1R - 345

REPORTS

DATE:

2003

MAXIM TECHNOLOGIES INC

10601 Lomas NE, Suite 106
Albuquerque, NM 87112
(505) 237-8440
Fax (505) 237-8656

June 12, 2003

Mr. Randolph Bayliss, P.E.
Oil Conservation Division
1220 S. St. Francis Dr.
Santa Fe, NM 87505

Subject: Remediation Completion Report
Lockhart A-27 Battery, OCD File: 1R-0345
Eunice, New Mexico
Maxim Project No. 3690056

Dear Mr. Bayliss:

Maxim Technologies, Inc. (Maxim) has been requested by ConocoPhillips to submit the enclosed report of remediation activities conducted at the Lockhart A-27 Battery near Eunice, New Mexico, in April 2003. These activities were completed in accordance with the workplan submitted and requirements as outlined in your letter dated March 26, 2003.

It is the understanding of ConocoPhillips that after your review to determine whether the remedial activities described and recorded in this report meet the conditions previously outlined, OCD will issue a "closure" letter for this site.

If you have any questions, please do not hesitate to contact me at (505) 237-8440 or Neal Goates (ConocoPhillips) at (832) 379-6427.

Sincerely,

MAXIM TECHNOLOGIES, INC.

John M. McBee

John M. McBee, P.E.
Senior Engineer

Enclosure: Remediation Completion Report, Lockhart A-27 Battery

cc: Paul R. Sheeley, OCD, Hobbs District Office
Neal Goates, ConocoPhillips

REMEDIATION CONSTRUCTION COMPLETION REPORT
LOCKHART A-27 BATTERY
EUNICE, NEW MEXICO

Prepared for:

ConocoPhillips

Threadneedle Office
600 North Dairy Ashford
Houston, Texas 77079

Prepared by:

MAXIM TECHNOLOGIES INC®

10601 Lomas NE, Suite 106
Albuquerque, New Mexico 87112
Maxim Project No. 3690056

June 11, 2003

TABLE OF CONTENTS

FIGURES

APPENDICES

REMEDIATION CONSTRUCTION COMPLETION REPORT
LOCKHART A-27 BATTERY
EUNICE, NEW MEXICO

1.0 INTRODUCTION

This report describes remediation activities adjacent to the ConocoPhillips Lockhart A-27 Battery near Eunice, New Mexico, conducted from April 5 through 29, 2003. These activities were designed in consultation and agreement with the State of New Mexico Oil Conservation Division (NMOCD). ConocoPhillips anticipates that completion of the remediation activities will result in a determination of no further action in a manner that is protective of subsurface soil and groundwater resources.

2.0 BACKGROUND

The Lockhart A-27 lease (T21S, R37E, Section 27, Unit C) is located northeast of Eunice, New Mexico, at the end of Continental Road. The site primarily consists of the Lockhart A-27 Tank Battery, numerous surface flow lines into the tank battery, and the identified area of concern (historic oil field operation) immediately north of the tank battery. The following sections provide a brief history of delineation and excavation activities performed at the site.

Previous Activities

In March 2001 eight soil borings were installed in the footprint and surrounding the area of concern. Five soil borings were perimeter borings installed to provide stratigraphic control, define the lateral extent of the area of concern, and determine whether any impacts from the area of concern extended to groundwater. Two borings were drilled through the center of the area of concern to characterize the thickness of impacted material in the fenced area immediately north of the Lockhart A-27 Battery. Both borings were terminated at approximately 25 feet below ground surface (bgs) following collection of bottom-hole soil samples that exhibited soil impacts below NMOCD action levels. One additional boring was placed north of the area of concern to characterize an isolated extension of the same area. Samples for laboratory analysis were collected from each boring at or near the surface as well as at the bottom of each boring. The borings were sampled and headspace analyses performed with a photo-ionization detector (PID) at two-foot intervals during drilling.

Under the direction of ConocoPhillips, Maxim generated a work plan for excavation of impacted material at the Lockhart A-27 site. This plan was subsequently submitted to and approved by the NMOCD. Maxim provided oversight for all excavation and haulage activities conducted in May 2002 and performed field test work with a PID and a total petroleum hydrocarbons (TPH) test kit to guide excavation operations. As the excavation progressed, a layer of light-colored sandy material of varying thickness (one- to two-feet thick at 18 to 20 feet bgs) began to consistently exhibit higher field PID and TPH readings compared to the overlying soil. Due to the nature of the excavation, the extent of this layer north and south of the excavation was unknown and data on extent to the east and west was limited to the width of the excavation. Due in part to this unforeseen development, ConocoPhillips decided to halt excavation activities and re-evaluate the project.

A subsurface investigation plan was subsequently prepared to further define the lateral extent of the layer of impacted material appearing to underlie less-impacted material at the margins of the Lockhart A-27 excavation. The path-forward agreed upon at the site called for installation of borings in a pattern

that would define the maximum extent of potential soil impacts remaining at the site. In late May 2002, five borings were advanced using rotary drilling techniques in a perimeter around the existing fenced excavation north of the Lockhart A-27 Battery. Soil samples were collected from the borings at five-foot intervals. An additional boring was placed near the northeast corner of the excavation and was sampled at the bottom for chlorides.

Field-testing of soil gathered from the five perimeter borings indicated soil impacts outside of the fenced area were minimal. Soil samples were also collected from three stockpiles on site for analysis via EPA 1312 SPLP SW846 8015B for TPH diesel-range organics (DRO) and gasoline-range organics (GRO); SW846 8260B for benzene, toluene, ethylbenzene, and total xylenes (BTEX); and SW846 9056 for chlorides.

As a result of these investigations a path forward was determined. In a letter dated March 26, 2003, NMOCD agreed (with certain stipulations) to a work plan submitted in August 2002 that included removal of the hydrocarbon-impacted soils in the existing "north pile" at the site, construction of a clay barrier over an area encompassed by the existing fence (Figure 1), and covering the clay barrier with three feet of soil.

