AP - 59

GENERAL CORRESPONDENCE

DATE: 2007-2004

AP-59
Gen Cor.
2007 - 2004

R. T. HICKS CONSULTANTS, LTD.

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

September 24, 2007

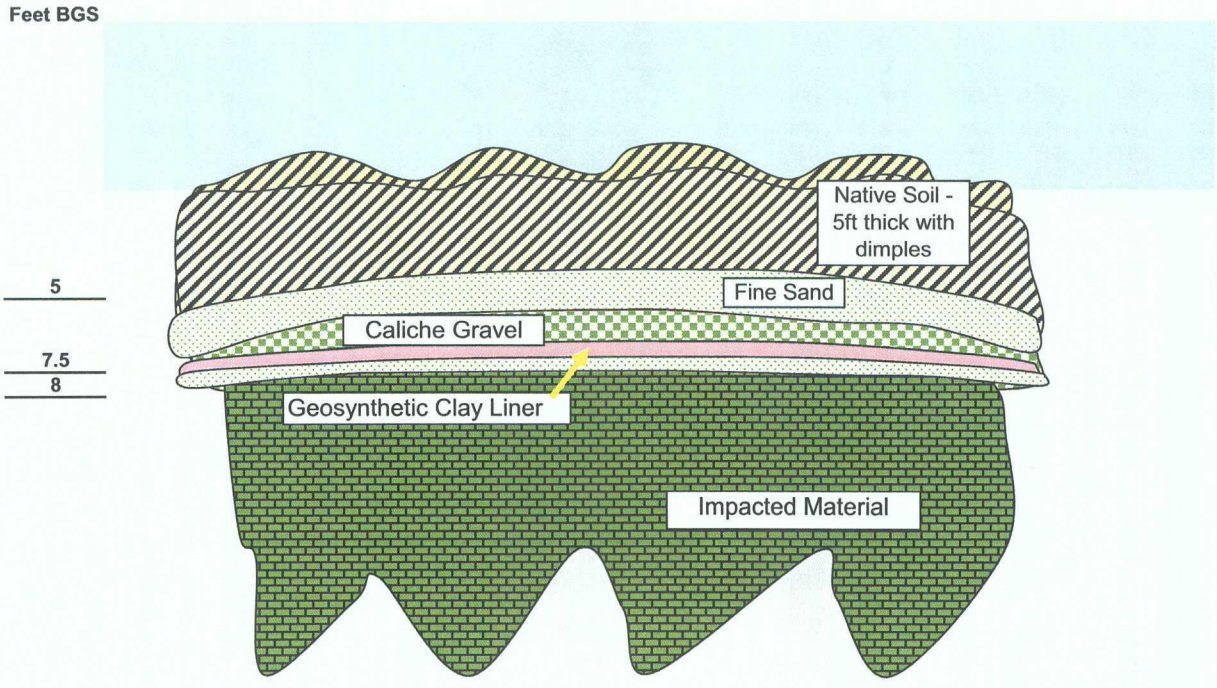
Edward Hansen
NMOCD
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Via E-mail

RE: F-35 SWD & G-35 SWD, T17S, R35E; NMOCD Case #: AP-59, Quarterly Report

Dear Mr. Hansen,

This letter serves as our Status Report for the abovementioned sites, presenting work and progress there from April-August of this year.

Vadose Zone Remedy
As you may recall, in April we conducted additional investigations at these sites at your request and reported on their results on the 23rd of the same month. On May 24th we received your response requesting an amended Vadose Zone Remedy Plan. We submitted amendments on June 13th, which were approved on the 14th. We began the approved amended Remedy the week of June 25th, and followed the plans to backfill the excavation presented in the table and drawing below.



F-35 and G-35 Design Thickness (inches)	F-35 and G-35 Design Thickness (feet)	(All layers are dome shaped to shed excess water)
6	0.5	Topsoil
54	4.5	Native Soil Layer
12	1.0	Fine Sand interface
18	1.5	Pea Gravel Caliche Sub Layer
0.25	0.02	GCL
6	0.50	Sand
96.25	8.0	Total Thickness above Chloride material

The pictures below show the installation of the GCL as well as the final backfilled status at both sites.

GCL at F-35, placed 7 feet below grade

Backfilled excavation at F-35

Imported hay to condition topsoil at both sites.

G-35

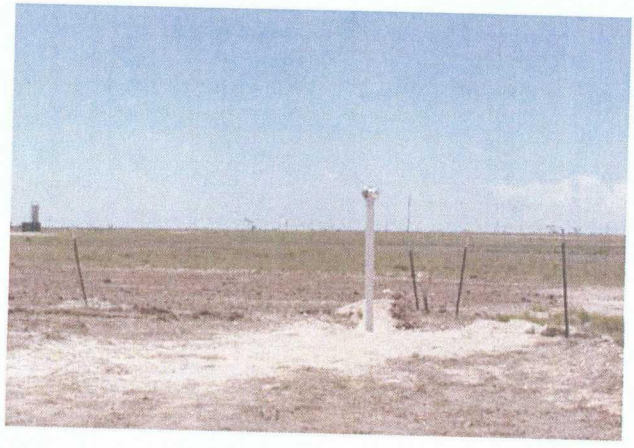
GCL in excavation at G-35, 7 feet bgs

Filling the excavation at G-35

Spreading topsoil at G-35

Once the excavations were filled in, decomposing hay was incorporated to condition topsoil. On August 8th and 9th, two passive soil vapor vents were installed at each site. The attached logs show that these vents were slotted from 47-45, 37-35, and 27-25 below ground surface. The vents extend to 6 feet above the ground surface and are fitted with a turbine to vent the subsurface.

Passive soil vent at F-35



Completed soil vapor vents at G-35 (backfilled excavation visible to right of vents)

Revegetation is ongoing.

Point Source Treatment

Point source treatment at F-35 is on-going. We have added features to make the system more reliable. We estimate that this spring over 15,000 gallons have been pumped, producing over 3,000 gallons for wildlife and approximately 11,000 gallons for routine SWD pipeline maintenance.

Upcoming Actions

A recovery well has been installed at G-35 and will soon be fitted with a solar pump. Treatment equipment is targeted for installation in the 4th quarter of 2007. We are evaluating options for treatment of water at G-35 and will submit our proposed process shortly. We will notify you of any planned field work with as much notice as possible once the schedule is set.

Sincerely,
R.T. Hicks Consultants, Ltd.

Katie Lee

Katie Lee
Staff Scientist

Copy: Rice Operating Company

Hansen, Edward J., EMNRD

From: Hansen, Edward J., EMNRD
Sent: Thursday, May 24, 2007 6:20 PM
To: Kristin Pope
Cc: Randall Hicks (Randall Hicks); Prichard, Sharon, EMNRD; Price, Wayne, EMNRD; 'Katie Lee'
Subject: RE: F-35 & G-35 SWD; NMOCD Case #:AP-59

Dear Ms. Pope:

The New Mexico Oil Conservation Division (NMOCD) has reviewed your amended investigation report (dated April 23, 2007) for the above referenced sites. The additional information was very useful in the NMOCD's continuing review of the abatement plan for these sites. However, since the additional investigatory data determined that the vadose zone is contaminated with elevated concentrations of chloride and hydrocarbons at depth, NMOCD is requiring that the vadose zone must be further remediated. Therefore, the NMOCD hereby denies the Vadose Zone Remedy (dated February 2, 2007) for these sites. Since this Remedy was originally tested in dryer climate compared to the precipitation that does occur at these sites, there could be "break-through" during wetter precipitation periods. Therefore, this Remedy would involve long-term monitoring to ensure its effectiveness and the NMOCD does not have the resources to monitor these sites on a long-term basis (and Rice Operating Company would be better served spending their limited resources on shorter term remedies). Rice Operating Company must submit a revised Vadose Zone Remedy within 30 days to the NMOCD that includes a design that will prevent further infiltration through the contaminated vadose zone at these sites.

