1R - 460

WORKPLANS

Date:

5-7-10

Hansen, Edward J., EMNRD

From: Katie Jones [kjones@riceswd.com]
Sent: Friday, June 04, 2010 3:20 PM
To: Hansen, Edward J., EMNRD
Cc: Hack Conder; Gil Van Deventer
Subject: EME A-12 (1R0460) CAP Amendment
Attachments: ROC A-12 leak to EME L-6 boot.jpg

Mr. Hansen,

A Corrective Action Plan (CAP) for EME A-12 (1R0460) was submitted to NMOCD on May 7, 2010 and approved by NMOCD on May 11, 2010. In that CAP, ROC requested to remove a chloride mass of 1,953 kg from MW-1. ROC requests to amend that report to remove the chloride mass by pumping groundwater from the nearby EME L-6 boot site (see attached Figure 5) to maximize environmental benefit of the chloride mass removal effort. The recovery system at EME L-6 boot is readily available and as of May 2010 a chloride concentration of 11,200 mg/L was observed.

A chloride concentration of 11,200 mg/L (.0112 kg/L) yields:

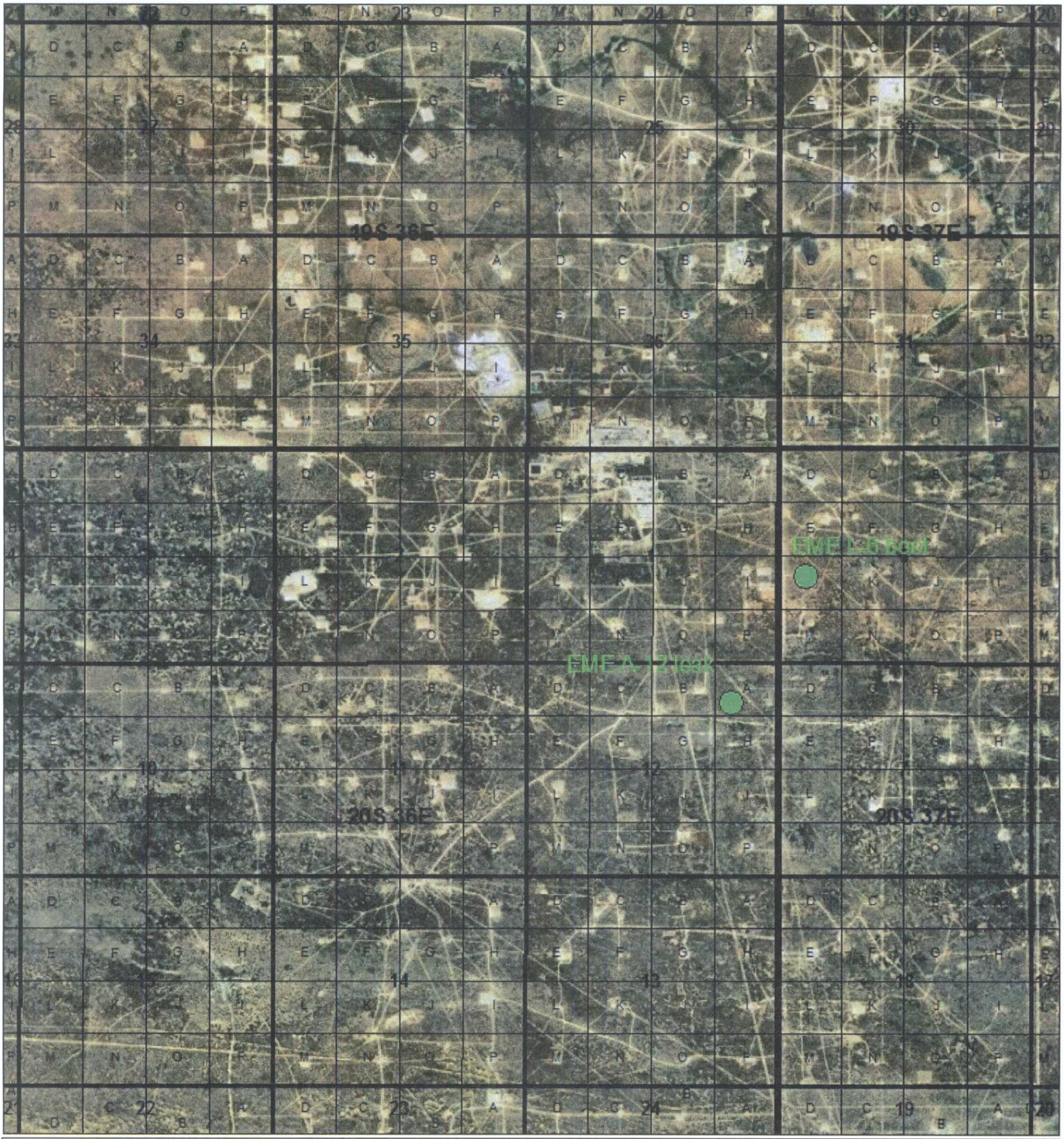
1,935 kg \ .0112 kg/L \ 3.7854 L/gal \ 42 gal/bbl = 1,086.7 barrels

Groundwater quality at L-6 allows a minimal removal of water and a high removal of chloride from groundwater. Removed groundwater will be utilized for pipeline and well maintenance. Groundwater will be pumped at a rate of approximately 1 gallon per minute (gpm) for approximately 8 hours per day. If you have any questions or comments, please do not hesitate to contact us.

Thank you.

Katie Jones
Environmental Project Coordinator
RICE Operating Company

EME A-12 leak to EME L-6 boot



RICE OPERATING COMPANY
ROC
SINCE 1955

EME A-12 leak
Legals: UL/A sec. 12 T20S R37E
NMOCD Case #: 1R460

EME L-6 boot
Legals: UL/L sec. 6 T20S R37E

FIGURE 5

N
W E
S

0 1,450 2,900 5,800
Feet

Drawing date: 6/3/2010
Drafted by: Lara Weinheimer

TRIDENT ENVIRONMENTAL

P. O. Box 7624
Midland TX 79708
Office: 432-682-0008
Mobile: 432-638-8740

CERTIFIED MAIL
RETURN RECEIPT NO. 7010 0290 0003 1264 9109

May 7, 2010

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

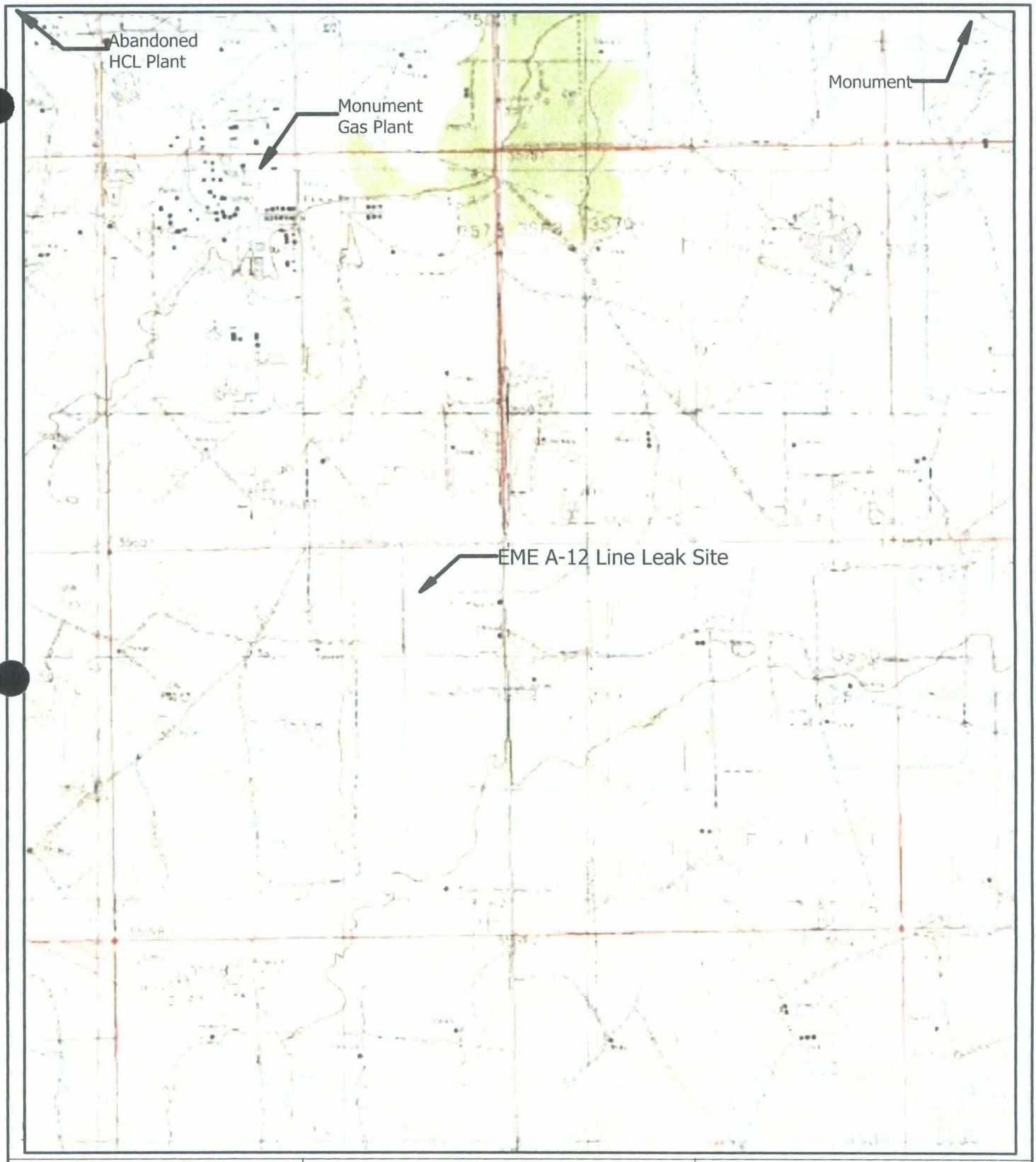
RE: **CORRECTIVE ACTION PLAN**
EME A-12 Leak Site (NMOCD Case No. 1R0463)
T20S-R36E-Section 12, Unit Letter A
Lea County, New Mexico

Mr. Hansen:

RICE Operating Company (ROC) retained Trident Environmental to address potential environmental concerns at the above-referenced site. ROC submitted a notification of groundwater impact to NMOCD on December 10, 2008 based on the findings of the activities performed in accordance with the Investigation & Characterization Plan (ICP). This Corrective Action Plan (CAP) incorporates the findings from the ICP and proposes recommendations for corrective action similar in scope and context to other sites in the regionally impacted Monument area.

