1R - 425 - 1

APPROVALS

YEAR(S):

2007 - 2006

AR-425-01
Gen. Cor.
2007

YAHOO! SMALL BUSINESS Email

Date:	Tue, 20 Mar 2007 13:54:46 -0700 (PDT)
From:	"L. Peter Galusky, Jr. P.E." <lpg@texerra.com>
Subject:	Addenda for Vacuum N-6-1, K-35-1 and E-2
To:	"Edward J. Hansen" <edwardj.hansen@state.nm.us>
CC:	"Kristin Pope" <kpope@riceswd.com>

Dear Edward,

I offer the following in reply to your request for additional information to supplement the Corrective Action Plans th recently submitted for Vacuum N-6-1, K-35-1 and E-2.

Disposition of recovered water: Rice intends to employ MacLaskey Oilfield Services to collect the recovered wate site. We anticipate that that will use trucks of 130 +/- bbl capacity. The recovered water will be trucked to the Stat facility at Arkansas Junction (operated by Alliance). Rice will obtain manifests of each load and retain these in the

As constructed cross-sections of clay liners: Please find the attached images for each site, which were prepared b I have also included photographs to supplement the drawings.

I am providing this information via e-mail so that you may have it at your fingertips more quickly. I will forward har the same to you in the mail.

Again, I greatly appreciate OCD's consideration of these proposed Corrective Action Plans for these projects.

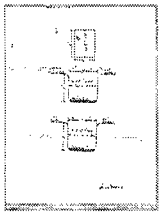
Sincerely,

Pete G.

L. Peter Galusky, Jr. Ph.D.
Principal
Texerra
Energy Square
505 N. Big Spring, Suite 404
Midland, Texas 79701
E-mail: lpg@texerra.com
Web: www.texerra.com
Office Telephone/Fax: 877-534-9001

Attachments

Photos:



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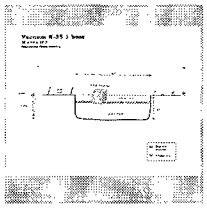

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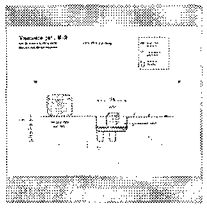

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Vacuum_E_2_clay_liner_photo_9_14_04.JPG (52