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

Edward J. Hansen
Hydrologist
Environmental Bureau

From: Katie Lee [mailto:katie@rthicksconsult.com]
Sent: Monday, April 23, 2007 12:40 PM
To: Price, Wayne, EMNRD; Hansen, Edward J., EMNRD; Prichard, Sharon, EMNRD
Cc: Kristin Pope; Randall Hicks (Randall Hicks)
Subject: F-35 & G-35 SWD; NMOCD Case #:AP-59

Ladies and Gentlemen,

Attached please find our report, on behalf of Rice Operating Company, regarding agreed upon work conducted on 4-16-2007 at the above referenced sites.

Hard copies follow via the post. We look forward to your response.

Best regards,

Katie Lee

Staff Scientist
R.T. Hicks Consultants, Ltd.
ph. 505-266-5004
fax 505-266-0745
mobile 505-400-7925

R. T. HICKS CONSULTANTS, LTD.

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

April 23, 2007

Ed Hansen
NMOCD
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Via E-mail

2007 APR 24 AM 8

RE: Agreed Work at F-35 SWD & G-35 SWD, T17S, R35E; NMOCD Case #: AP-59

Dear Mr. Hansen,

We are pleased to report that we have completed the agreed scope of work as discussed on April 12, and confirmed in our April 13th, 2007 letter for the above-referenced sites. Our agreed work included:

- One exploratory boring in each excavation where surface sampling and field examination suggest that the highest volume of fluid was released to the subsurface
- Collect samples from each boring at 5-foot intervals for field analysis of chloride and organic vapors using standard ROC protocols
- Record observations of the physical nature of the vadose zone on a boring log
- Extend the soil borings at each site to the capillary fringe

We attach site sketches noting the boring locations. Locations were selected based on areas believed to have been subject to the highest impact and placed in the center of previous excavations as noted. Also find boring logs for exploratory soil borings at F-35 and G-35 that show results of field analysis at 5-foot intervals and record observations of the physical nature of the vadose zone. Borings extended to the capillary fringe at both sites.

- Submit no more than two samples to the laboratory for analysis of BTEX if field analysis of organic vapors exceeds 100 ppm
- Collect two samples from each boring for laboratory analysis of chloride
- Collect 2-3 samples from each boring for laboratory analysis of soil moisture

Please see the attached chain of custody and laboratory results for samples collected during borings.

- Construct a 4-inch recovery/monitoring well at G-35 near the excavation using the well design shown in Figure 1 (attached) at a location that is 25 feet down gradient from the edge of the excavation (which is the former discharge site).

A well completion diagram and lithologic log are also included, and the location of this new 4" casing monitoring well is noted on the G-35 site sketch. Sampling of this well is scheduled for May 8, 2007 to allow the well to equilibrate and as sampling schedules allow.

Finally, below we include photo documentation of our April 16th work on these sites.

Boring at F-35

Boring at G-35

Monitoring Well at G-35

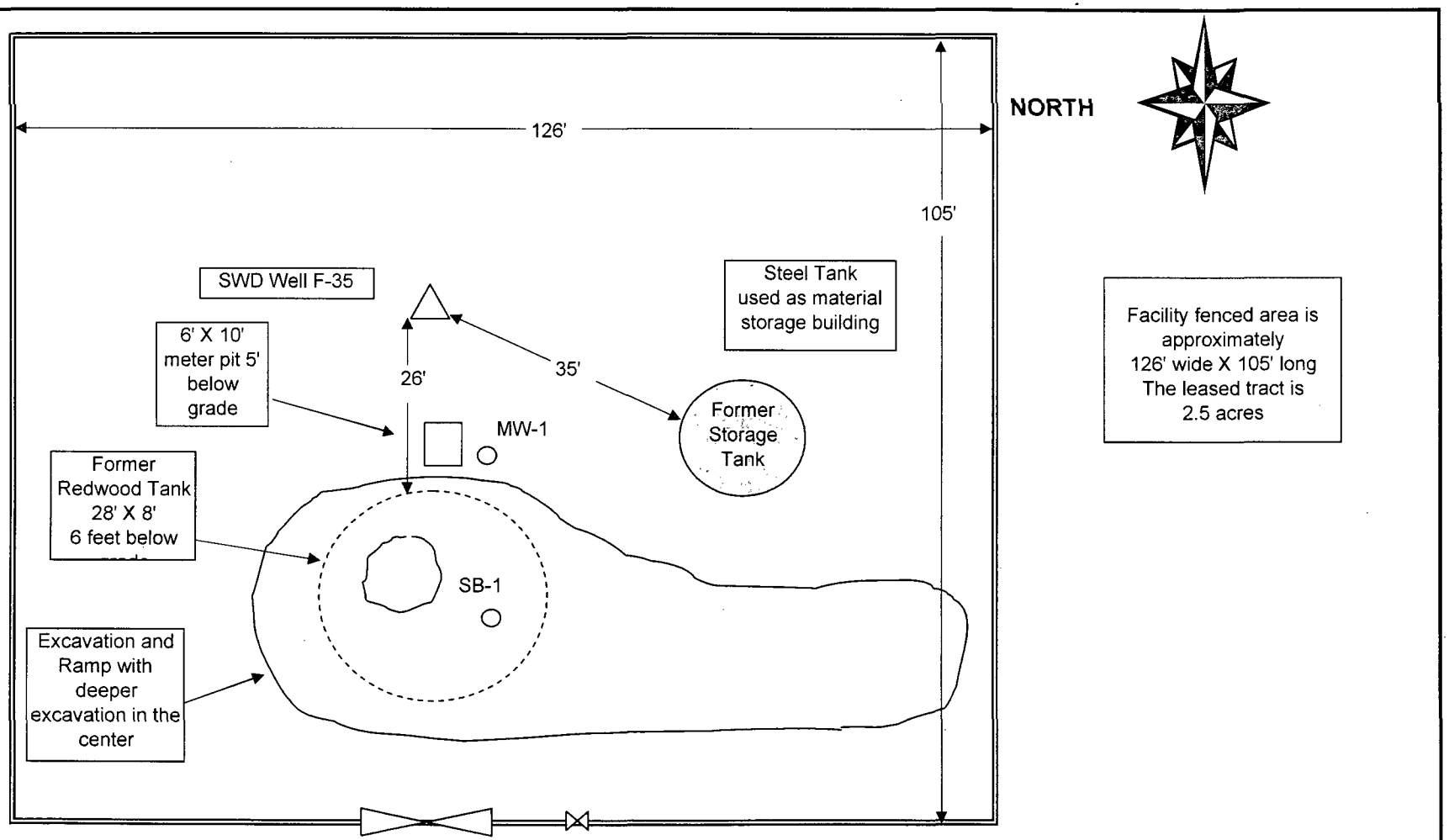
We are hopeful that this information will allow for the speedy approval of our proposed vadose zone remedies for these sites and we are ready to schedule installation of the excavation caps as described in our previous submissions. We look forward to your response.

Sincerely,
R.T. Hicks Consultants, Ltd.

