Apache

EXPLORING WHAT'S POSSIBLE

APACHE CORPORATION

P.O.Box 1849
Eunice, NM 88231
Phone 575.394.3159

Lou Wortham #20 AD

Update Report

NMOCD Case #: 1R0711-2726

Unit Letter F, Section 11, Township 22S, Range 37E

Rice Environmental Consulting & Safety
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

November 29th, 2011

Mr. Geoffrey Leking
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau
1625 N. French Drive
Hobbs, New Mexico 88240

RE: **UPDATE REPORT**
Apache Corporation
Lou Wortham #20 AD (1R0711-2726): UL/F sec. 11 T22S R37E

Mr. Leking:

Apache Corporation (Apache) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site.

The site is located approximately 2.5 miles southeast of Eunice, New Mexico at UL/F, Sec. 11, T22S, R37E as shown on the Site Location Map (Figure 1). Groundwater at this site is located approximately +/-37 feet below ground surface (bgs).

On May 25th, 2011 six soil bores were installed at the site (Figure 2). The samples were field tested for chlorides and screened in the field for hydrocarbons with a photo-ionization detector. Representative samples from the bores were taken to a commercial laboratory for confirmation of chloride field numbers (Appendix A). Laboratory readings showed chloride numbers ranging from a high of 7,900 mg/kg at 18 ft bgs in SB-2 to a low of 16 mg/kg at the surface of SB-3.

Beginning on August 3rd, 2011 the site was excavated to 120' x 188' x 5' bgs per the approval of the NMOCD District 1 Office (Figure 3). The excavated soils were taken for disposal at an NMOCD approved facility. A total of 5,104 yards of soil were taken to Sundance Services for disposal. Two additional areas within the excavation were excavated to 21 ft bgs. These two areas surrounded SB-1 and SB-2 respectively and measured 10' x 10' each. At the base of these two excavations, liners were installed to inhibit the downward migration of chlorides. A one foot clay layer was placed at the base of the two excavations, and then a 20-mil reinforced poly liner was laid on top of the clay. One and a half feet of blow sand from landowner's pit was placed above the poly liner to pad the liner. Then the two excavations were backfilled to 5 ft bgs with clean imported caliche from the landowner's pit. On August 12th, 2011, a 20-mil reinforced poly liner was placed over the entire 120' x 188' excavation. The liner was padded above and below with six inches of clean imported blow sand. The sand below the liner was imported from landowner's pit and the sand above the liner was imported from Apache. Representative samples from the imported sand above the liner and the imported caliche were taken to a commercial laboratory for analysis. Laboratory readings returned non-detect for chlorides on the

imported sand and at 16 mg/kg for chlorides on the imported caliche (Appendix B). The excavation was then backfilled with the imported caliche to 2 ft bgs. Imported sand was then used to bring the excavation up to surface level (Appendix C). Soil amendments were added to the site and the site was seeded with a native vegetative mix on September 6th, 2011 (Appendix D). Photos of these activities can be found in Appendix E.

On August 9th, 2011, two monitor wells were installed at the site (Figure 2). MW-1, the source monitor well, was installed 35 ft south southeast of the excavation and MW-2, the up gradient monitor well, was installed 63 ft north northwest of the excavation. Logs for these wells can be found in Appendix F.

On September 12th, 2011, the two monitor wells were sampled for groundwater chloride concentrations (Figure 4). The samples were taken to a commercial laboratory for analysis. MW-1, the source monitor well, had a laboratory chloride concentration 17,400 mg/L and MW-2, the up gradient monitor well, had a laboratory chloride concentration of 17,800 mg/L (Appendix G).

Recommendations

Based on the soil bore installations, there is evidence that chloride may have leached through the vadose zone and into the capillary fringe. Therefore, Apache will conduct quarterly monitor well sampling to determine the possible extent of chloride contamination beneath the site. Once it is determined whether chloride impact has occurred to groundwater beneath the site, Apache will either suggest a groundwater remedy for the site or request site termination.

RECS appreciates the opportunity to work with you on this project. Please call Hack Conder (575) 393-9174 or Natalie Gladden (575) 390-4186 if you have any questions or wish to discuss the site.

Sincerely,

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

cc. Natalie Gladden, Apache Corp.
Glenn von Gonten, NMOCD
Edward J. Hansen, NMOCD

Attachments:

Figure 1 – Site location map

Figure 2 – Soil bore installation map

Figure 3 – Excavation map

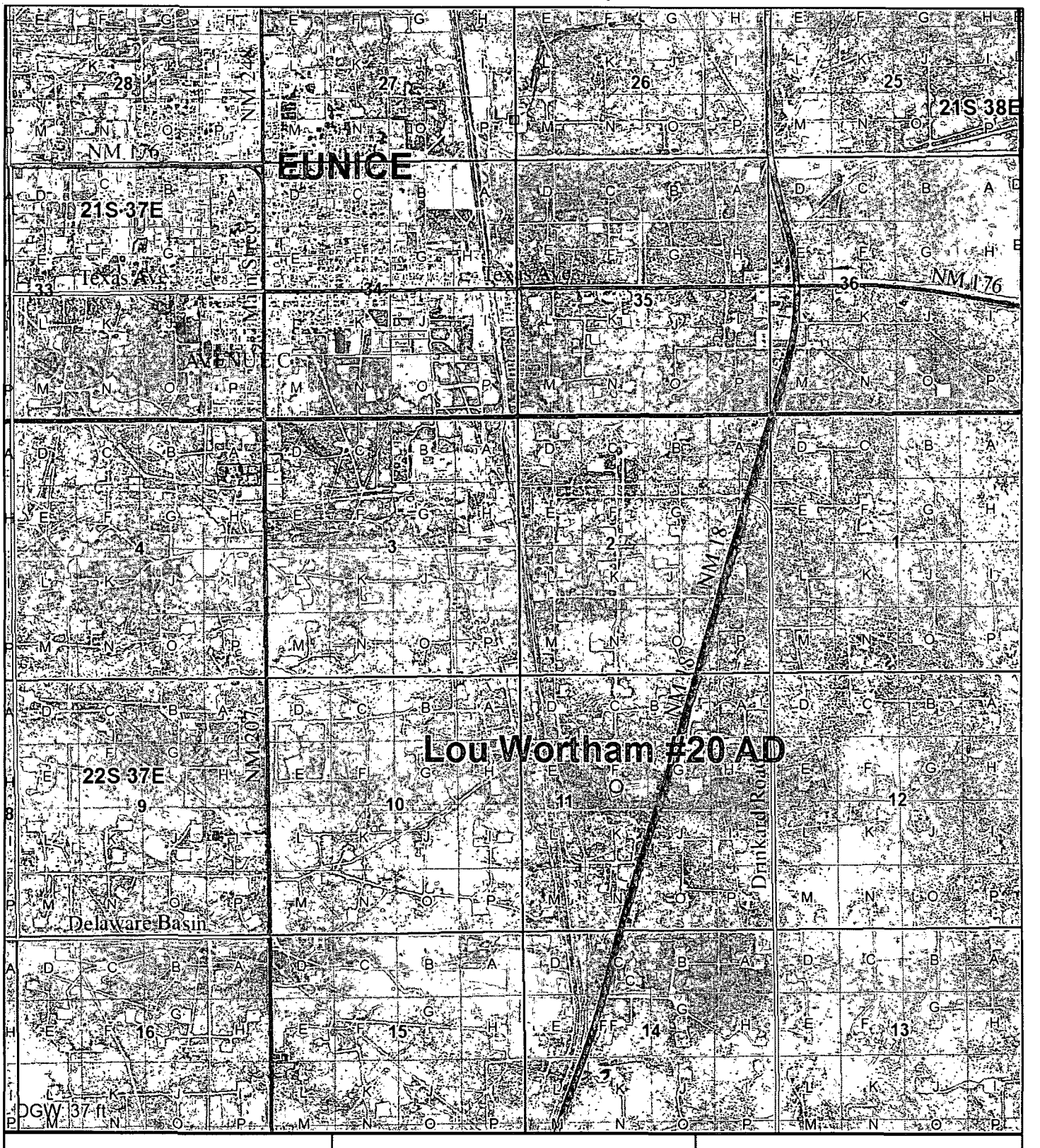
Figure 4 – Monitor well sampling map

Appendix A – Soil bore logs and laboratory confirmation
Appendix B – Imported sand and caliche laboratory confirmation
Appendix C – Excavation diagram
Appendix D – Seeding report
Appendix E – Excavation photo page
Appendix F – Monitor well installation logs
Appendix G – Monitor well sampling laboratory analysis

Figures

RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

Site Map



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC
RECS

Apache
Lou Wortham #20 AD

NMOCD Case #: 1R0711-2726

LEGALS: UL/F sec. 11
T22S R37E

Figure 1

N
W E
S

0 0.25 0.5 1
Miles

Drawing date: 8-18-11
Drafted by: L. Weinheimer

Monitor Well Installation

SB-1
45'S/50'E of well head

Depth	Cl-	PID	LAB Cl-
SS	6503	0.2	7500
3	2932	2.5	
6	3333	1.4	
9	3041	0.6	4700
12	2333	0.6	
15	1255	0.7	
18	614	0.6	
21	426	0.6	
24	364	0.9	
27	423	0.6	
30	260	1.2	
33	211	1.1	240

SB-2
69'NE of SB-1

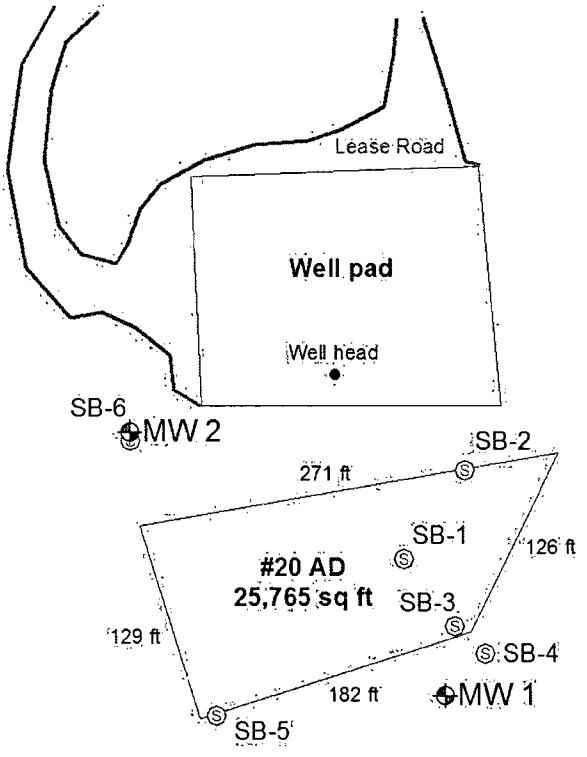
Depth	Cl-	PID	LAB Cl-
SS	284	0.1	176
3	385	0.7	
6	649	0.9	
9	611	1.2	
12	3761	1.1	
15	3676	0.8	
18	4415	0.6	7900
21	3740	0.8	
24	1029	0.9	
27	935	0.6	
30	879	1	
33	930	1.1	1090

SB-3
54'SE of SB-1

Depth	Cl-	PID	LAB Cl-
SS	175	0.2	16
3	298	1.9	
6	595	0.8	
9	690	1.2	
12	1049	1.2	
15	1060	0.9	1140
18	916	1.3	
21	326	1.1	
24	469	0.8	
27	480	0.8	
30	533	0.6	
33	823	1.1	832

SB-4
75'SE of SB-1

Depth	Cl-	PID	LAB Cl-
SS	154	0	80
3	706	1.1	
6	955	0.4	1280
9	845	0.4	
12	594	0.3	
15	478	0.4	
18	306	0.3	
21	153	0.2	128



SB-5
159'SE of SB-1

Depth	Cl-	PID	LAB Cl-
SS	234	0	240
3	861	0.6	1280
6	715	0.8	
9	733	0.4	
12	590	0.6	
15	379	0.6	
18	318	0.3	
21	175	0.3	96

SB-6
187'SE of SB-1

Depth	Cl-	PID	LAB Cl-
SS	374	0.4	<16
3	180	0.9	
6	149	0.1	
9	288	0.7	
12	361	0.4	480
15	250	0.8	
18	241	0.5	
21	146	0.5	96

DGW: 37 ft

RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

Apache
Lou Wortham #20 AD

LEGALS: UL/F sec. 11
T22S R37E

NMOCD Case #: 1R0711-2726

Figure 2

N W E S

0 37.5 75 150
Feet

Drawing date: 8-18-11
Drafted by: L. Weinheimer

Excavation Map

SB-1
45'S/50'E of well head

Depth	Cl-	PID	LAB Cl-
SS	6503	0.2	7500
3	2932	2.5	
6	3333	1.4	
9	3041	0.6	4700
12	2333	0.6	
15	1255	0.7	
18	614	0.6	
21	426	0.6	
24	364	0.9	
27	423	0.6	
30	260	1.2	
33	211	1.1	240

SB-2
69'NE of SB-1

Depth	Cl-	PID	LAB Cl-
SS	284	0.1	176
3	385	0.7	
6	649	0.9	
9	611	1.2	
12	3761	1.1	
15	3676	0.8	
18	4415	0.6	7900
21	3740	0.8	
24	1029	0.9	
27	935	0.6	
30	879	1	
33	930	1.1	1090

SB-3
54'SE of SB-1

Depth	Cl-	PID	LAB Cl-
SS	175	0.2	16
3	298	1.9	
6	595	0.8	
9	690	1.2	
12	1049	1.2	
15	1060	0.9	1140
18	916	1.3	
21	326	1.1	
24	469	0.8	
27	480	0.8	
30	533	0.6	
33	823	1.1	832.

