

1R - 428-56

REPORTS

DATE:

4-13-11

R. T. HICKS CONSULTANTS, LTD.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

April 13, 2011

Mr. Edward J. Hansen

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

Via E-mail

RE: Termination Request
Hobbs Jct. F-31-2, NMOCD Case #1R428-56
Township 18S, Range 38E, Section 31, Unit F

Mr. Hansen,

R.T. Hicks Consultants, Ltd. is submitting this Termination Request on behalf of Rice Operating Company (ROC) for the above-referenced site. The investigation demonstrated that neither chloride nor hydrocarbons are present in the vadose zone in quantities that represent a threat to fresh water or the environment and recommended re-vegetation. Excavation, liner installation, surface restoration and re-vegetation efforts have been completed at the site.

Background

The Hobbs Jct. F-31-2 site is located west of the city of Hobbs at Township 18S, Range 38E, Section 31, Unit F. In 2002 a 5-foot deep excavation at this site identified hydrocarbon-impacted soil. The Investigation & Characterization Plan (ICP) was dated January 20, 2010 and approved by the NMOCD on January 21, 2010. The ICP includes background information and a site vicinity map for this and three other nearby ROC sites and is attached as a supporting document in the Corrective Action Plan.

As part of the approved ICP, ROC planned to install and sample at least five 12-foot deep backhoe trenches. When near surface rock proved too hard to penetrate with a backhoe, a deep soil sampling program to delineate the extent and magnitude of media impact was implemented in April 2010. Our November 2, 2010 Corrective Action Plan (CAP) described the results of that field program and presented recommended actions. ROC submitted an addendum to the CAP that revised the recommended actions on December 14, 2010. The CAP and addendum were approved by the NMOCD on December 23, 2010. The CAP, addendum, and NMOCD approval are included in Attachment A.

The CAP recommended corrective action for the site included:

- Installing a 30 x 22.5 foot synthetic liner 10 feet below ground surface.
- Backfill above this liner would contain soil with no more than 1,000 mg/kg chloride and a field screening less than 100 using a PID.
- Installing a second 30 x 45 foot synthetic liner 4 feet below ground surface. (See the figure accompanying the Addendum in Attachment A)
- Backfill above this liner would contain soil with no more than 500 mg/kg chloride and a field screening less than 100 using a PID.
- Re-vegetation and basic surface restoration

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April 13, 2011

Page 2

Corrective Action

Liner installation, backfilling and surface restoration efforts were conducted at the site between December 27, 2010 and February 17, 2011. ROC work included:

- Excavating the site to 30 x 45 x 5 feet below ground surface (bgs) and, on the north end, an area 30 x 22.5 x 10 feet bgs,
- Hauling 672 yards of soil to an NMOCD approved landfill,
- Installing synthetic liners as proposed,
- Importing 696 yards of soil, hay and sand,
- Sampling and analyzing backfill for Chloride and TPH,
- Contouring the site to the surrounding area,
- Installing silt net fencing around the area,
- Adding soil amendments and seeding the area with native grasses

Attachment B includes notes and photos documenting the excavation, liner installations, surface restoration and re-vegetation efforts at the site, as well as the laboratory results of sampling of backfill.

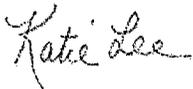
Recommendations

Previous investigations demonstrate that residual chloride and hydrocarbons in the vadose zone will not with reasonable probability contaminate ground water or surface water in excess of the standards in Subsections B and C of 19.15.30.9 NMAC through leaching, percolation or other transport mechanisms, or as the water table fluctuates. The installation of synthetic liners and re-vegetation of the site meets the mandate of NMOCD Rules for protection of surface water and the environment. ROC's documented actions will foster re-vegetation at the site. Re-vegetation of the ground surface will limit infiltration of precipitation and the subsequent migration of constituents of concern to ground water. We recommend termination of the regulatory file.

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 that own the Hobbs System (System Parties) provides all operating capital on a percentage ownership/usage basis. The Hobbs SWD system is in abandonment.

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.



Katie Lee
Project Scientist

Copy: Hack Conder, Rice Operating Company

Attachment A

Corrective Action Plan & Addendum

R.T. Hicks Consultants, Ltd.

901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Katie Lee

From: Hansen, Edward J., EMNRD [edwardj.hansen@state.nm.us]
Sent: Thursday, December 23, 2010 9:24 AM
To: Hack Conder
Cc: Leking, Geoffrey R, EMNRD; Katie Jones; 'Dale Littlejohn'; Katie Lee
Subject: Corrective Action Plan (1R428-56) Approval - ROC Hobbs SWD Jct F-31-2 Site
**RE: "Corrective Action Plan"
for the Rice Operating Company's
Hobbs SWD Jct F-31-2 Site
Unit Letter F, Section 31, T18S, R38E, NMPM, Lea County, New Mexico
Corrective Action Plan (1R428-56) Approval**

Dear Mr. Conder:

The New Mexico Oil Conservation Division (OCD) has received the Corrective Action Plan for the Hobbs SWD Jct F-31-2 Site, dated November 2, 2010, and addendum (dated December 14, 2010) and has conducted a review of the Plan. The Plan indicates that Rice Operating Company (ROC) has met the requirements of 19.15.29 NMAC (Part 29; formerly, Rule 116) for a remediation plan. Therefore, the OCD hereby conditionally approves the Corrective Action Plan as proposed for above-referenced site in accordance with 19.15.29 NMAC:

ROC must submit to the OCD a final report of the corrective actions within 120 days.

Please be advised that OCD approval of this Plan does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

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

Edward J. Hansen
Hydrologist
Environmental Bureau

Katie Lee

From: Katie Jones [kjones@riceswd.com]
Sent: Tuesday, December 14, 2010 2:41 PM
To: Edward J. EMNRD Hansen
Cc: Hack Conder; Katie Lee
Subject: Hobbs Jct. F-31-2 (1R428-56) CAP Addendum
Follow Up Flag: Follow up
Flag Status: Red

Mr. Hansen:

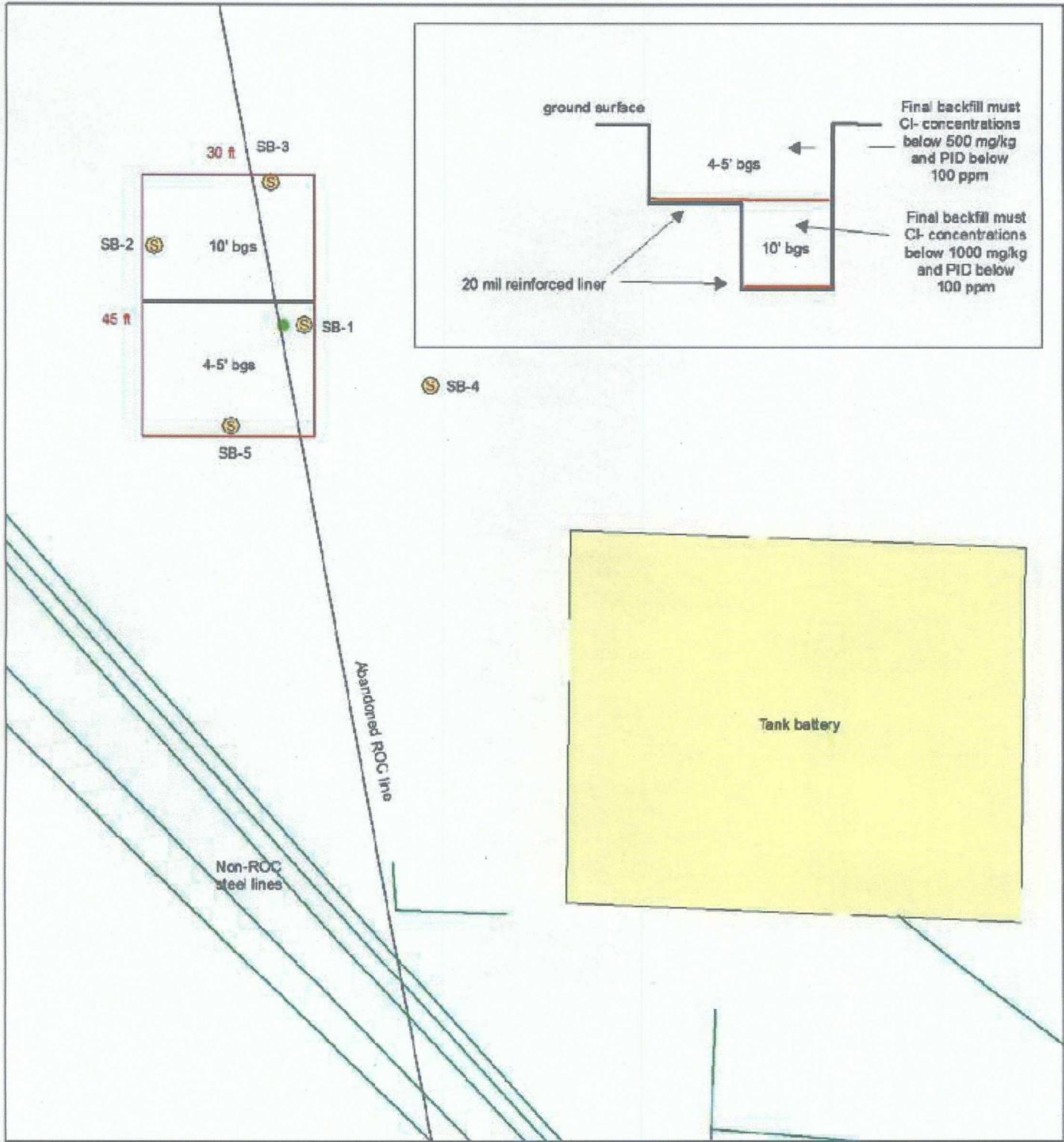
The following is an Addendum to the Hobbs Jct. F-31-2 (1R428-56) CAP submitted to the NMOCD on November 2, 2010. Page 4, section: Recommendations, paragraph 2; red lettering will be deleted from the paragraph and blue lettering should be added to the paragraph. If you need any other information, please let me or Hack Conder know.

