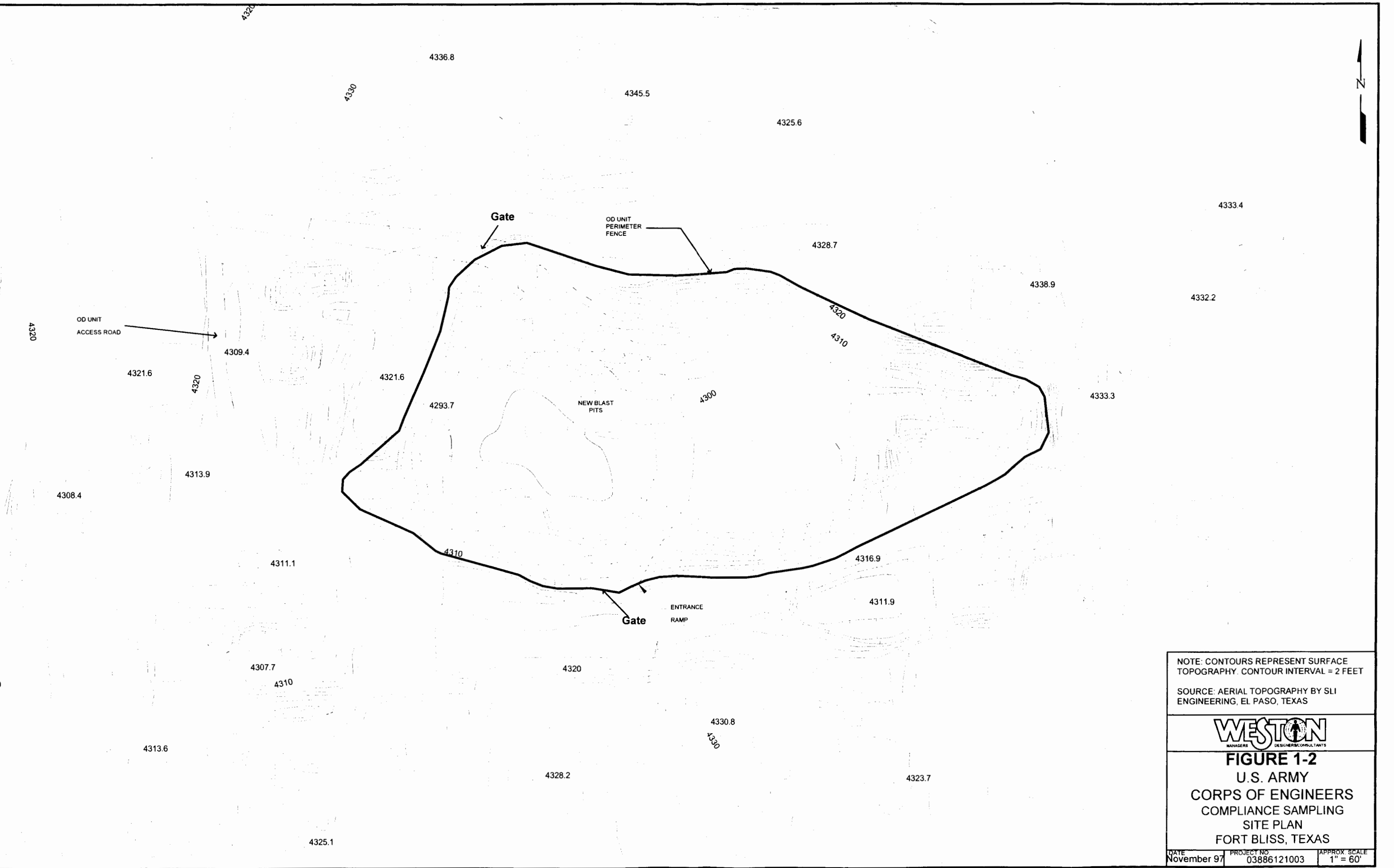
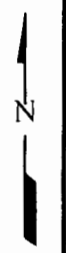
As required by the Permit, WESTON completed an initial site investigation at the OD Unit in September 1995. Surface, near-surface, and subsurface soil samples were collected and submitted for metals, inorganics, and organics analyses. Results of the initial characterization indicated the presence of site-related constituents, particularly in the western portion and along the western perimeter of the OD Unit. Once the initial characterization of the OD Unit was completed, WESTON received approval from USACE and Fort Bliss personnel to conduct semiannual compliance sampling, after which the results were compared to those of the initial characterization. The sampling events that have been conducted in response to the RCRA Permit include:

- Initial OD Unit Characterization—August 1995
- First 1996 Compliance Sampling Event—April 1996
- Second 1996 Compliance Sampling Event—August 1996
- First CY97 Compliance Sampling Event—February 1997
- Second CY97 Compliance Sampling Event—August 1997