Site Description

The A-12 Leak site is located at township 20 south, range 36 east, section 12, unit letter A approximately 3 miles west-southwest of Monument, NM as shown on the attached Site Location Map (Figure 1). Land in the site area is primarily utilized for crude oil production and cattle ranching.



TRIDENT ENVIRONMENTAL

EME A-12 Leak Site

T20S - R36E - Section 12 - Unit A

RICE Operating Company

FIGURE 1

SITE LOCATION MAP

Site History

On January 27, 2003, ROC was notified of an accidental discharge of approximately 25 barrels of produced water from an 8-inch A/C pipeline at a point located approximately 938 feet west of the A-12 junction box. Approximately 5 barrels of produced water were recovered and discharged to an EME SWD facility. The 8-inch A/C pipeline was replaced with a 13-foot length of 8-inch PVC pipe. The initial C-141 report was submitted by ROC on February 17, 2003, and approved by the NMOCD on March 7, 2003. A 2,384-ft section of the existing 8-inch pipeline was lined with 6-inch polyethylene pipe.

Initial soil sampling activities conducted on January 27, February 21, and March 6, 2003. An impacted surface area of 4,311 ft^2 was estimated based on chloride field tests and visual observations. On March 6, 2003, the upper 12-16 inches of impacted soils (168 cubic yards) were excavated and transported to the C&C Landfarm. ROC submitted a disclosure of potential groundwater impact on April 1, 2003. On July 15, 2004, a soil sample collected from a boring at a depth of 30 feet below ground surface (bgs) confirmed total petroleum hydrocarbons (TPH) and chloride impact to the vadose zone.

On April 25, 2005, ROC submitted an *Investigation and Characterization Plan* (ICP) to the NMOCD to address potential groundwater concerns at this site. In accordance with the ICP, four soil borings and three monitoring well installations were conducted on July 2, 2008. Groundwater was encountered at approximately 32 ft bgs. The monitoring wells were constructed, developed, and sampled pursuant to OCD guidelines.

After two quarters of groundwater sampling and laboratory analysis it was confirmed that chloride and total dissolved solids (TDS) exceed the Water Quality Control Commission (WQCC) standards at the site. ROC submitted a notification of groundwater impact to the NMOCD on December 10, 2008. Chloride and TDS concentrations are known to be elevated on a regional scale in this area near Monument as is clearly evidenced by the elevated chloride and TDS concentrations in the upgradient monitoring well (MW-2) at this site. ROC has continued quarterly groundwater monitoring at the site.

Regional and Local Geology

The site is underlain by Quaternary colluvium deposits composed of sand, silt, and gravel deposited by slopewash, and talus which were re-deposited from the underlying Ogallala Formation. These deposits are often calichified (indurated with cemented calcium carbonate) with caliche layers from 1 to 20 feet thick. The thickness of the colluvium deposits and Ogallala Formation at the site is estimated between 60 to 100 feet; however, it varies locally as a result of significant paleo-topography at the top of the underlying Triassic Dockum Group. Since Cretaceous Age rocks in the region have been removed by pre-Tertiary erosion, the colluvial deposits and Ogallala Formation rest unconformably on the Triassic Dockum Group. The uppermost unit of the Dockum Group is the Chinle Formation, which primarily consists of micaceous red clay and shale but also contains thin interbeds of fine-grained sandstone and siltstone. The red clays and shale of the Chinle Formation act as an aquitard beneath the water bearing colluvial deposits and therefore limit the amount of recharge to the underlying Dockum Group.

Based on the descriptions provided in lithologic logs, the subsurface soils are composed of very fine- to medium-grained sand and caliche. More detailed descriptions of the subsurface lithology are provided in the soil boring and monitoring well logs (Appendix A).

Regional and Local Hydrogeology

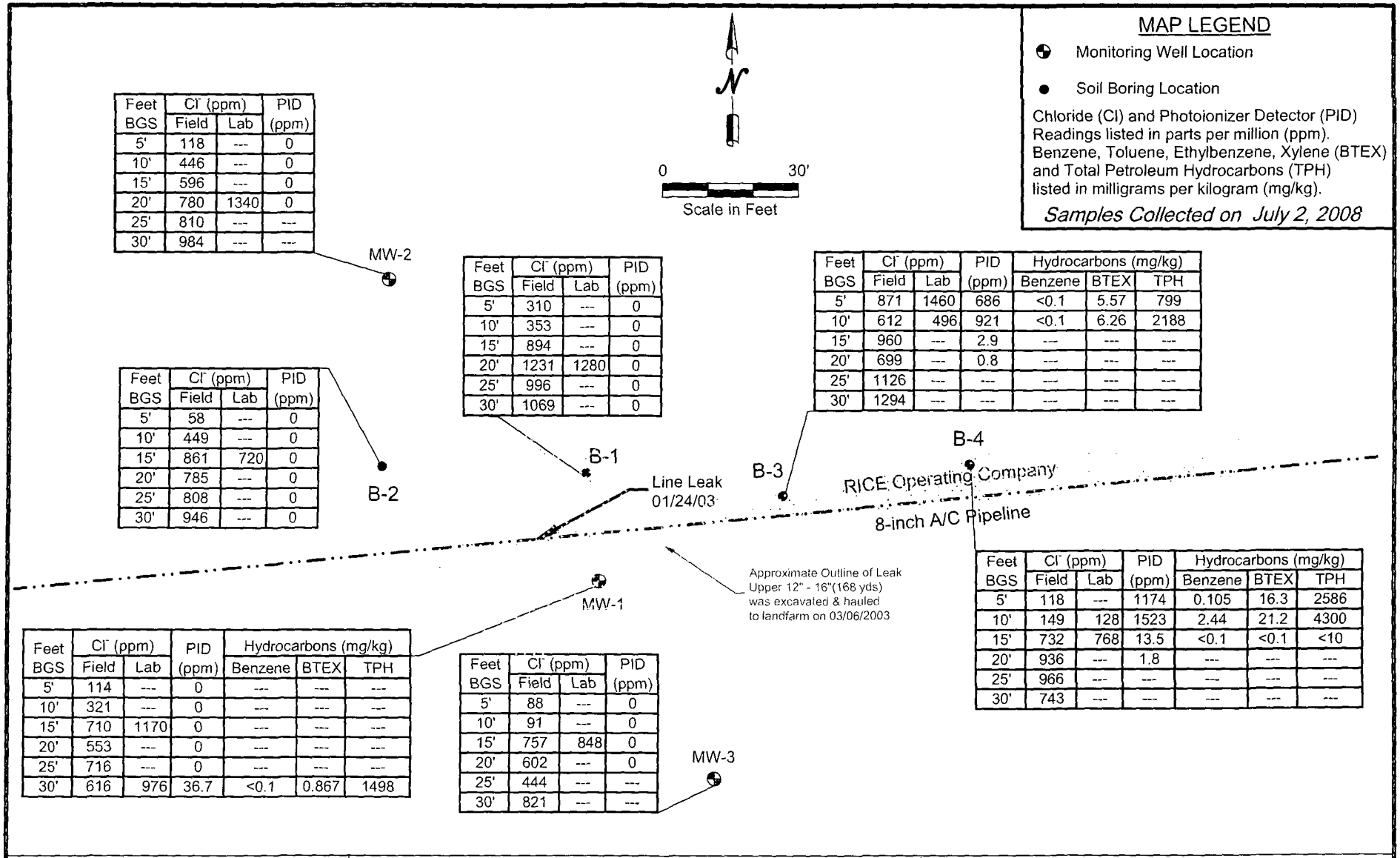
Potable ground water used in southern Lea County is derived primarily from the Ogallala Formation (including the colluvial deposits) and the Quaternary alluvium. Lower yields have also been provided by water bearing zones within the Triassic Dockum Group in a few scattered areas within southern Lea County. No potable water is known to be derived below the Triassic Dockum Group. Water from the Ogallala and alluvium aquifers in southern Lea County is used for irrigation, stock, domestic, industrial, and public supply purposes.

Water well records from the Office of the State Engineer (NMOSE) and the United States Geological Survey (USGS) websites were reviewed to determine if there are any active water supply wells in use for domestic, irrigation, livestock, municipal, or industrial purposes in the site area. As a result of this review and several field reconnaissance efforts there currently are no known potential water supply receptors within 1,000 feet of the A-12 Leak site.

Recent data from the three monitoring wells at the A-12 Leak site shows that the water table is at a depth of approximately 32 ft bgs and slopes towards the southeast at a magnitude of approximately 0.002 ft/ft which is consistent with those of several other groundwater monitoring sites in the Monument area and the regional gradient as cited in published reports. The base of the aquifer is estimated at approximately 70 ft bgs (Nicholson and Clebsch, 1961), therefore the saturated thickness is estimated at 38 ft. There is no surface water body located within a mile of the site.