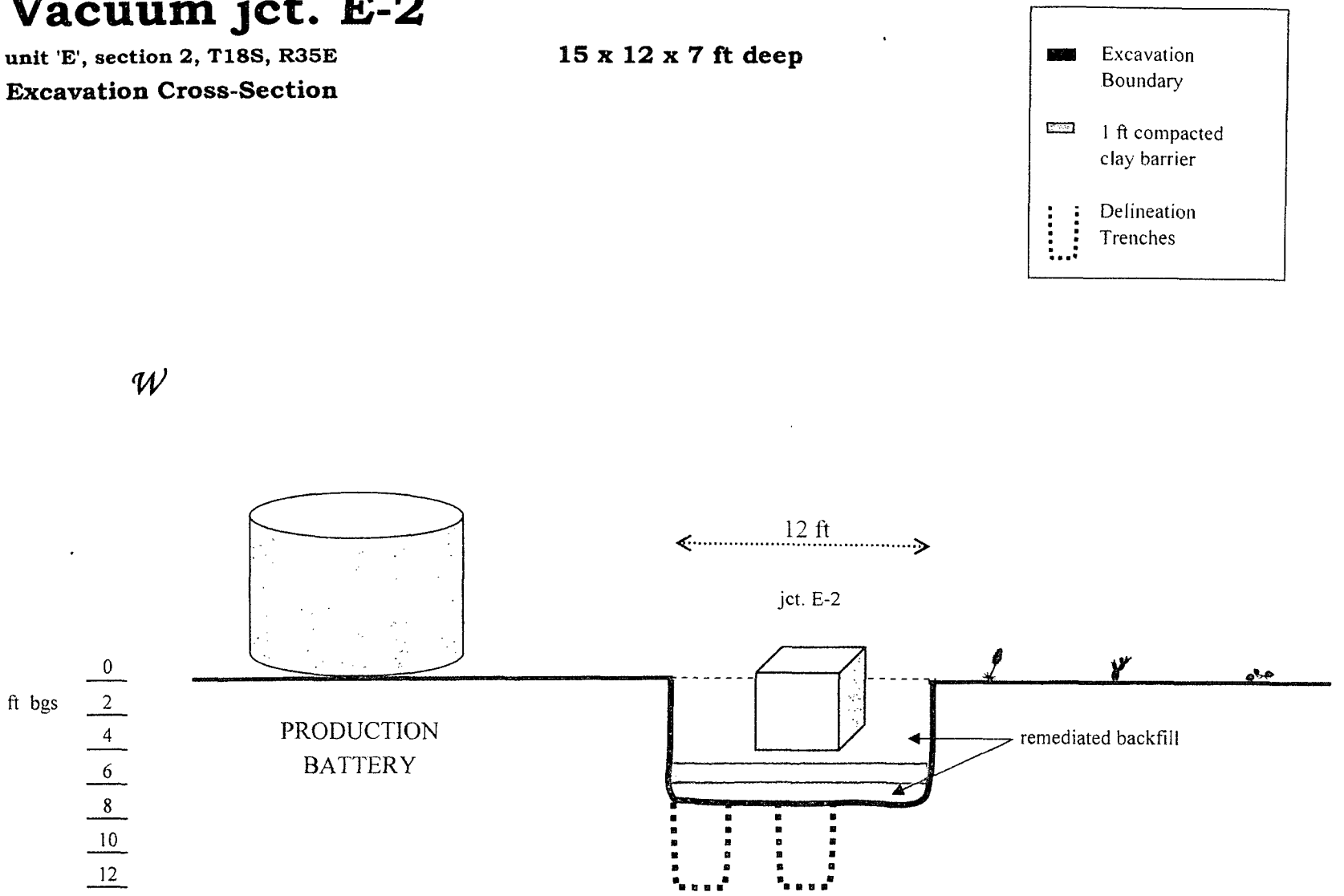
Save All to Yahoo! Photos

Vacuum jct. E-2

unit 'E', section 2, T18S, R35E

Excavation Cross-Section

15 x 12 x 7 ft deep



E-2

Hansen, Edward J., EMNRD

From: Hansen, Edward J., EMNRD
Sent: Wednesday, March 21, 2007 3:20 PM
To: Carolyn Haynes; 'Kristin Pope'
Cc: Price, Wayne, EMNRD; 'L. Peter Galusky, Jr. P.E.'
Subject: 1R0425-01 - Vacuum SWD E-2 Site; 1R0425-03 - Vacuum SWD K-35-1; 1R0479 - Vacuum SWD N-6-1

Dear Ms. Haynes:

The New Mexico Oil Conservation Division (NMOCD) has reviewed your Corrective Action Plans (CAPs) (dated February 28, 2007, and March 2, 2007, and amended March 20, 2007) for the above referenced three sites. The NMOCD hereby approves the CAPs with the condition that the proposed corrective action be initiated by May 1, 2007, at each site. Also, Rice Operating Company must submit a monthly summary report(s) for each site. Upon review of the report(s), the NMOCD will determine if the submittal of an Abatement Plan will be required for any of the three sites.

Please be advised that NMOCD approval of these plans 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, NMOCD approval does not relieve the owner/operator of responsibility for compliance with any NMOCD, 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

Price, Wayne, EMNRD

From: Price, Wayne, EMNRD
Sent: Friday, May 19, 2006 2:11 PM
To: 'lpg@texerra.com'
Cc: Kristin Pope
Subject: RE: Rice Operating Company Vacuum Field E-2 ICP OCD #1R0425-01

OCD hereby approves of the ICP for the above site with the following conditions:

1. Please provide the sample results of all remediated soils above and below the clay liner within 10 days.
2. Please provide waste disposal manifest.
3. The vertical delineation shall consist of at least one bore hole through the area of noted highest contamination. Soil samples shall be collected above and below the clay barrier for any constituent of concern. Other bore holes are recommended.
4. This approval will be included in the final report.
5. This project has been assigned OCD # 1R425-01. Please provide this number on all correspondence.
6. The ICP shall be completed by July 14, 2006 and all information, included information requested above shall be reported to OCD no later than July 28, 2006.
7. Notify the OCD Santa Fe office and the OCD District office at least 48 hours in advance of all scheduled activities such that the OCD has the opportunity to witness the events and/or split samples during OCD's normal business hours.

Special Note: From looking at the disclosure report it appeared that chloride levels ranged from 960-3958. If this project was closed pursuant to "in accordance with the OCD-approved Junction Box Upgrade Work Plan (Rev. July 2003)" which only allow soils containing 1000 ppm chlorides there may be an issue of proper closure. Please investigate this issue and explain why the clay barrier was placed before final investigation. Also explain why this closure did not follow the Jct Box work plan.

Please be advised that NMOCD approval of this plan does not relieve the owner/operator of Responsibility should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve the owner/operator of responsibility for compliance with any other federal, state, or local laws and/or regulations

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From: L. Peter Galusky, Jr. P.E. [mailto:lpg@texerra.com]
Sent: Thursday, May 18, 2006 10:34 AM
To: Price, Wayne, EMNRD
Cc: Kristin Pope
Subject: Rice Operating Company Vacuum Field E-2 ICP

Wayne,

Please find attached, in Adobe .pdf format, and ICP for the above referenced site.

