1R-427-317

REPORTS

DATE:

6-23-11

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

CERTIFIED MAIL
RETURN RECIEPT NO. 7008 1140 0001 3070 5597

June 23rd, 2011

Mr. Edward Hansen
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

RE: **TERMINATION REQUEST**
Rice Operating Company – EME SWD System
EME jct. K-8-2 (1R427-317): UL/K sec. 8 T20S R37E
(formerly EME jct. N-8-2)

Mr. Hansen:

RICE Operating Company (ROC) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site in the EME Salt Water Disposal (SWD) system. The site was previously referred to as the EME jct. N-8-2. However, GIS mapping shows the site to be located within unit letter K (Figure 1). To reflect the geographical location of the site, the name has been changed to EME jct. K-8-2. All correspondences will reference EME jct. K-8-2.

ROC is the service provider (agent) for the EME SWD System and has no ownership of any portion of the pipeline, well, or facility. The system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage/usage basis.

Background and Previous Work

The site is located approximately 3 miles south of Monument, New Mexico at UL/K sec. 8 T20S R37E as shown on the Site Location Map (Figure 1). The jct. K-8-2 site is located with a regionally impacted groundwater area (Figure 3). NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 30 +/- feet.

In 2009 ROC initiated work on the former EME K-8-2 junction box. The site was delineated using a backhoe to form a 30 ft x 10 ft x 12 ft deep excavation and soil samples were screened at regular intervals for both hydrocarbons and chlorides (Figure 2). Laterally, the 5 ft north vertical was clean with field chloride readings ranging from a high of 209 mg/kg at 4 ft bgs to a low of 149 mg/kg at 12 ft bgs. The 5 ft south vertical was clean with chloride readings ranging from a high of 181 mg/kg at 8 ft bgs to a low of

140 mg/kg at 2 ft bgs. The 5 ft west vertical was also clean with chloride readings ranging from a high of 173 mg/kg at 6 ft bgs to a low of 145 mg/kg at 8 ft bgs. The east wall was expanded from 5 ft east to 25 ft east to achieve low chloride readings. At the 25 ft east vertical, the chloride readings ranged from a high of 176 mg/kg at 12 ft bgs to a low of 144 mg/kg at 10 ft bgs. All samples from all walls showed negligible PID (photo-ionization detector) readings suggesting negligible hydrocarbons in the soil. From the field data, it is evident that ROC has encompassed the lateral extent of the chloride and hydrocarbon contamination.

From the excavation, the four-wall composite, the bottom composite and the backfill were taken to a commercial laboratory for analysis. Laboratory tests of the four-wall composite showed a chloride reading of 144 mg/kg, negligible gasoline range organics (GRO) reading and negligible diesel range organics (DRO) reading. The bottom composite showed a chloride laboratory reading of 400 mg/kg and negligible GRO and DRO readings. The excavated soil was blended on site and backfilled into the excavation to 5 feet bgs. Laboratory analysis of the blended backfill showed a chloride reading of 288 mg/kg, negligible GRO and a DRO reading of 77.0 mg/kg. At 5-4 feet bgs, a 1 ft thick clay layer was installed with a compaction test performed on November 9th, 2009. The area was contoured to the surrounding landscape, seeded, and an identification plate was placed on the surface of the site to mark its location for future environmental considerations.

The bottom composite laboratory reading suggested that ROC did not in fact encompass the chloride contamination vertically, a soil bore was advanced on November 12th, 2009, fifteen feet east of the source (the area of the highest chloride concentrations). The boring was advanced to 28 ft bgs and samples were taken every two feet. The samples were screened in the field for both chlorides and hydrocarbons. The 20 ft, 24 ft, and 28 ft samples were taken to a commercial laboratory to be analyzed. The 20 ft samples showed negligible GRO and DRO readings and a chloride reading of 1,650 mg/kg. The 24 ft sample showed a negligible GRO reading, a DRO reading of 10.7 mg/kg and a chloride reading of 1,280 mg/kg. The 28 ft sample showed a negligible GRO reading, a DRO reading of 55.5 mg/kg, and a chloride reading of 256 mg/kg. The entire bore hole was plugged with bentonite to the ground surface. NMOCD was notified of potential groundwater impact on February 25, 2010 and a junction box disclosure report (Appendix A) was submitted to NMOCD with all the 2009 junction box closures and disclosures.

Analysis of Site Investigation

To determine if residual chlorides pose a threat to groundwater quality, ROC personnel ran the U.S. Environmental Protection Agency Exposure Assessment Multimedia Model (MULTIMED Version 1.5, 2005) to determine the possible increase in concentration of chlorides contributed by soils in the vadose zone. Data inputs and model outputs are included in Attachment B. With the existing clay barrier, the model output concludes that the peak concentration of chlorides in groundwater contributed by the vadose zone soils would be approximately 230 mg/L in 90 years. Since the estimated increase in

chloride concentrations in groundwater from residual chloride migration is below the WQCC standard of 250 mg/L, no further action is warranted for this site.

On December 18th, 2009, ROC personnel seeded the site with a blend of native vegetation (photo included in Appendix A: Junction Box Disclosure Report). This site is located in a high oilfield traffic area, next to an active tank battery with numerous flow lines (Appendix C). Given the location of the site, no further surface restoration is warranted.

Since the site poses no threat to groundwater based on the results of the Exposure Assessment Multimedia Model and since the site has returned to normal vegetative capacity, ROC requests that NMOCD grant TERMINATION to the EME jct. K-8-2 regulatory file.

ROC appreciates the opportunity to work with you on this project. Please call Hack Conder at (575) 393-9174 or me if you have any questions or wish to discuss the site.

