AP - 068

STAGE 1 WORKPLAN

2/14/2007

HUNGRY HORSE, LLC
ENVIRONMENTAL SERVICES

February 14, 2007

Mr. Glenn Von Gotten
Energy, Minerals, and Natural Resources Department
New Mexico Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

Subject: Apache Corporation - - NEDU #527 – Stage I Ground Water Abatement Plan

Dear Mr. Von Gotten:

Hungry Horse, LLC, on behalf of Apache Corporation (APACHE) submits for your consideration the Stage I Ground Water Abatement Plan for the "NEDU #527" pit closure site. This report documents the vertical and horizontal extents of chloride contamination at the site, excavation and disposal of chloride contaminated soils down to the 21-ft bgs level, borehole evaluation of soils below the 21-ft bgs level and ultimate confirmation of ground water impact at the site.

This submittal is consistent with NMOCD Rule 19 requirements of immediate notification and submittal of a Stage I Abatement Plan in the event that ground water contamination has occurred as a result of oilfield activities. On behalf of Apache Corporation, Hungry Horse LLC requests that the NMOCD consider the information provided within this documentation and allow Apache Corp to proceed with the proposed monitor well installations and further ground water investigations at this site.

Questions or comments regarding this project should be directed to Mr. Jerry Brian at the Hungry Horse office, or at 505-390-6149. Mr. Harold Swain of Apache Corporation can be contacted by phone at 915-527-3311.

Please address all official correspondence regarding this release and subsequent remediation activities to Mr. Harold Swain at:

Apache Corporation
P.O. Box 848
Wink, TX 79789

Sincerely,

Jerry Brian, Senior Environmental Consultant/General Manager

cc: Harold Swain, Apache Corporation, w/enclosure
Larry Johnson, NMOCD – Hobbs District Office
File

P.O. Box 1058, Hobbs, NM 88241
Phone: (505) 393-3386 Fax: (505) 391-4585

APACHE CORPORATION

STAGE 1 GROUND WATER ABATEMENT PLAN (AP068)

NEDU #527 WELL SITE

API#30-025-37242

UL-M (SW¼ OF THE SW¼) OF SECTION 10 T21S R37E

LATITUDE: N32° 29.387' LONGITUDE: 103° 09.502'

~2.7 MILES SOUTHWEST (BEARING 224°) OF EUNICE

LEA COUNTY, NEW MEXICO

February 14, 2007

PREPARED FOR APACHE CORPORATION BY:

HUNGRY HORSE, LLC

ENVIRONMENTAL SERVICES

3709 S. Eunice Hwy, P.O. Box 1058, Hobbs, New Mexico 88241

(505) 393-3386; Fax (505) 391-4585

Table of Contents

1.0 Company Contacts

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Mailing Address: P.O. Box 848, Wink, TX 79789

Hungry Horse, LLC:

Jerry Brian, General Manager/Environmental Consultant
Phone: 505-393-3386
Email: jrbrian@verizon.net
Mailing Address: P.O. Box 1058, Hobbs, NM 88241

2.0 Introduction

By letter dated November 29, 2006, the New Mexico Oil Conservation Division is requiring Apache Corporation to submit a Stage 1 investigation proposal to complete the definition of the lateral and vertical extent of groundwater contamination at the Apache NEDU #527 well site located in Unit M, Section 10, T21S – R37E, Lea County, New Mexico. The plan is required pursuant to OCD Rule 19.E.1 and OCD Rule 19.E.3. The Stage 1 Abatement Plan presented herein complies with the requirements of these rules and incorporates work already performed at the site prior to detection of the groundwater impact.

3.0 Background

On the 7/23/06, Hungry Horse, LLC began to conduct a "dig & haul' remediation pit closure procedure on the NEDU # 527. All drilling material and chloride impacted material below the liner was removed to a depth of 10' bgs and disposed of at Sundance disposal facility.

On the 7/31/06, we began extracting samples beneath the pit liner for chloride analysis. Chloride impacted material has been removed to a depth of 21' bgs. Approximately 9000 $yrds^3$ have been removed and disposed of at the NMOCD Approved Sundance disposal facility.

Vertical delineation continued until impacted groundwater was encountered in the SW Quadrant (BH # 3) at 62' bgs. The impact was reported to the New Mexico Oil Conservation Division (OCD) District One office in Hobbs and to Glenn Von Gotten at the OCD office in Santa Fe, NM on the 7/19/06.

4.0 Investigation Status

Prior to presentation of the Abatement Plan later in the document, the soil and groundwater work performed to date will be briefly reviewed below.

Based on investigation results and pursuant to NMOCD guidelines (**"Guidelines for Remediation of Leaks, Spills and Releases"** *New Mexico Oil Conservation Division* – August 13, 1993), Hungry Horse, LLC submitted a Risk Based remedial/clean-up work plan to the NMOCD on the 2/5/07. The work plan included further excavation of high

chloride impacted materials above the water table, utilizing a double cap method to prevent any further vertical downward migration of chlorides. It also proposed drilling three initial groundwater-monitoring wells to establish groundwater gradient and water quality.