Existing Conditions

Overall, approximately 7,500 cubic yards of impacted soil were removed from the site during the May 2002 efforts, resulting in two excavations. The first, small excavation is located in the southeast corner of the site, and the second, larger excavation is roughly in the center of the fenced area (Preconstruction Site Survey, Appendix B). The larger excavation was about 17 feet deep at the deepest point. The excavation walls were near vertical on the east and west and the north and south walls were about 20° from the horizontal. Three soil piles existed at the site: the north pile, which contained hydrocarbon-impacted soil; and the southwest and east piles which consisted of unimpacted site soils. The site was fenced and the pits were dry. A caliche road had been constructed into the area (Photo 1).

3.0 REMEDIAL ACTION CONSTRUCTION

A Health and Safety Plan (HASP) for the work at the site was prepared. In addition to defining Personal Protective Equipment (PPE) requirements, site access restrictions, and emergency procedures, the HASP detailed handling of site-specific activities, including coordination with the ConocoPhillips Business Unit safety requirements (i.e., Job Safety Analyses and initial site orientation).

In general, remedial action construction consisted of:

- The hauling away of stockpiled hydrocarbon-impacted soils to an NMOCD-approved landfarm.
- Backfilling of existing excavations—southeast pit and main pit (Appendix B).
- Excavation of the entire footprint (i.e., the area fenced as of May 2002 [≈ 1.55 acres]) to a level about 4 feet below existing ground surface (minus four-foot grade elevation).
- Placement and compaction of a clay layer one foot thick, meeting NMOCD requirements.
- Backfill with cover soils approximately 3 feet thick to original ground surface.

The primary objective of the remedial construction was to place a clay cover over the footprint of the May 2002 fenced area to prevent infiltration of surface and/or rainwater into any underlying soils. The first step in the remediation was to relocate the western and northern sections of the existing fence (Figure 1) in order to accommodate construction traffic and the stockpiling of soils. Also, survey benchmarks were established by licensed surveyors for construction control and to verify excavation depths and thickness of the clay layer. The original ground surface at, and adjacent to the site, is fairly level and elevations ranged from 3400 feet mean sea level (MSL) (northwest) to 3399 feet (southeast); the benchmark for the average elevation for site construction was set at 3399.77 feet MSL.

The clay cover would be a minimum of 1 foot thick with approximately 3 feet of cover soil; therefore, the entire site that was previously bounded by the fence would be excavated to a depth of approximately 4 feet bgs (3396 MSL). The southern edge of the excavation was adjusted to the north to avoid active gas and oil piping on the southern edge of the site and construction activities were conducted as close as safely possible (approximately 2 to 3 feet) to the piping. Excavation and placement of the clay cover on the eastern side was to within 2 to 3 feet of the fence. A portion of the previously stockpiled soils was pushed into the existing pits on the site and excess soil was stockpiled for use as cover soil. Additional soil from an offsite borrow area would be hauled in to bring the site up to approximate original ground surface elevations.

Initial earth moving activities at the site consisted of placement and compaction of soil in the large excavation in the center of the site from the pre-existing southwest soil stockpile (Photo 2). At this time the southeast pit was also filled with site soils that were above the 4-foot excavation grade level. To control the potential for run-on of surface water to the site, small earthen berms were constructed around the perimeter of the site on the northern and eastern sides. The soil stockpiled from the excavation to grade formed the run-on controls on the western side of the site and surface water flow would drain away from the site on the southern boundary.

Concurrent with soil placement into the excavations, a front-end loader loaded trucks with soil from the north pile, which was hauled to the J&L Landfarm, southwest of Hobbs New Mexico. This facility is an NMOCD-approved landfarm. Any impacted material clinging to the truck beds was removed at the landfarm. Soil was loaded from the north pile above original ground surface elevation and hauled to the landfarm (a total of 1,060 cubic yards of soil was removed, see receipt, Appendix C). Soils surrounding and beneath the footprint of the north pile were placed into the eastern half of the central pit to bring it up to the minus 4 foot grade elevation (Photos 3 and 4).

The previously fenced area (approximately 1.55 acres) that was above the minus 4-foot grade elevation were excavated, and the soil stockpiled on the western portion of the construction area (Photos 5 and 6). With the backfilling of the two pits, removal of stockpiled impacted soils, and excavation of site clean soils, the entire site footprint was brought to an elevation 4 feet below the benchmark elevation (Photos 7 and 8). This was the base elevation for the placement of the clay layer. The site area was surveyed to ensure that the surface elevation and area to be covered complied with NMOCD requirements (Figure 2) to cover the original (May 2002) fenced area with an engineered clay cover. Thirty-eight points surveyed in the bottom of the excavation had an average elevation of 3395.78 feet, which is 4 feet below the benchmark elevation.

Clay materials used to construct the clay cover were hauled from the Wallach Concrete, Inc., pit east of the Lockhart A-27 site and stockpiled. These materials had been tested using American Society for Testing and Materials (ASTM) laboratory test procedures for determining soils properties such as permeability, moisture-density relationships, etc. The test results meet the NMOCD requirements for

having a permeability of less than 1×10^{-7} centimeters per second (cm/s) tested at 95 percent Standard Proctor (ASTM D-698) dry density and other tests. These parameters had been specified in a letter dated March 26, 2003 and confirmed in a conversation with Mr. Randy Bayliss of the NMOCD (see laboratory test data results [Appendix C]).

The area for placement of the clay had a previous application of water for moisture conditioning. Clay materials for the clay cover were hauled to the site footprint using "belly dump" trucks. After unloading, a road grader was used to spread the materials into thin, approximately 3 inch lifts. Water trucks then applied water to the materials and a "sheep's-foot" compactor was used to break down the larger clay clods, to work the water through the entire lift of the clay, and compact it to a minimum 95 percent Standard Proctor dry density (Photo 9).