Sincerely,

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

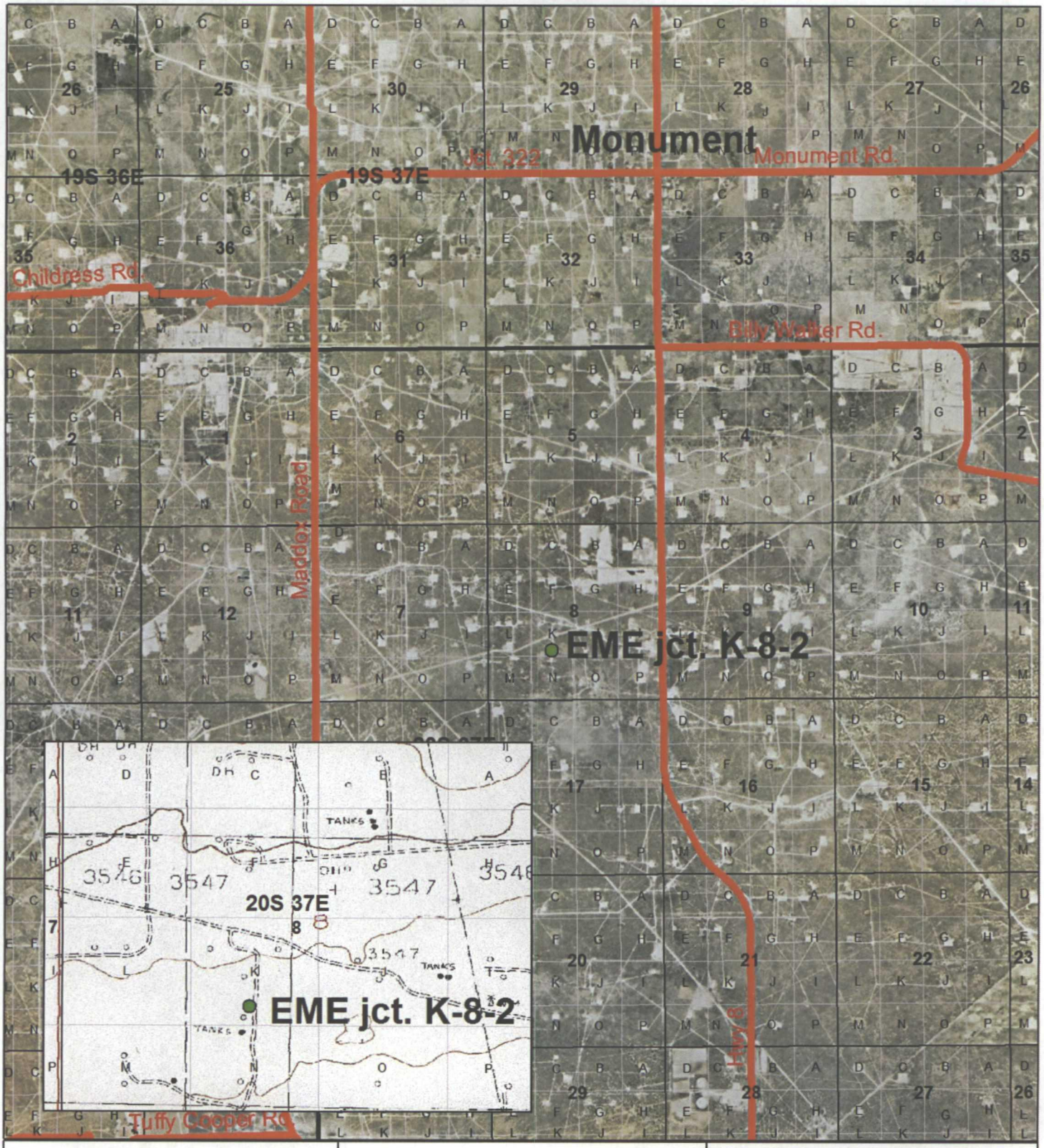
Attachments:

- Figure 1 – Site location map
- Figure 2 – Soil data
- Figure 3 – Site location within the chloride plume
- Appendix A – Junction Box Disclosure Report
- Appendix B – Chloride Exposure Assessment
- Appendix C – Site photo

Figures

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

Site Location



RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

EME jct. K-8-2

Legals: UL/K sec. 8
T20S R37E

Case #: 1R427-317

Figure 1

N W E S

Drawing date: 4/8/2011
Drafted by: L. Weinheimer

Soil data

Source		
Depth	Cl-	PID
3	203	2.5
4	179	0.5
5	333	0.1
6	255	0
7	369	0
8	238	2.1
9	233	1
10	233	5.4
11	205	5
12	140	0.6

5' North		
Depth	Cl-	PID
2	208	0.1
4	209	0
6	207	0
8	151	0
10	179	0
12	149	0

5' South		
Depth	Cl-	PID
2	140	0
4	141	0.6
6	169	0
8	181	0
10	151	0
12	152	0

5' West		
Depth	Cl-	PID
2	147	0.3
4	151	0.1
6	173	0.5
8	145	0.4
10	150	0.7
12	149	0.3

5' East		
Depth	Cl-	PID
2	149	1.1
4	148	0.1
6	146	1.8
8	181	0.2
10	179	2.7
12	207	0.2

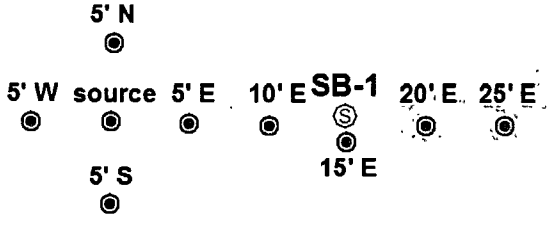
10' East		
Depth	Cl-	PID
2	242	0.8
4	367	0.1
6	309	0.1
8	387	0.1
10	387	0
12	382	0

15' East		
Depth	Cl-	PID
2	238	0.4
4	480	0.1
6	727	0
8	592	0
10	568	0
12	579	0

20' East		
Depth	Cl-	PID
2	250	1.3
4	629	0.6
6	500	0.1
8	535	0.4
10	572	0.7
12	511	1.2

25' East		
Depth	Cl-	PID
2	144	0
4	142	0
6	169	0
8	147	0
10	144	0
12	176	0

SB-1					
Depth	Cl-	PID	Cl-	GRO	DRO
14	572	0.6			
16	1327	1			
18	615	21.6	1650	<10	<10
20	1390	69.9			
22	604	84.4			
24	1446	0	1280	<10	10.7
26	719	0			
28	614	0	256	<10	55.5



