1R-480

WORKPLANS

DATE:
12-17-09



CERTIFIED MAIL RETURN RECIEPT NO. 7099 3400 0017 1737 1872

December 17, 2009

Mr. Edward Hansen New Mexico Energy, Minerals, & Natural Resources Oil Conservation Division, Environmental Bureau 1220 S. St. Francis Drive Santa Fe, New Mexico 87504

RE: Corrective Action Plan

EME B-8 Release Site (NMOCD Case No. 1R0480)

T20S-R37E-Section 8, Unit Letter B

Lea County, New Mexico

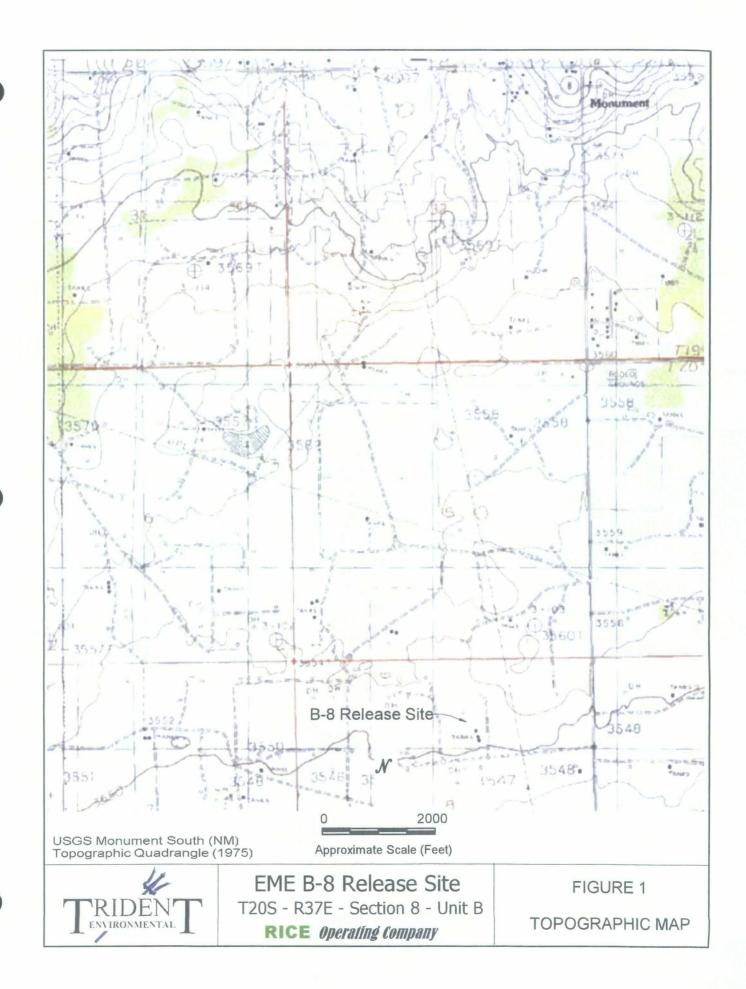
Mr. Hansen:

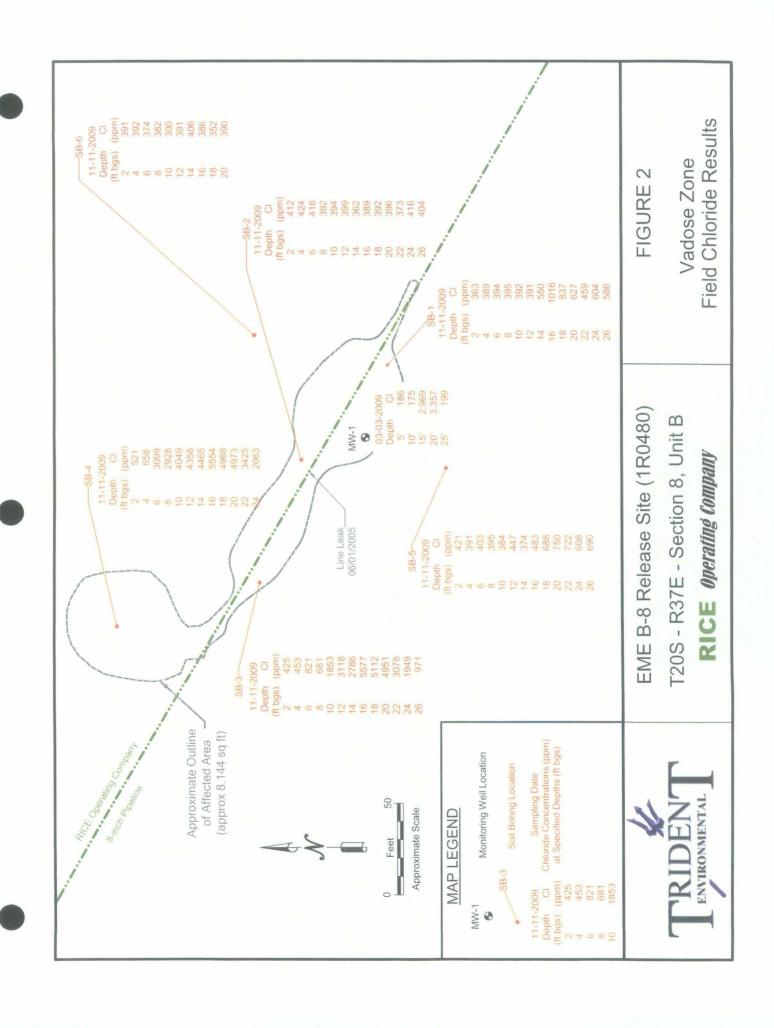
As agent for Rice Operating Company (ROC), Trident Environmental (Trident) is submitting this Corrective Action Plan for the above-referenced site in accordance with 19.15.29 NMAC and your email on October 22, 2009 (Attachment A), in which you requested a plan for chloride mass removal in groundwater based on vadose zone loading. A site location map is shown in Figure 1.

Soil Sampling Procedures and Results

On November 11, 2009, six soil borings (SB-1 through SB-6) were conducted using a Geoprobe direct push sampling rig equipped with percussion capability to delineate the chlorides in the vadose zone at the site. Four of the soil borings (SB-1 through SB-4) were spaced at representative intervals along the length of the release in areas where greatest impact had been reported during previous investigations. Two soil borings were advanced to the south (SB-5) and north (SB-6) of the release to determine background conditions. Samples were collected at two-foot intervals and field titrated to analyze for chloride content. Duplicate samples from the intervals with the highest field chloride result and the bottom of the each boring were submitted to Cardinal Laboratories for comparison with field values.

The lithology, depths sampled, and chloride testing results are described on soil boring logs which are included in Attachment B. A map showing the results of the recent vadose zone investigation is depicted in Figure 2. Photo documentation of the soil boring activities is included in Attachment C. Laboratory analytical reports and chain of custody documentation is provided in Attachment D.



