1R - 425-88

WORKPLANS

Date:

10-26-10

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

CERTIFIED MAIL
RETURN RECIEPT NO. 7009 1680 0001 6619 6330

October 26th, 2010

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

RE: **INVESTIGATION & CHARACTERIZATION PLAN**
Rice Operating Company – Vacuum SWD System
Vacuum D-31 EOL (1R425-88): UL/D, Sec. 31, T17S, R35E

Mr. Hansen:

RICE Operating Company (ROC) has retained Rice Environmental Consulting and Safety (RECS) to address potential environmental concerns at the above-referenced site in the abandoned Vacuum Salt Water Disposal (SWD) system. ROC is the service provider (agent) for the Vacuum SWD System and has no ownership of any portion of the pipeline, well, or facility. The system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage/usage basis. Environmental projects of this nature require System Party AFE approval prior to work commencing at the site. In general, project funding is not forthcoming until NMOCD approves the work plan. Therefore, your timely review of this submission is greatly appreciated.

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

- Protects public health,
- Provides the greatest net environmental benefit,
- Complies with NMOCD Rules, and
- Is supported by good science.

Each site shall generally have three submissions:

1. This Investigation and Characterization Plan (ICP) is proposed for gathering data and site characterization and assessment.

2. Upon evaluating the data and results from the ICP, a recommended remedy will be submitted in a Corrective Action Plan (CAP) if warranted.

3. Finally, after implementing the remedy, a Termination Request with final documentation will be submitted.

Background and Previous Work

This site is located approximately 0.3 miles south of Buckeye, New Mexico in UL/D, Sec. 31, T17S, R35E as shown on the Site Location Map (Figure 1). NM OSE records indicate that groundwater will likely be encountered at a depth of approximately 117 +/- feet.

In 2009, ROC initiated work on the former Vacuum D-31 EOL junction as part of the system abandonment. The site was delineated using a backhoe to form an excavation with dimensions 30x25x12-ft deep and soil samples were screened at regular intervals for both hydrocarbons and chlorides. A 4-wall, bottom, and blended backfill composite sample was collected from the excavation for laboratory verification. Laboratory results yielded negligible concentrations of gasoline range organics (GRO) and diesel range organics (DRO) in all samples. Chloride concentrations were confirmed at 672 mg/kg in the 4-wall composite, 1,200 mg/kg in the bottom composite, and 720 mg/kg in the blended backfill composite. The blended excavated soil (blended backfill composite) was returned to the excavation 5 feet below ground surface (bgs). A 5 foot deep shelf was excavated 5 feet in each direction in preparation for a clay barrier. At 5 ft below ground surface (bgs), a 40x35 ft clay barrier was installed with a compaction test performed on May 21, 2009. The remaining blended excavated soil was blended with clean, imported soil and placed over the clay barrier. Laboratory analysis of the blended backfill II composite confirmed a chloride concentration of 256 mg/kg. The area was contoured to the surrounding landscape, seeded, and an identification plate was placed on the surface of the site to mark its location for future environmental considerations. NMOCD was notified of potential groundwater impact on March 12, 2009 and a junction box disclosure report (Appendix A) was submitted to NMOCD with all the 2009 junction box closures and disclosures.

To further investigate depth of chloride presence, one soil bore (SB-1) was initiated on June 19, 2009 at 3 feet south-east of the former junction box. The boring was advanced to 80 feet bgs with soil samples collected every 5 feet and field tested for organic vapors and chlorides. Field chloride titrations yielded concentrations that decreased with depth, which was confirmed by laboratory analysis of the 35 foot (1,500 mg/kg) and the 80 foot (272 mg/kg) samples. TPH (GRO and DRO) concentrations were negligible in both samples. The entire borehole was plugged with bentonite to the ground surface.

ROC proposes additional investigative and characterization work at the site to determine if there is potential for groundwater degradation from residual chlorides at the site.

Proposed Work Elements

1. Using site specific data, a conservative chloride migration model will be used to determent if unsaturated chloride transport through the vadose zone would cause the underlying groundwater to exceed 250 mg/L in the future.

2. A visual inspection of the site will be conducted to determine if soil restoration is required to promote re-vegetation of the ground surface. Depending on the findings, the appropriate steps will be taken to re-vegetate the site. Vegetation acts as a 'natural infiltration barrier' because plants capture water through their roots, reducing the volume of water infiltrating below the root zone.
3. Collect regional hydrogeologic data to verify depth to groundwater in the area of this site. A one-half mile water well inventory will be performed. The water well inventory will include a review of water well records listed on the New Mexico State Engineer Office and United States Geological Survey (USGS) websites.

If site specific modeling shows no threat to groundwater from residual chlorides and surface restoration work has been completed, then a Termination Request will be submitted to NMOCD. However, if site specific modeling shows impact to groundwater from residual chlorides, a CAP will be developed to address these concerns.

Thank you for your time and consideration on this project. Please call Hack Conder at (575) 393-9174 or me if you have any questions or wish to discuss the site.

