Administrative/Environmental Order



AE Order Number Banner

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1RP - 2733

APACHE CORP

7/26/2016



APACHE CORPORATION

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

Lou Wortham Central Battery AD Update Report

NMOCD Case #: 1R0811-2733

Unit Letter C, D, E & 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 Central Battery AD (1R0811-2733): UL/C, D, E & 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/C, D, E & F, Sec. 11, T22S, R37E as shown on the Site Location Map (Figure 1). Groundwater at this site is located approximately +/- 40 feet below ground surface (bgs).

On August 3rd and 4th, 2011 twelve soil bores and two monitor wells were installed at the site (Figure 2 and 3). Soil bores 1-5 were installed west of the Central Battery, and soil bores 6-12 were installed east of the Central Battery. Soil samples were taken every three feet as the bores were being installed. 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 and hydrocarbon field numbers (Appendix A). In SB-1, SB-2, and SB-4, laboratory chloride data indicated that elevated chloride were present in the vadose zone at depth; although, in SB-1 and SB-2 laboratory chlorides decreased with depth. In SB-1, laboratory chloride readings peaked at 24 ft bgs with a reading of 4,400 mg/kg and decreased to 3,360 mg/kg at 33 ft bgs. In SB-2, laboratory chloride readings peaked at 15 ft bgs with a reading of 1,220 mg/kg and decreased to 896 mg/kg at 33 ft bgs. In SB-4, chloride readings increased with depth to 992 mg/kg at 33 ft bgs. SB-3 and SB-5 showed relatively low laboratory chlorides readings that did not impact the capillary fringe. In all soil bores west of the battery except SB-1 and SB-3, Gasoline Range Organics (GRO) and Diesel Range Organics (DRO) had laboratory readings of non-detect. In SB-1, GRO and DRO readings peaked at 12 ft bgs with a GRO reading of 539 mg/kg and a DRO reading of 4,010 mg/kg and decreased to non-detect at 33 ft bgs. In SB-3, the DRO reading at the surface was 23.6 mg/kg, but all other laboratory readings for GRO and DRO were non-detect.

On the east side of the battery, SB-6, SB-8 and SB-10 through SB-12, had low laboratory chloride readings that did not impact the capillary fringe. In SB-7, laboratory chloride readings peaked at 18 ft bgs with a chloride reading of 2,680 mg/kg and decreased to 2,280 mg/kg at 33 ft bgs. In SB-9, laboratory chloride readings increased as the bore was advanced to a high of 3,000 mg/kg at 33 ft bgs. In all the soil bores east of the battery, GRO and DRO laboratory readings were low or became low as the soil bores advanced through the vadose zone.

The two monitor wells were not sampled as they were installed (Appendix B). The source well, MW-2, is a 4 inch monitor well while the up gradient monitor well, MW-1, is a 2 inch monitor well. The two wells have been sampled twice since their installation (Figure 4). During the latest monitor well sampling event on August 16th, 2011, MW-1 had a laboratory chloride reading of 20,800 mg/L while MW-2 had a chloride laboratory reading of 22,000 mg/L (Appendix C).

Beginning on August 29th, 2011 two excavations, one on the west side and one on the east side were dug with the approval of the NMOCD District 1 Office (Figure 5-6). The west excavation was dug to 100 ft x 62 ft x 5 ft deep and the east excavation was dug to 121 ft x 83 ft x 5 feet deep. The excavated soils were taken for disposal at an NMOCD approved facility. A total of 5,196 yards of soil were taken to Sundance Services for disposal. One additional area in the east excavation and three additional areas within the west excavation were dug to 21 ft bgs. At the base of these 21 ft bgs excavations, liners were installed to inhibit the downward migration of chlorides. A 1 $\frac{1}{2}$ foot clay layer was placed at the base of the 21 ft bgs excavations, and 20-mil reinforced poly liners were laid on top of the clay. Then the poly liners were padded with 6 inches of sand to protect the liners from punctures. The 21 ft bgs excavations, and capped with clean imported caliche to 5 ft bgs, the level of the surrounding excavations, and capped with clean imported sand to prepare the larger excavations for poly liners (Figure 7-8).

The imported sand and caliche were field tested for hydrocarbons with a photo-ionization detector. The readings for both samples were 0 ppm. The samples were then taken to a commercial laboratory for analysis of chlorides. Laboratory analysis of chlorides showed a result of 32 mg/kg for the imported caliche and non-detect for the imported sand (Appendix D).

At 5 ft bgs, a 20-mil reinforced poly liner was installed in both the west and east excavations. After they were installed the excavations were backfilled with clean imported sand. A sample of this imported sand was field tested for hydrocarbons with a photo-ionization detector. The reading for the sample was 0 ppm. Then it was taken to a commercial laboratory for chloride analysis. Laboratory chloride analysis returned a result of non-detect (Appendix E).

A total of 1,033 yards of imported caliche was used to backfill the 21 ft bgs excavations to 5 ft bgs and a total of 4,152 yards of imported sand was used to backfill the larger west and east excavations.

Soil amendments were added to the site and the site was seeded with a native vegetative mix on October 21st, 2011 (Appendix F). Photos of these activities can be found in Appendix G.

Recommendations

Based on the soil bore installations, there is some evidence that chlorides 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 impacts have occurred to groundwater beneath the site, Apache will either suggest a groundwater remedy 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,

HC.W.

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 (SB 1-5)

Figure 3 – Soil bore installation map (SB 6-12)