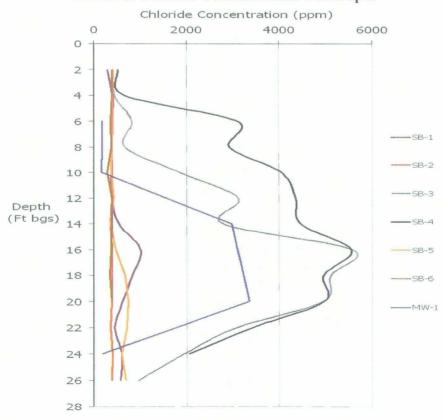


The following table and profile summarizes the chloride concentrations from the recent soil borings conducted at the site.

Table 1: Summary of Chloride Concentrations in Vadose Zone

Donth (ft boo)	_	Chl	oride C	oncentr	ations (ppm)	
Depth (ft bgs)	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	MW-1
2	363	412	425	521	421	391	
4	389	424	453	658	391	392	
6	394	418	821	3099	403	374	186
8	395	392	681	2928	395	382	
10	392	394	1853	4049	384	300	175
12	391	399	3118	4358	447	391	
14	550	362	2786	4465	374	406	2969
16	1016	389	5577	5554	483	386	
18	837	392	5112	4968	688	352	
20	627	396	4951	4973	750	390	3357
22	459	373	3078	3425	722		
24	604	416	1949	2063	608		199
26	586	404	971		690		

Profile of Chloride Concentrations with Depth



Groundwater Conditions

Depth to groundwater at the site is approximately 29 feet below ground surface (bgs). Table 2 below summarizes the historical groundwater monitoring results (MW-1) at the site.

Table 2: Summary of Groundwater Monitoring Results (MW-1)

Sample Date	Depth to Groundwater (feet BTOC)	Chloride (mg/L)	TDS (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethyl- benzene (mg/L)	Xylene (mg/L)
03/31/09	30.03	512	1,440	< 0.001	< 0.001	< 0.001	< 0.003
05/18/09	30.21	900	2,120	< 0.001	< 0.001	< 0.001	< 0.003
08/20/09	30.81	960	2,380	< 0.001	< 0.001	< 0.001	< 0.003
11/05/09	31.02	890	2,030	< 0.001	< 0.001	< 0.001	<0.003

After four quarters of groundwater sampling and laboratory analysis, it has been confirmed that chloride and total dissolved solids (TDS) exceed the Water Quality Control Commission (WQCC) standards at the site. There has been no indication of hydrocarbon impact in groundwater or the vadose zone; therefore, with concurrence from OCD, sampling and analysis for BTEX will be suspended.

Chloride Load in Vadose Zone

The chloride concentrations measured at the six soil borings conducted on November 11, 2009, along with the soil data obtained for monitoring well MW-1 on March 3, 2009, were used to calculate the chloride loads in the vadose zone to address potential contribution of chlorides from the release. First, the size of the impacted area is conservatively assumed to be 8,144 ft² as measured and reported during the initial response to the release. A mass load spreadsheet was used to calculate the total chloride and the background chloride loads per unit area based on equally-weighting the chloride data in Table 1. The near source soil boring chloride values (SB-1, SB-2, SB-3, SB-4, and MW-1) were input for conservatively calculating the total chloride mass. The mass load spreadsheet was also used to compensate for the background chloride load as measured in soil borings SB-5 and SB-6, which are located outside of the release area. Based on these calculations, the resulting chloride mass contributed by the release is 10,725 kg as summarized in the following tables.

Table 3: Estimate of Chloride Mass in Vadose Zone

Soil Sample	Proportional	Chloride Load Calculated	Boring Chloride Load
Identification	Area Weights	at Each Soil Boring	times Proportion Of Area
SB-1	0.1429	7.06 kg/m^2	1.01 kg/m^2
SB-2	0.1429	11.32 kg/m^2	$1.62 kg/m^2$
SB-3	0.1429	30.22 kg/m^2	$4.32 kg/m^2$
SB-4	0.1429	39.55 kg/m^2	$5.65 ext{ kg/m}^2$
SB-5	0.1429	-3.51 kg/m^2	-0.50 kg/m^2
SB-6	0.1429	-1.67 kg/m^2	-0.24 kg/m^2
MW-1	0.1429	16.27 kg/m^2	$2.32 kg/m^2$
		Total	$14.18 kg/m^2$
Av	eraged Chloride Lo	oad Contributed by Release =	1.317 kg/ft^2

Values for soil borings SB-1, SB-2, SB-3, SB-4, and MW-1 represent the total chloride load in vadose zone. Values for soil borings SB-5 and SB-6 represent background (pre-release) chloride load.

Parameter Type	Value	Parameter Validation (description of equations used)
Release area	8,144 ft ²	As reported during first response to release.
Averaged chloride load	1.317 kg/ft^2	Calculated as summarized in table above.
Total chloride mass	10,725 kg	Simple multiplication of two parameters listed above

ROC proposes to use the groundwater recovery system at a nearby site (EME Jct. K-6) which utilizes a solar-powered submersible pump, to extract the chloride mass attributable to the EME B-8 site. Water from the recovery well at the EME Jct. K-6 site is stored on site and will be utilized for pipeline maintenance operations.

At its present location and configuration, the system at the EME Jct. K-6 site is capable of extracting approximately 21 kg per day. At that rate it would take approximately 511 days and the equivalent of 6,746 barrels (bbls) to remove 10,725 kg of chloride mass.

Concurrent with groundwater recovery at the EME Jct. K-6 site, ROC will continue quarterly groundwater monitoring at the EME B-8 site. Since there has been no indication of hydrocarbon impact in groundwater or the vadose zone, ROC requests suspension of sampling and analysis for BTEX constituents. Sampling and analysis for chlorides and TDS would be continued.

Closure and Proposed Schedule of Activities

ROC will continue quarterly groundwater sampling at monitoring well MW-1 and vegetation will be monitored for growth and amendments added if necessary.

At the completion of corrective actions as described herein, a final report will be submitted to the NMOCD with a request for termination of the regulatory file associated with this site.

ROC is the service provider (agent) for the EME Salt Water Disposal System and has no ownership of any portion of the pipelines, wells, or facilities. The EME System is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis. Environmental remediation projects of this magnitude require System Parties AFE approval and work begins as funds are received.

Please feel free to call me at 432-638-8740 or Hack Conder at 575-393-9174, if you have any questions.