Sincerely,

Lara Weinheimer
Project Scientist
RECS
(575) 441-0431

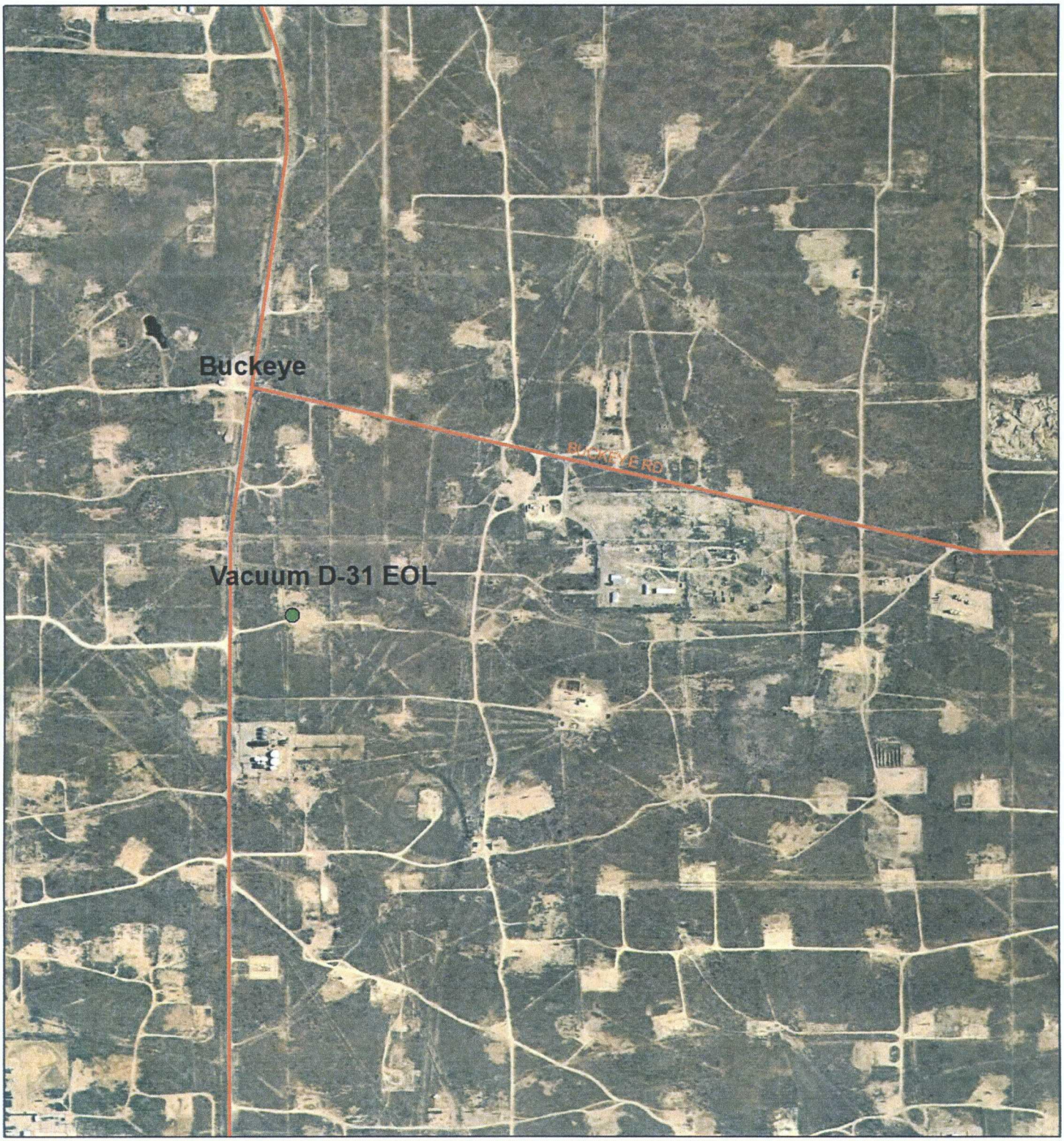
Attachments:

Figures – Site location map
Appendix A – Junction Box Disclosure Report
Appendix B – Quality Procedures

Figures

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

Site Location



RICE ENVIRONMENTAL RECS CONSULTING & SAFETY, LLC

Vacuum D-31 EOL

Legals: UL/D sec. 31
T17S R35E
NMOCD Case #: 1R425-88

FIGURE 1

0 500 1,000 2,000 Feet

Drawing date:
Revision date:
Drafted by:

Appendix A

Junction Box Disclosure Report

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

RICE OPERATING COMPANY
JUNCTION BOX DISCLOSURE REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
Vacuum	D-31 EOL	D	31	17S	35E	Lea	eliminated		

LAND TYPE: BLM ___ STATE X FEE LANDOWNER ___ OTHER ___

Depth to Groundwater 117 feet NMOCD SITE ASSESSMENT RANKING SCORE: 20

Date Started 2/18/2009 Date Completed 6/8/2009 OCD Witness no

Soil Excavated 333.3 cubic yards Excavation Length 30 Width 25 Depth 12 feet

Soil Disposed 84 cubic yards Offsite Facility Sundance Location Eunice, NM

FINAL ANALYTICAL RESULTS: Sample Date 4/6/2009, 4/15/2009, 5/20/2009, 6/19/2009 Sample Depth 12 ft, 35 ft, 80 ft

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

Sample Location	PID (field) ppm	GRO mg/kg	DRO mg/kg	Chlorides mg/kg
4-WALL COMP.	0.5	<10.0	<10.0	672
BOTTOM COMP.	2.3	<10.0	<10.0	1,200
BLENDED BACKFILL COMP.	2.0	<10.0	<10.0	720
BLENDED BACKFILL II COMP	0.9			256
SB #1 @ 35'		<10.0	<10.0	1,500
SB #1 @ 80'		<10.0	<10.0	272

CHLORIDE FIELD TESTS

LOCATION	DEPTH	mg/kg
4-WALL COMP.	n/a	568
BOTTOM COMP.	12'	957
BLENDED BACKFILL COMP.	n/a	722
BLENDED BACKFILL II COMP.	n/a	303
BACKGROUND	6"	194
Soil Bore 3 ft. south east of the former junction box	15'	861
	20'	871
	25'	844
	30'	1,393
	35'	1,412
	40'	1,338
	45'	997
	50'	1,101
	55'	779
	60'	525
	65'	531
	70'	510
	75'	425
	80'	300

General Description of Remedial Action: This junction was addressed during the Vacuum SWD System Abandonment. An investigation was conducted at the former junction box site using a backhoe to collect soil samples at regular intervals creating a 30x25x12 ft excavation. Chloride field tests performed on each sample yielded elevated concentrations. Organic vapors, measured using a PID, yielded low concentrations. Representative composite samples were sent to a commercial laboratory for analysis of chloride and TPH, which confirmed elevated chloride concentrations and low concentrations of TPH. The blended excavated soil was returned to the excavation 5 ft below ground surface (BGS). A 5-ft-deep shelf was excavated 5 ft in every direction. At 5-4 ft BGS, a 1-ft thick clay barrier was installed with a compaction test performed on 5/21/2009. The remaining backfill was blended on site with clean imported soil and returned to ground surface and contoured to the surrounding area. On 6/8/2009, the site was seeded with a blend of native vegetation and is expected to return to a productive capacity at a normal rate. To further investigate depth of chloride presence, a soil bore was initiated on 6/19/2009 at 3 ft SE of the former junction box site. The boring was advanced to a depth of 80 ft BGS with soil samples collected every 5 ft and field tested for chloride and organic vapors. Lab analysis of the 35 and 80 ft samples yielded chloride concentrations that decreased with depth and low concentrations of organics. The entire bore hole was plugged with bentonite to the ground surface. NMOCD was notified of potential groundwater impact on 3/12/09.

