1R - 428-75

REPORTS

DATE:

June 23, 2009

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266.0745

June 23, 2009

Mr. Brad Jones
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: **Hobbs SWD System Junction E-33-2 Site: T-18-S, R-38-E, Section 33, Unit E**
NMOCD CASE #: 1R428-75
Termination Request

Dear Mr. Jones:

On behalf of Rice Operating Company (ROC), R.T. Hicks Consultants, Ltd. is submitting this termination request for the Hobbs Junction E-33-2 regulatory file. The investigation demonstrated that neither chloride nor hydrocarbons are present in the vadose zone in quantities that represent a threat to ground water quality.

Background
The Hobbs SWD Junction E-33-2 is located west of the city of Hobbs at T-18-S, R-38-E, Section 33, in Unit E, and chloride concentrations above background levels were found in soil at the site during junction box abandonment excavations that were conducted in December of 2002. The NMOCD-approved Investigation Characterization Plan (ICP), dated April 4, 2008, is provided as Attachment A to this letter. The ICP includes background information and a site vicinity map for this and six other nearby ROC sites.

Field Program
As a part of the approved ICP, ROC installed and sampled nine 10- to 12-foot deep backhoe trenches on July 15 and 16, 2008 to delineate the vertical and horizontal extent of chloride and hydrocarbons in the soil. The data from the center of the excavation is not believed reliable because it is considered to be caving material from the December 2002 excavation at the same location. Attachment B presents a summary map prepared by ROC that includes results of the field chloride analyses and hydrocarbon screening data as well as a laboratory report for the soil samples used to verify the ROC field data. The results of this initial assessment indicate that the highest chloride concentrations (>1,200 mg/kg by field titrations) are present at four to twelve feet below the surface and at a distance of up to 20 feet south (down slope) of the original junction box. Laboratory results demonstrate that the soil samples taken from the deepest point of each excavation contain from 144 to 1,200 mg/kg chloride. The horizontal extent of the chloride-impacted soil is approximately 1,600 ft^2.

The maximum hydrocarbon concentration identified by field screening (16.8 ppm) was located eleven feet below the center of the original excavation. Although this sample is not considered an accurate representation of the depth

from which it was taken, it is still useful for verifying the maximum hydrocarbon concentration. An analysis of BTEX performed on this sample indicated that the compound concentrations did not exceed the laboratory detection limits; therefore, no further hydrocarbon-impacted soil investigations were performed. It is assumed that regulated hydrocarbons are not present in soil at concentrations that represent a threat to fresh water, human health, or the environment.

Hicks Consultants supervised a deep soil sampling program to complete the assessment of chloride-impacted soil. On October 23, 2008, soil boring No. 1 (SB-1) was drilled approximately 13 feet south of the original junction box in order to delineate the vertical extent of the release in the area of greatest impact. SB-2 was drilled 30 feet to the south of the excavation in an effort to verify the horizontal extent of the release. Plate 1 shows the location of the soil borings relative to the excavation and sampling trenches. Soil samples were collected and field screened by ROC for chloride concentrations.

Attachment C provides a soil lithology log including the field chloride screening data. Attachment D provides the laboratory report and chain of custody for verification of field data.

Results

Data from SB-1 indicate that the chloride concentrations in the soil greater than 250 mg/kg are present from near surface to a depth of 15 feet below ground surface (bgs). Concentrations greater than 1,000 mg/kg are present within a silt and caliche formation from 6-10 feet bgs. Geologically, the rocks located below the near-surface caliche and above the unconsolidated sand consist of interbedded silt and quartzite which is capable of preventing the saturated flow of chloride-impacted water from the junction box area. Data from SB-2 show a chloride concentration above 1,000 mg/kg at 10 feet bgs. The quartzite layer encountered at approximately 21 feet bgs in SB-1 was encountered at 20 feet bgs in SB-2. Lab data from the bottom sample in both borings confirmed a chloride concentration below 250 mg/kg.

Simulation Modeling

We used the AMIGO tool (HYDRUS-1D model) to simulate the potential future impact to ground water due to non-saturated chloride transport through the vadose zone. The input to the model employed field data from the site, nearby locations, and conservative input data for parameters that were not measured at or near the site. The results of the simulation indicate that the ground water below the site will not exceed chloride concentrations of 91 mg/L (below WQCC standards) if no further corrective actions are taken. Attachment E provides a list of the specific parameters used in the simulation at the E-33-2 site.

Re-Vegetation
Attachment F presents documentation of seeding the site with native plant seeds. On April 28, 2009, ROC prepared the surface and seeded the site with 1.25 lbs. of Lea county Mix, 1.0 lbs. Blue Grama and 4.0 lbs. Heavy Recleaned Race Horse Oats.

Recommendations
Based on the soil boring information, we conclude that this site is in compliance with the mandates of Part 29 such that the remaining chloride-impacted soil does not endanger public health or the environment. We recommend termination of the regulatory file.

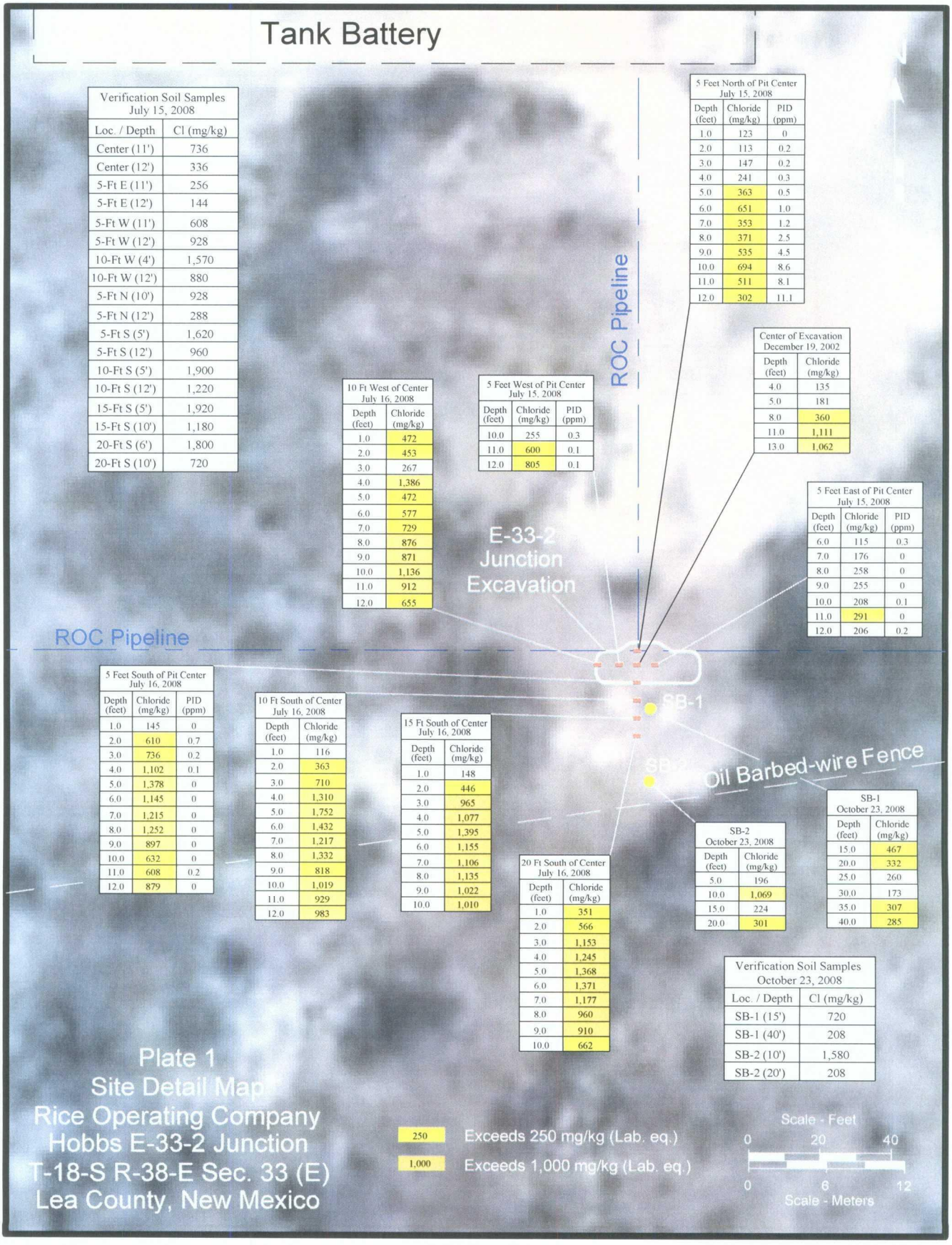
ROC is the service provider (agent) for the Hobbs Salt Water Disposal System and has no ownership of any portion of pipeline, well or facility. The Hobbs SWD System is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

Please contact Hack Conder of ROC at 575-393-9174 if you have any questions concerning this submission. Thank you for your time and consideration.