As we are interested in scheduling field sampling for this site in tandem with other nearby sites in June, we would be most grateful for your review of this ICP at your earliest opportunity.

Please call me if you have any questions or need additional information.

Thank you.

Sincerely,

Pete G.

L. Peter Galusky, Jr. Ph.D., P.E.
Environmental Engineer
Energy Square
505 N. Big Spring, Suite 404
Midland, Texas 79701
E-mail: lpg@texerra.com
Cell: 432-967-2128
Web: www.texerra.com

Price, Wayne, EMNRD

From: L. Peter Galusky, Jr. P.E. [lpg@texerra.com]
Sent: Thursday, May 18, 2006 10:34 AM
To: Price, Wayne, EMNRD
Cc: Kristin Pope
Subject: Rice Operating Company Vacuum Field E-2 ICP
Attachments: 2135144812-Rice Vacuum Field E-2 ICP.pdf

Wayne,

Please find attached, in Adobe .pdf format, and ICP for the above referenced site.

As we are interested in scheduling field sampling for this site in tandem with other nearby sites in June, we would be most grateful for your review of this ICP at your earliest opportunity.

Please call me if you have any questions or need additional information.

Thank you.

Sincerely,

Pete G.

L. Peter Galusky, Jr. Ph.D., P.E.
Environmental Engineer
Energy Square
505 N. Big Spring, Suite 404
Midland, Texas 79701
E-mail: lpg@texerra.com
Cell: 432-967-2128
Web: www.texerra.com

L. Peter Galusky, Jr. Ph.D., P.G.
Consulting Hydrogeologist

May 19th, 2006

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

RE: **Investigation and Characterization Plan**
Vacuum E-2 Junction Box, UL E Sec 2 T18S R 35E

CERTIFIED MAIL, RETURN RECEIPT

Mr. Price:

RICE Operating Company (ROC) has retained L. Peter Galusky, Jr. Ph.D. to address potential environmental concerns at the above-referenced site. ROC is the service provider (operator) 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 Partners, who provide all operating capital on a percentage ownership/usage basis. Environmental projects of this magnitude require System Partner AFE approval, and work begins as funds are received. In general, project funding is not forthcoming until NMOCD approves the work plan. Therefore, your timely review of this submission would be greatly appreciated.

For all such environmental projects, ROC will choose a 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, as described below:

1. **This** Investigation and Characterization Plan (**ICP**) **is a proposal** for data gathering 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 this is warranted.

3. Finally, after implementing the remedy, a Closure Report with final documentation will be submitted.

Background and Previous Work

The subject site is located approximately approximately 2 miles ESE of Buckeye, NM, approximately 7,500 ft southwest of the intersection of Buckeye Road and County Road 53 and; (please see Appendix A). The topography is gently sloping toward the southeast. Soils on the site are mapped (as KO) in the Lea County Soil Survey[1] as belonging to the Kimbrough gravelly loam soil series. These are characterized by gravelly loam to a depth of approximately 6 inches, and this is underlain by several feet of calcium indurated caliche. Groundwater is estimated to occur at a depth of approximately 51 feet, in unconsolidated Tertiary alluvium of the Ogallala Formation[2].

In September of 2004, ROC replaced a junction box at the subject site, in accordance with the OCD-approved Junction Box Upgrade Work Plan (Rev. July 2003). The junction box was located within approximately 100 ft. east of an operating tank battery. During delineation and excavation, visual evidence of contamination was suspected. Subsequent soil investigation (using field titration kits) revealed detectable levels of chlorides, ranging from approx. 1,300 ppm near the surface to approximately 2,300 ppm at the limit of excavation, 7 ft below ground surface; (please see Appendix B *for field* sampling results and photographs from preliminary soils evaluation, and schematics of junction box replacement). PID measure of hydrocarbon revealed insignificant levels (less than 18 ppm). The areal extent and depth of chloride contamination from the replaced junction box are not presently known, and further evaluation will be needed to determine this.

The old, wooden junction box and connections were removed and soils beneath it were excavated to a depth of approximately 7-12 feet. The excavated soil was blended on site and backfilled into the hole. At 6 feet below ground surface a 1 foot thick compacted clay barrier was installed to inhibit potential further downward chloride migration from overlying soils. The remaining excavated soils were backfilled on top of the clay barrier, and a waterproof junction box was installed.