4.1 Vertical and Horizontal Extent of Contamination in the Vadose Zone

Preliminary investigation of the extent of soil contamination was performed from the 7/31/06 until the 9/19/06.

On the 7/31/06, we began extracting samples beneath the pit liner for chloride analysis. A 5-point sampling plan (see site sampling map) was conducted in the pit area (NW quadrant, NE quadrant, Center, SW quadrant). Sample points were located in the center of each quadrant, and one sample point located in the center of the pit area.

The working pit area closest to the wellhead was divided into 3 areas (E Work Pit, Center Work Pit, and SW Work Pit). Sample points were located in the center of each area.

Samples were extracted from 10' bgs to 19' bgs. Field chloride tests were conducted to determine if chloride concentrations exceeded the acceptable MCL of 250-ppm.

A total of 16 confirmation grab samples were retrieved. These samples were properly packaged, preserved, and transported under Chain-of-Custody to Cardinal Laboratories of Hobbs, New Mexico for analysis. All samples were analyzed for Chlorides (EPA Method: 4500-Cl^-B).

Confirmation samples were extracted in the NE quadrant at 10'bgs, and 19' bgs. Analytical results indicated chloride concentrations were 17275-ppm, and 288-ppm, respectively (see table).

Confirmation samples were extracted in the NW quadrant at 12', 16'and 19' bgs. Analytical results indicated chloride concentrations were 16315-ppm, 8797-ppm, and 8557-ppm, respectively (see table).

Confirmation samples were extracted in the Center quadrant at 10', 12', 16'and 17' bgs. Analytical results indicated chloride concentrations were 2255-ppm, 272-ppm, 6158-ppm, and 112-ppm, respectively (see table).

Confirmation samples were extracted in the SW quadrant at 12', 16', 17', and 19' bgs. Analytical results indicated chloride concentrations were 26872-ppm, 37988-ppm, 10477-ppm, and 8717-ppm, respectively (see table).

Confirmation samples were extracted in the SE quadrant at 10', 16', and 19' bgs. Analytical results indicated chloride concentrations were 12396-ppm, 5806-ppm, and 1935-ppm, respectively (see table).

Confirmation samples were extracted in the Center Work Pit at 14' bgs. Analytical results indicated the chloride concentration was 176-ppm (see table).

Confirmation samples were extracted in the SW Work Pit at 14', and 19' bgs. Analytical results indicated chloride concentrations were 9677-ppm, and 5118-ppm, respectively (see table).

Confirmation samples were extracted in the E Work Pit at 19' bgs. Analytical results indicated the chloride concentration was 224-ppm (see table).

On the 9/14/06 and the 9/19/06, four bore holes (BH #1 - NE quadrant, BH #2 – SE quadrant, BH #3 – SW Quadrant, BH #4 – NW quadrant) (see site sampling map) were drilled and split spoon sampling conducted every 5'. A total of 22 discrete grab samples were retrieved.

The samples were properly packaged, preserved, and transported under Chain-of-Custody to Cardinal Laboratories of Hobbs, New Mexico for analysis. All samples were analyzed for Chlorides (EPA Method: 4500-Cl⁻B).

BH # 1- NE quadrant and BH #2 – SE quadrant were sampled at 25', 30', and 35' bgs respectively.

Chloride analysis at 25', 30', and 35' bgs indicated concentrations at BH #1 were 240-pm, 112-pm, and 48-pm, respectively (see table).

Chloride analysis at 25', 30', and 35' bgs indicated concentrations at BH #2 were 4319-pm, 1328-pm, and 128-pm, respectively (see table).

BH #3 – SW Quadrant was sampled at 25', 30', 35', 40', 45', 50', 55', 57', 60', and 62' bgs respectively.

Chloride analysis at 25', 30', 35', 40', 45', 50', 57', 60', and 62' bgs indicated concentrations at BH #3 were 10,157-ppm, 11,436-ppm, 8237-ppm, 3071-ppm, 2159-ppm, 1695-ppm, 1663-ppm, 656-ppm, and 2007-ppm (saturated zone), respectively (see table).

BH #4 – NW Quadrant was sampled at 25', 30', 35', 40', 45', 50', and 55' bgs respectively.

Chloride analysis at 25', 30', 35', 40', 45', 50', and 55'bgs indicated concentrations at BH #4 were 1408-ppm, 1871-ppm, 512-ppm, 432-ppm, 560-ppm, 400-ppm, and 16-ppm, respectively (see table).

4.2 Groundwater Characterization

Groundwater was encountered in BH #3 at 62' bgs with a chloride concentration of 2007-ppm.