Sincerely,
R.T Hicks Consultants, Ltd.

Dale T Littlejohn
Geologist

Copy: Hack Conder, ROC
NMOCD Hobbs
Edward J. Hansen, NMOCD Santa Fe



Verification Soil Samples July 15, 2008	
Loc. / Depth	Cl (mg/kg)
Center (11')	736
Center (12')	336
5-Ft E (11')	256
5-Ft E (12')	144
5-Ft W (11')	608
5-Ft W (12')	928
10-Ft W (4')	1,570
10-Ft W (12')	880
5-Ft N (10')	928
5-Ft N (12')	288
5-Ft S (5')	1,620
5-Ft S (12')	960
10-Ft S (5')	1,900
10-Ft S (12')	1,220
15-Ft S (5')	1,920
15-Ft S (10')	1,180
20-Ft S (6')	1,800
20-Ft S (10')	720

5 Feet North of Pit Center July 15, 2008		
Depth (feet)	Chloride (mg/kg)	PID (ppm)
1.0	123	0
2.0	113	0.2
3.0	147	0.2
4.0	241	0.3
5.0	363	0.5
6.0	651	1.0
7.0	353	1.2
8.0	371	2.5
9.0	535	4.5
10.0	694	8.6
11.0	511	8.1
12.0	302	11.1

Center of Excavation December 19, 2002	
Depth (feet)	Chloride (mg/kg)
4.0	135
5.0	181
8.0	360
11.0	1,111
13.0	1,062

10 Ft West of Center July 16, 2008	
Depth (feet)	Chloride (mg/kg)
1.0	472
2.0	453
3.0	267
4.0	1,386
5.0	472
6.0	577
7.0	729
8.0	876
9.0	871
10.0	1,136
11.0	912
12.0	655

5 Feet West of Pit Center July 15, 2008		
Depth (feet)	Chloride (mg/kg)	PID (ppm)
10.0	255	0.3
11.0	600	0.1
12.0	805	0.1

5 Feet East of Pit Center July 15, 2008		
Depth (feet)	Chloride (mg/kg)	PID (ppm)
6.0	115	0.3
7.0	176	0
8.0	258	0
9.0	255	0
10.0	208	0.1
11.0	291	0
12.0	206	0.2

5 Feet South of Pit Center July 16, 2008		
Depth (feet)	Chloride (mg/kg)	PID (ppm)
1.0	145	0
2.0	610	0.7
3.0	736	0.2
4.0	1,102	0.1
5.0	1,378	0
6.0	1,145	0
7.0	1,215	0
8.0	1,252	0
9.0	897	0
10.0	632	0
11.0	608	0.2
12.0	879	0

10 Ft South of Center July 16, 2008	
Depth (feet)	Chloride (mg/kg)
1.0	116
2.0	363
3.0	710
4.0	1,310
5.0	1,752
6.0	1,432
7.0	1,217
8.0	1,332
9.0	818
10.0	1,019
11.0	929
12.0	983

15 Ft South of Center July 16, 2008	
Depth (feet)	Chloride (mg/kg)
1.0	148
2.0	446
3.0	965
4.0	1,077
5.0	1,395
6.0	1,155
7.0	1,106
8.0	1,135
9.0	1,022
10.0	1,010

20 Ft South of Center July 16, 2008	
Depth (feet)	Chloride (mg/kg)
1.0	351
2.0	566
3.0	1,153
4.0	1,245
5.0	1,368
6.0	1,371
7.0	1,177
8.0	960
9.0	910
10.0	662

SB-2 October 23, 2008	
Depth (feet)	Chloride (mg/kg)
5.0	196
10.0	1,069
15.0	224
20.0	301

SB-1 October 23, 2008	
Depth (feet)	Chloride (mg/kg)
15.0	467
20.0	332
25.0	260
30.0	173
35.0	307
40.0	285

Verification Soil Samples October 23, 2008	
Loc. / Depth	Cl (mg/kg)
SB-1 (15')	720
SB-1 (40')	208
SB-2 (10')	1,580
SB-2 (20')	208

ATTACHMENT A
Investigation Characterization Plan

R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

April 4, 2008

Mr. Edward Hansen
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

RE: Investigation & Characterization Plan
Hobbs Salt Water Disposal System: A-6 Vent, E-29 Vent, Jct. E-33-2, Jct L-30, K-29 EOL, Jct. O-29-1 Vent, P-29 Vent
T18S, R38E, Sections 29, 30, 33 and T19S, R38E Section 6

Dear Mr. Hansen:

On behalf of Rice Operating Company (ROC), R.T. Hicks Consultants, Ltd. is pleased to submit this Investigation & Characterization Plan (ICP) for the seven junction box and vent sites within the Hobbs Salt Water Disposal System referenced above. Plate 1 is a map showing the sites relative to major roads in the area. Plate 2 shows the sites, nearby USGS monitoring wells and a regional potentiometric surface map.

The work elements proposed to characterize these sites sufficiently to develop and appropriate corrective action plan are presented below.

1. ROC will identify and document the location of all current and historic equipment and pipelines associated with each site.
2. ROC will use a backhoe with a 12-foot vertical reach to install a series of sampling trenches in order to recover soil samples and delineate the lateral extent (and potentially the vertical extent) of impacted soil.
3. If characterization by the backhoe is insufficient to define the extent and magnitude of past releases, ROC and Hicks Consultants will use a drilling rig to install one soil boring at the center of the source area to delineate the vertical extent of chloride in the soil.
4. Soil samples employed for delineation will be obtained from regular intervals below ground surface.
5. Representative soil samples will be sent to a laboratory to allow for verification of the field results.
6. General soil texture descriptions will be provided for each sample trench or boring.
7. The criteria to delineate the extent of impact during trenching as well as in a soil boring is 5 point chloride decline vs. depth, or:
   a. After three consecutive samples demonstrate <250 ppm chloride using field analyses and <100ppm total hydrocarbon vapors using the

headspace method (see attached ROC Quality Procedure in Appendix A), or

b. After five consecutive samples show a decreasing trend of chloride and hydrocarbons and the last sample shows chloride < 250 ppm and total hydrocarbon vapors <100 ppm (Appendix A).
c. Soil boring to capillary fringe should neither (a) or (b) apply

8. If the boring penetrates the capillary fringe, a monitoring well will be completed with a 2 or 4" diameter 25 feet down gradient from the source for use during possible corrective actions. Plate 2 presents a potentiometric surface map for the site area.
9. If field analysis of hydrocarbon vapors and observations of staining show that hydrocarbon impact is unlikely at the site or below 20-feet, collection of samples from cuttings may be substituted for split spoon sampling (chloride only).