The surface (ecological) impact of this release was relatively small. However, as the potential for groundwater contamination exists, this warrants further evaluation for chlorides and petroleum hydrocarbons, the constituents of concern. Therefore, ROC proposes additional investigative work, as outlined in the Investigation and Characterization Plan (ICP) below, to more definitively evaluate the extent of contamination caused by the release, and to then evaluate the potential for groundwater degradation.

It should be noted that the source of this impact is historical. There is no longer a threat of continued, compounded impact at this site, as the junction box has been removed, and the Vacuum SWD System subsequently placed out of service.

---

[1] USDA SCS. Soil Survey of Lea County, New Mexico. Issued January, 1974.
[2] New Mexico Bureau of Geology & Mineral Resources. 1982. Circular 175 – Western extent of the Ogallala Formation in New Mexico.

Investigation and Characterization Plan

Task 1 - Collect Regional Hydrogeological Data

Published maps and reports of surficial geology, soils, hydrogeology and ecosystem characteristics will be reviewed and summarized to provide a context and baseline from which to evaluate the results of subsequent analysis. State and county records of water wells will be reviewed and summarized to identify downgradient receptors which could potentially be affected.

Task 2 - Evaluate Concentrations of Constituents of Concern in Soil (and Ground Water)

Soils samples will be taken from a sufficient number of selected representative locations and depths in order to quantify the areal extent and depth of contamination with respect to chlorides and hydrocarbons. Soil samples will be taken and tested for chlorides, using field titration methods, and for BTEX, using EPA-standard PID methodology. A small sub-set of samples at key locations (such as the total sampled depth, apparent "hot spots", etc.) will be sent to a commercial laboratory for verification/calibration of the field tests, according to standard EPA sampling and laboratory methods.

A limited number of monitoring wells may be constructed in selected, representative locations, generally where WQCC standards are exceeded within 10+/- feet of the water table and where the location of such wells will useful for hydrogeological analysis . All such monitoring wells will be constructed per NM Dept. Environment standards; (*see Appendix C*).

Task 3 - Evaluate Risk of Groundwater Impact

The data gathered from this study will be summarized and presented in simple and clear graphs and maps. This will provide a means for an intuitive evaluation of the apparent potential for groundwater impacts. Additionally, simple spreadsheet vadose zone /or groundwater dilution models may be used as a supplemental, interpretive tool. The information thus obtained from this work will be evaluated to determine if there exists any substantial risk for groundwater impacts resulting from this release of produced water.

If the evaluation demonstrates that residual constituents pose no threat to ground water quality, then only a surface restoration plan will be proposed to OCD. If, as a result of this work, it is believed that this produced water leak does pose a present or future risk of impacting groundwater quality, then a *risk-based* corrective action plan (CAP) will be developed and proposed to OCD which addresses the identified risks.

I appreciate the opportunity to work with you on this project. Please call either myself, at the number below, or Kristin Farris Pope (ROC) at 505-393-9174, if you have any questions or wish to discuss these matters.

Thank you for your consideration.