~~“Our recommended corrective action for the site is installation of a 30 x 30 foot synthetic liner 4-5 feet below ground surface centered over the former junction box and backfilling with soil containing no more than 500 mg/kg chloride and with a field screening less than 100 using a PID.”~~ Our recommended corrective action for the site is installing double liners. First, a 30 x 22.5 foot synthetic liner 10 feet below ground surface will be installed based on the attached Figure. Backfill above this liner will contain soil with no more than 1,000 mg/kg chloride and a field screening less than 100 using a PID. Second, a 30 x 45 foot synthetic liner 4 feet below ground surface will be installed based on the attached Figure. Backfill above this liner will contain soil with no more than 500 mg/kg chloride and a field screening less than 100 using a PID. We also recommend revegetation of the ground surface to limit infiltration of precipitation and the subsequent migration of constituents of concern to ground water. A synthetic liner installed below the root zone as proposed will inhibit the downward migration of water through the subsurface, slowing movement of chloride or soluble hydrocarbons toward ground water. Plants capture water through their roots, thereby reducing the volume of water infiltrating below the root zone. This natural “infiltration barrier” also helps protect ground water. Upon documentation of installation of the liner and re-seeding of the site with an appropriate mix of native grasses we will submit a Termination Request for this site’s regulatory file.”

Thank you.

Katie Jones
Environmental Project Coordinator
RICE Operating Company

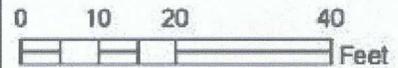
Proposed liner



Hobbs jct. F-31-2

Legals: UL/F sec. 31
T18S R38E

Case #: 1R428-56



Drawing date: 10-22-10
Drafted by: L. Weinheimer

R. T. HICKS CONSULTANTS, LTD.

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

November 2, 2010

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

**RE: Rice Operating Company, Hobbs SWD System Junction F-31-2 Site
T-18-S, R-38-E, Section 31, Unit F, Lea County, New Mexico,
NMOCD CASE #1R428-56
Correction Action Plan**

Mr. Hansen:

On behalf of Rice Operating Company (ROC), R.T. Hicks Consultants, Ltd. is submitting this Correction Action Plan for the Hobbs Junction F-31-2 site. The investigation demonstrates that residual chloride and hydrocarbons in the vadose zone will not with reasonable probability contaminate ground water or surface water, in excess of the standards in Subsections B and C of 19.15.30.9 NMAC through leaching, percolation or other transport mechanisms, or as the water table elevation fluctuates. Our recommended corrective action for the site is installation of a 30 x 30 foot synthetic liner 4-5 feet below ground surface centered over the former junction box and backfilling with soil containing no more than 500 mg/kg chloride and with a field screening less than 100 using a PID. We also recommend re-vegetation of the site. Our recommended corrective action meets the mandate of NMOCD Rules for protection of surface water and the environment.

Background

The Hobbs Junction F-31-2 is located west of the city of Hobbs, New Mexico at T-18-S, R-38-E, Section 31, in Unit F. An initial 4-foot deep excavation was installed on November 13, 2002, which identified chloride- and hydrocarbon-impacted soil. The NMOCD-approved Investigation Characterization Plan (ICP), dated January 20, 2010 (Attachment A) was prepared to address the further delineation of the site. It includes background information, a site vicinity map, and a regional ground water gradient map.

Field Programs

As a part of the approved ICP, ROC planned to install and sampled at least five 12-foot deep backhoe trenches. However, attempts to excavate the initial trench at the site verified that the near surface rock was too hard to penetrate with a backhoe.

Hicks Consultants supervised a deep soil sampling program to delineate the extent and magnitude of media impact. On April 21 and 22, 2010, five 45- to

55-foot deep soil borings were drilled near the original junction box location (SB-1) and the surrounding area (SB-2 to SB-5). ROC conducted field analysis of soil samples for chloride and volatile hydrocarbon vapors for the boring program. Most of the samples were recovered from drill cuttings because the soil was too hard to recover material with a split spoon sampler.

Plate 1 is a summary map that includes results of the field chloride analyses and hydrocarbon screening data as well as laboratory results for the soil samples used to verify the ROC field data. Attachment B provides the soil lithology logs for the soil borings, which includes the field chloride and hydrocarbon screening data and laboratory results. Attachment C provides the laboratory reports and chain of custody documents for all of the soil verification samples.

Results: Chloride

The initial ROC source area excavation, conducted in 2002, encountered a maximum chloride concentration of 319 mg/kg at 3 feet below the surface.

The soil borings were installed to delineate the depth and extent of chloride-impacted soil relative to the NMOCD guideline target level. Generally, the highest chloride concentrations were observed adjacent to the inactive pipeline (SB-1 and SB-3) at depths of 20 to 40 feet below the surface. The maximum chloride concentrations were identified in SB-1 at 20 feet below the surface (1,250 mg/kg) and in SB-3 at 35 feet below the surface (1,140 mg/kg). Concentrations decrease with depth in each of the borings but remain above target level in SB-1 (336 mg/kg). A summary of the chloride laboratory results from all of the soil borings relative to the regulatory screening guideline is provided on Table 1.

Results: Hydrocarbons

The initial ROC source area excavation, conducted in 2002, encountered visible indications of hydrocarbon-impacted soil with "slight" odors. The excavation was fenced and left open.

Field screening of hydrocarbon vapors in the soil from the soil borings identified concentrations greater than 1,000 ppm only in SB-1 near the source area. The maximum reading (1,233 ppm) was observed at 20 feet below the surface from a split spoon sample. Laboratory analysis of this sample indicated concentrations of benzene (<0.05 mg/kg), toluene (4.63 mg/kg), ethylbenzene (9.61 mg/kg), and total xylenes (47.7 mg/kg). In addition, the sample contained gas and diesel range organics which are essentially non-soluble with respect to leaching. A summary of the hydrocarbon laboratory results from all of the soil borings relative to the regulatory screening guidelines is provided on Table 1 below.

Table 1
Rice Operating Hobbs Jct. F-31-2 Site
Laboratory Data - Soil Samples

Sample Location	Depth (feet)	Sample Date	PID (ppm)	Chloride (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)
SB-1	20	4/21/10	1,233	1,250	<0.05	4.63	9.61	47.70	62.0	1,700	3,910
	25	4/21/10	720	976	0.084	1.14	2.04	13.00	16.3	479	2,850
	55	4/21/10	13	336	--	--	--	--	--	<10	389
SB-2	10	4/21/10	106	832	<0.05	0.210	0.361	2.58	3.20	<10	256
	15	4/21/10	297	432	<0.05	0.198	0.695	3.07	4.01	<50	1,890
	55	4/21/10	146	128	<0.05	<0.05	<0.05	0.378	0.53	<10	<10
SB-3	5	4/22/10	353	32	0.211	3.71	1.14	15.40	20.5	897	13,800
	35	4/22/10	222	1,140	<0.05	0.707	0.226	2.34	3.32	<50	2,150
	55	4/22/10	35	144	<0.05	0.442	0.165	2.16	2.82	<50	316
SB-4	20	4/22/10	6	288	--	--	--	--	--	<10	<10
	45	4/22/10	27	208	--	--	--	--	--	<10	412
SB-5	20	4/22/10	712	624	<0.05	0.438	1.20	8.29	10.0	362	4,350
	55	4/22/10	12	208	--	--	--	--	--	<10	81
NMOC Guideline Remediation Levels				250	10	--	--	--	50	No regulatory standards have been established	
2006 NMED Soil Com./Indus. Vapor Exposure Risk					25.8	252	128	82	--		
Screening Guidelines				Protect GW (DAF₂₀)	0.0201	21.7	20.2	2.06	--		
Site Specific GW Protective Levels (DAF ₂₉₉)					0.300	324	302	30.8	--		

Elevated concentrations of chloride, benzene, and xylenes in the soil require further evaluation to insure the protection of the underlying ground water; therefore a conservative estimate of 6,400 ft² (80 ft x 80 ft) was used in the simulation modeling evaluations.

Simulation Modeling

We used the AMIGO tool (HYDRUS-1D model) to determine if un-saturated chloride transport through the vadose zone would cause the underlying ground water to exceed 250 mg/L chloride in the future. 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.

In the absence of any corrective action by ROC, the simulation indicates that a maximum ground water chloride concentration of 170 mg/L will occur in the year 2057. Attachment D provides an explanation of the data used and results from the chloride model simulation at the site.

We used the VLEACH vadose zone model to determine if the benzene and xylenes identified during the site assessment would cause the underlying ground water to exceed the regulatory standard. The input to the model employed field data from the site, nearby locations, and conservative default values for parameters that were not measured at or near the site.

The simulation results indicate that if no further actions are taken the maximum ground water impact will occur in 240 years for benzene (0.0011 mg/L) and 700 years for xylenes (0.019 mg/L). During this time neither the benzene nor xylenes mass input to the ground water will be sufficient to cause the water concentrations below the site to exceed the New Mexico water quality standards.

VLEACH is conservative of ground water quality because the model does not take into account the natural biological degradation of the hydrocarbons. Attachment D provides an explanation of the data used and results from the simulation at the Hobbs Junction F-31-2 Vent site. A detailed description of the model and a free windows-based program download is available from the USEPA at <http://www.epa.gov/ada/csmos/models/vleach.html>.

Recommendations

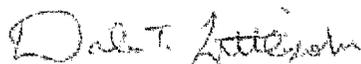
The site data that documents the residual mass of chloride and hydrocarbons in the vadose zone permit a conclusion that these constituents in the vadose zone will not with reasonable probability contaminate ground water or surface water in excess of the standards in Subsection B and C of the 19.15.30.9 NMAC through leaching, percolation or other transport mechanisms, or as the water table elevation fluctuates.

Our recommended corrective action for the site is installation of a 30 x 30 foot synthetic liner 4-5 feet below ground surface centered over the former junction box and backfilling with soil containing no more than 500 mg/kg chloride and with a field screening less than 100 using a PID. We also recommend re-vegetation of the ground surface to limit infiltration of precipitation and the subsequent migration of constituents of concern to ground water. A synthetic liner installed below the root zone as proposed will inhibit the downward migration of water through the subsurface, slowing movement of chloride or soluble hydrocarbons toward ground water. Plants capture water through their roots, thereby reducing the volume of water infiltrating below the root zone. This natural "infiltration barrier" also helps protect ground water. Upon documentation of installation of the liner and re-seeding of the site with an appropriate mix of native grasses we will submit a Termination Request for this site's 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.