Figure 4 - MW Sampling Map

Figure 5 – West Side Excavation

Figure 6 - East Side Excavation

Figure 7 - West Side Excavation Cross-Section

Figure 8 – East Side Excavation Cross-Section

Appendix A - Soil Bore Logs and Laboratory Confirmation

Appendix B - Monitor Well Logs

Appendix C - MW Sampling Data

Appendix D - Imported Sand and Caliche Laboratory Confirmation

Appendix E - Imported Sand Laboratory Confirmation

Appendix F - Re-vegetation Form

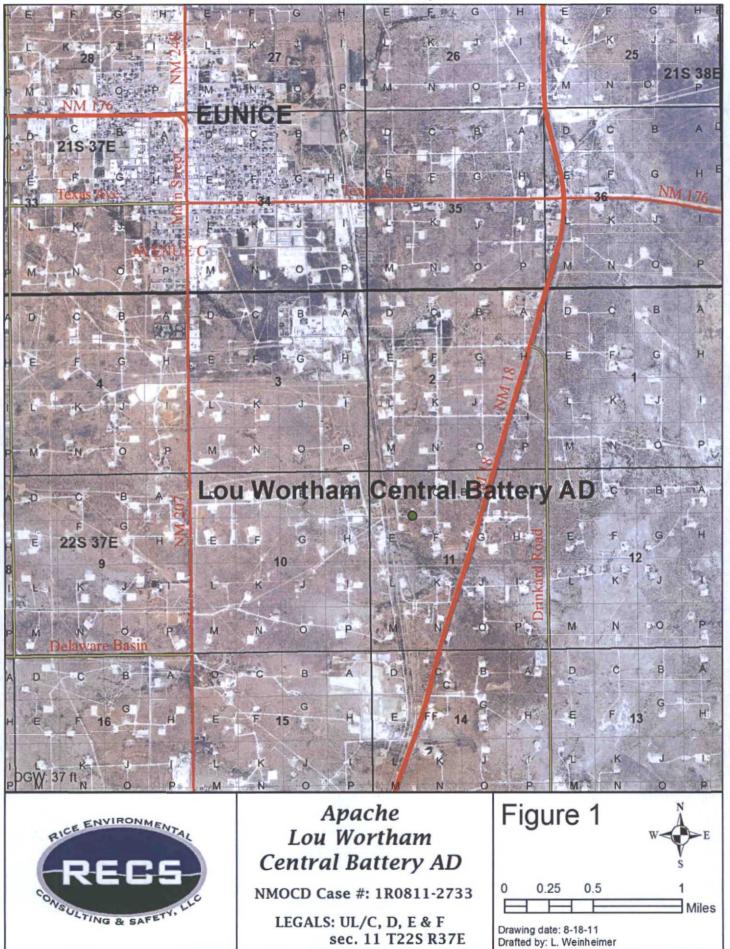
Appendix G - Photo Documentation



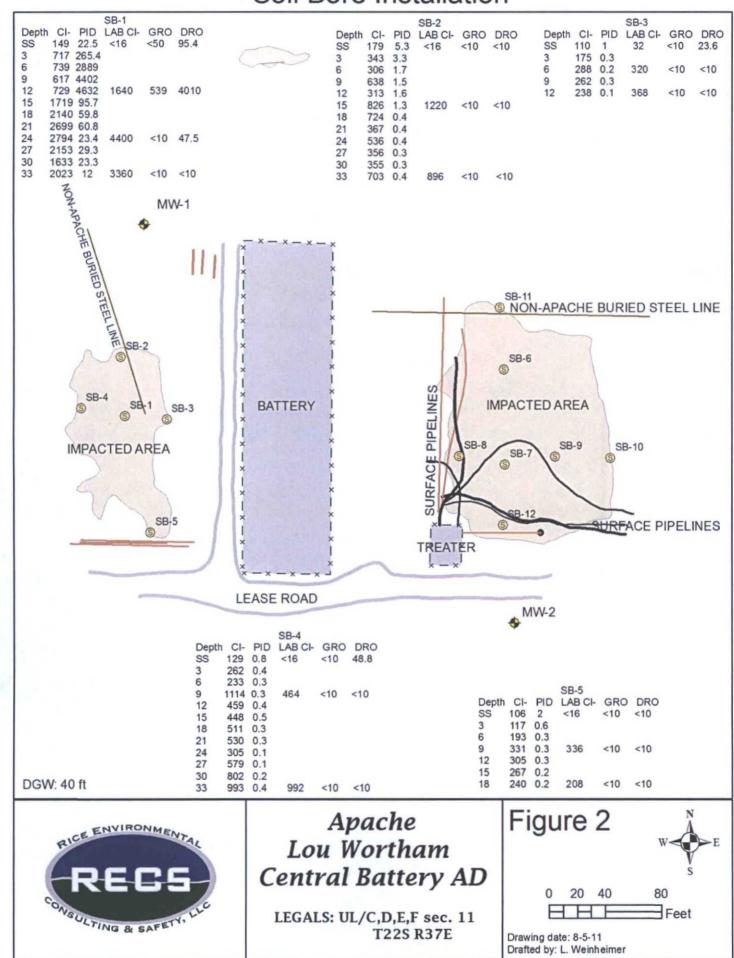
Figures

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

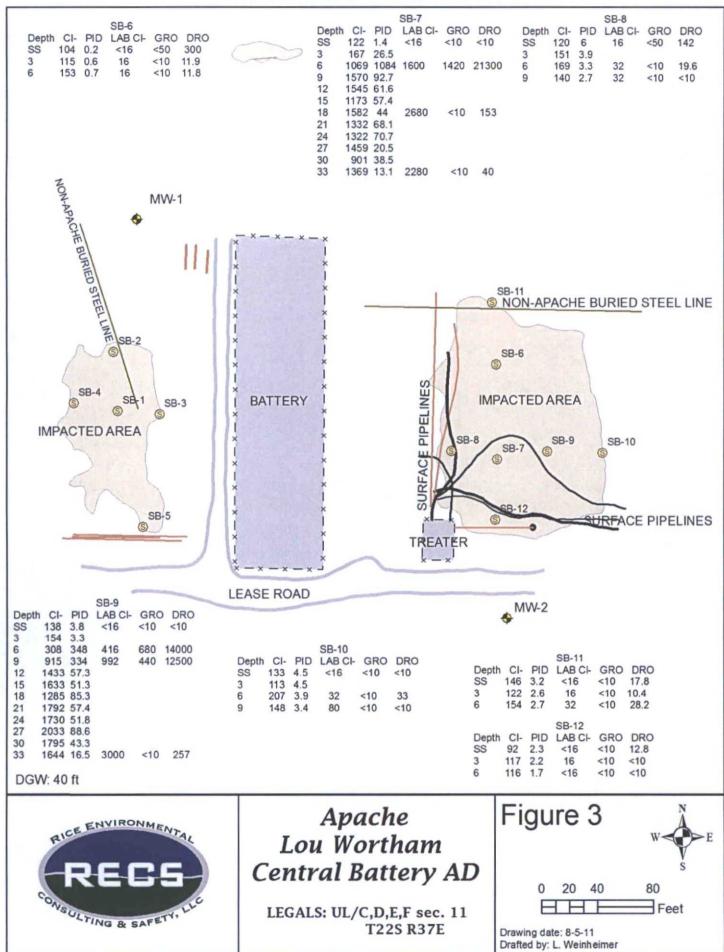
Site Map



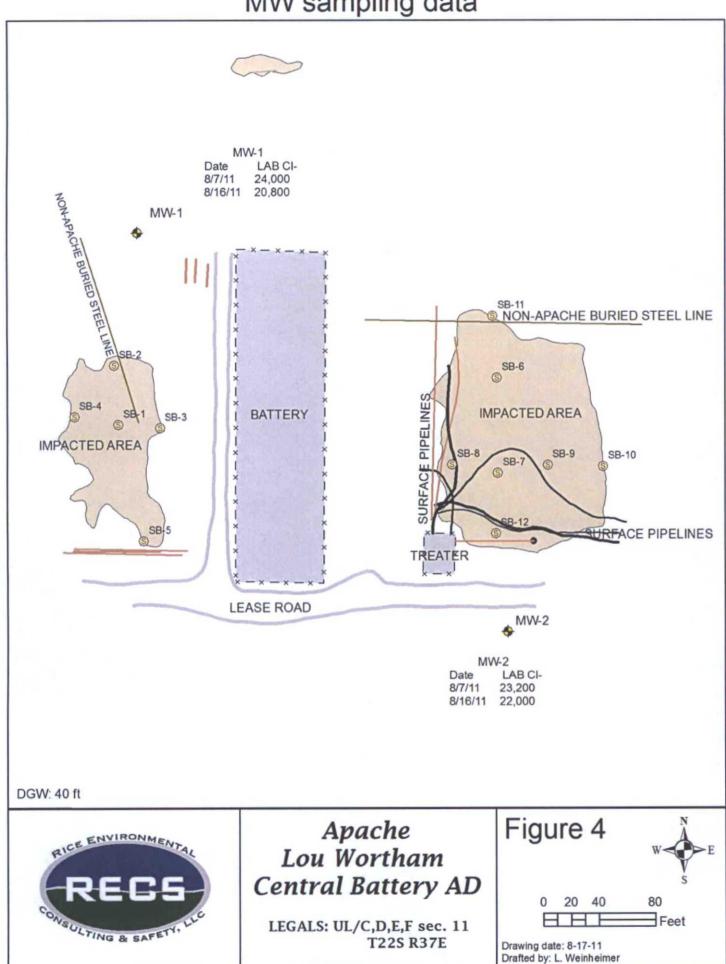
Soil Bore Installation

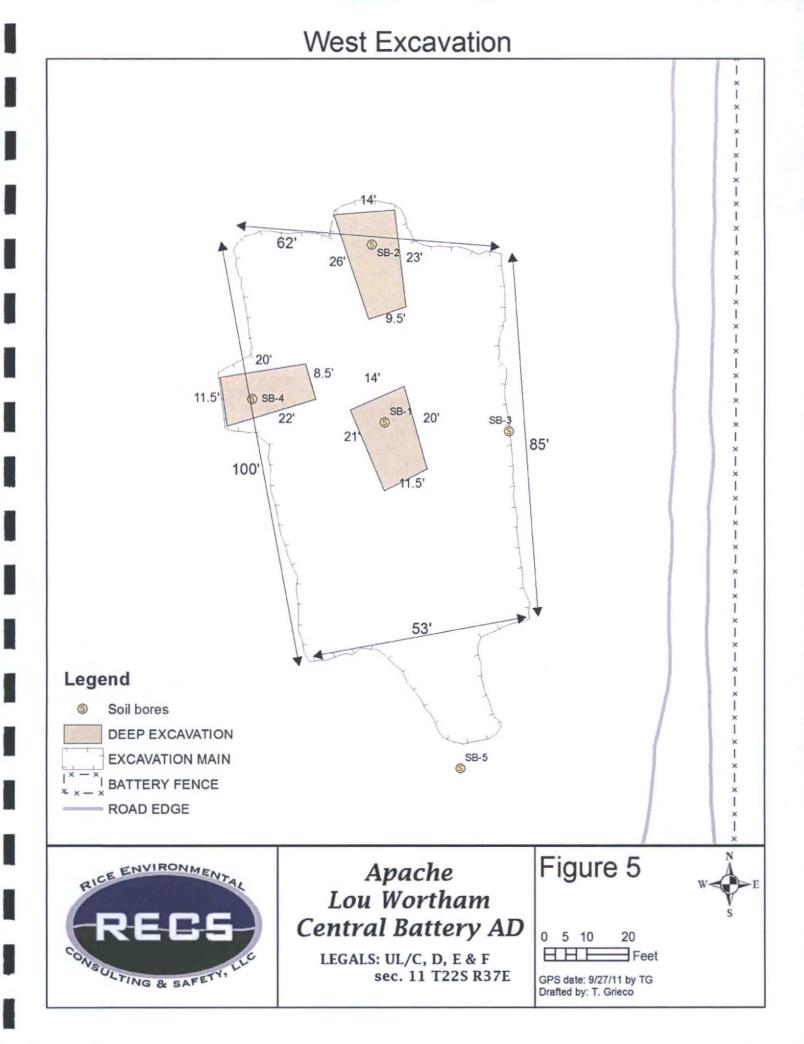


Soil Bore Installation

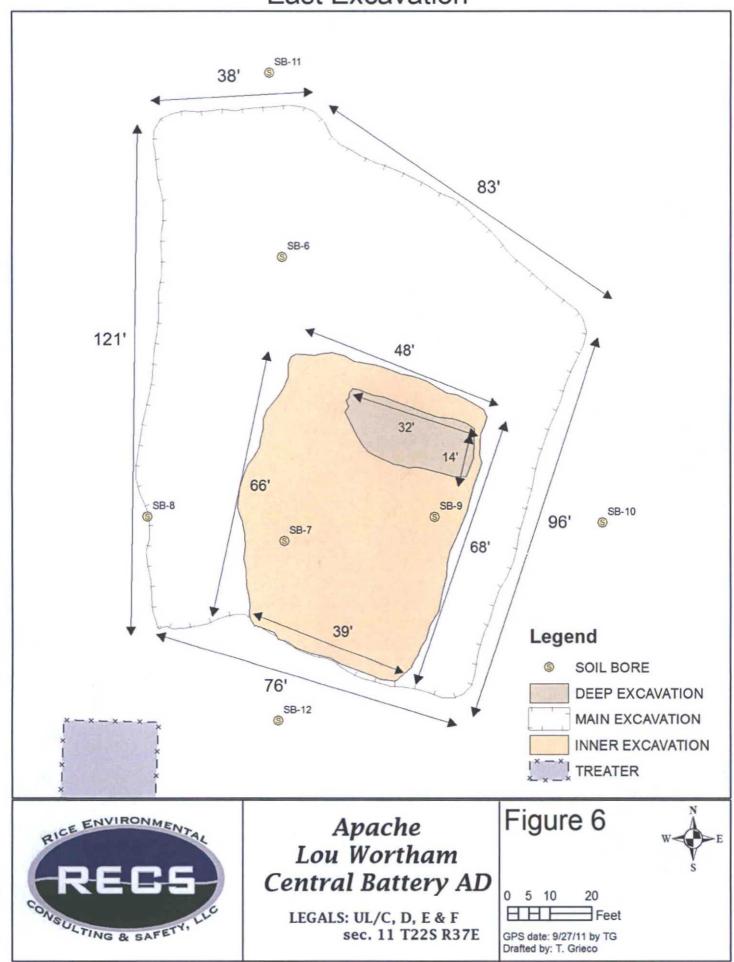


MW sampling data





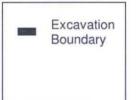
East Excavation



Apache Lou Wortham Central Battery Unit 'C, D, E F', Sec. 11, T22S, R37E

West Excavation Cross-Section

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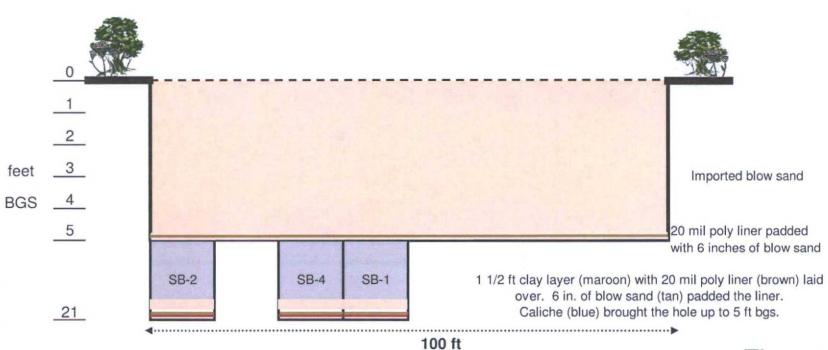