The samples were properly packaged, preserved, and transported under Chain-of-Custody to Cardinal Laboratories of Hobbs, New Mexico for analysis. All samples were analyzed for Chlorides (EPA Method: 4500-Cl⁻B).

5.0 Abatement Plan

The purpose of the Stage 1 abatement plan is "to design and conduct a site investigation that will adequately define site conditions, and provide the data necessary to select and design an effective abatement option." Pursuant to OCD Rule 19.E.3, a State 1 abatement plan may include but not be limited to information as needed to select and

implement an abatement option. Accordingly, Apache will generate and include the following information and date in the report to be submitted following such site investigation as necessary to determine abatement options. Information previously generated and included with this report is expected to satisfy some to the investigation report requirements.

a. *Descriptions of the site, including a site map, and of site history including the mature of the release that caused the water impact, and a summary of previous investigations;*

   Information satisfying much of the requirement is submitted herein. It will be updated as necessary for submittal with the Stage 1 report.

b. *Additional site investigation to define (i) site geology and hydrogeology, the vertical and horizontal extent and magnitude of groundwater contamination, subsurface hydraulic conductivity, transmissivity, storativity, and rate and direction of contaminant migration, inventory of water wells inside and within one (1) mile from the perimeter of the three dimensional body where the standards set forth in [the rule] are exceeded, and location and number of such wells actually or potentially affected by the impact; and (ii) surface-water hydrology, seasonal stream flow characteristics, groundwater/surface-water relationships,...[etc.]*

   Additional investigation is necessary to fill gaps in data already collected at the site, including the drilling and installation of monitor wells, and measurement of aquifer properties. An inventory of water wells will be conducted within one mile of the perimeter of the site and wells that potentially could be affected by the contamination identified. Three temporary monitor wells will be installed and completed as permanent wells with a bentonite seal to within 2 ft. of the surface and a metal protective locking box cemented at the surface. Following evaluation of data collected from the initial monitor wells, additional monitoring wells will be drilled as deemed necessary.

   To determine the hydraulic conductivity and transmissivity of the sediments, groundwater slug-tests will be conducted on the monitor wells and the draw down and recovery data analyzed with procedures commonly utilized for the purpose. Determination of storativity usually requires installation of closely spaced monitor wells so that one can serve as an observation well for the pumping well. At this location with a shallow water table, storativity can be estimated from technical publications and a separate monitor well solely for this purpose is not necessary.

   No intermittent, ephemeral or permanent sources of surface water are present in the area of the impact, so no hydrological or biological studies of the impact of the release on surface water are necessary.

c. *Monitoring program, including sampling stations and frequencies, for the duration of the abatement plan that may be modified, after approval by the Director, as additional sampling stations are created.*

Following installation of the monitoring wells, they will be developed to remove any mud, silt and sand inadvertently introduced during the drilling process. The well locations and elevations will be located and surveyed by a registered professional surveyor. Water levels will be measured quarterly and wells will be sampled quarterly for CoC's following purging to ensure a fresh sample. In addition, the initial sampling will also include major cations and anions to establish a baseline condition for these constituents.

d. *Quality assurance plan, consistent with the sampling and analytical techniques listed in [the Water Quality Control Commission regulations] for all work to be conducted pursuant to the abatement plan.*

Samples will be collected and handled in accordance with appropriate protocols for collection, preservation and transport of samples including maintaining a chain-of-custody and record keeping. The analytical laboratory selected to perform the analyses will be monitored for compliance with the applicable QA/QC standards.

e. *A schedule for all Stage 1 abatement plan activities, including the submission of summary quarterly progress reports, and the submission, for approval by the Director, of a detailed final site investigation report.*

It is expected that all investigation work proposed within the Stage 1 abatement plan will be completed within three months of the date of approval. Quarterly progress reports will be submitted within 30 days following the end of the previous quarter. The report will include work performed and analytical results from testing of water quality in new and existing monitor wells. A final report will be prepared and submitted within 60 days of the completion of the work.

f. *Any additional information that may be required to design and perform and adequate site investigation.*

The information necessary to design and perform an adequate site investigation is included in the above paragraphs.