◉ Backhoe Delineation Trenches

RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC — RECS

EME jct. K-8-2

LEGALS: UL/K sec. 8
T20S R37E

NMOCD Case #: 1R427-317

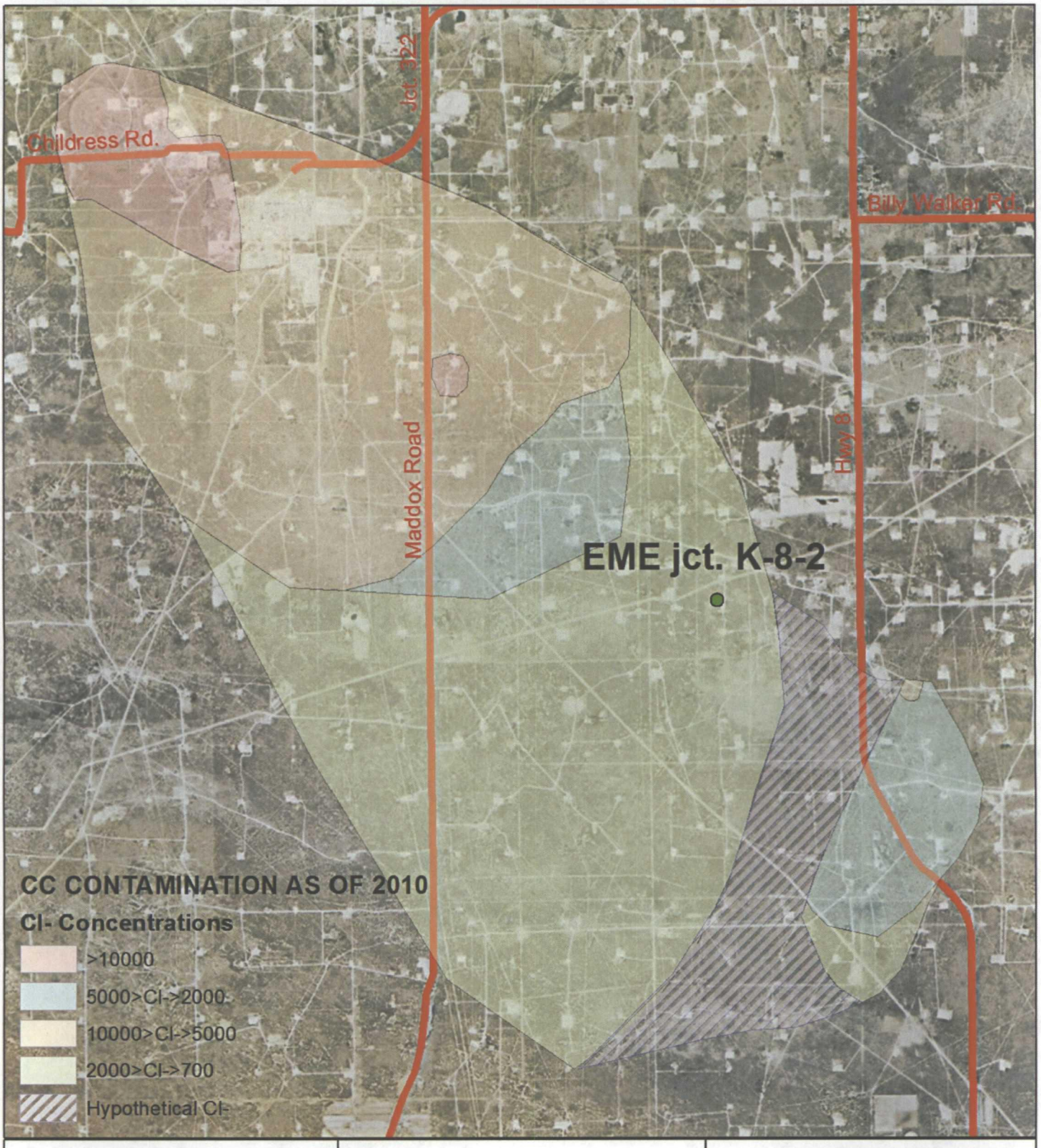
Figure 2

N W E S

0 5 10 20 Feet

Drawing date: 4-18-11
Drafted by: L. Weinheimer

Site location within the chloride plume



RICE ENVIRONMENTAL CONSULTING & SAFETY, LLC
RECS

EME jct. K-8-2

LEGALS: UL/K sec. 8
T20S R37E

NMOCD Case #: 1R427-317

Figure 3

N
W E
S

0 1,550 3,100 6,200
Feet

Drawing date: 4-18-11
Drafted by: L. Weinheimer

Appendix A

Junction Box Disclosure Report

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

RICE OPERATING COMPANY
JUNCTION BOX DISCLOSURE* REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
Eunice Monument Eumont (EME)	Jct. N-8-2	N	8	20S	37E	Lea	eliminated		

LAND TYPE: BLM ___ STATE ___ FEE LANDOWNER Jimmie Cooper OTHER ___

Depth to Groundwater 30 feet NMOCD SITE ASSESSMENT RANKING SCORE: 20

Date Started 9/1/2009 Date Completed 11/12/2009 OCD Witness no

Soil Excavated 133.3 cubic yards Excavation Length 30 Width 10 Depth 12 feet

Soil Disposed 0 cubic yards Offsite Facility n/a Location n/a

FINAL ANALYTICAL RESULTS:

Sample Date 10/8/2009, 11/12/2009 **Sample Depth** 12 ft, 20 ft, 24 ft, 28 ft

Procure 5-point composite sample of bottom and 4-point composite sample of sidewalls. TPH and Chloride laboratory test results completed by using an approved lab and testing procedures pursuant to NMOCD guidelines.

Sample Location	PID (field) ppm	GRO mg/kg	DRO mg/kg	Chlorides mg/kg
4-WALL COMP.	1.8	<10.0	<10.0	144
BOTTOM COMP.	2.4	<10.0	<10.0	400
BLENDED BACKFILL	4.8	<10.0	77.0	288
SB#1 @ 20'	69.9	<10.0	<10.0	1,650
SB#1 @ 24'	0.0	<10.0	10.7	1,280
SB#1 @ 28'	0.0	<10.0	55.5	256

CHLORIDE FIELD TESTS

LOCATION	DEPTH	mg/kg
4-wall comp.	n/a	354
bottom comp.	12'	481
blended backfill	n/a	457
SOIL BORING at 15 ft east of the junction (11/12/2009)	14'	572
	16'	1,327
	18'	615
	20'	1,390
	22'	604
	24'	1,446
	26'	719
	28'	614

General Description of Remedial Action: This junction box was eliminated during the pipeline replacement/upgrade program. An investigation was conducted at the former junction box site using a backhoe to collect soil samples at regular intervals producing a 30x10x12-ft-deep excavation. Chloride field tests were performed on each sample which yielded some elevated concententrations. Organic vapors, measured using a PID, yielded low concentrations. The excavated soil was blended on site and representative composite samples were collected from the blended backfill, the excavation walls, and the bottom of the excavation and sent to a commercial laboratory for analysis of chloride and TPH. The blended backfill was returned to the excavation up to 5 ft below ground surface (BGS). At 5-4 ft BGS, a 1-ft thick clay barrier was installed with a compaction test performed on 11/9/2009. The remaining backfilll was returned to the excavation to ground surface and contoured to the surrounding area. To further investigate depth of chloride presence, a soil bore was initiated on 11/12/2009 at 15 ft east of the former junction box. The boring was advanced to 28 ft BGS while soil samples were collected at regular intervals and field tested for chlorides. The 20 ft, 24 ft, and 28 ft samples were analyzed by a commercial laboratory for chlorides and TPH. Laboratory analysis confirmed some elevated concentrations. The entire borehole was plugged with bentonite to the ground surface. On 12/18/2009, the site was seeded with a blend of native vegetation and is expected to return to productive capacity at a normal rate. NMOCD was notified of potential groundwater impact on 2/25/2010.