Sincerely,

Gilbert J. Van Deventer, REM, PG

Trident Environmental - Project Manager

cc: Hack Conder (Rice Operating Co., Hobbs NM))

Larry Hill (NMOCD District 1, Hobbs NM)

enclosures: OCD correspondence, lithologic logs and well construction diagram, photo documentation, laboratory analytical reports

Attachment A

NMOCD Correspondence

Gil Van Deventer

From:

"Hansen, Edward J., EMNRD" <edwardi,hansen@state.nm.us>

To:

"Haskell Conder" < hconder@riceswd.com>

"Leking, Geoffrey R, EMNRD" <GeoffreyR.Leking@state.nm.us>; "Katie Jones" <kjones@riceswd.com>; "Hill,

Larry, EMNRD" larry, EMNRD" suddenlink.net>

Thursday, October 22, 2009 9:07 AM Sent:

Subject:

RE: EME B-8 Release Site (1R0480) - Investigation and Characterization Report - Further Delineation Required

RE:

"Investigation and Characterization Report"

for the Rice Operating Company's

EME B-8 Release Site

Unit Letter B, Section 8, T20S, R37E, NMPM, Lea County, New Mexico

Remediation Plan (1R480) Further Delineation Required

Dear Mr. Conder:

The New Mexico Oil Conservation Division (OCD) has received the Investigation and Characterization Report for the EME B-8 Release Site, dated October 19, 2009, and has conducted a review of the report. The report indicates that the Rice Operating Company (ROC) has not completed the delineation requirements in accordance with 19.15.29 NMAC (formerly, Rule 116). Therefore, the OCD cannot accept a request for closure for above-referenced site at this time. Due to the chloride concentrations in the vadose zone and its proximity to groundwater at this site, the OCD is requiring the following:

ROC must submit a plan to the OCD for approval within 60 days for chloride mass removal in groundwater based on vadose zone loading.

If you have any questions regarding this matter, please contact me at 505-476-3489.

dward J. Hansen Hydrologist Environmental Bureau

From: Gil Van Deventer [mailto:qilbertvandeventer@suddenlink.net]

Sent: Monday, October 19, 2009 9:46 AM

To: Hansen, Edward J., EMNRD

Cc: Leking, Geoffrey R, EMNRD; Katie Jones; Haskell Conder; Hill, Larry, EMNRD Subject: EME B-8 Release Site (1R0480) - Investigation and Characterization Report

Attention: Edward Hansen, New Mexico Oil Conservation Division - Environmental Bureau

Subject: Investigation and Characterization Report

Site Name: EME B-8 Release Site

NMOCD Case No.: 1R0480

Site Agent: RICE Operating Company

Site Location: T20S-R37E-Section 8, Unit Letter B, Lea County, New Mexico

Greetings Edward:

Attached is the Investigation and Characterization Report for the EME B-8 Release Site (1R0480). One complete hard copy and one copy on compact disk will be sent to you via USPS Certified Mail (# 7099 3400 0017 1737 1865) today. Upon receipt from Irident, ROC will also deliver a hard copy to the NMOCD District 1 office in Hobbs. Please feel free to contact me at 432-638-40, or Hack Conder at ROC (575-393-9174).

Thank you, Gil

Gilbert J. Van Deventer, PG, REM

Frident Environmental P. O. Box 7624, Midland TX 79708 Work/Mobile: 432-638-8740 Fax: 413-403-9968

Home: 432-682-0727

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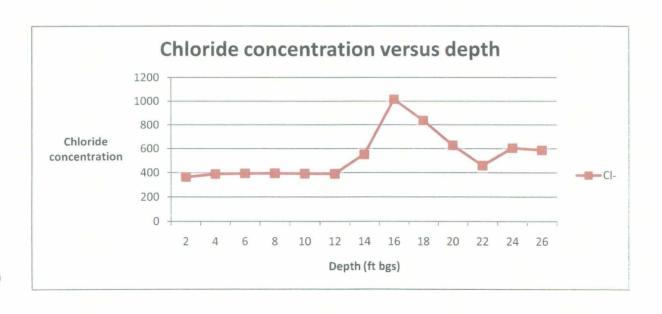
This email has been scanned using Webroot Email Security.

Attachment B

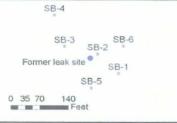
Lithologic Logs
And
Monitoring Well Construction Diagram

Logger:	.ogger: Gil Van Deventer Harrison & Cooper, Inc.		3B-4				ATING	COMPAN
Driller:	Har	rison & Coo Drilling				QUE OPER		Thedre
Driller.				SB-3 SB-6 SB-2	1 1			
Consulta	nt: Tri	dent Enviror	nmental	Former leak site SB-1		SII	VCE 195	5
Drilling N	lethod:	Geo-prob	ре	SB-5				
Start Dat	e:	11/11/20	09	0 35 70 140 Feet				
End Date	:	11/11/20	09	reet	Pro	oject Name:		Well ID:
Comme	ents: All	samples	from sp	olit spoon sampling; no hydrocarbon	_	EME B-8 I		SB #1
	iss	ues.						8 T20S R37E
	TD =		ted by: L	ara Weinheimer GW = 28'8"		t: 32°35'31.0		County: Lea
D (1)		The second second second		GW - 200	Long: 103°16'23.226"W State: NM			
Depth (feet)	chloride	IIAB	PID	Description		Lithology	Well	Construction
(feet)	field test	S			-			
				Dung and fine to made in the				
2	363			Dune sand, fine to med. grained, well				
	-			sorted, subrounded, unconsolidated, slightly moist, dark yellowish orange		sw		
				(10YR 6/6)		SVV		
				(1011000)				
				Dune sand, fine to med. grained, well				
4	389			sorted, subrounded, unconsolidated,				
				slightly moist, dark yellowish orange				
		_		(10YR 6/6)				
				Dune sand, fine to med. grained, well				
6	394			sorted, subrounded, unconsolidated,				
-				slightly moist, dark yellowish orange				
				(10YR 6/6)				
8	395			Fine sand with calcium carbonate in		SM/CAL		bentonite
				matrix, unconsolidated, slightly moist,) bornorme
				very pale orange (10YR 8/2)				seal
				Fine sand with calcium carbonate in				
10	392			matrix, unconsolidated, slightly moist,				
				very pale orange (10YR 8/2)				
						100		
12	391			Fine sand with calcium carbonate in		SM/CAL		
12	291			matrix, unconsolidated, slightly moist,				
				greenish yellow (10Y 8/3) & grayish				
				orange (10YR 7/4)				
			-	Fine sand with anlainer and and				
4.4	550			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,				
14								
14				greenish yellow (10Y 8/3) & grayish				