ATTACHMENTS

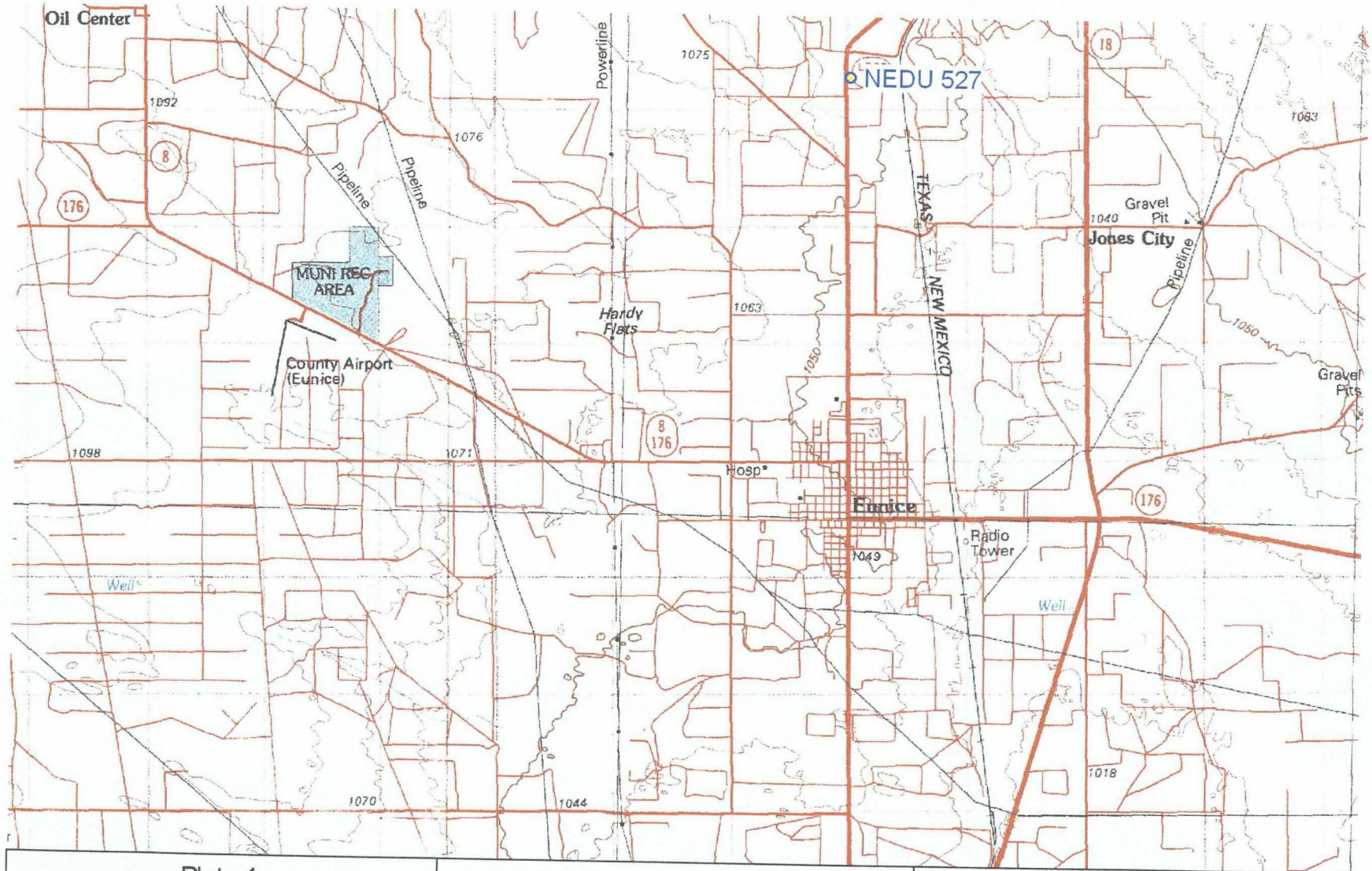


Plate 1 Well Site and Pit Location Apache Corporation NEDU #527	Lea County, New Mexico UL-M SECTION 10 T21S R37E 32° 29.387' N, 103° 09.502' W Elevation: ~3466-ft amsl	Drawing by: John Good February - 2007	Rev: 1
		SCALE: 0 Miles 2	N