The ROC trench characterization will be employed to identify the lateral extent of chloride at each site, if possible. If trenching does not fully characterize the lateral extent of chloride at each site, boreholes will be advanced 20 feet beyond the furthest trenches where the soil data has an average chloride concentration greater than 1,000 mg/kg. The total depth of borings installed to characterize lateral extent shall be 20 feet below ground surface with soil samples for delineation taken at 5 foot intervals.

Rice Operating Company (ROC) is the service provider (agent) for the Hobbs Saltwater Disposal System and has no ownership of any portion of pipeline, well, or facility. A consortium of oil producers who own the Hobbs System (System Partners) provide all operating capital on a percentage ownership/usage basis. Major projects require System Partner authorization for expenditures (AFE) approval and work begins as funds are received. We will implement the work outlined herein after NMOCD approval and subsequent authorization from the System Partners. The Hobbs SWD system is in abandonment.

For all environmental projects, ROC will choose a path forward that:

1. Protects public health.
2. Provides the greatest net environmental benefit.
3. Complies with NMOCD Rules.
4. Is supported by good science.

The last criteria employed when evaluating any proposed remedy or investigative work is confirming that there is a reasonable relationship between the benefits created by the proposed remedy or assessment and the economic and social costs.

Each site shall have three submissions or a combination of:

1. This Investigation and Characterization Plan (ICP), which is a proposal for data gathering, and site characterization and assessment (this submission).
2. Upon evaluation of the data and results from the ICP, a recommended remedy will be submitted in a Corrective Action Plan (CAP).
3. Finally, after implementing the remedy, a closure report with final documentation will be submitted.

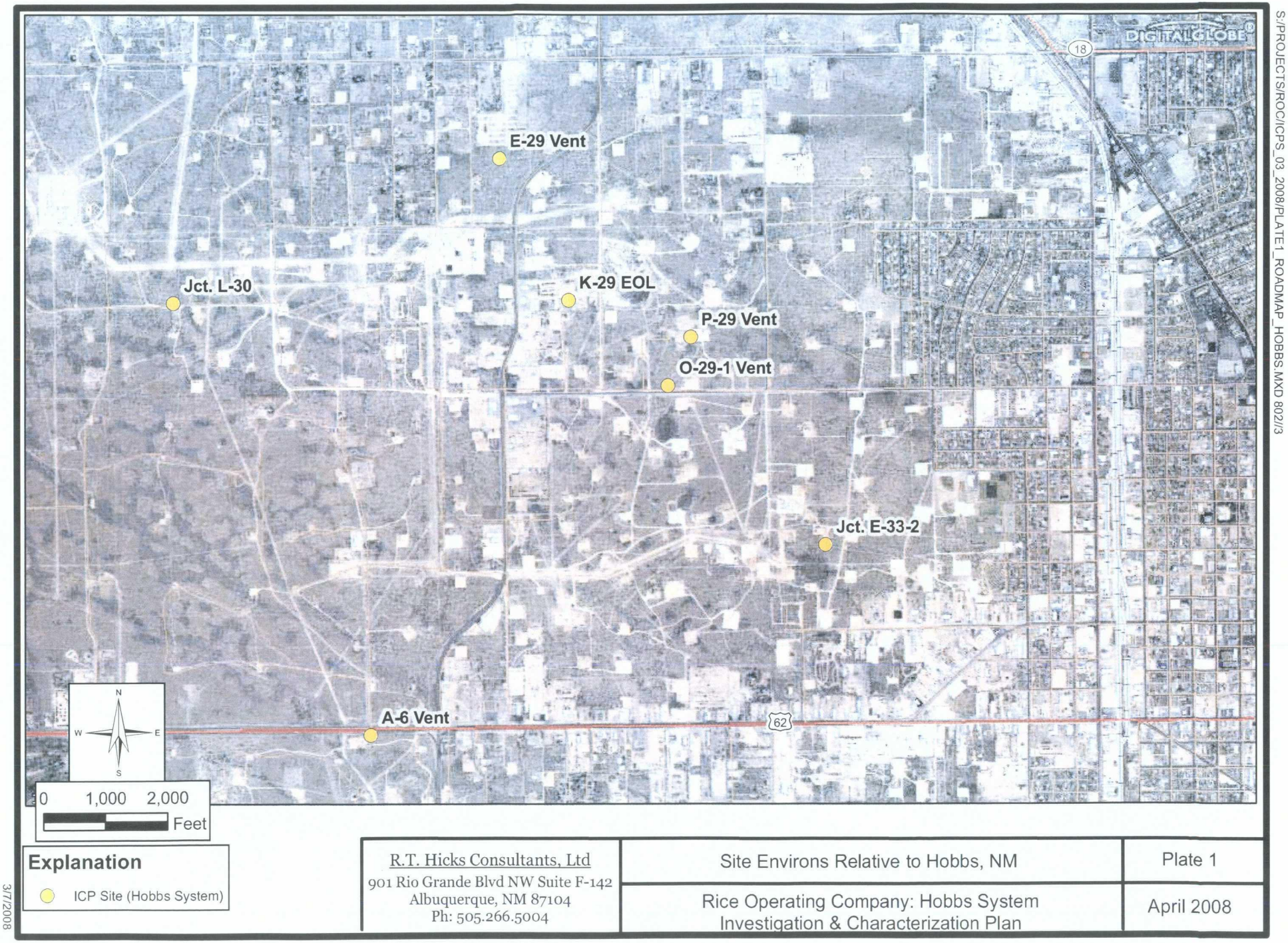
Following the site characterization described above, a Corrective Action Plan with the data and analysis supportive of a procedure for site closure will be submitted. Quality Procedures for characterization work are provided in Appendix A.

If you have any questions or comments regarding this ICP, please contact Kristin Pope of Rice Operating Company as she has reviewed and approved this submission.

Sincerely,
R.T. Hicks Consultants, Ltd.