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
16	1016	CI- 800		Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		
		GRO <10		grayish orange (10YR 7/4)		
		DRO 17.2			SM/CAL	
18	837			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		
				grayish orange (10YR 7/4)		
20	627			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		
				very pale orange (10YR 8/2)		bentonite
22	459			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		seal
				very pale orange (10YR 8/2) & pale yellowish brown (10YR 6/2)	SM/CAL	
24	604			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		
				very pale orange (10YR 8/2) & pale yellowish brown (10YR 6/2)		
				yenowish brown (10 1 K 0/2)		
26	586	CI- 224		Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		
		GRO <10		very pale orange (10YR 8/2) & pale		
		DRO 15.0		yellowish brown (10YR 6/2)		



Logger: Gil Van Deventer Harrison & Cooper, Driller: Inc. Drilling Trident Environmental Consultant: Drilling Method: Geo-probe Start Date: 11/11/2009 End Date: 11/11/2009 All samples from air rotary; no hydrocarbon issues. Comments:



DERATING COMPANY

Project Name:

Well ID:

EME B-8 leak

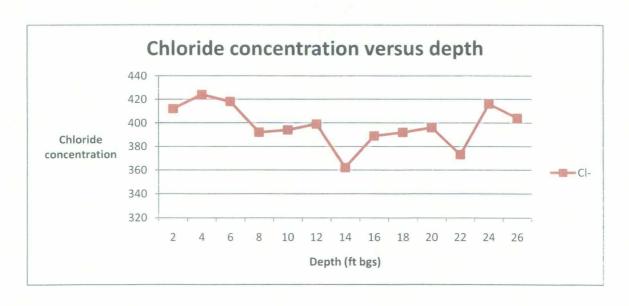
SB #2

Location:

UL/B sec. 8 T20S R37E

Depth (feet)	epth chloride eet) field tests LAB PID		PID	Description	Lithology	Well Construction	
2	412 424	CI- 16 GRO <10 DRO		Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, slightly moist, grayish orange (10YR 7/4) Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, slightly moist, grayish orange (10YR 7/4)	sw		
6	418	14.4		Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, slightly moist, grayish orange (10YR 7/4)			
8	392			Fine sand with slight amount of calcium carbonate in matrix, unconsolidated, slightly moist, greenish yellow (10Y 8/3) & dark yellowish orange (10YR 6/6)	SW/CAL		
10	394			Fine sand with slight amount of calcium carbonate in matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2) & pale greenish yellow (10Y 8/2)			
12	399			Fine sand with slight amount of calcium carbonate in matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2) & grayish orange (10YR 7/4)	sw		
14	362			Fine sand, unconsolidated, slightly moist, greenish yellow (10Y 8/3) & grayish orange (10YR 7/4)	SM/CAL	bentonite	

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction		
16	6 389		389			Fine sand, unconsolidated, slightly		
				moist, greenish yellow (10Y 8/3) & grayish orange (10YR 7/4)				
18	392			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,				
				very pale orange (10YR 8/2)				
					100			
20	396			Fine sand with calcium carbonate in				
				matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2)	SM/CAL			
22	373			Fine sand with calcium carbonate in				
				matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2)				
24	416			Fine sand with calcium carbonate in				
				matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2)				
26	404	CI- 32		Fine sand with calcium carbonate in				
		GRO <10		matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2)				
		DRO 24.1						



Gil Van Deventer Logger: Harrison & Cooper, Driller: Inc. Drilling Trident Environmental Consultant: **Drilling Method:** Geo-probe Start Date: 11/11/2009 11/11/2009 End Date:

Comments:

SB-4 SB-2 SB-6 SB-3 Former leak site SB-1 SB-5 0 35 70 140 Feet All samples from air rotary; no hydrocarbon issues.

Drafted by: Lara Weinheimer

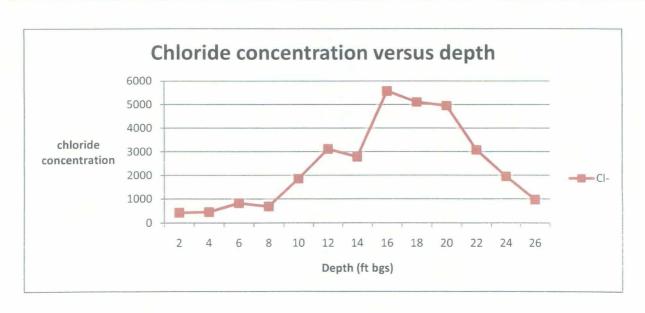


Project Name: EME B-8 leak Well ID: SB #3

Location: UL/B sec. 8 T20S R37E Lat: 32°35'31.779"N County: Lea **Lat:** 32°35'31.779"N

Depth	I AB PIII		I AR I PID I Description		Lithology		Well Construction	
feet)	field tests							
2	425			Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, slightly moist, grayish orange (10YR 7/4)		sw		
4	453			Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, slightly moist, grayish orange (10YR 7/4)				
6	821			Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, slightly moist, grayish orange (10YR 7/4)				
8	681			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2)		SM/CAL		
10	1853			Fine - med sand, unconsolidated, slightly moist, dark yellowish orange (10YR 6/6)				
12	3118			Fine - med sand, unconsolidated, slightly moist, grayish orange (10YR 7/4)		sw		
14	2786			Fine - med sand, unconsolidated, slightly moist, grayish orange (10YR 7/4)			bentoni	

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
16	5577	CI- 5920		Fine - med sand, unconsolidated,		
		GRO <10		slightly moist, grayish orange (10YR 7/4)		
		DRO <10				
18	5112			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		
				pale greenish yellow (10Y 8/2) and very pale orange (10YR 8/2)		
20	4951			Fine sand with calcium carbonate in matrix, mostly unconsolidated with		
				some indurated caliche, slightly moist, very pale orange (10YR 8/2)	SM/CAL	
22	3078			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		
				very pale orange (10YR 8/2)		
24	1949			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		
				very pale orange (10YR 8/2)		
		CI-				
26	971	736 GRO		Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		
		<10 DRO		very pale orange (10YR 8/2)		
		13.8				/



Logger:	Gil Van Deventer	SB-4
Driller:	Harrison & Cooper, Inc. Drilling Trident	SB-3 SB-2 SB-6
Consultant:	Environmental	Former leak site SB-1
Drilling Method:	Geo-probe	SB-5
Start Date:	11/11/2009	0 35 70 140
End Date:	11/11/2009	Feet
Comments:	All samples from air	rotary; no hydrocarbon issues.