SB-4
75'SE of SB-1

Depth	Cl-	PID	LAB Cl-
SS	154	0	80
3	706	1.1	
6	955	0.4	1280
9	845	0.4	
12	594	0.3	
15	478	0.4	
18	306	0.3	
21	153	0.2	128

Lease Road

SB-6

188 ft

10 ft

10 ft SB-2

10 ft

10 ft SB-1

Excavation

120 ft

SB-3

SB-4

SB-5
159'SE of SB-1

Depth	Cl-	PID	LAB Cl-
SS	234	0	240
3	861	0.6	1280
6	715	0.8	
9	733	0.4	
12	590	0.6	
15	379	0.6	
18	318	0.3	
21	175	0.3	96

MW 1

SB-6
187'SE of SB-1

Depth	Cl-	PID	LAB Cl-
SS	374	0.4	<16
3	180	0.9	
6	149	0.1	
9	288	0.7	
12	361	0.4	480.
15	250	0.8	
18	241	0.5	
21	146	0.5	96

DGW 37 ft

RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

Apache
Lou Wortham #20 AD

LEGALS: UL/F sec. 11
T22S R37E

NMOCD Case #: 1R0711-2726

Figure 3

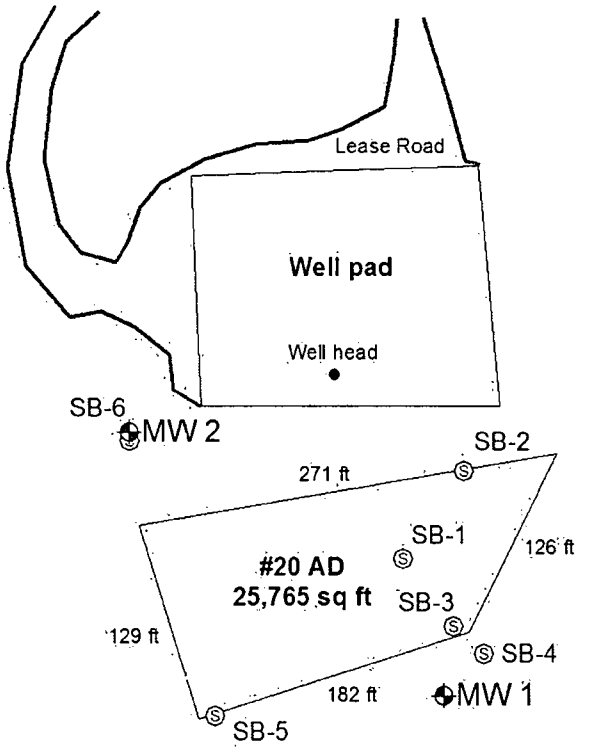
N W E S

0 12.5 25 50
Feet

Drawing date: 8-18-11
Drafted by: L. Weinheimer

Monitor Well Sampling

MW	Depth to Water	Total Depth	Well Volume	Volume Purged	Sample Date	Cl	Comments
1	39.67	80.78	26.7	80	9/12/2011	17400	Clear No odor
2	40.35	50.95	1.7	8	9/12/2011	17800	Clear No odor



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC

Apache
Lou Wortham #20 AD

LEGALS: UL/F sec. 11
T22S R37E

NMOCD Case #: 1R0711-2726

Figure 4

N W E S

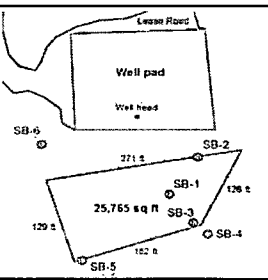
0 37.5 75 150 Feet

Drawing date: 9-19-11
Drafted by: L. Weinheimer

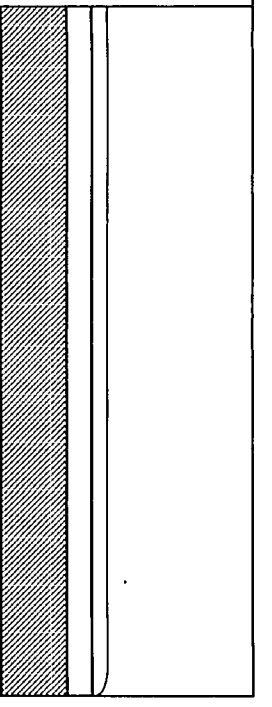
Appendix A

Soil bore logs and laboratory confirmation

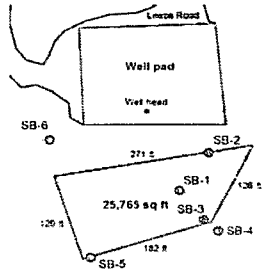
RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

Logger:	Jordan Woodfin		RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC
Driller:	Harrison & Cooper, Inc.		**Company:** Apache Corporation
Drilling Method:	Air rotary		**Project Name:** Lou Worthan #20 AD **Well ID:** SB-1
Start Date:	5/25/2011		**Project Consultant:** RECS
End Date:	5/25/2011		**Location:** UL/F sec. 11 T22S R37E
Comments: Located 125 ft south-south-west from the well head. All the samples were taken from cuttings. **DRAFTED BY: L. Weinheimer** TD = 33 ft GW = 37 ft			**Lat:** 32°24'25.136"N **County**: Lea **Long:** 103°8'8.853"W **State**: NM

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Tan very fine silty sand with caliche		
SS	6503	Cl- 7500	0.2			
				Red very fine silty clay		
3 ft	2932		2.5			
				Light brown very fine silty sand with caliche		
6 ft	3333		1.4			
				Tan very fine silty sand with caliche		bentonite seal
9 ft	3041	Cl- 4700	0.6			
12 ft	2333		0.6			
15 ft	1255		0.7			
18 ft	614		0.6			
21 ft	426		0.6			

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Tan very fine silty sand with caliche		
24 ft	364		0.9			
27 ft	423		0.6			
				Brown to red very fine sand		
30 ft	260		1.2			
				Tan to brown very fine silty sand with caliche		
33 ft	211	Cl-240	1.1			

Logger:	Jordan Woodfin
Driller:	Harrison & Cooper, Inc.
Drilling Method:	Air rotary
Start Date:	5/25/2011
End Date:	5/25/2011



Company: Apache Corporation
Project Name: Lou Worthan #20 AD
Well ID: SB-2
Project Consultant: RECS

Comments:
Located 103 ft southeast from the well head. All the samples were taken from cuttings.

DRAFTED BY: L. Weinheimer

TD = 33 ft GW = 37 ft

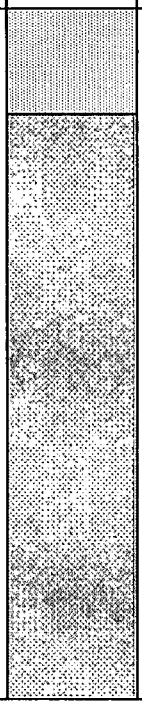
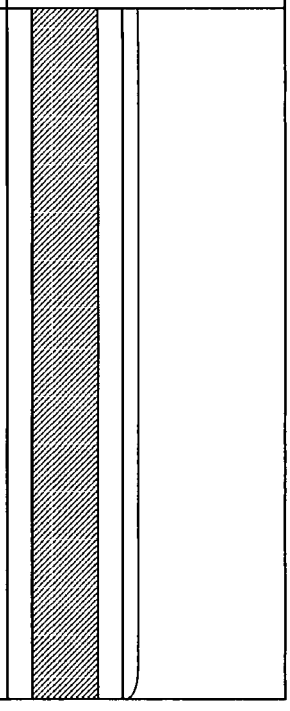
Location: UL/F sec. 11 T22S R37E
Lat: 32°24'25.691"N **County**: Lea
Long: 103°8'8.376"W **State**: NM

Depth (feet)	chloride field tests	LAB	PID	Description
				Brown very fine silty sand with caliche
SS	284	Cl- 176	0.1	
				Red fine silty clay
3 ft	385		0.7	
				Brown very fine silty sand with caliche
6 ft	649		0.9	
				Light brown to tan very fine silty sand
9 ft	611		1.2	
12 ft	3761		1.1	
15 ft	3676		0.8	
				Tan very fine silty sand with caliche
18 ft	4415	Cl- 7900	0.6	
21 ft	3740		0.8	

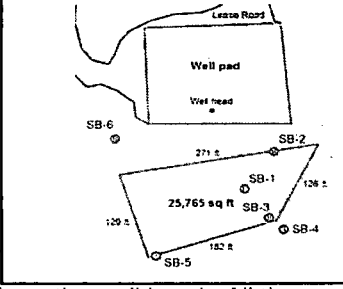
Lithology

Well Construction

bentonite seal

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
						
24 ft	1029		0.9			
				Light brown to tan very fine silty sand		
27 ft	935		0.6			
30 ft	879		1.0			
33 ft	930	Cl-1090	1.1			

Logger:	Jordan Woodfin
Driller:	Harrison & Cooper, Inc.
Drilling Method:	Air rotary
Start Date:	5/25/2011
End Date:	5/25/2011



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC
RECS

Company: Apache Corporation
Project Name: Lou Worthan #20 AD
Well ID: SB-3
Project Consultant: RECS

Comments:
Located 178 ft south-south-east from the well head. All the samples were taken from cuttings.