Sincerely,

L. Peter (**Pete**) Galusky, Jr. Ph.D., P.G.
Consulting Hydrogeologist

505 N. Big Spring, Suite 404
Midland, Texas 70701
Tel: 432-967-2128
E-mail: lpg@texerra.com
Web site: www.texerra.com

cc: CDH, KFP, file

attachments as noted

Appendix A – Maps

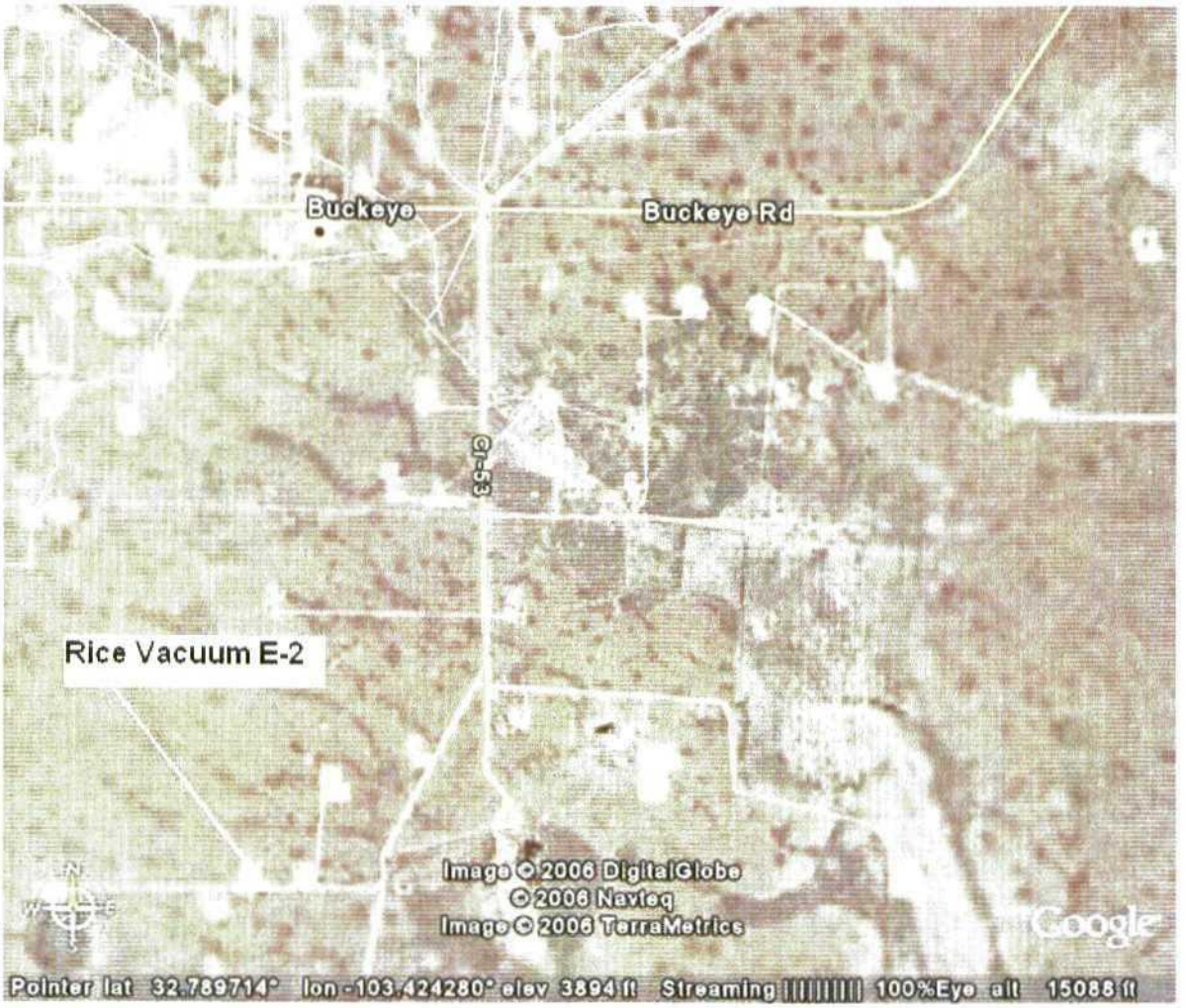

Figure A-1 – Satellite photo (15,000 ft view) showing location[3] of Jct Box E-2. Note production battery just east of the site.

[3] From www.earth.google.com .