Project Name:

Well ID:

EME B-8 leak

SB #4

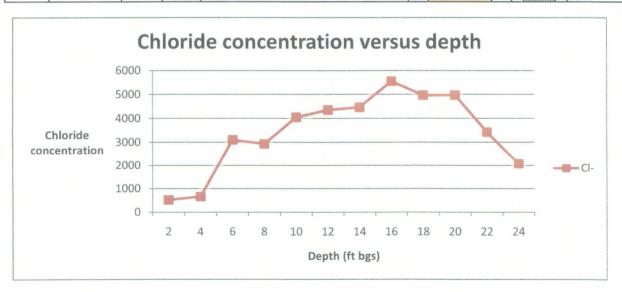
Location: UL/B sec. 8 T20S R37E Lat: 32°35'32.609"N

County: Lea

	Drafted	by: Lara \	Neinheimer
TD = 24	ft	GV	V = 28'8"

Long: 103°16'24.764"W State: NM Depth chloride PID LAB Description Lithology **Well Construction** (feet) field tests Dune sand; fine to med. grained, well 2 521 sorted, subrounded, unconsolidated, slightly moist, grayish orange (10YR 7/4) Dune sand; fine to med. grained, well SW 658 4 sorted, subrounded, unconsolidated, slightly moist, grayish orange (10YR 7/4) & very pale orange (10YR 8/2) Fine sand, moderately well sorted, 6 3099 subrounded, unconsolidated, slightly moist, dark yellowish orange (10YR 6/6) & grayish orange (10YR 7/4) Fine sand, moderately well sorted, 8 2928 subrounded, unconsolidated, slightly moist, grayish orange (10YR 7/4) Fine sand, moderately well sorted, 10 4049 subrounded, unconsolidated, slightly moist, light brown (5YR 6/4) Fine sand with slight amount of calcium 12 4358 SW/CAL carbonate in matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2) & pale yellowish brown (10YR 6/2)Fine sand with slight amount of calcium 14 4465 bentonite carbonate in matrix, unconsolidated, slightly moist, very pale orange (10YR seal 8/2) & pale yellowish brown (10YR 6/2)

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
16	5554	CI- 6240 GRO <10		Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2)		
		DRO 26.2		roty para orange (to the ora)		
18	4968			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2)		
20	4973			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2)	SM/CAL	
22	3425			Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist, very pale orange (10YR 8/2)		
24	2063	CI- 2640 GRO		Fine sand with calcium carbonate in matrix, unconsolidated, slightly moist,		
		<10 DRO <10		very pale orange (10YR 8/2)		



Gil Van Deventer Logger: Harrison & Cooper, Driller: Inc. Drilling Trident Consultant: Environmental Drilling Method: Geo-probe Start Date: 11/11/2009 End Date: 11/11/2009

Comments:

SB-4 SB-2 SB-6 SB-3 Former leak site SB-5 0 35 70 140 Feet



Project Name:

Well ID:

EME B-8 leak

SB #5

Location: UL/B sec. 8 T20S R37E **Lat**: 32°35'30.684"N

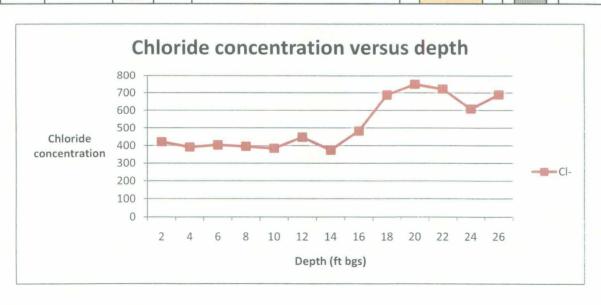
County: Lea Long: 103°16'23.883"W State: NM

	Drafted by:	Lara Weinheimer
TD = 26 ft		GW = 28'8"

All samples from air rotary; no hydrocarbon issues.

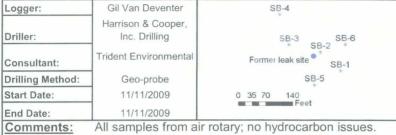
Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
2	421			Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, dry, grayish orange pink (5YR 7/2)	sw	
4	391			Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, dry, very pale orange (10YR 8/2)		
6	403			Fine sand with slight amount of calcium carbonate in matrix, unconsolidated, dry, greenish yellow (10Y 8/3)	SM/CAL	
8	395			Fine sand with slight amount of calcium carbonate in matrix, unconsolidated, dry, very pale orange (10YR 8/2)	SIM/CAL	
10	384			Fine sand with slight amount of calcium carbonate in matrix, unconsolidated, dry, pale yellowish brown (10YR 6/2)		
12	447			Fine sand with slight amount of calcium carbonate in matrix, unconsolidated, dry, very pale orange (10YR 8/2) and		
14	374			pale yellowish brown (10YR 6/2) Fine - med. sand, moderately well sorted, subrounded, unconsolidated, dry, grayish orange (10YR 7/4) and very pale orange (10YR 8/2)	sw	bentonite

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction	n
16	483			Fine - med. sand, moderately well			
				sorted, subrounded, unconsolidated, dry, light brown (5YR 6/4)			
18	688			Fine sand, moderately well sorted,			
				subrounded, unconsolidated, dry, light brown (5YR 6/4) & pale yellowish			
				brown (10YR 6/2)			
20	750	CI- 448		Fine sand with calcium carbonate in			
20	730	GRO <10		matrix, unconsolidated, dry, very pale			
		DRO		orange (10YR 8/2)	014/04/		
		16.6			SM/CAL		
22	722			Fine sand with calcium carbonate in matrix, unconsolidated, dry, very pale			
				orange (10YR 8/2)			
24	608			Fine sand with calcium carbonate in matrix, unconsolidated, dry, very pale			
				orange (10YR 8/2)			
26	690	CI- 464		Fine sand with calcium carbonate in			
		GRO <10		matrix, unconsolidated, dry, very pale orange (10YR 8/2)			
		DRO 12.0					



Logger:	Gil Van Deventer
Driller:	Harrison & Cooper, Inc. Drilling
Consultant:	Trident Environmental
Drilling Method:	Geo-probe
Start Date:	11/11/2009
End Date:	11/11/2009
Cammantai	All a a manula a frama

Lost pipe down hole; soil bore abandoned.