Characterization of Vadose Zone Conditions

On July 2, 2008, soil samples were collected at 5-foot intervals using an air-rotary drilling rig at seven locations to a depth of 30 feet. Three of the borings were converted into monitoring wells (MW-1, MW-2, and MW-3) and the remaining four borings ((B-1, B-2, B-3, and B-4) were backfilled with bentonite chips to the ground surface. Soil samples were field tested for chloride content using field-adapted Method 4500-Cl-B and headspace readings were recorded using a Mini-Rae Model PGM 76 photoionization detector (PID) calibrated with 100 isobutylene. Select samples were submitted for laboratory analysis of chlorides (EPA Method 4500-Cl-B), benzene, toluene, ethylbenzene, and xylenes (BTEX; EPA Method 8021B), and total petroleum hydrocarbons (TPH; Method 8015M). Results of all chloride field tests, PID readings, and lab analytical results are shown in Figure 2. A profile of chloride concentrations versus depth is depicted in Figure 3. Lithologic logs of each soil boring and monitoring well construction diagrams are included in Appendix A. Photo documentation of sampling activities in included in Appendix B. Laboratory analytical reports and chain of custody documentation are included in Appendix C.



Feet BGS	Cl⁻ (ppm) Field	Cl⁻ (ppm) Lab	PID (ppm)
5'	118	---	0
10'	446	---	0
15'	596	---	0
20'	780	1340	0
25'	810	---	---
30'	984	---	---

Feet BGS	Cl⁻ (ppm) Field	Cl⁻ (ppm) Lab	PID (ppm)
5'	310	---	0
10'	353	---	0
15'	894	---	0
20'	1231	1280	0
25'	996	---	0
30'	1069	---	0

Feet BGS	Cl⁻ (ppm) Field	Cl⁻ (ppm) Lab	PID (ppm)	Hydrocarbons (mg/kg) Benzene	BTEX	TPH
5'	871	1460	686	<0.1	5.57	799
10'	612	496	921	<0.1	6.26	2188
15'	960	---	2.9	---	---	---
20'	699	---	0.8	---	---	---
25'	1126	---	---	---	---	---
30'	1294	---	---	---	---	---

Feet BGS	Cl⁻ (ppm) Field	Cl⁻ (ppm) Lab	PID (ppm)
5'	58	---	0
10'	449	---	0
15'	861	720	0
20'	785	---	0
25'	808	---	0
30'	946	---	0

Feet BGS	Cl⁻ (ppm) Field	Cl⁻ (ppm) Lab	PID (ppm)	Hydrocarbons (mg/kg) Benzene	BTEX	TPH
5'	118	---	1174	0.105	16.3	2586
10'	149	128	1523	2.44	21.2	4300
15'	732	768	13.5	<0.1	<0.1	<10
20'	936	---	1.8	---	---	---
25'	966	---	---	---	---	---
30'	743	---	---	---	---	---

Feet BGS	Cl⁻ (ppm) Field	Cl⁻ (ppm) Lab	PID (ppm)	Hydrocarbons (mg/kg) Benzene	BTEX	TPH
5'	114	---	0	---	---	---
10'	321	---	0	---	---	---
15'	710	1170	0	---	---	---
20'	553	---	0	---	---	---
25'	716	---	0	---	---	---
30'	616	976	36.7	<0.1	0.867	1498

Feet BGS	Cl⁻ (ppm) Field	Cl⁻ (ppm) Lab	PID (ppm)
5'	88	---	0
10'	91	---	0
15'	757	848	0
20'	602	---	0
25'	444	---	---
30'	821	---	---

TRIDENT ENVIRONMENTAL

EME A-12 Leak Site (1R0463)

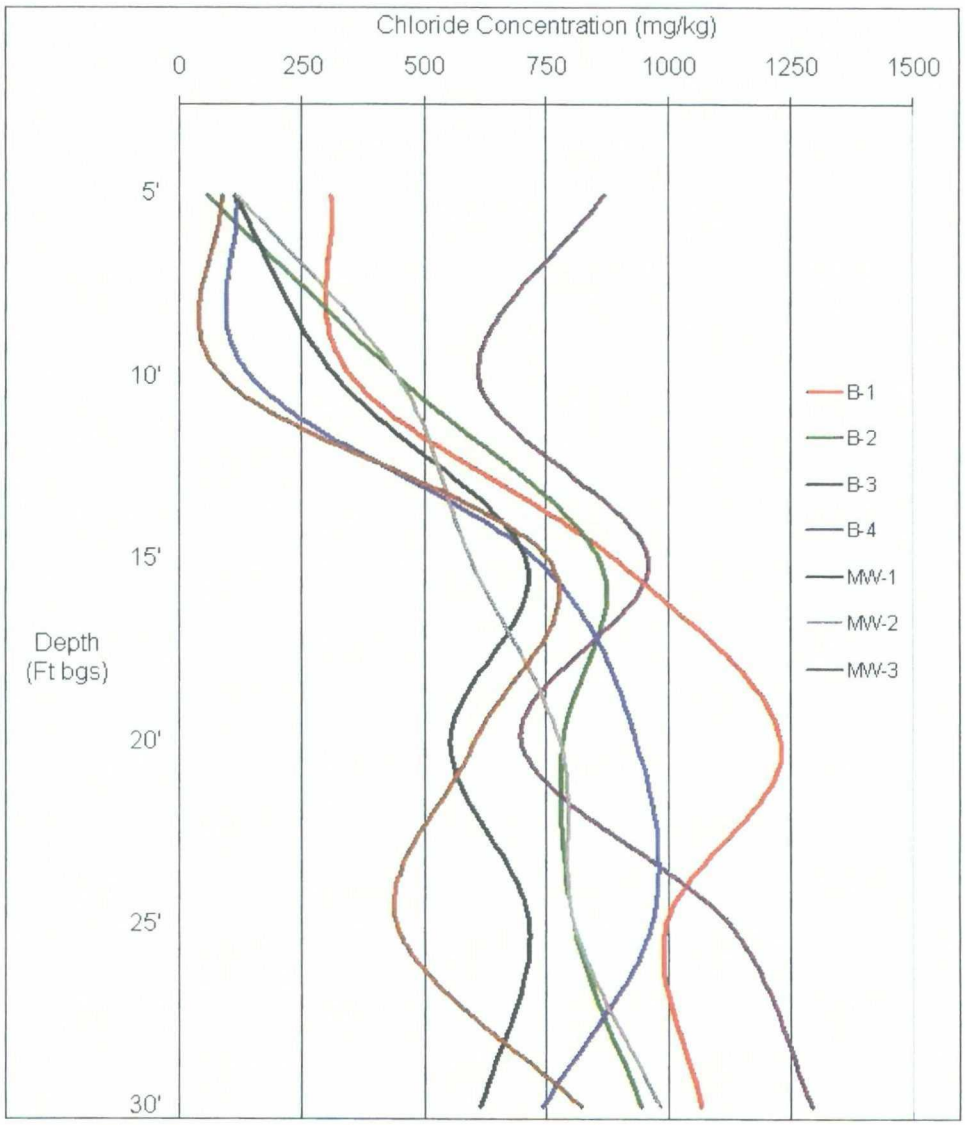
T20S - R36E - Section 12, Unit A

RICE Operating Company

FIGURE 2

CHLORIDE AND HYDROCARBON CONCENTRATIONS IN VADOSE ZONE

Figure 3: Profile of Chloride Concentrations in Vadose Zone



Chloride concentrations in the four soil borings and three monitoring wells (Figure 2) ranged from a minimum of 58 ppm at 5 ft bgs in boring B-2 to a maximum of 1,460 ppm at 5 ft bgs in boring B-3. The average chloride concentration soil borings MW-1, B-1, B-3 and B-4 (*inside* the leak boundary) was 712 ppm. Average chloride concentrations in soil borings B-2, MW-2, and MW-3 (*outside* the leak boundary) was 580 ppm.

There were no indications of hydrocarbon impact at borings B-1, B-2, MW-2, and MW-3 (PID readings measured 0 ppm for each sampled interval). Laboratory analysis of hydrocarbon constituents of concern (benzene, BTEX, and TPH) in borings B-3 and B-4 indicate impact is limited to the upper 5 to 10 feet of the vadose zone. Monitoring well MW-1 indicates hydrocarbon impact immediately above the water table at 30 ft bgs but not at all within the vadose zone above that depth, indicating potential migration within the groundwater from a location upgradient and offsite.