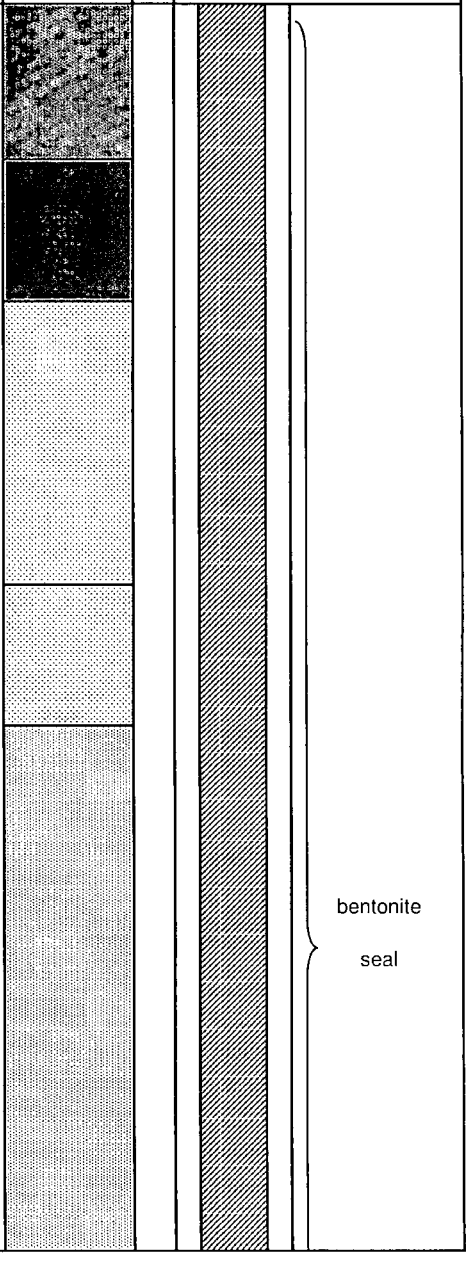
DRAFTED BY: L. Weinheimer

TD = 33 ft GW = 37 ft

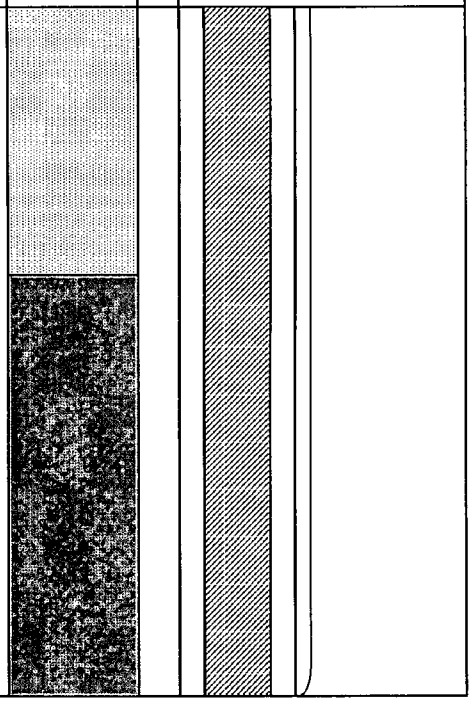
Location: UL/F sec. 11 T22S R37E

Lat: 32°24'24.702"N **County**: Lea
Long: 103°8'8.465"W **State**: NM

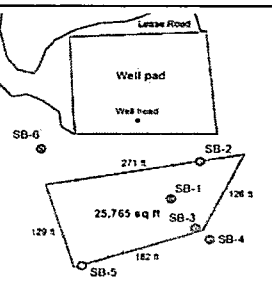
Depth (feet)	chloride field tests	LAB	PID	Description
				Brown very fine silty sand well consolidated
SS	175	Cl- 16	0.2	
				Red silty clay well consolidated
3 ft	298		1.9	
				Tan very fine silty sand
6 ft	595		0.8	
9 ft	690		1.2	
				Light red very fine silty sand
12 ft	1,049		1.2	
				Tan very fine silty sand with caliche
15 ft	1,060	Cl- 1140	0.9	
18 ft	916		1.3	
21 ft	326		1.1	



Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
24 ft	469		0.8			
27 ft	480		0.8			
30 ft	533		0.6			
				Brownish red very fine sand		
33 ft	823	Cl-832	1.1			



Logger:	Jordan Woodfin
Driller:	Harrison & Cooper, Inc.
Drilling Method:	Air rotary
Start Date:	5/25/2011
End Date:	5/25/2011



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC — RECS

Company: Apache Corporation
Project Name: Lou Worthan #20 AD
Well ID: SB-4
Project Consultant: RECS

Comments:
Located 202 ft south-south-east from the well head. All the samples were taken from cuttings.

DRAFTED BY: L. Weinheimer

TD = 21 ft GW = 37 ft

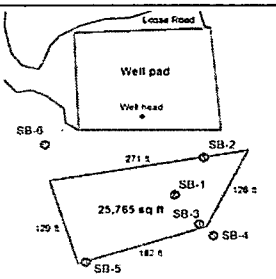
Location: UL/F sec. 11 T22S R37E
Lat: 32°24'24.535"N **County**: Lea
Long: 103°8'8.272"W **State**: NM

Depth (feet)	chloride field tests	LAB	PID	Description
				Light brown very fine silty sand
SS	154	Cl-80	0	
				Red silty clay well consolidated
3 ft	706		1.1	
				Tan very fine silty sand with caliche
6 ft	955	Cl-1280	0.4	
9 ft	845		0.4	
12 ft	594		0.3	
15 ft	478		0.4	
18 ft	306		0.3	
21 ft	153	Cl-128	0.2	

Lithology

Well Construction: bentonite seal

Logger:	Jordan Woodfin
Driller:	Harrison & Cooper, Inc.
Drilling Method:	Air rotary
Start Date:	5/25/2011
End Date:	5/25/2011



Company: Apache Corporation
Project Name: Lou Worthan #20 AD
Well ID: SB-5
Project Consultant: RECS
Location: UL/F sec. 11 T22S R37E
Lat: 32°24'24.161"N
Long: 103°8'10.292"W
County: Lea
State: NM

Comments:
Located 230 ft south-west from the well head. All the samples were taken from cuttings.
DRAFTED BY: L. Weinheimer
TD = 21 ft
GW = 37 ft

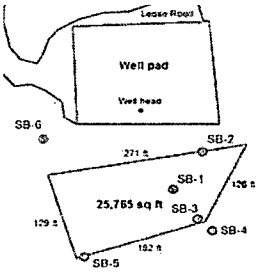
Depth (feet)	chloride field tests	LAB	PID	Description
				Brown very fine sand
SS	234	Cl-240	0	
				Tan very fine silty sand with caliche
3 ft	861	Cl-1280	0.6	
6 ft	715		0.8	
9 ft	733		0.4	
12 ft	590		0.6	
15 ft	379		0.6	
18 ft	318		0.3	
21 ft	175	Cl-96	0.3	

Lithology

Well Construction

bentonite seal

Logger:	Jordan Woodfin
Driller:	Harrison & Cooper, Inc.
Drilling Method:	Air rotary
Start Date:	5/25/2011
End Date:	5/25/2011



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC — RECS

Company: Apache Corporation
Project Name: Lou Worthan #20 AD
Well ID: SB-6
Project Consultant: RECS

Comments:
Located 139 ft west-south-west from the well head. All the samples were taken from cuttings.

DRAFTED BY: L. Weinheimer

TD = 21 ft GW = 37 ft

Location: UL/F sec. 11 T22S R37E

Lat: 32°24'25.886"N **County**: Lea
Long: 103°8'10.915"W **State**: NM

Depth (feet)	chloride field tests	LAB	PID	Description
				Brown very fine sand
SS	374	Cl- <16.0	0.4	
				Red very fine silty clay
3 ft	180		0.9	
				Tan very fine silty sand with caliche
6 ft	149		0.1	
9 ft	288		0.7	
12 ft	361	Cl- 480	0.4	
15 ft	250		0.8	
				Light brown very fine silty sand with caliche
18 ft	241		0.5	
21 ft	146	Cl- 96	0.5	

Lithology

Well Construction

bentonite seal

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

June 01, 2011

NATALIE GLADDEN

APACHE - EUNICE

P. O. BOX 1849

EUNICE, NM 88231

RE: LOU WORTHAN #20

Enclosed are the results of analyses for samples received by the laboratory on 05/25/11 15:52.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydorcarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

APACHE - EUNICE
NATALIE GLADDEN
P. O. BOX 1849
EUNICE NM, 88231
Fax To: 394-2425

Received:	05/25/2011	Sampling Date:	05/25/2011
Reported:	06/01/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAN #20	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SOIL BORE #1 @ SURFACE (H101075-01)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**7500**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #1 @ 9' (H101075-02)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**4700**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #1 @ 33' (H101075-03)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**240**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #2 @ SURFACE (H101075-04)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**176**	16.0	05/27/2011	ND	448	112	400	3.64	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

APACHE - EUNICE
NATALIE GLADDEN
P. O. BOX 1849
EUNICE NM, 88231
Fax To: 394-2425

Received:	05/25/2011	Sampling Date:	05/25/2011
Reported:	06/01/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAN #20	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SOIL BORE #2 @ 18' (H101075-05)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**7900**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #2 @ 33' (H101075-06)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1090**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #3 @ SURFACE (H101075-07)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**16.0**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #3 @ 15' (H101075-08)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1140**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #3 @ 33' (H101075-09)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**832**	16.0	05/27/2011	ND	448	112	400	3.64	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

APACHE - EUNICE
NATALIE GLADDEN
P. O. BOX 1849
EUNICE NM, 88231
Fax To: 394-2425

Received:	05/25/2011	Sampling Date:	05/25/2011
Reported:	06/01/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAN #20	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SOIL BORE #4 @ SURFACE (H101075-10)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**80.0**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #4 @ 6' (H101075-11)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1280**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #4 @ 21' (H101075-12)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**128**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #5 @ SURFACE (H101075-13)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**240**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #5 @ 3' (H101075-14)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**1280**	16.0	05/27/2011	ND	448	112	400	3.64	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

APACHE - EUNICE
NATALIE GLADDEN
P. O. BOX 1849
EUNICE NM, 88231
Fax To: 394-2425

Received:	05/25/2011	Sampling Date:	05/25/2011
Reported:	06/01/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAN #20	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SOIL BORE #5 @ 21' (H101075-15)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**96.0**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #6 @ SURFACE (H101075-16)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #6 @ 12' (H101075-17)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**480**	16.0	05/27/2011	ND	448	112	400	3.64	

Sample ID: SOIL BORE #6 @ 21' (H101075-18)

Chloride, SM4500Cl-B mg/kg **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**96.0**	16.0	05/27/2011	ND	448	112	400	3.64	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Celey D. Keene, Lab Director/Quality Manager

CARDINAL LABORATORIES
101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325)673-7020

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

1 of 2

Company Name: Apache	BILL TO
Project Manager: Natalie Gladden	P.O. #:
Address:	Company:
City: State: NM Zip:	Attn:
Phone #: Fax #:	Address:
Project #: Project Owner:	City:
Project Name: Lou Worthan #20	State: Zip:
Project Location:	Phone #:
Sampler Name: Zach Conder	Fax #:

FOR LAB USE ONLY				MATRIX						PRESERV			SAMPLING		ANALYSIS REQUEST										
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID/BASE:	ICE / COOL	OTHER:	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions	TDS					
H10075																									
1	Soil Bore #1 Surface Sample	G	1			✓							5/25/11		✓										
2	Soil Bore #1 @ 9'	G	1			✓							5/25/11		✓										
3	Soil Bore #1 @ 33'	G	1			✓							5/25/11		✓										
4	Soil Bore #2 Surface Sample	G	1			✓							5/25/11		✓										
5	Soil Bore #2 @ 18'	G	1			✓							5/25/11		✓										
6	Soil Bore #2 @ 33'	G	1			✓							5/25/11		✓										
7	Soil Bore #3 Surface Sample	G	1			✓							5/25/11		✓										
8	Soil Bore #3 @ 15'	G	1			✓							5/25/11		✓										
9	Soil Bore #3 @ 33'	G	1			✓							5/25/11		✓										

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 5/25/11	Received By:	Phone Result: ☐ Yes ☑ No Add'l Phone #:
	Time: 3:52		Fax Result: ☐ Yes ☑ No Add'l Fax #:
Relinquished By:	Date:	Received By:	REMARKS:
	Time:		email results Natalie.Gladden@usa.apachecorp.com; Zconder@rice-ecs.com; Bbaker@rice-ecs.com; hconder@rice-ecs.com; Lweinheimer@rice-ecs.com

Delivered By: (Circle One) Sampler - UPS - Bus - Other: 34°

Sample Condition: Cool ☐ Yes ☐ No; Intact ☑ Yes ☐ No

CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

#220

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325)673-7020

2 of 2

Company Name: Apache	BILL TO	P.O. #:	
Project Manager: Natalie Gladden		Company:	
Address:		Attn:	
City: State: NM Zip:		Address:	
Phone #: Fax #:		City:	
Project #: Project Owner:		State: Zip:	
Project Name: Lou Worthan #20		Phone #:	
Project Location:		Fax #:	
Sampler Name: Zach Conder			

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRESERV: ACID/BASE	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions	TDS
H10075																				
10	Soil Bore #4 Surface Sample	G	1			✓							5/25/11		✓					
11	Soil Bore #4 @ 6'	G	1			✓							5/25/11		✓					
12	Soil Bore #4 @ 21'	G	1			✓							5/25/11		✓					
13	Soil Bore #5 Surface Sample	G	1			✓							5/25/11		✓					
14	Soil Bore #5 @ 3'	G	1			✓							5/25/11		✓					
15	Soil Bore #5 @ 21'	G	1			✓							5/25/11		✓					
16	Soil Bore #6 Surface Sample	G	1			✓							5/25/11		✓					
17	Soil Bore #6 @ 12'	G	1			✓							5/25/11		✓					
18	Soil Bore #6 @ 21'	G	1			✓							5/25/11		✓					

Relinquished By:	Date: 5/25/11 Time: 3:55	Received By: Jodi Henson	Phone Result: ☐ Yes ☑ No	Add'l Phone #:
Relinquished By:	Date: Time:	Received By:	Fax Result: ☐ Yes ☑ No	Add'l Fax #:

REMARKS:

email results
Natalie.Gladden@usa.apachecorp.com;
Zconder@rice-ecs.com; Bbaker@rice-ecs.com;
hconder@rice-ecs.com; Lweinheimer@rice-ecs.com

Delivered By: (Circle One)
Sampler - UPS - Bus - Other:

Sample Condition: Cool ☐ Yes ☑ No; Intact ☑ Yes ☐ No

CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

#426

Appendix B

Imported sand and caliche laboratory confirmation

RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

August 15, 2011

NATALIE GLADDEN

APACHE - EUNICE

P. O. BOX 1849

EUNICE, NM 88231

RE: LOU WORTHAM #20 AD

Enclosed are the results of analyses for samples received by the laboratory on 08/12/11 15:45.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydorcarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

APACHE - EUNICE
NATALIE GLADDEN
P. O. BOX 1849
EUNICE NM, 88231
Fax To: 394-2425

Received:	08/12/2011	Sampling Date:	08/12/2011
Reported:	08/15/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM #20 AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T22S-R37E-SEC11 UL-F - LEA CTY., NM		

Sample ID: BLOW SAND ABOVE LINER IMPORTED (H101703-01)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	08/15/2011	ND	416	104	400	0.00	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Celey D. Keene, Lab Director/Quality Manager

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325)673-7020

Company Name:	Apache	BILL TO	
Project Manager:	Natalie Gladden	P.O. #:	
Address:		Company:	
City:	State: NM Zip:	Attn:	
Phone #:	Fax #:	Address:	
Project #:	Project Owner:	City:	
Project Name:	Lov Worthon #20 AD	State: Zip:	
Project Location:		Phone #:	
Sampler Name:	Gerald Perez	Fax #:	

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST										
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions	TDS					
H101703																									
-1	Blow sand above liner imported	G	1			✓							8-12-11	2:00	✓										

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 8/17/11	Received By:	Phone Result: ☐ Yes ☑ No Add'l Phone #:
	Time: 7:45	Addie Henson	Fax Result: ☐ Yes ☑ No Add'l Fax #:
Relinquished By:	Date:	Received By:	REMARKS: email results Natalie.Gladden@usa.apachecorp.com; Zconder@rice-ecs.com; Bbaker@rice-ecs.com; hconder@rice-ecs.com; Lweinheimer@rice-ecs.com
	Time:		
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition Cool: ☐ Yes ☑ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials)

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

August 18, 2011

NATALIE GLADDEN

APACHE - EUNICE

P. O. BOX 1849

EUNICE, NM 88231

RE: LOU WORTHAM #20 AD

Enclosed are the results of analyses for samples received by the laboratory on 08/16/11 16:26.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydorcarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Hope S. Moreno

Hope Moreno

Inorganic Technical Director

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

APACHE - EUNICE
NATALIE GLADDEN
P. O. BOX 1849
EUNICE NM, 88231
Fax To: 394-2425

Received:	08/16/2011	Sampling Date:	08/15/2011
Reported:	08/18/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM #20 AD	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: BACKFILL (CALICHE) (H101724-01)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: AP**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**16.0**	16.0	08/17/2011	ND	416	104	400	0.00	

Cardinal Laboratories

*=Accredited Analyte

Hope S. Moreno

Hope Moreno, Inorganic Technical Director

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Hope S. Moreno

Hope Moreno, Inorganic Technical Director

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603
(505) 393-2326 FAX (505) 393-2476 (325) 673-7001 FAX (325)673-7020

Company Name: Apache	BILL TO
Project Manager: Natalie Gladden	P.O. #:
Address:	Company:
City: State: NM Zip:	Attn:
Phone #: Fax #:	Address:
Project #: Project Owner:	City:
Project Name:	State: Zip:
Project Location: LOU WORTHON #20 AD	Phone #:
Sampler Name: GERALD PEREZ	Fax #:

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST										
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions	TDS					
H10124-1	BACKFILL (CALICHE)	C	1			✓							8/15/11	02:05	✓										

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 8-15-11	Received By:	Phone Result: ☐ Yes ☑ No	Add'l Phone #:	
	Time: 4:26	Jodi Henson	Fax Result: ☐ Yes ☑ No	Add'l Fax #:	
Relinquished By:	Date:	Received By:	REMARKS: email results Natalie.Gladden@usa.apachecorp.com; Zconder@rice-ecs.com; Bbaker@rice-ecs.com; hconder@rice-ecs.com; Lweinheimer@rice-ecs.com		
	Time:				
Delivered By: (Circle One) Sampler - UPS - Bus - Other: 33°C	Sample Condition Cool: ☐ Yes ☑ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials)			

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

#26

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

August 25, 2011

NATALIE GLADDEN

APACHE - EUNICE

P. O. BOX 1849

EUNICE, NM 88231

RE: LOU WORTHAM #20 AD

Enclosed are the results of analyses for samples received by the laboratory on 08/23/11 16:00.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydorcarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

APACHE - EUNICE
NATALIE GLADDEN
P. O. BOX 1849
EUNICE NM, 88231
Fax To: 394-2425

Received:	08/23/2011	Sampling Date:	08/19/2011
Reported:	08/25/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM #20 AD	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: IMPORTED TOP CAP 8 PT. COMP (H101780-01)

Chloride, SM4500Cl-B **mg/kg** **Analyzed By: AP**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**16.0**	16.0	08/24/2011	ND	432	108	400	3.77	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(505) 393-2326 FAX (505) 393-2476

Company Name:	Apache
Project Manager:	Natalie Gladden
Address:	
City:	State: Zip:
Phone #:	Fax #:
Project #:	Project Owner:
Project Name:	
Project Location:	Lea Co. TWN. #20 A.D.
Sampler Name:	Bruce Baker

BILL TO	
P.O. #:	
Company:	
Attn:	
Address:	
City:	
State:	Zip:
Phone #:	
Fax #:	

FOR LAB USE ONLY				MATRIX						PRESERV			SAMPLING		ANALYSIS REQUEST												
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	ACID/BASE:	ICE / COOL	OTHER:	DATE	TIME	Cl-												
H101780	1 Inverted Top Cap & pt. Comp.	C	1			✓							8-19-11	10:45am	✓												

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By: Bruce Baker	Date: 8-23-11 Time: 4:00 pm	Received By: Jodi Henson	
Relinquished By:	Date: Time:	Received By:	

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS: email Natalie Gladden
Hack Cooler
Bruce Baker
Lara Weinheimer

Delivered By: (Circle One)
Sampler - UPS - Bus - Other:

Sample Condition: Cool ☐ Yes ☐ No Intact ☒ Yes ☐ No

CHECKED BY: (Initials) CHK

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476 #26

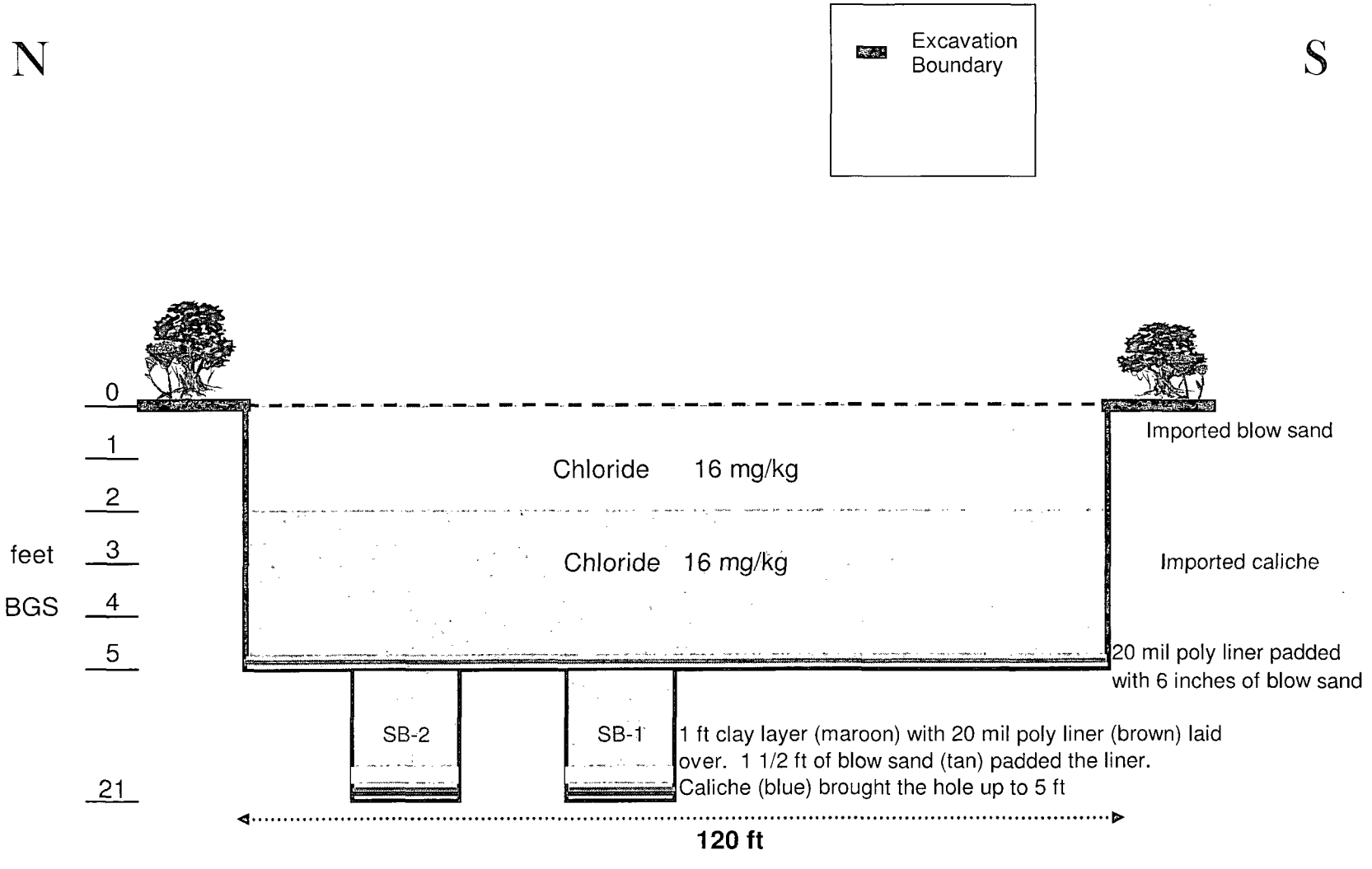
Appendix C

Excavation diagram

RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

Apache Lou Wortham #20 AD
Unit 'F', Sec. 11, T22S, R37E

Northwest Excavation Cross-Section



Appendix D

Seeding report

RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

RICE ENVIRONMENTAL
RECS
CONSULTING & SAFETY, LLC

PO Box 5630
Hobbs, NM 88241
Phone: (575) 393-4411
Fax: (575) 393-0293

REVEGETATION FORM

1. General Information

Site name: Apache Lou Wortham #20 AD						
U/L	Section	Township	Range	County	Latitude	Longitude
F	11	22S	37E	Lea	32°24'25.057"N	103°8'9.313"W
Contact Name: Bruce Baker						
Email: bbaker@rice-ecs.com						
Site size: 32,258 square feet			Map detail of site attached ☒			
Additional information:						

2. Soils **Do not rip caliche subsoils; caliche rocks brought to the surface by ripping shall be removed.*

Salvaged from site ☐	Bioremediated ☐	Imported ☒	Blended ☐	Depth (in): 60 in
Texture: sandy	Describe soil & subsoil:	Sandy blow sand		
Soil prep methods:	Rip ☐ Depth(in):	Disc ☒ Depth (in): 6 in	Rollerpack ☐	
Date completed: 9/6/11				

3. Bioremediation

Fertilizer ☐	Hay ☐	Other ☒
Type:		Describe: 90 bags of RestoreNhance
Lbs/acre:		

4. Seeding **Attach seed bag tags to this form. Seed bag tags shall contain the site name and S-T-R.*

Custom seed mix ☒	Prescribed mix ☐	Seed mix name: 35 lbs Johnson seed mix, 50 lbs wheat	Seeding date: 9/6/2011
Broadcast ☒ Method: push broadcast			
Soil conditions during seeding: Dry ☒ Damp ☐ Wet ☐			
Photos attached ☒ Number of photos:	Observations:		

5. Certification I hereby certify that the information in this form and attachments is true and complete to the best of my knowledge and belief.