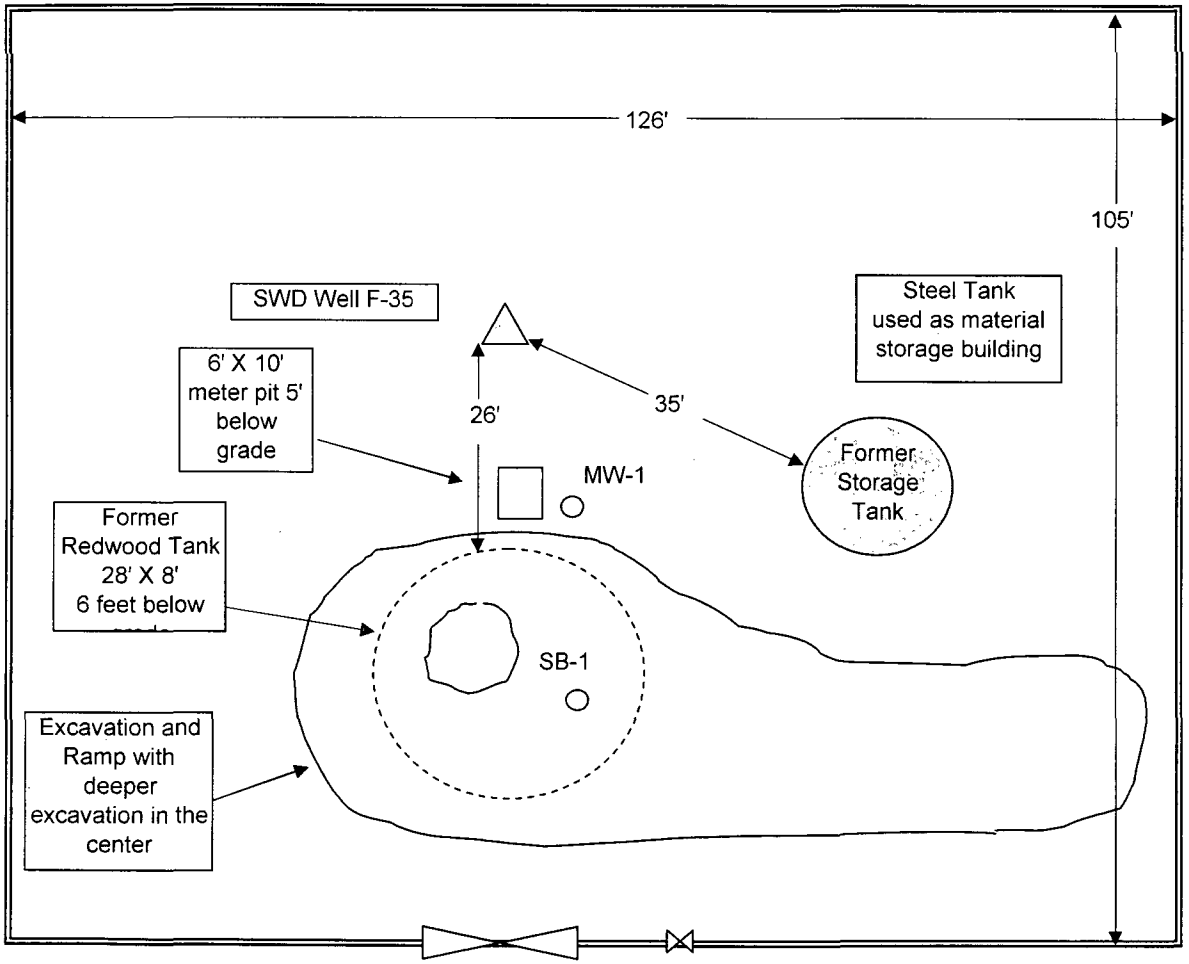
Katie Lee

Katie Lee
Staff Scientist

Copy: Rice Operating Company
Hobbs NMOCD office



R T Hicks Consultants Ltd 901 Rio Grande Blvd NW Albuquerque, NM 87104 (505) 266-5004	Plate 1 F-35 Site Map (Original Equipment)	Disposal Facility and Storage Tank Vacuum SWD Well F-35 Unit Letter F, Sec 35-T17S-R35E Lea County, New Mexico



R T Hicks Consultants Ltd
901 Rio Grande Blvd NW
Albuquerque, NM 87104
(505) 266-5004

Plate 1

F-35 Site Map (Original Equipment)

Disposal Facility and Storage Tank
Vacuum SWD Well F-35
Unit Letter F, Sec 35-T17S-R35E
Lea County, New Mexico

LITHOLOGIC LOG (SOIL BORING)

R T Hicks Consultants Ltd

P O Box 7624
Midland, TX 79708
(432) 528-3878

MONITOR WELL NO.:	SB-F1 & 1A	TOTAL DEPTH:	52.0 Ft (below original surface)
SITE ID:	Vacuum F-35 / G-35	CLIENT:	Rice Operating Company
SURFACE ELEVATION:	0.00	COUNTY:	Lea County
CONTRACTOR:	Harrison & Cooper, Inc.	STATE:	New Mexico
DRILLING METHOD:	Air-Rotary	LOCATION:	T-17-S, R-35-E, Sec. 35 (F)
INSTALLATION DATE:	4/16/07	FIELD REP.:	Dale Littlejohn
WELL PLACEMENT:	Within Pit (8 ft bgs)	FILE NAME:	\Vac F & G-35\Lithlogs
COMMENTS:	Lat. 32° 47' 34.4" North, Long. 103° 25' 49.1" West		

Lithology	SAMPLE DATA PHOTO	DEPTH	TYPE	PID	Cl (Lab)	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE SORTING, ROUNDING, CONSOL., DIST. DEATURES
BENTONITE / CEMENT SLURRY		10-12	Cuttings	620 ppm	90 mg/kg	5	CALICHE AND SAND Grayish brown caliche covered by 1/2 foot of brown silty top soil. Sand brown, very fine grain, with very large caliche gravel (70 to 80% sand). Description and photo from walls of excavation (surface to 16 ft bgs).
		15-17	Split Spoon	1,398 ppm	89 mg/kg	10	
		20-22	Cuttings	445 ppm	84 mg/kg	15	
		25-27	Split Spoon	1,556 ppm	361 mg/kg	20	SANDSTONE (quartzite) gray, fine crystalline, well cemented, very hard drilling.
		30-32	Cuttings	552 ppm	404 mg/kg	25	SAND Light brown, very fine grain, well-sorted, rounded.
		35-37	Split Spoon	1,365 ppm	701 mg/kg	30	SAND Brown, fine-grain, well-sorted, rounded to sub-rounded with interbedded layers of thin, hard quartzite.
		40-42	Split Spoon	1,672 ppm	994 mg/kg	35	
		45-47	Split Spoon	1,684 ppm	1,105 mg/kg	40	SAND Brown, fine-grain, well-sorted, sub-rounded, unconsolidated.
		50-52	Split Spoon	1,796 ppm	1,560 mg/kg	45	
						50	Soil moist, with mud on drill pipe.

TD = 52 Feet

LITHOLOGIC LOG (SOIL BORING)

R T Hicks Consultants Ltd

P O Box 7624
Midland, TX 79708
(432) 528-3878

MONITOR WELL NO.:	SB-G1	TOTAL DEPTH:	47.0 Ft (below original surface)
SITE ID:	Vacuum F-35 / G-35	CLIENT:	Rice Operating Company
SURFACE ELEVATION:	0.00	COUNTY:	Lea County
CONTRACTOR:	Harrison & Cooper, Inc.	STATE:	New Mexico
DRILLING METHOD:	Air-Rotary	LOCATION:	T-17-S, R-35-E, Sec. 35 (G)
INSTALLATION DATE:	4/16/07	FIELD REP.:	Dale Littlejohn
WELL PLACEMENT:	Within Pit (5 ft bgs)	FILE NAME:	\Vac F & G-35\Lithlogs
COMMENTS:	Lat. 32° 47' 34.9" North, Long. 103° 25' 34.4" West		

BENTONITE / CEMENT SLURRY

Lithology	PHOTO	SAMPLE DATA DEPTH	TYPE	PID	Cl (Lab)	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE SORTING, ROUNDING, CONSOL., DIST. DEATURES
							SILTY CLAY Grayish brown with some caliche covered by small gravel (SWD well pad). Description and photo from walls of
							SILTY SAND Brown with some caliche. Description and photo from walls of excavation (surface to 5 ft bgs).
						5	
		10-12	Split Spoon	1,048 ppm	303 mg/kg	10	SILTY CLAY Grayish black (discolored), with some caliche.
		15-17	Split Spoon	1,296 ppm	366 mg/kg	15	SILTY SAND Light greenish gray, very fine grain, with some very small gravel.
		20-22	Split Spoon	1,188 ppm	668 mg/kg	20	
		25-27	Cuttings	58.7 ppm	456 mg/kg	25	SANDSTONE (quartzite) gray, fine crystalline, well cemented, very hard drilling.
		30-32	Split Spoon	46.4 ppm	3,804 mg/kg	30	SAND Light brown, very fine-grain, well-sorted, angular.
		35-37	Split Spoon	184 ppm	2,570 mg/kg	35	SAND Brown to reddish brown, fine-grain, well-sorted, sub-rounded.
		40-42	Split Spoon	1,243 ppm	2,499 mg/kg	40	
		45-47	Split Spoon	1,645 ppm	2,849 mg/kg	45	Soil moist, with mud on drill pipe.