Figure 7

Apache Lou Wortham Central Battery AD Unit 'C, D, E F', Sec. 11, T22S, R37E

East Excavation Cross-Section

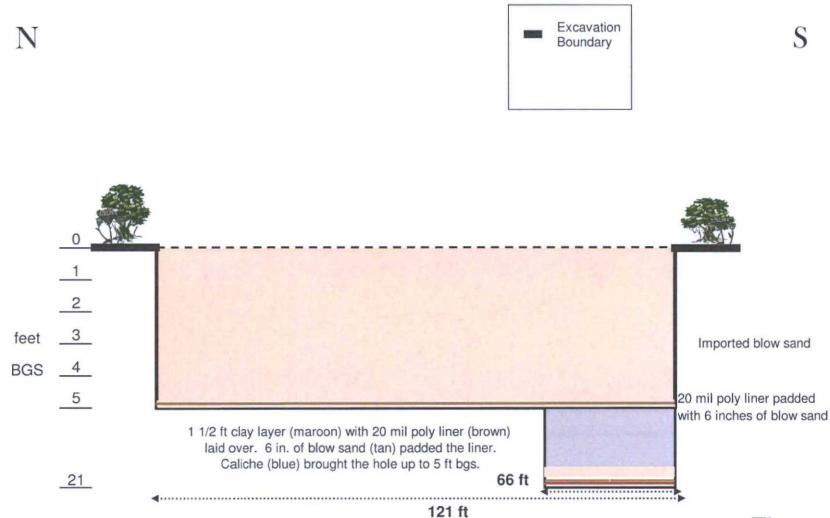


Figure 8

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: Driller:		Tony Gr Harrison & Co		58-4 58-1 58-3	RECS					
Drilling M Start Date End Date	e: :	Air rota 8/3/20 8/3/20	11	IMPACTED AREA	Company: Apache Corporation Project Name: Well ID: Lou Wortham Central Batt AD SB-1 Project Consultant: RECS					
Comme				from cuttings.	Lo	cation: UL/D s	ec. 11 T			
		= 33 ft		GW = 37 ft	Lo	ng: 103 %'18.6	85"W	State: NM		
Depth (feet)	Chlori field te		PID	Description		Lithology	Wel	I Construction		
SS	149	CI- <16	22.5	Brown/red slightly clayey silt, unconsolidated, dry, no odor or stain						
		GRO <50 DRO 95.4		Brown clayey silt, very weakly consolidated, damp strong odor, staining						
3 ft	717		265.4	Stanning						
	700			Light tan, slightly clayey silt, scattered caliche fragments, unconsolidated, damp, strong odor, no stain						
6 ft	739		2889	Light tan slightly clayey silt, increase in caliche fragments, weakly						
9 ft	617		4402	consolidated, dry, strong odor						
				Light tan slightly clayey silt, few small caliche fragments, unconsolidated, dry, decreasing odor						
12 ft	729	CI- 1640 GRO 539	4632	Light tan slightly clayey silt, few small						
		DRO 4010		caliche fragments, unconsolidated,						
15 ft	1719	9	95.7	dry, slight odor						
				Light tan slightly clayey silt, few small caliche fragments, unconsolidated, dry, slight odor				bentonite seal		
18 ft	2140		59.8	ury, siigin odor						
				Light tan slightly clayey silt, few small caliche fragments, unconsolidated,						
21 ft	2699	9	60.8	dry, slight odor						

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Red/tan mixture of unconsolidated slightly clayey silt (50%) and larger		
				fragments of moderately well consolidated. Clayey silt. Scattered		
24 ft	2794	CI- 4400	23.4	caliche fragments. Very slight odor and dampness		
		GRO <10		Red/tan mixture of caliche fragments (75% volume) and unconsolidated		
		DRO 47.5		slightly clayey silt. Scattered silt clay masses of type noted above. Very		
27 ft	2153		29.3	slight odor, very slightly damp		
				Red/tan predominantly, slightly clayey, unconsolidated to weakly		
30 ft	1633		23.3	consolidated silt/very fine sand. Scattered larger caliche fragments. No odor, slightly damp		
		CI-		Red/tan predominantly, slightly clayey, unconsolidated to weakly		
33 ft	2023	3360 GRO	12	consolidated silt/very fine sand. Scattered larger caliche fragments.		
		<10 DRO <10		No odor, slightly damp		

Logger: Driller:	Har	Tony Grie		58-4 58-1 58-3	F	RECS			
Drilling M Start Date End Date Comme	e: :	Air rotar 8/3/201 8/3/201	l	IMPACTED AREA	Company: Apache Corporation Project Name: Well ID: Lou Wortham Central Batt AD SB-2 Project Consultant: RECS				
oomme		All s	amples	from cuttings.	Location: UL/D s	sec. 11 T22S R37E			
	TD = 3		TED BY	/: L. Weinheimer GW = 37 ft	Lat: 32°24'37.464"N Coun Long: 103°8'18.711"W State:				
Depth (feet)	Chloride field test		PID	Description	Lithology	Well Construction			
				Red silt/very fine sand, unconsolidated, dry, no odor or stain					
SS	179	CI- <16	5.3	unconsolidated, dry, no odor or stan	1.8				
		GRO <10		Red slightly clayey silt,					
		DR0 <10		unconsolidated to weakly consolidated, dry, no odor or stain.					
3 ft	343	<10	3.3	Scattered caliche pieces					
				Tan, mixture of silt (50% volume) and larger fragments of caliche.					
6 ft	306	_	2	Unconsolidated, dry, no stain or odor					
-		-		Red/tan predominantly, slightly clayey silt with scattered caliche					
9 ft	638		2	pieces. Unconsolidated to weakly consolidated. Dry, no odor or stain					
_		_							
12 ft	313		1.6	Tan silt and abundant larger pieces					
				of caliche, unconsolidated, dry, no stain or odor					
15 ft	826	CI- 1220	1.3						
		GRO <10 DRO				bentonite seal			
18 ft	724	<10	0.4						
				Tan silt, unconsolidated, dry, no					
21 ft	367		0.4	stain or odor					

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
				Tan slight red predominantly unconsolidated silt with some		
24 ft	536		0.4	fragments of caliche. Slightly damp, no stain or odor		
27 ft	356		0.3			
30 ft	355		0.3	Red slight tan predominantly		
33 ft	703	CI- 896	0.4	unconsolidated silt, scattered caliche fragments. Slightly damp, no stain or odor		
		GRO <10 DRO <10				

Logger: Driller:			fony Grie		SB-4 SB-1 SB-3		F	RECS	tre		
Drilling I Start Dat End Date	e:		Air rotar 8/3/2011 8/3/2011	r I	IMPACTED AREA		Company: Apache Corporation Project Name: Well ID: Lou Wortham Central Batt AD SB-3				
Comm	ents:					Pre	oject Consulta	ant: RECS	5		
			All s	amples	from cuttings.	LO	cation: UL/D s	ec. 11 12	25 R37E		
			DRA	TED B	/: L. Weinheimer	La	t: 32°24'37.024	1"N	County:		
		0 = 12	ft		GW = 37 ft	Lo	ng: 103 %'18.3	39"W	State: N		
Depth Chloride (feet) field tests LAB PI					Description		Lithology	Well	Constructio		
SS	11	0	CI- 32	1	Red silt/very fine sand, unconsolidated, dry, no odor or stain						
			GRO <10 DRO 23.6		Red slightly clayey silt, unconsolidated and weakly consolidated, dry, no odor or stain						
3 ft	17	5		0.3	Tan silt, unconsolidated, dry, no stain or odor						
6 ft	28	8	CI- 320	0.2	Stant of oddi				bentoni		
			GRO <10 DRO						seal		
			<10								
9 ft	26	2		0.3	Tan silt with caliche, unconsolidated,						
10.4			CI-	0.1	dry, no stain or odor						
12 ft	23	Ø	368 GRO <10	0.1							
			DRO <10								

Logger: Driller:			fony Grie		SB-4 SB-3	Company: Apache Corporation					
Drilling M	Aethod:		Air rotary	/	IMPACTED AREA						
Start Dat			8/3/2011		2		bject Name:		Well ID:		
End Date			8/3/2011		SB-5		u Wortham Centra		SB-4		
Comme	ents:					Project Consultant: RECS					
			All sa	amples	from cuttings.	Lo	cation: UL/D s	ec. 11 T2	2S R37E		
	TO			TED BY	: L. Weinheimer		: 32°24'37.111		County: Lea State: NM		
Depth Chlor			LAB	PID	GW = 37 ft Description		ng: 103 %'19.0		Construction		
(feet)	field t	ests					gy		1		
					Pod silt/von fine cond		1				
					Red silt/very fine sand, unconsolidated, no odor or stain		Sec.				
SS	12	0	CI- <16	0.8			and the second				
33	12	9	GRO	0.0	De difference de la babara						
	-		<10 DRO		Red/tan mixture of slightly clayey unconsolidated silt and larger						
			48.8		fragments of caliche. Dry, no stain						
3 ft	26	2		0.4	or odor						
511	20	-		0.4							
					Tan mixture of unconsolidated silt						
					and larger fragments of caliche. No stain or odor, dry						
6 ft	23	3	_	0.3	stant of odor, dry						
					Red silt/very fine sand,						
			CI-		unconsolidated, no stain or odor		6700				
9 ft	111	4	464 GRO	0.3							
			<10								
			DRO <10								
			<10								
12 ft	45	9		0.4							
15 ft	44	8		0.5							
					-				bentonite		
_				_	Tan mixture of unconsolidated silt and larger fragments of caliche. No				seal		
					stain or odor, dry						
18 ft	51	1		0.3							
01.0											
21 ft	53	0		0.3							

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
24 ft	305		0.1			
27 ft	579		0.1			
30 ft	802		0.2	Reddish tan unconsolidated slightly clayey silt/very fine sand with abundant fragments of well consolidated siltstone. Slightly damp, no stain or odor		
33 ft	993	CI- 992 GRO <10	0.4			
		DRO <10				

l

Logger: Driller:			Fony Grie		58-4 58-1 58-3	Company: Apache Corporation					
Drilling N Start Dat			Air rotary 8/3/2011								
End Date			8/3/2011		SB-5		ject Name: Wortham Centr		Well ID: SB-5		
Comme	ents:		All sa	amples	from cuttings.	Pro	ject Consult ation: UL/D	ant: RECS	S		
		= 18		TED B	Y: L. Weinheimer GW = 37 ft		: 32°24'36.24 ng: 103°8'18.4		County: Lea State: NM		
Depth (feet)	Chlor field to		LAB	PID	Description		Lithology	Well	Construction		
					Red silt/very fine sand,						
SS	100	3	CI- <16	2	unconsolidated, dry, no odor or stain						
			GR0 <10								
			DRO <10		Red silt/very fine sand, weakly consolidated, dry, no odor or stain		Sec.				
3 ft	11	7		0.6							
					Slightly reddish tan silt with abundant caliche fragments, unconsolidated,						
6 ft	193	3		0.3	dry, no stain or odor						
9 ft	33		CI- 336	0.3	Tan silt with scattered small caliche				bentonite		
511	00		GR0 <10	0.0	fragments, unconsolidated, dry, no stain or odor				seal		
			DRO <10								
12 ft	30	5		0.3							
					Red silt unconsolidated with						
15 ft	26	(0.2	abundant fragments of well consolidated siltstone. No stain or odor, dry						
18 ft	24)	CI- 208	0.2							
			GRO <10								
			DRO <10								

Logger: Driller:	н	Tony arrison &	/ Grie		SB-6 MACTED AREA	RECS					
Drilling N	Method:	Air	rotary	/	IMPACTED AREA SB-8 SB-7 SB-9 SB-10 SB-10	Company: Apache Corporation Project Name: Well ID:					
Start Dat	e:	8/3	3/2011		STINE -						
End Date	ə:	8/3	3/2011	L	TREATER	Lo	Wortham Cen	ntral	Batt AD	SB-6	
Comme	ents:				Project Consultant: RE						
		1	All sa	amples	from cuttings.	Location: UL/C sec. 11 T22S R			2S R37E		
			DRAF	TED BY	: L. Weinheimer	La	t: 32°24'37.3	35"	N	County: Lea	
	TD	= 6 ft			GW = 37 ft	Lo	ng: 103 %'15	.55	3"W	State: NM	
Depth (feet)	Chlorid field tes		АВ	PID	Description		Lithology		Well C	Construction	
					Asphaltine cemented dark red silt/very fine sand, medium		a set or				
					consolidated where cemented,		1 - L - Q				
			CI-		otherwise unconsolidated. Dry, no						
SS	104		:16	0.2	odor						
			RO 50								
			RO				Contraction of the				
_			800				Section 1			bentonite	
2.4	115		CI- 16	0.6	Red silt/very fine sand,					}	
3 ft	115		RO	0.0	unconsolidated to loosely					seal	
			10		consolidated, dry, no odor or stain		Particular Press				
			RO								
			1.9								
6 ft	153		CI- 16	0.7							
			RO								
							the second s				
			:10 RO								