1.3 REPORT FORMAT

The Second CY97 Compliance Sampling Results Report 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



NOTE: CONTOURS REPRESENT SURFACE TOPOGRAPHY. CONTOUR INTERVAL = 2 FEET
SOURCE: AERIAL TOPOGRAPHY BY SLI ENGINEERING, EL PASO, TEXAS



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

DATE November 97	PROJECT NO. 03886121003	APPROX SCALE 1" = 60'
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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 Narrative and Exception Reports
- Appendix D—Analytical Data Summary Tables

SECTION 2 COMPLIANCE SAMPLING ACTIVITIES

The OD Unit compliance sampling included the following activities:

- Inspecting the condition of the OD Unit and associated features.
- Collecting surface and near-surface soil samples in and around the OD Unit.
- Completing one deep soil boring and collecting subsurface soil samples.

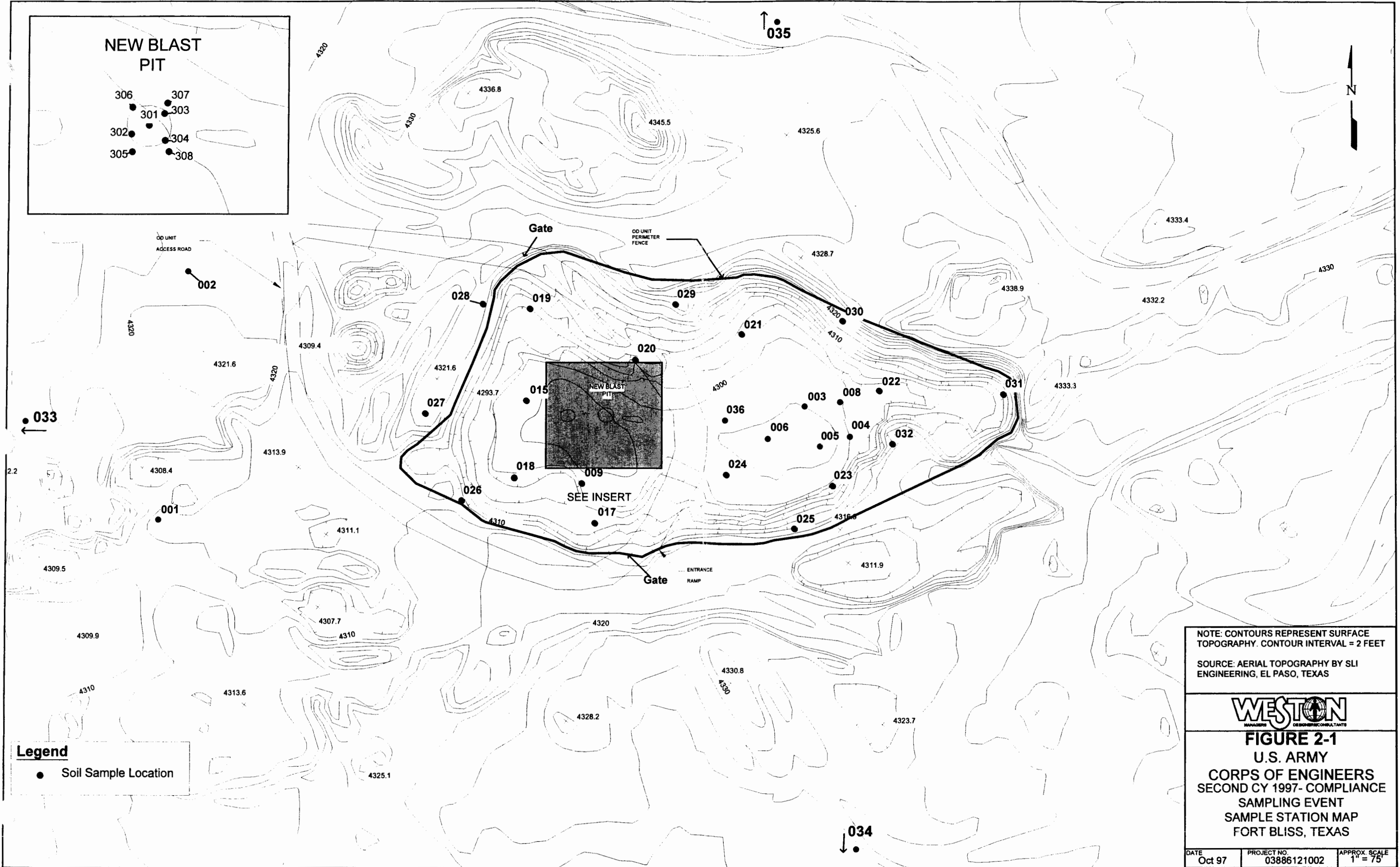
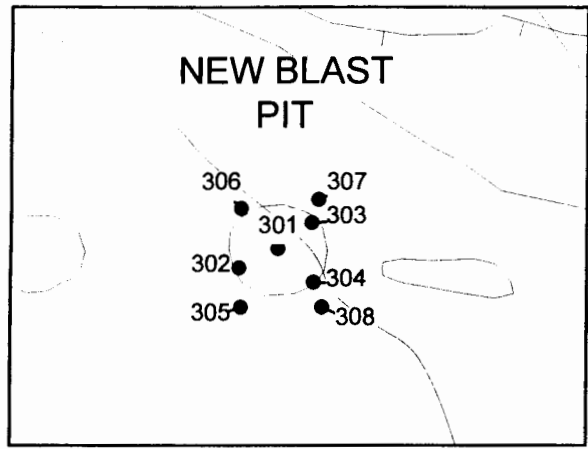
These activities were conducted in accordance with WESTON's approved Final Work Plan for the OD Unit Investigation (WESTON, 1995), the Work Plan Addendum (WESTON, 1996c), and Memorandum of Understanding for CY 1997 Compliance Sampling (WESTON, 1997b). The sampling activities are described in the following subsections. The overall sampling strategy was specified in the Permit and adopted for the Work Plan. The samples collected at the OD Unit were labeled in accordance with the requirements specified in Subsection B2.2.5 (Soil Sample Identification) of the Work Plan (WESTON, 1995). 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 stations in and around the OD Unit as shown in Figure 2-1. The locations were not surveyed after sampling but have been placed on the figure based on measurements from semi-permanent features such as fence corner posts. The sample stations shown in Figure 2-1 approximate those specified in the Permit (NMED, 1995), the USACE SOW for the Initial Unit Characterization (USACE, 1995), and the Work Plan Addendum (WESTON, 1996c).