ADDITIONAL EVALUATION IS HIGH PRIORITY

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

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

SITE SUPERVISOR Jordan Woodfin SIGNATURE Jordan Woodfin COMPANY RICE OPERATING COMPANY

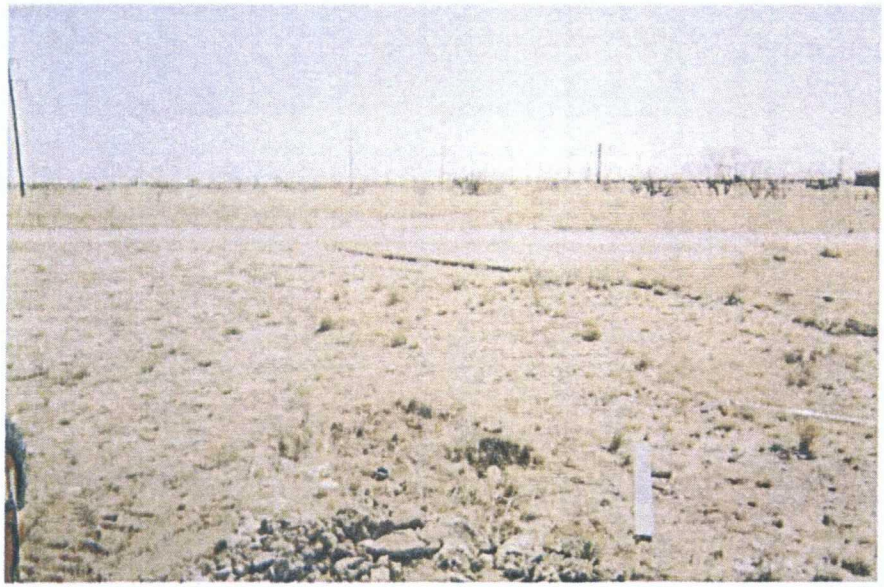
REPORT ASSEMBLED BY Larry Bruce Baker Jr. INITIAL LBB

PROJECT LEADER Larry Bruce Baker Jr. SIGNATURE Larry Bruce Baker Jr. DATE 4-1-10

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

Vacuum D-31 EOL

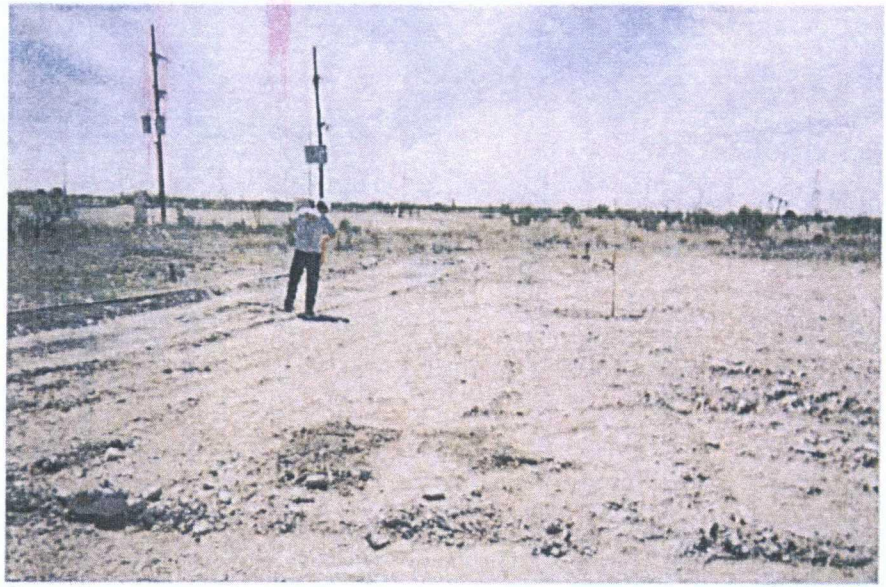
Unit D, Section 31, T17S, R35E



Site prior to excavation 2/18/2009

Delineation trench being excavated 3/25/2009

Compaction test 5/21/2009



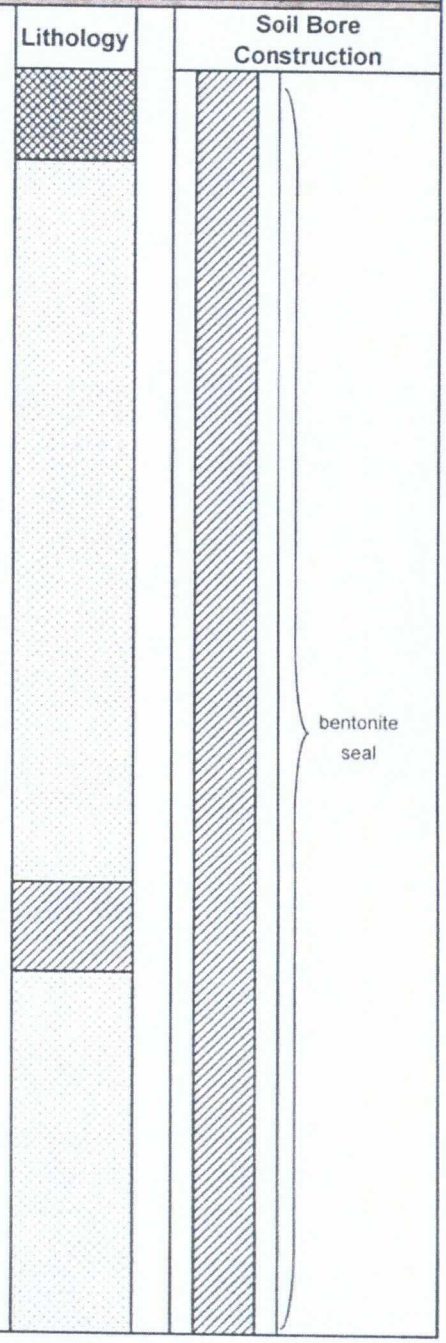
Seeding excavation 6/08/2009

Drilling Soil Bore #1 6/19/2009

plugging Soil Bore #1 with bentonite 6/19/2009

Logger:	Lara Weinheimer	**Client:** RICE Operating Company	**Well ID:** SB - 1
Driller:	Harrison & Cooper, Inc. Drilling		
Drilling Method:	Air rotary	**Project Name:** Vacuum D-31 EOL	
Start Date:	6-19-09		
End Date:	6-19-09	**Location:** Vacuum SWD System unit 'D' Sec.31 T17S, R35E Lea County, NM	
Comments: Located: 3 ft SE of the former junction box site TD = 80 ft GW = ~117 ft			