Logger: Driller:		Tony Grie		SB-11 CON-APACHE BURIED		R	ECS		
Drilling M Start Dat End Date Comme	e: :	Air rotar 8/4/201 8/4/201	1	from cuttings.	Company: Apache Corporation Project Name: Well ID: Lou Wortham Central Batt AD SB-7 Project Consultant: RECS Location: UL/C sec. 11 T22S R37E				
	TD = 33	DRA		r: L. Weinheimer GW = 37 ft		: 32°24'36.69" 1 g: 103°8'15.5		County: Lea State: NM	
Depth (feet)	Chloride field tests	LAB	PID	Description		Lithology	Well C	construction	
SS	122	CI- <16	1.4	Red silt/very fine sand, unconsolidated, dry, no stain or odor					
		GR0 <10 DR0 <10		Red silt/very fine sand, unconsolidated to weakly consolidated, dry, slight stain, slight					
3 ft	167		26.5	odor					
				Red silt/very fine sand, unconsolidated, slightly damp, slight stain, strong odor					
6 ft	1069	CI- 1600 GRO 1420	1084			Carrier			
		DRO 21300		Red silt/very fine sand, unconsolidated, dry, no stain, slight odor. Scattered caliche fragments					
9 ft	1570		92.7	Red silt/very fine sand,					
12 ft	1545		61.6	unconsolidated, dry, no stain, slight odor. Scattered caliche fragments					
15 ft	1173		57.4	Red-tan silt/very fine sand,				bentonite	
18 ft	1582	CI- 2680	44	unconsolidated, dry, no stain, slight odor. Scattered caliche fragments, abundant very small caliche chips				seal	
		GRO <10 DRO 153							
21 ft	1332		68.1						

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
24 ft	1322		70.7			
27 ft	1459		20.5	Red-tan silt/very fine sand, unconsolidated, dry, no stain, slight odor. Scattered caliche fragments, abundant very small caliche chips, increased percentage of larger		
30 ft	901		38.5	fragments (25%)		
33 ft	1369	CI- 2280	13.1	Red-tan silt/very fine sand, unconsolidated, dry, no stain, slight odor. Scattered caliche fragments, abundant very small caliche chips,		
		GRO <10 DRO 40		decreased percentage of larger fragments (10%)		

Logger: Driller: Drilling N Start Dat	Nethod:	arriso	Tony Grieco rison & Cooper, Inc. Air rotary 8/4/2011				Company: Apache Corporation Project Name: Well ID:				
End Date					A BURFACE		u Wortham Centr	al Batt AD			
Comme				amples	from cuttings.	Pro	cation: UL/C	ant: REC	CS		
				TED B	/: L. Weinheimer		: 32°24'36.75		County: Lea		
	TD	= 9 f	t		GW = 37 ft	Lo	ng: 103 %'15.9	931"W	State: NM		
Depth (feet)	Chlorid field test		LAB	PID	Description		Lithology	Wel	I Construction		
					Dark red/brown silt/very fine sand,						
					unconsolidated to medium						
SS	120		CI- 16	6	consolidated with asphaltine cement. Dry, very stained but no odor						
			GRO <50								
			DRO 142								
3 ft	151			3.9	Dark red silt/very fine sand, unconsolidated to medium						
		-			consolidated, dry, little stain, no odor				bentonite seal		
6 ft	169		CI- 32	3.3							
			GRO <10								
		-	DRO								
-		-	19.6 Cl-		Tan silt, unconsolidated, dry, no						
9 ft	140	_	32 GRO	2.7	stain or odor, scattered larger caliche fragments						
			<10								
		_	DRO				CONTRACTOR OF THE PROPERTY OF				

Logger: Driller: Drilling M Start Dat End Date Comme	Method: e: e: ents:	DRAF	per, Inc. y l amples	from cuttings.	Pro Lor Lor Lor	mpany: Apach oject Name: u Wortham Centro oject Consulta cation: UL/C s	al Batt AD ant: RECS sec. 11 T2 1"N	Well ID: SB-9	
TD = 33 ft Depth Chloride (feet) field tests LAB PID				GW = 37 ft Description	Long: 103 °8'15.144"W			State: NM	
SS	138	Cl- <16 GRO	3.8	Dark red silt/very fine sand, unconsolidated to medium consolidated, dry, no stain or odor					
3 ft	154	<10 DRO <10	3.3	Red silt/very fine sand, unconsolidated, dry, no stain or odor					
6 ft	308	Cl- 416	348	Black silt, unconsolidated, oily wet, heavy stain, very strong odor					
		GRO 680 DRO 14000 Cl-		Red silt/very fine sand, unconsolidated, dry, slight stain, strong odor					
9 ft	915	992 GRO 440 DRO 12500	334	Red silt/very fine sand, unconsolidated, dry, slight stain, strong odor, slightly decreased odor					
12 ft	1433		57.3	Red silt/very fine sand, unconsolidated, dry, odor, no stain					
15 ft 1633 51.3		51.3	Red silt/very fine sand, unconsolidated, dry, odor, no stain,				bentonite seal		
18 ft	1285		85.3	slightly decreased odor					

Depth (feet)	Chloride field tests	LAB	PID	Description	Lithology	Well Construction
21 ft	1792		57.4			
24 ft	1730		51.8	Tan silt, unconsolidated, dry, no		
27 ft	2033		88.6	stain, slight odor, scattered caliche fragments		
30 ft	1795		43.3			
33 ft	1644	CI- 3000 GRO <10	16.5			
		DRO 257				

Logger: Driller: Drilling M Start Date End Date Comme	Nethod: e: e:	Harrisc	on & Coop Air rotary 8/4/2011 8/4/2011 All sa	per, Inc. y i	SB-10 SB-20	Lou Wortham Central Batt AD Project Consultant: RECS Location: UL/C sec. 11 T2				Well ID: SB-10 S 22S R37E		
	то	= 9 1		TED B	/: L. Weinheimer GW = 37 ft		t: 32℃4'36.7 ng: 103 %'14			County: Lea State: NM		
Depth (feet)	Chlori field te	de	LAB	PID	Description	LO	Lithology	.00:		onstruction		
SS	133		CI- <16	4.5	Red silt/very fine sand unconsolidated, dry, no odor or stain							
3 ft	113		GRO <10 DRO <10	4.5	Red silt/very fine sand,							
			CI-		unconsolidated to medium consolidated, dry, no stain or odor	consolidated to medium				bentonite seal		
6 ft	207		32 GRO <10 DRO 33	3.9								
9 ft				Tan silt, unconsolidated, dry, no odor or stain, scattered caliche fragments								

Logger: Driller:	Harri	Tony Grie		SB-H NON-APACHE BURIED		F	RECS	a de la de		
Drilling M Start Date End Date Comme	e: :	DRA	amples	From cuttings.		Company: Apache Corporation Project Name: Well ID: Lou Wortham Central Batt AD SB-11 Project Consultant: RECS Location: UL/C sec. 11 T22S R37E Lat: 32°24'37.776"N County: Let Long: 103 °8'15.584"W State: NM				
Depth (feet)	Chloride field tests	LAR	PID	Description		Lithology		Construction		
SS	146	CI- <16	3.2	Red silt/very fine sand unconsolidated, dry, no odor or stain						
		GRO <10 DRO 17.8 Cl-						bentonite		
3 ft	122	GRO <10 DRO 10.4	2.6	Red silt/very fine sand, unconsolidated to medium consolidated, dry, no stain or odor				seal		
6 ft	154	CI- 32 GRO	2.7							
	101									

Logger: Driller:		Tony Grie	per, Inc.	SB-1 NON-APACHE BURIED SB-6 MPACTED AREA SB-7 SB-9 SB-10 SB-10		F		te
Drilling M	Aethod:	Air rotar	У	4 38-4 58-7 58-9 58-10	Co	mpany: Apac	he Corpor	ration
Start Dat	e:	8/4/201	1	THE REPORT OF	Pro	oject Name:	1	Well ID:
End Date		8/4/201	1	TREATER		u Wortham Centra		SB-12
Comm	ents:					oject Consult		
		All s	amples	from cuttings.	Lo	cation: UL/C	sec. 11 T2	22S R37E
	TD		FTED BY	: L. Weinheimer		1: 32°24'36.25		County: Lea
	and the second se	= 6 ft	-	GW = 37 ft	LO	ng: 103 %'15.	567 W	State: NM
Depth (feet)	Chlorid field tes		PID	Description		Lithology	Well (Construction
				Red silt/very fine sand)
				unconsolidated, dry, no odor or				
SS	92	Cl- <16	2.3	stain				
		GRO				19		
		<10 DRO				Sec. March		
		12.8						bentonite
		CI-						1
3 ft	117	16 GRO	2.2					seal
		<10		Red silt/very fine sand,				11
		DRO		unconsolidated to medium		Service sales		
		<10		consolidated, dry, no stain or odor		No. No.		
C.41	110	CI-	17					
6 ft	116	<16 GRO	1.7			Part of the		
		<10						
		DRO				16. C 4-16		
		<10				Section at 15		

*



August 08, 2011

NATALIE GLADDEN APACHE - EUNICE P. O. BOX 1849 EUNICE, NM 88231

RE: LOU WORTHAM BATTERY AD

Enclosed are the results of analyses for samples received by the laboratory on 08/04/11 8:50.

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. Keine

Celey D. Keene Lab Director/Quality Manager

CARDINAL

Analytical Results For:

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

Received:	08/04/2011	Sampling Date:	08/03/2011
Reported:	08/08/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB #1 SURFACE (H101617-01)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	08/04/2011	ND	368	92.0	400	12.2	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<50.0	50.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	95.4	50.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	112	% 70-130							
Surrogate: 1-Chlorooctadecane	125	% 70-130							

Sample ID: SB #1 12' (H101617-02)

Chloride, SM4500CI-B	mg	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1640	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	539	50.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	4010	50.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	119	% 70-130							
Surrogate: 1-Chlorooctadecane	118	% 70-130							

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Celez D. Kune

Celey D. Keene, Lab Director/Quality Manager

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Analytical Results For:

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

08/04/2011	Sampling Date:	08/03/2011
08/08/2011	Sampling Type:	Soil
LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
NONE GIVEN	Sample Received By:	Jodi Henson
NOT GIVEN		
	08/08/2011 LOU WORTHAM BATTERY AD NONE GIVEN	08/08/2011Sampling Type:LOU WORTHAM BATTERY ADSampling Condition:NONE GIVENSample Received By:

Sample ID: SB #1 24' (H101617-03)

Chloride, SM4500Cl-B mg/kg Analyzed By: HM Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qualifier Chloride 4400 16.0 08/04/2011 ND 448 112 400 3.64 Analyzed By: ab **TPH 8015M** mg/kg Qualifier Analyte **Reporting Limit** Analyzed Method Blank Result BS % Recovery True Value QC RPD GRO C6-C10 <10.0 08/07/2011 10.0 ND 210 105 200 0.924 DRO >C10-C28 47.5 08/07/2011 10.0 ND 193 96.5 200 2.13 Surrogate: 1-Chlorooctane 113 % 70-130 Surrogate: 1-Chlorooctadecane 125 % 70-130