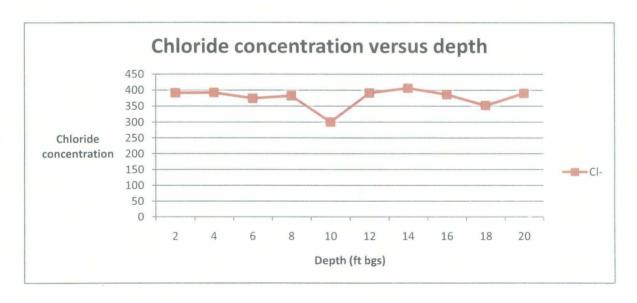


Project Name: EME B-8 leak Well ID: SB #6

Location: UL/B sec. 8 T20S R37E **Lat:** 32°35'31.789"N County: Lea

Lost þi	pe down hole $TD = 2$	Draft		Lara Weinheimer GW = 28'8"	La	t: 32°35'31.7 ng: 103°16'23		nty: Lea
Depth (feet)	chloride field tests	LAB	PID	Description		Lithology	Well Cons	truction
2	391			Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, dry, light brown (5YR 6/4)		sw		
4	392			Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, dry, very pale orange (10YR 8/2) & pale yellowish brown (10YR 6/2)				
6	374			Dune sand; fine to med. grained, well sorted, subrounded, unconsolidated, dry, very pale orange (10YR 8/2) & pale yellowish brown (10YR 6/2)				
8	382			Fine sand with slight amount of calcium carbonate in matrix, unconsolidated, dry, very pale orange(10YR 8/2)		sw		
10	300			Fine sand with slight amount of calcium carbonate in matrix, unconsolidated, dry, very pale orange(10YR 8/2)		SM/CAL	}	bentonite
12	391			Fine sand, moderately well sorted, subrounded, unconsolidated, dry to slightly moist, very pale orange (10YR 8/2) & pale yellowish brown (10YR 6/2)				seal
14	406	CI- <16 GRO <10 DRO 16.2		Fine sand, moderately well sorted, subrounded, unconsolidated, dry to slightly moist, very pale orange (10YR 8/2) & pale yellowish brown (10YR 6/2)		sw		

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
16	386			Fine sand, moderately well sorted, subrounded, unconsolidated, dry to slightly moist, grayish orange (10YR		
				7/4)	sw	
18	352			Fine sand, moderately well sorted, subrounded, unconsolidated, dry to		
				slightly moist, pale yellowish brown (10YR 6/2) & grayish orange (10YR		
		CI-		7/4)		
20	390	<16		Fine sand, moderately well sorted,	SM/CAL	
		GRO <10		subrounded, unconsolidated, dry to		
		DRO 12.4		slightly moist, light brown (5YR 6/4)		



LITHOLOGIC LOG AND MONITORING WELL CONSTRUCTION DIAGRAM



4" Sched 40 PVC Blank Casing 3/8 Bentonite Hole Plug

3/8 Bentonite Hole Plug

MONITOR WELL NO.: MW - 1

SITE ID: EME B-8 Line Leak

TOTAL DEPTH: 65 Feet

CONTRACTOR: Harrison & Cooper, Inc.

CLIENT: RICE Operating Company

DRILLING METHOD: Air Rotary

COUNTY: Lea

START DATE: 03/03/09

STATE: New Mexico

LOCATION: T20S-R37E-Sec 8-Unit B

COMPLETION DATE: 03/03/09

FIELD REP.: G. Van Deventer

COMMENTS: Montoring well located approximately 35 ft southeast of leak point.

Photo at left taken near leak point facing southeast .

	Samp		Chloride		USCS	LITHOLOGIC DESCRIPTION:
Depth	Time	Туре	(ppm)	(ppm)	0000	LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
		Surface				Light brown (5 YR 6/4) sand, medium-grained, rounded/subrounded, well-sorted, dry
		Curiaco				
-						
						Moderate yellowish brown (10YR 5/4) sand, fine to medium-grained, rounded/subrounded, well-sorted, dry
5						Thousand your warm (10111 517) Sand, line to medianly grained, founded subfounded, well-sorted, dry
	0920	Split	186	0.4		
	0020	Spoon	100	0.1.1.		
					SW	
	0925	Split	175	0.3		
10	0020	Spoon	1,70	0.0		Pale yellowish brown (10YR 6/2) sand, fine-grained, rounded/subrounded, well-sorted, dry
-						
-	*****	Colit				
- 21	0928	Split Spoon	2969	0.3		Van sele exece (40VP 9/2) and with selection as hands (2, 20)
15		0,0001				Very pale orange (10YR 8/2) sand with calcium carbonate (CaCQ in matrix (20-50%). Sand is very fine-grained, dry.
	0931	Split	3357	0.3	SM/CAL	
20	0931	Spoon	3357	0.3		Very pale orange (10YR 8/2) sand with calcium carbonate (CaCO3) in matrix (20-50%). Sand is very fine-grained, dry
20						
-						
-						
-	0935	Split	199	0.3		
25		Spoon				Very pale orange (10YR 8/2) and light brown (5YR 6/4) sand, fine-grained, moderately sorted, subarounded, moist.
V-					SM	Groundwater encountered at ~26 ft bgs
-					CIVI	
	0937					Very pale orange (10YR 8/2) and light brown (5YR 6/4) sand, fine-grained, moderately sorted, subrounded/subangular
30						
				١,		Light brown (5 YR 6/4) sand, fine- to medium-grained, subrounded, well-sorted, damp.
-					SW	
	0939					
35	0939				SVV	Light brown (5 YR 6/4) sand, fine- to medium-grained, subrounded, well-sorted, damp.
35	0939				300	Light brown (5 YR 6/4) sand, fine- to medium-grained, subrounded, well-sorted, damp.
35	0939				SW	Light brown (5 YR 6/4) sand, fine- to medium-grained, subrounded, well-sorted, damp.
35	0939				SW	Light brown (5 YR 6/4) sand, fine- to medium-grained, subrounded, well-sorted, damp.
35	0939				300	Light brown (5 YR 6/4) sand, fine- to medium-grained, subrounded, well-sorted, damp.
35	0939				Sv	Light brown (5 YR 6/4) sand, fine- to medium-grained, subrounded, well-sorted, damp.
					Svv	
35	0939				SW	Light brown (5 YR 6/4) sand, fine- to medium-grained, subrounded, well-sorted, damp. Light brown (5 YR 6/4) clayey sand, mostly sand which is fine-grained, wet.
					SW	
					SW	
					SW	
					SW	
40	0941				sc	Light brown (5 YR 6/4) clayey sand, mostly sand which is fine-grained, wet.
40						
40	0941					Light brown (5 YR 6/4) clayey sand, mostly sand which is fine-grained, wet.

Light brown (5 YR 6/4) clayey sand, mostly sand which is fine-grained, wet.

4" Diameter Screen with 0.035" Machined Slots 8/16 Brady Silica Sand Pack 8/16 Brady Silica Sand Pack

LITHOLOGIC LOG AND MONITORING WELL CONSTRUCTION DIAGRAM



TOTAL DEPTH: 65 Feet MONITOR WELL NO.: MW - 1

SITE ID: EME B-8 Line Leak

CONTRACTOR: Harrison & Cooper, Inc.

COUNTY: Lea

DRILLING METHOD: Air Rotary

START DATE: 03/03/09

COMPLETION DATE: 03/03/09

FIELD REP: G. Van Deventer

COMMENTS: Montoring well located approximately 35 ft southeast of leak point.

Leak point marked by wood stake near rear wheel of pickup in photo at left.