Name: Dak Harris	Title: Environmental Tech	Date: 9/6/11
Signature: Dak Harris		

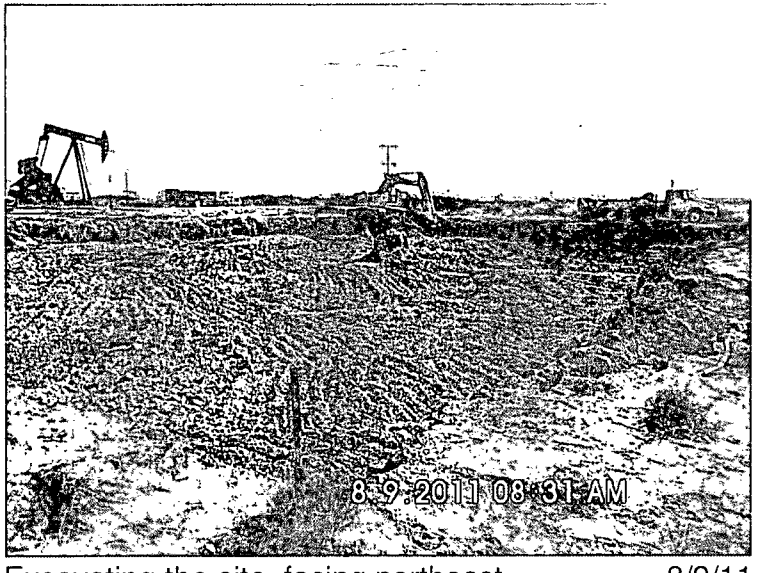
Appendix E

Excavation photo page

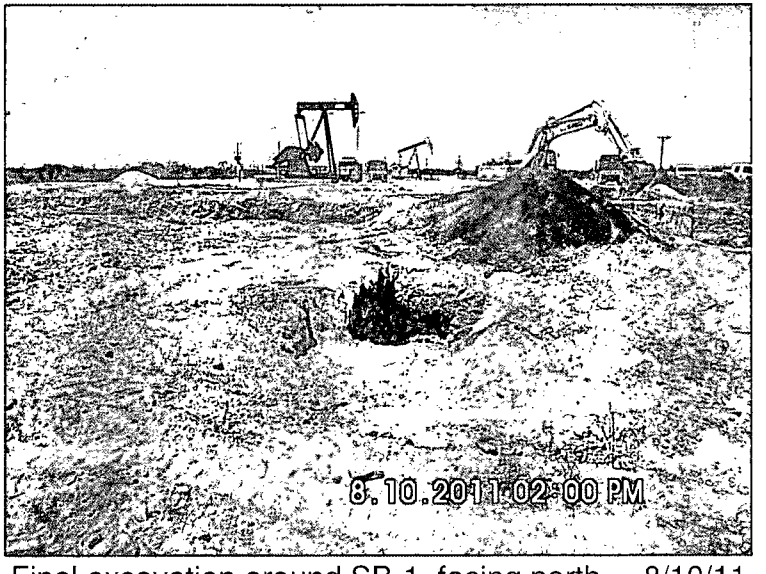
RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

Apache Lou Wortham #20 AD

Unit F, Section 11, T22S, R37E

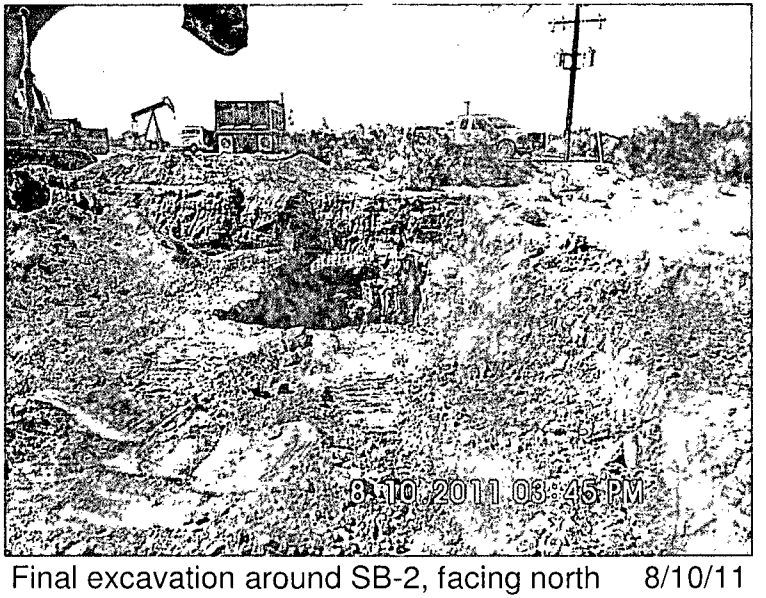


Excavating the site, facing northeast 8/9/11



Final excavation around SB-1, facing north 8/10/11

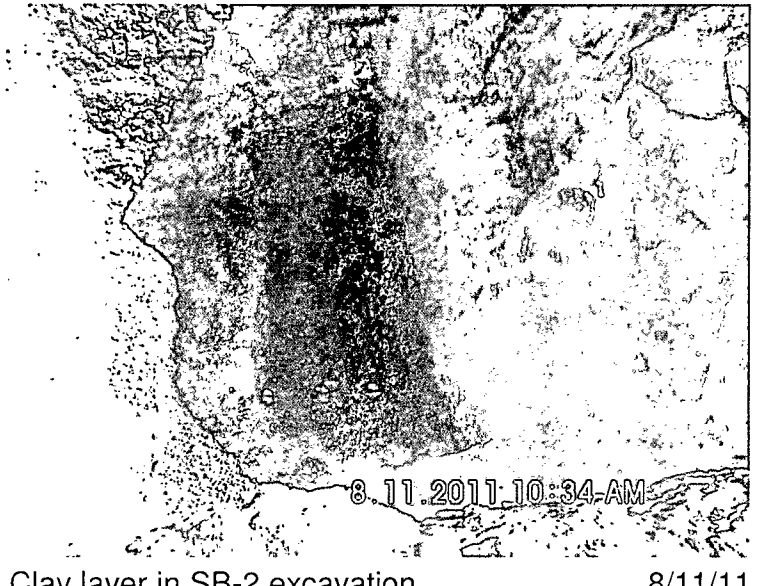
Exporting soil, facing southwest 8/10/11



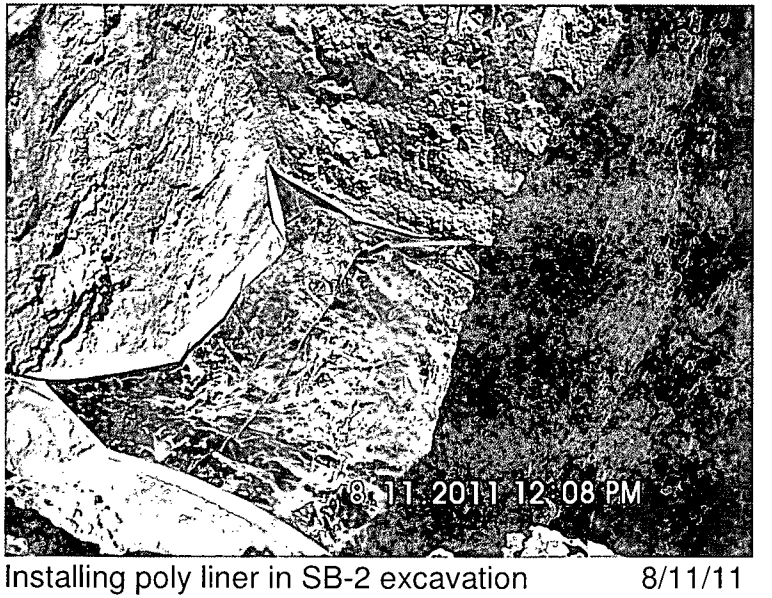
Final excavation around SB-2, facing north 8/10/11

Clay layer in SB-1 excavation 8/11/11

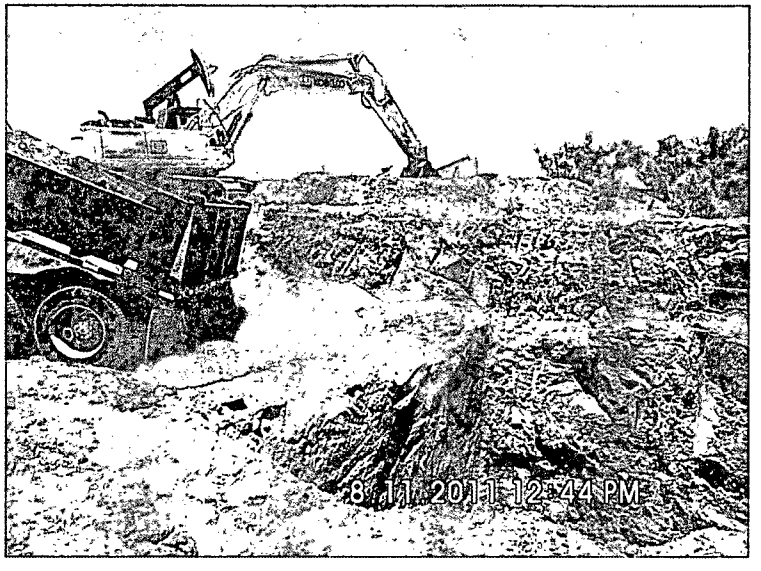
Installing poly liner in SB-1 excavation 8/11/11



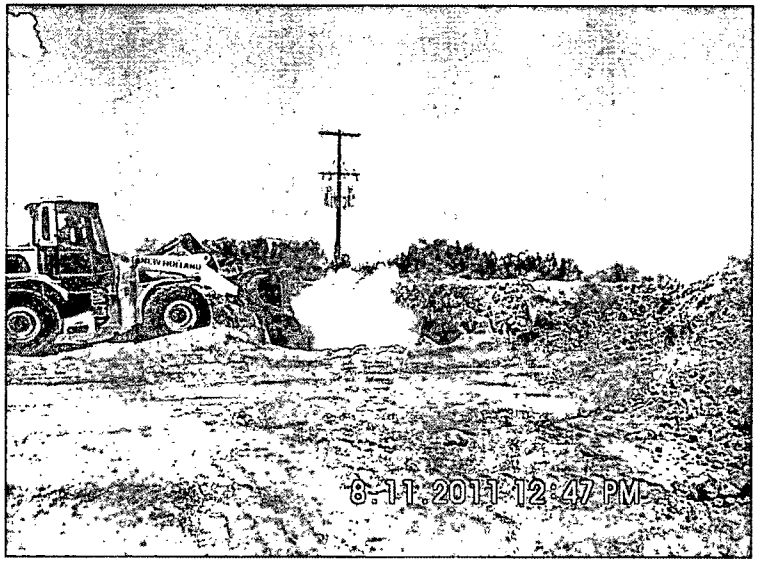
Clay layer in SB-2 excavation 8/11/11



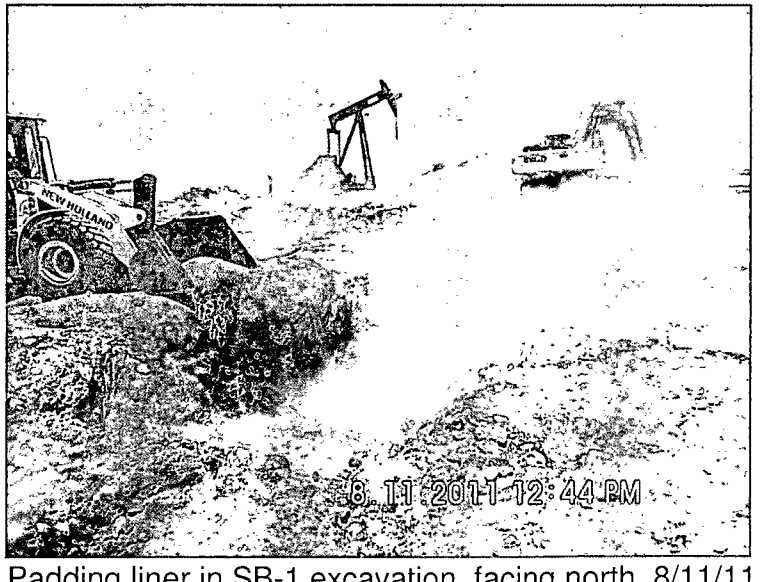
Installing poly liner in SB-2 excavation 8/11/11