ADDITIONAL EVALUATION IS HIGH PRIORITY

enclosures: photos, boring log, lab results, PID screenings, cross-section, compaction test, chloride curve

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SITE SUPERVISOR Jordan Woodfin SIGNATURE Jordan Woodfin COMPANY RICE OPERATING COMPANY

REPORT ASSEMBLED BY Katie Jones INITIAL KJ

PROJECT LEADER Larry Bruce Baker Jr. SIGNATURE Larry Bruce Baker Jr. DATE 3-25-10

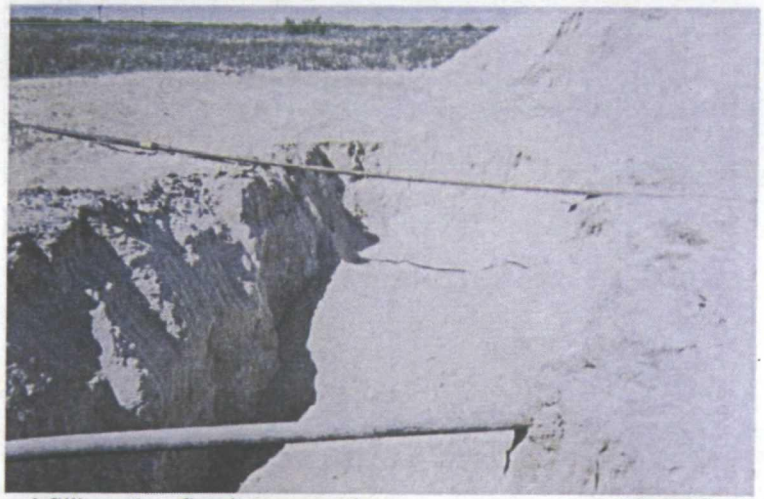
*This site is a "DISCLOSURE." It will be placed on a prioritized list of similar sites for further consideration.

EME Jct. N-8-2

Unit N, Section 8, T20S, R37E

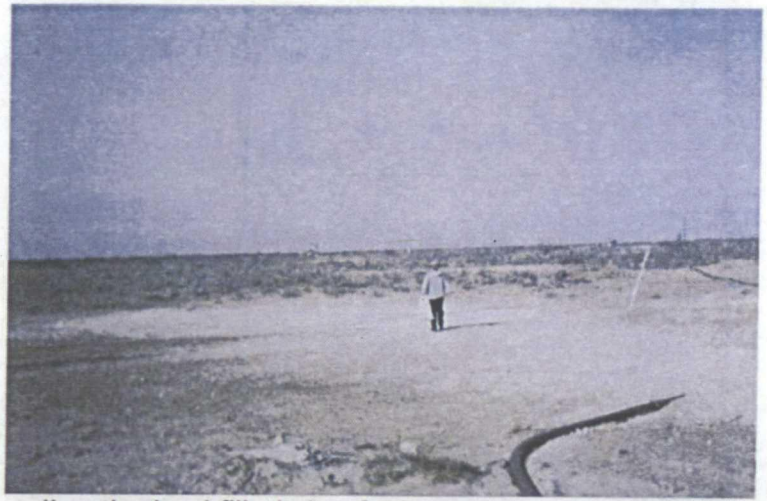
excavating the former junction box site, facing west 9/1/2009

collecting a soil sample, facing west 9/1/2009



backfilling the final excavation up to 5 ft BGS, facing east 10/20/2009

unloading clay 10/28/2009

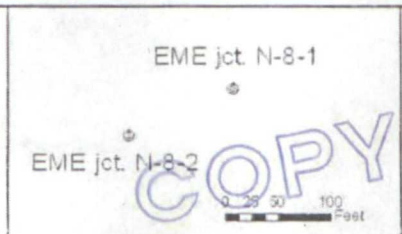


seeding the backfilled site, facing west 12/18/2009

drilling SB #1at 15 ft east of the former junction 11/12/2009

plugging SB #1 with bentonite 11/12/2009

Logger:	Lara Weinheimer
Driller:	Harrison & Cooper, Inc. Drilling
Consultant:	N/A - ROC junction box upgrade plan
Drilling Method:	Geo-probe
Start Date:	11/12/2009
End Date:	11/12/2009



RICE OPERATING COMPANY ROC SINCE 1955

Project Name: EME jct. N-8-2 Well ID: SB #1

Location: UL/N sec. 8 T20S R37E

Lat: 32°35'3.634"N County: Lea

Long: 103°16'34.06" W State: NM

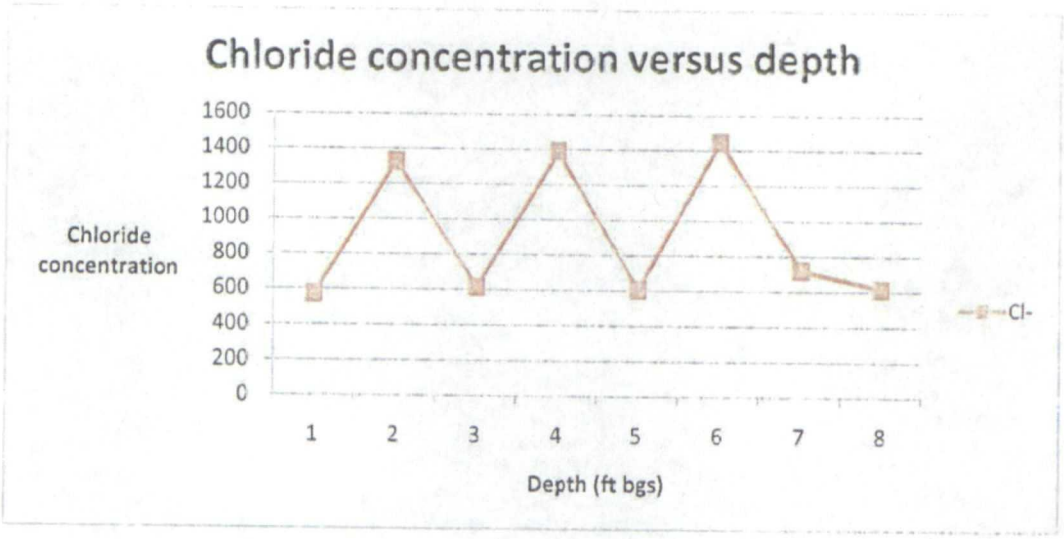
Comments: All samples from split spoon sampling.
Located 15 feet east of the former juction box site.
Drafted by: Lara Weinheimer
TD = 28 ft Estimated Depth to GW = 30 ft