As with previous sampling events, OD blast pits were not present in the eastern portion of the OD Unit (historically referred to as the former Pit B Area). Sampling was therefore conducted at previously established sampling stations to provide general coverage of this area. A new blast pit measuring approximately 13 feet in diameter and 3 feet deep was present in the western portion of the Unit as shown in Figure 2-1. The western portion of the OD Unit contained three blast pits (2 old and 1 new) at the time of sampling. Sampling locations in and around the old blast pit (former stations 201 through 208) were not sampled during this event, and instead new sampling stations 301 through 308 were established to investigate the new blast pit. The selection of the new sampling stations is consistent with the RCRA Part B Permit.

With a few exceptions noted below, the sample station utilized during the second CY 1997 compliance sampling event were generally the same as those used previously. A summary of the sample stations and rationale (and corresponding sample station numbers shown on Figure 2-1 are as follows:



Legend

● Soil Sample Location

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

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



FIGURE 2-1

U.S. ARMY

CORPS OF ENGINEERS

SECOND CY 1997- COMPLIANCE

SAMPLING EVENT

SAMPLE STATION MAP

FORT BLISS, TEXAS

DATE Oct 97	PROJECT NO. 03886121002	APPROX. SCALE 1" = 75'
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- Sixteen discrete surface soil samples were collected from the bottom of the OD Pit (003, 004, 005, 006, 008, 009, 015, 301, 302, 303, 304, 305, 306, 307, 308, 036). During this compliance sampling event, a recent blast pit was present in the western portion of the OD Unit. This pit was sampled as originally specified in the Permit and Work Plan. To distinguish between the stations sampled during the previous compliance sampling event, the sample stations were designated as 301 through 308. Previously established stations 201 through 208 were not sampled due to association with an old blast pit.
- Eight discrete random surface and near-surface soil samples were collected from the interior of the OD Unit (017, 018, 019, 020, 021, 022, 023, 024).
- Eight discrete random surface and near-surface soil samples were collected from the OD Unit perimeter (025, 026, 027, 028, 029, 030, 031, 032).
- Two discrete surface soil samples (001, 002) were collected from approximately 200 feet west of the OD Unit perimeter for monitoring the area west of sample stations 026, 027, and 028.
- Three discrete background surface soil samples (033, 034, 035) were collected from areas away from the OD Unit that appeared not to have been affected by operations from the OD activities. These three samples were located approximately 700 feet from the center of the OD Unit excavation as specified by the Permit.
- Ten subsurface soil samples were collected from the deep soil boring (036). The soil boring was completed near the center of the OD Unit.

2.2 SAMPLING PROCEDURES

2.2.1 Surface and Near-Surface Soil Samples

Fort Bliss 41st EOD personnel provided UXO clearance and support prior to the sampling activities. An OD event occurred the week prior to the sampling event, and the 41st EOD inspected the Unit after detonation. According to the EOD personnel, the Unit was cleared for sampling. 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. In the case of the near-surface soil samples, a shovel was used as needed to remove the surface material to the desired depth and then disposable scoops were used to collect the soil sample. After sample collection, the material removed from each hole was used as backfill.

