

1R - 298

REPORTS

DATE:

2001

PRELIMINARY SITE INVESTIGATION REPORT

**Lockhart B-12 Battery
Lea County, New Mexico**

Prepared For:

Conoco Inc.

ETGI Project # CON 2300S

Prepared By:
Environmental Technology Group, Inc.
2540 W. Marland
Hobbs, New Mexico 88240

March 2001


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APPENDIX A: Soil Boring Logs

1.0 INTRODUCTION

Environmental Technology Group, Inc. (ETGI) conducted a preliminary subsurface investigation of the referenced pit area and adjacent tank battery for Conoco Inc. (Conoco). The investigation was conducted in order to document the water table conditions in the subsurface.

The site is located in the SE1/4 of the NE1/4 of Section 14, Township 21 South, Range 37 East, in Lea County, New Mexico. The geographic location of the site is depicted on Figure 1, the Site Location Map. A pit area, tank battery and adjacent pump jack characterize the site as depicted on Figure 2, the Site Map.

2.0 SUMMARY OF FIELD ACTIVITIES

ETGI mobilized a rotary drilling rig to the site on February 21, 2000 and field activities were terminated on February 23, 2001. Mrs. Beth Aldrich, ETGI, Mr. Steve Dyer, Rhino Environmental Services (Rhino), Mr. Leo Gatson, representative for Conoco, and Mr. Bill McNeill the landowner, were present and provided supervision and oversight of the site activities. ETGI, of Hobbs, New Mexico, performed the drilling with Mr. William Hules in charge of the drilling rig.

The drilling rig advanced a total of eight soil borings at the site. The total depth for the borings ranged from 58 feet below the ground surface (bgs) in boring SB-4 to 65 feet bgs in soil boring SB-6. Immediately after the soil borings were completed and the soil samples were inspected for moisture, the borings were backfilled with bentonite in order to prevent potential vertical migration of fluids or solids down the bore hole.

3.0 SITE DESCRIPTION

3.1 Regional Geology/Hydrogeology

The site is located approximately three miles northeast of the town of Eunice, New Mexico. This places it south of the geophysical feature referred to as the Southern High Plains escarpment. The average surface elevation in the area ranges between 3,000 to 4,200 feet above sea level with the average surface topography sloping to the south and southeast at approximately 10 feet per mile. The ground water gradient in the region appears to reflect the topography with a similar slope to the south and southeast with some local variations.

The site is located on Kimbrough association type soils. This soil complex is about 70 percent Kimbrough soil. Lea, Stegall, Portales, and Slaughter soils make up the remaining 30 percent. This association consists of nearly level and gently sloping, well-drained soils in broad areas on uplands. These soils have a gravelly loam surface layer that overlies indurated caliche at a depth of 6 to 16 inches. Kimbrough soils are

moderately permeable and runoff is slow to medium. Erosion is a slight hazard in this region.

Data collected by the United States Weather Bureau indicate that the average annual precipitation in the site vicinity is approximately 12 to 15 inches. This amount occurs primarily as storm events during the period between June and October. Infiltration and evaporation rates are generally high resulting in limited surface flow from these events. The primary utilization of these lands consists of range, wildlife habitat, and recreational areas.

3.2 Site Geology/Hydrology

The soil samples collected from all of the borings were dry with no evidence that the borings penetrated any ground water. Generally, the upper 10 feet of section is composed of white sand and caliche with no moisture. An underlying caliche layer extends completely across the site with depths ranging from 5 feet bgs on the north side to 2 feet bgs on the south side. This section is underlain by a minimum of 45 feet of red sand, which is inter-bedded with caliche throughout the section. These materials are generally associated with the Tertiary age Ogallala Formation.

Finer red bed materials, generally associated with the Dockum group of Triassic age, unconformably underlie this horizon. All soil borings penetrated to the red bed horizon. There was no indication of moisture at any horizon in any of the soil borings. The soil boring logs are provided as Appendix A.

4.0 SUMMARY AND CONCLUSIONS

As defined in the Scope of Work, a preliminary subsurface investigation was conducted utilizing an air-rotary drilling rig to penetrate to the red beds in order to assess the ground water conditions at the site. Eight soil borings were advanced to the red beds as depicted on the Site Map. None of the borings penetrated any ground water conditions or any visible signs of moisture.