Three in-place moisture tests were conducted during the initial stages of construction of the clay layer to address constructability concerns and in order to assure consistency of placement and compaction of the layer. To ensure that the clay cover met the permeability requirements as set forth by the NMOCD, a total of six additional tests were conducted on two different days, at four separate locations of the site footprint, and at the approximate midpoint of the upper and lower portions (6 inches thick) of the clay layer. Table 1 lists the results of the in-place testing and Figure 3 shows the test locations. A copy of the test results from the subcontracted geotechnical testing firm is presented as Appendix C.

Following construction and testing of the clay layer, a registered land surveying firm surveyed the site (Figure 3). The average elevation of 40 points surveyed on top of the clay layer averaged 3396.82 feet MSL, which is slightly more than one foot higher in elevation than the clay subgrade elevation. These data confirmed that a minimum one-foot thickness of clay was constructed over the site footprint. The clay layer was crowned slightly (approximately 2 to 3 inches) to prevent infiltrating water ponding on the surface of the clay, and to induce drainage off the cover to the east and west. A total of 4,276 tons of clay were purchased and hauled from Wallach Concrete to construct the clay layer (Photos 10 and 11). With an in-place dry density of approximately 100 pounds per cubic foot (see Appendix C, Laboratory Test Results), this amount of clay would be approximately 3,100 cubic yards in place.

TABLE 1
Clay Density Test Results

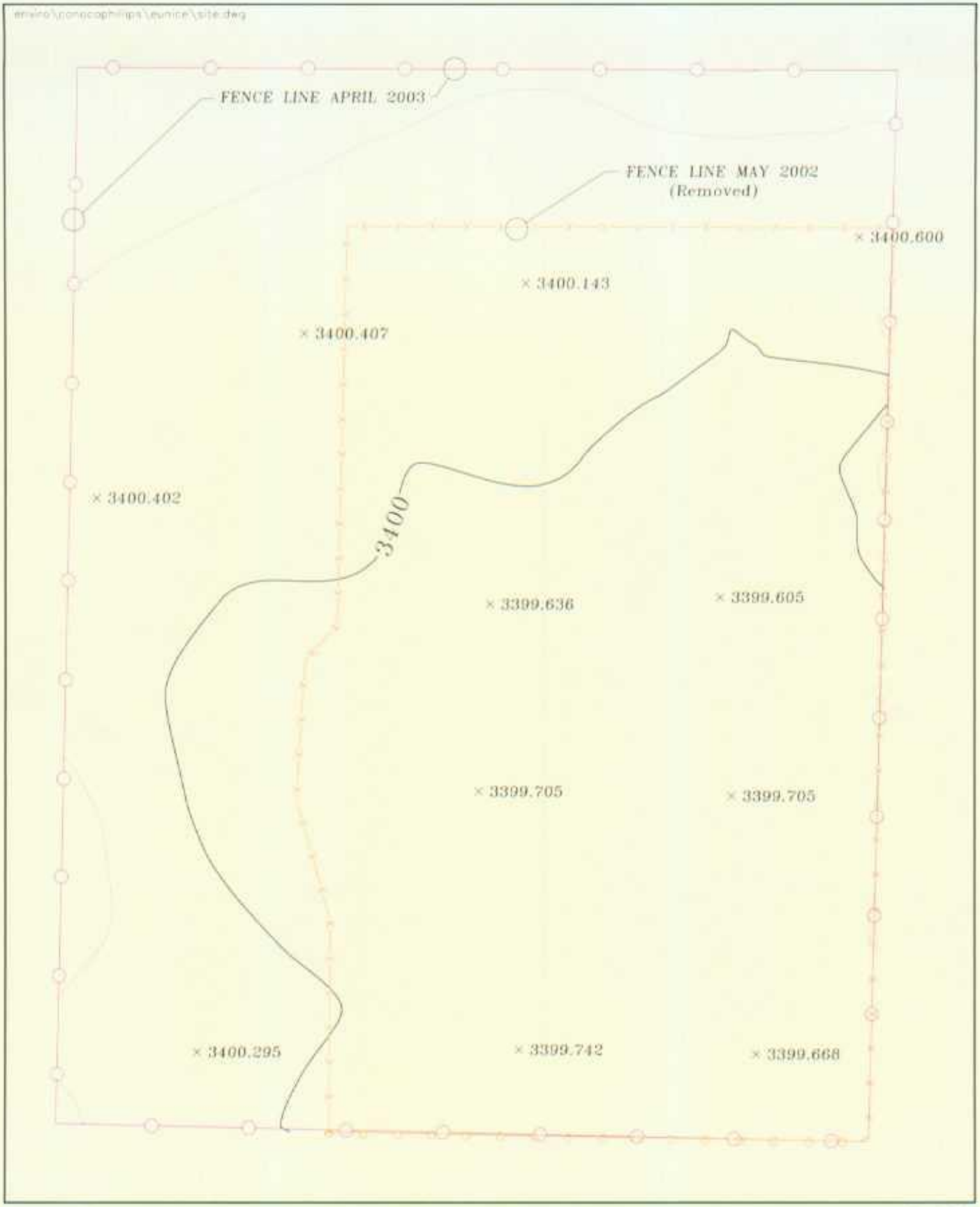
Sample No.	Location	Lift	Density (% of Max.)
SG-4	SW	Lower	102.2
SG-5	SE	Lower	99.8
SG-6	NE	Lower	103.3
SG-7	SW	Upper	106.8
SG-8	NW	Upper	102.9
SG-9	SE	Upper	98.4

Following confirmation of the in-place density and thickness of the clay cover, soils that had been stockpiled from the site footprint were then hauled and spread with a scraper and compacted with the "sheep's-foot" compactor. To prevent the upper surface of the clay layer from drying out, a water truck wet the entire surface of the clay layer prior to placement of the first lift of the cover soils which

were placed within 4 hours of the final survey of the clay cover. The cover soils were placed in approximate 8- to 9-inch-thick lifts and nominally compacted to prevent settlement of the soils (Photo 12).