Disturbed Area

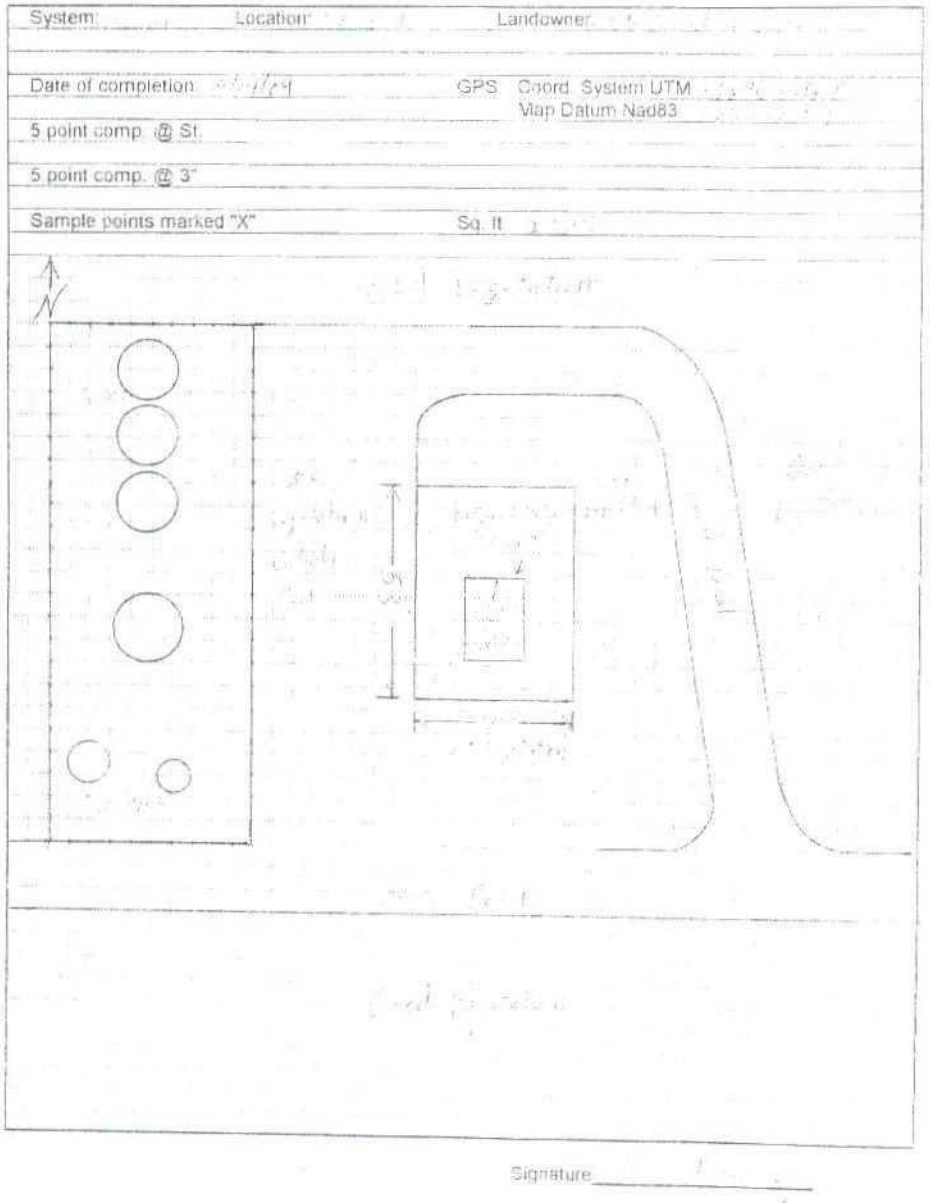

Figure A-2 – Site Diagram (also shows production battery to the west)

Appendix B – Photographs, Preliminary Data & Junction Box Schematic

Figure B-1 – Photographs taken August, 2003 and September, 2004

RICE OPERATING COMPANY
JUNCTION BOX **DISCLOSURE*** REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth
Vacuum	E-2	E	2	18S	35E	Lea	7	5	4

LAND TYPE: BLM_____ STATE__X__ FEE LANDOWNER_____ OTHER_____

Depth to Groundwater 52 feet NMOCD SITE ASSESSMENT RANKING SCORE: 10

Date Started 8/31/2005 Date Completed 9/14/2004 NMOCD Witness no

Soil Excavated 60 cubic yards Excavation Length 15 Width 12 Depth 7-12 feet

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

FINAL ANALYTICAL RESULTS:

Sample Date n/a **Sample Depth** n/a

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

Sample Location	PID ppm	GRO mg/kg	DRO mg/kg	Chloride mg/kg
4-WALL COMP.	no lab samples were collected on final excavation			
BOTTOM COMP.				
REMED. BACKFILL				

CHLORIDE FIELD TESTS

LOCATION	DEPTH (ft)	ppm
vertical at junction box	6	1200
	7	1409
	8	2009
	9	1319
	10	1230
	11	1379
	12	1529
5 ft *EAST* of junction	1	1290
	2	1259
	3	960
	4	1110
	5	2369
	6	2459
	7	2280
5 ft *NORTH* of junction	1	2669
	2	2549
	3	3958
	4	2609
	5	2189
	6	2370
	7	2250

General Description of Remedial Action: This junction box is located in rocky pastureland across a dirt road from an active production battery. The old box lumber was removed and the pipeline and connections were replaced with a new 2-inch poly pipeline. The location was delineated using a backhoe while PID field screenings (enclosed) and chloride field tests were conducted at regular intervals. PID levels were generally low throughout the excavation and none exceeded the maximum reading of 17.8 ppm. Chloride concentrations were relatively consistent with depth and breadth throughout the 12 x 15 x 7-12 ft deep excavation. The excavated soil was blended on-site and backfilled into the hole. At 6 ft BGS, a 1-ft-thick compacted clay barrier was installed to inhibit further chloride migration. The remaining spoils were backfilled on top of the clay. A new watertight junction box was built at this site. NMOCD was notified of potential groundwater impact at this location on 11/29/2004 via e-mail. The Vacuum System Partners have decided to abandon the SWD system; work towards abandonment will progress in 2005.

enclosures: chloride graphs, photos, excavation cross-section, PID field screenings, clay test

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

SITE SUPERVISOR Rob Elam SIGNATURE not available COMPANY Curt's Environmental--Odessa, TX