Depth (feet)	chloride field tests	PID	Description
			10 - 15 ft VERY FINE TO FINE SAND, ROCKY light brown, caliche, chert, sandstone, dry
15	861	0	
20	871	0	15 - 45 ft VERY FINE TO FINE SAND light brown, dry
25	844		
30	1393		
35	1412		
LAB	1500	GRO < 10 DRO < 10	
40	1338		
45	997		
50	1101		45 - 55 ft VERY FINE TO FINE SAND light brown, slightly moist
55	779		
60	525		55 - 60 ft VERY FINE TO FINE SAND, QUARTIZE reddish-brown, moist
65	531		60 - 70 ft VERY FINE TO FINE SAND reddish-brown, moist
70	510		
75	425		70 - 75 ft VERY FINE TO FINE SAND reddish-brown, slightly moist
80	300		75 - 80 ft VERY FINE TO FINE SAND reddish-brown, moist
LAB	272	GRO < 10 DRO < 10	



CARDINAL LABORATORIES

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

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

Receiving Date: 06/23/09
Reporting Date: 11/09/09**
Project Owner: NOT GIVEN
Project Name: VACUUM D-31 EOL**
Project Location: VACUUM D-31 EOL**

Sampling Date: 06/19/09
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: HM
Analyzed By: AB/HM

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/kg)	DRO (>C_{10}-C_{28}) (mg/kg)	Cl* (mg/kg)
ANALYSIS DATE		06/24/09	06/24/09	06/23/09
H17687-1	SB #1 @ 35'	<10.0	<10.0	1,500
H17687-2	SB #1 @ 80'	<10.0	<10.0	272
Quality Control		590	600	490
True Value QC		500	500	500
% Recovery		118	120	98.0
Relative Percent Difference		1.6	1.0	2.0

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

Chemist

11/09/09
Date

COPY

H17687 TCL RICE

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name:	ROC	BILL TO P.O. #:	
Project Manager:	Hack Conder	Company:	
Address:		Attn:	
City:	State: Zip:	Address:	
Phone #:	Fax #:	City:	
Project #:	Project Owner:	State: Zip:	
Project Name:	Vacuum Jct D-31 Vacuum D-31 EOL	Phone #:	
Project Location:	Vacuum Jct D-31 Vacuum D-31 EOL	Fax #:	
Sampler Name:	Lara Weinheimer		

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(GRAB OR (COMP.)	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER :	PRESERV.: ACID/BASE	ICE / COOL	OTHER :	SAMPLING: DATE	TIME	ANALYSIS REQUEST: Cl⁻	SO4 ⁼
H17087-1	SD #1 @ 35'	G	1			✓					✓		6-18-09	2:30	✓	✓
-2	SD #1 @ 80'	G	1			✓					✓		6-18-09	2:51	✓	✓

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:	Date: 6-23-09 Time: 12:07	Received By:	
Relinquished By:	Date: Time:	Received By:	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition: Cool: ☑ Yes ☐ No; Intact: ☐ Yes ☐ No	CHECKED BY: (Initials)	

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

email
jpurvis @ riceswd.com
bbaker @ "
Lweinheimer @ "

Joe Purvis called on 11/06/09 @ 1:30p
+ Changed Project Name + Location to Vacuum D-31 EOL.
LS 11/6/09

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

RICE OPERATING COMPANY

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

PID METER CALIBRATION & FIELD REPORT FORM

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

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO:	08-3425	EXPIRATION DATE:	8-29-09
FILL DATE:	2-29-09	METER READING ACCURACY:	100.0

ACCURACY: +/- 2%

SYSTEM	SITE	UNIT	SECTION	TOWNSHIP	RANGE
Vacuum	Jct D-31	D	31	T17S	R35E

SAMPLE ID: Soil Bore #1

DEPTH	PID
15'	0
20'	0

DEPTH	PID

DEPTH	PID

DEPTH	PID

DEPTH	PID

DEPTH	PID

DEPTH	PID

DEPTH	PID

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

Signature _____ Date 6-19-09

SITE MAP

N

CARDINAL LABORATORIES

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

ANALYTICAL RESULTS FOR
RICE OPERATING COMPANY
ATTN: JORDAN WOODFIN
122 W. TAYLOR
HOBBS, NM 88240

Receiving Date: 04/06/09
Reporting Date: 04/08/09
Project Number: NOT GIVEN
Project Name: VACUUM JCT D-31 EOL
Project Location: VACUUM JCT D-31 EOL

Sampling Date: 04/06/09
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: AB/TR

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/kg)	DRO (>C_{10}-C_{28}) (mg/kg)	Cl* (mg/kg)
ANALYSIS DATE		04/07/09	04/07/09	04/07/09
H17200-1	5PT BTM COMP	<10.0	<10.0	1,200
H17200-2	4 WALL COMP	<10.0	<10.0	672
Quality Control		547	542	500
True Value QC		500	500	500
% Recovery		109	108	100
Relative Percent Difference		3.5	3.5	< 0.1

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

COPY

Chemist

04/07/09
Date

H17200 TCL RICE

CARDINAL LABORATORIES

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

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

Company Name:	RICE OPERATING	BILL TO	
Project Manager:	JORDAN WOODFIN	P.O. #:	
Address:	122 W. TAYLOR ST.	Company:	
City:	HOBBS State: NM Zip: 88240	Attn:	
Phone #:	393-9174 Fax #:	Address:	
Project #:	Project Owner:	City:	
Project Name:	VACUUM Jct D-31 EOL	State: Zip:	
Project Location:	VACUUM Jct D-31 EOL	Phone #:	
Sampler Name:	JORDAN WOODFIN	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												
H17200-1	Spt Btm Comp	G	1			X					X		4-10-09	215p	X	X										
-2	Wall Comp	G	1			X					X		4-10-09	330p	X	X										

Relinquished By:	Date: 4-10-09 Time: 5:35	Received By:	Phone Result: ☐ Yes ☐ No Add'l Phone #:
JORDAN WOODFIN		Matty LaBaut	Fax Result: ☑ Yes ☐ No Add'l Fax #:
Relinquished By:	Date: Time:	Received By:	REMARKS: EMAIL RESULTS TO BBAKER@RICESWD.COM cc JPURUIS@RICESWD.COM cc JWOODFIN@RICESWD.COM

Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☐ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials) MKB

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

RICE OPERATING COMPANY

122 West Tayor Hobbs, NM 88240
PHONE: (575) 393-9174 FAX: (575) 397-1471
PID METER CALIBRATION & FIELD REPORT FORM

Check Model Number:

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

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO : 08-3425	EXPIRATION DATE: 8-29-09
FILL DATE: 2-29-08	METER READING ACCURACY: 100

ACCURACY : +/- 2%

SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
Vacuum	D-31 EA	D	-31	17S	35E