Characterization of Groundwater Conditions

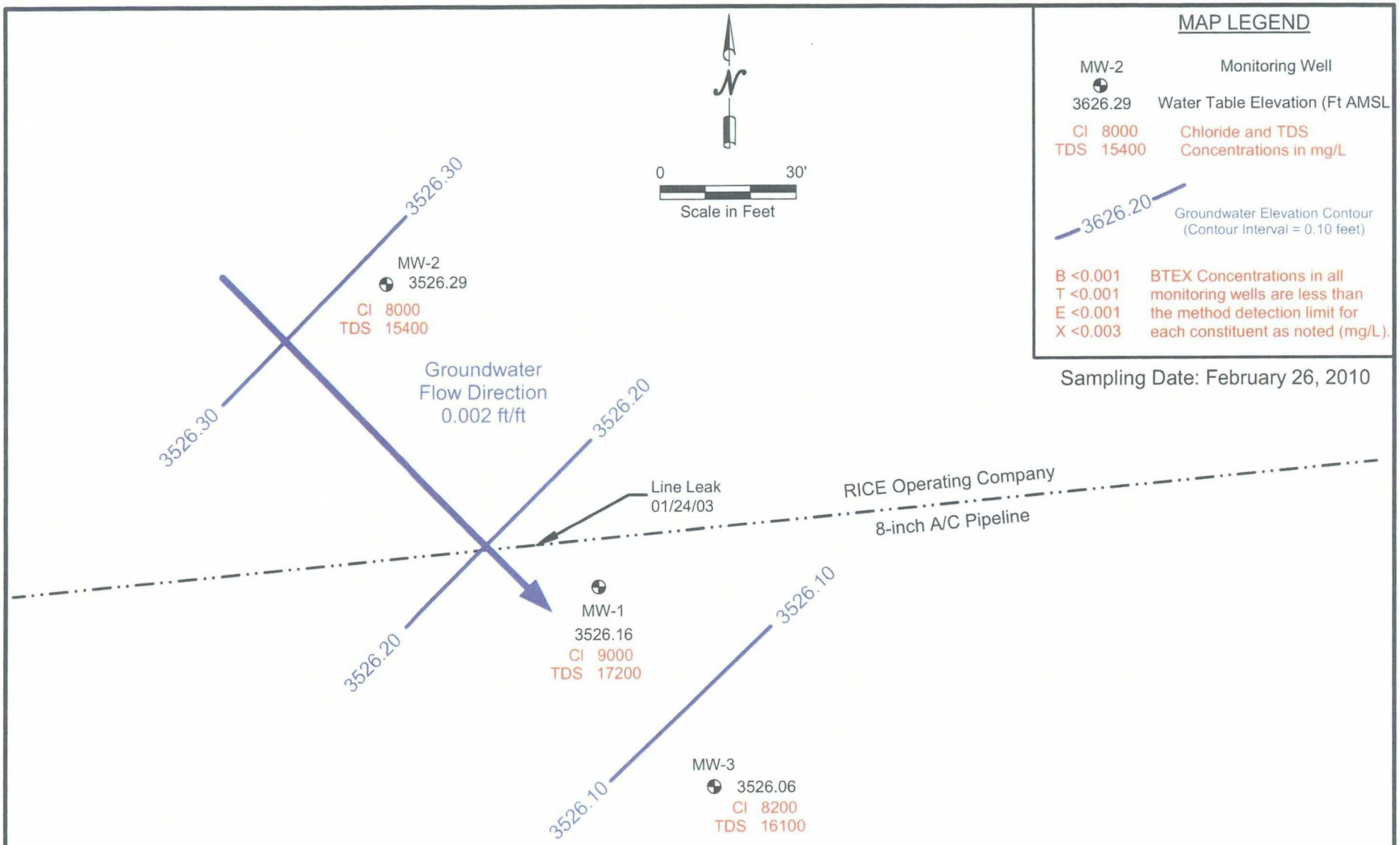
Monitoring wells MW-1, MW-2, and MW-3 have been sampled on a quarterly basis since September 3, 2008. Recent data from the three monitoring wells show that the water table is at a depth of approximately 32 ft bgs and slopes towards the southeast at a magnitude of approximately 0.002 ft/ft. A map of the most current groundwater conditions for the A-12 Leak site is depicted in Figure 4. The historical analytical results and groundwater elevations for monitoring wells MW-1, MW-2, and MW-3 are summarized in Table 1. The laboratory analytical report and chain of custody form for the most recent ground water sampling event are included in Appendix C. Based on the results of the most recent sampling event on November 10, 2009, the following observations are evident:

- BTEX concentrations in monitoring wells MW-1, MW-2, and MW-3 have been below the WQCC standards for each constituent and for every sampling event taken place, and are not constituents of concern.

- Chloride concentrations in monitoring wells MW-1 (9,000 mg/L), up gradient MW-2 (8,000 mg/L), and down gradient MW-3 (8,200 mg/L) exceed the WQCC standard of 250 mg/L.

- The TDS concentrations in monitoring wells MW-1 (17,200mg/L), upgradient MW-2 (15,400 mg/L), and down gradient MW-3 (16,100 mg/L) exceed the WQCC standard of 1,000 mg/L.

Each monitoring well indicates chloride and TDS concentrations above WQCC standards; however, after seven consecutive quarterly sampling events it is clear that the upgradient monitoring well (MW-2) has chloride and TDS concentrations consistent with those observed near the line leak (MW-1) and downgradient well MW-3. Therefore, we conclude that the elevated chloride and TDS concentrations observed on site are due in most part to the regional impact from an upgradient source(s) northwest of this site.



TRIDENT ENVIRONMENTAL

EME A-12 Leak Site (1R0463)

T20S - R36E - Section 12, Unit A

RICE Operating Company

FIGURE 4
GROUNDWATER GRADIENT AND CHLORIDE, TDS, & BTEX CONCENTRATION MAP

Table 1: Summary of Groundwater Monitoring Results

Monitoring Well	Sample Date	Depth to Groundwater (feet BTOC)	Groundwater Elevation (feet AMSL)	Chloride (mg/L)	TDS (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethyl-benzene (mg/L)	Xylene (mg/L)
MW-1	09/03/08	34.22	3526.67	**8,600**	**17,500**	<0.001	<0.001	<0.001	<0.003
	11/07/08	34.23	3526.66	**9,300**	**17,500**	<0.001	<0.001	<0.001	<0.003
	02/16/09	34.22	3526.67	**9,400**	**17,200**	<0.001	<0.001	<0.001	<0.003
	05/19/09	34.21	3526.68	**9,500**	**18,900**	<0.001	<0.001	<0.001	<0.003
	08/26/09	34.46	3526.43	**8,900**	**18,200**	<0.001	<0.001	<0.001	<0.003
	11/10/09	34.63	3526.26	**8,700**	**19,200**	<0.001	<0.001	<0.001	<0.003
	02/26/10	34.73	3526.16	**9,000**	**17,200**	<0.001	<0.001	<0.001	<0.003
MW-2	09/03/08	34.54	3526.79	**8,200**	**16,600**	<0.001	<0.001	<0.001	<0.003
	11/07/08	34.55	3526.78	**7,900**	**15,000**	<0.001	<0.001	<0.001	<0.003
	02/16/09	34.49	3526.84	**8,100**	**15,100**	<0.001	<0.001	<0.001	<0.003
	05/19/09	34.47	3526.86	**9,000**	**16,900**	<0.001	<0.001	<0.001	<0.003
	08/26/09	34.71	3526.62	**7,600**	**15,300**	<0.001	<0.001	<0.001	<0.003
	11/10/09	34.95	3526.38	**7,800**	**16,500**	<0.001	<0.001	<0.001	<0.003
	02/26/10	35.04	3526.29	**8,000**	**15,400**	<0.001	<0.001	<0.001	<0.003
MW-3	09/03/08	32.93	3526.56	**8,100**	**16,600**	<0.001	<0.001	<0.001	<0.003
	11/07/08	32.94	3526.55	**8,200**	**15,500**	<0.001	<0.001	<0.001	<0.003
	02/16/09	32.86	3526.63	**8,400**	**15,800**	<0.001	<0.001	<0.001	<0.003
	05/19/09	32.85	3526.64	**8,800**	**15,500**	<0.001	<0.001	<0.001	<0.003
	08/26/09	33.13	3526.36	**8,100**	**16,200**	<0.001	<0.001	<0.001	<0.003
	11/10/09	33.34	3526.15	**8,200**	**16,800**	<0.001	<0.001	<0.001	<0.003
	02/26/10	33.43	3526.06	**8,200**	**16,100**	<0.001	<0.001	<0.001	<0.003
			WQCC Standards	250	1000	0.01	0.75	0.75	0.62

Recommendations for Corrective Action to Vadose Zone

The repair of the pipeline and removal of the upper 12-in to 16-in of impacted soils (168 yd^3) has effectively mitigated any potential threat of chlorides and TDS from the line leak. The surrounding area is supportive of vegetation and will be re-seeded with a mixture of native grasses and plants that will re-vegetate the area at a natural rate. ROC will monitor the site for continued healthy growth of native vegetation and add amendments if necessary.

Recommendations for Corrective Action to the Groundwater

It has become clear that the upgradient monitoring well (MW-2) has chlorides and TDS concentrations consistent with those observed near the line leak (MW-1) and downgradient well (MW-3), which indicates regional impact from an upgradient source(s) northwest of the site. Groundwater in this area of Monument, New Mexico, has been reported as regionally impacted with chlorides and unusable as early as 1952 (Nicholson and Clebsch, Groundwater Report 6, 1961). The exact source of groundwater impact at the A-12 Leak site is unknown because of the numerous potential facilities, past and present, located upgradient of the site.

ROC proposes to install a groundwater recovery system to remove chloride impacted groundwater that will be utilized for well and pipeline maintenance. It is being conservatively assumed that the observed chloride concentrations in monitoring well MW-1 (adjacent to the line leak) were contributed, in part, by a release from the ROC pipeline. With that assumption in mind, the following worst-case scenario estimate of chloride mass was calculated based on straight-forward mass balance equations which are explained as follows:

Method 1 (Estimate of chloride mass in groundwater)

First, a 4,311 ft^2 area of the chloride plume from this release was estimated to be the same area as reported at the time of the release. The aquifer thickness was estimated to be 38 ft (depth to water table at 32 feet subtracted from aquifer bottom estimated at 70 feet). The total area multiplied by the thickness of the aquifer and its porosity (0.25) results in a saturated pore space volume of 1,245,785 liters. Next, the difference between the average chloride (9,057 mg/L) observed in MW-1 (near the line leak "source") and the average chloride (8,086 mg/L) observed in upgradient MW-2 was calculated. This net difference (971 mg/L) is conservatively presumed to be the chloride concentration in groundwater contributed by a release from the line leak. This chloride concentration multiplied by the saturated pore space volume results in a chloride mass of 1,126 kg. Future sampling results might dictate re-calculation by this method. These calculations are shown in the following table in the same order as described above.