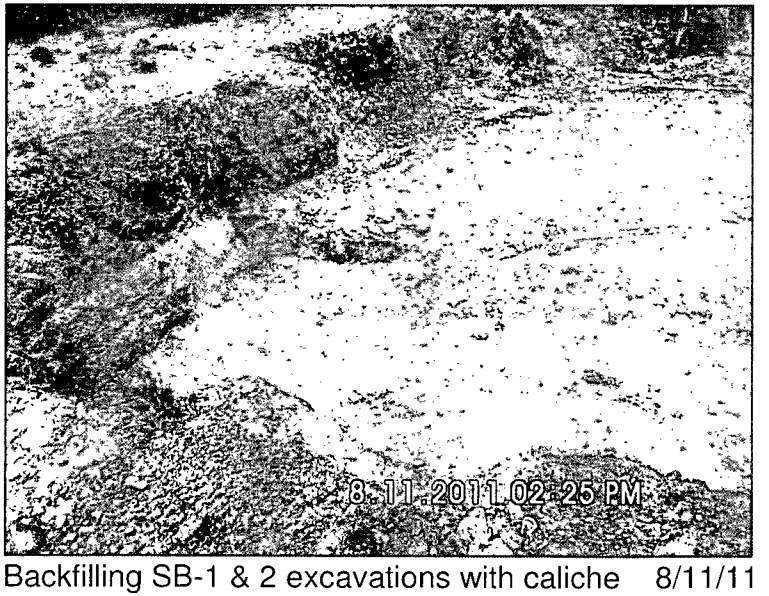
Importing sand to pad liners, facing north 8/11/11



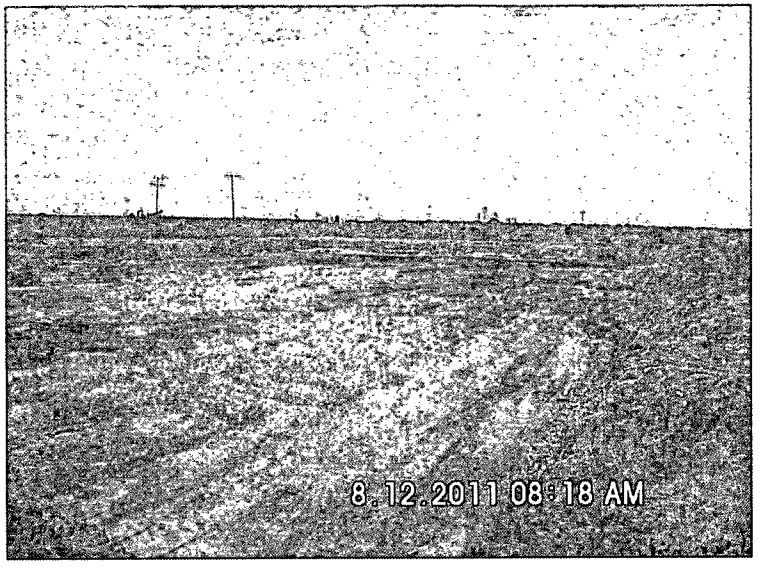
Padding liner in SB-2 excavation, facing NE 8/11/11



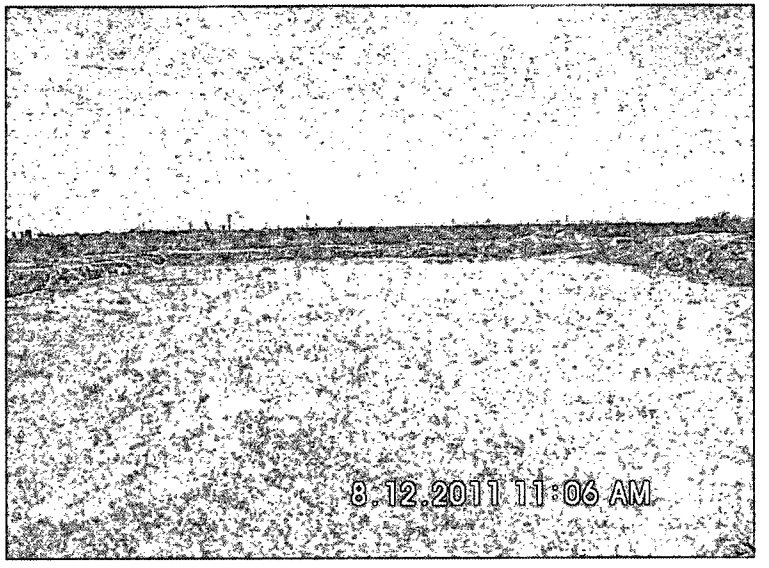
Padding liner in SB-1 excavation, facing north 8/11/11



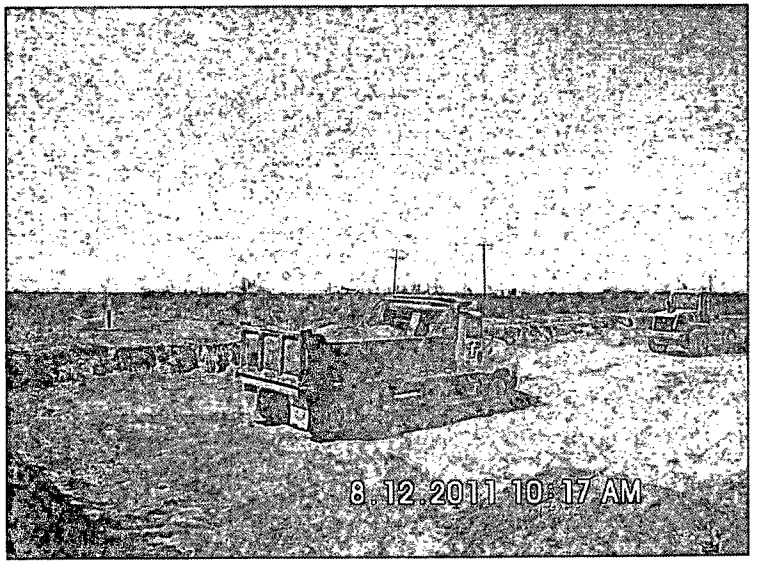
Backfilling SB-1 & 2 excavations with caliche 8/11/11



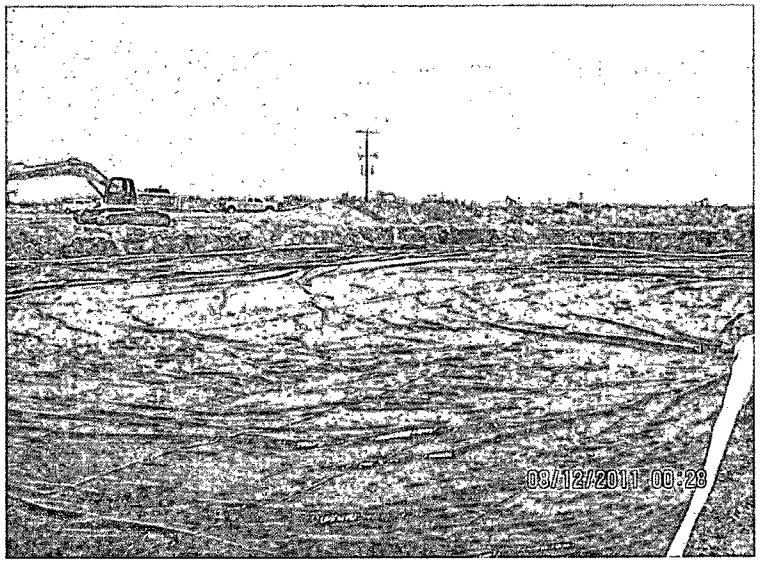
Excavation complete, facing southeast 8/12/11



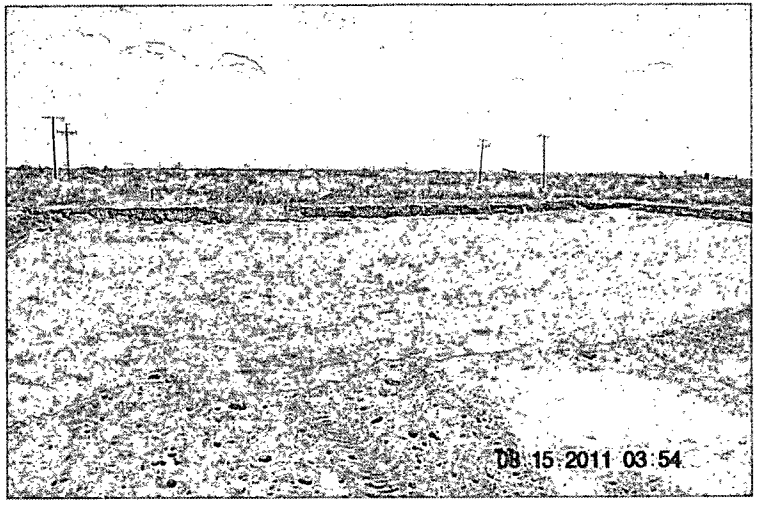
6 in blow sand pad complete, facing west 8/12/11



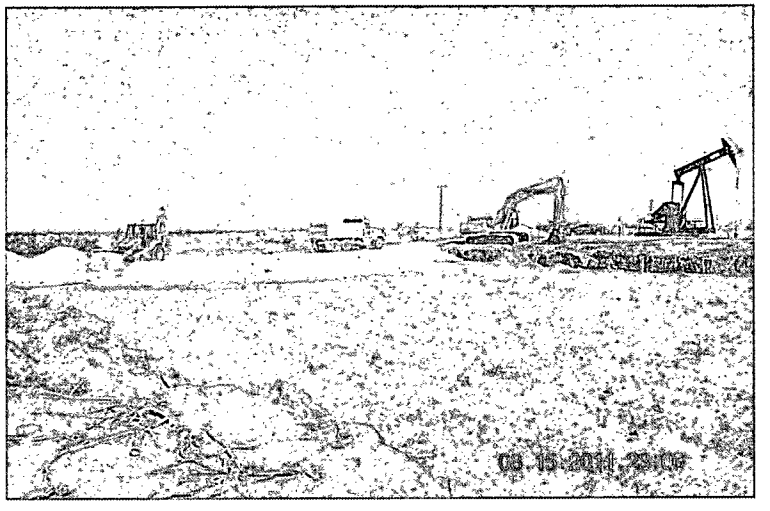
Importing soil to pad liner, facing southwest 8/12/11



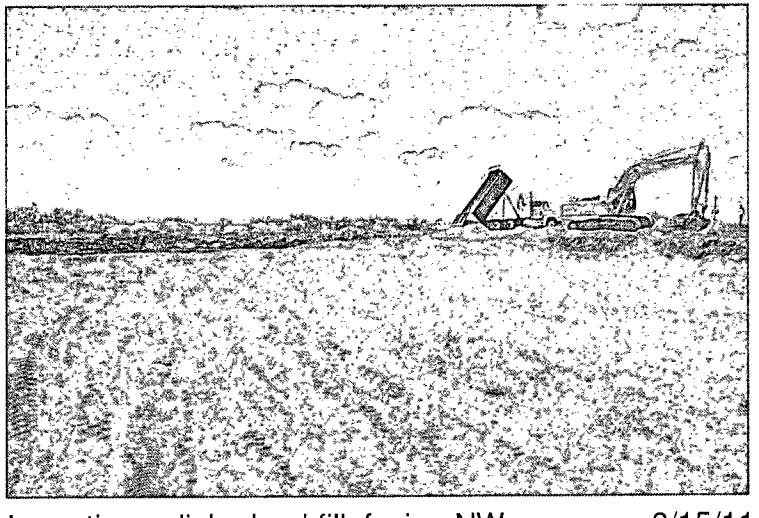
Liner installed, facing northeast 8/12/11



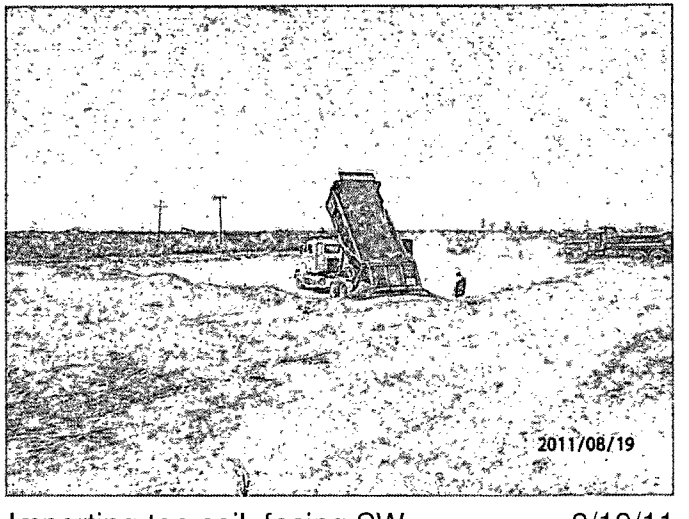
Padding liner complete, facing south 8/15/11