Randall T. Hicks
Principal

Copy: Rice Operating Company



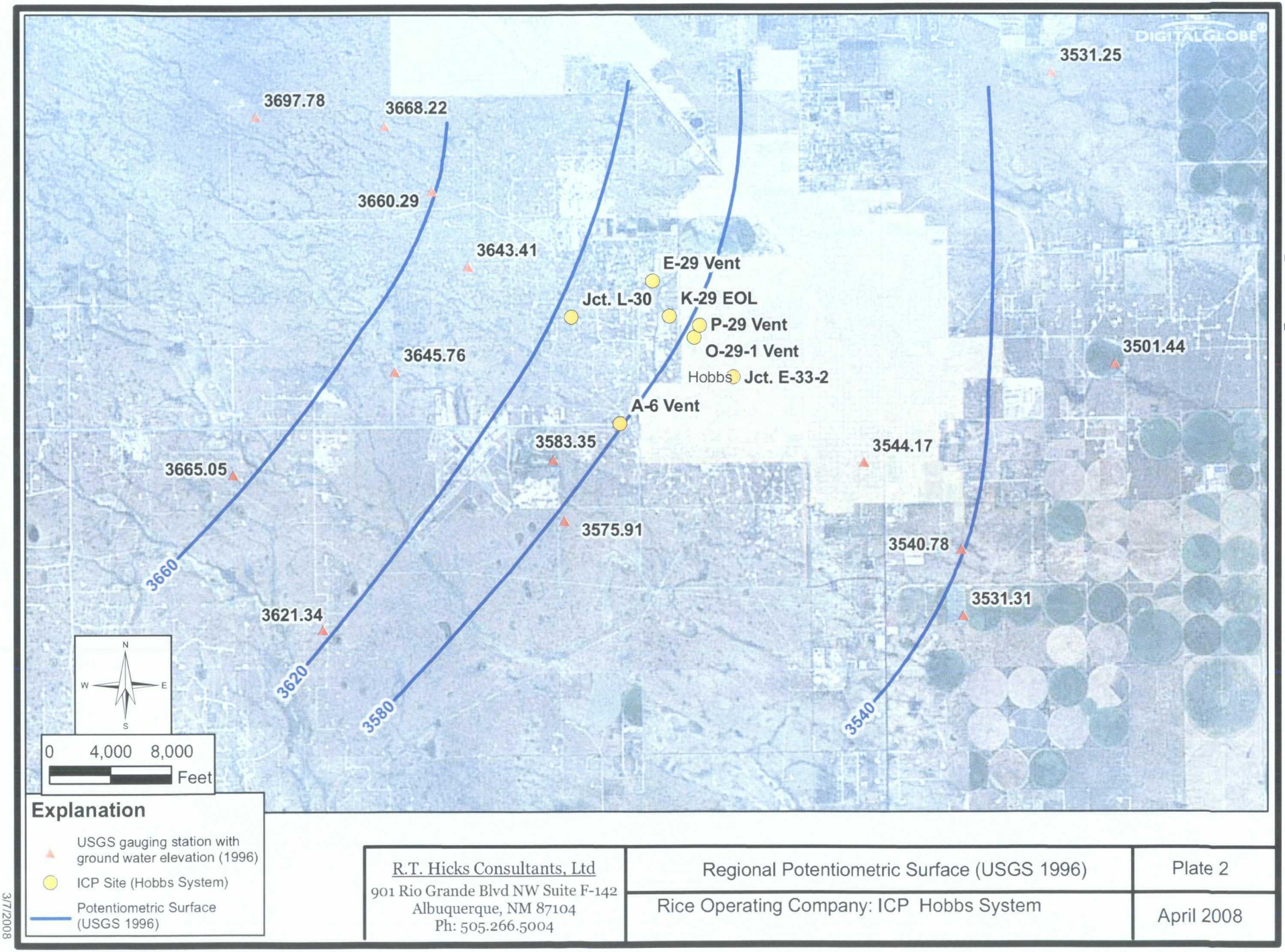
Explanation

ICP Site (Hobbs System)

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Site Environs Relative to Hobbs, NM	Plate 1
	Rice Operating Company: Hobbs System Investigation & Characterization Plan	April 2008

S:/PROJECTS/ROC/ICPS_03_2008/PLATE1_ROADMAP_HOBBS.MXD 802/3

3/7/2008



R.T. Hicks Consultants, Ltd
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Albuquerque, NM 87104
Ph: 505.266.5004

Regional Potentiometric Surface (USGS 1996)

Rice Operating Company: ICP Hobbs System

Plate 2

April 2008

S:/PROJECTS/ROC/ICPS_03_2008/PLATE2_POTENTIO_HOBBS.MXD 802/3

3/7/2008

R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

Appendix A

Rice Operating Company

QUALITY PROCEDURE - 03
Sampling and Testing Protocol - Chloride Titration Using .282 Normal Silver Nitrate Solution

1.0 Purpose
This procedure is to be used to determine the concentration of chloride in soil.

2.0 Scope
This procedure is to be used as the standard field measurement for soil chloride concentrations.

3.0 Sample Collection and Preparation

3.1 Collect at least 80 grams of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. Ifnecessary, prepare a composite san1ple for soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.2 The soil sample(s) shall be immediately inserted into a one-quart or large polyethylene freezer bag. Care should be taken to insure that no cross-contamination occurs between the soil sample and the collection tools or sample processing equipment.

3.3 The sealed sample bag should be massaged to break up any clods.

4.0 Sample Preparation

4.1 Tare a clean glass vial having a minimum 40 ml capacity. Add at least 10 grams of the soil sample and record the weight.

4.2 Add at least 10 grams of reverse osmosis water to the soil sample and shake for 20 seconds.

4.3 Allow the sample to set for a period of 5 minutes or until the separation of soil and water.

4.4 Carefully pour the free liquid extract from the sample through a paper filter into a clean plastic cup if necessary.

5.0 Titration Procedure

5.1 Using a graduated pipette, remove 10 m1 extract and dispense into a clean plastic cup.

5.2 Add 2-3 drops potassium chromate (K_2CrO_4) to mixture.

5.3 If the sample contains any sulfides (hydrogen or iron sulfides are common to oilfield soil samples) add 2-3 drops of hydrogen peroxide (H_2O_2) to mixture.

5.4 Using a 10 ml pipette, carefully add 0.282 normal silver nitrate (one drop at a time) to the sample while constantly agitating it. Stop adding silver nitrate when the solution begins to change from yellow to red. Be consistent with endpoint recognition.

5.5 Record the ml of silver nitrate used.

6.0 Calculation
To obtain the chloride concentration, insert measured data into the following formula:

$$\frac{0.282 \times 35{,}450 \times \text{ml } AgNO_3}{\text{ml water extract}} \times \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

Using Step 5.0, determine the chloride concentration of the RO water used to mix with the soil sample. Record this concentration and subtract it from the formula results to find the net chloride in the soil sample.

Record all results on the delineation form.

Appendix A
ICP- A-6 Vent, E-29 Vent, Jct. E-33-2, Jct L-30, K-29 EOL, Jct. O-29-1 Vent, P-29 Vent

Rice Operating Company

QUALITY PROCEDURE -07
Sampling and Testing Protocol for VOC in Soil

1.0 Purpose
This procedure is to be used to determine the concentrations of Volatile Organic Compounds in soils.

2.0 Scope
This procedure is to be used as the standard field measurement for soil VOC concentrations. It is not to be used as a substitute for full spectrographic speciation of organic compounds.

3.0 Procedure

3.1 Sample Collection and Preparation

3.1.1 Collect at least 500 g. of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample of soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.1.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag and sealed. When sealed, the bag should contain a nearly equal space between the soil sample and trapped air. Record the sample name and the time that the sample was collected on the Field Analytical Report Form.

3.1.3 The sealed samples shall be allowed to set for a minimum of five minutes at a temperature of between 10-15 Celsius, (59-77° F). The sample temperatures may be adjusted by cooling the sample in ice, or by heating the sample within a generally controlled environment such as the inside of a vehicle. The samples should not be placed directly on heated surfaces or placed in direct heat sources such as lamps or heater vents.

3.1.4 The sealed sample bag should be massaged to break up any clods, and to provide the soil sample with as much exposed surface area as practically possible.

3.2 Sampling Procedure

3.2.1 The instrument to be used in conducting VOC concentration testing shall be an Environmental Instruments 13471 OVM / Datalogger or a similar pro-type instrument. (Device will be identified on VOC Field
Test Report Form.) Prior to use, the instrument shall be zeroed-out in accordance with the appropriate maintenance and calibration procedure outlined in the instrument operation manual. The PID device will be calibrated each day it's used.

3.2.2 Carefully open one end of the collection bag and insert the probe tip into the bag taking care that the probe tip not touch the soil sample or the sidewalls of the bag.