					Samp	le	Chloride	PID	LISCS	LITHOLOGIC DESCRIPTION:
_	71/2	4" →	-	Depth	Time	Туре	(ppm)	(ppm)	USCS	LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
										Light brown (5 YR 6/4) sand,fine-grained, subrounded, well-sorted, wet.
	Screen			- "						
	or o			-1						
	(I)			:-						
CK	4	×		-2 1	and the					Light brown (5 YR 6/4) sand,fine-grained, subrounded, well-sorted, wet.
18	otana and	Brady Silica Sand Pack		55	0949				SW	Eight brown (5 111 014) Sand, intergramed, Sabrounded, Weir-Sorted, Wet.
Sand Pack		and								
g.		i i								
8/16 Brady Silica	ing	Silic								
ady	Cas	ady								
DE	ank	Bra		60	0951					Light brown (5 YR 6/4) sand, fine-grained, subrounded, well-sorted, wet.
0//0	PVC Blank Casing	8/16								
	PVC									
Sec. 1122	40								SS	Sandstone (fine-grained) and chert (microcrystalline quartz), very pale orange (10YR 8/2) and light brown (5YR 6/4)
	Sch 40									
100	4" 8			65	0955					
									GP	Gravel (granule and pebble sized), loose, multi-colored.
				70	1000		-		CL	Moderate reddish brown (10R 4/6) clay
491	71/,			7.0	1000					Total depth of boring at 70 ft bgs but loose gravel caved to fill in bottom 5 ft of open boring.
	17. 189	4	1							Total depth of monitoring well at 65 ft bgs.
				7.5						
			1	75						
				-						
				-						
				,						
				80						
				85						
				90						
				-						
				TC						
				95						
				90						
			1							
			1	100						

Attachment C

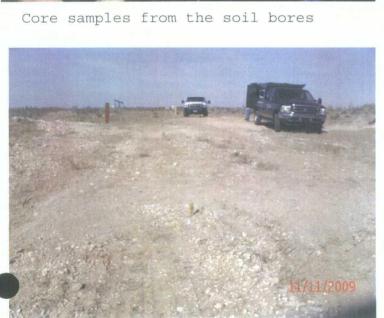
Photo Documentation

EME B-8 leak
Soil bore installations
UL/B sec. 8 T20S R37E



Installation of soil bores





Sealing the soil bores in total with bentonite

Completed soil bores

EME B-8 Release Site (1R-0480)



Facing SE: Soil boring SB-1 (background) ~66 ft ESE from release point (wooden stake in foreground).



Facing NE: Soil boring SB-2 located ~8 feet from release point (wooden stake in foreground).



Facing ESE: Soil boring SB-3 (~60 ft WNW of release point)



Facing N: Soil boring SB-4 (~120 ft NW of release point)



Facing north: Soil boring SB-5 (~75 ft south of release point).



Facing north: Soil boring SB-6 (far background) with MW-1 (right-center) and leak point (left-center).

Attachment D

Laboratory Analytical Reports

and

Chain of Custody Documentation



ANALYTICAL RESULTS FOR RICE OPERATING COMPANY ATTN: HACK CONDER

122 W. TAYLOR HOBBS, NM 88240 FAX TO: (575) 397-1471

Receiving Date: 11/13/09

Reporting Date: 11/17/09

Project Owner: NOT GIVEN

Project Name: EME B-8 LEAK Project Location: EME B-8 LEAK Sampling Date: 11/11/09

Sample Type: SOIL

Sample Condition: COOL & INTACT

Sample Received By: ML Analyzed By: CK/HM

GRO DRO

 $(C_6-C_{10}) (>C_{10}-C_{28})$

CI*

LAB NUMBER SAMPLE ID

(mg/kg) (mg/kg)

(mg/kg)

ANALYSIS D	ΔTF	11/16/09	11/16/09	11/16/09
H18724-1	SB #1 @ 16'	<10.0	17.2	800
H18724-2	SB #1 @ 26'	<10.0	15.0	224
H18724-3	SB #2 @ 4'	<10.0	14.4	16
H18724-4	SB #2 @ 26'	<10.0	24.1	32
H18724-5	SB #3 @ 16'	<10.0	<10.0	5,920
H18724-6	SB #3 @ 26'	<10.0	13.8	736
H18724-7	SB #4 @ 16'	<10.0	26.2	6,240
H18724-8	SB #4 @ 24'	<10.0	<10.0	2,640
H18724-9	SB #5 @ 20'	<10.0	16.6	448
H18724-10	SB #5 @ 26'	<10.0	12.0	464
H18724-11	SB #6 @ 14'	<10.0	16.2	< 16
H18724-12	SB #6 @ 20'	<10.0	12.4	< 16
Quality Contr	ol	457	522	500
True Value Q	С	500	500	500
% Recovery		91.4	104	100
Relative Perc	ent Difference	0.6	7.7	< 0.1

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; CI: Std. Methods 4500-CIB *Analyses performed on 1:4 w:v aqueous extracts. Reported on wet weight.

Chemist

Date



CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

ARDINAL LABORATORIES
101 East Mariand, 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: Rice Operating Company		SE.	(6)						ANA	LYSK	ANALYSIS REQUEST	UEST		. 45	
Project Manage	Project Manager: Hack Conder		P.(P.O. #:						v			-			
Address: 122	Address: 122 West Taylor		පි	Company:									-		<u> </u>	
city: Hobbs	State	State: NM Zip: 88240	Attn	ij.												
Phone #: 393-9174		Fax #: 397-1471	Ad	Address:												
Project #:	Project	Project Owner:	City:	; <u>;</u>				M	H							
Project Name:	CAR B-8 100k	,	Str	State:	Zip:		:er	SI	<u>d</u> J							
Project Location:	in: 6ME B-8 1001	7	A.	Phone #:				.E								
Sampler Name:	Sampler Name: Lara Weinheimer		Fa	Fax #:												_
FOR LAB USE ONLY		*	MATRIX	PRESERV.	SAMPLING											
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP. # CONTAINERS GROUNDWATER WASTENATER	SOIL SOIL SOIL	ACID/BASE: ICE / COOL OTHER:	DATE	TIME		<u> </u>	L					· · · · · · · · · · · · · · · · · · ·	: :	
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-2	Sis 1 2 26'	- 23	2	``		1204	`									
5	Ser C4.	٠ زز.	`	``	11 11 24 10	4):0:	3									
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3	56 43 6 16) -		>	11-11-20	11.10	>									
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8-	South & 24"	, , ,	>	`	1 10.11-11	8h:2	· >									
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-10)	500 € 26	. 6		\	11-11-5	3:39	2	_					1			