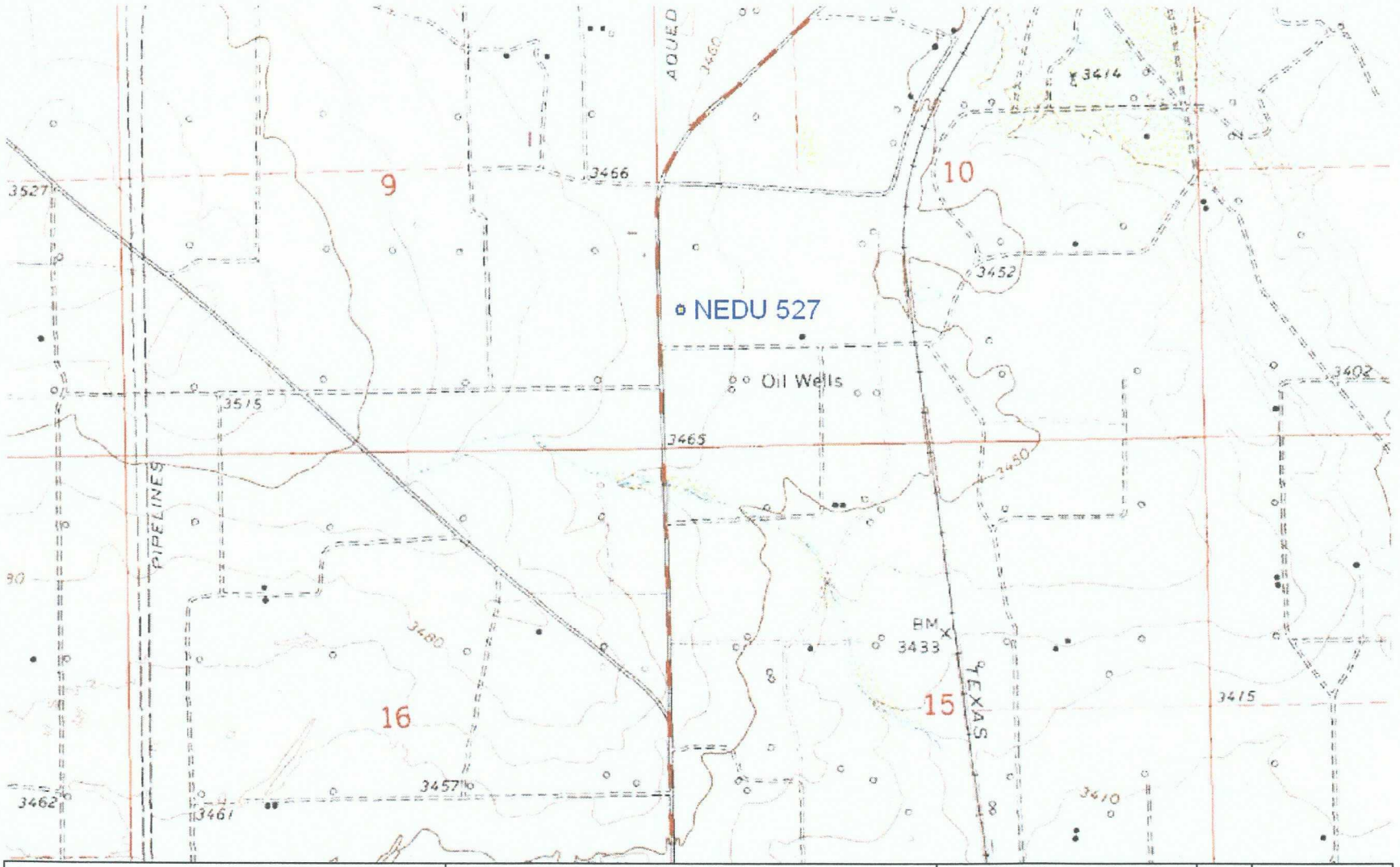
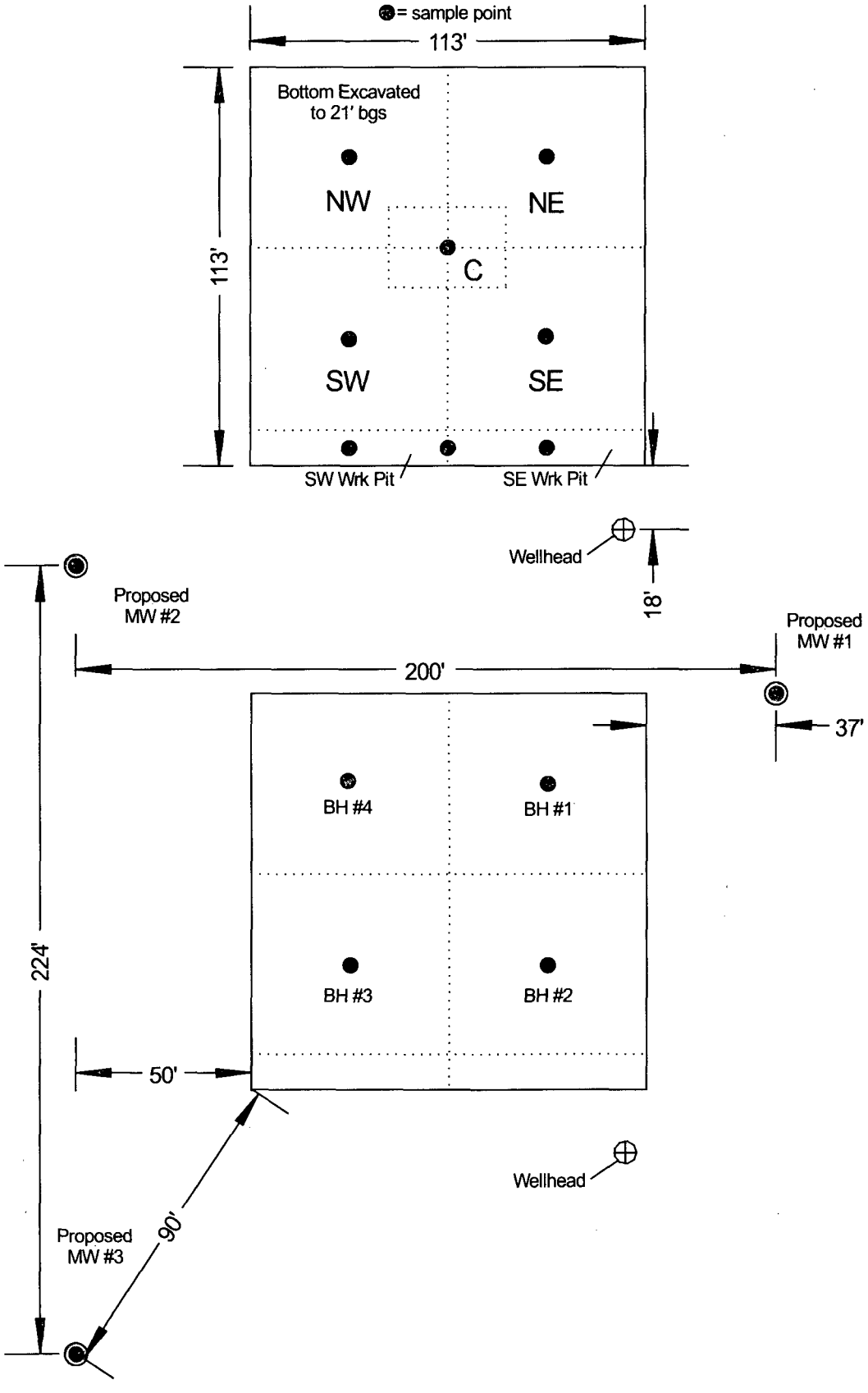