Placement and compaction of the cover soils from the stockpiled on-site soils continued until they had been used as backfill over the clay cover. Then soils from a borrow area approximately 600 feet north of the site were hauled to the site and placed as the upper layer of cover soils. The upper one-foot of soils were not compacted to encourage root growth and re-vegetation of the site. Soils were placed over the site footprint to replicate the original ground surface and have approximately 3 feet of cover over the clay layer (Photos 13 and 14). Final ground surface elevations ranged from 3399.6 feet MSL in the southeastern part of the site to slightly over 3400 feet MSL on the northern and western portion of the site (Figure 4). This figure also shows the areal extent of the clay cover and a general cross-section of the site at the end of construction.

The site controls consist of fencing to restrict access, and appropriate signage for the site are being made to prevent accidental intrusion, i.e., digging over the site footprint. ConocoPhillips is also in discussions with the site owner to determine a seed-mix for re-vegetation of the site.



Source: Pyeatts Land Surveying, April 2003

May 2003

N

0 Feet 50

MAXIM TECHNOLOGIES INC. 3690056

3396.830 × Spot Elevation

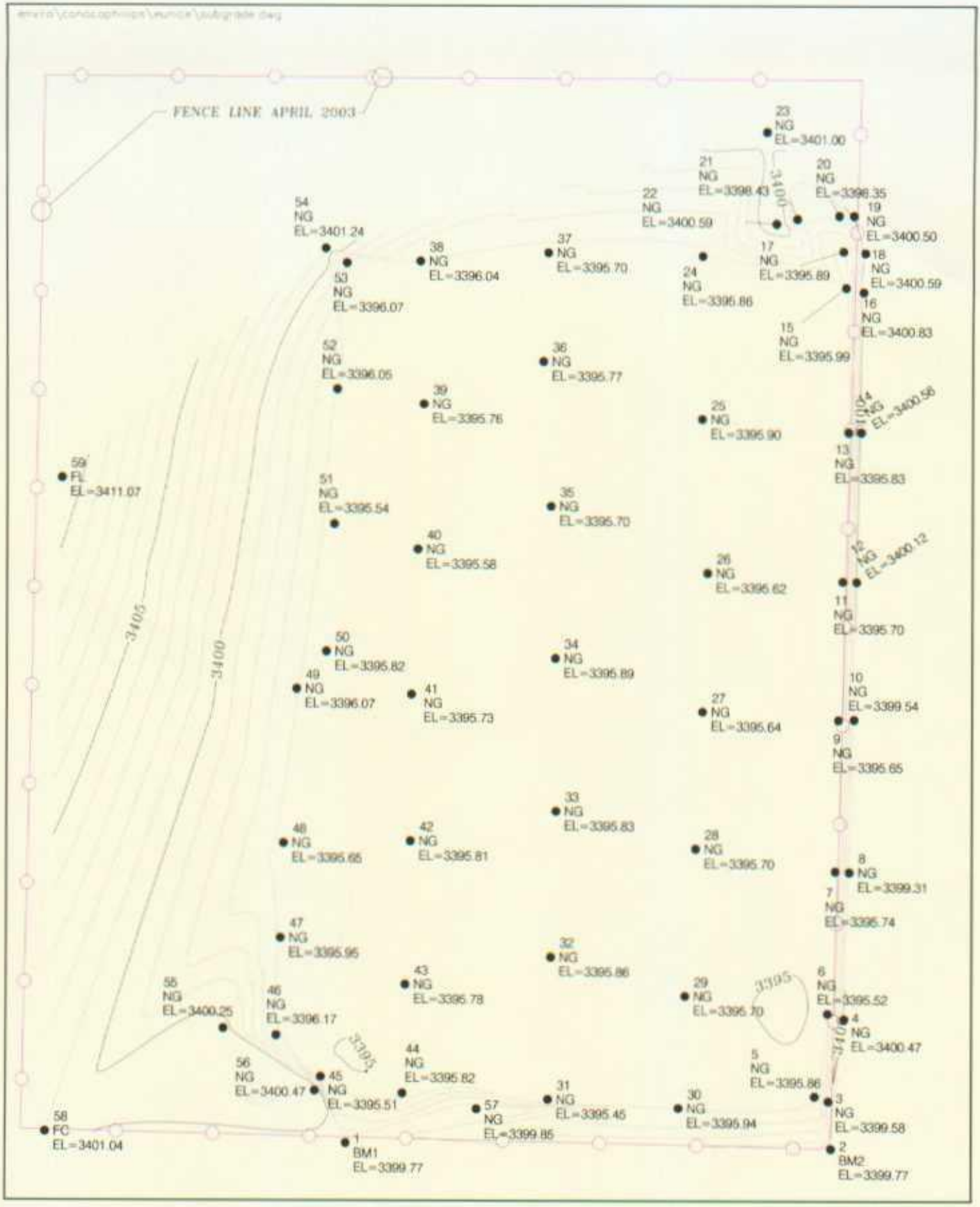
Fence

Major Contour

Minor Contour

NOTE: All spot elevations represent end of construction grading.