Method 1: Estimate of Chloride Mass in Groundwater:

Parameter Type	Value	Parameter Validation (description of equations used)
Release area	4,311 ft^2	Area of Commingled Plume (Total surface area covered by leak)
Aquifer Thickness	38 ft	Known lithology of monitoring well MW-1 and published reports (Nicholson and Clebsch, 1961).
Porosity	0.25	Professional estimate for water saturated pore volume
Volume of impacted Groundwater below site.	40,955 ft^3	Simple multiplication of each parameter listed above (saturated pore space volume).
Volume of Impacted Groundwater below site.	1.246E+06 L	Unit conversion of previous value to liters (saturated pore space volume)..
Chloride concentration	971 mg/L	Difference between average chloride concentration in MW-1 (9,067 mg/L) and upgradient MW-2 (8,100 mg/L)
Total chloride mass	**1,126 kg**	Simple multiplication of two parameters listed above

Method 2 (Estimate of chloride mass in vadose zone)

The approach for estimating the chloride mass in the vadose zone is similar to that explained for groundwater above. Again, an area of 4,311 ft^2 was estimated as reported at the time of the release. The 32 ft thickness of the vadose zone is equal to the known depth to groundwater below ground surface. The total area multiplied by the vadose zone thickness results in a total volume of 137,952 ft^3. Estimating the mass of the vadose zone at 100 lb/ft^3, corresponds to approximately 45.4 kg/ft^3. Multiplying that factor by the

volume of impacted vadose zone results in weight of 6,263,021 kg. Next, the difference between the average chloride concentration of 712 mg/kg for the four soil borings inside the leak boundary (MW-1, B-1, B-3, and B-4) and the average chloride concentration of 580 mg/kg for the three borings outside the leak boundary (B-2, MW-2, and MW-3) was calculated. This net difference (132 kg) is a conservative estimate of the chloride concentration in the vadose zone contributed by the line leak. This chloride concentration multiplied by the weight of the vadose zone beneath the leak area results in a chloride mass of 827 kg in the vadose zone. These calculations are shown in the following table in the same order as described above.

Method 2: Estimate of Chloride Mass in Vadose Zone:

Parameter Type	Value	Parameter Validation (description of equations used)
Release area	4,311 ft^2	Area of Commingled Plume (initial surface area covered by leak)
Vadose zone thickness	32 ft	Known lithology of monitoring well MW-1 and published reports (Nicholson and Clebsch, 1961).
Volume of impacted vadose zone	137,952 ft^3	Simple multiplication of each parameter listed above
Mass of impacted vadose zone	6.26E+06 kg	Volume of impacted vadose zone times mass density (1 ft^3 of soil weighs ~45.4 kg or ~100 lb/ft^3)
Chloride concentration added to soil from leak	132 mg/kg	Difference between average chloride concentration in soil borings MW-1, B-1, B-3, & B-4 (712 mg/kg) inside leak boundary and soil borings B-2, MW-2, & MW-3 (580 mg/kg) outside leak boundary.
Total chloride mass	**827 kg**	Simple multiplication of two parameters listed above

Adding both of the Method 1 and 2 estimates results in a total chloride mass of 1,953 kg.

A groundwater recovery system employed at the A-12 Leak site extracting water with chloride concentrations consistent with those in MW-1 (~9,000 mg/L) could extract about 49.1 kg per day, assuming an average pumping rate of 1 gallon per minute can be achieved. At that rate it would take approximately 40 days and the equivalent of 1,365 barrels (bbls) to remove 1,953 kg of chloride mass.

The conceptual design and specifications of the groundwater recovery system include a submersible pump capable of discharging at a minimum rate of 1 gpm. Due to the remoteness of the site, the necessary power supply for the system will likely be provided by a solar powered panel. Water from the recovery well will be utilized in pipeline and well maintenance operations. Flow rate, total volume, and chloride content of the recovered will be measured and recorded on a log.

Termination and Proposed Schedule of Activities

ROC will continue quarterly groundwater sampling at each of the three monitoring wells for chloride, sulfate, and TDS analyses; however, the EPA Method 8021B analysis will be suspended since each monitoring well has had concentrations below 0.001 mg/L for

each constituent of BTEX, which is well below WQCC standards. Vegetation will be monitored for growth and amendments added if necessary.

Upon approval of this Corrective Action Plan, ROC will schedule the site to be re-seeded. The ground water remedy at the A-12 Leak site will be implemented utilizing the existing 4-inch monitoring well (MW-1). ROC intends to use one of their groundwater recovery systems currently employed at another site after it is available for use.

At the completion of corrective actions as described herein and in accordance with 19.15.29 NMAC (Part 29), a final report will be submitted to the NMOCD with a termination request for this corrective action plan and plugging of the three monitoring wells using cement grout with 1% to 3% bentonite.

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.

We appreciate the opportunity to work with you on this project. Please feel free to call Hack Conder at 575-393-9174, if you have any questions.

Sincerely,

Gilbert J. Van Deventer, REM, PG
Trident Environmental

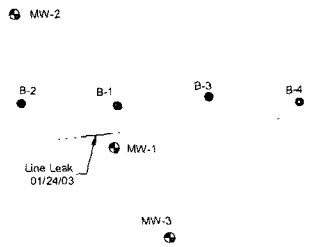
cc: Hack Conder (ROC)

Enclosures: Figures, tables, lithologic logs/well construction diagrams, photo documentation, and laboratory analytical reports

Appendix A

Lithologic Logs
And
Monitoring Well Construction Diagrams

SOIL BORING LITHOLOGIC LOG



BOREHOLE NO.: B-1 TOTAL DEPTH: 39 Feet

SITE ID: EME A-12 Leak CLIENT: RICE *Operating Company*

CONTRACTOR: Harrison & Cooper, Inc. COUNTY: Lea

DRILLING METHOD: Air Rotary STATE: New Mexico

START DATE: 07/02/08 LOCATION: T20S-R36E-Sec 12-Unit A

COMPLETION DATE: 07/02/08 FIELD REP.: G. Van Deventer

COMMENTS: Boring located ~14 ft north and ~10 ft east of leak source.

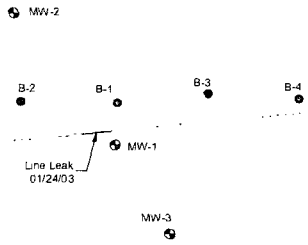
Latitude 32° 35' 30.0" N, Longitude 103° 18' 9.4" W

Sample Depth	Sample Time	Sample Type	Chloride (ppm)	PID (ppm)	USCS	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
		Surface				
5	0839	Split Spoon	310	0		Very fine- to fine-grained sand with ~10% calcium carbonate in matrix, very pale orange (10YR 8/2), unconsolidated, dry, no odor.
10	0842	Split Spoon	353	0	SM/CAL	Very fine- to fine-grained sand with ~10% calcium carbonate in matrix, very pale orange (10YR 8/2), unconsolidated, dry, no odor.
15	0848	Split Spoon	894	0		Very fine- to fine-grained sand with ~10% calcium carbonate in matrix, very pale orange (10YR 8/2), unconsolidated, dry, no odor.
20	0850	Split Spoon	1231	0		Very fine- to fine-gtrained sand with ~5-10% calcium carbonate in matrix and caliche fragments, very pale orange (10YR 8/2) and grayish orange (10YR 7/4), dry, no odor. Lab chloride = 1280 mg/kg.
25	0901	Split Spoon	996	0	SW/CAL	Fine sand, light brown (5YR 6/4), with some caliche fragments. Sand grains are subrounded moderately sorted, dry, no odor.
30	0909	Split Spoon	1069	0		Fine sand, grayish orange (10YR 7/4), subrounded moderately sorted, slightly moist, no odor.
						Groundwater slowly infilled to ~ 32 ft bgs.
35					SW	
40						Bottom of boring at 39 feet.
45						
50						
55						

3/8 Bentonite Hole Plug

5"

SOIL BORING LITHOLOGIC LOG



BOREHOLE NO.: B-2 | TOTAL DEPTH: 30 Feet

SITE ID: EME A-12 Leak | CLIENT: RICE *Operating Company*

CONTRACTOR: Harrison & Cooper, Inc. | COUNTY: Lea

DRILLING METHOD: Air Rotary | STATE: New Mexico

START DATE: 07/02/08 | LOCATION: T20S-R36E-Sec 12-Unit A

COMPLETION DATE: 07/02/08 | FIELD REP.: G. Van Deventer

COMMENTS: Boring located ~39 ft WNW of leak source

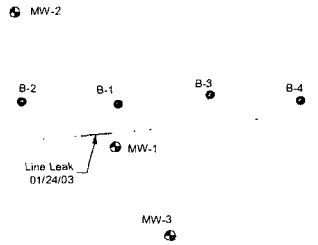
Latitude 32° 35' 30.2" N, Longitude 103° 18' 10.0 W

Sample Depth	Sample Time	Sample Type	Chloride (ppm)	PID (ppm)	USCS	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
		Surface				
5	1432	Split Spoon	58	0		Very fine sand with ~10% calcium carbonate in matrix, very pale orange (10YR 8/2), unconsolidated, dry, no odor.
10	1434	Split Spoon	449	0		Very fine sand with ~10% calcium carbonate in matrix, very pale orange (10YR 8/2), unconsolidated, dry, no odor.
15	1437	Split Spoon	861	0	SM/CAL	Very fine sand with ~10% calcium carbonate in matrix, very pale orange (10YR 8/2), unconsolidated, dry, no odor. Lab chloride = 720 mg/kg.
20	1440	Split Spoon	785	0		Very fine sand with ~5-10% calcium carbonate in matrix and caliche fragments, very pale orange (10YR 8/2) and grayish orange (10YR 7/4), dry, no odor.
25	1447	Split Spoon	808	0	SW/CAL	Fine sand, light brown (5YR 6/4), with some caliche fragments. Sand grains are subrounded moderately sorted, dry, no odor.
30	1449	Split Spoon	946	0		Fine sand, grayish orange (10YR 7/4), with some caliche fragments. Sand grains are subrounded moderately sorted, slightly moist, no odor.
35						Bottom of boring at 30 feet. Groundwater ~ 31 ft bgs.
40						
45						
50						
55						