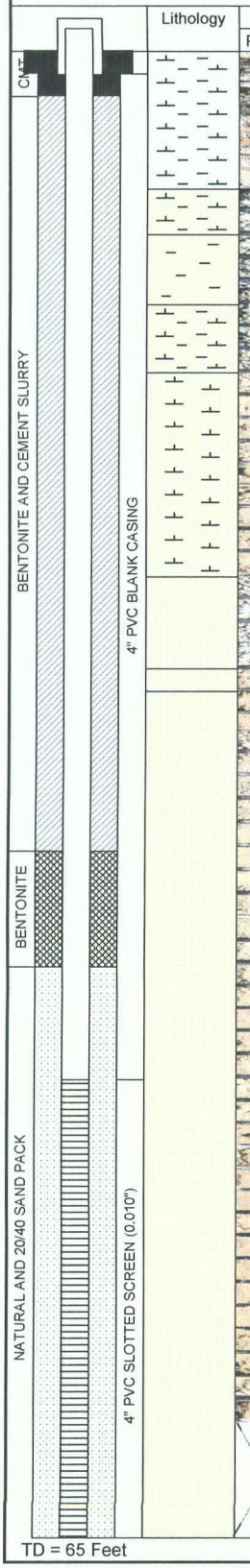
TD = 47 Feet

LITHOLOGIC LOG (MONITORING WELL)

R T Hicks Consultants Ltd

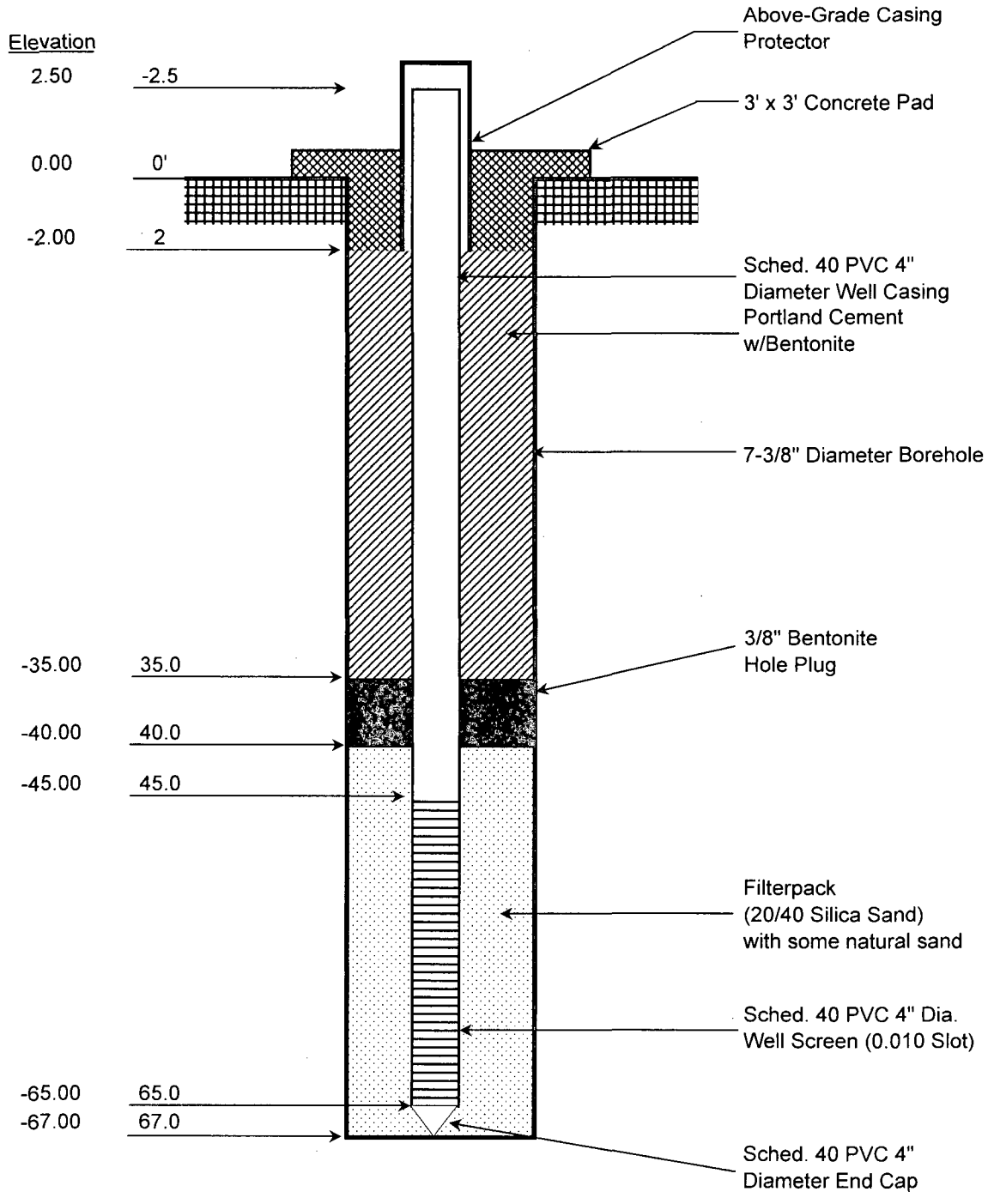
P O Box 7624
Midland, TX 79708
(432) 528-3878

MONITOR WELL NO.:	MW-G4	TOTAL DEPTH:	65.0 Ft
SITE ID:	Vacuum F-35 / G-35	CLIENT:	Rice Operating Company
SURFACE ELEVATION:	0.00	COUNTY:	Lea County
CONTRACTOR:	Harrison & Cooper, Inc.	STATE:	New Mexico
DRILLING METHOD:	Air-Rotary	LOCATION:	T-17-S, R-35-E, Sec. 35 (G)
INSTALLATION DATE:	4/16/07	FIELD REP.:	Dale Littlejohn
WELL PLACEMENT:	Southeast of pit	FILE NAME:	\Vac F & G-35\Lithlogs
COMMENTS:	Lat. 32° 47' 34.6" North, Long. 103° 25' 33.9" West		



Lithology	SAMPLE DATA PHOTO	DEPTH	% REC	PID	Cl (Fld)	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE SORTING, ROUNDING, CONSOL., DIST. DEATURES
							SILTY CLAY AND CALICHE Brown to reddish brown with a thin layer of gravel (SWD Well Pad) at the surface. Photo and description from open excavation near monitoring well.
		No soil samples recovered				5	
							CALICHE Gray with some silt and sandstone.
							SILTY SAND Gray very fine grain, well-sorted.
						10	
		No soil samples recovered					CALICHE with light brown fine grain silty sand.
						15	SAND Light brown to tan, very fine grain, well-sorted, with some caliche.
						20	
		No soil samples recovered				25	SANDSTONE (Quartzite) Light brown to gray, fine crystalline, very hard drilling.
							SAND Lt brown, very fine grain with interbedded sandstone.
							SAND Light reddish brown, fine grain, well-sorted, sub-rounded to sub-angular.
						30	
						35	
		No soil samples recovered					
						40	
						45	
		No soil samples recovered				50	Moist sample, lost some of the returns
						55	Developed well by pumping 55 gallons at approximately 12 gpm with approximately 6 ft of drawdown.
						60	
	No Sample					65	

MONITORING WELL CONSTRUCTION DIAGRAM



R T Hicks Consultants Ltd	SITE: Vacuum F-35 / G-35		**Monitoring Well No. MW-G4**
	DATE: 4/19/2007	REV. NO.: 1	
	AUTHOR: DTL	TECH: DTL	
	DRILLER: H & C, Inc	FILE: Lithlogs	

ENVIRONMENTAL LAB OF

12600 West I-20 East - Odessa, Texas 79765

A Xenco Laboratories Company

Analytical Report

Prepared for:

Kristin Farris-Pope

Rice Operating Co.