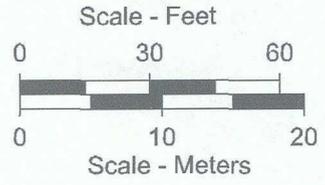
Dale T Littlejohn
Geologist

Copy: Hack Conder, ROC

SB-2 April 21, 2010		
Depth (feet)	Chloride (mg/kg)	PID (ppm) cuttings
5	225	113
10	847	106
15	489	297
20	671	81.1
25	230	9.4
30	301	5.7
35	250	33.0
40	222	181
45	250	67.5
50	176	5.9
55	209	146

Buried Pipeline

SB-3 April 22, 2010		
Depth (feet)	Chloride (mg/kg)	PID (ppm) cuttings
5	148	353
10	348	262
15	287	121
20	498	190
25	730	116
30	849	250
35	1,060	222
40	829	333
45	360	214
50	211	171
55	150	34.9



SB-4 April 22, 2010		
Depth (feet)	Chloride (mg/kg)	PID (ppm) cuttings
5	232	3.9
10	197	51.4
15	198	5.5
20	336	6.4
25	286	3.9
30	230	4.8
35	282	13.5
40	278	73.1
45	241	27.0

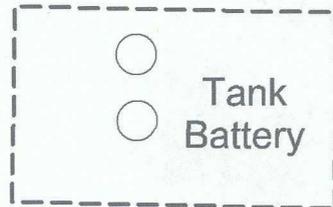


SB-5 April 22, 2010		
Depth (feet)	Chloride (mg/kg)	PID (ppm) cuttings
5	206	292
10	356	423
15	506	316
20	696	712
25	459	190
30	352	153
35	253	104
40	225	152
45	206	137
50	226	17.6
55	250	11.8

SB-1 April 21, 2010		
Depth (feet)	Chloride (mg/kg)	PID (ppm)
5*	453	201
10*	173	636
15*	475	519
20	957	1,233
25	972	720
30*	783	180
35*	893	108
40*	965	240
45	598	723
50*	328	145
55*	357	13

ROC Pipeline

F-31-2 Site

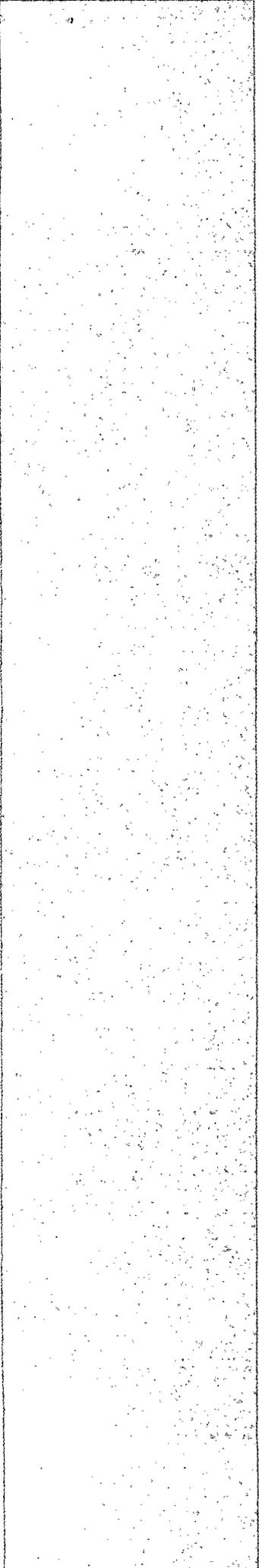


Lease Road

F-31-1 Site

Hobbs F-31-2 Laboratory Verification Results - April 21 and 22, 2010								
Location	Depth (feet)	Benzene (mg/kg)	Toluene (mg/kg)	E Benzene (mg/kg)	Xylenes (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	Chloride (mg/kg)
SB-1 * Spoon	20*	<0.05	4.63	9.61	47.7	1,700	3,910	1,250
	25*	0.084	1.14	2.04	13.0	479	2,850	976
	55	--	--	--	--	<10	389	336
SB-2	10	<0.05	0.210	0.361	2.58	<10	256	832
	15	<0.05	0.198	0.695	3.07	<50	1,890	432
	55	<0.05	<0.05	<0.05	0.378	<10	<10	128
SB-3	5	0.211	3.71	1.14	15.4	897	13,800	32
	35	<0.05	0.707	0.226	2.34	<50	2,150	1,140
	55	<0.05	0.442	0.165	2.16	<50	316	144
SB-4	20	--	--	--	--	<10	<10	288
	45	--	--	--	--	<10	412	208
SB-5	20	<0.05	0.438	1.20	8.29	362	4,350	624
	55	--	--	--	--	<10	80.8	208

Plate 1
 Soil Sample Results
 Rice Operating Company
 Hobbs F-31-2
 T-18-S, R-38-E, Sec. 31 (F)
 Lea County, New Mexico



Attachment A

Previous Submissions

R.T. Hicks Consultants, Ltd.

901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

R. T. HICKS CONSULTANTS, LTD.

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

January 20, 2010

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

**RE: Investigation & Characterization Plan
Hobbs Jct. F-31-2 NMOCD Case # 1R428-56
Township 18S, Range 38E, Section 31, Unit F**

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 Hobbs Jct. F-31-2 site. Plate 1 is a map showing the site relative to major roads in the area. Plate 2 shows the site, nearby USGS monitoring wells, and a regional potentiometric surface map.

The work elements proposed below will allow us to characterize this site and develop an appropriate corrective action plan.

1. ROC will identify and document the location of all current and historic equipment and pipelines associated with the 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 drill one soil boring at the center of the source area to delineate the vertical extent of chloride in the soil.
4. Soil samples obtained by the backhoe or drilling rig 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 chloride and PID 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, 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 <100ppm.
 - 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 considered for completion with a 2 or 4" diameter casing down gradient from

confirmed impact 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 the site, if possible. If trenching does not fully characterize the lateral extent of chloride at the 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 drilled 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 Parties) provide all operating capital on a percentage ownership/usage basis. Major projects require System Parties' 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 Parties. 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.

Following the site characterization described above, a Corrective Action Plan with the data and analysis supportive of a procedure for site file termination, or a termination request will be submitted, depending on characterization findings.

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.



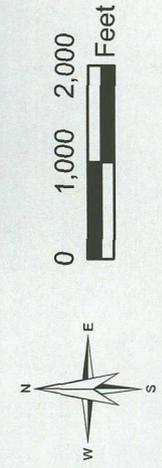
Katie Lee
Project Scientist

Copy: Hack Conder, ROC



Explanation

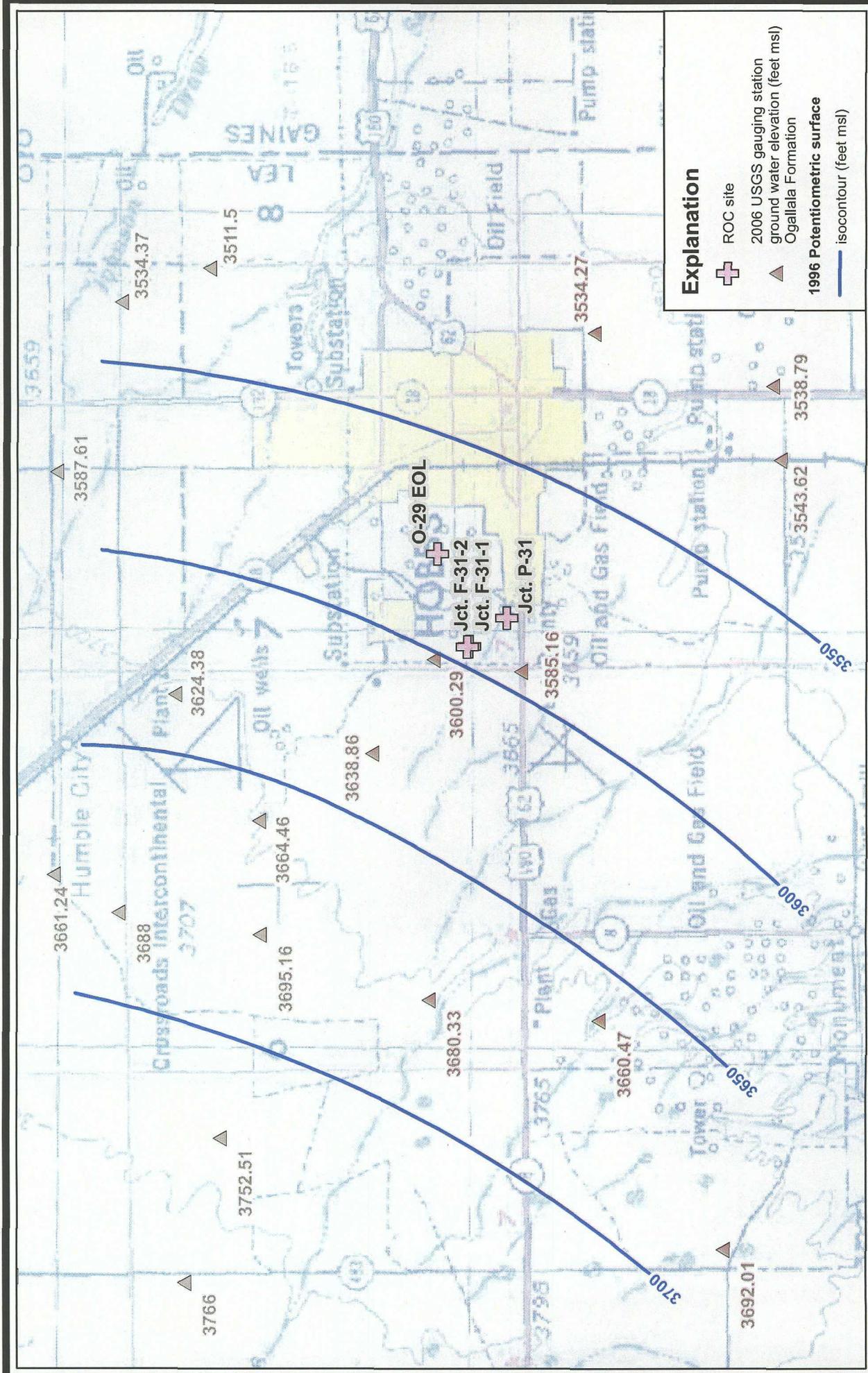
✚ ROC site



R.T. Hicks Consultants, Ltd
 901 Rio Grande Blvd NW Suite F-142
 Albuquerque, NM 87104
 Ph: 505.266.5004