SAMPLE ID	PID	SAMPLE ID	PID
4 Wall Comp	0.5		
5pt Btm Comp	2.3		
		COPY	

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

SIGNATUE: Jordan Woolf DATE: 4-4-09

CARDINAL LABORATORIES

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

ANALYTICAL RESULTS FOR
RICE OPERATING COMPANY
ATTN: JORDAN WOODFIN
122 W. TAYLOR
HOBBS, NM 88240

Receiving Date: 04/15/09
Reporting Date: 04/17/09
Project Number: NOT GIVEN
Project Name: VACUUM JCT D-31 EOL
Project Location: VACUUM JCT D-31 EOL

Sampling Date: 04/15/09
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: AB/HM

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/kg)	DRO (>C_{10}-C_{28}) (mg/kg)	Cl* (mg/kg)
ANALYSIS DATE		04/17/09	04/17/09	04/16/09
H17243-1	BLENDED BACKFILL	<10.0	<10.0	720
Quality Control		538	538	500
True Value QC		500	500	500
% Recovery		108	108	100
Relative Percent Difference		13.9	10.5	< 0.1

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl: Std. Methods 4500-Cl B
*Analysis performed on a 1:4 w:v aqueous extract.

Chemist

04/17/09
Date

H17243 TCL RICE

CARDINAL LABORATORIES

101 East Marland, Hobbs, NM 88240
(575) 393-2326 Fax (575) 393-2476

Page ____ of ____

Company Name:	RICE OPERATING	**BILL TO**	ANALYSIS REQUEST
Project Manager:	JORDAN WOODFIN	P.O. #:	
Address:	122 W TAYLOR	Company:	
City:	HOBBS State: NM Zip: 88240	Attn:	
Phone #:	393-9174 Fax #:	Address:	
Project #:	Project Owner:	City:	
Project Name:	Vacuum Jct D-31 EOL	State: Zip:	
Project Location:	Vacuum Jct D-31 EOL	Phone #:	
Sampler Name:	JORDAN WOODFIN	Fax #:	

LAB USE ONLY				MATRIX							PRESERV			SAMPLING			
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			
H17243-1	Bleeded BACKFILL	C	1			X					X		11-15-07	3:45pm	X	X	

COPY

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.

Sampler Relinquished: JORDAN Woodfin	Date: 11-15-07 Time: 4:28	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:	Temp:	Sample Condition Cool / Intact ☑ Yes ☐ Yes ☐ No ☐ No	CHECKED BY: (Initials)	REMARKS: Email Results to: BBAKER@RICESWD.COM cc JPURVIS@RICESWD.COM cc JWOODFIN@RICESWD.COM	

† Cardinal cannot accept verbal changes. Please fax written changes to 575-393-2476.

RICE OPERATING COMPANY

122 West Tayor Hobbs, NM 88240
PHONE: (575) 393-9174 FAX: (575) 397-1471
PID METER CALIBRATION & FIELD REPORT FORM

Check Model Number:

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

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO.: 08-3425	EXPIRATION DATE: 8-29-09
FILL DATE: 2-29-08	METER READING ACCURACY: 100

ACCURACY: +/- 2%

SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
Vacuum	D-31 EOL	D	31	17S	35E

SAMPLE ID	PID	SAMPLE ID	PID
Blended Backfill	20		

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

SIGNATURE: Jordan Wood DATE: 4-15-09

CARDINAL LABORATORIES

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

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

Receiving Date: 05/19/08
Reporting Date: 05/20/09
Project Number: NOT GIVEN
Project Name: VACUUM JCT D-31 EOL
Project Location: VACUUM JCT D-31 EOL

Analysis Date: 05/20/09
Sampling Date: 05/19/09
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: ML
Analyzed By: AB

LAB NO.	SAMPLE ID	Cl^- (mg/kg)
H17457-1	BLENDED BACKFILL II	256
Quality Control		500
True Value QC		500
% Recovery		100
Relative Percent Difference		2.0

METHOD: Standard Methods	4500-Cl'B

Note: Analysis performed on a 1:4 w:v aqueous extract.

COPY

Chemist

05/20/09
Date

H17457 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	BILL TO	
Project Manager:	JORDAN WOODFIN	P.O. #:	
Address:	122. W. TAYLOR	Company:	
City:	HOBBS State: NM Zip: 88240	Attn:	
Phone #:	393-9174 Fax #:	Address:	
Project #:	Project Owner:	City:	
Project Name:	Vacuum Jct D-31 EOL	State: Zip:	
Project Location:	Vacuum, Jct D-31 EOL	Phone #:	
Sampler Name:	JORDAN WOODFIN	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	Cl-	TPH 8015m	Cancel TPH for Discharge Water									
H17457-1	Blended Backfill IL	C	1			X					X		5-19-09	3:00p	X	X										

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:	Date: 5-19-09	Received By:	Phone Result: ☐ Yes ☐ No	Add'l Phone #:
JORDAN WOODFIN	Time: 4:35		Fax Result: ☐ Yes ☐ No	Add'l Fax #:
Relinquished By:	Date:	Received By:	REMARKS:	
	Time:			

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

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

CHECKED BY: (Initials)

EMAIL Results to:
BBAKER@RICESWD.COM
cc JPURVIS@RICESWD.COM
cc JWOODFIN@RICESWD.COM

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

RUSH!

RICE OPERATING COMPANY

122 West Tayor Hobbs, NM 88240
PHONE: (575) 393-9174 FAX: (575) 397-1471
PID METER CALIBRATION & FIELD REPORT FORM

Check Model Number:

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

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO.: 083425	EXPIRATION DATE: 8-29-09
FILL DATE: 2-29-08	METER READING ACCURACY: 100

ACCURACY : +/- 2%

SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
Vacuum	D-31 EOL	D	31	17S	35E