Plate 2 Well Site and Pit Topography Apache Corporation NEDU #527	Lea County, New Mexico UL-M SECTION 10 T21S R37E 32° 29.387' N, 103° 09.502' W Elevation: ~3466-ft amsl	Drawing by: John Good February - 2007	Rev: 1
		SCALE: 0 Feet 2800	

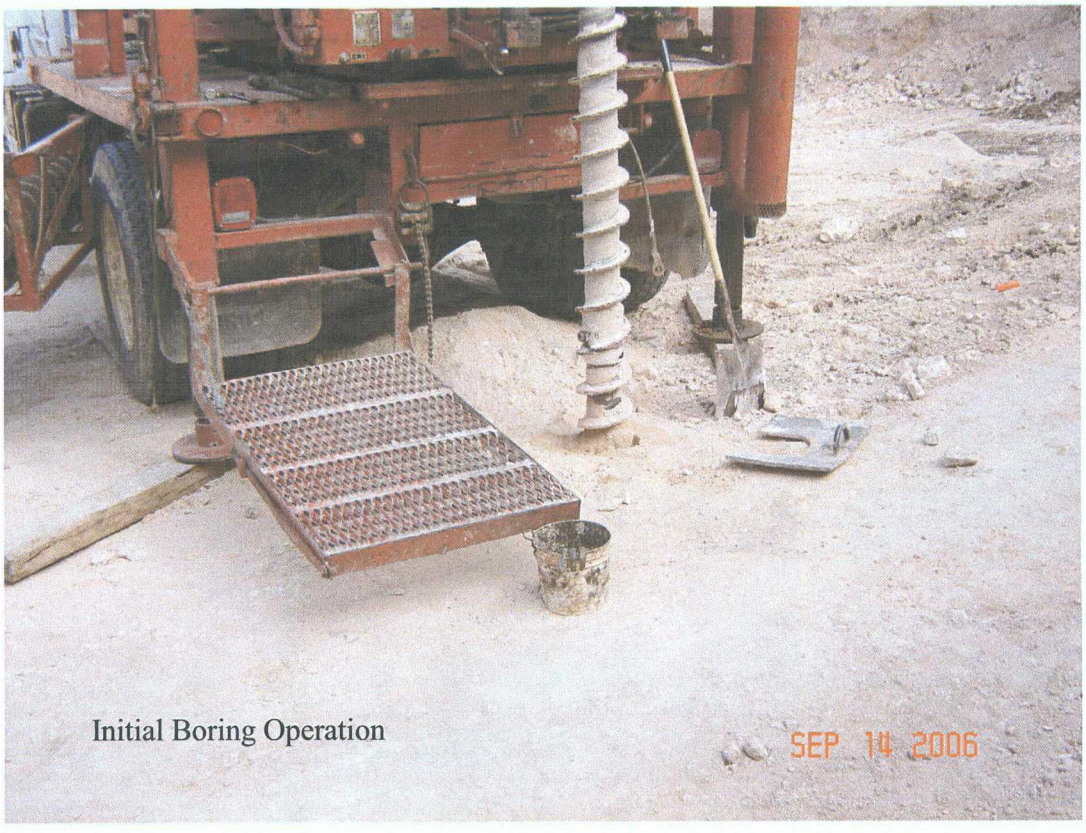
Plate 3 Aerial Photograph Apache Corporation NEDU #527	Lea County, New Mexico UL-M SECTION 10 T21S R37E 32° 29.387' N, 103° 09.502' W Elevation: ~3466-ft amsl	Drawing by: John Good February - 2007 SCALE: 0 Feet 1200	Rev: 1 N