Depth (feet)	chloride field tests	LAB	PID	Description
				11 - 14 ft
				VERY FINE TO FINE SAND; CALICHE
14	572		0.6	brown, dry, no odor
				14 - 16 ft
				VERY FINE TO FINE SAND; CALICHE
16	1327		1	light brown, slightly moist, no odor
				16 - 20 ft
				VERY FINE TO FINE SAND; CALICHE
18	615		21.6	slight reddish brown, dry, no odor
20	1390	Cl- 1850	69.9	
		GRO <10.0		20 - 22 ft
		DRO <10.0		VERY FINE TO FINE SAND WITH CLAY
22	604		84.4	reddish brown, dry, no odor
24	1446	Cl- 1250	0	
		GRO <10.0		22 - 28 ft
		DRO 10.7		VERY FINE TO FINE SAND: CONSOL. ROCK; CALICHE; CLAY
26	719		0	light brown, slightly moist, no odor
28	614	Cl- 258	0	
		GRO <10.0		
		DRO 55.5		

Lithology

Well Construction

bentonite seal


Chloride concentration versus depth
Chloride concentration
1600
1400
1200
1000
800
600
400
200
0
1
2
3
4
5
6
7
8
Depth (ft bgs)
Cl-

CARDINAL LABORATORIES

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

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 JCT. N-8-2
Project Location: EME JCT. N-8-2

Sampling Date: 11/12/09
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: CK/HM

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/kg)	DRO (>C_{10}-C_{28}) (mg/kg)	Cl* (mg/kg)
ANALYSIS DATE		11/17/09	11/17/09	11/13/09
H18725-1	SB #1 @ 20'	<10.0	<10.0	1,650
H18725-2	SB #1 @ 24'	<10.0	10.7	1,280
H18725-3	SB #1 @ 28'	<10.0	55.5	256
Quality Control		457	522	500
True Value QC		500	500	500
% Recovery		91.4	104	100
Relative Percent Difference		0.6	7.7	< 0.1

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

Chemist

11/17/09
Date

H18725 TCL RICE

CARDINAL LABORATORIES

CHAIN OF CUSTODY AND ANALYSIS REQUEST

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

Company Name: Rice Operating Company	BILL TO
Project Manager: Hack Conder	P.O. #:
Address: 122 West Taylor	Company:
City: Hobbs State: NM Zip: 88240	Attn:
Phone #: 393-9174 Fax #: 397-1471	Address:
Project #: Project Owner:	City:
Project Name: EME jct N-8-2	State: Zip:
Project Location: EME jct N-8-2	Phone #:
Sampler Name: Lara Weinheimer	Fax #:

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST									
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE	ICE / COOL	OTHER :	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH						
H18725-1	SB #1 @ 10'	G	1			✓					✓		11-12-09	9:49	✓	✓								
-2	SB #1 @ 24'	G	1			✓					✓		11-12-09	10:02	✓	✓								
-3	SB #1 @ 28'	G	1			✓					✓		11-12-09	10:09	✓	✓								

COPY

Relinquished By: L. Weinheimer	Date: 11-13-09 Time: 8:50	Received By: Misty LaBeet	Phone Result: ☐ Yes ☑ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By:	Fax Result: ☐ Yes ☑ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials) MCB	REMARKS: email results

Hconder@riceswd.com; jpurvis@riceswd.com; Lweinheimer@riceswd.com

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

NEED SAMPLES BACK, PLEASE

RICE OPERATING COMPANY

122 West Taylor ~ Hobbs, NM 88240
PHONE: (575) 393-9174 FAX: (575) 397-1471

PID METER CALIBRATION & FIELD REPORT FORM

CK		MODEL: PGM 7300	SERIAL NO: 590-000183
MODEL	✓	MODEL: PGM 7300	SERIAL NO: 590-000504
NO.		MODEL: PGM 7600	SERIAL NO: 110-12383
		MODEL: PGM 7600	SERIAL NO: 110-02920 013 676

COPY

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO: 424908	EXPIRATION DATE: 7-29-2012
FILL DATE: 7-30-09	METER READING ACCURACY: 100.0

ACCURACY: +/- 2%

SYSTEM	SITE	UNIT	SECTION	TOWNSHIP	RANGE
EME	jcf N-8-2	N	8	T20S	R37E

SAMPLE ID: Soil boring #1

DEPTH	PID
14'	0.6
16'	1.0
18'	21.6
20'	69.9
22'	84.4

DEPTH	PID

DEPTH	PID

DEPTH	PID

DEPTH	PID
24'	0
26'	0
28'	0

DEPTH	PID

DEPTH	PID

DEPTH	PID

I verify that I have calibrated the above instrument in accordance to the manufacture's operation manual.

Signature _____ Date 11-12-09

SITE MAP

N

CARDINAL LABORATORIES

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

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

Receiving Date: 10/09/09
Reporting Date: 10/13/09
Project Owner: NOT GIVEN
Project Name: FINAL SAMPLES
Project Location: EME N-8-2

Sampling Date: 10/08/09
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: AB/HM

COPY

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/kg)	DRO (>C_{10}-C_{28}) (mg/kg)	Cl* (mg/kg)
ANALYSIS DATE		10/12/09	10/12/09	10/12/09
H18461-1	4 WALL COMPOSITE	<10.0	<10.0	144
H18461-2	5 PT BOTTOM COMPOSITE	<10.0	<10.0	400
H18461-3	BLENDED BACKFILL	<10.0	77.0	288
Quality Control		447	506	490
True Value QC		500	500	500
% Recovery		89.4	101	98.0
Relative Percent Difference		2.2	1.9	2.0

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

Chemist

10/13/09
Date

H18461 TCL RICE

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

		BILL TO	
Company Name:	Rice Operating	P.O. #:	
Project Manager:	Bruce Baker	Company:	
Address:	122 W. Taylor	Attn:	
City:	Hobbs State: NM Zip: 88240	Address:	
Phone #:	393-9174 Fax #: 575-397-1471	City:	
Project #:	Project Owner:	State: Zip:	
Project Name:	Final Samples	Phone #:	
Project Location:	EME N-8-2	Fax #:	
Sampler Name:	Darrell Mitchell		