3/8 Bentonite Hole Plug

5"

SOIL BORING LITHOLOGIC LOG



BOREHOLE NO.: B-3 | TOTAL DEPTH: 30 Feet

SITE ID: EME A-12 Leak | CLIENT: RICE *Operating Company*

CONTRACTOR: Harrison & Cooper, Inc. | COUNTY: Lea

DRILLING METHOD: Air Rotary | STATE: New Mexico

START DATE: 07/02/08 | LOCATION: T20S-R36E-Sec 12-Unit A

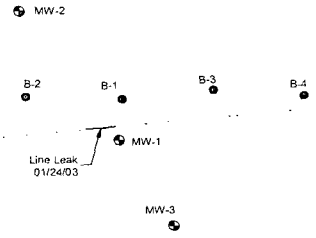
COMPLETION DATE: 07/02/08 | FIELD REP.: G. Van Deventer

COMMENTS: Boring located ~56 ft NNE of leak source

Latitude 32° 35' 30.1" N, Longitude 103° 18' 8.9 W

	Sample Depth	Time	Type	Chloride (ppm)	PID (ppm)	USCS	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
3/8 Bentonite Hole Plug	Surface						
	5	1503	Split Spoon	871	686		Very fine sand with ~10% calcium carbonate in matrix, very pale orange (10YR 8/2), unconsolidated, dry, slight hydrocarbon odo Lab results in mg/kg: chloride = 1460, Benzene <0.1, Toluene = 0.345, Ethylbenzene = 0.672, Xylenes = 4.55, GRO = 401, DRO = 398.
	10	1505	Split Spoon	612	921		Fine sand, light olive gray (5Y 5/2), subrounded, well sorted, unconsolidated, dry, moderate HC odor. Lab results (mg/kg): chloride = 496, Benzene = <0.1, Toluene = 1.02, Ethylbenzene=0.942, Xylenes = 4.30, GRO = 698, DRO = 1490.
	15	1507	Split Spoon	960	2.9	SM/CAL	Fine sand, very pale orange (10YR 8/2), subrounded, moderately well sorted, unconsolidated, dry, no odor.
	20	1510	Split Spoon	699	0.8		Fine sand, light brown (5YR 6/4), with some calcium carbonate. Sand grains are subrounded, moderately well sorted, dry, no odor.
	25	1514	Split Spoon	1126		SW/CAL	Fine sand, grayish orange (10YR 7/4), with some calcium carbonate. Sand grains are subrounded, moderately well sorted, dry, no odor.
← 5" →	30	1516	Split Spoon	1294			Fine sand, light brown (5YR 6/4), with some caliche fragments. Sand grains are subrounded moderately sorted, slightly moist, nc odor.
							Bottom of boring at 30 feet.
	35						
	40						
	45						
	50						
	55						

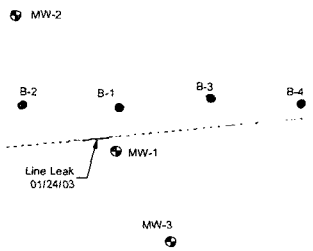
SOIL BORING LITHOLOGIC LOG



BOREHOLE NO.: B-4 TOTAL DEPTH: 30 Feet
SITE ID: EME A-12 Leak CLIENT: RICE *Operating Company*
CONTRACTOR: Harrison & Cooper, Inc. COUNTY: Lea
DRILLING METHOD: Air Rotary STATE: New Mexico
START DATE: 07/02/08 LOCATION: T20S-R36E-Sec 12-Unit A
COMPLETION DATE: 07/02/08 FIELD REP.: G. Van Deventer
COMMENTS: Boring located ~96 ft NNE of leak source
Latitude 32° 35' 30.0" N, Longitude 103° 18' 8.5 W

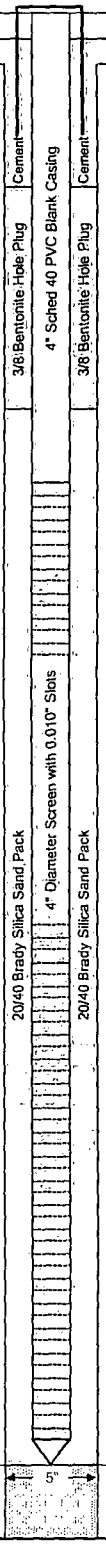
	Depth	Sample Time	Sample Type	Chloride (ppm)	PID (ppm)	USCS	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
3/8 Bentonite Hole Plug	Surface						
	5	1535	Split Spoon	118	1174	SM/CAL	Very fine sand, pale yellowish brown (10YR 6/2), unconsolidated, dry, moderate hydrocarbon odor. Lab results in mg/kg: chloride = 32, Benzene = 0.105, Toluene = 0.899, Ethylbenzene = 2.76, Xylenes = 12.5, GRO = 1590, DRO = 996.
	10	1538	Split Spoon	149	1523	SM/CAL	Fine sand, light olive gray (5Y 5/2), subrounded, well sorted, unconsolidated, dry, strong HC odor. Lab results in mg/kg: chloride = 128, Benzene = 2.44, Toluene = 1.10, Ethylbenzene = 3.08, Xylenes = 14.6, GRO = 2100, DRO = 2200.
	15	1540	Split Spoon	732	13.5		Fine sand, very pale orange (10YR 8/2), subrounded, moderately well sorted, unconsolidated, dry, slight HC odor. Lab results (mg/kg): chloride = 768, Benzene <0.1, Toluene <0.1, Ethylbenzene <0.1, Xylenes <0.1, GRO <10, DRO <10.
	20	1543	Split Spoon	936	1.8		Fine sand, light brown (5YR 5/6), with some calcium carbonate. Sand grains are subrounded, moderately well sorted, dry, slight hydrocarbon odor.
	25	1546	Cuttings	966		SW/CAL	Fine sand, light brown (5YR 5/6), with some calcium carbonate. Sand grains are subrounded, moderately well sorted, dry, slight hydrocarbon odor.
← 5" →	30	1547	Cuttings	743			Fine sand, light brown (5YR 6/4), with some caliche fragments. Sand grains are subrounded moderately sorted, slightly moist, slight hydrocarbon odor.
							Bottom of boring at 30 feet.
	35						
	40						
	45						
	50						
	55						

LITHOLOGIC LOG AND MONITORING WELL CONSTRUCTION DIAGRAM



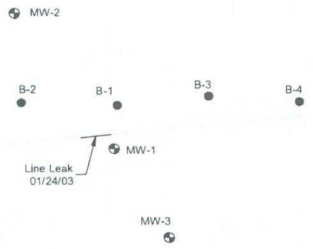
MONITOR WELL NO.: MW- 1
SITE ID: EME A-12 Leak
CONTRACTOR: Harrison & Cooper, Inc.
DRILLING METHOD: Air Rotary
START DATE: 07/02/08
COMPLETION DATE: 07/02/08
COMMENTS: Monitoring well located ~15 ft southeast of leak source.
Latitude 32° 35' 29.9" N, Longitude 103° 18' 9.5 W

TOTAL DEPTH: 57 Feet
CLIENT: RICE *Operating Company*
COUNTY: Lea
STATE: New Mexico
LOCATION: T20S-R36E-Sec 12-Unit A
FIELD REP.: G. Van Deventer



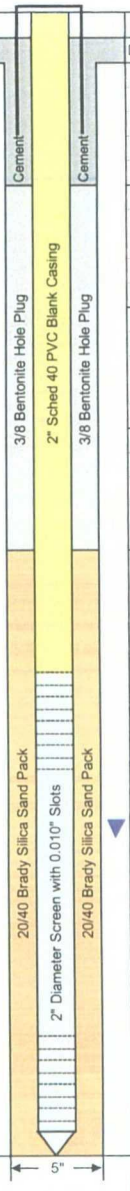
Depth	Time	Sample Type	Chloride (ppm)	PID (ppm)	USCS	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
5	1000	Split Spoon	114		SW	Fine sand, very pale orange (10YR 8/2) and grayish orange (10YR 7/4), subrounded, moderately sorted, unconsolidated, dry, no odor.
10	1003	Split Spoon	321			Fine sand, very pale orange (10YR 8/2), subrounded, moderately sorted, unconsolidated, dry, no odor.
15	1006	Split Spoon	710		SW/CAL	Fine sand, very pale orange (10YR 8/2), with caliche, subrounded, moderately sorted, unconsolidated, dry, no odor. Lab chloride = 1170 mg/kg.
20	1010	Split Spoon	553			Fine sand, very pale orange (10YR 8/2), with caliche, subrounded, moderately sorted, unconsolidated, dry, no odor.
25	1025	Split Spoon	716			Fine sand, light brown (5YR 5/6), subrounded/subangular, moderately sorted, dry, no odor.
30	1029	Split Spoon	616	36.7		Fine- to medium-grained sand, light olive gray (5Y 5/2), subrounded, moderately well sorted, unconsolidated, slightly moist, slight HC odor. Lab results in mg/kg: chloride = 976, Benzene <0.1, Toluene <0.1, Ethylbenzene = 0.161, Xylenes = 0.706, GRO = 358, DRO = 1140.
35						
40					SW	
45						
50						
55						
60						Bottom of monitoring well at 57 ft bgs

LITHOLOGIC LOG AND MONITORING WELL CONSTRUCTION DIAGRAM



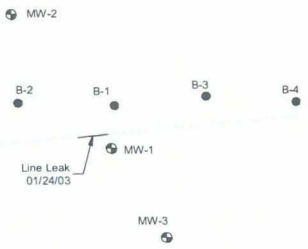
MONITOR WELL NO.: MW- 2
SITE ID: EME A-12 Leak
CONTRACTOR: Harrison & Cooper, Inc.
DRILLING METHOD: Air Rotary
START DATE: 07/02/08
COMPLETION DATE: 07/02/08
COMMENTS: Monitoring well located ~66 ft northwest of leak source.
Latitude 32° 35' 30.5" N, Longitude 103° 18' 9.9 W