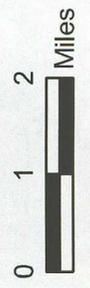
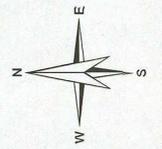
Site Map - 2005 Aerial Photo (RGIS)
 O-29 EOL, Jct. F-31-1, Jct. F-31-2, and Jct. P-31
 Rice Operating Company
 2010 Hobbs Investigation and Characterization Plan

Plate 1
 January 2010



Explanation

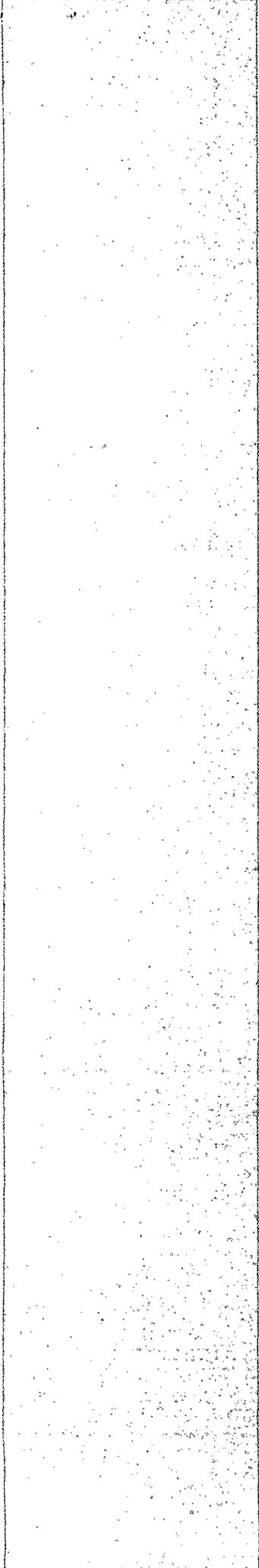
- ROC site
- 2006 USGS gauging station ground water elevation (feet msl) Ogallala Formation
- 1996 Potentiometric surface
- isocontour (feet msl)



R.T. Hicks Consultants, Ltd
 901 Rio Grande Blvd NW Suite F-142
 Albuquerque, NM 87104
 Ph: 505.266.5004

2006 Potentiometric Surface Map
 O-29 EOL, Jct. F-31-1, Jct. F-31-2, and Jct. P-31
 Rice Operating Company
 2010 Hobbs Investigation and Characterization Plan

Plate 2
 January 2010



Attachment B

Soil Lithology

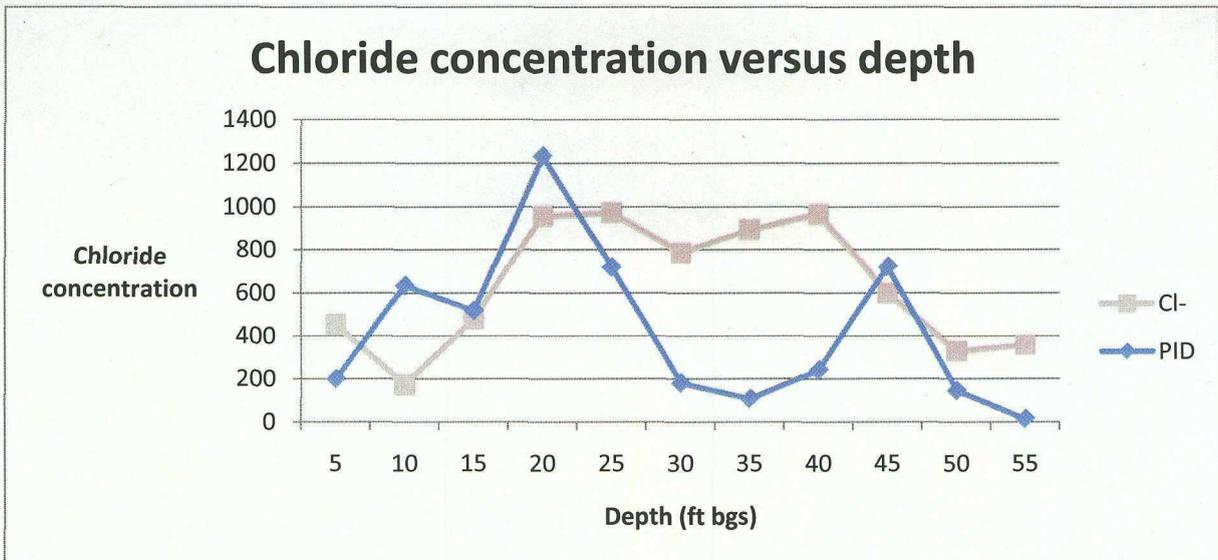
R.T. Hicks Consultants, Ltd.

901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Logger:	Dale Littlejohn		
Driller:	Harrison & Cooper, Inc. Drilling		
Consultant:	R.T. Hicks		
Drilling Method:	Air rotary		
Start Date:	4/21/2010		
End Date:	4/21/2010	Project Name: Hobbs Jct. F-31-2	Well ID: SB-1
Comments: Split spoon sampling from 20,25,45 ft. All others were from cuttings. Located at the source of the former jct. box.		Location: UL/F Sec. 31 T18S R38E	
Drafted by: Lara Weinheimer TD = 55 ft GW = 63 ft		Lat: 32°42'26.882"N County: Lea Long: 103°11'24.837" W State: NM	

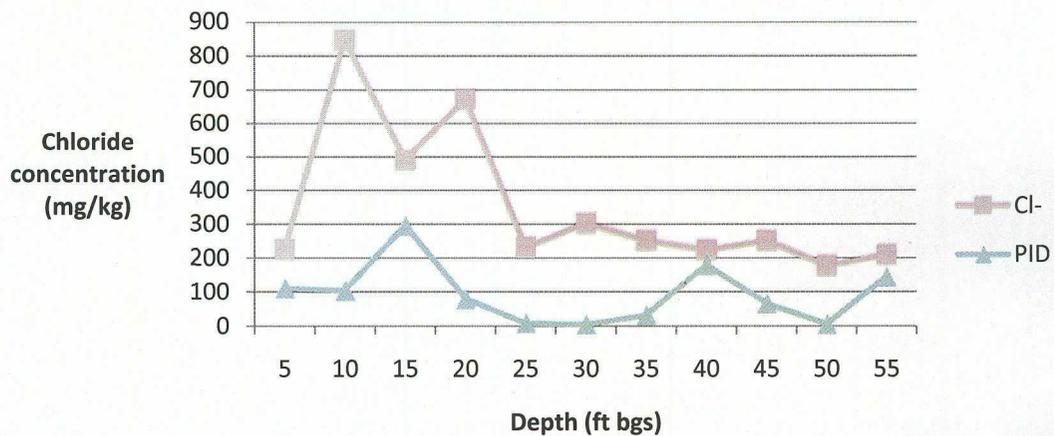
Depth (feet)	chloride field tests (ppm)	LAB	PID	Description	Lithology	Bore Construction
				0 - 1.5 SILTY CLAY dark brown (top soil)		
5	453		200.6	1.5 - 8 ft CALICHE; SILT light gray to grayish brown (hard drilling), with interbedded light brown silt, hydrocarbon odor		
10	173		636.0	8 - 14 ft CALICHE; SILT white to gray, with interbedded gray (discolored) to light brown silt, hydrocarbon odor		
15	475		519.0	14 - 18 ft SAND; CALICHE; SANDSTONE light grayish brown to light brown, very fine grained, well sorted, interbedded gray sandstone and caliche, hydrocarbon odor		
20	957		1233.0	18 - 29 ft SAND brown, medium to fine grained, well sorted, angular, hydrocarbon odor		
25	972		720.0			
30	783		179.5	29 - 32 ft SAND; QUARTZITE brown to light brown, medium grained, well sorted, angular with had interbedded quartzite, hydrocarbon odor		bentonite seal
35	893		107.5			

Depth (feet)	chloride field tests (ppm)	LAB	PID	Description	Lithology	Bore Construction
				32 - 43 ft		
40	965		240.0	SAND light brown, fine grained, well sorted, angular, hydrocarbon odor		
45	598		723.0			
				43 - 55 ft		
50	328		144.5	SAND; SANDSTONE brown to light brown, fine to medium grained, moderately sorted, sub-rounded, with interbedded cemented sandstone, hydrocarbon odor		
55	357		13.1			



Depth (feet)	chloride field tests (ppm)	LAB	PID	Description	Lithology	Bore Construction
30	301		5.7	25 - 44 ft SAND light brown, very fine grained, poorly sorted, angular	[Light brown sand pattern]	[Blue hatched bore construction]
35	250		33.0			
40	222		181.1			
45	250		67.5			
50	176		5.9	44 - 55 SAND brown, fine to medium grained, moderately sorted, sub-rounded	[Dark brown sand pattern]	[Blue hatched bore construction]
55	209		145.6			

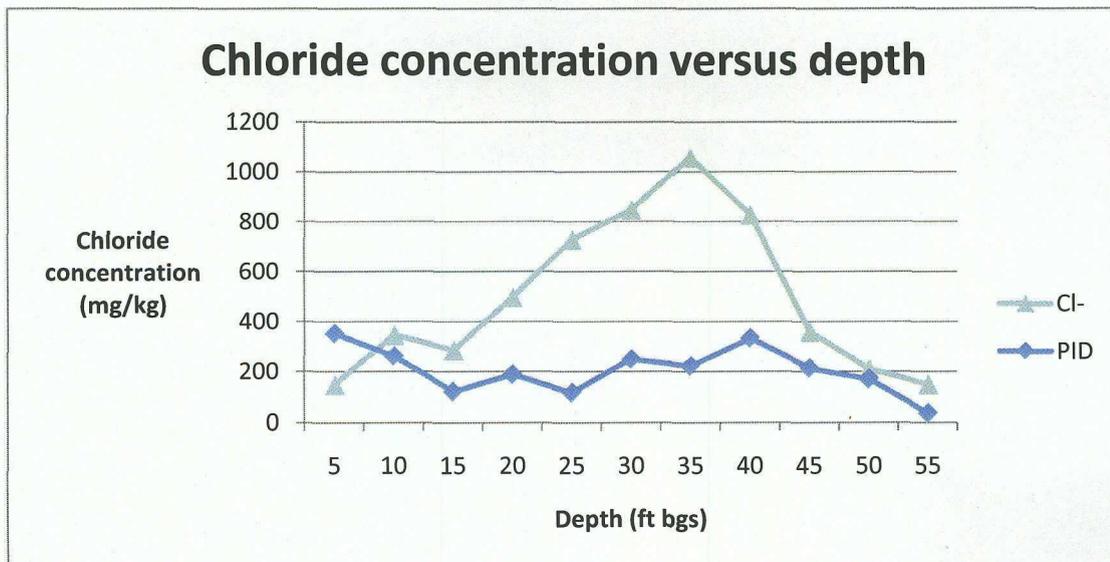
Chloride concentration versus depth



Logger:	Dale Littlejohn		
Driller:	Harrison & Cooper, Inc. Drilling		
Consultant:	R.T. Hicks		
Drilling Method:	Air rotary		
Start Date:	4/22/2010		
End Date:	4/22/2010	Project Name: Hobbs Jct. F-31-2	Well ID: SB-3
Comments: All samples from cuttings. Located 25 ft N of the former junction box site.		Location: UL/F Sec. 31 T.18S R38E	
Drafted by: Lara Weinheimer TD = 55 ft GW = 63 ft		Lat: 32°42'27.124"N County: Lea Long: 103°11'24.902" W State: NM	