122 W. Taylor

Hobbs, NM 88240

Project: Vacuum G-35/ F-35 Site

Project Number: Pit Soil Borings (both sides)

Location: T17S, R35E, Sec 35, Unit Letter F, G

Lab Order Number: 7D18003

Report Date: 04/19/07

Rice Operating Co.	Project: Vacuum G-35/ F-35 Site	Fax: (505) 397-1471
122 W. Taylor	Project Number: Pit Soil Borings (both sides)	
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
F-35 SB-1 40.0' - 42.0'	7D18003-01	Soil	04/16/07 09:30	04-18-2007 10:00
F-35 SB-1 50.0' - 52.0'	7D18003-02	Soil	04/16/07 10:00	04-18-2007 10:00
F-35 SB-1A 15.0' - 17.0'	7D18003-03	Soil	04/16/07 10:05	04-18-2007 10:00
F-35 SB-1A 25.0' - 27.0'	7D18003-04	Soil	04/16/07 10:20	04-18-2007 10:00
G-35 SB-1A 15.0' - 17.0'	7D18003-05	Soil	04/16/07 13:13	04-18-2007 10:00
G-35 SB-1 30.0' - 32.0'	7D18003-06	Soil	04/16/07 13:37	04-18-2007 10:00
F-35 SB-1 35.0' - 37.0'	7D18003-07	Soil	04/16/07 13:45	04-18-2007 10:00
F-35 SB-1 45.0' - 47.0'	7D18003-08	Soil	04/16/07 14:00	04-18-2007 10:00

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Rice Operating Co	Project: Vacuum G-35/ F-35 Site	Fax: (505) 397-1471
122 W. Taylor	Project Number: Pit Soil Borings (both sides)	
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	

Organics by GC

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F-35 SB-1 50.0' - 52.0' (7D18003-02) Soil									
Benzene	**4.22**	0.0250	mg/kg dry	25	ED71706	04/18/07	04/18/07	EPA 8021B	
Toluene	**18.1**	0.0250	"	"	"	"	"	"	
Ethylbenzene	**20.1**	0.0250	"	"	"	"	"	"	
Xylene (p/m)	**24.9**	0.0250	"	"	"	"	"	"	
Xylene (o)	**12.5**	0.0250	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*1730 %*	*75-125*		"	"	"	"	*S-04*
Surrogate: 4-Bromofluorobenzene		*171 %*	*75-125*		"	"	"	"	*S-04*
F-35 SB-1A 25.0' - 27.0' (7D18003-04) Soil									
Benzene	**4.86**	0.0250	mg/kg dry	25	ED71706	04/18/07	04/18/07	EPA 8021B	
Toluene	**5.29**	0.0250	"	"	"	"	"	"	
Ethylbenzene	**27.0**	0.0250	"	"	"	"	"	"	
Xylene (p/m)	**32.8**	0.0250	"	"	"	"	"	"	
Xylene (o)	**11.2**	0.0250	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*2140 %*	*75-125*		"	"	"	"	*S-04*
Surrogate: 4-Bromofluorobenzene		*187 %*	*75-125*		"	"	"	"	*S-04*
G-35 SB-1A 15.0' - 17.0' (7D18003-05) Soil									
Benzene	**7.64**	0.100	mg/kg dry	100	ED71706	04/18/07	04/19/07	EPA 8021B	
Toluene	**20.7**	0.100	"	"	"	"	"	"	
Ethylbenzene	**38.2**	0.100	"	"	"	"	"	"	
Xylene (p/m)	**45.4**	0.100	"	"	"	"	"	"	
Xylene (o)	**21.2**	0.100	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*206 %*	*75-125*		"	"	"	"	*S-04*
Surrogate: 4-Bromofluorobenzene		*136 %*	*75-125*		"	"	"	"	*S-04*
G-35 ~~F-35~~ SB-1 45.0' - 47.0' (7D18003-08) Soil (see chain of custody)									
Benzene	**0.557**	0.0250	mg/kg dry	25	ED71706	04/18/07	04/19/07	EPA 8021B	
Toluene	**3.48**	0.0250	"	"	"	"	"	"	
Ethylbenzene	**5.80**	0.0250	"	"	"	"	"	"	
Xylene (p/m)	**8.05**	0.0250	"	"	"	"	"	"	
Xylene (o)	**3.57**	0.0250	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*176 %*	*75-125*		"	"	"	"	*S-04*
Surrogate: 4-Bromofluorobenzene		*131 %*	*75-125*		"	"	"	"	*S-04*

Rice Operating Co	Project: Vacuum G-35/ F-35 Site	Fax: (505) 397-1471
122 W Taylor	Project Number: Pit Soil Borings (both sides)	
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	

General Chemistry Parameters by EPA / Standard Methods

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
F-35 SB-1 40.0' - 42.0' (7D18003-01) Soil									
% Moisture	7.0	0.1	%	1	ED71903	04/18/07	04/19/07	% calculation	
F-35 SB-1 50.0' - 52.0' (7D18003-02) Soil									
Chloride	1700	20.0	mg/kg Wet	2	ED71906	04/18/07	04/18/07	SW 846 9253	
% Moisture	7.5	0.1	%	1	ED71903	"	04/19/07	% calculation	
F-35 SB-1A 15.0' - 17.0' (7D18003-03) Soil									
% Moisture	12.7	0.1	%	1	ED71903	04/18/07	04/19/07	% calculation	
F-35 SB-1A 25.0' - 27.0' (7D18003-04) Soil									
Chloride	160	20.0	mg/kg Wet	2	ED71906	04/18/07	04/18/07	SW 846 9253	
% Moisture	7.6	0.1	%	1	ED71903	"	04/19/07	% calculation	
G-35 SB-1A 15.0' - 17.0' (7D18003-05) Soil									
% Moisture	21.0	0.1	%	1	ED71903	04/18/07	04/19/07	% calculation	
G-35 SB-1 30.0' - 32.0' (7D18003-06) Soil									
Chloride	202	20.0	mg/kg Wet	2	ED71906	04/18/07	04/18/07	SW 846 9253	
F-35 SB-1 35.0' - 37.0' (7D18003-07) Soil									
% Moisture	10.0	0.1	%	1	ED71903	04/18/07	04/19/07	% calculation	
G-35 F-35 SB-1 45.0' - 47.0' (7D18003-08) Soil (see chain of custody)									
Chloride	383	20.0	mg/kg Wet	2	ED71906	04/18/07	04/18/07	SW 846 9253	
% Moisture	20.3	0.1	%	1	ED71903	"	04/19/07	% calculation	

12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

Rice Operating Co.	Project: Vacuum G-35/ F-35 Site	Fax: (505) 397-1471
122 W. Taylor	Project Number: Pit Soil Borings (both sides)	
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	

Organics by GC - Quality Control

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch ED71706 - EPA 5030C (GC)										
Blank (ED71706-BLK1)				Prepared: 04/17/07 Analyzed: 04/18/07						
Benzene	ND	0.00100	mg/kg wet							
Toluene	ND	0.00100	"							
Ethylbenzene	ND	0.00100	"							
Xylene (p/m)	ND	0.00100	"							
Xylene (o)	ND	0.00100	"							
Surrogate: a,a,a-Trifluorotoluene	*53.5*		*ug/kg*	*50.0*		*107*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*49.0*		*"*	*50.0*		*98.0*	*75-125*			
LCS (ED71706-BS1)				Prepared: 04/17/07 Analyzed: 04/18/07						
Benzene	0.0546	0.00100	mg/kg wet	0.0500		109	80-120			
Toluene	0.0548	0.00100	"	0.0500		110	80-120			
Ethylbenzene	0.0579	0.00100	"	0.0500		116	80-120			
Xylene (p/m)	0.107	0.00100	"	0.100		107	80-120			
Xylene (o)	0.0589	0.00100	"	0.0500		118	80-120			
Surrogate: a,a,a-Trifluorotoluene	*55.5*		*ug/kg*	*50.0*		*111*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*54.1*		*"*	*50.0*		*108*	*75-125*			
Calibration Check (ED71706-CCV1)				Prepared: 04/17/07 Analyzed: 04/19/07						
Benzene	56.8		ug/kg	50.0		114	80-120			
Toluene	55.8		"	50.0		112	80-120			
Ethylbenzene	57.5		"	50.0		115	80-120			
Xylene (p/m)	105		"	100		105	80-120			
Xylene (o)	58.1		"	50.0		116	80-120			
Surrogate: a,a,a-Trifluorotoluene	*54.9*		*"*	*50.0*		*110*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*49.6*		*"*	*50.0*		*99.2*	*75-125*			
Matrix Spike (ED71706-MS1)	**Source: 7D13015-02**			Prepared: 04/17/07 Analyzed: 04/19/07						
Benzene	0.130	0.00200	mg/kg dry	0.130	ND	100	80-120			
Toluene	0.128	0.00200	"	0.130	ND	98.5	80-120			
Ethylbenzene	0.133	0.00200	"	0.130	ND	102	80-120			
Xylene (p/m)	0.237	0.00200	"	0.259	ND	91.5	80-120			
Xylene (o)	0.129	0.00200	"	0.130	ND	99.2	80-120			
Surrogate: a,a,a-Trifluorotoluene	*46.3*		*ug/kg*	*50.0*		*92.6*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*43.8*		*"*	*50.0*		*87.6*	*75-125*			