PEASE NOTE: Lability and Damages. Cardinals lability and client's archainse remedy finisty data airble whether based in centract or but shall be limited to the airble that an analyses. At claims including those for heighgones and any other cause whitherware shall be desired where make it writing and received by Cardinial within 30 days electronish for the applicable service. The reverse and Cardinal be labile to indential or consequented changes, including without buttered, business himstylines, loss of line, or joins or profits incurred by claim, its authelicities.

arrelates of Successives, arreng out of or related to the performance of services, hereunder by Cardinal,	of services, hereunder by, C.	ardinal, regardese of whether auch claim is beased upon any of the above stated reasons or otherwise,	easons of otherwise.
Relinquished By:.,	Date:	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
The same of the sa	11-17-97	X	Fax Result: Yes Add'l Fax #:
L. Weinheimer	Time:	Link Held	REMARKS:
Relinquished By:	Date:	Received By:	email results
	Time:		
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Delivered By: (Circle One)		Sample Condition CHECKED BY:	ricolidei (Gliceswalcolli, Jpaivis (Gliceswalcolli,
,		Cool Intact (Initials)	Lweinheimer@riceswd.com
Sampler - UPS - Bus - Other:		The Table	
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† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476

NEED SAMPLES BACK, PLEASE



CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

ARDINAL LABORATORIES
101 East Marland, Hobbs, NM 86240 2111 Beechwood, Abilene, TX 79603 (505) 393-2328 FAX (605) 393-2476 (325) 673-7001 FAX (325)673-7020

Company Name: Rice Oper	Rice Operating Company					Ą	ANALYSIS REQUEST	REQUEST		,	
Project Manager: Hack Conder	nder		P.O. #:				-			_	
Address: 122 West Taylor	or		Company:								
City: Hobbs	State: NM	Zip: 88240	Attñ:				·				
Phone #: 393-9174	Fax #: 397-1471	471	Address:								
Project #:	Project Owner:	r:	cu).	(M	Н					
Project Name: Em6	0-8 lak		State: Zip:	sə _l	X او	ld.					
Project Location:	11.11 8-8		Phone #:	oin	E)	L S					
Sampler Name: Lara Weinheimer	eimer		Fax#:	olr		e >					
FOR LAB USE ONLY		MATRIX	PRESERV. SAMPLING			κə					
Lab I.D. Sa	Sample I.D.	CONTAINERS SCONTAINERS SROUNDWATER SOIL SOIL SOIL SIGNERS SIGN	CEVCOOL SEVCOOL SAHER:) IMB	11	1					
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PLEASE NOTE: Lability and Damages; Cardinal's Pability, and defents exclusive remedy for any dating analyses. All datins including those for negligence and eny other cause whatesever shall be deerined.	's Babdity and client's exclusive remedy for a	iny claim arbing whether based in contract desirred waysed unbest made in welfing and	athing whether based in contract or toot; shell be limited to this emount peld by the client for the waters and constituted by the second of t	by the clout for the							1
earvice. In no event shall Cardhial be liable for holdental of consequintal damagas, including without limbath, bushes siffatted or successors existing out of or related to the performance of services inferenced by Cardhial, regardless of who	dental or consequental denegas, including the performance of services becaude by C	y without limitation, business interruptions, leading, regardless of whether such claim is	limbaton, bushwas hibritations, loss of lass, of loss of profits incursed by climit. In substitutes regardless of whother stock climit is basisful upon any of the above statud ressens of otherwise.	ent, its subsidiaries ons of otherwise.	. :	4		• 1			
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L. Weinheimer	 -	X / 11/0/	400	Fax Result: REMARKS:	☐ Yes	9 2 5	Add'l Fax#:				-
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	Time:										
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3011 100000		Cool Intact		Lweinheimer@riceswd.com	er@rice	swd.c	zóm móc				
sampler - UPS - Bus - Other:	ler:	LAYea 12 Yea	_)	; ;					

mpier - UPS - Bus - Other:

No D-No

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

BACK, PLEASE SAMPLES NEED



ANALYTICAL RESULTS FOR RICE OPERATING COMPANY ATTN: HACK CONDER 122 W. TAYLOR HOBBS, NM 88240 FAX TO: (575) 397-1471

Receiving Date: 11/06/09
Reporting Date: 11/11/09
Project Number: NOT GIVE

Project Number: NOT GIVEN Project Name: EME B-8 LEAK

Project Location: T20S-R37E-SEC8 B~ LEA CO., NM

Sampling Date: 11/05/09 Sample Type: WATER

Sample Condition. COOL & INTACT

Sample Received By: ML

Analyzed By: ZL

LAB NUMBE SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE	11/09/09	11/09/09	11/09/09	11/09/09
H18674-1 MONITOR WELL #1	<0.001	<0.001	<0.001	<0.003
Quality Control	0.053	0.047	0.048	0.148
True Value QC	0.050	0.050	0.050	0.150
% Recovery	106	94.0	96.0	98.7
Relative Percent Difference	8.5	7.1	6.7	7.8

METHOD: EPA SW-846 8021B

TEXAS NELAP CERTIFICATION T104704398-08-TX FOR BENZENE, TOLUENE, ETHYL BENZENE, AND TOTAL XYLENES.

Chémist

Date



ANALYTICAL RESULTS FOR RICE OPERATING COMPANY ATTN: HACK CONDER 122 WEST TAYLOR HOBBS, NM 88240 FAX TO: (575) 397-1471

Receiving Date: 11/06/09
Reporting Date: 11/13/09
Resided Number: NOT CIVI

Project Number: NOT GIVEN

Project Name: EME B-8 LEAK

Project Location: T20S-R37E-SEC8 B ~ LEA CO., N.M.

Sampling Date: 11/05/09 Sample Type: WATER

Sample Condition: COOL & INTACT

Sample Received By: ML

Analyzed By: HM

		CI	SO ₄	TDS
LAB NO.	SAMPLE ID	(mg/L)	(mg/L)	(mg/L)
Analysis Date:		11/10/09	11/11/09	

Analysis Date		11/10/09	11/11/09	11/10/09
H18674-1	MONITOR WELL #1	890	206	2,030
THE STREET SHOW NAME AND ADDRESS OF THE	*	APPAR APPAR IN THE RESERVE TO THE RE		
				The same of the sa
recognition to the second seco				
Quality Contro)l	490	34.7	NI
True Value Q		500	40.0	NI
% Recovery		98.0	86.7	NI
Relative Perce	ent Difference	2.0	6.1	3.

			,
METHOD: Standard Methods, EPA	4500-Cl B	375.4	160.1

Not accredited for Chloride, Sulfate and TDS.

Chemist

Date

H18674 RICE

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 client for 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 thirty (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. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

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101 East Marland - Hobbs, New Mexico 88240			Ç	4		+		Ç					-	CHAIN-OF-CUSTODY AND ANALYSIS REQUEST	Š	S	210	<u>ک</u>	2	¥		S R		EST		٦
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