3.2.3 Set the instrument to retain the highest result reading value. Record the reading onto the Field Test Report Form.

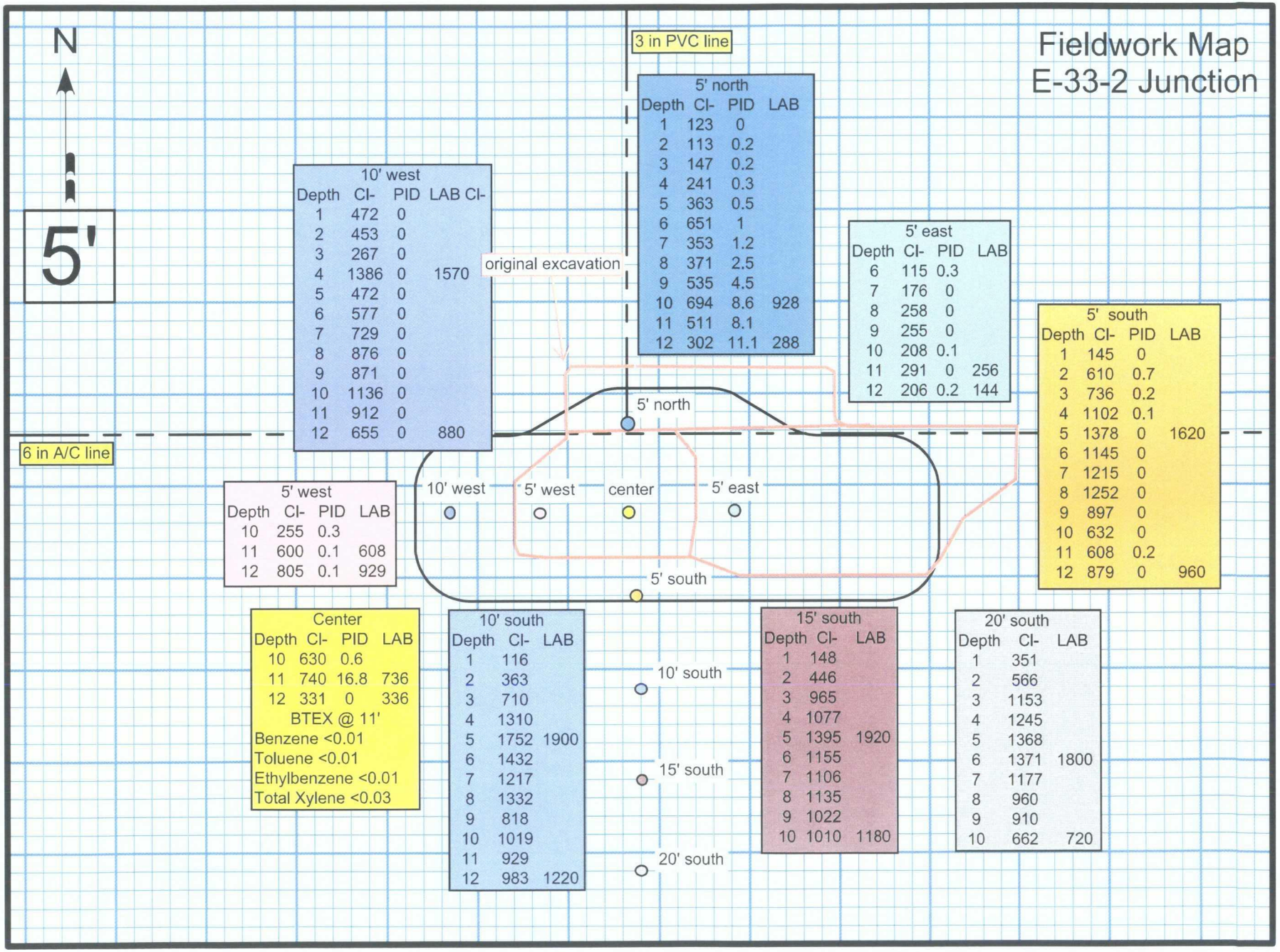
3.2.4 If the instrument provides a reading exceeding 100 ppm, proceed to conduct BTEX Speciation in accordance with QP-O2 and QP-O6. If the reading is 100 ppm or less, NMOCD BTEX guideline has been met and no further testing fur BTEX is necessary. File the Field Test Report Form in the project file.

4.0 Clean-up

After testing, the soil samples shall be returned to the sampling location, and the bags collected for off-site disposal, IN NO CASE SHALL THE SAME BAG BE USED TWICE. EACH SAMPLE CONTAINER MUST BE DISCARDED AFTER EACH USE.

ATTACHMENT B

Summary of Trench Assessment
Conducted by ROC in July 2008


Fieldwork Map
E-33-2 Junction
N
5'
3 in PVC line
6 in A/C line
original excavation
10' west
Depth Cl- PID LAB Cl-
1 472 0
2 453 0
3 267 0
4 1386 0 1570
5 472 0
6 577 0
7 729 0
8 876 0
9 871 0
10 1136 0
11 912 0
12 655 0 880
5' north
Depth Cl- PID LAB
1 123 0
2 113 0.2
3 147 0.2
4 241 0.3
5 363 0.5
6 651 1
7 353 1.2
8 371 2.5
9 535 4.5
10 694 8.6 928
11 511 8.1
12 302 11.1 288
5' east
Depth Cl- PID LAB
6 115 0.3
7 176 0
8 258 0
9 255 0
10 208 0.1
11 291 0 256
12 206 0.2 144
5' south
Depth Cl- PID LAB
1 145 0
2 610 0.7
3 736 0.2
4 1102 0.1
5 1378 0 1620
6 1145 0
7 1215 0
8 1252 0
9 897 0
10 632 0
11 608 0.2
12 879 0 960
5' west
Depth Cl- PID LAB
10 255 0.3
11 600 0.1 608
12 805 0.1 929
10' west
5' west
center
5' east
5' north
5' south
Center
Depth Cl- PID LAB
10 630 0.6
11 740 16.8 736
12 331 0 336
BTEX @ 11'
Benzene <0.01
Toluene <0.01
Ethylbenzene <0.01
Total Xylene <0.03
10' south
Depth Cl- LAB
1 116
2 363
3 710
4 1310
5 1752 1900
6 1432
7 1217
8 1332
9 818
10 1019
11 929
12 983 1220
10' south
15' south
20' south
15' south
Depth Cl- LAB
1 148
2 446
3 965
4 1077
5 1395 1920
6 1155
7 1106
8 1135
9 1022
10 1010 1180
20' south
Depth Cl- LAB
1 351
2 566
3 1153
4 1245
5 1368
6 1371 1800
7 1177
8 960
9 910
10 662 720

ATTACHMENT C

Lithology Log from Soil Boring (Vertical Delineation)
Conducted by ROC and RTH in October 2008

RT Hicks Consultants Ltd
P O Box 7624
Midland, Texas 79708
(432) 528-3878
(432) 689-4578 (fax)

LITHOLOGIC LOG (Soil Boring)

SOIL BORING NO.: SB-1
SITE ID: Hobbs SWD E-33-2
SURFACE ELEVATION: 3,636 (USGS)
CONTRACTOR: Harrison Cooper
DRILLING METHOD: Air-Rotary
INSTALLATION DATE: 10/23/08
WELL PLACEMENT: 13' S of Junction Box
BORING LAT /LONG: Lat. 32° 42' 15.1" North, Long. 103° 09' 32.2"

TOTAL DEPTH: 40 Feet
CLIENT: Rice Operating Co.
COUNTY: Lea County
STATE: New Mexico
LOCATION: T18-S R38-E 33 (E)
FIELD REP: D. Littlejohn
FILE NAME: \Hobbs SWD\E-33-2

No Surface Completion: Bentonite Hole Plug; No Casing Installed

Lithology	Sample Type	% Rec	Cl (mg/kg)	PID (ppm)	Depth (feet)	Lithologic Description: LITHOLOGY, Color, grain size, sorting, rounding, special features
	Excav.	--	148	--		SILT Grayish brown with some caliche.
	Excav.	--	446	--		
	Excav.	--	965	--		
	Excav.	--	1,077	--		
	Excav.	--	1,395	--	5	
	Excav.	--	1,155	--		
	Excav.	--	1,106	--		
	Excav.	--	1,135	--		
	Excav.	--	1,022	--		
	Excav.	--	1,010	--	10	CALICHE Grayish white, hard with some interbedded silt.
	Cutting	--	467	--	15	
	Cutting	--	332	--	20	SILT Light brown, with some caliche.
	Cutting	--	260	--	25	QUARTZITE Brown, fine crystilline, hard, interbedded with light brown silt.
	Cutting	--	173	--	30	SILT Light brown, with some interbedded sandstone and quartzite.
	Cutting	--	307	--	35	
	Cutting	--	285	--	40	SAND Brown, fine grain, well sorted, sub-rounded.