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 [WESTON,

1995]), date, time, and required analyses. 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

The deep soil boring was completed with hollow-stem auger drilling techniques and terminated at a depth of 46 feet (see Figure 2-1 for location). During the initial characterization, the soil boring was completed in the center of the OD Unit. During the First and Second Compliance Sampling Events of 1996, the boring was relocated to the western and eastern areas of the OD Unit, respectively, to investigate the subsurface conditions across the Unit. For the February and August 1997 sampling events, the deep soil boring was relocated near the center of the OD Unit. Continuous lithologic samples were collected using a 2-foot split spoon sampler throughout the boring. The lithologic samples were visually logged and classified using the Unified Soil Classification System (USCS). The visual description and the USCS classification were used to construct the geologic boring log presented as Figure 2-2.

WESTON did not 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 (where appropriate) was peeled or scraped with a clean stainless-steel knife to remove the outer layer in contact with the sampler and placed in the sample containers. Many of the selected intervals consisted of gravel and rock debris and peeling was not possible. The sample containers were then 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, a mixture of bentonite-cement grout was used to seal the borehole to the surface. The soil cuttings 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. 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 the ReCRA Labnet Chicago (ReCRA-formerly WESTON EMI) laboratory in University Park, Illinois for the required analyses.
- One of the extra sample volumes was sent to the ReCRA laboratory 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 sample).

GEOLOGIC DRILL LOG			SITE/SITE ID Ft Bliss OD Unit/Second CY97 Compliance Sampling		PAGE NO. 1 of 1	BORING NO. 036D
DATE STARTED 8/24/97	DATE FINISHED 8/24/97	DRILLER Tierra Drilling	DRILL METHOD Hollow Stem Auger	BOREHOLE DIAMETER(in) 7	TOTAL DEPTH(ft) 46.00	
GEOLOGIST Greg Braddy		GROUND ELEVATION (ft. MSL) 4299.00		COORDINATES (ft)		

DEPTH	SAMPLE INTERVAL	RECOVERY (%)	SAMPLE TYPE	SAMPLE ID	TIME SAMPLE COLLECTED	DVA	USCS	GRAPHIC LOG	VISUAL DESCRIPTION	DEPTH
				036 A 51 1	N/A	N/A	SG		Gravelly Sand: pale brown, silty, dry, gravel at 0.25-inch to 0.5-inch diameter, loose, poorly graded	
5	80			036 A 51 2					same as above, driving split spoons, up to 50 blows	5
10	70			036 A 51 3			GP		Gravel and Sand: silty, cobbles of sandstone larger than 1.0 inch diameter, dry, loose, poorly sorted and graded.	10
15	90			036 A 51 4			SM		Silty Sand: brown, fine grained, loose, well sorted, some grading at 15.5 to 16', damp at 15.5', occasional pebbles.	15
20	50			036 A 51 5			GM		Sandy Silty Gravel: loose, poorly sorted and graded, pebbles smaller than 0.25-inch in diameter, damp	20
25	50			036 A 51 6					same as above, cobbles becoming larger and over 1-inch in diameter, some clayey zones particularly around cobbles at 25'	25
30	60			036 A 51 7					same as above	30
35	70			036 A 51 8					with some sandy silt zones approximately 4-inches thick, zones damp and firm	35
40	80			036 A 51 9					same as above	40
45	80			036 A 51 0					same as above	45
Total Depth = 46'										

A = ANALYTICAL SAMPLE
 C = COMPOSITE SAMPLE
 G = GEOTECHNICAL SAMPLE
 L = LITHOLOGIC SAMPLE ONLY
 R = ARCHIVED SAMPLE



PAGE NO. 1 of 1	BORING NO. 036D
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WESTON
MANAGERS DESIGNERS/CONSULTANTS

FIGURE 2-2
U.S. ARMY CORPS OF ENGINEERS
FORT BLISS
GEOLOGIC DRILL LOG
FORT BLISS, TEXAS

DATE MAY 97	PROJECT NO. 03886121003	SCALE NONE
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- 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 ReCRA.

Since visual observations 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.

2.2.4 Decontamination Procedures

Decontamination activities were performed in the field at a location approved by Fort Bliss personnel. Nondisposable sampling equipment was decontaminated before and between each use. Small nondisposable equipment (e.g., stainless-steel knives and split-barrel samplers) was scrubbed in a mixture of phosphate-free detergent (e.g., Liquinox) and potable water, then rinsed with potable water. Large nondisposable equipment (e.g., drill rods, drilling tools, and split-barrel samplers) was steam-cleaned with a pressure washer in a clean 55-gallon drum before use and after completion of the deep soil boring. 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 Permit application and subsequently contained in the Permit dictate the analytical approach for the semiannual compliance sampling events. 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. Prior to the Initial Unit Characterization, WESTON's Lionville Laboratory (now ReCRA) conducted a method detection limit (MDL) study for these two compounds that involved 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.