Depth (feet)	chloride field tests (ppm)	LAB	PID	Description	Lithology	Bore Construction
				0 - 1.5 ft SILTY CLAY dark brown (top soil)		
				1.5 - 4 ft CALICHE gray to white (hard drilling)		
5	148		353.4			
				4 - 12 ft CALICHE; SILT white to gray, with interbedded olive to light brown silt, with some gray discoloration below 7 ft, slight hydrocarbon odor		
10	348		262.2			
				12 - 18 ft SILT; CALICHE grayish to white, with some interbedded quartzite		
15	287		121.1			
				18 - 23 ft SILTY SAND; SANDSTONE; QUARTZITE light olive brown, very fine grained, well sorted, with interbedded (thin) sandstone and quartzite		
20	498		189.7			
				23 - 48 ft SAND; SANDSTONE		bentonite seal
25	730		115.7			
30	849		249.8			

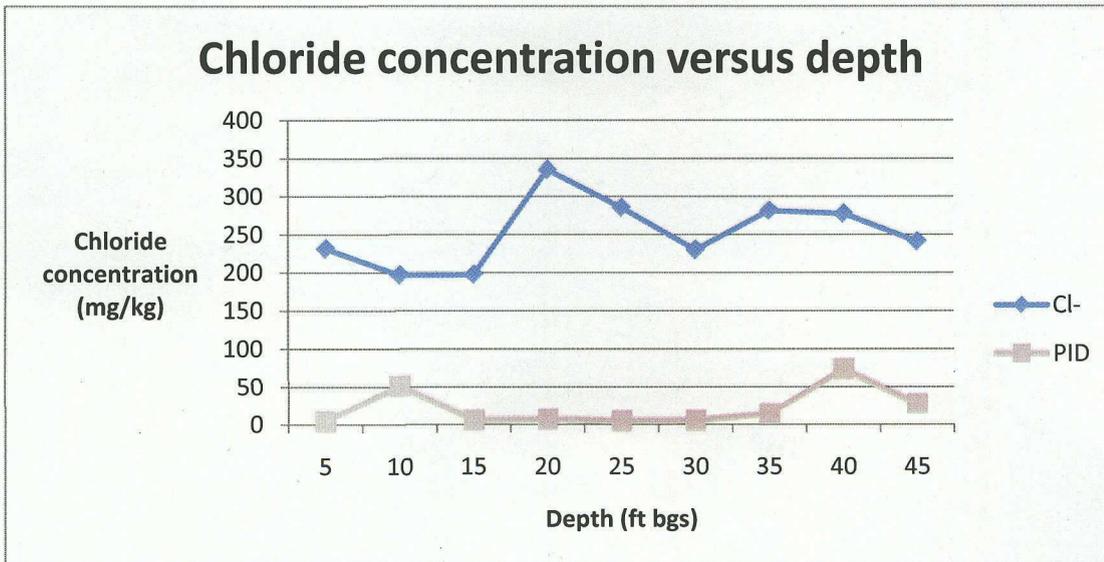
Depth (feet)	chloride field tests (ppm)	LAB	PID	Description	Lithology	Bore Construction
				sand, brown, fine grained, well sorted, angular, with thin sandstone bed between 29 and 48 ft		
35	1060	1140	222.3			
		GRD <60.0				
		4.33	DRD 2.150			
40	829		333.1			
45	360		214.1			
50	211		170.9	48 - 55 ft SAND		
				brown, medium grained, moderately sorted, sub-rounded		
55	150	1144	34.9			
		GRD <60.0				
		4.33	DRD 3.15			



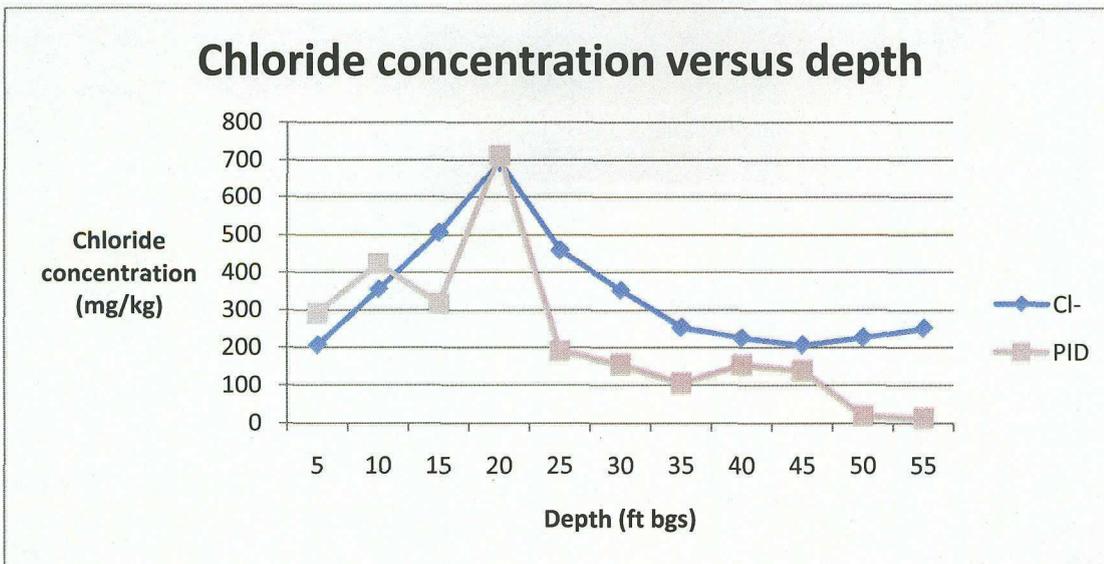
Logger:	Dale Littlejohn		
Driller:	Harrison & Cooper, Inc. Drilling		
Consultant:	R.T. Hicks		
Drilling Method:	Air rotary		
Start Date:	4/22/2010		
End Date:	4/22/2010	Project Name: Hobbs jct. F-31-2 Well ID: SB-4	
Comments: All samples from cuttings. Located 27 ft ESE of the former junction box site. Drafted by: Lara Weinheimer TD = 45 ft GW = 63 ft			Location: UL/F sec. 31 T18S R38E Lat: 32°42'26.778"N County: Lea Long: 103°11'24.586" W State: NM

Depth (feet)	chloride field tests (ppm)	LAB	PID	Description	Lithology	Bore Construction
				0 - 2 ft SILTY CLAY dark brown (top soil)		
5	232		3.9	2 - 12 ft CALICHE; SILT white to gray brown (hard drilling), with interbedded brown silt, hydrocarbon odor		
10	197		51.4			
15	198		5.5	12 - 14 ft QUARTZITE; CALICHE interbedded, quartzite brown to dark brown, fine crystalline		
20	336		6.4	14 - 18 ft CALICHE; SILT white to light gray with interbedded light brown silt		
25	286		3.9	18 - 36 ft SAND; SANDSTONE brown to light brown, fine grained, well sorted, angular, with interbedded thin sandstone from 29 to 34 ft		bentonite seal
30	230		4.8			

Depth (feet)	chloride field tests (ppm)	LAB	PID	Description	Lithology	Bore Construction
35	282		13.5	36 - 45 ft SAND; SANDSTONE light brown, very fine grained, well sorted, angular with some interbedded thin sandstone		
40	278		73.1			
45	241		27			
		GRO: <10.0				
		DRO: 412				



Depth (feet)	chloride field tests (ppm)	LAB	PID	Description	Lithology	Bore Construction
35	253		104.4	27 - 55 ft SAND brown, fine to medium grained, moderately sorted, sub-rounded interbedded (thick) with light brown very fine grained, well sorted, angular sand		
40	225		152.3			
45	206		136.8			
50	226		17.6			
55	250		11.8			



Attachment C

Laboratory Analyses

R.T. Hicks Consultants, Ltd.

901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104



**ARDINAL
LABORATORIES**

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

April 30, 2010

Hack Conder
Rice Operating Company
112 West Taylor
Hobbs, NM 88240

Re: Hobbs Jct. F-31-2

Enclosed are the results of analyses for sample number H19734, received by the laboratory on 04/23/10 at 8:05 am.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydrocarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.2	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

Total Number of Pages of Report: 5 (includes Chain of Custody)

Sincerely,

Celey D. Keene
Laboratory Director

This report conforms with NELAP requirements.



ARDINAL LABORATORIES

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

ANALYTICAL RESULTS FOR
RICE OPERATING COMPANY
ATTN: HACK CONDER
112 W. TAYLOR
HOBBS, NM 88240

Receiving Date: 04/23/10
Reporting Date: 04/27/10
Project Number: NOT GIVEN
Project Name: HOBBS JCT. F-31-2
Project Location: HOBBS JCT. F-31-2

Sampling Date: 04/21/10 & 04/22/10
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: JH
Analyzed By: AB/HM

LAB NUMBER	SAMPLE ID	GRO	DRO	CI*
		(C ₆ -C ₁₀) (mg/kg)	(>C ₁₀ -C ₂₈) (mg/kg)	(mg/kg)

ANALYSIS DATE	04/26/10	04/26/10	04/26/10
H19734-1 SB-1 @ 20'	1,700	3,910	1,250
H19734-2 SB-1 @ 25'	479	2,850	976
H19734-3 SB-1 @ 55'	<10.0	389	336
H19734-4 SB-2 @ 10'	<10.0	256	832
H19734-5 SB-2 @ 15'	<50.0	1,890	432
H19734-6 SB-2 @ 55'	<10.0	<10.0	128
H19734-7 SB-3 @ 5'	897	13,800	32
H19734-8 SB-3 @ 35'	<50.0	2,150	1,140
H19734-9 SB-3 @ 55'	<50.0	316	144
H19734-10 SB-4 @ 20'	<10.0	<10.0	288
H19734-11 SB-4 @ 45'	<10.0	412	208
H19734-12 SB-5 @ 20'	362	4,350	624
H19734-13 SB-5 @ 55'	<10.0	80.8	208
Quality Control	546	538	490
True Value QC	500	500	500
% Recovery	109	108	98.0
Relative Percent Difference	1.2	1.1	2.0

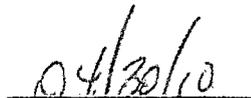
METHODS: TPH GRO & DRO: EPA SW-846 8015 M; CI: Std. Methods 4500-CI/B

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

Reported on wet weight.