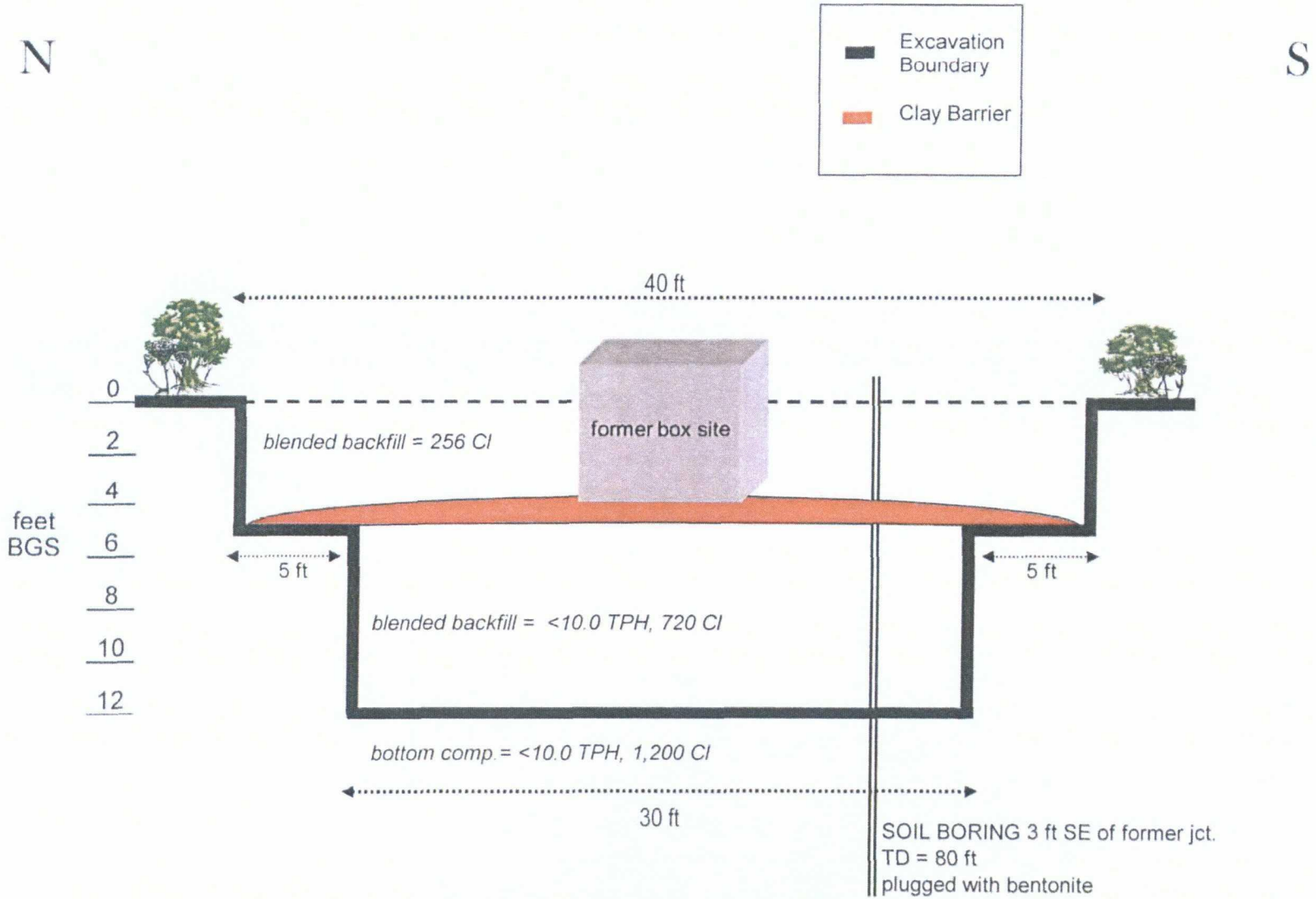
SAMPLE ID	PID	SAMPLE ID	PID
Blended Backfill	0.9		

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

SIGNATURE: Jordan Woodf DATE: 5-19-09

Vacuum D-31 EOL
Unit 'D' Sec. 31, T17S, R35E

Excavation Cross-Section



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

AASHTO R18
DEBRA P. HICKS, P.E./L.S.I.
WILLIAM M. HICKS, III, P.E./L.S.

To: Rice Operating Company
Attn: Hack Conder
122 W. Taylor
Hobbs, NM 88240

Material: Cooper Red Clay

Test Method: ASTM: D 2922

Project: General Information
Project No. 2008.1069

Date of Test: ~~April 16, 2009~~ 4/16
5/21/09 CH

Depth: See Below

Depth of Probe: 12"

Test No.	Location	Dry Density % Max	% Moisture	Depth
SG 13	Vacuum Jct. D/31 EOL - 10' W. & 10' N. of SE Corner of Pit	90.7	16.9	5' Below Surface

COPY

Control Density: 100.4
ASTM: D 698

Optimum Moisture: 21.6%

Required Compaction: 90 - 95%

Densometer ID: 815

Lab No.: 09 3200-3201

PETTIGREW & ASSOCIATES

Copies To: Rice Operating

BY: _____

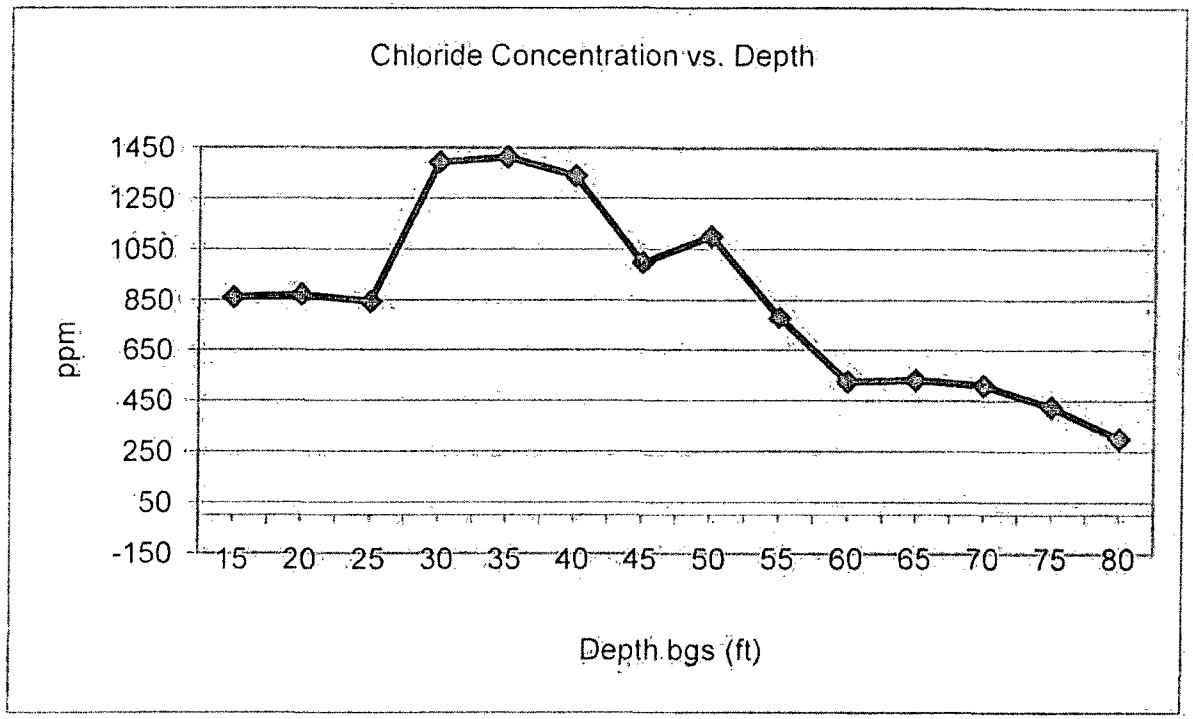
BY: _____ P.E.