Laboratory Results (mg/kg) (July and September 2008)

Depth	Chloride
5 Ft	1,920
10 Ft	1,180
15 Ft	720
40 Ft	208

TD = 40 Feet

RT Hicks Consultants Ltd
P O Box 7624
Midland, Texas 79708
(432) 528-3878
(432) 689-4578 (fax)

LITHOLOGIC LOG (Soil Boring)

SOIL BORING NO.: SB-2 | TOTAL DEPTH: 21 Feet
SITE ID: Hobbs SWD E-33-2 | CLIENT: Rice Operating Co.
SURFACE ELEVATION: 3,635 (USGS) | COUNTY: Lea County
CONTRACTOR: Harrison Cooper | STATE: New Mexico
DRILLING METHOD: Air-Rotary | LOCATION: T18-S R38-E 33 (E)
INSTALLATION DATE: 10/23/08 | FIELD REP: D. Littlejohn
WELL PLACEMENT: 30' S of excavation | FILE NAME: \Hobbs SWD\E-33-2
BORING LAT /LONG: Lat. 32° 42' 14.6" North, Long. 103° 09' 31.5"

No Surface Completion	Lithology	Sample Data: Type	% Rec	Cl (mg/kg)	PID (ppm)	Depth (feet)	Lithologic Description: LITHOLOGY, Color, grain size, sorting, rounding, special features
Bentonite Hole Plug / No Casing Installed							SILT Reddish brown.
		Cutting	--	196	--	5	CALICHE & SILT Grayish white caliche and light brown silt.
							SILT Light orange-brown with some interbedded caliche.
		Cutting	--	1,069	--	10	CALICHE Grayish white, with some interbedded grayish brown silt.
		Cutting	--	224	--	15	
		Cutting	--	301	--	20	SILT Light brown, with some caliche.
							QUARTZITE Brown, fine crystilline, hard, interbedded with light brown silt.

TD = 21 Feet

Laboratory Results (mg/kg) (September 2008)	
Depth	Chloride
10 Ft	1,580
20 Ft	208

ATTACHMENT D

Laboratory 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: 07/18/08
Reporting Date: 07/25/08
Project Number: NOT GIVEN
Project Name: HOBBS E-33-2
Project Location: NOT GIVEN
Lab Number: H15197-1
Sample ID: CENTER 11'

Analysis Date: 07/24/08
Sampling Date: 07/15/08
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: CK

VOLATILES (mg/kg)	Sample Result H15197-1	Method Blank	QC	%Recov.	True Value QC
Benzene	<0.010	<0.002	0.048	96.0	0.050
Toluene	<0.010	<0.002	0.044	88.0	0.050
Ethylbenzene	<0.010	<0.002	0.043	86.0	0.050
m,p-Xylene	<0.020	<0.004	0.090	90.0	0.100
o-Xylene	<0.010	<0.002	0.042	84.0	0.050

	% RECOVERY
Dibromofluoromethane	143
Toluene-d8	114
Bromofluorobenzene	97.6

METHODS: EPA SW-846 8260

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

Chemist

07/25/08
Date

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: 07/18/08
Reporting Date: 07/25/08
Project Number: NOT GIVEN
Project Name: HOBBS E-33-2
Project Location: NOT GIVEN
Lab Number: H15197-1
Sample ID: CENTER 11'

Analysis Date: 07/24/08
Sampling Date: 07/15/08
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: CK

VOLATILES (mg/kg)	Sample Result H15197-1	Method Blank	QC	%Recov.	True Value QC
Naphthalene	<0.025	<0.005	0.118	118	0.100

	% RECOVERY
Dibromofluoromethane	143
Toluene-d8	114
Bromofluorobenzene	97.6

METHODS: EPA SW-846 8260

Chemist

07/25/08
Date

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: 07/18/08
Reporting Date: 07/21/08
Project Number: NOT GIVEN
Project Name: HOBBS E-33-2
Project Location: NOT GIVEN

Analysis Date: 07/21/08
Sampling Date: 07/15/08
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: KS

LAB NUMBER	SAMPLE ID	Cl^- (mg/kg)
H15197-1	CENTER 11'	736
H15197-2	CENTER 12'	336
H15197-3	5' EAST 11'	256
H15197-4	5' EAST 12'	144
H15197-5	5' WEST 11'	608
H15197-6	5' WEST 12'	928
H15197-7	5' SOUTH 5'	1,620
H15197-8	5' SOUTH 12'	960
H15197-9	5' NORTH 10'	928
H15197-10	5' NORTH 12'	288
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

07/23/08
Date

H15197 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 W. TAYLOR	**Company:**	
City:	HOBBS	**State:** NM **Zip:** 88240	**Attn:**
Phone #:	575-393-9175	**Fax #:** 575-397-1471	**Address:**
Project #:		**Project Owner:**	**City:**
Project Name:	HOBBS E-33-2		**State:** **Zip:**
Project Location:			**Phone #:**
Sampler Name:	TONY GRIECO		**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	NAPTHALENE
H15197-1	CENTER 11'	G	1			✓					✓		7/15/08	8:30	✓	✓	✓
-2	CENTER 12'	G	1			✓					✓		7/15/08	8:42	✓		
-3	5' EAST 11'	G	1			✓					✓		7/15/08	9:20	✓		
-4	5' EAST 12'	G	1			✓					✓		7/15/08	9:33	✓		
-5	5' WEST 11'	G	1			✓					✓		7/15/08	9:50	✓		
-6	5' WEST 12'	G	1			✓					✓		7/15/08	10:05	✓		
-7	5' SOUTH 5'	G	1			✓					✓		7/15/08	1:15	✓		
-8	5' SOUTH 12'	G	1			✓					✓		7/15/08	2:15	✓		
-9	5' NORTH 10'	G	1			✓					✓		7/15/08	2:45	✓		
-10	5' NORTH 12'	G	1			✓					✓		7/15/08	3:35	✓		

Relinquished By:	**Date:** 7/15/08 **Time:** 3:30	**Received By:**		**Phone Result:** ☐ Yes ☐ No	**Add'l Phone #:**
				Fax Result: ☐ Yes ☐ No	**Add'l Fax #:**
Relinquished By:	**Date:** 7-8-08 **Time:** 3:30	**Received By:**		**REMARKS:**	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:		**Sample Condition** Cool ☐ Yes ☐ No Intact ☐ Yes ☐ No	**CHECKED BY: (Initials)**	EMAIL RESULTS TO: jpurvis@riceswd.com lweinheimer@riceswd.com hconder@riceswd.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: 07/18/08
Reporting Date: 07/21/08
Project Number: NOT GIVEN
Project Name: HOBBS E-33-2
Project Location: NOT GIVEN

Analysis Date: 07/21/08
Sampling Date: 07/16/08 & 07/17/08
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: KS

LAB NUMBER	SAMPLE ID	Cl^- (mg/kg)
H15198-1	10' SOUTH 5'	1,900
H15198-2	10' SOUTH 12'	1,220
H15198-3	15' SOUTH 5'	1,920
H15198-4	15' SOUTH 10'	1,180
H15198-5	20' SOUTH 6'	1,800
H15198-6	20' SOUTH 10'	720
H15198-7	10' WEST 4'	1,570
H15198-8	10' WEST 12'	880
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

07-22-08
Date

H15198 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 W. TAYLOR	Company:	
City:	HOBBS State: NM Zip: 88240	Attn:	
Phone #:	575-393-9175 Fax #: 575-397-1471	Address:	
Project #:	Project Owner:	City:	
Project Name:	HOBBS E-33-2	State: Zip:	
Project Location:		Phone #:	
Sampler Name:	TONY GRIECO	Fax #:	