REPORT ASSEMBLED BY Kristin Farris Pope SIGNATURE_____

DATE 3/9/2005 TITLE Project Scientist

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

Figure B-2 – ROC Junction Box Disclosure Report

Vacuum jct. E-2

unit 'E', sec. 2, T18S, R35E

5 ft EAST of junction

Depth bgs (ft)	[Cl⁻] ppm
1	1290
2	1259
3	960
4	1110
5	2369
6	2459
7	2280

Groundwater = 52 ft

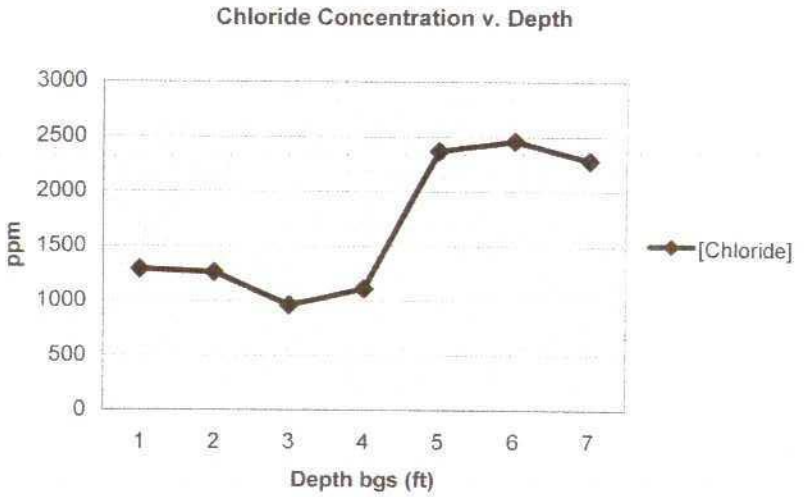

Figure B-3 – Preliminary Chloride Data

Vacuum Jct. E-2 ICP

Figure B-4 – Junction Box Replacement Schematic Diagram

Figure B-5 – Photograph taken February, 2006

Appendix C – NM Environmental Dept. Monitoring Well Standards

In order to accurately determine aquifer characteristics and obtain representative ground- water samples, it is important that monitoring wells be constructed and installed properly. In addition, the construction materials utilized should not alter the chemical composition of the groundwater in such a way as to interfere with the compounds being analyzed during assessment activities. The practices set forth in the American Society for Testing and Materials (ASTM) document D 5092-90 and in the State Engineer Office regulations should be followed, in addition to the items below (see schematic diagram below text):

- Borehole: The borehole should be drilled a minimum of 4 inches larger than the casing diameter, to allow for the emplacement of sand and sealant.

- Casing: The casing should, unless otherwise approved by the department, consist of Schedule 40 or heavier, flush mount threaded, o-ring sealed, PVC pipe of not less than two inches nominal inside diameter. Four inches nominal inside diameter may be appropriate for wells greater than or equal to 100 feet deep. No adhesive should be used to join the sections of casing.

- Screen: The screen should be of an appropriate length not to exceed 20 feet and should be machine slotted or other manufactured screen. The slot size should be appropriate for the grain size of the sand pack. No on-site or hack-saw slotting is permitted. A sediment sump should be attached to the base of the screen, with a cap at the bottom. The length of the sump may vary, depending on the nature and grain size of the formation, but should be a minimum of 2 feet in length. If the uppermost aquifer is unconfined, the top of the screen should be five feet above the water table to allow for seasonal fluctuations and to determine if NAPL is present. If the aquifer is confined, the top of the screen should be placed in such a way as to preserve the integrity of the aquifer.

- Filter pack: An annular space from 2 feet below to 2 feet above the screen should be packed with filter pack sand. The sand should be clean, silica based, and properly sized to prevent fines from entering the well. A tremmie pipe should be used for sand placement for wells greater than 50 feet deep.

- Filter pack seal: When appropriate, monitoring wells and piezometers should be constructed with a filter pack seal. The filter pack seal is to extend 1 foot above the top of the filter pack and should consist of 1 foot of clean, fine-grained silica sand.

- Bentonite seal: The annular space for at least 2 feet above the filter pack seal should be grouted or sealed with hydrated bentonite pellets, 0.25 or 0.5 inch in size as appropriate.

- Annular space above seal: The annular space above the seal should be filled with a bentonite/cement grout to reduce permeability.

  Note: Where shallow groundwater exists (less than 10 feet below ground surface), well construction must be pre-approved by the department.

- Surface completion: Where site conditions allow, the casing should extend at least 2 feet above ground surface. The casing top should be protected by a locking cap, and a locking shroud or well vault is to protect the exposed casing. Caps or steel covers should contain a clear label for monitoring well. The shroud or vault should be large enough to allow easy access for removal of the well cap. Flush mounted well vaults should be water tight, bolted down, and appropriately sized for anticipated traffic. A concrete slab (minimum of a 2 foot radius and a 6 inch thickness and reinforced in high traffic areas) should be poured around the shroud. The pad should be sloped so that rainfall and runoff flows away from the shroud.