All of the collected soil samples were submitted for inorganic, metals, and explosives analyses. Selected soil samples were also submitted for polychlorinated biphenyls (PCBs) and dioxin/furans. 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.

Approximately 10 percent of the total number of sampling stations were sampled for PCBs and dioxin/furans. The sample stations selected for PCBs and dioxin/furans analysis included 026, 027, 028, 033, and 301. The sampling stations selected to further characterize the extent of

**TABLE 2-1
ANALYTICAL METHODS AND COLLECTED SAMPLES**

**OD UNIT COMPLIANCE SAMPLING
FORT BLISS, TX**

PARAMETER	ANALYTICAL METHODS¹	NUMBER OF COLLECTED SAMPLES²
METALS		
Antimony	SW846 6010A	69 - Soil
Arsenic	SW846 7060	
Barium	SW846 6010A	
Cadmium	SW846 6010A	
Chromium	SW846 6010A	
Copper	SW846 6010A	
Iron	SW846 6010A	
Lead	SW846 6010A	
Mercury	SW846 7471	
Potassium	SW846 6010A	
Selenium	SW846 7740	
Silver	SW846 6010A	
Strontium	SW846 6010A	
Zinc	SW846 6010A	
INORGANICS		
Free Liquids (paint filter)	SW846 9095	69 - Soil
Ignitibility	SW846 1010	
pH	SW846 9045C	
Nitrate-Nitrite (as N)	EPA 353.2	
ORGANICS (EXPLOSIVES)		
Picric Acid	SW846 8330 ³	69 - Soil
HMX	SW846 8330	
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	8 - Soil
Dioxins/Furans	SW846 8280	14 - 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 QC samples.

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

dioxins/furans were selected based on historic sampling results; typically those which exhibited high total explosive concentrations. PCB analyses were performed in accordance with EPA SW846 Method 8081, and dioxins/furans analyses were performed in accordance with EPA SW846 Method 8280.

2.4 SAMPLE HANDLING AND MANAGEMENT

As previously stated, samples for chemical analyses were placed in clean sample containers and labeled with information including the date and time of collection, sample identification, and required analysis. Sample nomenclature followed the guidelines listed in Subsection B2.2.5 of the approved Work Plan (WESTON, 1995). The sample containers were then individually bagged, sealed, and placed in a cooler full of ice and packing material. The coolers were then sealed and delivered to Federal Express for overnight shipment to the appropriate laboratories. One cooler containing three samples did not receive an outer chain-of-custody (COC) seal as indicated by the COC Form (batch 9708G586) in Appendix A. Upon review of the results, no explosive constituents were reported above the laboratory detection limit in any of the associated samples. As such, the sampling integrity does not appear to have been compromised and the results have not been qualified or rejected. Proper 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

Decontamination fluid generated during the sampling event (approximately 20 gallons) was used in the grout mixture for sealing the deep soil boring. Soil cuttings derived from completion of the deep soil boring were contained in two DOT-approved 55-gallon drums that were temporarily staged inside the OD Unit. An investigation-derived waste (IDW) tracking form for the drums is included in Appendix B. Once filled, the drums were sealed and labeled as "Unclassified Waste" by WESTON personnel. Disposable sampling equipment and used gloves were placed in garbage bags and disposed of in an appropriate solid waste container on Post. The sampling results from the collected samples will be used to evaluate disposal options for the soil cuttings. The historical practice has been to dispose of the soil cuttings inside the OD Unit because of the lack of site-related constituents detected in the soil samples collected from the deep soil boring.

SECTION 3 NATURE AND EXTENT OF CONTAMINATION

A brief summary of the nature and extent of site-related constituents, based on the results of the Second CY 1997 Compliance Sampling Event at the OD 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 Second CY 1997 Compliance Sampling Results Report, WESTON submitted one copy of the complete raw analytical data (grouped by laboratory batch numbers) for the samples collected at the OD Unit to USACE for comparison to their QA samples. Data validation, including a Quality Assurance Comparability Evaluation performed by the USACE, has been performed on the analytical data, and a narrative with summary (exception) reports are provided in Appendix C. A copy of the USACE Quality Assurance Comparability Report is provided in Appendix E. Each data validation report has an assigned laboratory batch number that corresponds to the raw analytical data batch number. Raw data summary tables are provided in Appendix D.

To assist in data management and production of the summary tables contained in Appendix D, the designation "A" has been added to the sample station numbers to represent stations that changed locations between the initial characterization and First 1996 Compliance Sampling Event, "B" representing stations that changed twice between the initial characterization and second 1996 Compliance Sampling Event, "C" representing stations that changed three times between events, and "D" representing those that have changed between all events.

3.1 EVALUATION METHODS

The analytical results were evaluated by comparison to established background values that were calculated from background soil samples. It should be noted that two of the three background sample stations (034 and 035) have not changed during the five sampling events. For the initial characterization, sample station 033 was located approximately 700 feet east of the OD Unit. For all of the compliance sampling events, sample station 033 has been approximately 700 feet west of the OD Unit. From the five sampling events, a total of 15 different and discrete background samples have been collected and used to calculate new background values. The new background values did not change from the last compliance sampling event (February 1997) and have been used to evaluate the sample results from this sampling event. The outcome of the results evaluation are similar even when the background samples for a given sampling event are used.

The organic results (explosives, PCBs, dioxins/furans) were compared directly to the laboratory detection limits because reportable concentrations were not detected in any of the background samples. As such, the laboratory detection limit is the background value. Shaded entries in the summary tables (Appendix D) indicate concentrations at or greater than the laboratory detection limit.

Metals and nitrate-nitrite results were compared to three times the maximum background concentration of each associated constituent. In addition, published ranges of naturally occurring metal concentrations 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 (Table D10). Shaded entries in the summary tables indicate concentrations equal to or above the established background values.

3.2 ORGANIC RESULTS

Explosive compounds were detected at 10 sample stations during the Second CY97 Compliance Sampling Event. Nitroglycerin was the most frequently detected compound with concentrations ranging from 1.2 mg/kg to 63 mg/kg (station 004). The compound 2,4-dinitrotoluene was reported at stations 028 (0.54 mg/kg), 030 (0.82 mg/kg), and 032 (1.5 mg/kg) while 2,4,6-trinitrotoluene was reported only in the sample collected from station 009 at a concentration of 64 mg/kg. HMX and RDX were reported in samples from 009 and 028. The sample stations that contained reported concentrations of explosive compounds are summarized in Table 3-1 and shown on Figure 3-1.

Explosive compounds were not detected in any samples collected from the deep soil boring. The sample results from the deep soil boring suggest that vertical or downward migration of explosive compounds has not occurred.

Nitrate-nitrite concentrations ranged from 9.6 mg/kg (308) to 9,040 mg/kg (032). Soil samples collected from the deep soil boring contained nitrate-nitrite concentrations ranging from below the reporting limit (30-35 feet) to 2.8 mg/kg (10 feet). The maximum reported nitrate-nitrite concentration for the 15 background samples collected during the previous compliance sampling events was 2.5 mg/kg (station 035—First Compliance Sampling Event, April 1996). Sample stations that contained concentrations of nitrate-nitrite exceeding three times this background concentration (7.5 mg/kg) are included in Table 3-1 and shown in Figure 3-2.

Reportable concentrations of PCBs and dioxin/furans were not reported in any of the soil samples collected from the OD Unit.

3.3 INORGANIC RESULTS

Metals were detected in the surface and near-surface soil samples at concentrations exceeding the established background values. A summary table containing the metals results and associated sample stations is contained in Table 3-2. The range of concentrations reported in the soil samples for this sampling event, three times the maximum background value, and published ranges for naturally occurring concentrations for each metal are shown below:

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

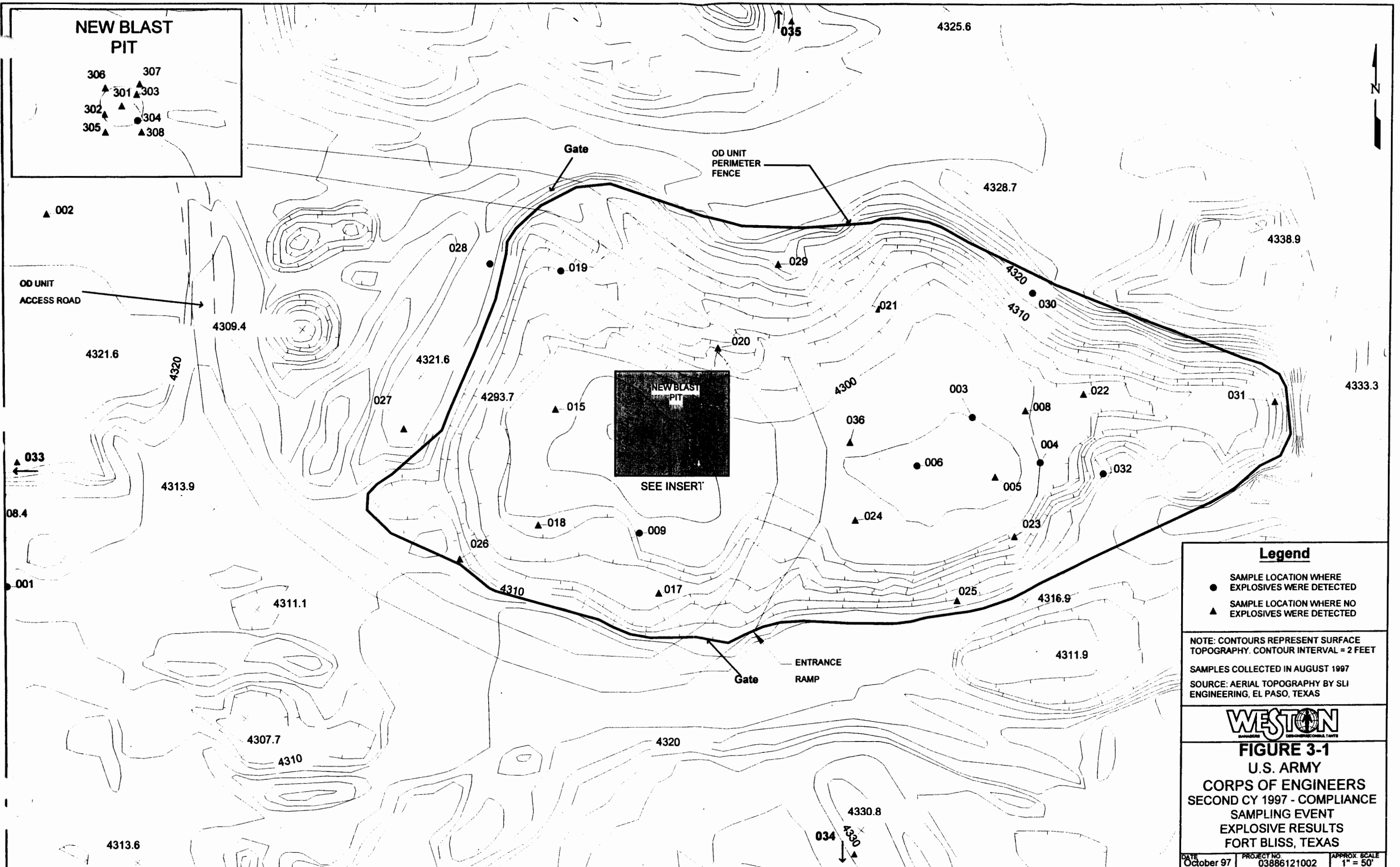
Second CY 1997 Compliance Sampling Event
Fort Bliss, Texas

Sample Station	Analyte Detected and Concentration (mg/kg)					
	2,4 Dinitrotoluene	2,4,6 Trinitrotoluene	Nitroglycerin	HMX	RDX	Nitrate-Nitrite*
001A-51-1	ND	ND	12	ND	ND	4380
003A-51-1	ND	ND	2.6	ND	ND	2.1
004A-51-1	ND	ND	63	ND	ND	<1
005A-51-1	ND	ND	ND	ND	ND	11.5
009A-51-1	ND	64	ND	17	140	57
015-51-1	ND	ND	ND	ND	ND	32.2
017-51-1	ND	ND	ND	ND	ND	27.7
018A-51-2	ND	ND	ND	ND	ND	74.6
019A-51-2	ND	ND	2.9	ND	ND	2.4
024-51-1	ND	ND	ND	ND	ND	14.7
028-51-1	0.54	ND	20	ND	ND	1
028-51-2	ND	ND	4.1	4.6	43	<1.9
029-51-2	ND	ND	ND	ND	ND	31.3
030-51-2	0.82	ND	35	ND	ND	2.4
032A-51-2	1.5	ND	ND	ND	ND	9040
304-51-1	ND	ND	2.9	ND	ND	4.1
307-51-1	ND	ND	ND	ND	ND	53.9
308-51-1	ND	ND	ND	ND	ND	9.6

* The established background value for nitrate-nitrite is 7.5 mg/kg. Nitrate-nitrite results exceeding 7.5 mg/kg are shaded.

ND = Not detected above the laboratory detection limit.

J = Result qualified estimated by validator.



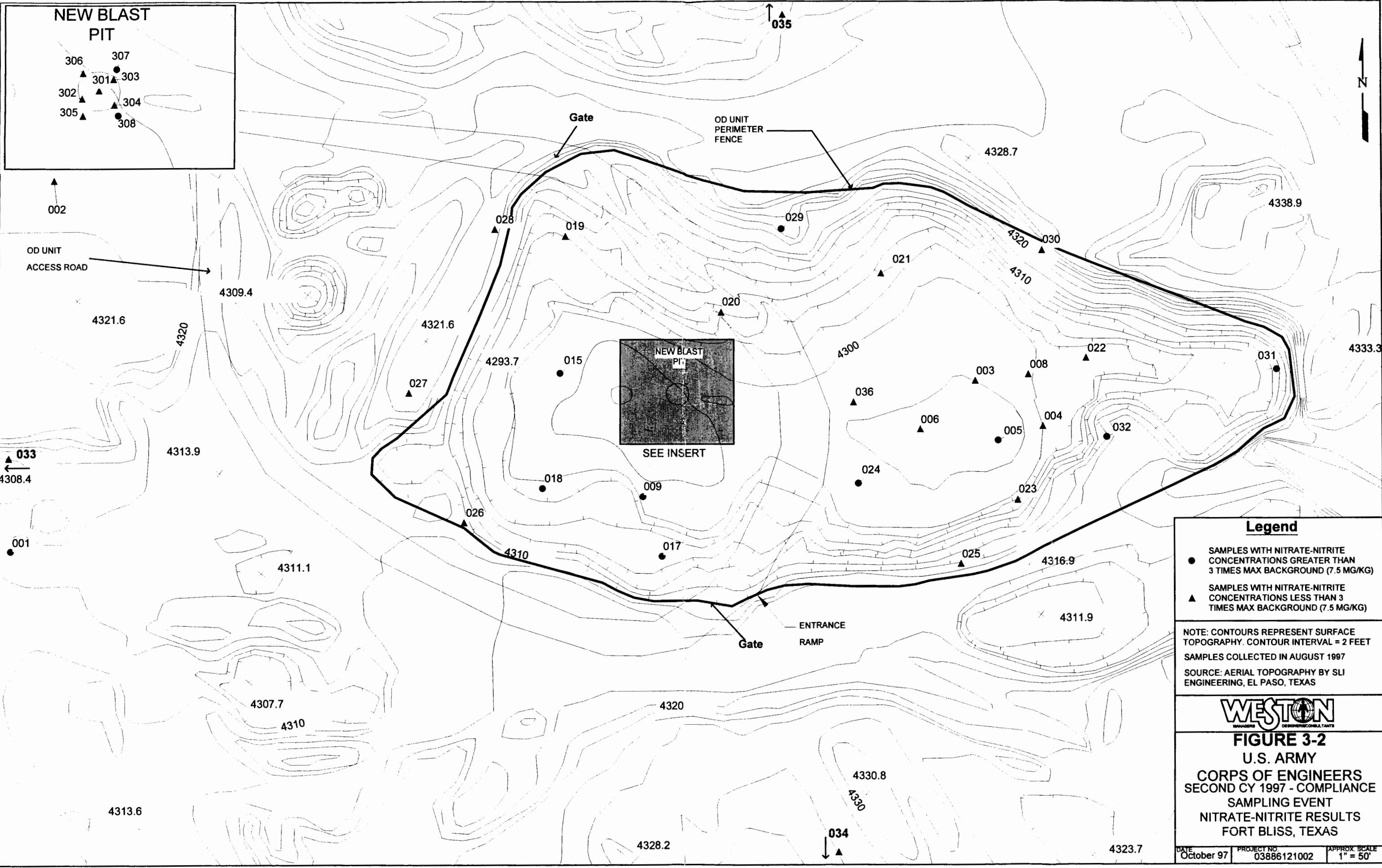
- Legend**
- SAMPLE LOCATION WHERE EXPLOSIVES WERE DETECTED
 - ▲ SAMPLE LOCATION WHERE NO EXPLOSIVES WERE DETECTED

NOTE: CONTOURS REPRESENT SURFACE TOPOGRAPHY. CONTOUR INTERVAL = 2 FEET
 SAMPLES COLLECTED IN AUGUST 1997
 SOURCE: AERIAL TOPOGRAPHY BY SLI ENGINEERING, EL PASO, TEXAS

WESTON
 MANAGERS DESIGNERS CONSULTANTS

FIGURE 3-1
 U.S. ARMY
 CORPS OF ENGINEERS
 SECOND CY 1997 - COMPLIANCE
 SAMPLING EVENT
 EXPLOSIVE RESULTS
 FORT BLISS, TEXAS

DATE: October 97 PROJECT NO: 03886121002 APPROX. SCALE: 1" = 50'



Legend

- SAMPLES WITH NITRATE-NITRITE CONCENTRATIONS GREATER THAN 3 TIMES MAX BACKGROUND (7.5 MG/KG)
- ▲ SAMPLES WITH NITRATE-NITRITE CONCENTRATIONS LESS THAN 3 TIMES MAX BACKGROUND (7.5 MG/KG)

NOTE: CONTOURS REPRESENT SURFACE TOPOGRAPHY. CONTOUR INTERVAL = 2 FEET
 SAMPLES COLLECTED IN AUGUST 1997
 SOURCE: AERIAL TOPOGRAPHY BY SLI ENGINEERING, EL PASO, TEXAS

WESTON
 MANAGING ENGINEERS/CONSULTANTS

FIGURE 3-2
 U.S. ARMY
 CORPS OF ENGINEERS
 SECOND CY 1997 - COMPLIANCE
 SAMPLING EVENT
 NITRATE-NITRITE RESULTS
 FORT BLISS, TEXAS

DATE October 97	PROJECT NO. 03886121002	APPROX. SCALE 1" = 50'
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