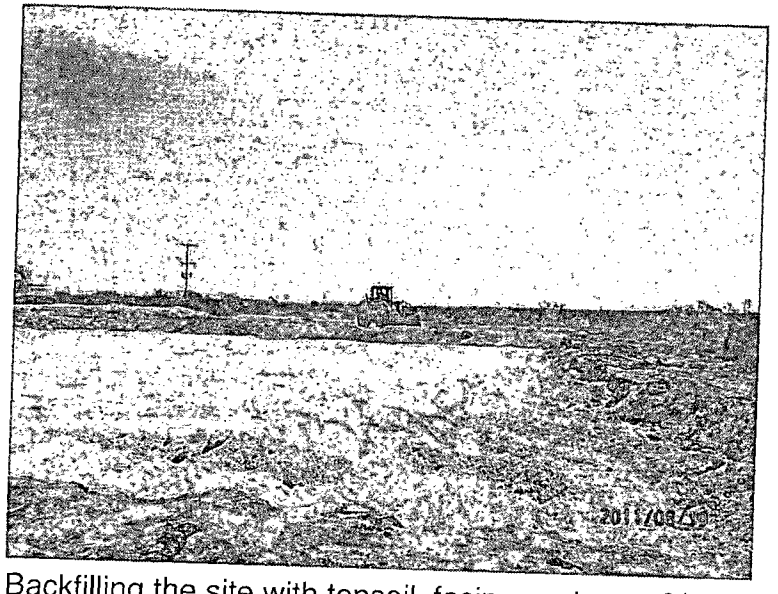
Backfilling site, facing northwest 8/15/11



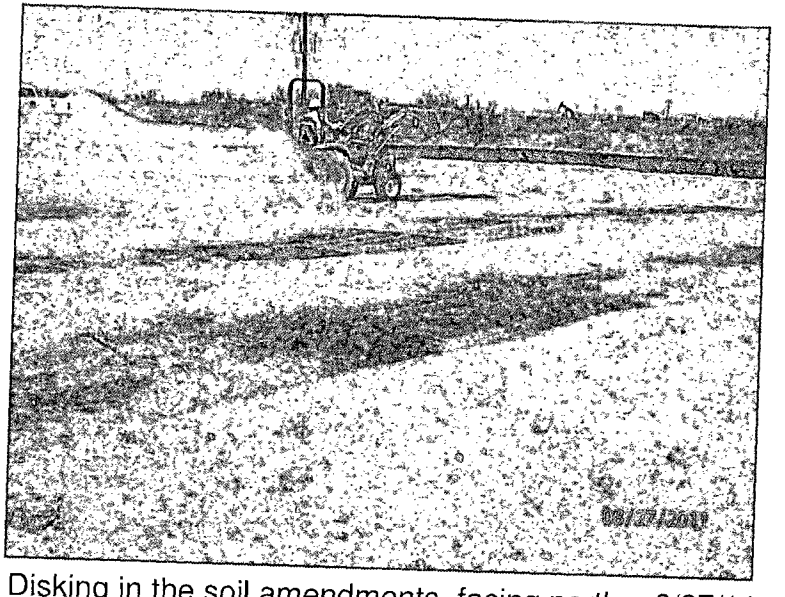
Importing caliche backfill, facing NW 8/15/11



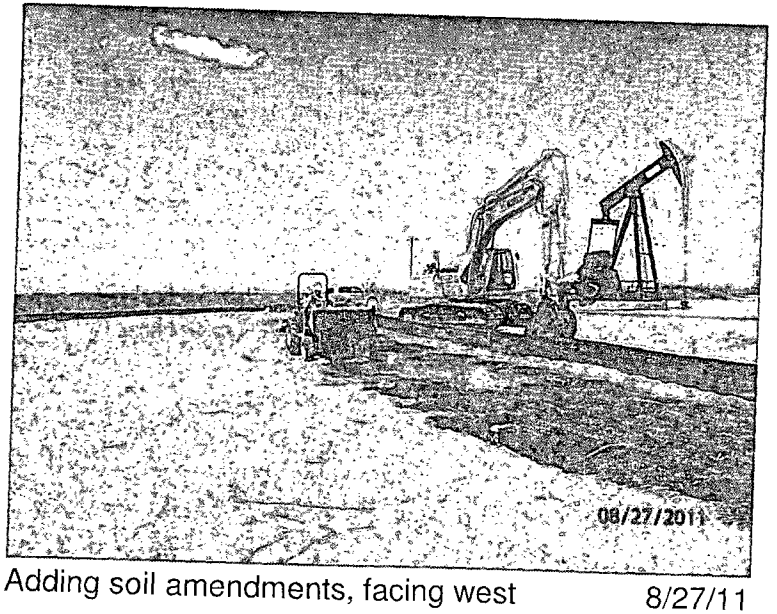
Importing top soil, facing SW 8/19/11



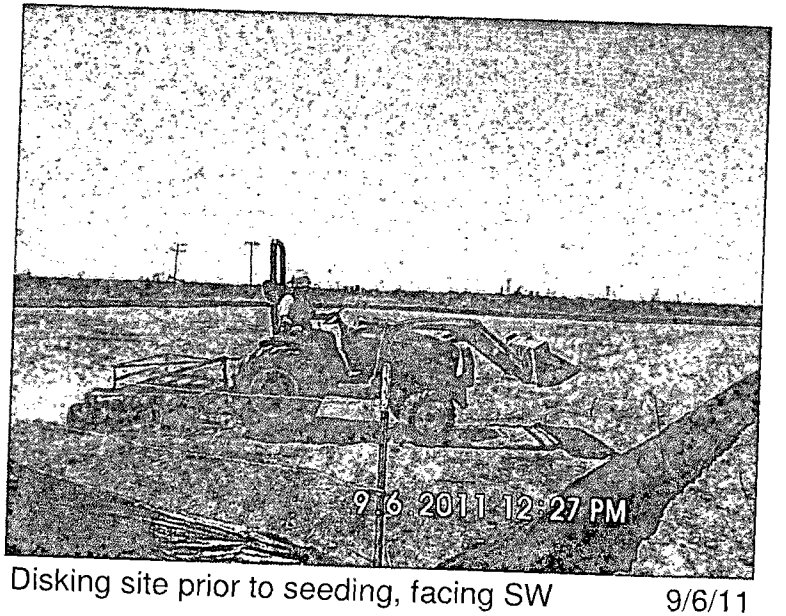
Backfilling the site with topsoil, facing east 8/19/11



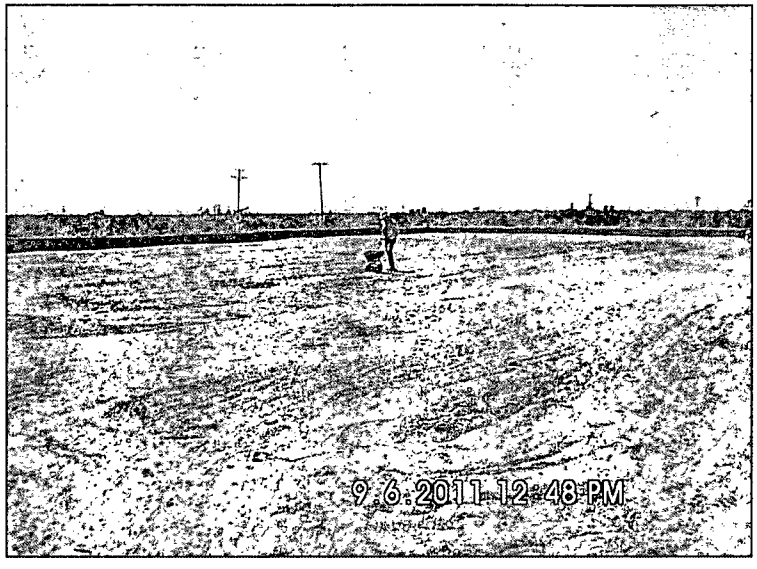
Disking in the soil amendments, facing north 8/27/11



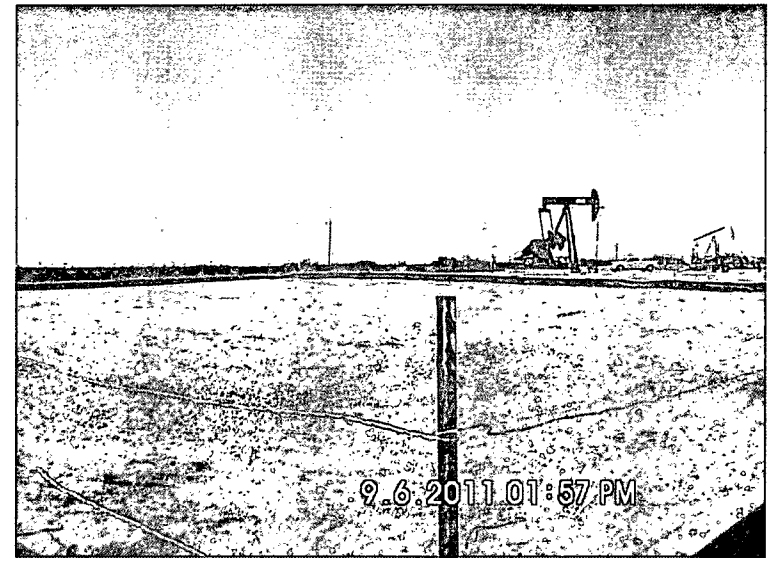
Adding soil amendments, facing west 8/27/11



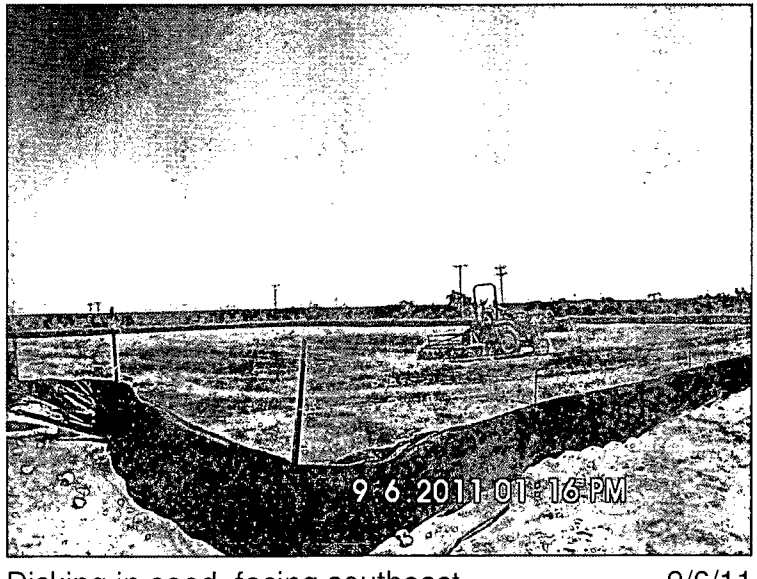
Disking site prior to seeding, facing SW 9/6/11