Site Map
ConocoPhillips
Lockhart A-27 Tank Battery
Eunice, New Mexico
FIGURE 1



Source: Pyeatts Land Surveying, April 2003

May 2003

N

0 Feet 50

3396.830 Spot Elevation

Fence

Major Contour

Minor Contour

Survey Location & Elevation

45 NG EL = 3395.65

MAXIM TECHNOLOGIES INC. 3690056

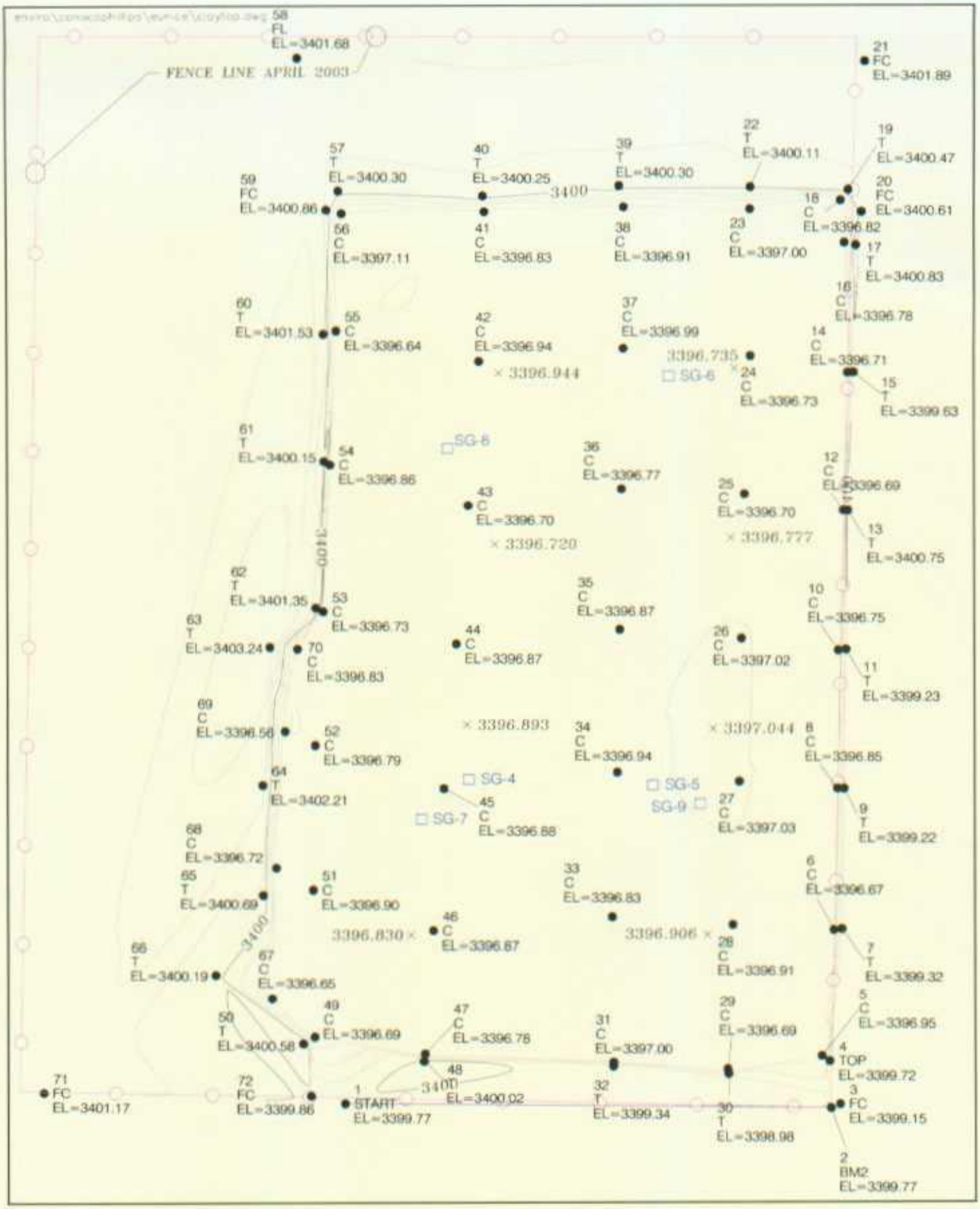
Clay Subgrade Elevation Contours

ConocoPhillips

Lockhart A-27 Tank Battery

Eunice, New Mexico

FIGURE 2



Source: Pyeatts Land Surveying, April 2003

May 2003

N

0 Feet 50

3396.830 × Spot Elevation

Fence

Major Contour

Minor Contour

SG-7 □ Density Test Location

● Survey Location & Elevation

46 NG EL = 3396.65

Top of Clay Elevation Contours

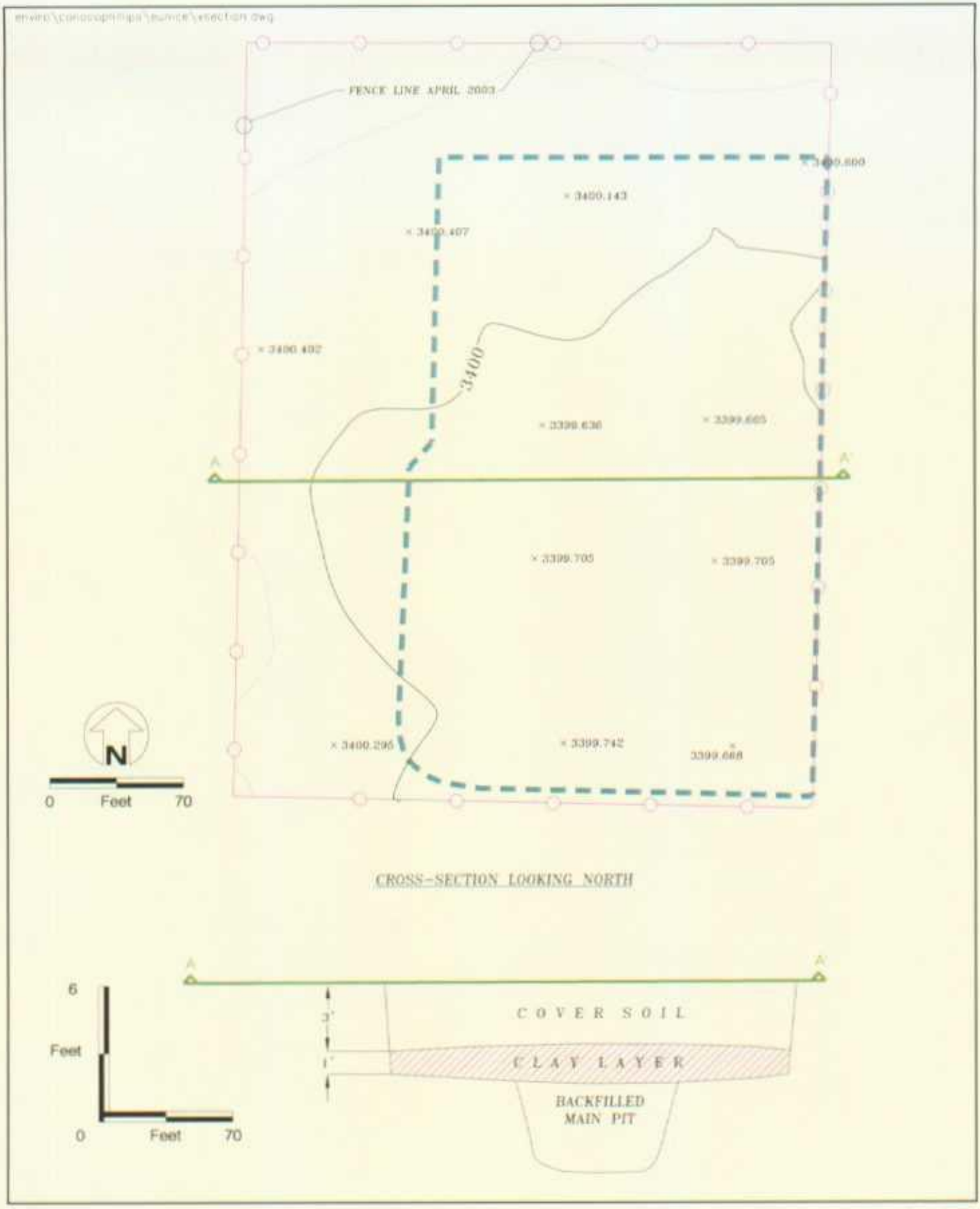
ConocoPhillips

Lockhart A-27 Tank Battery

Eunice, New Mexico

FIGURE 3

MAXIM TECHNOLOGIES INC. 3690056



Source: Pyeatts Land Surveying, April 2003

May 2003

3396.830 × Spot Elevation

Fence

Major Contour

Minor Contour

A—A Cross Section

Areal Extent of Clay Cover

End of Construction
ConocoPhillips
Lockhart A-27 Tank Battery
Eunice, New Mexico
FIGURE 4