Sample ID: SB #1 33' (H101617-04)

Chloride, SM4500CI-B	mg	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3360	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg/kg		Analyzed By: ab						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	<10.0	10.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	119	% 70-130							
Surrogate: 1-Chlorooctadecane	130	% 70-130							

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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager

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Analytical Results For:

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

Received: Reported: Project Name: Project Number: Project Location: 08/04/2011 08/08/2011 LOU WORTHAM BATTERY AD NONE GIVEN NOT GIVEN

Sampling Date:08/03/2011Sampling Type:SoilSampling Condition:Cool & IntactSample Received By:Jodi Henson

Sample ID: SB #2 SURFACE (H101617-05)

Chloride, SM4500CI-B Analyzed By: HM mg/kg Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qualifier Chloride <16.0 16.0 08/04/2011 ND 448 112 400 3.64 **TPH 8015M** Analyzed By: ab mg/kg Qualifier Analyte Reporting Limit Analyzed Method Blank True Value QC RPD Result BS % Recovery GRO C6-C10 08/07/2011 ND 105 200 0.924 <10.0 10.0 210 08/07/2011 193 96.5 200 2.13 DRO >C10-C28 <10.0 10.0 ND Surrogate: 1-Chlorooctane 119% 70-130 70-130 Surrogate: 1-Chlorooctadecane 131%

Sample ID: SB #2 15' (H101617-06)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1220	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg/kg		Analyzed By: ab						
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	<10.0	10.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	116	% 70-130							
Surrogate: 1-Chlorooctadecane	128	% 70-130							

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

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

Received:	08/04/2011	Sampling Date:	08/03/2011
Reported:	08/08/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB #2 33' (H101617-07) Chinada Chiasonci R

Chloride, SM4500CI-B	mg/	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	896	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg/	kg	Analyze	d By: ab	_			_	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	<10.0	10.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	113 5	70-130	1						
Surrogate: 1-Chlorooctadecane	125 9	70-130							

Sample ID: SB #3 SURFACE (H101617-08)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	23.6	10.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	110	% 70-130							
Surrogate: 1-Chlorooctadecane	121	% 70-130	1						

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager



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

08/04/2011	Sampling Date:	08/03/2011
08/08/2011	Sampling Type:	Soil
LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
NONE GIVEN	Sample Received By:	Jodi Henson
NOT GIVEN		
	08/08/2011 LOU WORTHAM BATTERY AD NONE GIVEN	08/08/2011Sampling Type:LOU WORTHAM BATTERY ADSampling Condition:NONE GIVENSample Received By:

Sample ID: SB #3 6' (H101617-09)

Chloride, SM4500CI-B	mg/	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	320	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg/	/kg	Analyze	d By: ab			-		
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	<10.0	10.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	108	% 70-130)						
Surrogate: 1-Chlorooctadecane	119	% 70-130	1						

Sample ID: SB #3 12' (H101617-10)

Chloride, SM4500CI-B	mg	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	368	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	<10.0	10.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	114	% 70-130)						
Surrogate: 1-Chlorooctadecane	124	% 70-130)						

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager



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

Received:	08/04/2011	Sampling Date:	08/03/2011
		Concernance in the second	
Reported:	08/08/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB #4 SURFACE (H101617-11)

Chloride, SM4500CI-B Analyzed By: HM mg/kg Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qualifier 16.0 08/04/2011 ND 448 400 Chloride <16.0 112 3.64 TPH 8015M mg/kg Analyzed By: ab Qualifier Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD GRO C6-C10 10.0 08/07/2011 ND 210 105 200 0.924 <10.0 DR0 >C10-C28 48.8 10.0 08/07/2011 ND 193 96.5 200 2.13 112% 70-130 Surrogate: 1-Chlorooctane 123 % 70-130 Surrogate: 1-Chlorooctadecane

Sample ID: SB #4 9' (H101617-12)

...

Chloride, SM4500CI-B	mg,	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	464	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	<10.0	10.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	111	% 70-130							
Surrogate: 1-Chlorooctadecane	122	% 70-130							

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Celey D. Keene, Lab Director/Quality Manager

Page 7 of 14

Analytical Results For:

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

Received:	08/04/2011	Sampling Date:	08/03/2011
Reported:	08/08/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB #4 33' (H101617-13) Chloride SM4500CI-B malka

Chioride, SM4500CI-B	mg,	rkg	Analyze	а ву: нм					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	992	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg,	/kg	Analyze	d By: ab			_		
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	<10.0	10.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	112	% 70-130							
Surrogate: 1-Chlorooctadecane	124	% 70-130							

Applyrod By HM

Sample ID: SB #5 SURFACE (H101617-14)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	210	105	200	0.924	
DRO >C10-C28	<10.0	10.0	08/07/2011	ND	193	96.5	200	2.13	
Surrogate: 1-Chlorooctane	111	% 70-130							
Surrogate: 1-Chlorooctadecane	121	% 70-130							

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager



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

Received:	08/04/2011	Sampling Date:	08/03/2011
Reported:	08/08/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB #5 9' (H101617-15)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	336	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	217	109	200	2.47	
DRO >C10-C28	<10.0	10.0	08/07/2011	ND	197	98.4	200	1.36	
Surrogate: 1-Chlorooctane	108	% 70-130	1						
Surrogate: 1-Chlorooctadecane	116	% 70-130							

Sample ID: SB #5 18' (H101617-16)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	208	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	217	109	200	2.47	
DRO >C10-C28	<10.0	10.0	08/07/2011	ND	197	98.4	200	1.36	
Surrogate: 1-Chlorooctane	106	% 70-130)						
Surrogate: 1-Chlorooctadecane	111	% 70-130	1						

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Celey D. Keine

Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

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

Received:	08/04/2011	Sampling Date:	08/03/2011
Reported:	08/08/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB #6 SURFACE (H101617-17)

Chloride, SM4500CI-B Analyzed By: HM mg/kg Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qualifier 08/04/2011 ND 400 Chloride <16.0 16.0 448 112 3.64 TPH 8015M mg/kg Analyzed By: ab Analyte Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qualifier Result GRO C6-C10 <50.0 50.0 08/07/2011 ND 217 109 200 2.47 DRO >C10-C28 300 50.0 08/07/2011 ND 197 98.4 200 1.36 107 % Surrogate: 1-Chlorooctane 70-130 70-130 Surrogate: 1-Chlorooctadecane 116%

Sample ID: SB #6 3' (H101617-18)

- /1---

Chloride, SM4500CI-B	mg,	/кд	Analyze	а ву: нм				_	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	08/04/2011	ND	448	112	400	3.64	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/07/2011	ND	217	109	200	2.47	
DRO >C10-C28	11.9	10.0	08/07/2011	ND	197	98.4	200	1.36	
Surrogate: 1-Chlorooctane	102	% 70-130							
Surrogate: 1-Chlorooctadecane	110	% 70-130							

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Celeg D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	08/04/2011	Sampling Date:	08/03/2011
Reported:	08/08/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: SB #6 6' (H101617-19)

Chloride, SM4500CI-B mg/kg Analyzed By: HM Reporting Limit Analyzed Method Blank % Recovery True Value QC RPD Qualifier Analyte Result BS 400 Chloride 16.0 16.0 08/04/2011 ND 448 112 3.64 TPH 8015M Analyzed By: ab mg/kg Reporting Limit Analyzed Method Blank BS True Value QC RPD Qualifier Analyte Result % Recovery GRO C6-C10 <10.0 08/07/2011 ND 217 109 200 2.47 10.0 DRO >C10-C28 11.8 10.0 08/07/2011 ND 197 98.4 200 1.36 Surrogate: 1-Chlorooctane 111% 70-130 Surrogate: 1-Chlorooctadecane 120 % 70-130

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Celey D. Keene, Lab Director/Quality Manager

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Notes and Definitions

	Samples reported on an as received basis (wet) unless otherwise noted on report
	Chloride by SM4500CI-B does not require samples be received at or below 6°C
***	Insufficient time to reach temperature.
**	Samples not received at proper temperature of 6°C or below.
RPD	Relative Percent Difference
ND	Analyte NOT DETECTED at or above the reporting limit
Z-01	One or more surrogates above historical limits.

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Celey D. Keene, Lab Director/Quality Manager

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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101 East Marland, Hobbs, NM 88240	2111 Beechwood, Abilene, TX 79603
(505) 303-2226 EAY (505) 302-2476	(325) 673-7004 EAY (325)673-7020

Company Name	B: Apache						BILL TO								1	ANAL	YSIS	REC	QUEST		
Project Manage	r: Natalie Gladden						P.(0. #:													
Address:							Company:									S					
City:	State: NM	Zi	p:				At	tn:				1				Cations/Anions					
Phone #:	Fax #:					Address:						1				ini					
Project #:	Project Ow	ner:				City:						Σ		-	S/A						
Project Name:							St	ate:		Zip:		Chlorides	10		TPH	ŝ				1	
Project Locatio	n: Lou Wortham Batt	low	AI)			Ph	one #:				1.5	TPH 801	BTEX	F	tic	TDS				
Sampler Name:		./	4.0				Fa	x #:				12	8	T	Texas	ő	FI				
FOR LAB USE ONLY	it is not in an	T	Т		MAT	RIX		PRES	ERV.	SAMPL	ING	5	1	-	e.						
Lab I.D.	Sample I.D.	(G)RAB OR (C)ON	# CONTAINERS	GROUNDWATER	SOIL	SLUDGE	OTHER :	ACID/BASE: ICE / COOL	OTHER :	DATE	TIME					Complete					
1	SB#1 Surface	G	1		1	_		1		8-3-11	9:00	~	-							_	
2	and a start of the	9	1	_	V	-		V			9:10	1	2								
3	SB#1 24'	<u> </u>	11		1	-		1		8-3-11	9:20	V	~								
4	SB#1 33'	9	11		V	-	-	V		8-3-11		1	V							_	
5	SB#2 Surface SB#2 15'	-6	11	-	V		1	V		8-3.11	10:00	-	5							_	
6		<u> </u>	11-		V		-	V		8-3-11	070	1	1					-			
7	SB#2 33	G	1		1		-	V	-	8-3-11	10:20	V	4								
8	SB#3 Surface SB#3 6	5			1	-	-		-		11:00	-	4								
9		9	-		V	+	-	1	-	8-3-11	11:10	5	2								
10	SB#3 12'	6	11		1			1		8-3-11	11,20	0	10								1

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Date: 4-11 **Relinguished By:** Phone Result: Yes INO Add'l Phone #: **Received By:** C Yes INO Fax Result: Add'I Fax #: REMARKS: Time: Relinquished By email results Received By: Pate Natalie.Gladden@usa.apachecorp.com; Time Zconder@rice-ecs.com; Bbaker@rice-ecs.com; Delivered By: (Circle One) CHECKED BY: Sample Condition Cool Intact Ves Ves No No hconder@rice-ecs.com; Lweinheimer@rice-ecs.com Ð Sampler - URS - Bus - Other: Knorman@rice-ecs.com