ANALYSIS REQUEST

COPY

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		8015M TPH	BTEX									
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME											
H18461-1	4 wall Composit	C	1			✓					✓		10-8-09	11:45	✓	✓	✓								
-2	5pt Bottom Composit	C	1			✓					✓		10-8-09	11:35	✓	✓	✓								
-3	Blended Backfill	C	1			✓					✓		10-8-09	1:10	✓	✓	✓								

Relinquished By:	Date: 10-9-09	Received By:		Phone Result: ☐ Yes ☐ No	Add'l Phone #:
Darrell Mitchell	Time: 9:40 am	Bruce Baker		Fax Result: ☐ Yes ☐ No	Add'l Fax #:
Relinquished By:	Date: 10-9-09	Received By:		REMARKS: Results B Baker Riceswd.com	
Bruce Baker	Time: 9:53 AM			J Purvis Rice Swd.com	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		Sample Condition Cool ☑ Yes ☐ No Intact ☑ Yes ☐ No	CHECKED BY: (Initials) MCKB		

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

RICE OPERATING COMPANY

122 West Tayor Hobbs, NM 88240
PHONE: (575) 393-9174 FAX: (575) 397-1471

COPY

PID METER CALIBRATION & FIELD REPORT FORM

Check Model Number:

✓	Model: PGM 7300	Serial No: 590-000183		Model: PGM 7600	Serial No: 110-023920
	Model: PGM 7300	Serial No: 590-000508		Model: PGM 7600	Serial No: 110-013744
	Model: PGM 7300	Serial No: 590-000504		Model: PGM 7600	Serial No: 110-013676

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO: 924503	EXPIRATION DATE: 7-29-2010
FILL DATE: 3-9-09	METER READING ACCURACY: 100.1ppm

ACCURACY : +/- 2%

SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
EME	N-8-2	N	8	21	36

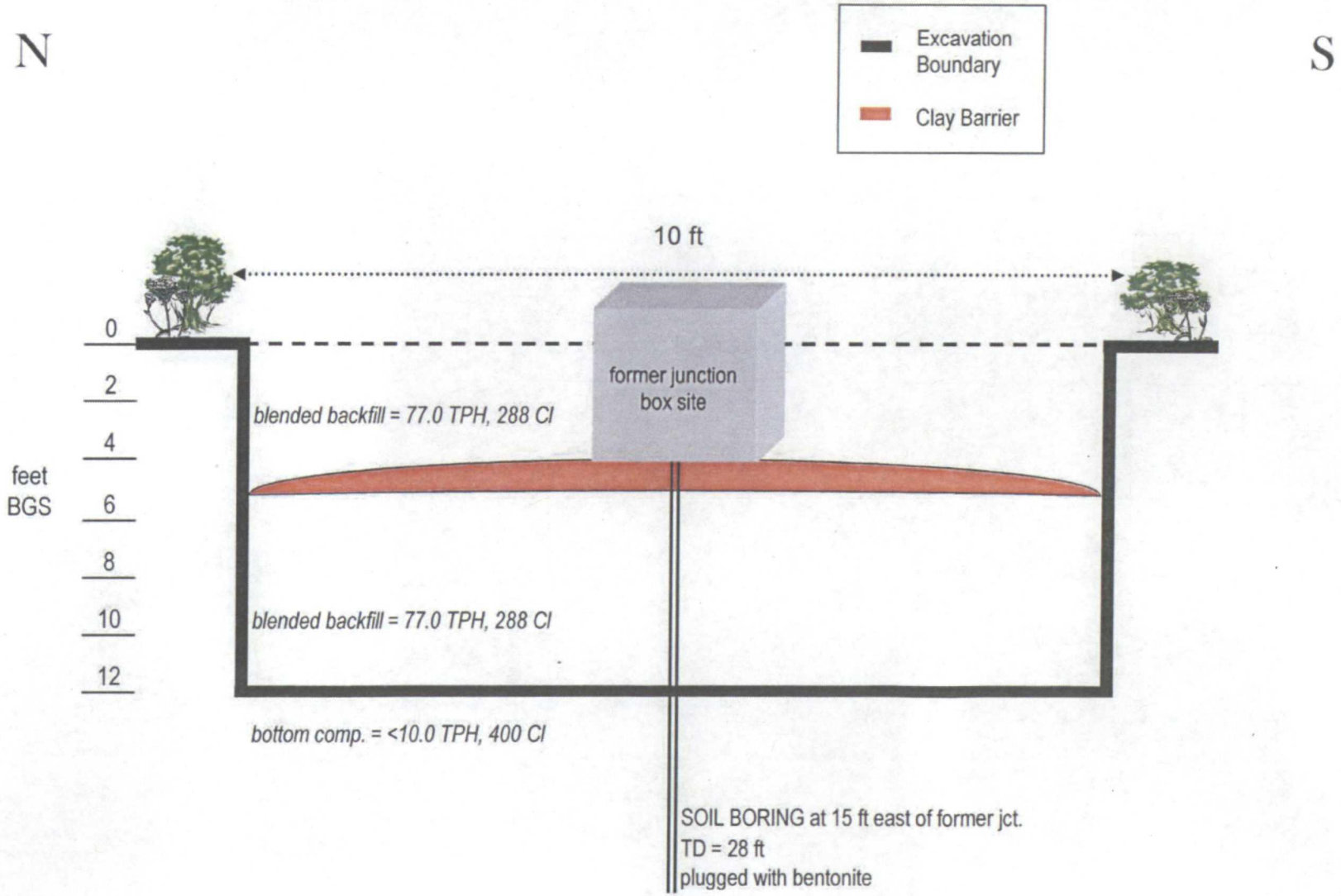
SAMPLE ID	PID	SAMPLE ID	PID
4 WALL COMP	1.8		
5pt BOTTOM	2.4		
BLENDED BACKFILL	4.8		

I verify that I have calibrated the above instrument in accordance to the manufacture operation manual.