Rice Operating Co.	Project: Vacuum G-35/ F-35 Site	Fax: (505) 397-1471
122 W. Taylor	Project Number: Pit Soil Borings (both sides)	
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	

Organics by GC - Quality Control

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch ED71706 - EPA 5030C (GC)										
Matrix Spike Dup (ED71706-MSD1)	**Source: 7D13015-02**			Prepared: 04/17/07 Analyzed: 04/19/07						
Benzene	0.129	0.00200	mg/kg dry	0.130	ND	99.2	80-120	0.803	20	
Toluene	0.125	0.00200	"	0.130	ND	96.2	80-120	2.36	20	
Ethylbenzene	0.129	0.00200	"	0.130	ND	99.2	80-120	2.78	20	
Xylene (p/m)	0.224	0.00200	"	0.259	ND	86.5	80-120	5.62	20	
Xylene (o)	0.122	0.00200	"	0.130	ND	93.8	80-120	5.60	20	
Surrogate: a,a,a-Trifluorotoluene	*46.2*		*ug/kg*	*50.0*		*92.4*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*42.5*		*"*	*50.0*		*85.0*	*75-125*			

Rice Operating Co.	Project: Vacuum G-35/ F-35 Site	Fax: (505) 397-1471
122 W. Taylor	Project Number: Pit Soil Borings (both sides)	
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Environmental Lab of Texas

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch ED71903 - General Preparation (Prep)										
Blank (ED71903-BLK1)				Prepared: 04/18/07 Analyzed: 04/19/07						
% Solids	100		%							
Duplicate (ED71903-DUP1)	**Source: 7D18002-01**			Prepared: 04/18/07 Analyzed: 04/19/07						
% Solids	88.9		%		89.6			0.784	20	
Batch ED71906 - Water Extraction										
Blank (ED71906-BLK1)				Prepared & Analyzed: 04/18/07						
Chloride	ND	20.0	mg/kg Wet							
LCS (ED71906-BS1)				Prepared & Analyzed: 04/18/07						
Chloride	93.6	10.0	mg/kg Wet	100		93.6	80-120			
Matrix Spike (ED71906-MS1)	**Source: 7D18002-04**			Prepared & Analyzed: 04/18/07						
Chloride	21200	400	mg/kg Wet	10000	12100	91.0	80-120			
Matrix Spike Dup (ED71906-MSD1)	**Source: 7D18002-04**			Prepared & Analyzed: 04/18/07						
Chloride	21300	400	mg/kg Wet	10000	12100	92.0	80-120	0.471	20	
Reference (ED71906-SRM1)				Prepared & Analyzed: 04/18/07						
Chloride	52.1	10.0	mg/kg Wet	50.0		104	80-120			

Rice Operating Co.	Project: Vacuum G-35/ F-35 Site	Fax: (505) 397-1471
122 W. Taylor	Project Number: Pit Soil Borings (both sides)	
Hobbs NM, 88240	Project Manager: Kristin Farris-Pope	

Notes and Definitions

S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: Brent Barron Date: 4/19/2007

Brent Barron, Laboratory Director/Corp. Technical Director
Celey D. Keene, Org. Tech Director
Raland K. Tuttle, Laboratory Consultant

James Mathis, QA/QC Officer
Jeanne Mc Murrey, Inorg. Tech Director

Environmental Lab of Texas

12600 West I-20 East
Odessa, Texas 79765
Phone: 432-563-1800
Fax: 432-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Kristin Farris
Company Name: Rice Operating Company
Company Address: 122 West Taylor
City/State/Zip: Hobbs, New Mexico 88240
Telephone No: 505-393-9174
Fax No: 505-397-1471
Email results to: katie@rthicksconsult.com, tgrieco@riceswd.com,kpope@riceswd.com, and andrew@rthicksconsult.com
Sampler Signature: Dale Littlejohn

Project Name: Vacuum G-35/F-35 Site
Project #: Pit Soil Borings (both sites)
Project Location: T17S, R35E, Sec 35, Unit Letter F, G
ROC Billing Code

2/8/09

LAB # (lab use only)	GIS CODE	FIELD CODE	Sample Depth (soils only) Begin (ft)	End (ft)	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	HNO3	HCl	NaOH	H2SO4	None	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify):	Analyze For: TCLP: TPH 418.1	8015M	1005	1006	TOTAL: Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, CO3, HCO3)	SAR / ESP / CEC	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B	RCI	Moisture Content	Total Dissolved Solids	Volumetric Moisture Content	Total Chloride	RUSH TAT (Pre-Schedule)	Standard TAT
7D18003								4oz glass																												
-01		F-35 SB-1	40.0	42.0	4/16/07	0930	1	X									X													X					X
-02		F-35 SB-1	50.0	52.0	4/16/07	1000	1	X									X												X					X	X
-03		F-35 SB-1A	15.0	17.0	4/16/07	1005	1	X									X													X					X
-04		F-35 SB-1A	25.0	27.0	4/16/07	1020	1	X									X												X					X	X
-05		G-35 SB-1	15.0	17.0	4/16/07	1313	1	X									X												X	X					X
-06		G-35 SB-1	30.0	32.0	4/16/07	1337	1	X									X																	X	X
-07		G-35 SB-1	35.0	37.0	4/16/07	1345	1	X									X													X					X
-08		G-35 SB-1	45.0	47.0	4/16/07	1400	1	X									X												X					X	X

Special Instructions:

Sample Containers Intact? (Y) N
Temperature Upon Receipt:
Laboratory Comments: w/labels + seals -2.5

Relinquished by:	Date	Time	Received by:	Date	Time
Dale Littlejohn	4/18/07	1000			
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
			Jana McMurry	04-18-07	1000

Dale 2 KP 4/18/07 1:00

Environmental Lab of Texas

Variance/ Corrective Action Report- Sample Log-In

Client: Rice Operating

Date/ Time: 04-18-07 @ 1000

Lab ID # : 7D18003

Initials: JMM

Sample Receipt Checklist

					Client Initials
#1	Temperature of container/ cooler?	Yes	No	-2.5 °C	
#2	Shipping container in good condition?	Yes	No		
#3	Custody Seals intact on shipping container/ cooler?	Yes	No	Not Present	
#4	Custody Seals intact on sample bottles/ container?	Yes	No	Not Present	
#5	Chain of Custody present?	Yes	No		
#6	Sample instructions complete of Chain of Custody?	Yes	No		
#7	Chain of Custody signed when relinquished/ received?	Yes	No		
#8	Chain of Custody agrees with sample label(s)?	Yes	No	ID written on Cont./ Lid	
#9	Container label(s) legible and intact?	Yes	No	Not Applicable	
#10	Sample matrix/ properties agree with Chain of Custody?	Yes	No		
#11	Containers supplied by ELOT?	Yes	No		
#12	Samples in proper container/ bottle?	Yes	No	See Below	
#13	Samples properly preserved?	Yes	No	See Below	
#14	Sample bottles intact?	Yes	No		
#15	Preservations documented on Chain of Custody?	Yes	No		
#16	Containers documented on Chain of Custody?	Yes	No		
#17	Sufficient sample amount for indicated test(s)?	Yes	No	See Below	
#18	All samples received within sufficient hold time?	Yes	No	See Below	
#19	Subcontract of sample(s)?	Yes	No	Not Applicable	
#20	VOC samples have zero headspace?	Yes	No	Not Applicable	