#26

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Company Nam	e: Apache							1		B	ILL	TO						1	ANAL	YSIS	S RE	QUE	ST		
Project Manage	er: Natalie Gla	adden						P.	0. #:	:															
Address:							Company:											S							
City:		State: NM	Zi	p:				At	ttn:										Cations/Anions						
Phone #:		Fax #:						A	ddres	ss:									Ini						
Project #:		Project Own	er:					CI	ty:							Σ		T	SIA						
Project Name:						and the second		-	ate:		Zip	D:		- 6	D	5	~	TPH	Suc						
And a state of the	on: Log Wo	tham Battoy	Al	2				P	none	#:				Chloridoc	2	801	BTEX	E	atic	TDS					
Sampler Name								-	x #:						2		T	Texas	S	F					
FOR LAB USE ONLY	I		T	Т		MAT	RIX	-	PRE	SER	V.	SAMPL	ING	- t	5	HH	-	.ô							
Lab I.D. HID1617		nple I.D.	(G)RAB OR (C)OM	# CONTAINERS	GROUNDWATER	Soil	OIL	OTHER :	ACID/BASE:	ICE / COOL	טואבא:	DATE	TIME						Complete						
11	SB#4	Surface	G			1					8-	3-11	1:00	6	1	~									
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14	SB#5	Surface	9	1		V		1					2:40	L	1	V			_						
15	SB#5	9'	67	1		1	-	1				3-3-11			1	V								 	
16	SB#5 SB#5	18'	5	1		V		-				8-3-11			1	V								 	
17	SB#6	Surface	5	11		1	_	-				1-5-1	3:00	2	4	K								 	
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9	SB#6	6'	9	4		レビ	-	-			8-	3-11	3:10		Y	/								 	

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Relinquished By;	Date: S-4-11 Received By:	Phone Result: Yes No Add'l Phone #:
halet	Time; 2.	Fax Result: □ Yes Ø Add'I Fax #: REMARKS:
Relinquished By:	Date 411 Received By:	email results
N/ NAT	TIME START LEUDON	Natalie.Gladden@usa.apachecorp.com;
Delivered By: (Circle One)	Sample Condition CHECKED BY:	Zconder@rice-ecs.com; Bbaker@rice-ecs.com;
Sampler - UPS - Bus - Other:	~ 10° Cool Intact (Initials)	hconder@rice-ecs.com; Lweinheimer@rice-ecs.com
	104 ONO NO LAN	Knorman@ricerecs.com

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Page 14 of 14



August 09, 2011

NATALIE GLADDEN APACHE - EUNICE P. O. BOX 1849 EUNICE, NM 88231

RE: LOU WORTHAM BATTERY AD

Enclosed are the results of analyses for samples received by the laboratory on 08/04/11 13:10.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021Benzene, Toluene, Ethyl Benzene, and Total XylenesMethod SW-846 8260Benzene, Toluene, Ethyl Benzene, and Total XylenesMethod TX 1005Total 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,

Celeg D. Keine

Celey D. Keene Lab Director/Quality Manager



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

Received:	08/04/2011	Sampling Date:	08/04/2011
Reported:	08/09/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Aaron Berry
Project Location:	NOT GIVEN		

Sample ID: SB 7 SURFACE (H101622-01)

Chloride, SM4500CI-B mg/kg Analyzed By: HM RPD Analyte Analyzed Method Blank True Value QC Qualifier Result Reporting Limit BS % Recovery Chloride <16.0 16.0 08/05/2011 ND 464 116 400 7.14 **TPH 8015M** mg/kg Analyzed By: ab Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qualifier GRO C6-C10 <10.0 10.0 08/08/2011 ND 196 97.8 200 0.358 0.577 DRO >C10-C28 <10.0 10.0 08/08/2011 ND 193 96.5 200 Surrogate: I-Chlorooctane 106% 70-130 116% 70-130 Surrogate: 1-Chlorooctadecane

Sample ID: SB 7 6' (H101622-02)

Chloride, SM4500CI-B	mg/	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	1600	16.0	08/05/2011	ND	464	116	400	7.14	
TPH 8015M	mg	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	1420	100	08/08/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	21300	100	08/08/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	118	% 70-130							
Surrogate: I-Chlorooctadecane	99.0	% 70-130							

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

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

Received:	08/04/2011	Sampling Date:	08/04/2011
Reported:	08/09/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Aaron Berry
Project Location:	NOT GIVEN		

Sample ID: SB 7 18' (H101622-03)

Chloride, SM4500CI-B mg/kg Analyzed By: HM Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qualifier Chloride 2680 16.0 08/05/2011 ND 464 116 400 7.14 Analyzed By: ab TPH 8015M mg/kg Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qualifier GRO C6-C10 <10.0 10.0 08/08/2011 ND 196 97.8 200 0.358 DRO >C10-C28 153 10.0 08/08/2011 ND 193 96.5 200 0.577 Surrogate: 1-Chlorooctane 99.4% 70-130 110 % 70-130 Surrogate: 1-Chlorooctadecane

Sample ID: SB 7 33' (H101622-04)

Chloride, SM4500CI-B	mg	/kg	Analyze	d By: HM	_				
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2280	16.0	08/05/2011	ND	464	116	400	7.14	
TPH 8015M	mg	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/08/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	40.0	10.0	08/08/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	106	% 70-130	r.						
Surrogate: 1-Chlorooctadecane	115	% 70-130	i -						

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

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

Received: Reported: Project Name: Project Number: Project Location: 08/04/2011 08/09/2011 LOU WORTHAM BATTERY AD NONE GIVEN NOT GIVEN

Sampling Date: 08/04/2011 Sampling Type: Soil Sampling Condition: Sample Received By: Aaron Berry

Cool & Intact

Sample ID: SB 8 SURFACE (H101622-05)

Chloride, SM4500CI-B Analyzed By: HM mg/kg Reporting Limit Analyzed Method Blank % Recovery True Value QC RPD Qualifier Analyte Result BS Chloride 16.0 16.0 08/05/2011 ND 464 116 400 7.14 TPH 8015M Analyzed By: ab mg/kg Analyte Result Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qualifier GRO C6-C10 97.8 <50.0 50.0 08/08/2011 ND 196 200 0.358 DRO >C10-C28 142 50.0 08/08/2011 ND 193 96.5 200 0.577 Surrogate: 1-Chlorooctane 99.9% 70-130 70-130 Surrogate: 1-Chlorooctadecane 107 %

Sample ID: SB 8 6' (H101622-06)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	08/05/2011	ND	464	116	400	7.14	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/08/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	19.6	10.0	08/08/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	107	% 70-130							
Surrogate: 1-Chlorooctadecane	118	% 70-130							

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

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

Received:	08/04/2011	Sampling Date:	08/04/2011
Reported:	08/09/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Aaron Berry
Project Location:	NOT GIVEN		

Sample ID: SB 8 9' (H101622-07)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	08/05/2011	ND	464	116	400	7.14	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/08/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	<10.0	10.0	08/08/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	103	% 70-130							
Surrogate: 1-Chlorooctadecane	107	% 70-130							

Sample ID: SB 9 SURFACE (H101622-08)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	08/05/2011	ND	464	116	400	7.14	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/08/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	<10.0	10.0	08/08/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	117	% 70-130							
Surrogate: 1-Chlorooctadecane	126	% 70-130							

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Celey D. Keine

Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

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

Received:	08/04/2011	Sampling Date:	08/04/2011
Reported:	08/09/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Aaron Berry
Project Location:	NOT GIVEN		

Sample ID: SB 9 6' (H101622-09)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	416	16.0	08/05/2011	ND	464	116	400	7.14	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	680	100	08/08/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	14000	100	08/08/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	120	% 70-130							
Surrogate: 1-Chlorooctadecane	118	% 70-130	1						

Sample ID: SB 9 9' (H101622-10)

Chloride, SM4500CI-B	mg/	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	992	16.0	08/05/2011	ND	464	116	400	7.14	
TPH 8015M	mg/	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	440	100	08/08/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	12500	100	08/08/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	118	% 70-130)						
Surrogate: 1-Chlorooctadecane	104	% 70-130	1						

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Celey D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	08/04/2011	Sampling Date:	08/04/2011
Reported:	08/09/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Aaron Berry
Project Location:	NOT GIVEN		

Sample ID: SB 9 33' (H101622-11)

Chloride, SM4500CI-B	mg,	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	3000	16.0	08/05/2011	ND	464	116	400	7.14	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/08/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	257	10.0	08/08/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	103	% 70-130							
Surrogate: 1-Chlorooctadecane	112	% 70-130							

Sample ID: SB 10 SURFACE (H101622-12)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	08/05/2011	ND	464	116	400	7.14	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/09/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	<10.0	10.0	08/09/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	96.4	% 70-130							
Surrogate: 1-Chlorooctadecane	100	% 70-130							

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

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

Received:	08/04/2011	Sampling Date:	08/04/2011
Reported:	08/09/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Aaron Berry
Project Location:	NOT GIVEN		

Sample ID: SB 10 6' (H101622-13)

Chloride, SM4500CI-B	mg/	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	08/05/2011	ND	448	112	400	0.00	
TPH 8015M	mg/	kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/09/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	33.0	10.0	08/09/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	106 9	% 70-130							
Surrogate: 1-Chlorooctadecane	114 9	70-130							

Sample ID: SB 10 9' (H101622-14)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	80.0	16.0	08/05/2011	ND	448	112	400	0.00	
TPH 8015M	mg,	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/09/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	<10.0	10.0	08/09/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	112	% 70-130							
Surrogate: 1-Chlorooctadecane	120	% 70-130							

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

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

Received:	08/04/2011	Sampling Date:	08/04/2011
Reported:	08/09/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Aaron Berry
Project Location:	NOT GIVEN		

Sample ID: SB 11 SURFACE (H101622-15)

Chloride, SM4500CI-B	mg/	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	08/05/2011	ND	448	112	400	0.00	
TPH 8015M	mg/	kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/09/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	17.8	10.0	08/09/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	119 5	% 70-130							
Surrogate: 1-Chlorooctadecane	129 9	70-130							

Sample ID: SB 11 3' (H101622-16)

Chloride, SM4500CI-B	mg	/kg	Analyze	d By: HM				_	
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	08/05/2011	ND	448	112	400	0.00	
TPH 8015M	mg	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/09/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	10.4	10.0	08/09/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	103	% 70-130							
Surrogate: 1-Chlorooctadecane	113	% 70-130	,						

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Celey D. Keine

Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

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

Received:	08/04/2011	Sampling Date:	08/04/2011
Reported:	08/09/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Aaron Berry
Project Location:	NOT GIVEN		

Sample ID: SB 11 6' (H101622-17)

Chloride, SM4500CI-B	mg/	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	08/05/2011	ND	448	112	400	0.00	
TPH 8015M	mg/	kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/09/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	28.2	10.0	08/09/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	107 5	% 70-130							
Surrogate: 1-Chlorooctadecane	115 9	70-130							

Sample ID: SB 12 SURFACE (H101622-18)

Chloride, SM4500CI-B	mg/	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	08/05/2011	ND	448	112	400	0.00	
TPH 8015M	mg/	kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/09/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	12.8	10.0	08/09/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	115 9	% 70-130							
Surrogate: 1-Chlorooctadecane	121 9	70-130							

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Celey D. Keine

Celey D. Keene, Lab Director/Quality Manager



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

Received:	08/04/2011	Sampling Date:	08/04/2011
Reported:	08/09/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM BATTERY AD	Sampling Condition:	Cool & Intact
Project Number:	NONE GIVEN	Sample Received By:	Aaron Berry
Project Location:	NOT GIVEN		