5.0 QA/QC PROCEDURES

No soil samples were collected for either photoionization detector (PID) or laboratory analysis during the field activities. However, all drilling equipment was kept clean during the field activities. In general, the cleaning procedures consisted of using high pressure steam to wash the drilling equipment prior to drilling and prior to starting each hole.

6.0 LIMITATIONS

Environmental Technology Group, Inc. has prepared this Preliminary Investigation Report to the best of its ability. No other warranty, expressed or implied, is made or intended.

Environmental Technology Group, Inc. has examined and relied upon documents referenced in the report and has relied on oral statements made by certain individuals. Environmental Technology Group, Inc. has not conducted an independent examination of the facts contained in referenced materials and statements. We have presumed the genuineness of the documents and that the information provided in documents or statements is true and accurate. Environmental Technology Group, Inc. has prepared this report in a professional manner, using the degree of skill and care exercised by similar environmental consultants. Environmental Technology Group, Inc. also notes that the facts and conditions referenced in this report may change over time and the conclusions and recommendations set forth herein are applicable only to the facts and conditions as described at the time of this report.

This report has been prepared for the benefit of Conoco Inc.. The information contained in this report including all exhibits and attachments, may not be used by any other party without the express consent of Environmental Technology Group, Inc. and/or Conoco Inc..