TOTAL DEPTH: 45 Feet
CLIENT: RICE *Operating Company*
COUNTY: Lea
STATE: New Mexico
LOCATION: T20S-R36E-Sec 12-Unit A
FIELD REP.: G. Van Deventer



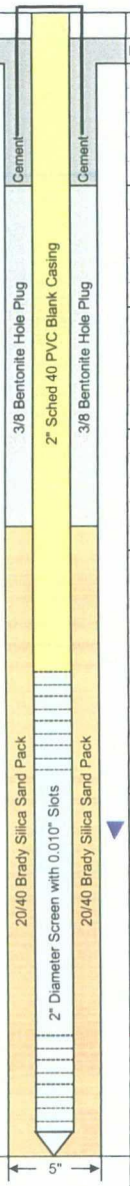
Depth	Sample Time	Sample Type	Chloride (ppm)	PID (ppm)	USCS	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
5	1214	Split Spoon	118	0	SW	Sandy loam, dark yellowish brown (10YR 4/2), subrounded, well sorted, unconsolidated, dry, no odor.
					SM/CAL	Very fine sand with some calcium carbonate in matrix, pale yellowish brown (10YR 6/2). Sand grains are rounded/subrounded, well sorter, unconsolidated, dry, no odor.
10	1217	Split Spoon	446	0	CAL	Caliche, chalky white, moderately hard, dry, no odor.
15	1221	Split Spoon	596	0		Caliche with some very fine sand, chalky white, moderately hard, dry, no odor.
20	1224	Split Spoon	780	0	SM/CAL	Fine sand, very pale orange (10YR 8/2), with caliche, subrounded, moderately sorted, unconsolidated, dry, no odor. Lab chloride = 1340 mg/kg.
25	1227	Cuttings	810		SW	Fine sand, light brown (5YR 5/6), subrounded/subangular, moderately sorted, dry, no odor.
30	1229	Cuttings	984		SW	Fine- to medium-grained sand, light brown (5YR 6/4), subrounded, moderately well sorted, unconsolidated, no odor.
45						Bottom of monitoring well at 45 ft bgs
50						
55						
60						

LITHOLOGIC LOG AND MONITORING WELL CONSTRUCTION DIAGRAM



MONITOR WELL NO.: MW- 3
SITE ID: EME A-12 Leak
CONTRACTOR: Harrison & Cooper, Inc.
DRILLING METHOD: Air Rotary
START DATE: 07/02/08
COMPLETION DATE: 07/02/08
COMMENTS: Monitoring well located ~66 ftsoutheast of leak source.
Latitude 32° 35' 29.3" N, Longitude 103° 18' 9.2 W

TOTAL DEPTH: 45 Feet
CLIENT: RICE *Operating Company*
COUNTY: Lea
STATE: New Mexico
LOCATION: T20S-R36E-Sec 12-Unit A
FIELD REP.: G. Van Deventer



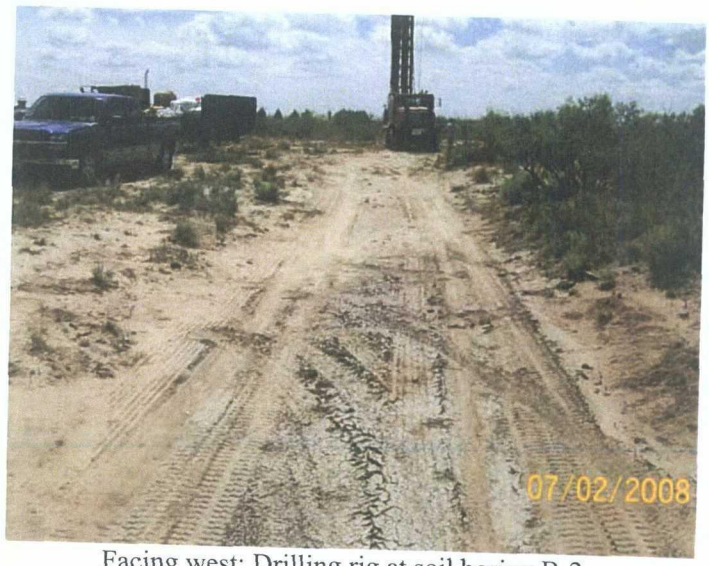
Depth	Time	Sample Type	Chloride (ppm)	PID (ppm)	USCS	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOLIDATION, DISTINGUISHING FEATURES
						Sandy loam, dark yellowish brown (10YR 4/2), subrounded, well sorted, unconsolidated, dry, no odor.
5	1330	Split Spoon	88	0	SW	Fine sand, grayish orange pinkk (5YR 7/2), subrounded, moderately well sorted, unconsolidated, dry, no odor.
10	1332	Split Spoon	91	0	SM/CAL	Fine sand and soft caliche in matrix, very pale orange (10YR 8/2), subrounded, well sorted, unconsolidated, dry, no odor.
15	1335	Split Spoon	757	0		Fine sand and soft caliche in matrix, very pale orange (10YR 8/2) and pale yellowish brown (10YR 6/2), subrounded, well sorted, unconsolidated, dry, no odor. Lab chloride = 848 mg/kg
20	1336	Split Spoon	602	0		Fine sand and soft caliche in matrix, very pale orange (10YR 8/2) and grayish orange (10YR 7/4), subrounded, well sorted, unconsolidated, dry, no odor.
25	1340	Cuttings	444		SW	Fine sand, light brown (5YR 5/6), subrounded/subangular, moderately sorted, dry, no odor.
30	1342	Cuttings	821		SW/CAL	Fine sand, light brown (5YR 6/4) and very pale orange (10YR 8/2) with subangular nodules of caliche. Sand grains are subrounded, moderately well sorted, unconsolidated, slightly moist, no odor.
40					SW	
45						Bottom of monitoring well at 45 ft bgs
50						
55						
60						

Appendix B

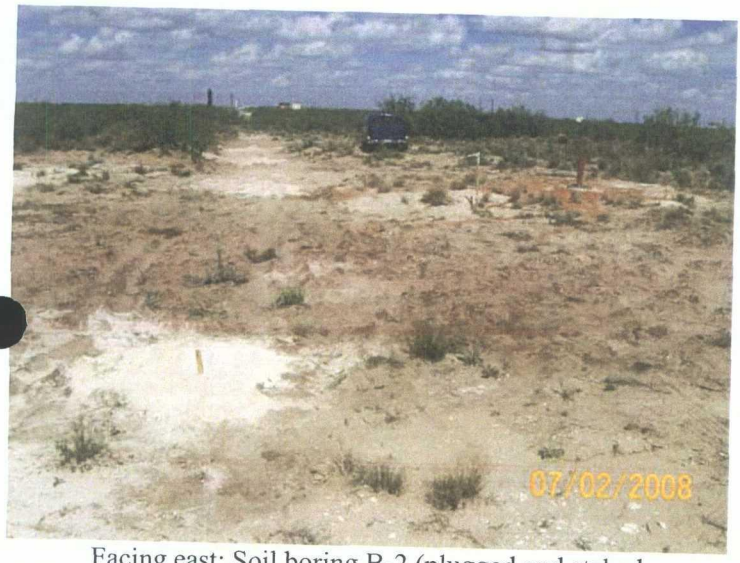
Photo Documentation

EME A-12 Line Leak Site (1R-0427-09)

Facing west: Soil boring B-1 (14' north and 10' east of leak).



Facing west: Drilling rig at soil boring B-2



Facing east: Soil boring B-2 (plugged and staked in foreground), monitoring well MW-1 (upper-right)

Facing east: Drilling soil boring B-3, leak point (stake in foreground), and monitoring well MW-1 (right-center)

Facing southeast: Recently completed monitoring wells MW-2 (foreground) and MW-1 (background)

Facing northwest: Recently completed monitoring wells MW-3 (foreground) and MW-1 (background)

Appendix C

Laboratory Analytical Reports

and

Chain of Custody Documentation

CARDINAL LABORATORIES

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

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

Receiving Date: 07/07/08
Reporting Date: 07/10/08
Project Number: NOT GIVEN
Project Name: EME A-12 LEAK
Project Location: EME A-12 LEAK

Sampling Date: 07/02/08
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: AB

LAB NO.	SAMPLE ID	GRO (C_6-C_{10}) (mg/kg)	DRO (>C_{10}-C_{28}) (mg/kg)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)
ANALYSIS DATE:		07/10/08	07/10/08	07/09/08	07/09/08	07/09/08	07/09/08
H15114-3	MW #1 @ 30'	358	1,140	<0.100	<0.100	0.161	0.706
H15114-7	SB #3 @ 5'	401	398	<0.100	0.345	0.672	4.55
H15114-8	SB #3 @ 10'	698	1,490	<0.100	1.02	0.942	4.30
H15114-9	SB #4 @ 5'	1,590	996	0.105	0.899	2.76	12.5
H15114-10	SB #4 @ 10'	2,100	2,200	2.44	1.10	3.08	14.6
H15114-11	SB #4 @ 15'	<10.0	<10.0	<0.100	<0.100	<0.100	<0.300
Quality Control		502	594	0.102	0.105	0.105	0.318
True Value QC		500	500	0.100	0.100	0.100	0.300
% Recovery		100	119	102	105	105	106
Relative Percent Difference		9.2	10.5	0.7	<0.1	2.8	1.4

METHODS: TPH GRO & DRO - EPA SW-846 8015 M; BTEX - SW-846 8021B.