MAXIM TECHNOLOGIES INC. 3690056

APPENDIX A

Site Photographs

Photo 1. Pre construction; view to the north (04/17/03).

Photo 2. Backfilling of pits; view to the south. Note: pre-existing southwest soil stockpile on right (04/08/03).

Conoco Lockhart A-27 Remediation Completion	Photographer: John McBee Photo Dates: April 5-29, 2003	Project No./Task 3690056.100

Photo 3. Backfilling of main pit and site grading (04/10/03).

Photo 4. North pile removed; completion of backfill of main pit (04/11/03).

Photo 5. Site grading and stockpiling of cover soils (04/11/03).

Photo 6. Site grading, view to the north (04/14/03).

Photo 7. Sub grade elevation for clay layer; view to the north (04/14/03).

Photo 8. Sub grade elevation for clay layer (note six-foot rule) (04/14/03)

Photo 9. Construction of clay cover (04/18/03).

Photo 10. Top of clay cover, west side of site (04/22/03).

Photo 11. Top of clay cover; east side of site (04/22/03).

Photo 12. First lift of cover soil over clay layer (04/22/03).

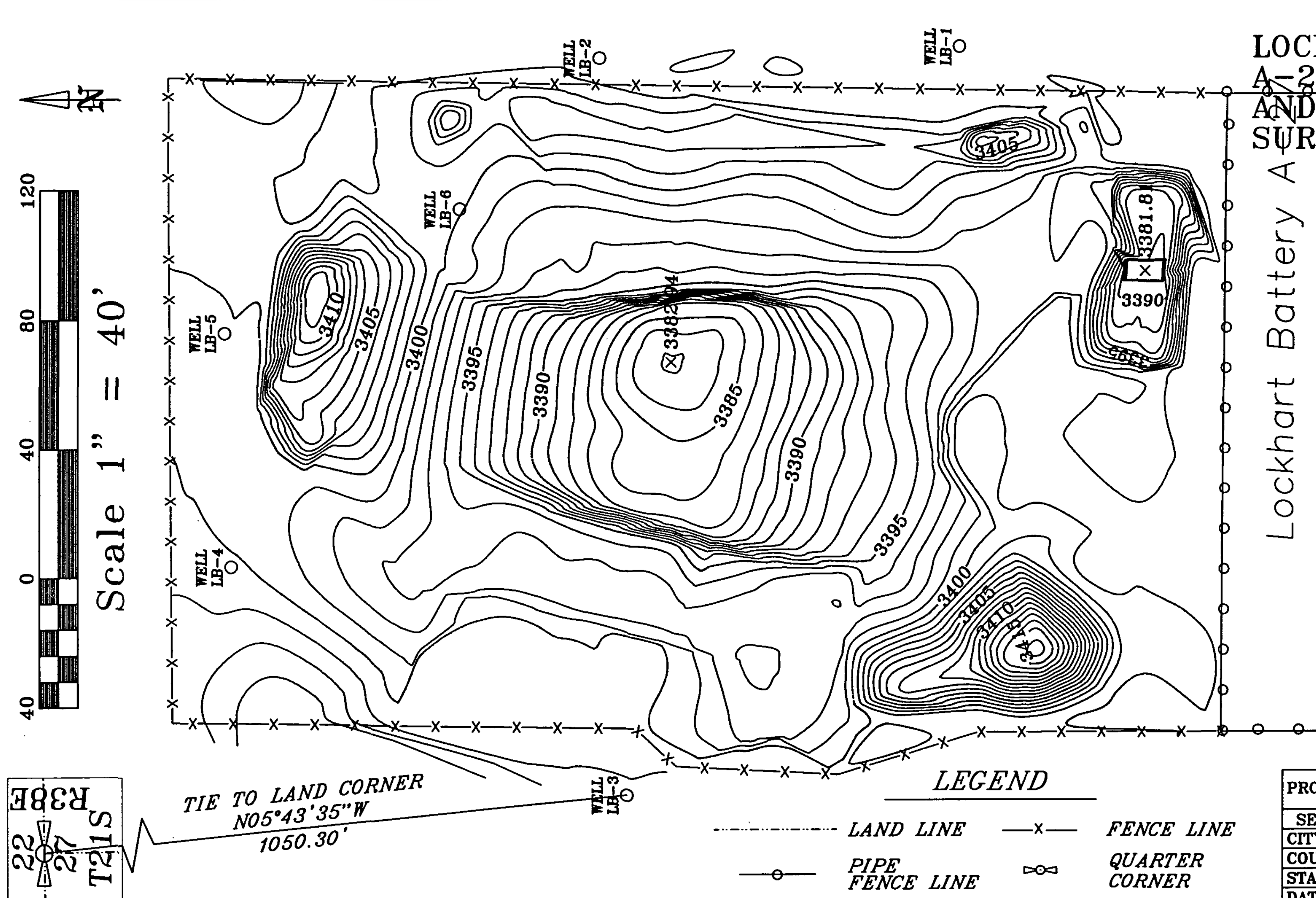
Photo 13. Placement of compaction of cover soils (04/24/03).