Sample ID: SB 12 3' (H101622-19)

Chloride, SM4500CI-B mg/kg Analyzed By: HM Reporting Limit Analyzed Method Blank BS % Recovery True Value QC RPD Qualifier Analyte Result Chloride 16.0 16.0 08/05/2011 ND 448 112 400 0.00 **TPH 8015M** Analyzed By: ab mg/kg Method Blank RPD Qualifier Analyte Result Reporting Limit Analyzed BS % Recovery True Value QC GRO C6-C10 <10.0 10.0 08/09/2011 ND 196 97.8 200 0.358 DRO >C10-C28 <10.0 10.0 08/09/2011 ND 193 96.5 200 0.577 Surrogate: 1-Chlorooctane 114% 70-130 70-130 Surrogate: 1-Chlorooctadecane 121%

Sample ID: SB 12 6' (H101622-20)

Chloride, SM4500CI-B	mg	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	08/05/2011	ND	448	112	400	0.00	
TPH 8015M	mg	/kg	Analyze	d By: ab					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	08/09/2011	ND	196	97.8	200	0.358	
DRO >C10-C28	<10.0	10.0	08/09/2011	ND	193	96.5	200	0.577	
Surrogate: 1-Chlorooctane	110	% 70-130							
Surrogate: 1-Chlorooctadecane	117	% 70-130							

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Celey D. Keene, Lab Director/Quality Manager



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 SM4500CI-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

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Celey D. Keene, Lab Director/Quality Manager

Page 12 of 14

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

ARDINAL LABORATORIES 101 East Marland, Hobbs, NM 88240 2111 Beechwood, Abilene, TX 79603

Company Name	Apache									BI	LL TO					1	ANAL	YSIS	REQUE	ST		
Project Manage		Gladden						Ρ.	0. #:				T									
Address:								C	ompar	y:							S					
City:		State: NM	Zip):				Attn:								Cations/Anions						
hone #:		Fax #:						Address:								Ini						
roject #: Project Owner:								City:					15 M		Т	SIP						
Project Name:								State: Zip:				Chlorides			a	ü						
Project Location: Lou Wortham Battay AD								Phone #:				1.5	801	BTEX	Texas TPH	atic	TDS					
Sampler Name:			/					Fa	x #:				12		B	Xa	Ű	F				
FOR LAB USE ONLY						MAT	RIX		PRES	ERV	SAMPL	ING	10	TPH	-	ê	te					
Lab I.D.		ample I.D.	(G)RAB OR (C)OMP	# CONTAINERS	GROUNDWATER	SOIL	OIL	OTHER :	ACID/BASE:	OTHER:		TIME					Complete					
4101622-1	SB7	Surface	G	1		1			V	1	8-4-11	8:00	V	1			- 0					
-7	SB7	6'	G	1	_	1	_		U	1	84-11	6:05	V	1								
-3	SB7	18'	6	1	-	1	-	-	V		8-4-11	B:10	V	10							_	-
- 4	SB7	33'	G	4	_	1		-	1	-	8-4-11	8:15	V	V					_			
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and the second second second second	SBS	9'	6	1	-			-	U		8-4-1	A COMPANY OF THE OWNER OF THE OWNER	V	V								-
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service. In no event shall Cardinal be lable for incidental or consequential damages, including without landance, business interruptions, loss of use, or loss of profits incurred by client, its sublicatives. Stillates of submission state for realised in the performance of cardinas have interruptions, divide the chief in the submission state of cardinas have interruptions of whether interruptions of the abuse the client interruption and one of the abuse stated interruptions.

Relinguished By:	Date: 8-4-1	Received By:	Phone Result: I Yes I No Add'l Phone #: Fax Result: I Yes I No Add'l Fax #:
hyph	Time:	A CD-L	REMARKS:
Relineuished By:	Date:	Redeived By:	email results
	Time:		Natalie.Gladden@usa.apachecorp.com;
Delivered By: (Circle One)		Sample Condition CHECKED BY:	Zconder@rice-ecs.com; Bbaker@rice-ecs.com;
Sampler - UPS - Bus - Other:	#26	5 Col Intact (Initials)	hconder@rice-ecs.com; Lweinheimer@rice-ecs.com

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

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

ARDINAL LABORATORIES

Company Name	Apache							建建		BI	LL TO	at trail				1	ANA	LYSIS	REQ	UEST	
Project Manage	r: Natalie Gladden							P.C	. #:		-										
Address:								Col	npan	y:	_		1				S				
City:	State: NM	Zip	o:				Attn:								Ы						
Phone #:	Fax #:							Add	iress	:							Y'ni				
Project #:	Project Owne	r:						City:				10	Σ		I	SIF					
Project Name:					-			State: Zip:				je l	2	X	TPH	UO					
Project Locatio	ion: Lou Wortham Bottory AD							Pho	one #	:			Chlorides	801	BTEX	S	Cations/Anions	TDS			
Sampler Name:								Fax	#:	_			12	T	B	Texas	Ü	F			
FOR LAB USE ONLY			Г		MA	TRI	X		PRES	ERV	SAMPL	ING	O	Hd		Le	te				
Lab I.D.	Sample I.D.	(G)RAB OR (C)OM	# CONTAINERS	GROUNDWATER	WASTEWATER	OIL	SLUDGE	OTHER :	ACID/BASE: ICE / COOL	OTHER :	DATE	TIME		ſ			Complete				
H101622-11	SB#9 33'	G	- 1		V	1			1	1	8-4-1	9:15	1	0							
-17	SB 10 Surface	6	1		1	1			1		8-4-11	9,30	10	0							
-13	SB10 6'	9	1		1	1				-	8-4-11		1	V				-			
14	SB10 9'	5	1		1	-		_		-	8-4-11		~	1							
-15	SBII Surface	9	14		V	1	-	_		-		10:00	V	10							
	-	9	1		V	1		_		1-	8-4-11	10:05	r	1							
-17	SB11 6'	5	14		1	1		-		-	8-4-11	10:10	V	1-							
-18	SB12 Surface	9	1	-		-	-	-			8-4-11	10:00	K	10							
	SB 12 3'	17	1	-	V	1-	-	-		-	8-14-11	11:10	10	V							
	53 12 6" nd Damages, Cardinal's insbility and client's exclusive remedy for	17	11			_				1	8-4-11		V	0			-	1			

PLEASE NOTE: Clearer and Damages. Cardonas addanty and clearts exclusive remetry for enry clean analysis, writter based in contract to ton, these cell international period by the clearts exclusive remetry for enry clean analysis. All cleares including those for negligence and any other cause whatsoever shall be deemed welved unless made in writing and received by Cardinal within 30 days after completion of the applicable services. In one event shall be to includents in contract, including damages, fluctual damages, fluctuation, business interry damages, cleares, or loss of profits incrured by cleant, its subdifiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is hased upon any of the above stated reasons or otherwise,

Relinquished By:	Date: 8-4-11 Receive	ad By:	Phone Result: I Yes I No Add'l Phone #: Fax Result: I Yes I No Add'l Fax #:
hyph	Time: 100	CBJ	REMARKS:
Relinquished By:	Date: Receive	ad By:	email results
	Time:	U	Natalie.Gladden@usa.apachecorp.com;
Delivered By: (Circle One)	- Langer and the second	Sample Condition OHECKED BY:	Zconder@rice-ecs.com; Bbaker@rice-ecs.com;
	1		hconder@rice-ecs.com; Lweinheimer@rice-ecs.com
Sampler - UPS - Bus - Other:	#26 5°C	Cool Intact (Initials)	

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

Appendix B Monitor Well Logs

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

Logger: Driller:	,		ony Grie n & Coop					F		5	,	
Drilling M Start Date End Date	e:	Ę	Air rotary 8/3/2011 8/3/2011		ANTERY ANTERY ANTERY THE ANTERY THE ANTERY	Company: Apache Corporation Project Name: Well ID: Lou Wortham Central Batt AD MW-1						
Comme No sam	pling occ		gy only	. All sa	Samples were taken for amples from cuttings.	Lo		ct Consultant: RECS tion: UL/D sec. 11 T22S R37E 32°24'38.386"N County:				
	TD :	= 46 ft	t		GW = 37	Lo	ong: 103°8'18	.52	25"W		state: NM	
Depth (feet)	chlorid field te:		LAB	PID	Description		Lithology		Well (Il Construction		
5 ft 10 ft					Red clayey silt/very fine sand, unconsolidated to moderately consolidated, dry, no odor or stain Red clayey silt/very fine sand, unconsolidated to moderately consolidated, slightly damp, no odor or stain						bentonite	
15 ft					Red/tan clayey silt with abundant caliche fragments, unconsolidated, dry, no odor or stain				2 in PVC		seal	
20 ft					Tan silt, with abundant caliche fragments, unconsolidated, dry, no odor or stain							
25 ft					Tan silt, decrease in caliche fragments, unconsolidated, damp, no odor or stain)		
					Tan silt, decrease in caliche fragments, unconsolidated, damp,							
30 ft					no odor or stain Tan silt, decrease in caliche fragments, unconsolidated, very							
35 ft					damp, no odor or stain						pack	
40.0					NO SAMPLES TAKEN							
40 ft												
45 ft												
46 ft				_							_	

	Harris Hethod: e: : ents: pling occurre	ll samp DRAF	per, Inc. y 1 is well. les froi	Samples were taken for n cuttings. Red bed clay at 40 ft. : L. Weinheimer GW = 37 Description	Pr Lo Lo	oject Name: ou Wortham Cer oject Consu cation: UL/ tt: 32°24'35.5 ong: 103°8'1	mpany: Apache Corporation oject Name: Well ID Wortham Central Batt AD M oject Consultant: RECS cation: UL/D sec. 11 T22S R3 : 32 °24'35.581"N Cour ng: 103 °8'15.49"W State Lithology Well Constru			
(feet) 5 ft	field tests			Red silt/very fine sand, unconsolidated, dry, scattered caliche fragments, no odor or stain		Lithology				
10 ft				Tan silt, unconsolidated, dry, no odor or stain Tan silt and caliche fragments, unconsolidated, dry. Abundant fragments of moderately consolidated tan siltstone (30%), no odor or stain				4 in PVC	bentonite } seal	
15 ft 20 ft				Tan silt, unconsolidated, dry scattered caliche fragments, no						
25 ft 30 ft				odor or stain)	
35 ft				Red silt/very fine sand, unconsolidated, damp, no stain or odor						
40 ft				NO SAMPLES TAKEN						

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

Appendix C MW Sampling Data

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



August 16, 2011

NATALIE GLADDEN APACHE - EUNICE P. O. BOX 1849 EUNICE, NM 88231

RE: APACHE LOU WORTHAM CENTRAL BATTERY AD

Enclosed are the results of analyses for samples received by the laboratory on 08/16/11 11:01.