Variance Documentation

Contact: _____ Contacted by: _____ Date/ Time: _____

Regarding: _____

Corrective Action Taken: _____

Check all that Apply:

- ☐ See attached e-mail/ fax
- ☐ Client understands and would like to proceed with analysis
- ☐ Cooling process had begun shortly after sampling event

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, 2007

Ed Hansen
NMOCD
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Via E-mail

RE: F-35 SWD & G-35 SWD, T17S, R35E; NMOCD Case #: AP-59

Dear Mr. Hansen,

First, we would like to thank you and other NMOCD staff for meeting with us on such short notice. I believe our wide-ranging discussion was very useful. In our meeting of April 12, 2007, we agreed to the following for the above referenced site:

- Install one exploratory boring in each excavation where surface sampling and field examination suggest that the highest volume of fluid was released to the subsurface
- Collect samples from each boring at 5-foot intervals for field analysis of chloride and organic vapors using standard ROC protocols
- Collect two samples from each boring for laboratory analysis of chloride
- Submit no more than two samples to the laboratory for analysis of BTEX if field analysis of organic vapors exceeds 100 ppm
- Collect 2-3 samples from each boring for laboratory analysis of soil moisture
- Record observations of the physical nature of the vadose zone on a boring log
- Extend the soil borings at each site to the capillary fringe
- Construct a 4-inch recovery/monitoring well at G-35 near the excavation using the well design shown in Figure 1 (attached) at a location that is 25 feet down gradient from the edge of the excavation (which is the former discharge site).

Please note that the attached design calls for 20-feet of screen in the saturated zone as this well is principally a recovery well. Because of the 4-inch well diameter and the placement of a recovery pump at the base of the screen, a sample bailed (or pumped from a sampling pump) from the upper portion of the screen while the bottom pump is active can capture a discrete water sample from the upper 10-feet of the aquifer.

We will be drilling this well on Monday, April 16.

Sincerely,
R.T. Hicks Consultants, Ltd.

Randall T. Hicks
Principal

Copy: Rice Operating Company, NMOCD Hobbs office

Client:	Rice Operting Company	Well Description:	Schematic Drawing of Well Construction for Proposed G-35 Down Gradient Wells
Project Name:	G-35		
Location:	T 17 S, R 35 E, Section 35		

Depth (feet)	Comments:	Material Descriptions:
0.0	Ground Water is assumed to be 55 feet below ground surface. Well Depths are to be adjusted to actual depth to water.	Cement, 0-2 feet
2.0		
4.0		
6.0		
8.0		
10.0		
12.0		
14.0		
16.0		
18.0		
20.0		
22.0		
24.0		
26.0		
28.0		
30.0		
32.0		
34.0		
36.0		
38.0		
40.0		
42.0		
44.0		
46.0		
48.0		
50.0		
52.0		
54.0		
56.0		
58.0		
60.0		
62.0		
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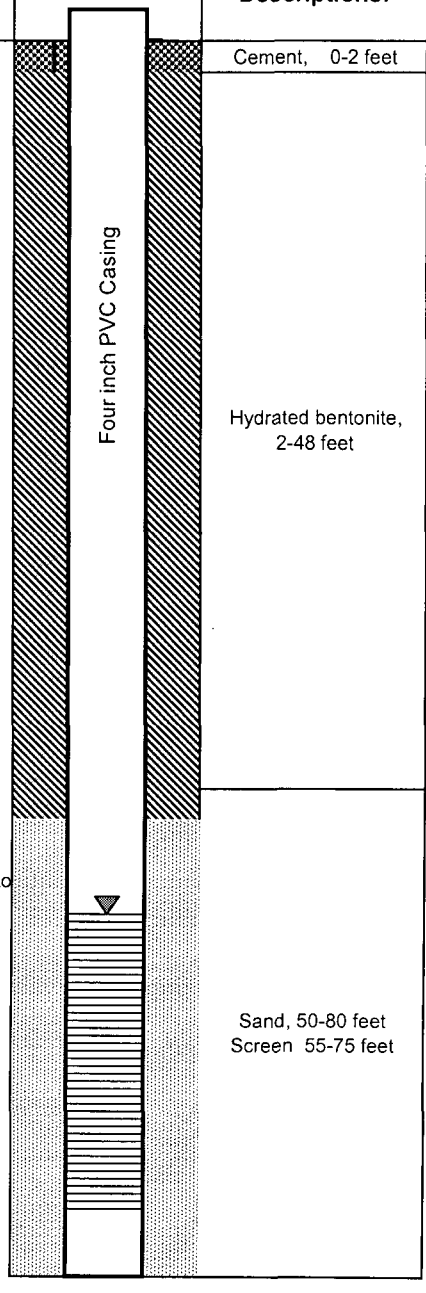
74.0		
76.0		
78.0		
80.0		
82.0		



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 *505-266-5004*	ROC , G-35 Sites	Figure 1
	Monitoring/Recovery Well Boring	March 2007

Hansen, Edward J., EMNRD

From: Price, Wayne, EMNRD
Sent: Friday, April 13, 2007 11:17 AM
To: Katie Lee; Hansen, Edward J., EMNRD; Kristin Pope; Randall Hicks (Randall Hicks)
Cc: 'Dale Littlejohn'; Caperton, Patricia, EMNRD
Subject: RE: F-35 and G-35 NMOCD # Ap-59

Approved with the following conditions:

1. All well bore annular space above the screen plug will be grouted to the surface with cement grout with 1-3% bentonite.
2. The infiltration barrier will not be constructed until OCD reviews the data and provides approval.
3. This approval is based on site specific conditions and should not be considered a blanket approval from any other site.

From: Katie Lee [mailto:katie@rthicksconsult.com]
Sent: Friday, April 13, 2007 9:34 AM
To: Hansen, Edward J., EMNRD; Price, Wayne, EMNRD; Kristin Pope; Randall Hicks (Randall Hicks)
Cc: 'Dale Littlejohn'; Caperton, Patricia, EMNRD
Subject: F-35 and G-35 NMOCD # Ap-59

Attached, our revised scope of work for drilling near Buckeye on Monday, April 16th, 2007.

Thank you,

Katie Lee
Staff Scientist
R.T. Hicks Consultants, Ltd.
ph. 505-266-5004
fax 505-266-0745
mobile 505-400-7925

Hansen, Edward J., EMNRD

From: Hansen, Edward J., EMNRD
Sent: Wednesday, April 11, 2007 8:19 AM
To: Katie Lee
Cc: Kristin Pope; Randall Hicks (Randall Hicks); Price, Wayne, EMNRD
Subject: RE: G-35 and F-35 Vadose Zone Comments, NMOCD Case # AP-59

Dear Ms. Lee:
Thank you for your timely response to my email message of March 23rd regarding the above-referenced sites. As the NMOCD understands from your letters of April 4 and 5, 2007:

1) Rice Operating Company (ROC) will proceed with a boring in the center of each of the two excavations and sample as specified in your letters. {However, the sampling must include a soil sample at the bottom of the vadose zone and a groundwater sample (i.e., a soil sample must be taken within 1 foot of the groundwater and a groundwater sample must be taken from each the borings) and the analytical results must be submitted to the NMOCD by April 23, 2007).}
2) ROC will use 5 feet (instead of 3 feet) of silty loam for the top layer of the proposed cap and compacted to 85-90% Standard Proctor density at each of the sites. {However, prior to installation of the proposed cap, the NMOCD must approve the design. The design cannot be approved until the analytical results from the soil borings have been reviewed by the NMOCD.}
3) The analytical results from SPS-25 and SPS-26 submitted in your April 4th letter are acceptable to the NMOCD.
4) ROC will install a 4" recovery well at the G-35 site and a 1" water line will be installed to connect the recovery well to the RO unit at the F-35 site (as specified in your April 5th letter). {The groundwater remedy for the G-35 site will be implemented by July 2, 2007.}

The NMOCD hereby approves the above amendments (with the specified exceptions). Please be advised that NMOCD approval of these amendments 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 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

From: Katie Lee [mailto:katie@rthicksconsult.com]
Sent: Thursday, April 05, 2007 1:44 PM
To: Hansen, Edward J., EMNRD; Price, Wayne, EMNRD
Cc: Kristin Pope; Randall Hicks (Randall Hicks)
Subject: G-35 and F-35 Vadose Zone Comments, NMOCD Case # AP-59

Mr. Hansen,

We are pleased to respond to NMOCD comments on our Vadose Zone Remedy plan for the above referenced site. As the attached letter and progress report show, the ground water treatment system at F-35 has been operating successfully for more than 4 consecutive weeks.