Chemist



Date

H19734 TCL RICE

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

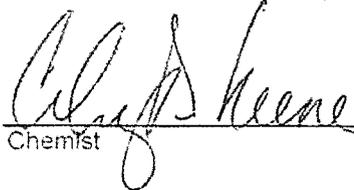
Receiving Date: 04/23/10
 Reporting Date: 04/30/10
 Project Number: NOT GIVEN
 Project Name: HOBBS JCT. F-31-2
 Project Location: HOBBS JCT. F-31-2

Sampling Date: 04/21/10 & 04/22/10
 Sample Type: SOIL
 Sample Condition: COOL & INTACT
 Sample Received By: JH
 Analyzed By: ZL

LAB NUMBE SAMPLE ID	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)
ANALYSIS DATE	04/28/10	04/28/10	04/28/10	04/28/10
H19734-1 SB-1 @ 20'	<0.050	4.63	9.61	47.7
H19734-2 SB-1 @ 25'	0.084	1.14	2.04	13.0
H19734-4 SB-2 @ 10'	<0.050	0.210	0.361	2.58
H19734-5 SB-2 @ 15'	<0.050	0.198	0.695	3.07
H19734-6 SB-2 @ 55'	<0.050	<0.050	<0.050	0.378
H19734-7 SB-3 @ 5'	0.211	3.71	1.14	15.4
H19734-8 SB-3 @ 35'	<0.050	0.707	0.226	2.34
H19734-9 SB-3 @ 55'	<0.050	0.442	0.165	2.16
H19734-12 SB-5 @ 20'	<0.050	0.438	1.20	8.29
Quality Control	0.053	0.047	0.043	0.131
True Value QC	0.050	0.050	0.050	0.150
% Recovery	106	94.0	86.0	87.3
Relative Percent Difference	1.8	<1.0	4.2	8.4

METHOD: EPA SW-846 8021B

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


 Chemist


 Date

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CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES

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

BILL TO	ANALYSIS REQUEST										
Company Name: Rice Operating Company	P.O. #:										
Project Manager: Hack Conder	Company:										
Address: 122 West Taylor	Attn:										
City: Hobbs	Address:										
Phone #: 393-9174	City:										
Project #:	State:										
Project Name: Hobbs, jet F-31-2	Phone #:										
Project Location: Hobbs, jet F-31-2	Fax #:										
Sampler Name: Lara Weinheimer											
FOR LAB USE ONLY	MATRIX	PRESERV	SAMPLING	DATE	TIME	Chlorides	TPH 8015 M	BTEX	Texas TPH	Complete Cations/Anions	
Lab I.D.	GROUNDWATER	# CONTAINERS	(G)RAB OR (C)OMP?								
H19734-	WASTEWATER										
11	SOIL			4-22-10	9:55	✓	✓	✓			
12	SLUDGE			4-22-10	10:30	✓	✓	✓			
13	OTHER:			4-22-10	10:46	✓	✓	✓			
	ACID/BASE										
	ICE/COOL										
	OTHER:										

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Relinquished By: L. Weinheimer Date: 4/22/10 Time: 7:30

Received By: [Signature] Date: 4/23/10 Time: 8:05

Delivered By: (Circle One) UPS

Sampler - UPS - Bus - Other:

Sample Condition: Cool Intact Yes No Yes No

Checked By: [Signature] (Initials) [Initials]

Phone Result: Yes No Add'l Phone #:

Fax Result: Yes No Add'l Fax #:

REMARKS: email results

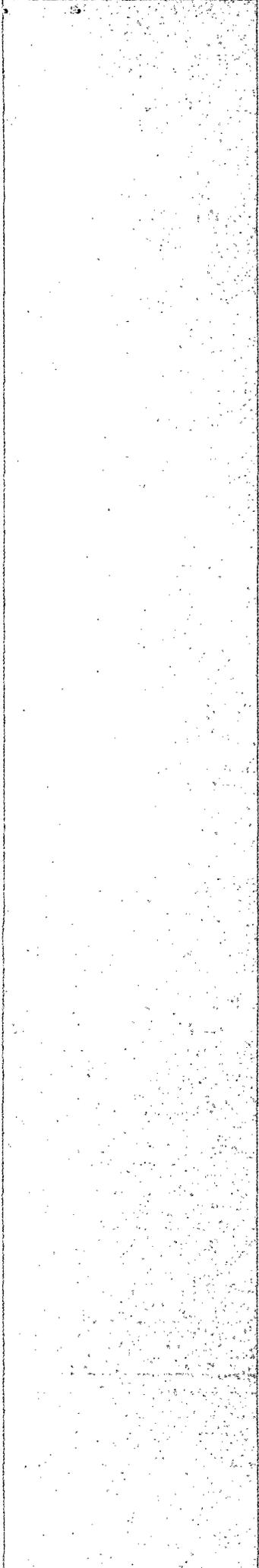
Hconder@riceswd.com; jpurvis@riceswd.com;

Lweinheimer@riceswd.com

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

NEED SAMPLES BACK, PLEASE

#26



Attachment D

VLEACH and AMIGO Model

Explanations

R.T. Hicks Consultants, Ltd.

901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

R. T. HICKS CONSULTANTS, LTD.

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

Input and Results of the VLEACH Simulation Performed at the Rice Operating Co. Hobbs Junction F-31-2 Site

The specific parameters used in the simulation and diffusion to ground water equation at the site are presented in the table and figures below.

Table 1 – Common Parameters Employed in the VLEACH model for the Hobbs Junction F-31-2 Site

Model Parameter	Value	Source of Value
Benzene & Xylene Chemical Parameters	Chemical Specific	NMED June 2006 Soil Screening Levels Document
Spill Area (ft ²)	6,400	Site Measurement (Estimate)
Groundwater Table Depth (ft)	60	Estimate from Soil Boring Data and Regional Data
Vadose Zone Soil Bulk Density (g/cm ³)	1.5	NMED June 2006 Document
Vadose Zone Porosity (unitless)	0.43	NMED June 2006 Document
Volumetric Water Content (%)	0.26	NMED June 2006 Document
Vadose Zone Soil Organic Content (f _{oc})	0.0015	NMED June 2006 Document
Recharge Rate (ft/year)	0.028	Musharrafiieh 1999
Benzene & Xylene Concentrations (ug/kg)	Chemical Specific	Worst-Case Hydrocarbon Profile (Excavations & SB-1)
Slope of Water Table	0.0034	Regional Map (Attachment A)
Hydraulic Conductivity (ft/d)	81	Musharrafiieh 1999
Max width perpendicular to direction of GW flow (ft)	80	Site Measurement
Aquifer Porosity (unitless)	0.25	Prof. Judgment Conservative Assumption
Mixing zone depth in aquifer	6.6	Prof. Judgment Conservative Assumption

Figure 1 - Actual Input Screens from the VLEACH Model Program for the Benzene Run

VLEACH Model Parameters

Simulation Parameters

File | Help | Run | Quit | Simulation Parameters | Chemical Parameters | Polygon Parameters | Boundary Conditions | Output Options | Initial Contaminant Concentrations

Simulation Year	Time Step	Output Time Interval	Print Time Interval
1000	40	40	1000
Years	Years	Years	Years

Chemical Parameters

Chemical | Reference Chemical Profile |

Chemical Name: Benzene (M)

Organic Carbon Partition Coefficient	Henry's Law Constant	Water Solubility	Free Air Diffusion Coefficient
0.85	0.225	1700	0.5307
mg/L	atm	mg/L	m ² /day

Polygon

Polygon Selected: []

Number of Polygon(s): 1

Add New Polygon

Delete Polygon

Replot Polygon

Polygon Parameters

Polygon Type: Polygon

Area of Polygon	Vertical Cell Discretization	Number of Cells	Height of Polygon
6400	5	60	50
Square ft	ft	Cells	ft

Soil Parameters

Soil Type: Heterogeneous Soil Type Profiles

Soil Type Name: Sand, 11M

Dry Bulk Density	Effective Porosity	Volumetric Water Content	Soil Organic Carbon Content
1.5	0.43	0.26	0.0015
g/cm ³	(n)	(Mc)	(foc)

Boundary Conditions

Recharge Rate	Concentration of Recharge Water	Upper Boundary Vapor Condition	Lower Boundary Vapor Condition
0.028	0	0	0
ft/year	mg/L	mg/L	mg/L

Output Options

Create Concentration and Soil Contamination Profile: Yes No

Soil Contamination Profile File (ft²): []

Initial Contaminant Concentrations

Upper Cell	Lower Cell	Initial Concentration (ug/g)
1	5	211
5	10	549
10	15	400
15	20	1257
20	25	641
25	30	77

As a conservative measure, a “worst-case” hydrocarbon soil profile was constructed by taking the highest benzene and xylenes concentration from each sampled depth as shown in Figure 2. Sampling depths for which laboratory results were not available were estimated from the field screening data. The benzene and xylenes values from this profile were conservatively assumed to be present across the entire 6,400 ft² area.

The results from the VLEACH modeling relative to this assessment are provided as a graph that presents the subsurface impact as Mass Flux to Ground Water in grams/year (g/yr) as a function of future time as shown in Figure 3.

Simulation Time, Time Step, Output Time Interval, and Profile Time Interval were adjusted to provide the clearest presentation of the results based on the time required to identify the maximum impact to groundwater. The model results show the highest benzene impact to ground water will occur about 250 years from now and the highest xylene impact to ground water will occur about 700 years from now.