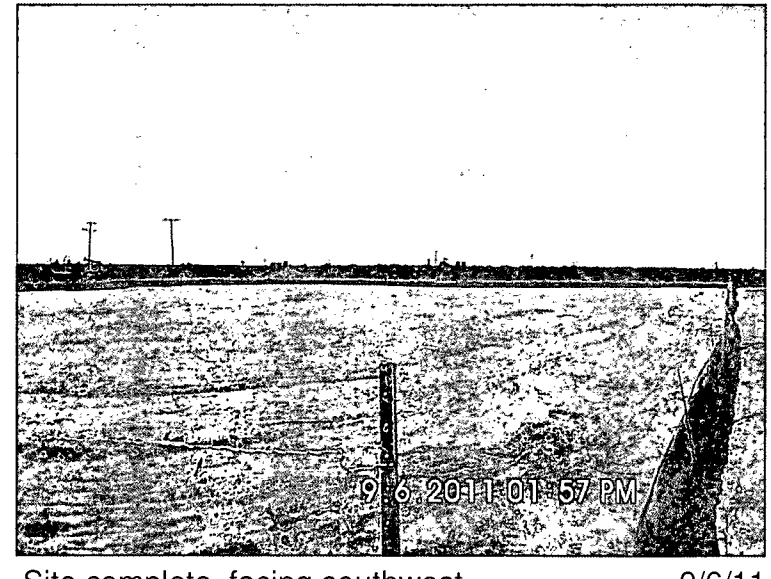
Seeding site, facing southwest 9/6/11



Site complete, facing northwest 9/6/11



Disking in seed, facing southeast 9/6/11



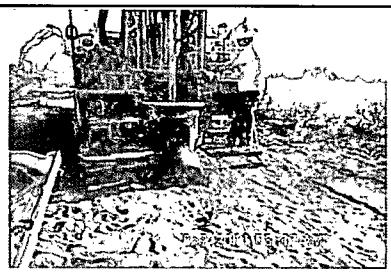
Site complete, facing southwest 9/6/11

Appendix F

Monitor well installation logs

RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

Logger:	Tony Grieco
Driller:	Harrison & Cooper, Inc.
Drilling Method:	Air rotary
Start Date:	8/9/2011
End Date:	8/9/2011

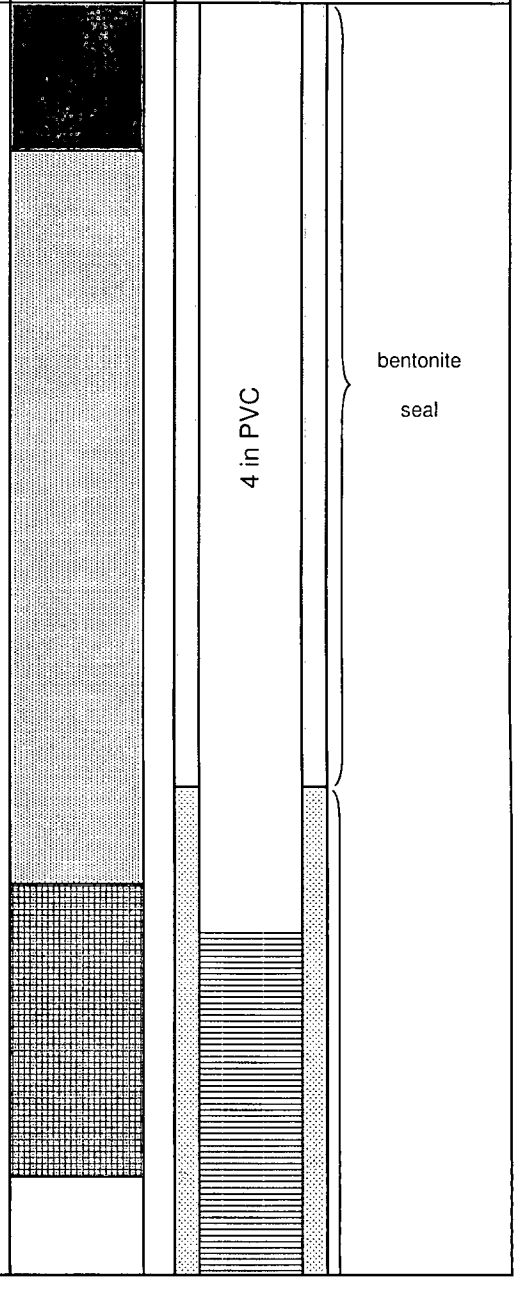


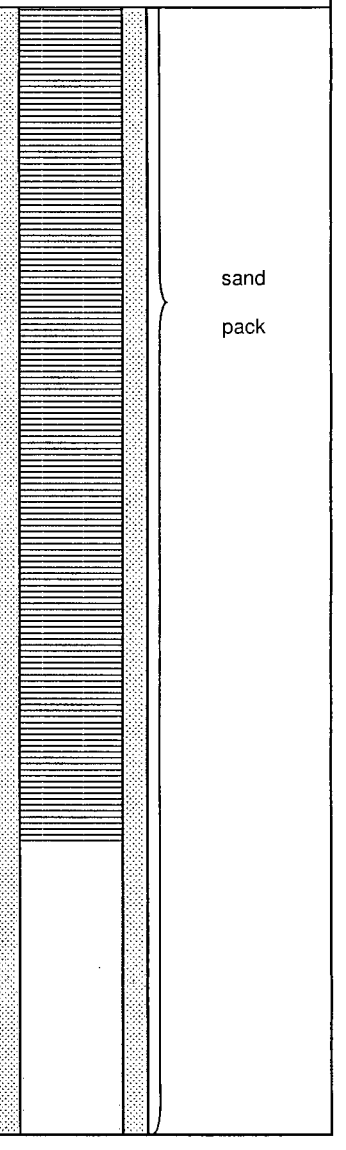
Company: Apache Corporation
Project Name: Lou Wortham #20 AD
Well ID: MW-1
Project Consultant: RECS

Comments:
No sampling occurred on this well. Samples were taken for lithology only.
DRAFTED BY: L. Weinheimer
TD = 82 ft GW = 37 ft

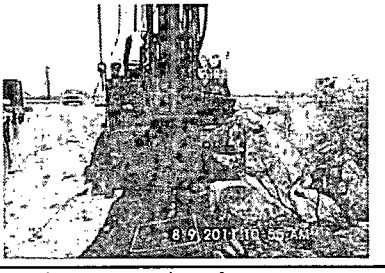
Location: UL/F sec. 11 T22S R37E
Lat: 32°24'24.287"N
Long: 103°8'8.555"W
County: Lea
State: NM

Depth (feet)	chloride field tests	LAB	PID	Description
				Red silt/very fine sand, moderately consolidated to unconsolidated, dry
5 ft				
				Tan/light gray silt, unconsolidated with abundant larger fragments of caliche, dry
10 ft				
				Tan/light gray predominately caliche fragments with unconsolidated silt, dry
15 ft				
				Tan/light gray silt, unconsolidated with abundant larger fragments of caliche, dry
20 ft				
				Tan/light gray predominately smaller caliche fragments with unconsolidated silt, dry
25 ft				
				Tan silt, unconsolidated with abundant small caliche fragments, dry
30 ft				
				Red clayey silt/very fine sand, unconsolidated with scattered caliche fragments and a few well consolidated siltstone fragments, moist
35 ft				
40 ft				



Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
45 ft				NO SAMPLES TAKEN		
50 ft						
55 ft						
60 ft						
65 ft						
70 ft						
75 ft						
80 ft						
82 ft						

Logger:	Tony Grieco
Driller:	Harrison & Cooper, Inc.
Drilling Method:	Air rotary
Start Date:	8/9/2011
End Date:	8/9/2011



Company: Apache Corporation
Project Name: Lou Wortham #20 AD
Well ID: MW-2
Project Consultant: RECS

Comments:
No sampling occurred on this well. Samples were taken for lithology only.
DRAFTED BY: L. Weinheimer

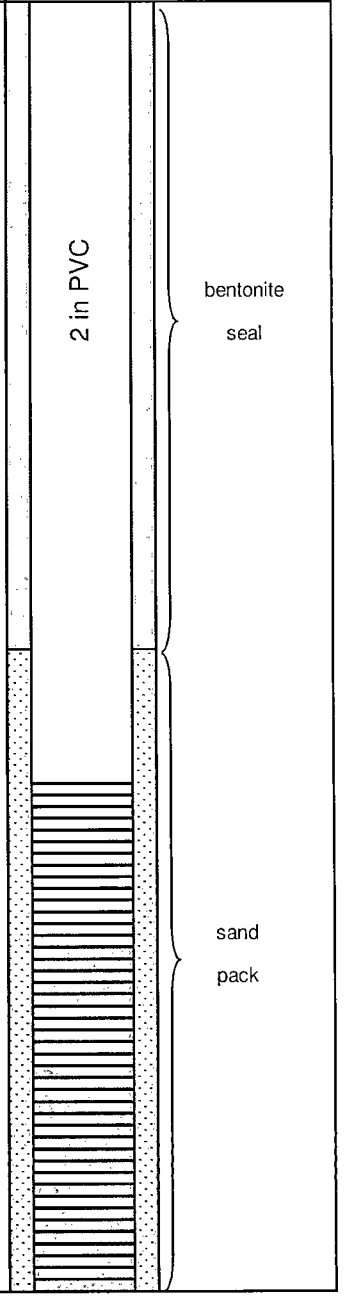
TD = 49 ft GW = 37 ft

Location: UL/F sec. 11 T22S R37E
Lat: 32°24'25.947"N
Long: 103°8'10.907"W
County: Lea
State: NM

Depth (feet)	chloride field tests	LAB	PID	Description
				Red silt/very fine sand, unconsolidated, dry
5 ft				
				Tan/light gray silt with scattered caliche fragments, moist
10 ft				
15 ft				
				Tan/light gray predominantly caliche fragments with unconsolidated silt, moist
20 ft				
				Tan/light gray silt with scattered caliche fragments, moist
25 ft				
30 ft				
				Red silty clay, loosely consolidated to moderately consolidated, very moist
35 ft				
40 ft				
				NO SAMPLES TAKEN
45 ft				
50 ft				

Lithology

Well Construction



Appendix G

Monitor well sampling laboratory analysis

RICE Environmental Consulting and Safety (RECS)
P.O. Box 5630 Hobbs, NM 88241
Phone 575.393.4411 Fax 575.393.0293

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

September 14, 2011

HACK CONDER

APACHE - EUNICE

P. O. BOX 1849

EUNICE, NM 88231

RE: APACHE LOU WORTHAM #20 AD

Enclosed are the results of analyses for samples received by the laboratory on 09/13/11 14:01.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydorcarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

APACHE - EUNICE
HACK CONDER
P. O. BOX 1849
EUNICE NM, 88231
Fax To: 394-2425

Received:	09/13/2011	Sampling Date:	09/12/2011
Reported:	09/14/2011	Sampling Type:	Water
Project Name:	APACHE LOU WORTHAM #20 AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T22S-R37E-SEC11 UL-F ~ LEA COUNTY I		

Sample ID: MONITOR WELL #1 (H101947-01)

Chloride, SM4500Cl-B **mg/L** **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**17400**	4.00	09/14/2011	ND	104	104	100	0.00	

Sample ID: MONITOR WELL #2 (H101947-02)

Chloride, SM4500Cl-B **mg/L** **Analyzed By: HM**

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**17800**	4.00	09/14/2011	ND	104	104	100	0.00	

Cardinal Laboratories *=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

101 East Marland - Hobbs, New Mexico 88240
Tel (575) 393-2326
Fax (575) 393-2476

Cardinal Laboratories, Inc.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # _____

Company Name: Apache	BILL TO Company: Apache PO#
Project Manager: Hack Conder, Rice Env Consulting Safety	Address: (Street, City, Zip)
Address: (Street, City, Zip) 122 W Taylor Street - Hobbs, New Mexico 88240	Phone#: Fax#:
Phone #: (575) 393-9174	Fax #: (575) 397-1471
Project #:	Project Name: Apache Lou Wortham #20 AD
Project Location: T22S-R37E-Sec11 UL-F - Lea County New Mexico	Sampler Signature: Rozanne Johnson (575)631-9310 rozanne@valornet.com

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY) 410 1947	FIELD CODE	(G)rab or (C)omp.	# CONTAINERS	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCL (2 40ml VOA)	HNO_3	$NaHSO_4$	H_2SO_4	ICE (1-1liter HDPE)	NONE	SAMPLING: DATE (2011)	TIME
1	Monitor Well #1	G	1	X								1		9-12	15:55
2	Monitor Well #2	G	1	X								1		9-12	13:10

MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005 / TX1005 Extended (C35)	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Moisture Content	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	Sulfates	Total Dissolved Solids	Chlorides	Turn Around Time ~ 24 Hours
																				X	
																				X	

Relinquished by: Rozanne Johnson	Date: 9-13-2011	Time: 14:00	Received by:
Relinquished by:	Date:	Time:	Received By: (Laboratory Staff) Date: 9-13-2011 Time: 14:00

Phone Results: Yes No
Fax Results: Yes No Additional Fax Number:

REMARKS:

Email Results to: hconder@riceswd.com
bjones@riceswd.com
lwelmheimer@rice-ecs.com
rozanne@valornet.com

Delivered By: (Circle One) Sampler - UPS - Bus - Other:

Sample Condition: Cool: Yes / No; Intact: Yes / No

CHECKED BY: (Initials)

#26