Vacuum D-31 EOL

Unit 'D', Sec. 31, T17S, R35E

SOIL BORING samples at 3 ft southeast of the junction (source)

Depth bgs (ft)	[Cl⁻] ppm
15	861
20	871
25	844
30	1393
35	1412
40	1338
45	997
50	1101
55	779
60	525
65	531
70	510
75	425
80	300



Groundwater = 117 ft

Appendix B
Quality Procedures

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

Rice Environmental Consulting and Safety

Quality Procedures

Table of Contents

Rice Environmental Consulting and Safety

Quality Procedure
Soil Samples for Transportation to a Laboratory

1.0 Purpose

This procedure outlines the methods to be employed when obtaining soil samples to be taken to a laboratory for analysis.

2.0 Scope

This procedure is to be used when collecting soil samples intended for ultimate transfer to a testing laboratory.

3.0 Preliminary

3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the soil.

3.2 If collecting TPH, BTEX, RCRA 8 metals, cation /anions or O&G, the sample jar may be a clear 4 oz. container with Teflon lid. If collecting PAH's, use an amber 4 oz. container.

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label.) Affix the labels to the jars.

5.0 Sampling Procedure

5.1 Do not touch the soil with your bare hands. Use new nitrile gloves to help minimize any contamination.

5.2 Go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to obtain the soil.

5.3 Pack the soil tightly into the container leaving the top slightly domed. Screw the lid down tightly. Enter the time of collection onto the sample collection jar label.

5.4 Place the sample directly on ice for transport to the laboratory if required.

5.5 Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

6.0 Documentation

6.1 The testing laboratory shall provide the following minimum information:

a. Project and sample name.
b. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
c. Results of the requested analyses
d. Test Methods employed
e. Quality Control methods and results

Rice Environmental Consulting and Safety

QUALITY PROCEDURE
Chloride Titration Using
0.282 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. If necessary, prepare a composite sample 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 larger 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 20 grams of reverse osmosis water to the soil sample and shake well.

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

5.0 Titration Procedure

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

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

5.3 Using a 1 ml pipette, carefully add .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.

5.4 Record the ml of silver nitrate used.

6.0 Calculation

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

$$\frac{.282 \times 35.450 \times \text{ml } AgNO_3}{\text{ml water extract}} \times \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

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.

Rice Environmental Consulting and Safety

Quality Procedure
Development of Cased Water-Monitoring Wells

1.0 Purpose

This procedure outlines the methods to be employed to develop cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Sample Collection and Preparation

3.1 Prior to development, the static water level and height of the water column within the well casing will be measured with the use of an electric D.C. probe.

3.2 All measurements will be recorded within a field log notebook.

3.3 All equipment used to measure the static water level will be decontaminated after each use by means of Liquinox, a phosphate free laboratory detergent, and water to reduce the possibility of cross-contamination. The volume of water in each well casing will be calculated.

4.0 Purging

4.1 Wells will be purged by using a 2" decontaminated submersible pump or dedicated one liter Teflon bailer. Wells should be purged until the pH and conductivity are stabilized and the turbidity has been reduced to the greatest extent possible.

4.2 If a submersible is used the pump will be decontaminated prior to use by scrubbing the outside surface of tubing and wiring with a Liquinox water mixture, pumping a Liquinox-water mixture through the pump, and a final flush with fresh water.

5.0 Water Disposal

5.1 All purge and decontamination water will be temporarily stored within a portable tank to be later disposed of in an appropriate manner.

6.0 Records

6.1 Rice Environmental Consulting and Safety will record the amount of water removed from the well during development procedures. The purge volume will be reported to the appropriate regulatory authority when filing the closure report.

Rice Environmental Consulting and Safety

Quality Procedure
Sampling of Cased Water-Monitoring Well

1.0 Purpose

This procedure outlines the methods to be employed in obtaining water samples from cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Preliminary

3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the water.

3.2 The following table shall be used to select the appropriate sampling container, preservative method and holding times for the various elements and compounds to be analyzed.

Compound to be Analyzed	Sample Container Size	Sample Container Description	Cap Requirements	Preservative	Maximum Hold Time
BTEX	40 ml	VOA Container	Teflon Lined	HCL	14 days
TPH (8015 Extended)	40 ounces	(2) 40ml VOA vials	Teflon Lined	HCL and Ice	14 days
PAH	1 liter	amber glass	Teflon Lined	Ice	7 days
Cation/Anion	1 liter	HD polyethylene	Any Plastic	None	48 Hrs
Metals	1 liter	HD polyethylene	Any Plastic	Ice/HNO_3	28 Days
TDS	300 ml	clear glass or 250 ml HD polyethylene	Any Plastic	Ice	7 Days
Cl-	500 ml	HD polyethylene	Any Plastic	None	28 Days

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the well identification and the individual tests to be performed at that location. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label). Affix the labels to the jars.

5.0 Bailing Procedure

5.1 Identify the well from the sites schematics. Place pre-labeled jar(s) next to the well. Remove the plastic cap from the well bore by first lifting the metal lever and then unscrewing the entire assembly.

5.2 Using a dedicated one liter Teflon bailer or submersible pump, purge a minimum of three well volumes. Place the water in storage container for transport to a ROC disposal facility.

5.3 If using a bailer, take care to insure that the bailing device and string does not become cross-contaminated. A clean pair of nitrile gloves should be used when handling either the retrieval string or bailer. The retrieval string should not be allowed to come into contact with the ground.

6.0 Sampling Procedure

6.1 Once the well has been bailed in accordance with 5.2 of this procedure, a sample may be decanted into the appropriate sample collection jar directly from the bailer or submersible pump.

6.2 Note the time of collection on the sample jar with a fine Sharpie.

6.3 Place the sample directly on ice for transport to the laboratory. The preceding table shows the maximum hold times between collection and testing for the various analyses.