FIGURES

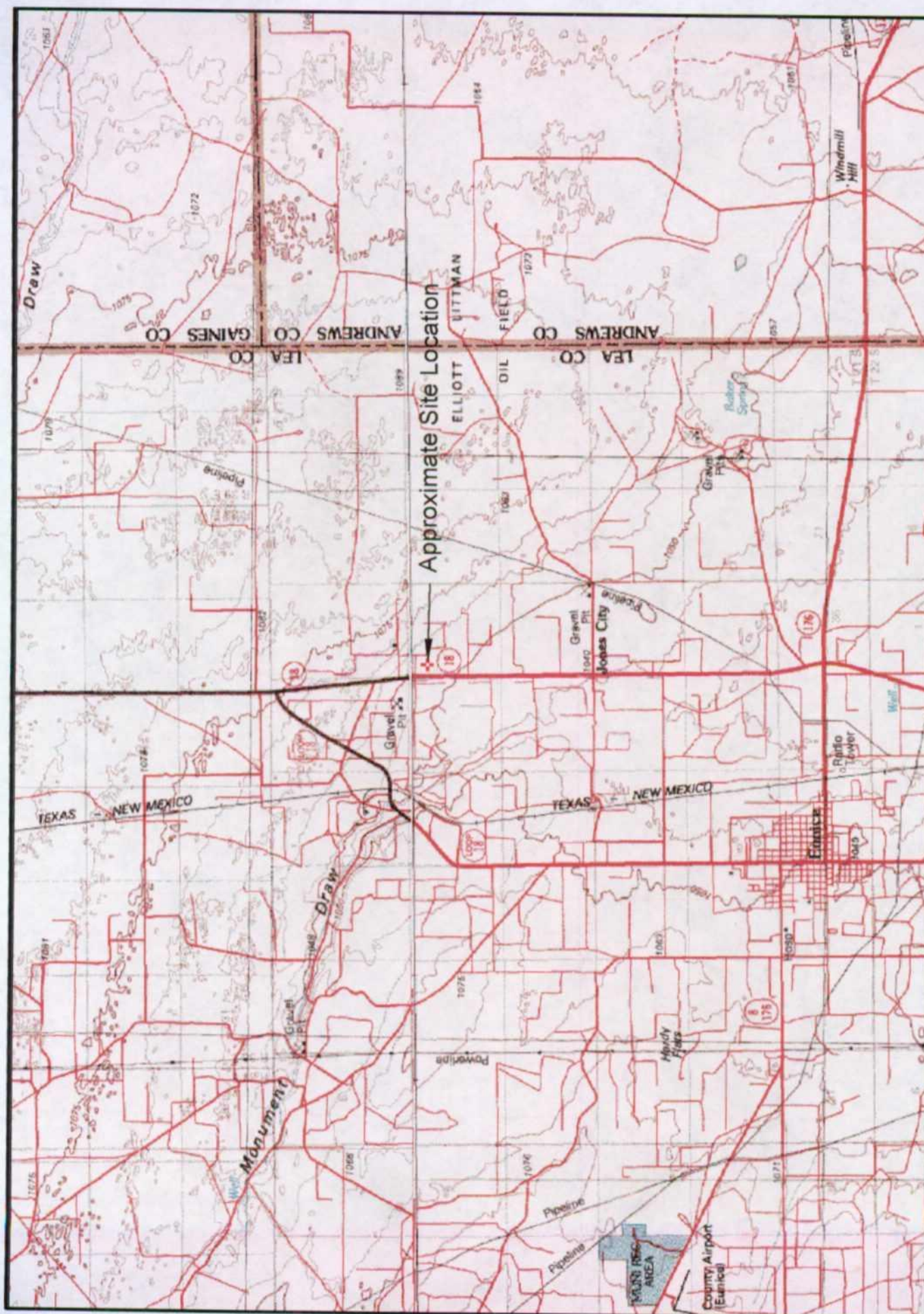
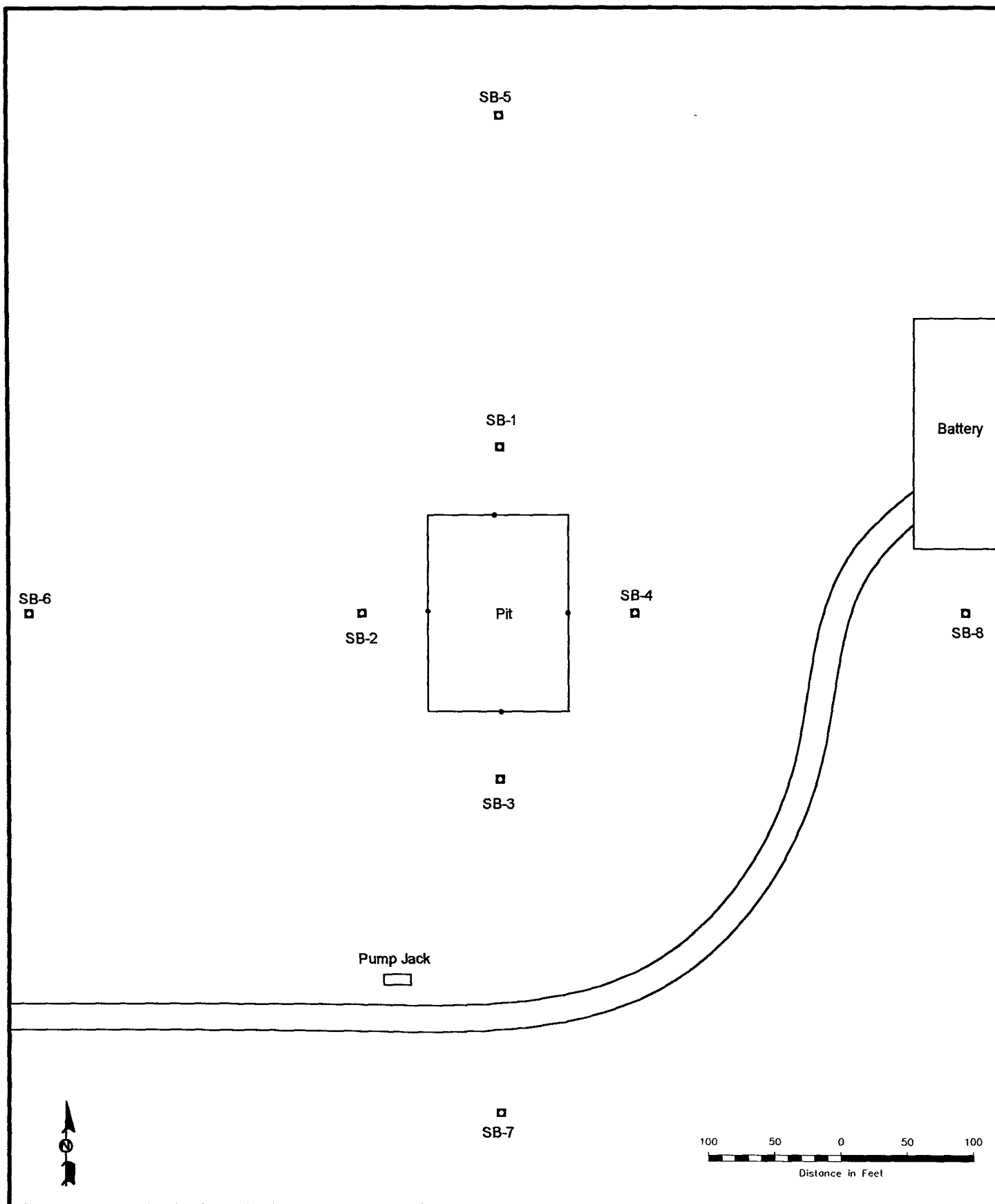