SIGNATUE: Darrell Mitchell DATE: 10-8-09

EME Jct. N-8-2
Unit 'N', Sec. 8, T20S, R37E

Excavation Cross-Section



LABORATORY TEST REPORT

PETTIGREW & ASSOCIATES, P.A.
1110 N. GRIMES
HOBBS, NM 88240
(575) 393-9827

AASHTO R18

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

To:	Rice Operating Company Attn: Bruce 122 W. Taylor Hobbs, NM 88240	**Material:**	Wallach Red Clay
		Test Method:	ASTM: D 2922
Project:	N-8-2-EME Project No. 2009.1294		
Date of Test:	November 9, 2009	**Depth:**	See Below
		Depth of Probe:	12"

COPY

Test No.	Location	Dry Density % Max	% Moisture	Depth
SG 1	N-8-2 EME - 7' W & 5' S. of NE Corner	90.9	16.0	FSG

RECEIVED
DEC 09 2009
RICE OPERATING
HOBBS, NM

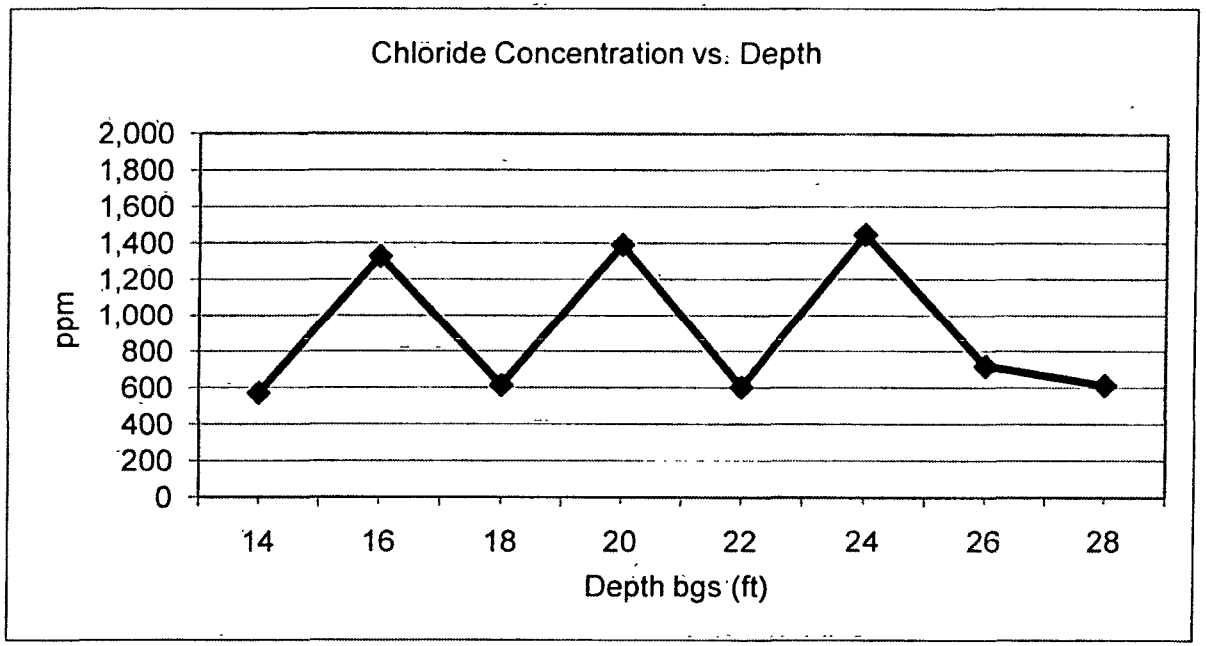
Control Density:	100.7 ASTM: D 698	**Optimum Moisture:**	20.7%
Required Compaction:	90% - 95%	**Densometer ID:**	815 PETTIGREW & ASSOCIATES
Lab No.:	09 7347-7348		
Copies To:	Rice Operating	**BY:**	Erica M. Hart
		BY:	P.E.

EME Jct. N-8-2

Unit 'N', Sec. 8, T20S, R37E

SOIL BORE samples at 15 ft east of the junction (source)

Depth bgs (ft)	[Cl⁻] ppm
14	572
16	1,327
18	615
20	1,390
22	604
24	1,446
26	719
28	614



Groundwater = 30 ft

Appendix B

Chloride Exposure Assessment

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

MULTIMED V1.01 DATE OF CALCULATIONS: 23-JUN-2011 TIME: 11: 2:38

U. S. E N V I R O N M E N T A L P R O T E C T I O N A G E N C Y

E X P O S U R E A S S E S S M E N T

M U L T I M E D I A M O D E L

MULTIMED (Version 1.50, 2005)

1
Run options
--- -------

Chemical simulated is Chloride

Option Chosen Saturated and unsaturated zone models
Run was DETERMIN
Infiltration Specified By User: 3.810E-02 m/yr
Run was transient
Well Times: Entered Explicitly
Reject runs if Y coordinate outside plume
Reject runs if Z coordinate outside plume
Gaussian source used in saturated zone model
1
1
UNSATURATED ZONE FLOW MODEL PARAMETERS
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

OPTIONS CHOSEN
------- ------
Van Genuchten functional coefficients
User defined coordinate system
1

Layer information

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	9.14	1

DATA FOR MATERIAL 1

VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	-999.	-999.
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	-999.	-999.
Air entry pressure head	m	CONSTANT	0.700	-999.	-999.	-999.
Depth of the unsaturated zone	m	CONSTANT	9.14	0.000	0.000	0.000

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Residual water content	--	CONSTANT	0.116	-999.	-999.	-999.
Brook and Corey exponent,EN	--	CONSTANT	-999.	-999.	-999.	-999.
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	-999.	-999.
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	-999.	-999.

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used		1
NTSTPS	- Number of time values concentration calc		40
DUMMY	- Not presently used		1
ISOL	- Type of scheme used in unsaturated zone		2
N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		2
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN

Convolution integral approach
Nondecaying pulse source
Computer generated times for computing concentrations

1

DATA FOR LAYER 1

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Thickness of layer	m	CONSTANT	9.14	-999.	-999.	-999.
Longitudinal dispersivity of layer	m	DERIVED	-999.	-999.	-999.	-999.
Percent organic matter	--	CONSTANT	0.000	-999.	-999.	-999.
Bulk density of soil for layer	g/cc	CONSTANT	1.83	-999.	-999.	-999.
Biological decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.