Photo 14. Completion of backfill and site grading (04/29/03).

APPENDIX B

Preconstruction Site Survey

LOCKHART BATTERY A-27 TOPOGRAPHIC AND WELL LOCATIONS SURVEY



WELL	N	E	EL
LB-1	530867.19	865219.39	3399.62
LB-2	530978.20	865215.85	3399.65
LB-3	530969.39	864987.73	3401.13
LB-4	531091.18	865058.43	3400.19*
LB-5	531093.34	865131.04	3399.84*
LB-6	531020.82	865169.24	3400.10*

*NOTE - ELEVATIONS MAY CHANGE AFTER DIRT WORK

MELVIN R. PYEATT
NEW MEXICO
8510
REGISTERED PROFESSIONAL LAND SURVEYOR

PROJECT:	MAXIM TECHNOLOGIES LOCKHART BATTERY A-27
SEC. 27	T 21S R 28E
CITY:	EUNICE
COUNTY:	LEA
STATE:	NEW MEXICO
DATE:	DECEMBER 13, 2002

APPENDIX C

Certificate of Waste Status
Laboratory Data Report on Clay (Wallach Pit)
In-Place Density Test Results (Clay)

Certificate of Waste Status

NMOCD 711 FACILITY: J&L LANDFARM, INC.

GENERATOR Conoco Phillips

GENERATING SITE Lockhart A-27 (Btry)

SEC 27 TOWNSHIP 21S RANGE 37E

COUNTY Lea STATE N. Mex

WASTE DESCRIPTION Non Haz Soil WASTE QTY. 1060 yards

TRUCKING COMPANY Key

EXEMPT WASTE ✓

As a condition of acceptance for disposal, I hereby certify that this waste is an exempt waste as defined by the EPA(Environmental Protection Agency). Waste is generated from oil and gas exploration and production operations; exempt from RCRA(Resource Conservation and Recovery Act, Subtitle C regulations. I do certify that hazardous or listed waste pursuant to EPA provisions has not been added or mixed with the waste, nor mixed with any non-exempt material.

NON-EXEMPT WASTE _____

As a condition of acceptance for disposal, I hereby certify that this waste is a non-exempt waste as defined by the EPA's (Environmental Protection Agency) July 1988 Regulatory determination. To my knowledge, this waste will be analyzed pursuant to the provisions of 40 CFR Part 261 to verify the nature as non-hazardous. I further certify that to my knowledge "hazardous or listed waste" pursuant to the provisions of 40 CFR, Part 261, Subparts C and D, has not been added or mixed with the waste so as to make the resultant mixture a "hazardous waste" pursuant to the provisions of 40 CFR, Section 2613.

I certify that this waste has been surveyed for Naturally Occurring Radioactive Material(NORM) and NORM concentrations do not exceed that listed in 20 NMAC 3.1 Subpart 1402. C and D.