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRESERV: ACID/BASE:	ICE / COOL	OTHER :	SAMPLING DATE	TIME	ANALYSIS REQUEST: CHLORIDE
H15998-1	10' SOUTH 5'	G	1			✓					✓		7/16/08	8:50	✓
-2	10' SOUTH 12'	G	1			✓					✓		7/16/08	10:15	✓
-3	15' SOUTH 5'	G	1			✓					✓		7/16/08	11:14	✓
-4	15' SOUTH 10'	G	1			✓					✓		7/16/08	1:10	✓
-5	20' SOUTH 6'	G	1			✓					✓		7/16/08	2:18	✓
-6	20' SOUTH 10'	G	1			✓					✓		7/16/08	2:51	✓
-7	10' WEST 4'	G	1			✓					✓		7/16/08	3:24	✓
-8	10' WEST 12'	G	1			✓					✓		7/17/08	9:05	✓

Relinquished By:	Date: 7-18-08	Received By:	
	Time: 4:15		
Relinquished By:	Date:	Received By:	
	Time:		

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

Sample Condition		CHECKED BY: (Initials)
Cool	Intact	
☑ Yes ☐ No	☑ Yes ☐ No	

Phone Result: ☐ Yes ☐ No Add'l Phone #:
Fax Result: ☐ Yes ☐ No Add'l Fax #:
REMARKS:

EMAIL RESULTS TO:
jpurvis@riceswd.com
lweinheimer@riceswd.com
hconder@riceswd.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: 10/23/08
Reporting Date: 10/24/08
Project Number: NOT GIVEN
Project Name: HOBBS JCT. E-33-2
Project Location: HOBBS JCT. E-33-2

Analysis Date: 10/24/08
Sampling Date: 10/23/08
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: HM

LAB NO.	SAMPLE ID	Cl^- (mg/kg)
H16182-1	SB #2 @ 10'	1,580
H16182-2	SB #1 @ 15'	720
H16182-3	SB #1 @ 40'	208
H16182-4	SB #2 @ 20'	208
Quality Control		500
True Value QC		500
% Recovery		100
Relative Percent Difference		2.0

METHOD: Standard Methods	4500-ClˉB

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

Chemist

10-27-08
Date

H16182 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: Hobbs jct E-33-2	State: Zip:
Project Location: Hobbs jct E-33-2	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
H16182-1	SB #2 @ 10'	G	1			✓					✓		10-23-08	12:52	✓
-2	SB #1 @ 15'	G	1			✓					✓		10-23-08	12:08	✓
-3	SB #1 @ 40'	G	1			✓					✓		10-23-08	12:19	✓
-4	SB #2 @ 20'	G	1			✓					✓		10-23-08	12:56	✓

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: 10-23-08 Time: 4117	Received By:	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

ATTACHMENT E

AMIGO Vadose Zone Screening Model Site Simulation Results

R. T. HICKS CONSULTANTS, LTD. ATTACHMENT E

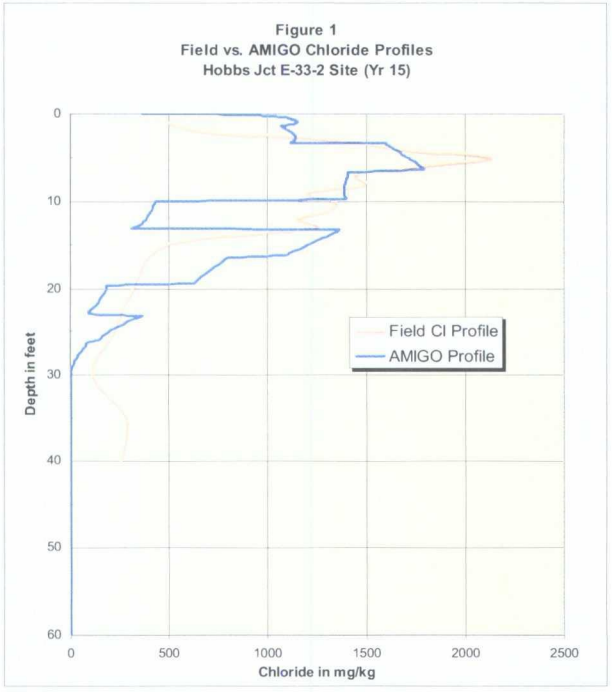
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266.0745

Input and Results of the AMIGO Simulation Performed at the Rice Operating Company Hobbs E-33-2 Site

The specific parameters used in the simulation at the E-33-2 site are presented in the table below.

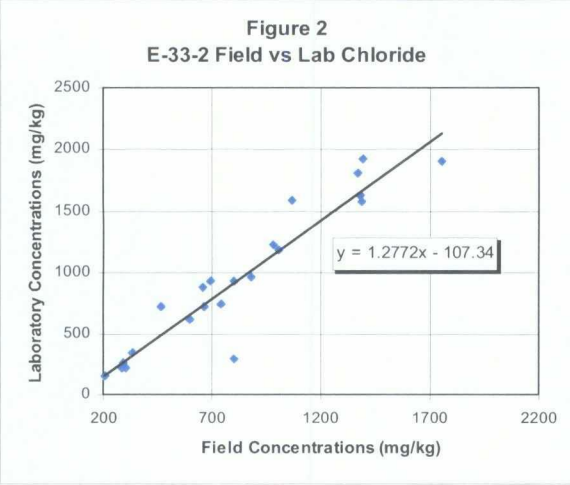
Table 1 - Parameters Employed in AMIGO tool for E-33-2

Model Parameter	Value	Source of Value
Climate (non-smoothed)	1946 - 1992	Pearl, NM Station
Input for distant or hypothetical well (ft)	NA	Not Required
Background Chloride in Aquifer (mg/L)	80	NM WAIDS, PTTC
Aquifer Porosity (unitless)	0.25	Sample Description
Groundwater Table Depth (ft)	60	Site Borings, F-29 Site
Aquifer Thickness (ft)	30	Professional Judgment Conservative Assumption
Slope of Water Table	0.0035	2007 ROC Water Table Data Section 29
Hydraulic Conductivity (ft/d)	80	Musharrafieh 1999
Average Chloride Load (kg/m²)	12.0	Calc. from Site Data using Mass-load
Max length of spill in dir. of GW flow (ft)	40	Site Data
Plant Uptake Trigger (%)	1.0	Prof. Judgment Conservative Assumption
Surface Layer	Caliche	Site Data
Soil Profile (sandy clay:caliche:sand ratio)	1:1:1	Boring Log



Musharrafieh and Chudnoff (1999) predict that the saturated thickness of the aquifer beneath the site will remain at least 50 feet until the year 2040. Data from similar sites show that, unlike hydrocarbons, chloride that enters the upper portion of an aquifer will become distributed throughout the entire saturated thickness within a relatively short travel distance from the source. The arbitrary selection of a 10-foot thick mixing zone (used as a default value for hydrocarbon sites) is unrealistic where the constituent of concern is chloride. In our opinion, a simulation using the 30-foot thickness of the aquifer is conservative for this site.