- Well construction: Care must be taken during installation to prevent contaminants from entering the well. After installation is complete, develop the monitoring well to remove all sediment, to reduce turbidity to the greatest extent possible, and to allow groundwater to flow freely through the well screen. See Chapter 1, Section 1.5 for procedures on monitoring well development.

- Survey: The top of casing of each monitoring well should be surveyed to determine its USGS elevation. This elevation and the depth to water should be established to an accuracy of 0.01 foot. In this way, the USGS elevation of the groundwater surface can be established. A unique, easily identifiable point should be marked on the top of the casing for this measurement. The horizontal location of the well should be determined to an accuracy of 0.1 foot.

- Lithologic log: A lithologic log and a well construction diagram should be completed for each monitoring well and submitted to the Department.

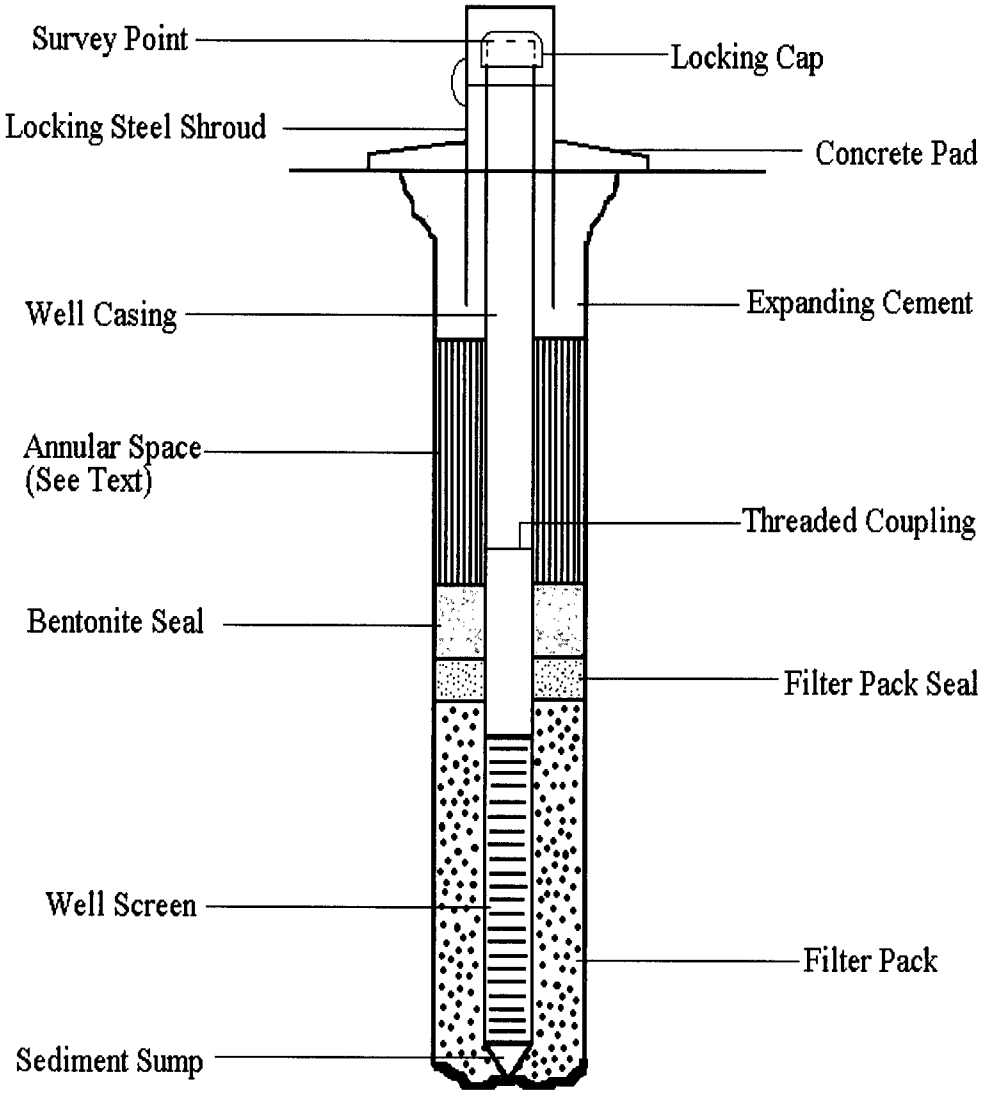

Figure C-1 - Monitoring Well Construction Diagram