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. Keine

Celey D. Keene Lab Director/Quality Manager



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

Received:	08/16/2011	Sampling Date:	08/16/2011
Reported:	08/16/2011	Sampling Type:	Water
Project Name:	APACHE LOU WORTHAM CENTRAL BATT	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	T22S-R37E-SEC11 UL/CDEF ~ LEA CTY,		

Sample ID: MONITOR WELL #1 (H101717-01)

Chloride, SM4500CI-B	mg)	/L	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	20800	4.00	08/16/2011	ND	108	108	100	0.00	

Sample ID: MONITOR WELL #2 (H101717-02)

Chloride, SM4500CI-B	mg/	/L	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	22000	4.00	08/16/2011	ND	108	108	100	0.00	

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager

Page 2 of 4

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 SM4500CI-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

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Celez D. Keine

Celey D. Keene, Lab Director/Quality Manager

Page 3 of 4

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Hack Cond	der, Rice Env Consulting Safe	ty																														
Address: (S	Street, City, Zip)				Phor	1e#:					Fa	x#:						~														
	Street ~ Hobbs, New Mexico 88240					-turney and												6010B/200.7														
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			1	1	/M.	ATR	QV			ETH			SAM	PLING			XT/	Ba Cd					624	270		8		X	CO3, HCO3)	Ne	2	- 24
LAB #	FIELD CODE	(G)rab or (C)omp	# CONTAINERS	R			GE	HCL (2 40ml VOA)		04	H2SO4		DATE (2011)		MTBE 8021B/602	BTEX 8021B/602	TPH 418.1/TX1005 / TX1005 Extended (C35)	Ag As	CLP Metals Ag As Ba	TCLP Volatiles TCLP Semi Volatiles	TCLP Pesticides		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 Mr Na Ki	Anions (Cl, SO4, C	S hould	les les	Turn Around Time ~ 24 Hours
HIDITIT		(G)rab	# CON	WATER	SOIL	AIR	SLUD	HCL	HNO ₃	NaHSO4	H2SO4	NONE	DATE	TIME	MTBE	BTEX	TPH 418.1/	Total N	TCLP A	TCLP	TCLP P	RCI	GC/MS	GC/MS	PCB's	Pesticik	BOD. T	Cation	Anions	Sulfates Total Di	Chlorides	Turn A
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#26

Appendix D 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



October 13, 2011

NATALIE GLADDEN APACHE - EUNICE P. O. BOX 1849

EUNICE, NM 88231

RE: LOU WORTHAM CENTRAL BATTERY

Enclosed are the results of analyses for samples received by the laboratory on 10/11/11 8:05.

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,

Celeg D. Keine

Celey D. Keene Lab Director/Quality Manager

Analytical Results For:

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

Received:	10/11/2011	Sampling Date:	10/10/2011
Reported:	10/13/2011	Sampling Type:	Soil
Project Name:	LOU WORTHAM CENTRAL BATTERY	Sampling Condition:	** (See Notes)
Project Number:	NONE GIVEN	Sample Received By:	Jodi Henson
Project Location:	NOT GIVEN		

Sample ID: CALICHE BACKFILL (H102180-01)

Chloride, SM4500CI-B	mg/	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	10/11/2011	ND	448	112	400	3.64	

Sample ID: SAND BACKFILL (H102180-02)

Chloride, SM4500CI-B	mg	kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	10/11/2011	ND	448	112	400	3.64	

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager

Page 2 of 4



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 SM4500CI-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

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager

Page 3 of 4

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

ARDINAL 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

Company Name	e: Apache Corp.					-	1			BI	LL TO					1	ANAL	YSIS	RE	QUES	ST		
Project Manage	ar: Natalie Gladden							P.0). #:														
Address:	Address:							Company:							S								
City:	State: Zip:							Attn:							no								
Phone #:	Fax #:						Ad	dress	:							Ani							
Project #:	#: Project Owner:						Cit	y:				10	Σ		I	s/ł							
Project Name:	LOU WORTHAM CENTR	AL	R	41	TE	24		Sta	ite:		Zip:		Chlorides	S	X	TPH	U						
Project Location:					Ph	one #	:			1.5	H 801	BTEX	exas T	Cations/Anions	TDS								
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PLEASE NOTE: Liability and Damages, Cardinal's liability and client's exclusive remedy for any claim among whether based in contract or tort, shall be lented to the amount paid by the client for the analyses. As claims including those for negligence and any other cause whatsoever shall be deemed waved unless made in arting nane received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be label for incidental diamages, including without limitation. Is burkes they temptions, loss of use, not sos of profis incurrent by client, its subschafters affiliates or successors artsing 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: Received By:	Phone Result: Yes No Add'l Phone #:
Incar	Time: Thang that	Fax Result: Ves O No Add'I Fax #:
Relinquished By	Date: 10-11-11 Received By: 10	email results
TH Marth	Time: TIVII NOUDON	natalie.gladden@apachecorp.com
Delivered By: (Circle One)	Sample Condition CHECKED BY:	Zconder@rice-ecs.com; Bbaker@rice-ecs.com;
Sampler - UPS - Bus - Other:	19° Cool Intact (initials) U Yes U Yes (initials) U No No	hconder@rice-ecs.com; Lweinheimer@rice-ecs.com

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

#26

Appendix E Imported Sand Laboratory Confirmation

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



October 17, 2011

NATALIE GLADDEN APACHE - EUNICE P. O. BOX 1849 EUNICE, NM 88231

RE: LOU WORTHAM LEASE

Enclosed are the results of analyses for samples received by the laboratory on 10/13/11 16:25.

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,

Celeg D. Keine

Celey D. Keene Lab Director/Quality Manager

CARDINAL Laboratories

Analytical Results For:

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

Received: Reported: Project Name: Project Number: Project Location: 10/13/2011 10/17/2011 LOU WORTHAM LEASE NONE GIVEN NOT GIVEN Sampling Date:10/13/2011Sampling Type:SoilSampling Condition:** (See Notes)Sample Received By:Jodi Henson

Sample ID: IMPORTED SOIL (H102213-01)

Chloride, SM4500CI-B	mg,	/kg	Analyze	d By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	10/15/2011	ND	432	108	400	3.64	

Cardinal Laboratories

*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any daim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses. All claims, including those for negligence and any other cause whitsoever shall be deemed waived unlies made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including, without Emittation, busines interruptions, bass of profits incrumed by client, its sublidiaries, arillates or succession arising out of or related to the performance of the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

Celeg D. Kune

Celey D. Keene, Lab Director/Quality Manager

Page 2 of 4



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 SM4500CI-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

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Celey D. Kune

Celey D. Keene, Lab Director/Quality Manager

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Relinquished By:

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240 (575) 393-2326 FAX (575) 393-2476 **Company Name:** Apache Corp Natalis Gladde BILL TO ANALYSIS REQUEST Project Manager: P.O. #: Address: Hobse Company: State: [[M Zip: 38240 City: Attn: Phone #: Fax #: Address: Project #: Project Owner: City: Project Name: State: Zip: Project Location: Los Worthan leuse Phone #: Sampler Name: Oscar Grand Fax #: FOR LAB USE ONLY MATRIX PRESERV SAMPLING (G)RAB OR (C)OMP GROUNDWATER WASTEWATER SOIL OIL SLUDGE OTHER ACID/BASE Sample I.D. ICE / COOL Lab I.D. CONT OTHER 2 HID2213 DATE TIME Imported Soil 6 X 13-13-11 855 PLEASE NOTE: Liability and Damages, Cardinal's liability and client's exclusive remody for any claim arising whether based in contract or tori, shall be linuted to the emount part by the client for the analyses. All cluims including those for neuligence and goy other source whatvoever shall be depresed valved unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Candwak be Roble for incidental or consequential damages, including without finitation, business interruptions, joss of use, or loss of profits incurred by client, its subsidences Wates or succession arising out of or related to the performance of services hereunder by Cordinal remodess of valuetier such Relinguished By: Received By: Phone Result: Ves Yes Add'l Phone #: Date: O No 10.73.11 D No Fax Result: Add'l Fax #: 1:25 Time; Uf: Date: REMARKS:

Naturie, Kate, Lann, HARK, ZACK, BANCI Oscar E-Mail Everyone Time: Delivered By: (Circle One) Sample Condition CHECKED BY: Cool Intact (Initials) Yes Yes 240, Sampler - UPS - Bus - Other: † Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

Received By:

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Appendix F Quality Procedures

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



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

REVEGETATION FORM

1. General l	Information						
Site name:	Apache Lou	Wortham Cent	ral Battery Al	D			
U/L	Section	Township	Range	County	Latitude		Longitude
D&C	11	22S	37E	Lea	32°24'37.091"N	103°8'17	.31"W
Contact Name:	Bruce Ba	ker					
Email:	bbaker@ric	e-ecs.com					
Site size:	16,05	5 square feet	Map de	tail of site attach	ned 🖂		
Additional info	rmation:						
2. Soils Salvaged from Texture: sand	site 🗌 🛛 B	<i>rip caliche subsoi</i> ioremediated escribe soil & su	Impor	and the second se	urface by ripping shal ended	Depth (in):	60 in
Soil prep metho	· · · · · · · · · · · · · · · · · · ·					ollerpack	
Date completed 10/21/11							
3. Bioremed	liation						
Fertilizer				Hay 🗌		Other 🛛	
Туре:						Describe:	5 bags of BioNhance
Lbs/acre:							
4. Seeding	*Attach	seed bag tags to the	his form. Seed l	bag tags shall con	tain the site name and	S-T-R.	
Custom seed m	ix 🛛 Pre	scribed mix	Seed mix n	ame: 30 lbs 30 lbs	Johnson seed mix, wheat	Seeding dat	te: 10/21/2011
Broadcast 🖂			1				
Method: hand	operated seed	ler					
Soil conditions			Damp 🗌	Wet			
Photos attached	and the second s	Observations:					
Number of pho	tos:						
5. Certifica	tion_Hhereby	certify that the inform	nation in this for	m and attachments i	s true and complete to the	e best of my know	vledge and belief.
Name:	Øscar Frayre	//	1	Title: Envi	ronmental Tech		Date: 10/25/11
Signature:	Send.	Laster	eilar	e			
X	X	- /0.					

Appendix G

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

Apache Lou Wortham Central Battery AD Unit C, D, E & F, Section 11, T-22-S, R-37-E



Beginning west excavation, facing south 8/29/11



Beginning east excavation, facing northeast 8/31/11



Exporting soil, facing east

9/23/11



East side, 21 ft excavation complete, facing south 9/26/11



Importing clay, facing northwest

10/6/11



East side, clay layer completed in 21 ft excavation, facing northeast 10/6/11



West side, installing liner over clay layer, facing west 10/6/11



Padding the liner, facing north

10/7/11



East side, deeping main excavation to 5 ft, facing northwest 10/7/11



Importing caliche, facing east

10/7/11



East side, backfilling pit, facing southwest 10/10/11



East side, placing sand pad over caliche, facing Southeast 10/10/11



West side, backfilling 21 ft excavations, facing 10/11/11 south



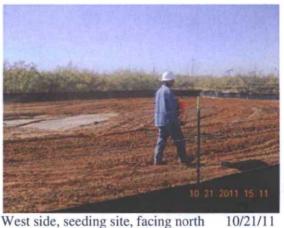
East side, liner installed at 5 ft, facing northwest 10/11/11



West side, liner installed at 5 ft, facing northeast 10/12/11



East side, excavation backfilled, facing northeast 10/14/11



West side, seeding site, facing north



West side, adding soil amendments, facing north 10/21/11



West side, excavation complete, facing west 10/21/11



West excavation, disking the seed in, facing east 10/21/11



East side, seeding site, facing southwest 10/21/11



East excavation, adding soil amendments, facing north 10/21/11



East side, excavation complete, facing northeast 10/21/11



East side, disking the seed in, facing west 10/21/11