The AMIGO tool assumes a single surface spill is the initial source of chloride that is observed in the subsurface. In order to ensure an accurate calibration of the model to the historic spill which occurred at the Hobbs E-33-2 site, we compared each year of the simulated profile with the field data until a conservative match was achieved. A favorable but conservative match to the field



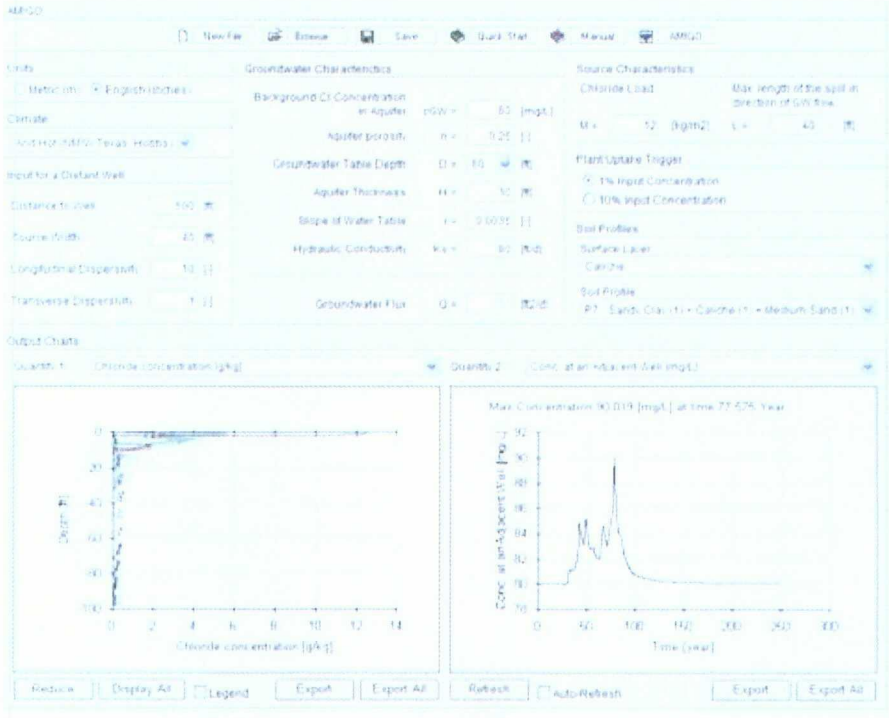
data was achieved using the year 15 simulation and the calculated chloride mass-load for the worst-case area of the release as demonstrated in Figure 1.

The red curve on Figure 1 is the profile using the maximum field chloride analysis for each depth sampled from the trenches (1 to 13 feet) and SB-1 (below 13 feet). The field (titration) concentrations were then adjusted based on a correction determined by comparing the field chloride concentrations with the duplicate laboratory sample concentrations as shown in Figure 2.

The blue curve in Figure 1 is the predicted chloride profile at year 15 of the simulation using a chloride load of 12.0 kg/m^2 (calculated from site data). Because the AMIGO simulation used the highest chloride area to represent the entire site it is considered a conservative input parameter.

The results of the simulation are shown below on the AMIGO ground water output chart which has been copied directly from the model results screen. It indicates that chloride concentrations in the ground water below the site will not exceed 90.02 mg/L (below WQCC standards) if no further corrective actions are taken. We believe the simulated concentration in ground water is a "worst-case" prediction because of the conservative input parameters used in the model.

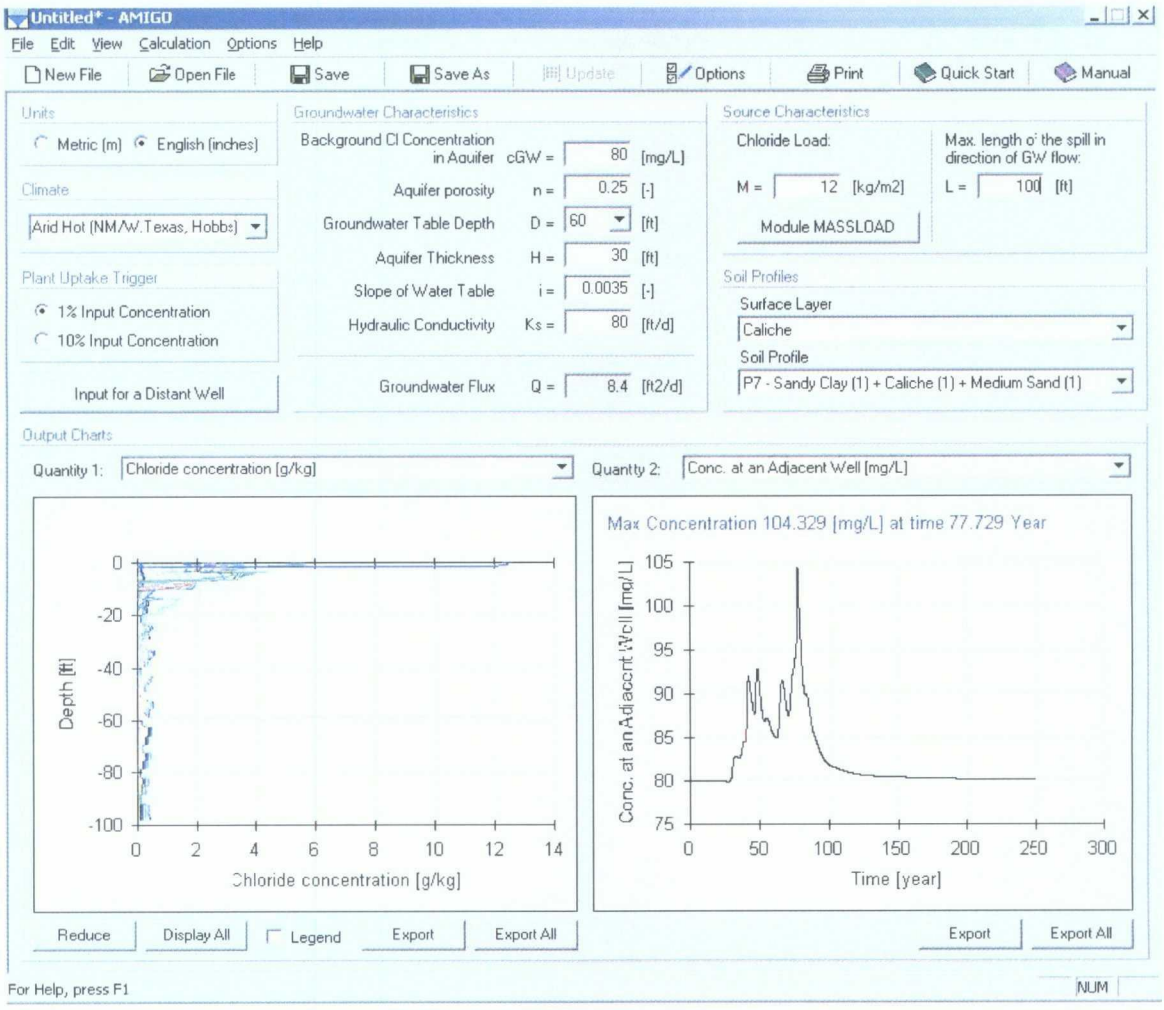
Figure 3
AMIGO ground water output chart for E-33-2 Vent Site



Based on site data, the max length of the spill in the direction of ground water flow is 40 feet. However, based on evidence of possible historic releases from other sites in the area, we conducted the same simulation with a max length of the spill in the direction of ground water changed to 100 feet. The results of the simulation are shown below on the AMIGO

ground water output chart copied from the model results screen. It indicates that chloride concentrations in the ground water below the site will not exceed 104.3 mg/L.

Figure 4
AMIGO ground water output chart for E-33-2 Vent Site with 100 ft spill length



Simulations in AMIGO with these site specific parameters predict that even with a max spill in direction of ground water flow of 700 feet, chloride concentrations in ground water would not exceed WQCC standards (reaching 210.7 mg/L).

ATTACHMENT F

Photo-Documentation of Site Re-Seeding Activities

HOBBS JCT E-33-2

(1.25 lbs Lea County Mix + 1.0 lbs Blue Grama + 4.0 lbs Oats)

4/28/09: SEEDING AND DISKING IN SEED

4/28/09: DISKING IN SEED

HOBBS JCT E-33-2

4/28/09: FINISHED SITE

Hansen, Edward J., EMNRD

From: Hack Conder [hconder@riceswd.com]
Sent: Monday, September 21, 2009 3:00 PM
To: Hansen, Edward J., EMNRD
Subject: FW: P&A and Soil Bores Backfilled.

Ed,

Our company policy for plugging and abandoning of wells and soil bores for ROC for the past several years is as follows, all monitor wells and soil bores were plugged with bentonite chips and water to the surface.

Thanks

Hack Conder
Enviromental Manager
Rice Operating Company
575-393-9174
fax 575-397-1471