1

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Solid phase decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Dissolved phase decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Overall chemical decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Acid catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Base catalyzed hydrolysis rate	l/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Reference temperature	C	CONSTANT	25.0	-999.	-999.	-999.
Normalized distribution coefficient	ml/g	CONSTANT	0.000	-999.	-999.	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Air diffusion coefficient	cm2/s	CONSTANT	-999.	-999.	-999.	-999.
Reference temperature for air diffusion	C	CONSTANT	-999.	-999.	-999.	-999.
Molecular weight	g/M	CONSTANT	-999.	-999.	-999.	-999.
Mole fraction of solute	--	CONSTANT	-999.	-999.	-999.	-999.
Vapor pressure of solute	mm Hg	CONSTANT	-999.	-999.	-999.	-999.
Henry's law constant	atm-m^3/M	CONSTANT	-999.	-999.	-999.	-999.
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000	0.000	0.000	1.00
Not currently used		CONSTANT	0.000	0.000	0.000	0.000
Not currently used		CONSTANT	0.000	0.000	0.000	0.000

1

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Infiltration rate	m/yr	CONSTANT	0.381E-01	-999.	-999.	-999.
Area of waste disposal unit	m^2	DERIVED	0.139E+04	-999.	-999.	-999.
Duration of pulse	yr	CONSTANT	50.0	-999.	-999.	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	-999.	-999.
Recharge rate	m/yr	CONSTANT	0.000	-999.	-999.	-999.
Source decay constant	1/yr	CONSTANT	0.000	0.000	0.000	0.000
Initial concentration at landfill	mg/l	CONSTANT	246.	-999.	-999.	-999.
Length scale of facility	m	CONSTANT	3.05	-999.	-999.	-999.
Width scale of facility	m	CONSTANT	9.14	-999.	-999.	-999.
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

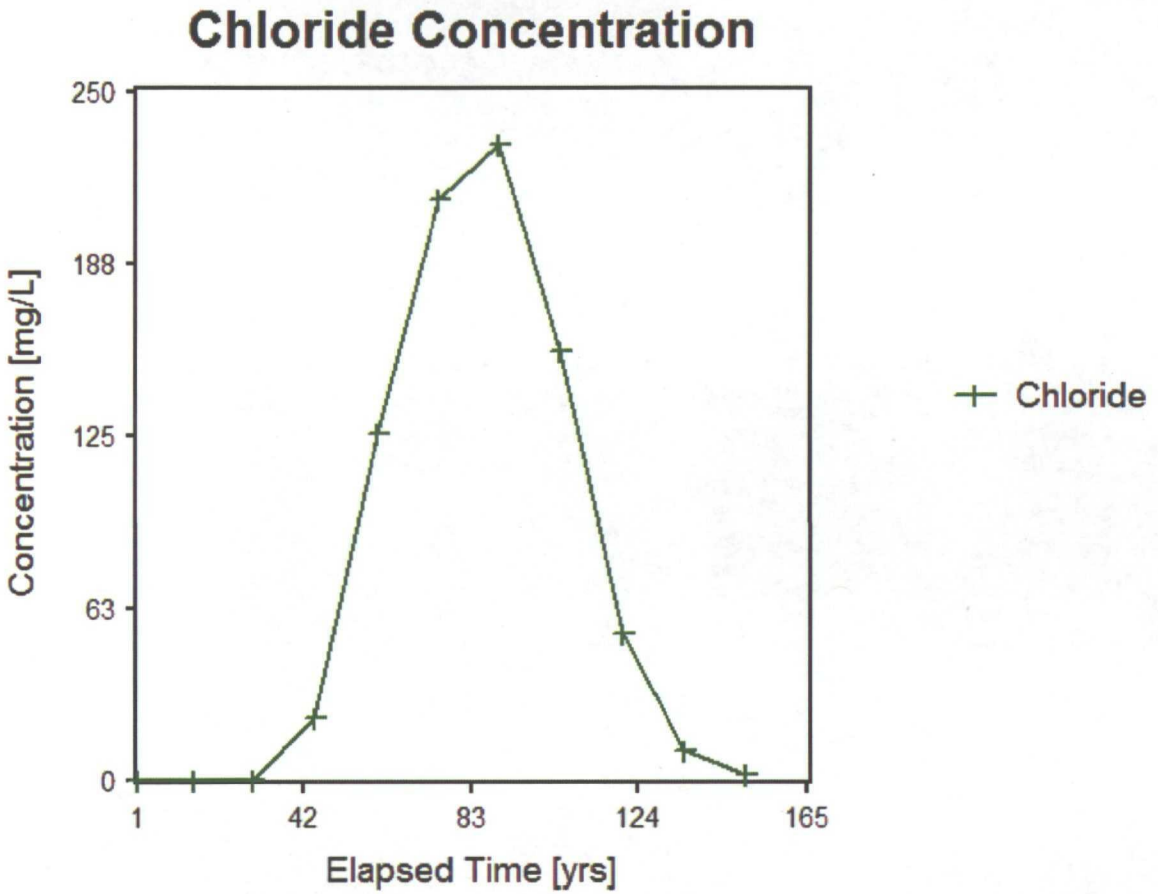
1

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS MEAN	PARAMETERS STD DEV	LIMITS MIN	LIMITS MAX
Particle diameter	cm	CONSTANT	-999.	-999.	-999.	-999.
Aquifer porosity	--	CONSTANT	0.300	-999.	-999.	-999.
Bulk density	g/cc	CONSTANT	1.70	-999.	-999.	-999.
Aquifer thickness	m	CONSTANT	9.14	-999.	-999.	-999.
Source thickness (mixing zone depth)	m	DERIVED	3.00	-999.	-999.	-999.
Conductivity (hydraulic)	m/yr	CONSTANT	30.0	-999.	-999.	-999.
Gradient (hydraulic)		CONSTANT	0.300E-02	-999.	-999.	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	-999.	-999.
Retardation coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Temperature of aquifer	C	CONSTANT	20.0	-999.	-999.	-999.
pH	--	CONSTANT	7.00	-999.	-999.	-999.
Organic carbon content (fraction)		CONSTANT	0.000	-999.	-999.	-999.
Well distance from site	m	CONSTANT	1.00	-999.	-999.	-999.
Angle off center	degree	CONSTANT	0.000	-999.	-999.	-999.
Well vertical distance	m	CONSTANT	0.000	-999.	-999.	-999.

1

TIME	CONCENTRATION
0.100E+01	0.00000E+00
0.150E+02	0.00000E+00
0.300E+02	0.22122E+00
0.450E+02	0.22434E+02
0.600E+02	0.12552E+03
0.750E+02	0.21062E+03
0.900E+02	0.23054E+03
0.105E+03	0.15579E+03
0.120E+03	0.53052E+02
0.135E+03	0.10649E+02
0.150E+03	0.20843E+01


Chloride Concentration
250
188
125
63
0
Concentration [mg/L]
1
42
83
124
165
Elapsed Time [yrs]
Chloride

Appendix C

Site photo

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

EME jct. K-8-2
Site photo

May 5th, 2011
Facing south