Figure 2
Site Map



**Environmental Technology
Group, Inc.**

Scale: 1" = 100'	Prep By: DJ	Checked By: CR
February 21, 2001		ETG/Project # REB23006

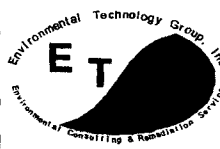


LEGEND:

- ▣ Soil Boring Location
- Yellow Pin Flag Location

**Figure 2
Site Map**

Conoco Inc.
Lockhart B-12 Battery
Lea County, New Mexico



**Environmental Technology
Group, Inc.**

Scale: 1" = 100'	Prep By: JDJ	Checked By: CR
February 21, 2001	ETGI Project #: RES2300S	

APPENDIX A

Soil Boring SB-1

Legend
 PID Head-space reading in ppm obtained with a photo-ionization detector.
 ○ Indicates samples selected for laboratory analysis.

Date Drilled 2 / 21 / 01

GPS Location

N 32° 29.832'

W 103° 07.303'

Elevation = 3,493msl

Petroleum Odor
 Petroleum Stain

PID Reading

Soil Description

Soil Columns

Depth (feet)



Soil Boring Log Details

Soil Boring SB-1

Lockhart B-12 Battery

Lea County, NM

Environmental Technology Group, Inc.



Scale: NTS
 March 7, 2001
 Prep By: JDU
 Checked By: KD
 ETGI Project # RES23005

Conoco Inc.

Soil Boring SB-2

Depth (feet)	Soil Columns	Soil Description	PID Reading	Petroleum Odor	Petroleum Stain	PID	Legend
0		Sand - (SM) - Loamy, Dark Brown, Very fine Grained, Well Sorted, Dry.					Head-space reading in ppm obtained with a photo-ionization detector.
5		Sand - (SP) - White, Very Fine Grained, Well Sorted, Dry.					Indicates samples selected for laboratory analysis.
10		Caliche with Red Sand Stringer		None	None		Date Drilled 2 / 21 / 01
15		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, with Caliche Nodules.		None	None		GPS Location
20		Sand - (SC) - Yellow, Very Fine Grained, Well Sorted, Dry, With Caliche Nodules.		None	None		N 32° 29.816'
25		Caliche Stringer		None	None		W103° 07.321'
30		Sand - (SC) - Yellow, Very Fine Grained, Well Sorted, Dry, With Caliche Nodules.		None	None		Elevation = 3,481msl
35		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, with Caliche Nodules.		None	None		
40		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, with Caliche Stringer.		None	None		
45		Caliche Stringer		None	None		
50		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry.		None	None		
55		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Clay.		None	None		
60		Red Bed, Dry.		None	None		
65				None	None		

Soil Boring Log Details

Soil Boring SB-2

Conoco Inc.

Lockhart B-12 Battery

Lea County, NM

Environmental Technology
Group, Inc.