= sample point
113'
Bottom Excavated to 21' bgs
NW
NE
C
SW
SE
113'
SW Wrk Pit
SE Wrk Pit
Wellhead
18'
Proposed MW #2
Proposed MW #1
200'
37'
BH #4
BH #1
BH #3
BH #2
224'
50'
Wellhead
Proposed MW #3
90'
N
Rev: 1
Drawing by: John Good
February - 2007
SCALE: 1" = 40'
0
80
Feet
Lea County, New Mexico
UL-M SECTION 10 T21S R37E
32° 29.387' N, 103° 09.502' W
Elevation: ~3466-ft amsl
Plate 4
Site Sampling Map
Apache Corporation
NEDU #527

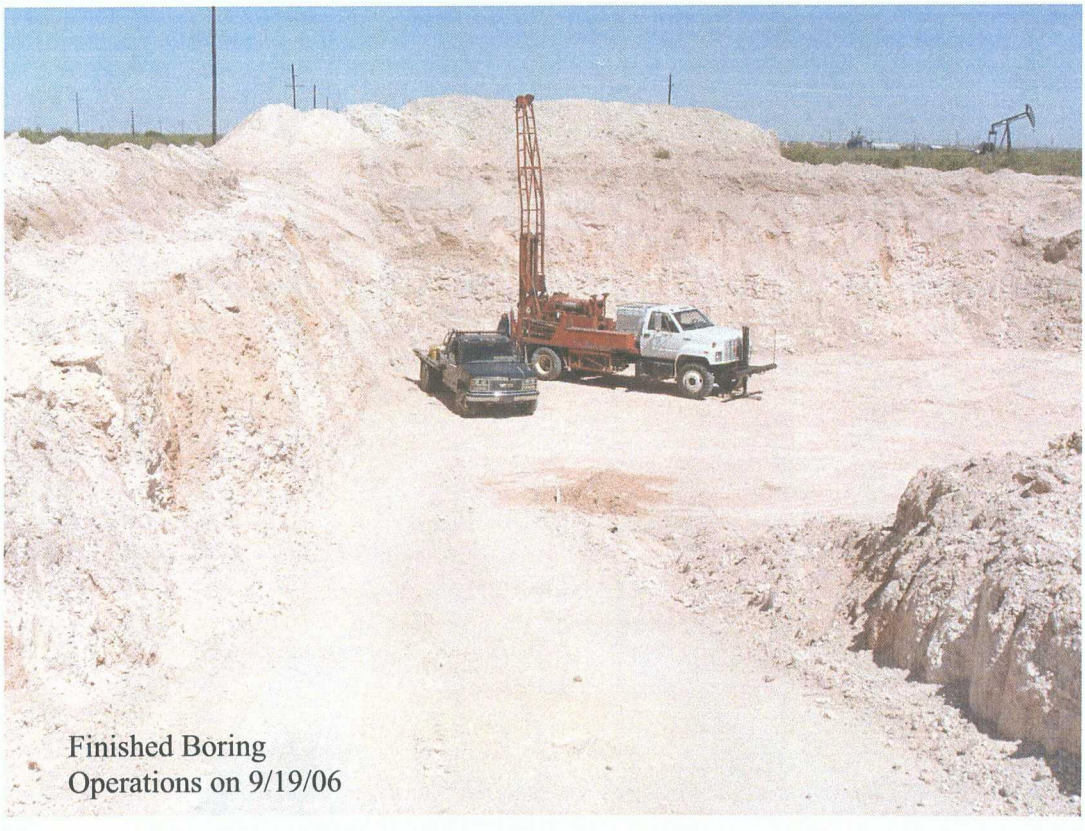
SUMMARY TABLE - - CHLORIDE ANALYSES			
Date	Location	Depth	ppm
7/31/2006	NE	10' BGS	17275
9/6/2006	NE	19' BGS	288
7/31/2006	NW	12' BGS	16315
8/806	NW	16' BGS	8797
9/6/2006	NW	19' BGS	8557
7/31/2006	C	10' BGS	2255
7/31/2006	C	12' BGS	272
8/8/2006	C	16' BGS	6158
8/8/2006	C	17' BGS	112
7/31/2006	SW	12' BGS	26872
8/8/2006	SW	16' BGS	37988
8/8/2006	SW	17' BGS	10477
9/6/2006	SW	19' BGS	8717
7/31/2006	SE	10' BGS	12396
8/8/2006	SE	16' BGS	5806
9/6/2006	SE	19' BGS	1935
8/8/2006	C.WRK.PIT	14' BGS	176
8/8/2006	SW.WRK.PIT	14' BGS	9677
8/28/2006	SW.WRK.PIT	19' BGS	5118
9/6/2006	E.WRK.PIT	19' BGS	224