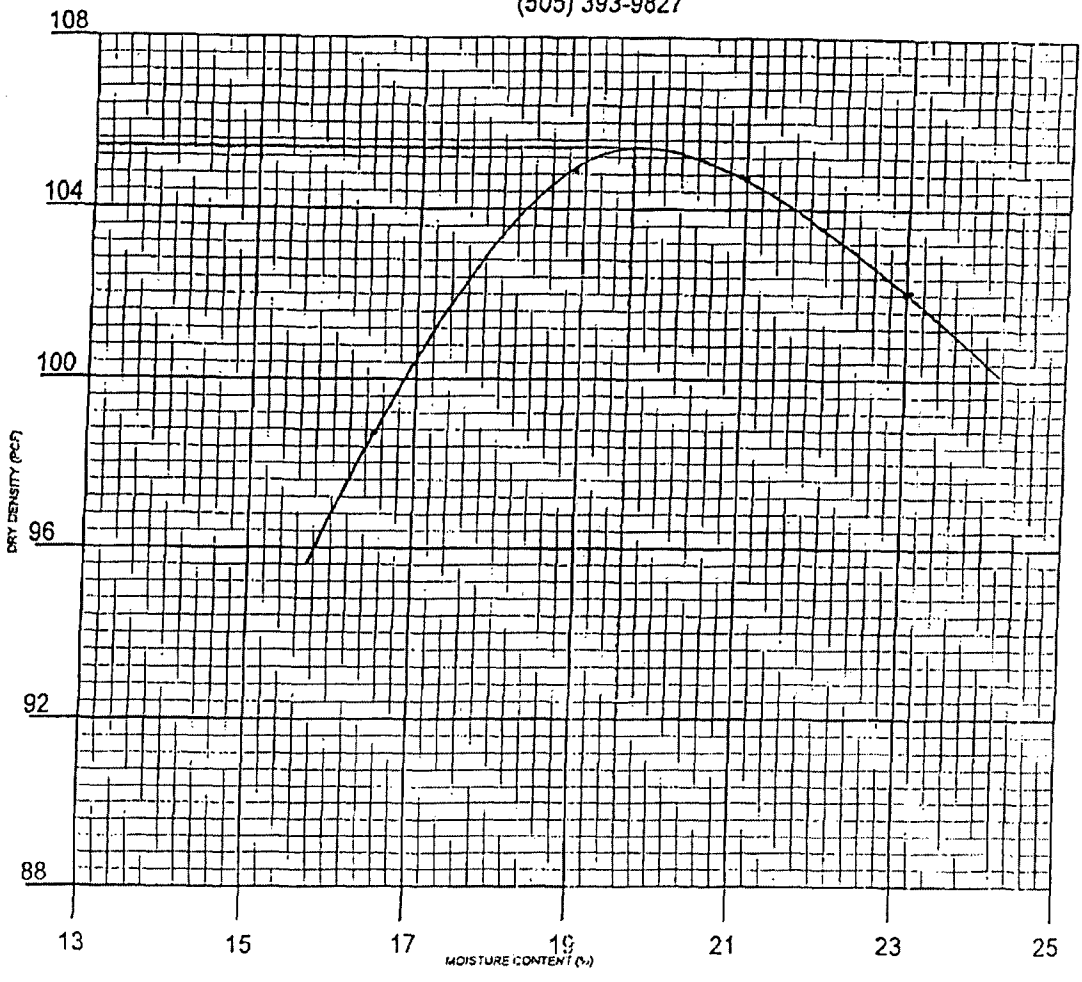
COMPANY AGENT John M. McBee
(Original Signature)
John M. McBee
(Name)

ADDRESS MAXIM - 10601 Lomas N.E. Suite 106
Albuquerque, N. Mex - 87112

DATE April 9, 2003

PETTIGREW and ASSOCIATES, P.A.
1110 N. GRIMES ST.
HOBBS, NM 88240
(505) 393-9827

DEBRA P. HICKS, P.E./L.S.I
WILLIAM M. HICKS III, P.E./P.S.



CLIENT: Maxim Technologies PROJECT: General Information

SAMPLE LOCATION: Stockpile at Wallach Pit

SOIL DESCRIPTION: Red Lean Clay

SOIL CLASSIFICATION: CL TEST METHOD: ASTM: D 698

ATTERBERG: LL 48 PI 29 *Sampled & Delivered 3/13/03*

DATE: 3/17/03 LAB NO. 03 2082- 2088

DRY WEIGHT LB/CU. FT. 105.4 MOISTURE CONTENT % 19.6

SIEVE ANALYSIS - % PASSING						
#4	#10	#40	#80	#200		Permeability: 3.53E -08 95.4% Compaction 22.2% Moisture
100	99	97	95	92.6		

PETTIGREW and ASSOCIATES

COPIES: Maximum - Tom Tangen

BY: Dean Pettigrew S.I.T.

LABORATORY TEST REPORT

PETTIGREW and ASSOCIATES, P.A.
1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./P.S.

To:	Maxim Technologies Tom Tanger 10601 Lomas NE Suite 106 Albuquerque, NM 87112	**Material:**	Red Clay
		Test Method:	ASTM: D 2922
Project:	Lockhart A-27		
Date of Test:	04/18/03	**Depth:**	6" Below Finished Subgrade

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG-4	115' N. & 75' E. of the SW Corner of Pit	102.2	19.3	
SG-5	115' N. & 70' W. of the SE Corner of Pit	99.8	18.8	
SG-6	65' W. & 75' S. of the NE Corner of Pit	103.3	16.4	

Control Density: 105.4
ASTM: D 698

Optimum Moisture: 19.6%

Required Compaction: 95%

Lab No.: 03 2308-2311

Copies To: Maxim Technologies

PETTIGREW and ASSOCIATES

BY: S.E.T.

LABORATORY TEST REPORT

PETTIGREW and ASSOCIATES, P.A.

1110 N. GRIMES
HOBBS, NM 88240
(505) 393-9827

AASHTO R18

DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS. III, P.E./P.S.

To:	Maxim Technologies Tom Tanger 10601 Lomas NE Suite 106 Albuquerque, NM 87112	**Material:**	Red Clay
		Test Method:	ASTM: D 2922
Project:	Lockhart A-27		
Date of Test:	04/22/03	**Depth:**	Finished Subgrade

Test No.	Location	Dry Density % Maximum	% Moisture	Depth
SG-7	100' N. & 55' E. of the SW Corner of Pit	106.8	17.2	
SG-8	55' E. & 90' S. of the NW Corner of Pit	102.9	20.1	
SG-9	50' W. & 105' N. of the SE Corner of Pit	98.4	22.6	

Control Density: 105.4
ASTM: D 698

Optimum Moisture: 19.6%

Required Compaction: 95%

Lab No.: 03 2344-2347

Copies To: Maxim Technologies

PETTIGREW and ASSOCIATES

BY: