

FB 2002



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

ENTERED

May 20, 2002

REPLY TO
ATTENTION:CF

Directorate of Environment



Mr. Glenn von Gonten
Hazardous Waste Bureau
New Mexico Environment Department
P. O. Box 26110
Santa Fe, New Mexico 87502

**RE: 2001 Compliance Sampling Results Report for McGregor Range Open Detonation Unit
Permit No. NM 4213720101-01, 8 June 1995**

Dear Mr. von Gonten:

When I sent you the Compliance Sampling Report referenced above, I neglected to enclose the Fort Bliss Commanding General's Delegation of Authority and the Certification Statement signed by the Director or Acting Director of Environment. The delegation and certification documents are enclosed. If you have any questions, please do not hesitate to call me at 915 568-6077.

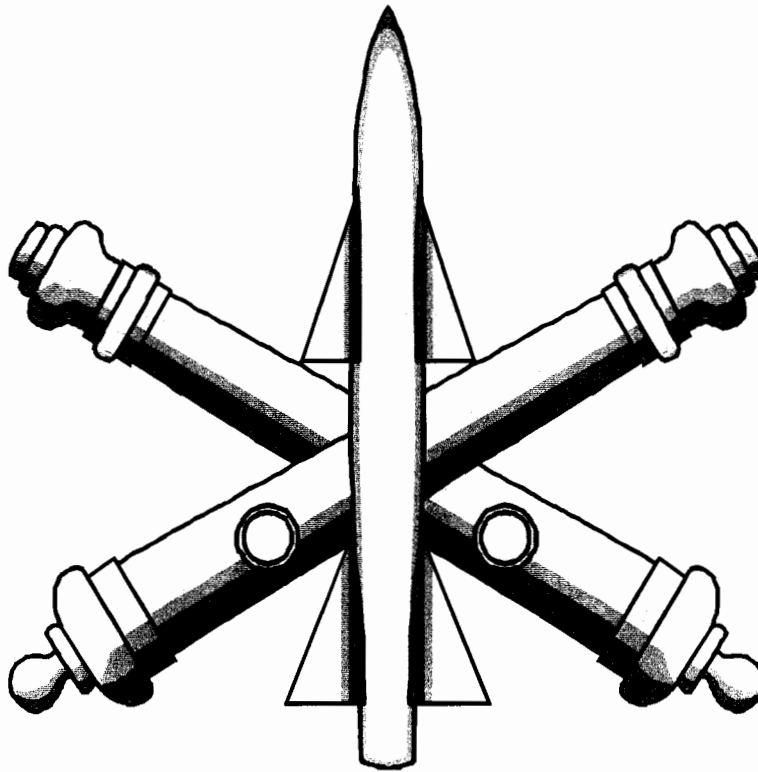
Sincerely,

Patricia McKernan
Hazardous Waste Program

Enclosure

Final

**2001 COMPLIANCE SAMPLING
RESULTS REPORT
FOR
MCGREGOR RANGE
OPEN DETONATION (OD) UNIT**



**FORT BLISS
OTERO COUNTY, NEW MEXICO**

MARCH 2002

**2001 COMPLIANCE SAMPLING RESULTS REPORT
MCGREGOR RANGE OD TREATMENT UNIT
FORT BLISS, NEW MEXICO**

TABLE OF CONTENTS

SECTION	TITLE	PAGE
1	INTRODUCTION.....	1-1
1.1	OBJECTIVE OF COMPLIANCE SAMPLING.....	1-1
1.2	SITE BACKGROUND AND DESCRIPTION.....	1-1
1.3	REPORT FORMAT.....	1-3
2	COMPLIANCE SAMPLING ACTIVITIES.....	2-1
2.1	SOIL SAMPLE LOCATIONS.....	2-1
2.2	SAMPLING PROCEDURES.....	2-2
	2.2.1 Surface and Near-Surface Soil Samples.....	2-2
	2.2.2 Quality Assurance/Quality Control Samples.....	2-2
	2.2.3 Waste Management.....	2-3
2.3	ANALYTICAL APPROACH.....	2-3
2.4	SAMPLE HANDLING AND MANAGEMENT.....	2-3
3	SUMMARY OF RESULTS.....	3-1
3.1	EVALUATION METHODS.....	3-1
3.2	DATA VALIDATION.....	3-1
3.3	ORGANIC RESULTS.....	3-2
3.4	INORGANIC RESULTS.....	3-2
3.5	QUALITY ASSURANCE/QUALITY CONTROL SAMPLES.....	3-3
3.6	COMPARISON OF DATA.....	3-3
	3.6.1 Organics.....	3-4
	3.6.2 Metals.....	3-5
4	CONCLUSIONS AND RECOMMENDATIONS.....	4-1
4.1	CONCLUSIONS.....	4-1
4.2	RECOMMENDATIONS.....	4-2
5	REFERENCES.....	5-1

**2001 COMPLIANCE SAMPLING RESULTS REPORT
MCGREGOR RANGE OD TREATMENT UNIT
FORT BLISS, NEW MEXICO**

LIST OF APPENDICES

APPENDIX TITLE

- A Chain-of-Custody Forms and Federal Express Airbill Receipts
- B Data Validation Narrative and Exception Reports
- C Analytical Data Summary Tables

**2001 COMPLIANCE SAMPLING RESULTS REPORT
MCGREGOR RANGE OD TREATMENT UNIT
FORT BLISS, NEW MEXICO**

LIST OF FIGURES

FIGURE	TITLE
1-1	OD Unit Location Map
1-2	Compliance Sampling Site Plan
2-1	2001 Compliance Sampling Event Sample Station Map
3-1	2001 Compliance Sampling Event Explosives Results
3-2	2001 Compliance Sampling Event Nitrate-Nitrite Results

LIST OF TABLES

TABLE	TITLE
2-1	Analytical Methods and Collected Samples
3-1	Comparison of Explosives Results
3-2	Summary of Metals Detections Metals
3-3	Comparison of Metals Results

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, 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) to perform initial characterization and compliance sampling at the OD Unit according to the requirements of the aforementioned Permit. The 2001 Compliance Sampling Event was authorized by USACE Contract DACA56-01-D-2002, Task Order 01.

This document represents the 2001 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 8 December 2000 (USACE, 2000). An initial OD Unit characterization was conducted in August 1995, and regular compliance monitoring has occurred to date.

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 25 and 26 September 2001. 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 compliance sampling results are compared to historical sampling results to determine if changes in the presence, magnitude, or location of site-related contaminants have occurred as a result of continued treatment activities at the Unit.

1.2 SITE BACKGROUND AND DESCRIPTION

The OD Unit is located in the northern portion of the Fort Bliss Military Reservation within the McGregor Firing Range (FAW-10). The location is approximately 7 miles east of the McGregor Range Camp within the impact area for ballistic aerial targets, large-caliber munitions, and guided rockets. There are no structures within approximately 4 miles of the OD Unit. Operations at the OD Unit are only conducted when McGregor Range is inactive. A location map for the OD Unit is provided as Figure 1-1.

The U.S. Army Air Defense Artillery Center currently operates an Explosive Ordnance Detachment (EOD) that performs work at the OD Unit. This OD Unit has been in operation since 1965. The 741st EOD conducts explosives demolition (generally small) at the OD Unit approximately 1 to 2 times per 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 until the Operational Permit was granted and issued in 1995. The Unit is now operated and

utilized according to the requirements specified in the Part B Permit and subsequent modifications. 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 the Unit.

The OD Unit is a manmade excavation and the dimensions are approximately 500-feet by 200-feet by 30-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 storm water diversion and control system was constructed to prevent storm water from entering the Unit. A site plan of the OD Unit is presented as 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 organic compound analyses. Results of the initial characterization revealed the presence of explosives, metals, and nitrate, particularly in the western portion and along the western perimeter of the OD Unit. Once the initial characterization of the OD Unit was completed, semiannual compliance sampling was performed during 1996 and 1997 as required by the Permit. The results of the compliance sampling were compared to those of the initial characterization to evaluate changes in conditions.

A Permit modification was issued by NMED on 22 July 1998 in response to Fort Bliss' petition to reevaluate the compliance monitoring requirements. The Permit modification, the third issued by NMED, was based on results from 2 years of compliance monitoring. Highlights of the 1998 Permit modification include reducing compliance monitoring to annual from semiannual, elimination of the deep soil boring, elimination of several sampling locations (those specifically related to blast pits) in the eastern portion of the Unit where OD activities do not occur, and elimination of some sampling parameters (pH, free liquids, ignitability, and polychlorinated biphenyls) from the monitoring program. The revised compliance monitoring requirements were implemented during the 1999, 2000, and 2001 Compliance Monitoring Events. 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
- 1998 Compliance Sampling Event—September 1998
- 1999 Compliance Sampling Event—August 1999
- 2000 Compliance Sampling Event—July 2000
- 2001 Compliance Sampling Event—September 2001

In December 2000, Fort Bliss petitioned for and received a fourth permit modification to allow receipt and demolition of waste military munitions from White Sands Missile Range (WSMR). As of the compliance sampling event (September 2001), no munitions from WSMR had been treated at the McGregor Range OD Unit.

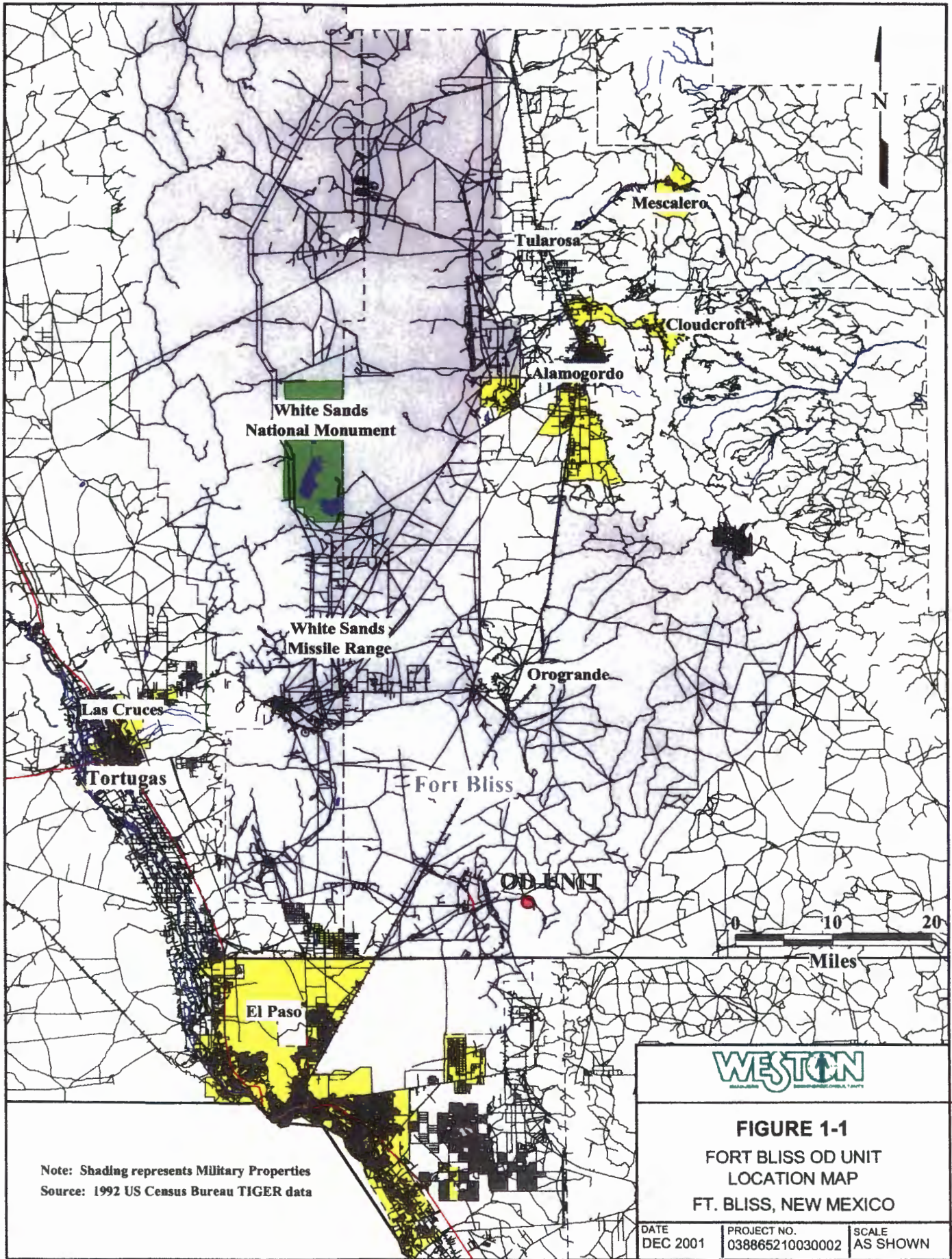
1.3 REPORT FORMAT

The remainder of the 2001 Compliance Sampling Results Report has been organized as follows:

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

Appendices to this Compliance Report include the following:

- Appendix A—Chain-of-Custody Forms and Federal Express Airbill Receipts
- Appendix B—Data Validation Narrative and Exception Reports
- Appendix C—Analytical Data Summary Tables
- Appendix D—USACE Comparability Report



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

WESTON
AN IRVING-CLOUD COMPANY

FIGURE 1-1
FORT BLISS OD UNIT
LOCATION MAP
FT. BLISS, NEW MEXICO

DATE DEC 2001	PROJECT NO. 038865210030002	SCALE AS SHOWN
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DATE: NOV 01
 PROJECT NO: 038865210030002
 APPROX SCALE: 1" = 60'
FIGURE 1-2
 U.S. ARMY
 CORPS OF ENGINEERS
 COMPLIANCE SAMPLING
 SITE PLAN
 FORT BLISS, NEW MEXICO

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



SECTION 2 COMPLIANCE SAMPLING ACTIVITIES

The OD Unit compliance typically includes inspecting the condition of the OD Unit and associated features, collecting surface and near-surface soil samples in and around the OD Unit, and conducting minor repair and improvements as necessary. All of these activities were completed during the 2001 Compliance Sampling Event. The 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 the Letter of Understanding for the 2001 Compliance Sampling Event (WESTON, 2001). The sampling activities are described in the following subsections. The overall sampling strategy was specified in the Permit (and associated Modifications) 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 21 previously established stations in and around the OD Unit as shown in Figure 2-1. In addition to the 21 samples from existing sampling stations, 8 soil samples were collected from the new blast pit (Figure 2-1). The stations have not been surveyed, 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). Wooden stakes identifying historical sampling locations were used for locating sample stations in the field. This approach allows for comparison of results over time to evaluate changes in the presence and concentration of identified constituents of concern at the Unit.

According to EOD personnel, the OD pit was last used on 21 and 28 August 2001. One new blast pit was present in the eastern portion of the Unit as shown in Figure 2-1. The pit was roughly circular, measuring approximately 10 feet in diameter and 3 feet deep. Sampling stations 700 through 707 were established to investigate the new blast pit. The selection of the sampling stations associated with the new blast pit were consistent with the RCRA Part B Permit.

With a few exceptions noted below, the sample stations utilized during the 2001 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:

- Eight discrete surface soil samples were collected from the new blast pit (top, sides, and bottom). This pit was sampled as originally specified in the Permit and Work Plan, and the sample stations were designated as 700 through 707.
- Eight discrete random surface and near-surface soil samples (16 total) were collected from the interior of the OD Unit (stations 017, 018, 019, 020, 021, 022, 023, and 024).
- Eight discrete random surface and near-surface soil samples (16 total) were collected from the OD Unit perimeter (stations 025, 026, 027, 028, 029, 030, 031, and 032).
- Two discrete surface soil samples (stations 001 and 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 outer perimeter (formerly referred to as background) surface soil samples (stations 033, 034, and 035) were collected at previously established locations approximately 700 feet from the center of the OD Unit excavation as specified by the Permit.

2.2 SAMPLING PROCEDURES

2.2.1 Surface and Near-Surface Soil Samples

The Fort Bliss 741st EOD provided UXO clearance and support prior to the sampling activities. The last OD event was reportedly conducted in late August 2001, and the EOD personnel cleared the Unit prior to sampling. Soil from each of the surface and near-surface sample stations was 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 collection, the sample containers were sealed and labeled with the sample identification number, date, time, and required analyses. The sample containers were then placed in plastic zip bags on ice in a cooler. The analytical approach for the soil samples is discussed below in Subsection 2.3.

2.2.2 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 three of the sample locations (stations 017, 027, and 707), three times the normal sample volume was collected as separate samples for QA/QC purposes. One aliquot represented the normal compliance sample for the particular station. One aliquot was sent as a

blind QC duplicate along with the normal sample to the laboratory. The third aliquot was sent as a QA sample to a USACE contracted laboratory. The USACE QA samples were submitted to the following two laboratories:

Applied Physics & Chemistry Lab
13760 Magnolia Ave.
Chino, CA 91710

and

Environmental Testing & Consulting
2924 Walnut Grove Road
Nashville, TN 38111

Since visual contamination was not identified at any of the sample stations, stations historically reported with detectable levels of explosives were selected for QA/QC sampling. The QC samples were collected at a rate of approximately one per twenty (20) normal samples, and soil for the QA/QC samples consisted of replicate splits representing the sampled interval.

2.2.3 Waste Management

All excavated soil was used to backfill depressions from the shovel, and all soil samples were collected with disposable plastic scoops. As such, no soil related wastes were generated during the sampling activities. Used personal protective equipment (gloves) and disposable sampling equipment were bagged and disposed in one of the solid waste dumpsters ^{at} McGregor Camp.

2.3 ANALYTICAL APPROACH

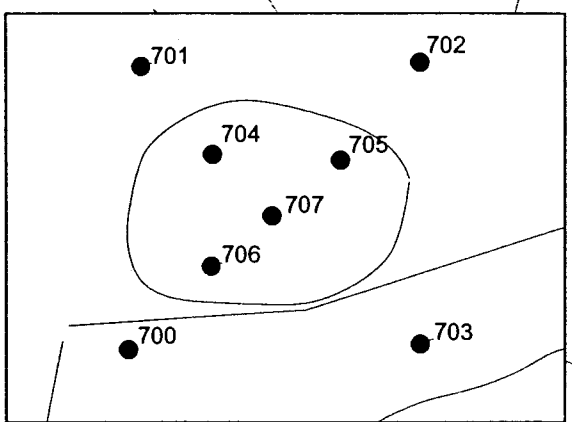
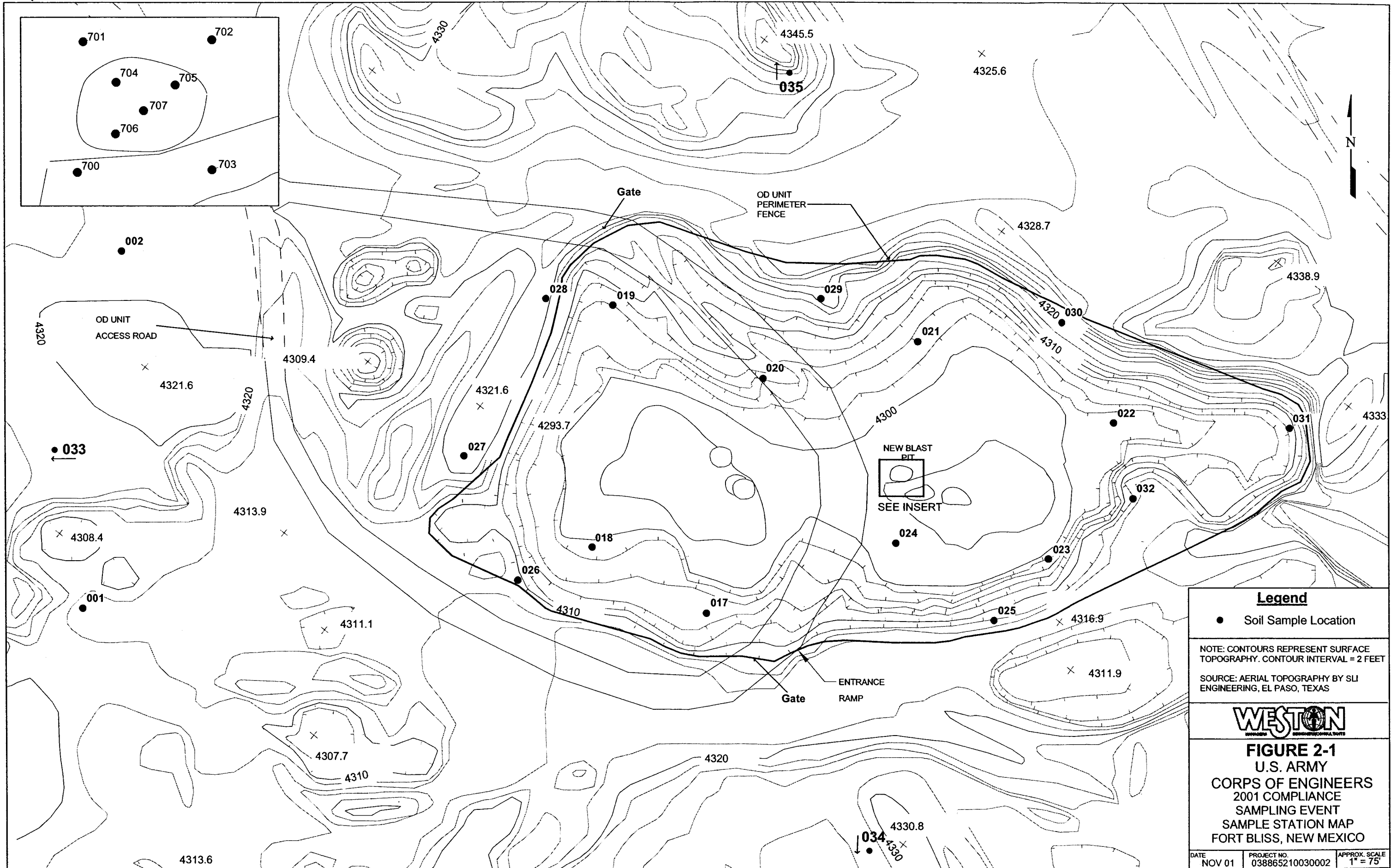
The available data and information used to prepare the Permit application and subsequently contained in the Permit and Permit Modifications dictate the analytical approach utilized for the compliance sampling events. The 1998 Permit Modification also specified the analytical requirements for monitoring. The specified analyses and the associated analytical methods are summarized in Table 2-1. The duplicate (QC) and QA (USACE) samples were submitted requesting the same analyses as the normal samples.

All of the collected soil samples were submitted for inorganic, metals, and explosives analyses. A total of 3 samples were sampled and submitted for dioxin/furans analysis. The sample stations selected for dioxin/furans analysis included 001 and 017. The sampling stations selected to further characterize the extent of dioxins/furans were selected based on historic sampling results; typically those which exhibited high total explosive concentrations. Dioxin/furan analyses were performed in accordance with EPA SW846 Method 8280A.

2.4 SAMPLE HANDLING AND MANAGEMENT

The selected soil material was placed in clean sample containers and labeled with information including the date and time of collection, sample identification, and required analyses. 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. Proper chain-of-custody procedures were implemented for all collected samples, and the appropriate documentation accompanied each sample shipment. Copies of the COC forms and Federal Express airbill receipts for each shipment are included in Appendix A.



Legend

- Soil Sample Location

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

WESTON
ENGINEERING CONSULTANTS

FIGURE 2-1
 U.S. ARMY
 CORPS OF ENGINEERS
 2001 COMPLIANCE
 SAMPLING EVENT
 SAMPLE STATION MAP
 FORT BLISS, NEW MEXICO

DATE NOV 01	PROJECT NO. 038865210030002	APPROX. SCALE 1" = 75'
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**TABLE 2-1
ANALYTICAL METHODS AND COLLECTED SAMPLES**

**2001 OD UNIT COMPLIANCE SAMPLING
FORT BLISS, NEW MEXICO**

PARAMETER	ANALYTICAL METHODS ¹	NUMBER OF COLLECTED SAMPLES ²
INORGANICS		
Antimony	SW846 6010B	48 – Soil
Arsenic	SW846 6010B	
Barium	SW846 6010B	
Cadmium	SW846 6010B	
Chromium	SW846 6010B	
Copper	SW846 6010B	
Iron	SW846 6010B	
Lead	SW846 6010B	
Mercury	SW846 7471A	
Potassium	SW846 6010B	
Selenium	SW846 6010B	
Silver	SW846 6010B	
Strontium	SW846 6010B	
Zinc	SW846 6010B	
Nitrate-Nitrite (as Nitrogen)	EPA 600 Method 300.0	
ORGANICS		
Picric Acid	SW846 8330	48 – Soil
HMX	SW846 8330	
RDX	SW846 8330	
Nitroglycerin	SW846 8330	
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	
Dioxins/Furans	SW846 8280A	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 QC samples.

SECTION 3 SUMMARY OF RESULTS

A summary of the results of the 2001 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). A discussion of evaluation methods, data validation, analytical results, and comparisons to previous sampling events is provided in this section. Data validation reports and analytical data summary tables are provided in Appendices B and C, respectively.

3.1 EVALUATION METHODS

The inorganic (metals and nitrate-nitrite) results from the 2001 Compliance Sampling Event were compared to background values that were previously established for the OD Unit. The background values were established using three times the maximum reported value from three background locations. The metals results were also compared to the recently promulgated Soil Screening Levels (SSLs) established by NMED (NMED, 2000) to evaluate significance and overall human health risk. Shaded entries in the summary tables indicate concentrations equal to or above the established background values.

The organic results (explosives and dioxins/furans) were compared directly to the laboratory detection limits because reportable concentrations of these constituents were not detected in any of the background samples during previous events. As such, the laboratory detection limit (or practical quantitation limit-PQL) is the background value. Shaded entries in the summary tables indicate concentrations at or greater than the laboratory detection limit.

3.2 DATA VALIDATION

Each of the two sample batches was validated before use in evaluating the conditions at the OD Unit. A data validation narrative is provided in Appendix B, and data qualification has been applied to the results where appropriate. In general, the data are useful for their intended purpose. The only significant finding of the validation is the MS/MSD recoveries for several of the metals being outside of the prescribed control limits. This is a recurring analytical difficulty due to elevated concentrations of metals in the soils from the site.

In summary, the MS/MSD recoveries for iron, potassium, and strontium in all batches were outside the control limits due to high concentrations of these analytes in the spiked matrix. The MS/MSD recoveries for antimony yielded zero percent for all batches. In addition, MS and/or MSD recoveries for arsenic, cadmium, lead, and zinc were lower than the lower control limits. Because of the MS/MSD issues, the associated metals results have been qualified as estimated.

A comparability evaluation performed by USACE between the QA and QC samples is currently being completed as an independent analysis of the overall laboratory results. The results will be

used to further evaluate the validity and usability of the analytical data, and a copy of the evaluation will be included in the final report.

3.3 ORGANIC RESULTS

Explosive compounds were detected at sixteen sample stations during the 2001 Compliance Sampling Event. The constituent, 2,4-Dinitrotoluene (2,4-DNT), was the most frequently detected compound (at ten stations) with concentrations ranging from 0.0296 milligrams/kilogram (mg/kg, station 033) to 3.38 mg/kg (station 027). The compound HMX was reported at three stations ranging from 0.0764 mg/kg (station 017) to 0.403 mg/kg (station 023), and 2,4,6-trinitrotoluene (2,4,6 TNT) was reported at two stations (021 and 033) during the 2001 Compliance Sampling Event. Picric acid, 2,6-dinitrotoluene (2,6-DNT), and nitroglycerin were not reported in any of the samples collected during the 2001 Compliance Sampling Event. With the exception of two locations (001 and 033), explosives were not reported in samples collected from stations outside of the OD Unit (002, 034, and 035). These two locations are located west of the OD Unit. The sample stations that contained reported concentrations of explosive compounds are provided in Table 3-1 and shown on Figure 3-1. The entire explosives data set is provided in Appendix C, Table C-1.

Nitrate-nitrite concentrations ranged from 2.85 mg/kg (029) to 78.5 mg/kg (024). For comparison purposes, the NMED Residential Soil SSL is 98,000 mg/kg. Three soil samples collected from outside of the OD Unit (002, 027, and 035) exhibited nitrate-nitrite concentrations that exceeded the established background value of 7.5 mg/kg. All other instances of nitrates exceeding the established background value were at stations within the OD Unit or associated with the most recent blast pit. Sample stations reported with nitrate-nitrite exceeding background are shown in Figure 3-2, and the results are presented in Appendix C, Table C-2.

Dioxins/furans were not reported in any of the collected samples above the laboratory detection limit. Some individual constituents (isomers) were reported at estimated concentrations below the laboratory detection limit, and some of the totals for each isomer groups do exceed the reporting limits, but only slightly. The octa-substituted dioxin species (OCDD) was reported in 4 of the six collected samples (excluding duplicates), and these were the most commonly reported species in the samples. A summary of the dioxin/furan results is provided in Table C-3 in Appendix C).

3.4 INORGANIC RESULTS

Metals were detected in the surface and near-surface soil samples at concentrations exceeding the established background values. A summary table containing metals observed in historic sampling events and which are possibly related to ordnance is contained in Table 3-2, and a complete table of results is contained in Appendix C, Table C-4. A condensed summary of the range of concentrations of selected metals reported in the soil samples for this sampling event, the background values, and NMED Residential Soil SSLs are shown on the following page.

Element	Concentration Range In Soil Samples (mg/kg)	Background Value (mg/kg)	NMED Residential Soil SSLs (mg/kg)
Cadmium	0.17 – 3.79	1.38	70
Chromium	2.78 – 12.0	29.1	100,000
Copper	4.16 – 309	124.5	2,800
Lead	4.82 – 40.4	31.5	400
Mercury	<0.020 – 0.83	0.12	6.5
Silver	<0.5 – 2.97	<1.0	380
Zinc	16.2 – 136	103.2	23,000

Cadmium, copper, lead, mercury, silver, and zinc were detected in several surface and near-surface soil samples greater than the established background comparison values. The instances of elevated metals are associated with sample stations within or at the perimeter of the OD Unit excavation. With the exception of 027, elevated metals were not reported in the stations outside of the OD Unit.

3.5 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Three QC samples were collected and sent as blind duplicates to the laboratory. The following are field samples and their corresponding QC duplicates (as listed on the tables in Appendix C):

<u>Field Sample</u>	<u>QC Duplicate Sample</u>
017-51-1	017-52-1
027-51-1	027-52-1
707-51-1	707-52-1

All reportable normal organic and inorganic sample results compared favorably to the corresponding QC duplicate sample results.

Three QA samples were collected and sent to the designated USACE laboratory. USACE will compare WESTON's analytical results to its own QA sample results, and a comparability report detailing this comparison will be provided as a separate document.

3.6 COMPARISON OF DATA

The results of the Initial OD Unit Characterization, conducted in August 1995, serves as the general baseline from which the compliance sampling results and future sampling results have and will be compared. These baseline results are used to determine whether activities at the OD Unit contribute to buildup of contaminants in the surface and near surface soils that may require action. Because of the regrading activities that altered some of the sampling stations (particularly those associated with individual blast pits) prior to the First 1996 Compliance Sampling Event (April 1996), an assessment specific to these individual stations cannot be made. Rather, the assessment focus has shifted to changes in the overall conditions at the OD Unit.

Historical activity at the OD Unit has been limited with only one or two small treatment events occurring each quarter; six OD events were conducted in 2001. Based on the low activity, the amount of explosives treated at the Unit in years past has been significantly below the permitted limit of 2,500 pounds per quarter. Buildup or accumulation of the constituents of concern (explosives, nitrate, and metals) has not been observed. Summaries of the historical organic and metals results are provided below for reference.

3.6.1 Organics

Table 3-1 contains results from the initial investigation (August 1995) and eight compliance sampling events that have been performed to date. As shown in Table 3-1, the organic results are relatively similar throughout the compliance sampling events with a general reduction in detectable concentrations for all constituents. It is noted that many of the recent explosives detections are estimated values below the laboratory PQL.

The occurrence of 2,4-DNT during this sampling event was greater compared to historic sampling events. 2,4-DNT was reported at 9 sample stations, with three of these being associated with the most recent blast pit. Explosive compound 2,4,6-TNT was reported at detectable concentrations in two samples (021 and 033) collected as part of the 2001 Compliance event. This constituent has been reported only three other times during the compliance sampling activities. The constituents RDX and 2,6-DNT have only been reported in isolated samples over the monitoring history. The low detection of these constituents, as well as TNT, suggests that the activities at the OD Unit are not contributing to accumulation of at the Unit.

Nitroglycerin was not reported in any of the samples collected as part of the 2001 Compliance event. Historically, nitroglycerin has been reported most frequently of all organic constituents at the OD Unit. The presence of this compound has been generally limited to sample stations located in the bottom of the OD Unit and stations along the western perimeter. During the 1998 and 1999 sampling events, nitroglycerin was reported at higher than normal concentrations for sampling stations 024 and 028. Nitroglycerine was not reported in any of the collected samples during the past two compliance sampling events.

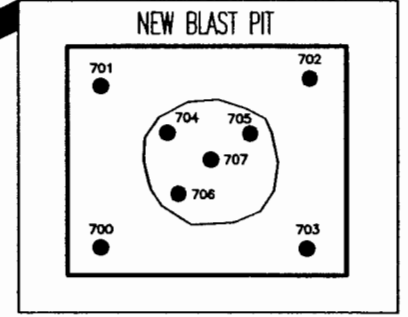
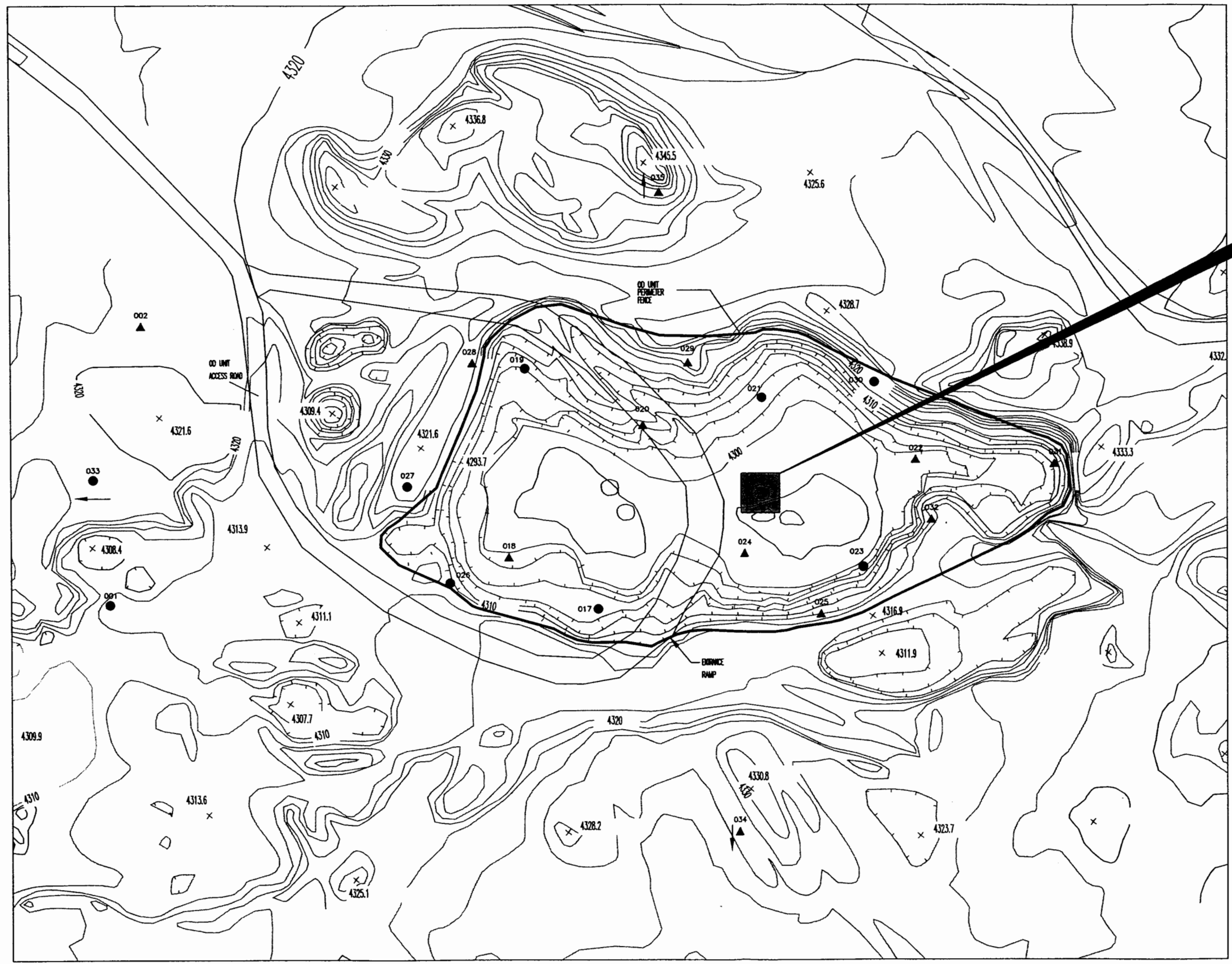
The occurrence of nitrate-nitrite is similar to that reported during previous sampling events. The maximum nitrate-nitrite concentration has ranged from 131 mg/kg during the Second 1996 Compliance Sampling Event to 343 mg/kg for the First 1996 Compliance Sampling Event. The highest concentration reported for the 2001 event was 78.5 mg/kg at station 024, which lies immediately adjacent to the most recent blast pit.

No dioxin/furan compounds were reported above the detection limit in samples collected during 2001 sampling activities. The samples collected as part of the 2001 Compliance Sampling Event were reported with occasional isomers at estimated concentrations below the laboratory PQL. This finding is slightly different from previous sampling events where some dioxin/furan compounds have been reported at some sample stations.

3.6.2 Metals

The metals results for both the Initial Unit Characterization and compliance sampling events are summarized on Table 3-3. This table includes the range of results from surface and near-surface soil samples. Several metals have been routinely reported in samples above the established background values. The metals (cadmium, copper, lead, mercury, silver, and zinc) are consistently reported with ranges of concentrations that are similar between sampling events.

The historical and recent data suggests that the metals results, particular copper, can be affected by debris (primers, casings, etc.) or elemental metals that may be present in the collected samples and subsequently analyzed. The subsurface soil samples have not shown the same random and elevated nature of the metals suggesting that vertical migration is not occurring and the above theory may account partly for the observed variability in results. None of the metals exceed the NMED SSLs, and buildup of metals in the soil at the OD Unit is not apparent.



LEGEND

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

SAMPLES COLLECTED IN SEPT 2001
 NOTE: CONTOURS REPRESENT SURFACE TOPOGRAPHY.
 CONTOUR INTERVAL = 2 FEET
 SOURCE: AERIAL TOPOGRAPHY BY SLI ENGINEERING, EL PASO, TEXAS

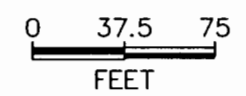
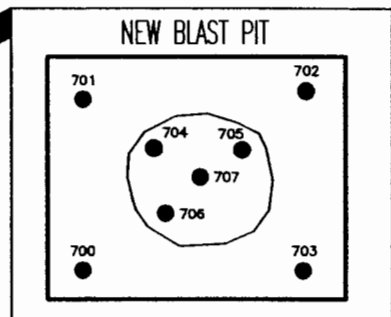
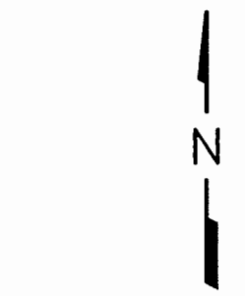
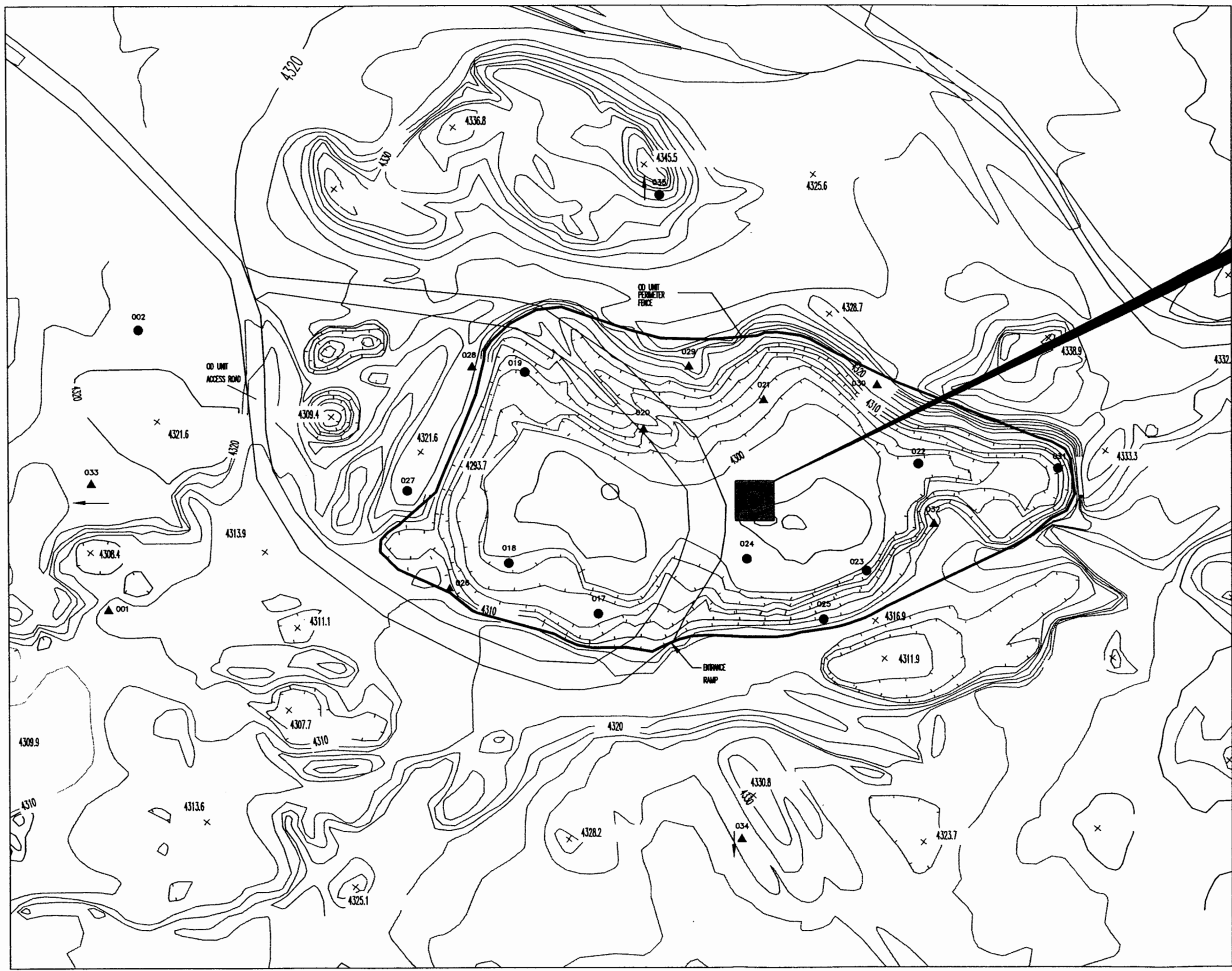


FIGURE 3-1
 U.S. ARMY
 CORPS OF ENGINEERS
 2001 COMPLIANCE SAMPLING EVENT
 EXPLOSIVE RESULTS
 FORT BLISS, NEW MEXICO

DATE NOVEMBER 2001	PROJECT NO. 03886.521.003.0002
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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)

SAMPLES COLLECTED IN SEPT. 2001

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

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

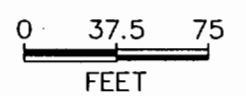


FIGURE 3-2
U.S. ARMY
CORPS OF ENGINEERS
2001 COMPLIANCE SAMPLING EVENT
NITRATE-NITRITE RESULTS
FORT BLISS, NEW MEXICO

DATE NOVEMBER 2001	PROJECT NO. 03886.521.003.0002
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