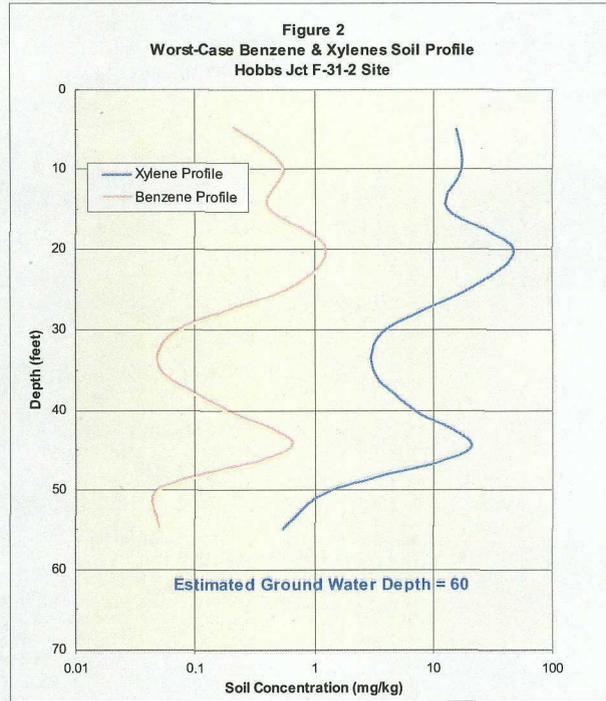
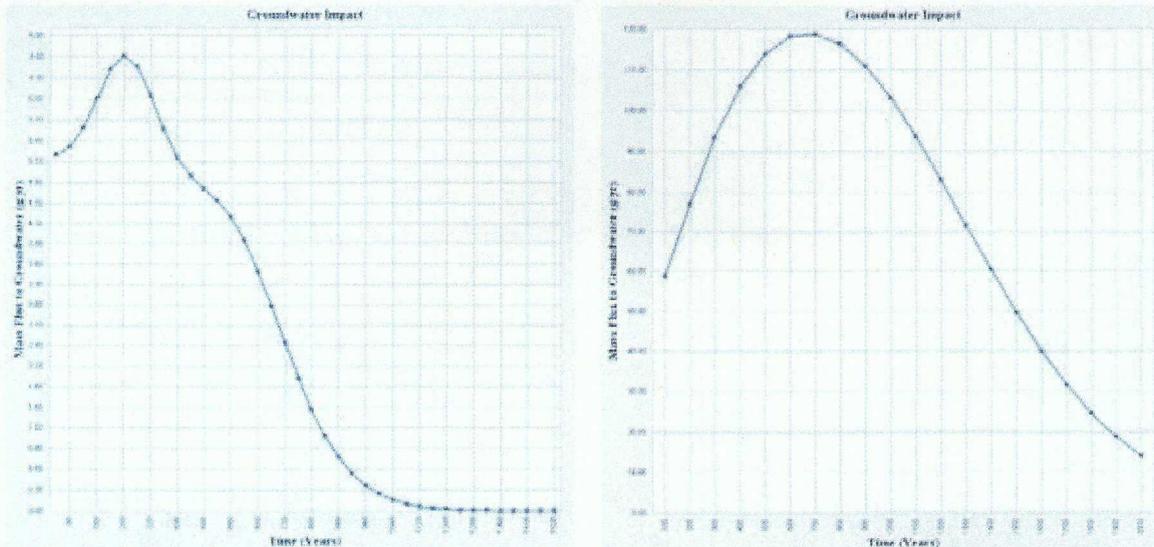


Figure 3
Results of VLEACH Vadose Model for Benzene (left) and Xylenes (right)



In order to compare the modeled results to the NMED ground water standard, the VLEACH output data required a conversion from g/yr to mg/L. This was performed by calculating the annual recharge (flux) volume from the spill area and the annual ground water flow volume below the spill area as shown:

Recharge is defined as: $Flux_{flow}(L/yr) = A \times R \times 29.317$ where,

A = spill area (ft²)

R = recharge rate (ft/yr), and

29.317 = conversion factor from ft³ to liters

Groundwater flow is defined as: $GW_{flow}(L/yr) = \left(\frac{k \times i}{\theta_T}\right) \times T_{aq} \times W \times 29.317$ where,

k = hydraulic conductivity of the aquifer (ft/yr)

i = groundwater gradient (ft/ft)

θ_T = porosity of the aquifer

T_{aq} = aquifer mixing zone thickness (ft) and,

W = length of the spill area (ft) perpendicular to the ground water gradient direction

The relationship between the annual recharge volume and the annual ground water flow volume was used to calculate the predicted ground water concentration for the initial (year zero) time and the maximum impact year time for the constituent of concern as demonstrated on the table below:

Chemical of Concern	Present Impact Data				Maximum Impact Data				NM Water Quality (mg/L)
	Year	Impact (g/yr)	Leachate Conc. (mg/L)	GW Conc. (mg/L)	Year	Impact (g/yr)	Leachate Conc. (mg/L)	GW Conc. (mg/L)	
Benzene	0	5.15	1.0	0.0008	240	6.61	1.3	0.0011	0.01
Total Xylenes	0	40	8	0.006	700	119	23	0.019	0.6

text values indicate concentrations that exceed the NMED Water Quality Standard values for groundwater.

R. T. HICKS CONSULTANTS, LTD.

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 Co. Hobbs Jct. F-31-2 Site

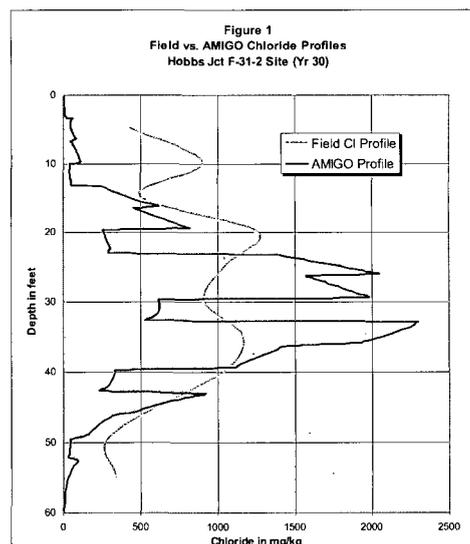
Table 1 - Parameters Employed in AMIGO tool for the Hobbs Junction F-31-2 Site

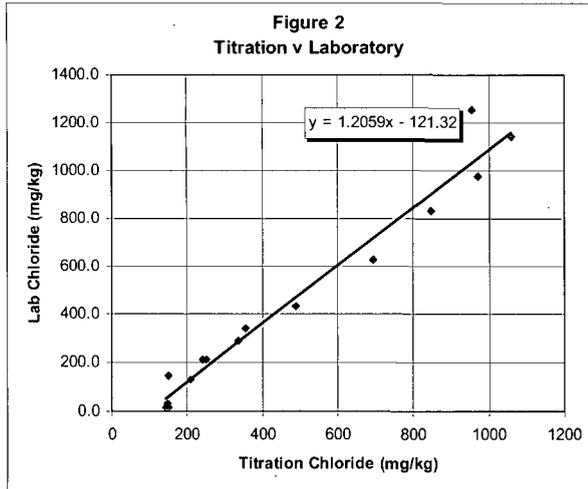
Model Parameter	Value	Source of Value
Climate (non-smoothed)	1946 - 1992	Pearl, NM Station
Input for distant or hypothetical well (ft)	NA	Not Required
Background Chloride in Aquifer (mg/L)	60	PTTC/PRRC Data
Aquifer Porosity (unitless)	0.25	Prof. Judgment Conservative Assumption
Groundwater Table Depth (ft)	60	Estimate from Soil Borings and Regional Data
Aquifer Thickness (ft)	30	Professional Judgment Conservative Assumption
Slope of Water Table	0.0034	Regional Map (Attachment A)
Hydraulic Conductivity (ft/d)	81	Musharrafiieh 1999
Average Chloride Load (kg/m ²)	18.0	Worst-Case Profile Match to Measured Site Data
Max length of spill in dir. of GW flow (ft)	80	Site Data
Plant Uptake Trigger (%)	1.0	Prof. Judgment Conservative Assumption
Surface Layer	Med. Sand	Site Data
Soil Profile	Sandy Clay (1/3) Caliche (1/3) Sand (1/3)	Site Data (Soil Borings) and Model Calibration to Chloride Levels in the Soil

Musharrafiieh 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 Junction F-31-2 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 30 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 soil borings. The field (titration) concentrations were then adjusted based on a correction determined





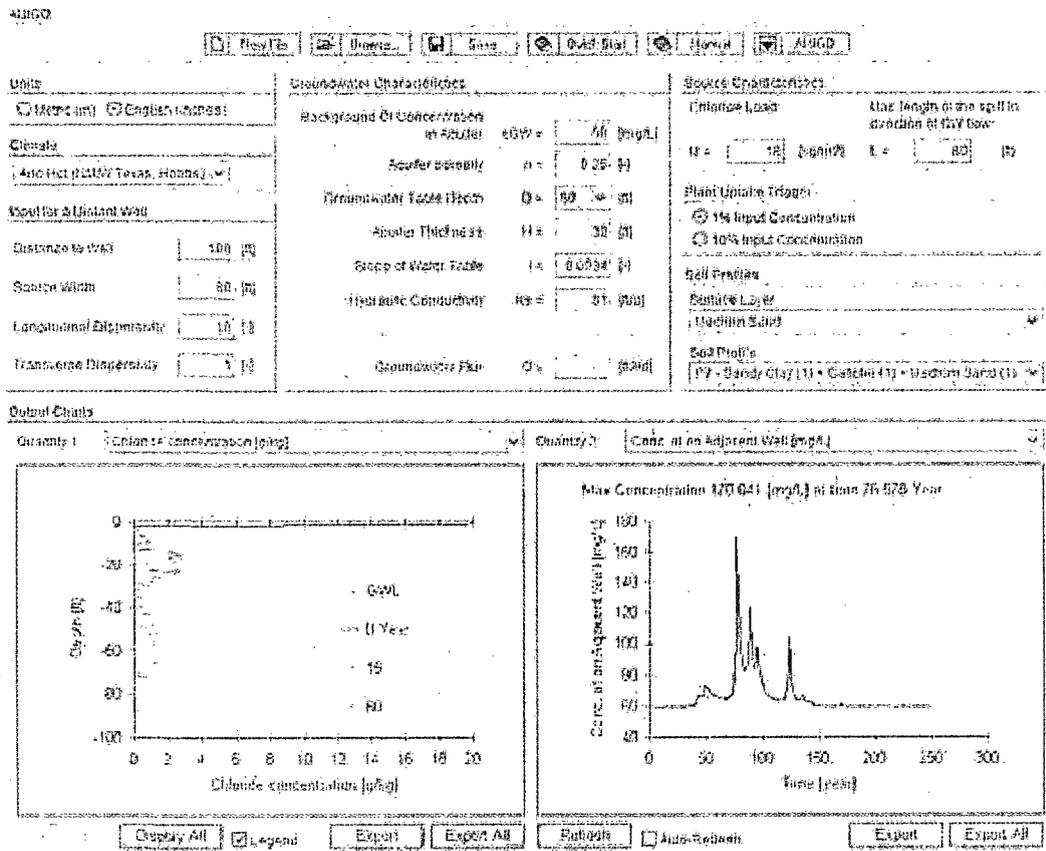
by comparing the field chloride concentrations with the duplicate laboratory sample concentrations as shown in Figure 2.