Scale: NTS
March 7, 2001
Prep By: JDU
Checked By: KD
ETGI Project # RES22008

Soil Boring SB-3

Depth (feet)	Soil Columns	Soil Description	PID Reading	Legend	
				PID	Head-space reading in ppm obtained with a photo-ionization detector.
0		Sand - (SM) - Loamy, Dark Brown, Very fine Grained, Well Sorted, Dry.			Indicates samples selected for laboratory analysis.
5		Sand - (SC) - White, Very Fine Grained, Well Sorted, Dry.			Date Drilled 2 / 21 / 01
10		Sand - (SC) - Red/Tan, Very Fine Grained, Well Sorted, Dry.			GPS Location
15		Sand - (SC) - White, Very Fine Grained, Well Sorted, Dry.			N 32° 29.800'
20		Sand - (SC) - Red/Tan, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules			W 103° 07.304'
25		Sand - (SC) - Red/Tan, Very Fine Grained, Well Sorted, Dry.			Elevation = 3,487msl
30		Sand - (SP) - Red/Yellow, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.			
35		Sand - (SP) - Red/Yellow, Very Fine Grained, Well Sorted, Damp.			
40		Sand - (SP) - Brown/Yellow, Very Fine Grained, Well Sorted, Damp, Imbedded with Heavy Clay			
45		Sand - (SP) - Red, Very Fine Grained, Well Sorted, Dry.			
50		Caliche Stringer			
55		Sand - (SP) - Red, Very Fine Grained, Well Sorted, Dry.			
60		Sand - (SP) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules			
65		Sand - (SP) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Clay.			
		Red Bed			
		TD			

Soil Boring Log Details

Soil Boring SB-3

Lockhart B-12 Battery

Lea County, NM

Environmental Technology
Group, Inc.



Scale: NTS
March 7, 2001
Prep By: JDU
Checked By: KD
ETGI Project # RES2300S

Conoco Inc.

Soil Boring SB-4

Legend
 PID Head-space reading in ppm obtained with a photo-ionization detector.
 ○ Indicates samples selected for laboratory analysis.

Date Drilled 2/22/01

GPS Location

N 32° 29.818'
 W 103° 07.288'

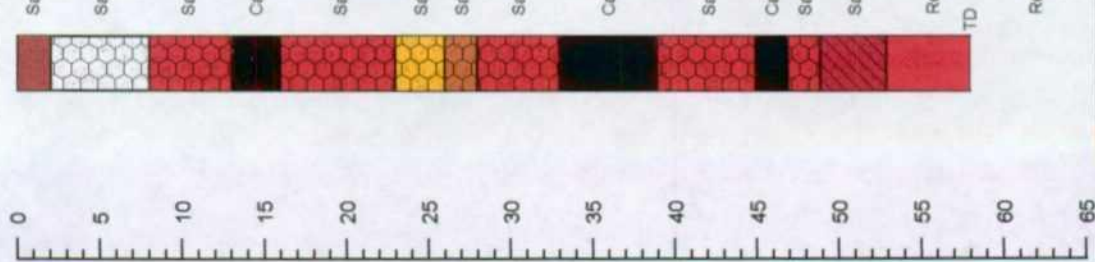
Elevation = 3,493msl

Petroleum Odor
 Petroleum Stain

PID Reading

Soil Columns

Depth (feet)



Sand - (SM) - Loamy, Dark Brown, Very Fine Grained, Well Sorted, Dry.

Sand - (SC) - White, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.

Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.

Caliche Stringer

Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.

Sand - (SC) - Red/Yellow, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.

Sand - (SC) - Yellow/Brown, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.

Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.

Caliche Stringer

Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.

Caliche Stringer

Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.

Sand - (SP) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Clay.

Red Bed, Dry

TD

Red Bed

Soil Boring Log Details

Soil Boring SB-4

Lockhart B-12 Battery

Lea County, NM

Conoco Inc.

Environmental Technology Group, Inc.



Scale: NTS
 March 7, 2001
 Prep By: JDU
 Checked By: KD
 ETGI Project # RES2300S

Soil Boring SB-5

Depth (feet)	Soil Columns	Soil Description	PID Reading	Petroleum Odor	Petroleum Stain	Legend
0		Sand - (SM) - Loamy, Dark Brown, Very Fine Grained, Well Sorted, Dry.				PID Head-space reading in ppm obtained with a photo-ionization detector.
5		Sand - (SC) - White, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	Indicates samples selected for laboratory analysis.
10		Caliche - Yellow				Date Drilled 2 / 22 / 01
15		Sand - (SC) - Red/Yellow, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	GPS Location
20		Sand - (SC) - White, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	N 32° 29.870'
25		Sand - (SC) - Yellow, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	W103° 07.288'
30		Caliche Layer				Elevation = 3,509msl
35		Sand - (SC) - Red/Brown, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	
40		Sand - (SC) - Red/Yellow, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	
45		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	
50		Sand - (SC) - Red/Brown, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	
55		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Clay.		None	None	
60		Clay - Red, Dry, Imbedded with Caliche.		None	None	
65		Red Bed		None	None	
		TD				

Soil Boring Log Details

Soil Boring SB-5

Conoco Inc.