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

Chemist

07/11/08
Date

H15114BT2

CARDINAL LABORATORIES

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

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

Receiving Date: 07/07/08
Reporting Date: 07/08/08
Project Number: NOT GIVEN
Project Name: EME A-12 LEAK
Project Location: EME A-12 LEAK

Analysis Date: 07/08/08
Sampling Date: 07/02/08
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: KS

LAB NUMBER	SAMPLE ID	Cl^- (mg/kg)
H15114-1	SB #1 @ 20'	1,280
H15114-2	MW #1 @ 15'	1,170
H15114-3	MW #1 @ 30'	976
H15114-4	MW #2 @ 20'	1,340
H15114-5	MW #3 @ 15'	848
H15114-6	SB #2 @ 15'	720
H15114-7	SB #3 @ 5'	1,460
H15114-8	SB #3 @ 10'	496
H15114-9	SB #4 @ 5'	32
H15114-10	SB #4 @ 10'	128
H15114-11	SB #4 @ 15'	768
Quality Control		500
True Value QC		500
% Recovery		100
Relative Percent Difference		< 0.1

METHOD: Standard Methods	4500-ClB

Note: Analyses performed on 1:4 w:v aqueous extracts.

Chemist

07/09/08
Date

H15114 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 A-12 leak	**State:** **Zip:**	
Project Location:	EME A-12 leak	**Phone #:**	
Sampler Name:	Lara Weinheimer/Noel Carmona	**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	BTEX	DRO, GRO									
H15114-1	SB #1 @ 20'		1			✓					✓		7/2/08	08:50	✓										
-2	MW #1 @ 15'		1			✓					✓		7/2/08	10:06	✓										
-3	MW #1 @ 30'		1			✓					✓		7/2/08	10:29	✓	✓	✓								
-4	MW #2 @ 20'		1			✓					✓		7/2/08	12:24	✓										
-5	MW #3 @ 15'		1			✓					✓		7/2/08	01:35	✓										
-6	SB #2 @ 15'		1			✓					✓		7/2/08	02:37	✓										
-7	SB #3 @ 5'		1			✓					✓		7/2/08	03:00	✓	✓	✓								
-8	SB #3 @ 10'		1			✓					✓		7/2/08	03:03	✓	✓	✓								
-9	SB #4 @ 5'		1			✓					✓		7/2/08	03:34	✓	✓	✓								
-10	SB #4 @ 10'		1			✓					✓		7/2/08	03:37	✓	✓	✓								

Relinquished By:	**Date:** 7-7-08	**Received By:**	**Phone Result:** ☐ Yes ☑ No **Add'l Phone #:**
L. Weinheimer	**Time:** 7:50		**Fax Result:** ☐ Yes ☑ No **Add'l Fax #:**
Relinquished By:	**Date:**	**Received By:**	**REMARKS:** email results
	Time:		Hconder@riceswd.com; jpurvis@riceswd.com; Lweinheimer@rice.swd.com

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

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

CHECKED BY: (Initials) MCAB

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

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 A-12 leak		**State:** **Zip:**
Project Location:	EME A-12 leak		**Phone #:**
Sampler Name:	Lara Weinheimer/Noel Carmona		**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	BTEX	DRO, GRO									
H15114-11	SB #4 @ 15'		1			✓					✓		7/2/08	03:40	✓	✓	✓								

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

Relinquished By: L. Weinheimer	**Date:** 7-7-08 **Time:** 3:50	**Received By:**	
Relinquished By:	**Date:** **Time:**	**Received By:**	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	**Sample Condition** Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	**CHECKED BY: (Initials)**	

Phone Result:	☐ Yes	☑ No	**Add'l Phone #:**
Fax Result:	☐ Yes	☑ No	**Add'l Fax #:**

REMARKS:

email results

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

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

CARDINAL LABORATORIES

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

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

Receiving Date: 03/03/10
Reporting Date: 04/19/10*
Project Number: NOT GIVEN
Project Name: EME A-12 LEAK
Project Location: T20S-R36E-SEC12 A ~ LEA CO., N.M.

Sampling Date: 02/26/10
Sample Type: WATER
Sample Condition: COOL & INTACT
Sample Received By: JH
Analyzed By: HM

LAB NO.	SAMPLE ID	Cl^- (mg/L)	SO_4 (mg/L)	TDS (mg/L)
Analysis Date:		03/04/10	03/03/10	03/03/10
H19367-1	MONITOR WELL #1	9,000	1,700	17,200
H19367-2	MONITOR WELL #2	8,000	1,660	15,400
H19367-3	MONITOR WELL #3	8,200	1,650	16,100
Quality Control		510	43.0	NR
True Value QC		500	40.0	NR
% Recovery		102	108	NR
Relative Percent Difference		< 0.1	7.7	1.6
METHOD: Standard Methods, EPA		4500-Cl B	375.4	160.1

Not accredited for Chloride, Sulfate and TDS.
*REVISED REPORT

Chemist

04/19/10
Date

H19367 RICE

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: 03/03/10
Reporting Date: 04/19/10*
Project Number: NOT GIVEN
Project Name: EME A-12 LEAK*
Project Location: T20S-R36E-SEC12 A~ LEA CO., NM

Sampling Date: 02/26/10
Sample Type: WATER
Sample Condition: COOL & INTACT
Sample Received By: JH
Analyzed By: ZL

LAB NUMBE SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE	03/08/10	03/08/10	03/08/10	03/08/10
H19367-1 MONITOR WELL #1	<0.001	<0.001	<0.001	<0.003
H19367-2 MONITOR WELL #2	<0.001	<0.001	<0.001	<0.003
H19367-3 MONITOR WELL #3	<0.001	<0.001	<0.001	<0.003
Quality Control	0.050	0.047	0.045	0.129
True Value QC	0.050	0.050	0.050	0.150
% Recovery	100	94.0	90.0	86.0
Relative Percent Difference	2.0	2.1	2.2	<1.0

METHOD: EPA SW-846 8021B

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

Chemist

04/19/10
Date

H19367 WR & RCE

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

Cardinal Laboratories, Inc.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LAB Order ID # _____

Company Name: RICE Operating Company	BILL TO Company: RICE Operating Company PO#
Project Manager: Hack Conder	Address: (Street, City, Zip) 122 W Taylor Street ~ Hobbs, New Mexico 88240
Address: (Street, City, Zip) 122 W Taylor Street ~ Hobbs, New Mexico 88240	Phone#: (575) 393-9174 Fax#: (575)397-1471
Phone #: (575) 393-9174	Fax #: (575)397-1471
Project #:	Project Name: EME A-12 Leak
Project Location: T20S-R36E-Sec12 A ~ Lea County - New Mexico	Sampler Signature: Rozanne Johnson (575)631-9310 rozanne@valornet.com

LAB # (LAB USE ONLY)	FIELD CODE	(G)rab or (C)omp	# CONTAINERS	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCL (2 40ml VOA)	HNO_3	$NaHSO_4$	H_2SO_4	ICE (1-1Liter HDPE)	NONE	SAMPLING: DATE (2010)	TIME
H9367-1	Monitor Well #1	G	3	X				2				1		2-26	10:50
-2	Monitor Well #2	G	3	X				2				1		2-26	7:55
-3	Monitor Well #3	G	3	X				2				1		2-26	8:40

ANALYSIS REQUEST
(Circle or Specify Method No.)

MTBE 8021B/602	BTEX 80213/602	TPH 418.1/TX1005 / TX1005 Extended (C35)	PAH 8270C	Total Metals Ag As Ba Cd Cr Pb Se Hg 6010B/200.7	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	TCLP Volatiles	TCLP Semi Volatiles	TCLP Pesticides	RCI	GC/MS Vol. 8260B/624	GC/MS Semi. Vol. 8270C/625	PCB's 8082/608	Pesticides 8081A/608	BOD, TSS, pH	Moisture Content	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	Sulfates	Total Dissolved Solids	Chlorides	Turn Around Time ~ 24 Hours
	X																	X	X	X	
	X																	X	X	X	
	X																	X	X	X	

Relinquished by: Rozanne Johnson Date: 3-3-2010 Time: 11:55

Received by: Date: Time:

Relinquished by: Date: Time:

Received By: (Laboratory Staff) Jodi Henson 3/3/10 11:56

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

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

CHECKED BY: (Initials)

Phone Results: ☐ Yes ☐ No

Fax Results: ☐ Yes ☐ No Additional Fax Number:

REMARKS:

Email Results to hconder@riceswd.com
lweinheimer@riceswd.com
kjones@riceswd.com
rozanne@valornet.com

#26

Gil Van Deventer

From: "Gil Van Deventer" <gil@trident-environmental.com>
"Hansen, Edward J., EMNRD" <edwardj.hansen@state.nm.us>
Cc: "Haskell Conder" <hconder@riceswd.com>; "Katie Jones" <kjones@riceswd.com>
Sent: Friday, May 07, 2010 11:38 AM
Attach: EME A-12 CAP.pdf
Subject: Corrective Action Plan for the EME A-12 Line Leak Site (1R0463)

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

Subject: Corrective Action Plan

Site Name: EME A-12 Line Leak Site

NMOCD Case No.: 1R0463

Site Agent: RICE Operating Company

Site Location: T20S-R36E-Section 12, Unit Letter A, Lea County, New Mexico

Mr. Hansen:

Attached is the *Corrective Action Plan* for the EME A-12 Line Leak Site (1R0463). One complete hard copy and one copy on compact disk will be sent to you via USPS Certified Mail (# 7010 0290 0003 1264 9109) today. If you have any questions please contact Hack Conder at 575-393-9174.

Thank you,
Gil

Gilbert J. Van Deventer, PG, REM
Trident Environmental
P. O. Box 7624, Midland TX 79708
Work/Mobile: 432-638-8740
Fax: 413-403-9968
Home: 432-682-0727