The blue curve in Figure 1 is the predicted chloride profile at year 30 of the simulation using a chloride load of 18.0 kg/m² (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, using the "worst-case" chloride load, will reach a maximum concentration of 170 mg/L (below standards) in 77 years from the release date if no further corrective actions are taken. If we assume the release date occurred 30 years ago, based on the profile match from Figure 1, then the maximum impact to the ground water will occur in 2057. 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 Hobbs Junction F-31-2 Site



Attachment B

Corrective Actions

R.T. Hicks Consultants, Ltd.

901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Hobbs Jct. F-31-2 (1R428-56)
T-18-S, R-38-E, Section 31, Unit F
Excavation Summary

- 12-27-10 The site was excavated to a size of 45x30x5-ft bgs and the north end of the site (22.5x30-ft) was excavated to a depth of 10 feet bgs. Five (5) loads of soil were hauled to Sundance for disposal and four (4) loads of blow sand were hauled in from Wallach.
- 12-28-10 The excavation was completed. The final dimensions were 45x30x5-ft bgs, with the north end of the site (22.5x30-ft) excavated to 10-ft bgs. Eleven (11) loads of soil were hauled to Sundance Disposal, and three (3) loads of soil were imported from Wallach.
- 12-29-10 The north side of the excavation 22.5x30x10-ft deep was padded with 6" of blow sand and a 20 mil, reinforced liner was installed. The liner was then padded with 6" of blow sand on the top of the plastic. Thirteen (13) loads of soil were hauled to Sundance Disposal.
- 12-30-10 Eight (8) loads of clean soil (Cl⁻ 112 mg/kg and 149 mg/kg) was imported from the surrounding R-O-W and used to backfill the 22.5x30-ft area up to 5 ft bgs. The 45x30x5-ft bgs excavation was then padded with 6" of blow sand. Eight (8) loads of soil were hauled to Sundance Disposal.
- 1-3-11 Four (4) loads of soil were hauled to Sundance Disposal. Nineteen (19) loads of clean soil from the surrounding R-O-W were hauled to the site. A backfill sample (R.O.W. backfill) was sent to the lab for analysis of chloride and TPH.
- 1-4-11 A 48x30-ft 20 mil, reinforced liner was installed at 4.5 ft bgs and was padded with 6" of blow sand. Nine (9) loads of soil were hauled to Sundance Disposal. Backfilling of the excavation began with the R.O.W. backfill (Cl⁻ <16, DRO <10, GRO <10).
- 1-5-11 The excavation was backfilled up to the depth of one (1) foot. Two (2) loads of soil were hauled to Sundance Disposal.
- 1-6-11 Approximately 6" of asphaltine on the south and east side of the excavation was scrapped and four (4) loads of soil were hauled to Sundance Disposal. Four (4) loads of blow sand were imported from Wallach.

- 1-7-11 Backfilling of the excavation was finished. Ten (10) loads of sand-hay mixture were imported from the TCT yard.
- 1-10-11 Seven (7) loads of hay-sand mix were imported to the site. The soil was spread and contoured to the surrounding area.
- 1-11-11 Three (3) loads of hay-sand mixture were imported from the TCT yard and it was contoured to the surrounding area. Boot guards were hauled into the location to expand the fence.
- 1-12-11 Silt net fencing was installed around the perimeter of the location.
- 2-17-11 150 lbs BioNhance and 100 lbs InfiltratioNhance were added to the site and the area was seeded with 15 lbs winter wheat, 10 lbs blue gramma, and 2lbs black gramma.

56 loads of soil removed 672 yards

58 loads of soil imported 696 yards



112 West Taylor
 Hobbs, NM 88240
 Phone: (575) 393-9174
 Fax: (575) 393-0293

REVEGETATION FORM

1. General Information

Site Name: Hobbs Jct. F-31-2						
U/L F	Section 31	Township 18S	Range 38E	County Lea	Latitude N. 32.70765	Longitude W. 103.18996
Contact Name: Bruce Baker						
Email: bbaker@riceswd.com						
Site size: (165x90-ft) 14,850 square feet				Map detail of site attached <input type="checkbox"/>		
Additional information:						

2. Soils

Salvaged from site <input checked="" type="checkbox"/>	Bioremediated <input checked="" type="checkbox"/>	Imported <input checked="" type="checkbox"/>	Blended <input type="checkbox"/>	Depth (in.):	
Texture: sandy	Describe soil and subsoil: caliche				
Soil prep methods:	Rip <input type="checkbox"/>	Depth (in.):	Disc <input checked="" type="checkbox"/>	Depth (in.): 4 in.	Rollerpack <input type="checkbox"/>
Date complete: 2/17/2011					

3. Bioremediation

Fertilizer <input type="checkbox"/>	Hay <input checked="" type="checkbox"/>	Other <input checked="" type="checkbox"/>
Type:	Describe: 150 lbs BioNhance	
Lbs/acre:	100 lbs InfiltratioNhance	

4. Seeding

Custom seed mix <input checked="" type="checkbox"/>	Prescribed mix <input type="checkbox"/>	Seed mix name:	Seeding date: 2/17/2011
Broadcast <input checked="" type="checkbox"/>	Method: portable seeder		
Soil conditions during seeding:	Dry <input checked="" type="checkbox"/>	Damp <input type="checkbox"/>	Wet <input type="checkbox"/>
Photos attached <input checked="" type="checkbox"/>	Observations: 15 lbs winter wheat, 10 lbs blue gramma, 2 lbs black gramma		

5. Certification

Name: Robert Harrison	Title: Environmental Tech	Date: 2/17/2011
Signature: <i>not available</i>		

**Hobbs Jct. F-31-2 (1R428-56)
T-18-S, R-38-E, Section 31, Unit F**



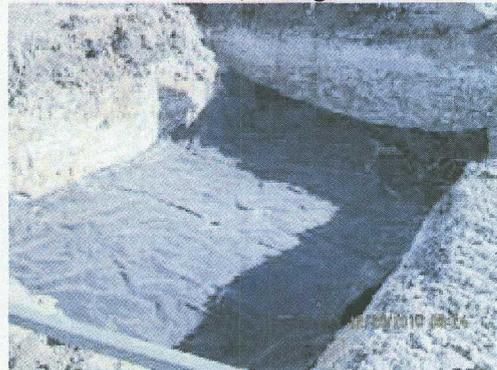
site prior to excavation, facing east



final excavation, facing southwest



blow sand pad below the liner, facing east



22.5x30-ft 20 mil liner installed at 10 ft bgs, facing east



blow sand pad above the liner, facing east



backfilling above the 22.5x30-ft liner, facing northwest



blow sand pad below the 48x30-ft liner, facing northwest



48x30-ft 20 mil liner installed at 4 ft bgs, facing north



blow sand pad above the 20 mil liner, facing south



backfilling, facing east



hauling off soil, facing northwest



backfilling with imported soil, facing south



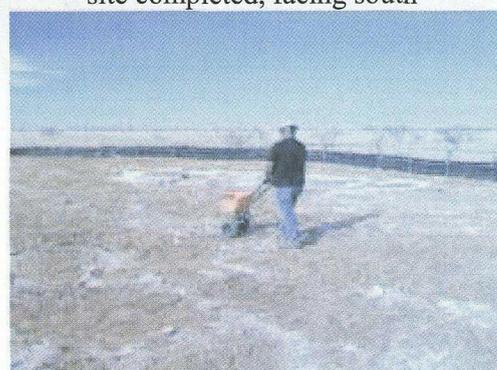
hauling in imported soil blended with hay, facing north



site completed, facing south



adding amendments, facing south 2/16/2011



seeding, facing north 2/16/2011



January 05, 2011

Hack Conder
Rice Operating Company
112 W. Taylor
Hobbs, NM 88240

RE: HOBBS JCT F-31-2

Enclosed are the results of analyses for samples received by the laboratory on 01/03/11 16:17.

Cardinal Laboratories is accredited through Texas NELAP for:

Method SW-846 8021	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method SW-846 8260	Benzene, Toluene, Ethyl Benzene, and Total Xylenes
Method TX 1005	Total Petroleum Hydrocarbons

Certificate number T104704398-08-TX. Accreditation applies to solid and chemical materials and non-potable water matrices.

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script that reads "Celey D. Keene".

Celey D. Keene
Lab Director/Quality Manager



Analytical Results For:

Rice Operating Company
Hack Conder
112 W. Taylor
Hobbs NM, 88240
Fax To: (575) 397-1471

Received: 01/03/2011
Reported: 01/05/2011
Project Name: HOBBS JCT F-31-2
Project Number: HOBBS JCT F-31-2
Project Location: NOT GIVEN

Sampling Date: 01/03/2011
Sampling Type: Soil
Sampling Condition: Cool & Intact
Sample Received By: Jodi Henson

Sample ID: R. O. W. BACKFILL (H100002-01)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: HM					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	<16.0	16.0	01/04/2011	ND	432	108	400	0.00	

TPH 8015M		mg/kg		Analyzed By: CK					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10	<10.0	10.0	01/04/2011	ND	177	88.3	200	0.491	
DRO >C10-C28	<10.0	10.0	01/04/2011	ND	184	92.2	200	14.9	

Surrogate: 1-Chlorooctane 120% 70-130
Surrogate: 1-Chlorooctadecane 126% 70-130

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



Notes and Definitions

- Z-01 Surrogates outside historical limits.
- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- ** Samples not received at proper temperature of 6°C or below.
- *** Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C
Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