* Saturated zone - ground water sample

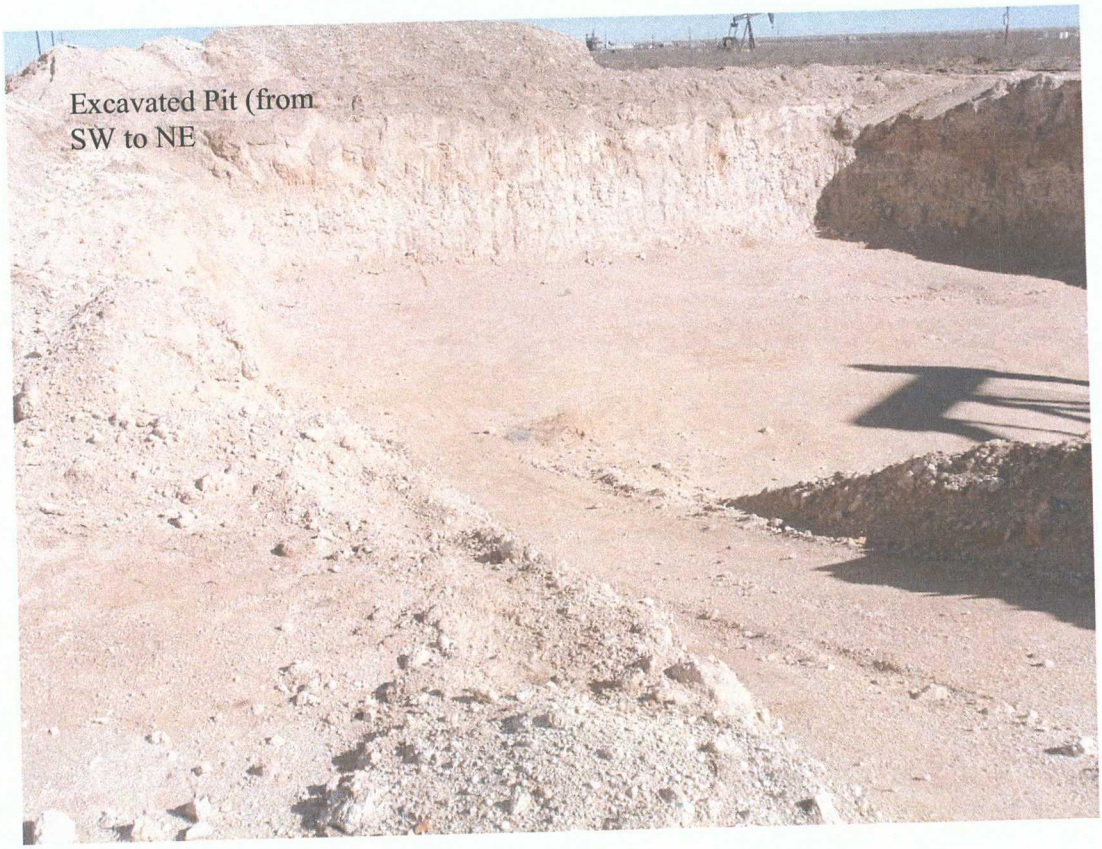
Date	Location	Depth	ppm
9/14/2006	BH #1	25' BGS	240
9/14/2006	BH #1	30' BGS	112
9/14/2006	BH #1	35' BGS	48
9/14/2006	BH #2	25' BGS	4319
9/14/2006	BH #2	30' BGS	1328
9/14/2006	BH #2	35' BGS	128
9/14/2006	BH #3	25' BGS	10157
9/14/2006	BH #3	30' BGS	11436
9/14/2006	BH #3	35' BGS	8237
9/14/2006	BH #3	40' BGS	3071
9/14/2006	BH #3	45' BGS	2159
9/14/2006	BH #3	50' BGS	1695
9/19/2006	BH #3	57' BGS	1663
9/19/2006	BH #3	60' BGS	656
9/19/2006	**BH #3**	**62' BGS**	**2007***
9/19/2006	BH #4	25' BGS	1408
9/19/2006	BH #4	30' BGS	1871
9/19/2006	BH #4	35' BGS	512
9/19/2006	BH #4	40' BGS	432
9/19/2006	BH #4	45' BGS	560
9/19/2006	BH #4	50' BGS	400
9/19/2006	BH #4	55' BGS	16



Initial Boring Operation



Finished Boring
Operations on 9/19/06



Excavated Pit (from SW to NE

Excavated Pit (from NW to SE

Cardinal Laboratories
Analytical Reports

(Photocopies attached to printed reports)