Lea County, NM

Environmental Technology
Group, Inc.



Scale: NTS	Prep By: JDU	Checked By: KD
March 7, 2001	ETGI Project # RES23005	

Soil Boring SB-6

Depth (feet)	Soil Columns	Soil Description	PID Reading	Petroleum Odor	Petroleum Stain	Legend
0		Sand - (SM) - Loamy, Dark Brown, Very Fine Grained, Well Sorted, Dry.				PID Head-space reading in ppm obtained with a photo-ionization detector. Indicates samples selected for laboratory analysis.
5		Sand - (SC) - White, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	Date Drilled 2 / 22 / 01
10		Caliche - Yellow.		None	None	GPS Location
15		Caliche - White.		None	None	N 32° 29.818'
20		Caliche - Yellow.		None	None	W103° 07.368'
25		Sand - (SC) - Red/Yellow, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	Elevation = 3,478msl
30		Sand - (SC) - Red/Brown, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	
35		Sand - (SC) - Yellow/Brown, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	
40		Caliche - White.		None	None	
45		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Clay.		None	None	
50		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	
55		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Clay.		None	None	
60		Caliche - White.		None	None	
65		Red Bed, Dry.		None	None	

Soil Boring Log Details

Soil Boring SB-6

Lockhart B-12 Battery

Lea County, NM

Conoco Inc.

Environmental Technology
Group, Inc.



Scale: NTS
March 7, 2001
Prep By: JDU
Checked By: KD
ETGI Project # RES20008

Soil Boring SB-7

Depth (feet)	Soil Columns	Soil Description	PID Reading	Petroleum Odor	Petroleum Stain	Legend
0		Sand - (SM) - Loamy, Dark Brown, Very fine Grained, Well Sorted, Dry.				PID Head-space reading in ppm obtained with a photo-ionization detector. Indicates samples selected for laboratory analysis.
5		Caliche - White		None	None	Date Drilled 2 / 22 / 01
10		Caliche - Red/Tan		None	None	GPS Location N 32° 29.759' W 103° 07.296'
15		Sand - (SC) - Red/Yellow, Very Fine Grained, Well Sorted, Dry.		None	None	Elevation = 3,500msl
20		Sand - (SC) - Red/Yellow, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche. Caliche - White		None	None	
25		Sand - (SC) - Yellow/Brown, Very Fine Grained, Well Sorted, Dry, Imbedded with Clay.		None	None	
30		Sand - (SC) - Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Clay.		None	None	
35				None	None	
40		Caliche - Imbedded with Red Clay.		None	None	
45				None	None	
50		Caliche/Clay Stringer.		None	None	
55		Sand - (SP) - Red, Very Fine Grained, Well Sorted, Dry, Hard Layer.		None	None	
60		Sand - (SP) - Dark Red, Very Fine Grained, Well Sorted, Dry, Imbedded with Caliche Nodules.		None	None	
65		Red Bed, Dry. TD		None	None	

Soil Boring Log Details

Soil Boring SB-7

Conoco Inc.

Lockhart B-12 Battery

Lea County, NM

Environmental Technology
Group, Inc.



Scale: NTS
March 7, 2001
Prep By: JDU
Checked By: KD
ETGI Project # RES23005

Soil Boring SB-8

Legend
 PID Head-space reading in ppm obtained with a photo-ionization detector.
 ○ Indicates samples selected for laboratory analysis.

Date Drilled 2 / 23 / 01

GPS Location

N 32° 29.811'

W 103° 07.230'

Elevation = 3,466msl

Petroleum
 Odor
 Stain

PID
 Reading

Soil
 Columns
 Soil Description

Depth
 (feet)



Soil Boring Log Details

Soil Boring SB-8

Lockhart B-12 Battery

Lea County, NM

Conoco Inc.

Environmental Technology
 Group, Inc.



Scale: NTS
 March 7, 2001
 Prep By: JDU
 Checked By: KD
 ETGI Project # RES20008