6.4 Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

7.0 Documentation

7.1 The testing laboratory shall provide the following minimum information:

A. Project and sample name.
B. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
C. Results of the requested analyses
D. Test Methods employed
E. Quality Control methods and results

Calculation for Determining the Minimum Bailing Volume for Monitor Wells
Formula $V = (\pi r^2 h)$
2" well [V/231=gal] X 3 = Purge Volume

V=Volume
π=pi
r=inside radius of the well bore
h=maximum height of well bore in water table

Example:

π	r^2	h(in)	V(cu.in)	V(gal)	X 3 Volumes	Actual
3.1416	1	180	565.488	2.448	7.34 gal	>10 gal

Rice Environmental Consulting and Safety

Quality Procedure
Composite Sampling of Excavation Sidewalls and Bottoms For TPH and Chloride Analysis

1.0 Purpose

This procedure outlines the methods to be employed when obtaining final composite soil samples for TPH and Chloride analysis.

2.0 Scope

This procedure is to be used in conjunction with ***Quality Procedure – 02: Soil Samples for Transportation to a Laboratory*** and will be inserted at subparagraph 5.2 of Section 5.0: Sampling Procedure.

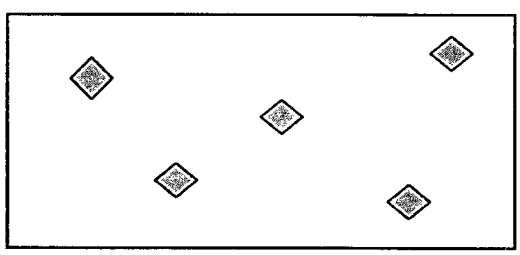
3.0 Sampling Procedure

Follow ***Quality Procedure – 02: Soil Samples for Transportation to a Laboratory*** for all Sections and subparagraphs until subparagraph 5.2 of Section 5.0: Sampling Procedure. Instead of 5.2 instructions, perform the composite sample collection procedure as follows:

3.1 Go to the excavation with a new plastic baggie. If not analyzing for ions or metals, use a trowel to obtain the soil. If the excavation is deeper than 6' BGS, do not enter the pit, but use a backhoe to assist in procurement of the sample. (If a backhoe is used, the backhoe will obtain an amount of soil from each composite point; bring the purchase to the surface staging area where a sample-portion of soil will be extracted from the backhoe purchase. The remainder of the backhoe purchase will be staged on the surface with other staged soils.)

3.2 Sidewall samples

3.2.1 On each sidewall, procure a 5oz sample from each of five distinct points on the sidewall with distinct points resembling the "W" pattern:



3.2.2 Thoroughly blend these five samples in a labeled baggie.
3.2.3 Repeat steps 3.2.1 through 3.2.4 for each remaining sidewall.
3.2.4 From each labeled baggie, procure a 5 oz portion and pour into a baggie labeled "Sidewall Composite". Blend this soil mixture completely.
3.2.5 Obtain proper laboratory sample container for "Sidewall Composite" and continue with subparagraph 5.3 of QP – 01.

3.3 Bottom Sample
3.3.1 From bottom of excavation, procure a 5oz sample from each of five distinct points with distinct points resembling the "W" pattern as illustrated above.
3.3.2 Thoroughly blend these five samples in a clean baggie.
3.2.3 Obtain proper laboratory sample container for "Bottom Composite" and continue with subparagraph 5.3 of QP – 01.

Rice Environmental Consulting and Safety

QUALITY PROCEDURE
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^{0}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 a RAE Systems Photoionization device. (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 QP-7. If the reading is 100 ppm or less, NMOCD BTEX guideline has been met and no further testing for 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.**

Rice Environmental Consulting and Safety

Quality Procedure
Composite Sampling of Excavation Sidewalls and Bottoms For BTEX

1.0 Purpose

This procedure outlines the methods to be employed when obtaining final composite soil samples for BTEX analysis.

2.0 Scope

This procedure is to be used when collecting soil samples intended for ultimate transfer to a testing laboratory for BTEX analysis. This procedure is to be used only when the PID field-test results for OVM exceeds 100 ppm.

3.0 Preliminary

3.1 Obtain sterile, clear, 2 oz. glass containers with Teflon lid from a laboratory supply company or the testing laboratory designated to conduct analyses of the soil.

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label.) Affix the labels to the jars.

5.0 Sampling Procedure

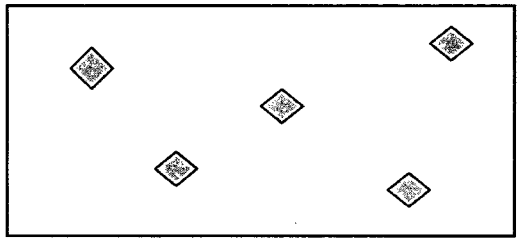
5.1. Do not touch the soil with your bare hands. Use new nitrile gloves to help minimize any cross-contamination.

5.2. If safe and within OSHA regulations, go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to

obtain the soil. If the excavation is deeper than 6' BGS, do not enter the pit, but use a backhoe to assist in procurement of the sample. (If a backhoe is used, the backhoe will obtain an amount of soil from each composite point; bring the purchase to the surface staging area where a sample-portion of soil will be extracted from the backhoe purchase. The remainder of the backhoe purchase will be staged on the surface with other staged soils.)

5.3. Sidewall Samples

5.3.1. On each sidewall, procure a 2oz sample from each of five distinct points on the sidewall with distinct points resembling the "W" pattern:



5.4. Pack the soil tightly into the container leaving the top slightly domed. Screw the lid down tightly. Enter the time of collection onto the sample collection jar label. Repeat for each sampling point.

5.5. Place the samples directly on ice for transport to the laboratory if required.

5.6. Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

6.0 Documentation

6.1 The testing laboratory shall provide the following minimum information:

a. Project and sample name.
b. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
c. Results of the requested analyses
d. Test Methods employed
e. Quality Control methods and results

Rice Environmental Consulting and Safety

Procedure for Plugging & Abandonment of Cased Water Monitoring Wells

1.0 Purpose

This procedure outlines the methods to be employed to plug and abandon cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells located in the State of New Mexico

3.0 Preliminary

3.1 No well may be drilled, modified or plugged without NMOCD approval. Additional approvals may be required if the well is situated in a sensitive area, within municipal jurisdictions or on federal or tribal lands.

4.0 Plugging

4.1 Each bore will be filled with a 1% - 3% bentonite/concrete slurry to three feet bgs. The remaining three feet will be capped with concrete only.

4.2 All wellheads will be removed to below ground surface.

6.0 Records

6.1 The company plugging the well shall prepare a report on their company letter head listing the site name and describing general well construction including total depth of the well, the diameter of casing, material used to plug the well (e.g. bentonite/cement slurry), and date of the plugging operation.

6.2 It is recommended but not required that photographs of the final surface restoration be taken and included within the records.

6.3 Copies of the plugging report shall be submitted to all appropriate agencies and retained by the well operator for a minimum period of ten years.