I will call this afternoon to discuss.

Best regards,

Katie Lee
Staff Scientist
R.T. Hicks Consultants, Ltd.
ph. 505-266-5004
fax 505-266-0745
mobile 505-400-7925

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

April 5, 2007

Ed Hansen
NMOCD
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Via E-mail

RE: F-35 SWD & G-35 SWD, T17S, R35E; NMOCD Case #: AP-59
F-35 Point Source Treatment System Progress Report
Proposed Minor Modification to G-35 System Design

Dear Mr. Hansen,

We are pleased to report that the ground water treatment system at F-35 has been operating successfully for several weeks. Our experience with F-35 leads us to propose a minor modification to the Stage 2 Abatement Plan for the ground water remedy at the G-35 site.

F-35 System Operation

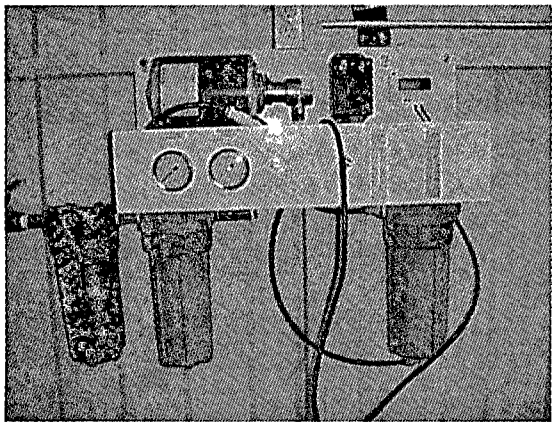
1. The F-35 point source treatment system began discharging small volumes of treated water to a stock tank for wildlife in early March, 2007.
2. As stated in previous communications, this system:
   a. extracts water from the F-35 MW-1 which discharges to
   b. an aeration tank to reduce BTEX concentrations, which then flows through
   c. a slow sand filter to remove particulates and further reduce BTEX,
   d. a water softener and a granular activated carbon filter accept the water from the sand filter for pre-treatment prior to pumping to
   e. a small RO unit that dispenses water to
   f. a 1000-gallon stock tank for wildlife consumption while
   g. waste streams from the RO unit and softener regeneration are stored on site in a waste tank and periodically off-hauled for disposal.
3. The discharge to the wildlife tank meets all WQCC standards for human consumption (see Table 1).

Table 1. Water Quality at the end of weeks one & three of system operation at F-35

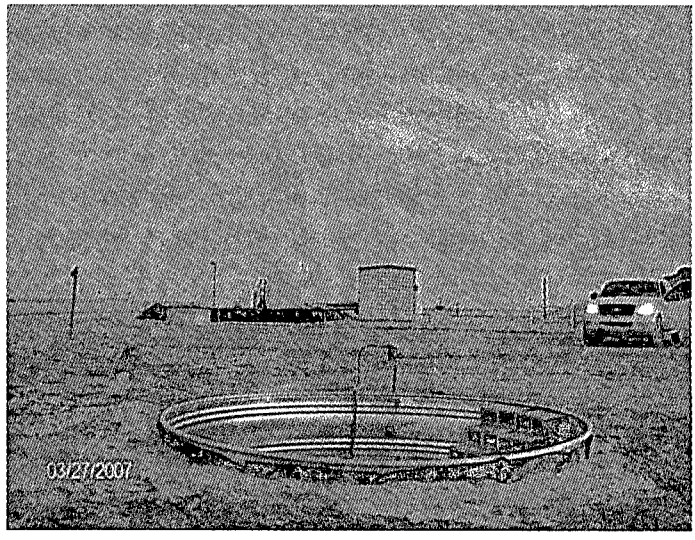
Sample	Sample Date	TDS	Cl	Benzene	Toluene	Ethyl Benzene	Total Xylenes
		(mg/L)					
RO treated	3/13/2007	151	96	<0.002	0.07	<0.002	<0.002
	3/27/2007	146	88	<0.002	0.011	<0.002	<0.002

RO feed	3/13/2007	3,593	1,759	<0.002	<0.002	<0.002	<0.002
	3/27/2007	3,763	1,819	<0.002	<0.002	<0.002	<0.002
RO waste	3/13/2007	6,967	3,599	<0.002	0.027	<0.002	<0.002
	3/27/2007	6,951	3,759	<0.002	0.004	<0.002	<0.002

4. Toluene in the treated water is most likely due to "contamination" by glue and solvent used to assemble the PVC pipes of the system and is declining with time.
5. Since early March, the system has pumped about 20 gallons a day from MW-1 and produced about 10 gallons a day of treated water for wildlife.
6. This week we are upgrading the system to pump 50+ gallons each day, producing about 25+ gallons per day clean water.
7. The pictures below show some of the key system components.



RO unit in housing on site, large stock tank with view of tanks and housing in the background.



G-35 System Plans

Rather than install another treatment system at G-35, we propose to use the F-35 system to treat pumped G-35 water for wildlife consumption or operation maintenance as the need arises. This plan includes:

1. Installation of a 4 inch casing recovery well near the excavation at G-35.
2. Running a 1 inch pipe into the currently unused 8 inch pipe casing that runs from G-35 to F-35 underneath the road.
3. A solar powered pump in the G-35 recovery well to pump ground water from G-35 and send it to the F-35 system for treatment.
4. Installation of an additional tank to hold fresh water for use in field operations at F-35.

5. Treatment of G-35 ground water through the F-35 system components.

This system would be a small scale addition to the raw water supply at F-35.

We look forward to your expeditious response to this proposed minor modification to the Stage 1 and 2 Abatement Plan as we hope to have components in place to treat ground water from G-35 in the F-35 system within the next few months.

Sincerely,
R.T. Hicks Consultants, Ltd.

Katie Lee

Katie Lee
Staff Scientist

Copy: Rice Operating Company

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

April 4, 2007

Ed Hansen
NMOCD
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Via E-mail

RE: F-35 SWD & G-35 SWD, T17S, R35E; NMOCD Case #: AP-59

Dear Mr. Hansen,

In your email of March 23, 2007 and subsequent phone conversation with Mr. Hicks, we understand that NMOCD has several comments regarding the recent submissions for the above-referenced site. As you will see in our responses below, the F-35 ground water system just completed its fourth consecutive week of successful operation. Also, while we believe some of the NMOCD requested modifications of the vadose zone remedy for the abovementioned sites are unnecessary for the protection of fresh water, we are willing to comply as shown below in an effort to expedite the installation of the remedy. We propose to:

- Install exploratory borings through the center of the excavations to a depth 5-feet above ground water at each site for data collection prior to installation of the ET Barrier,
- Install 5 foot thick ET barriers on the excavation caps, and
- Install one 4 inch casing recovery well at G-35.

We request your immediate approval of these actions and propose that NMOCD also approve the subsequent backfilling and capping of the site excavations with the capillary break and ET barriers as described regardless of the data collected in borings through the excavations.

Here we list your comments in italics, with our responses below.

1. *Prior to implementing the proposed [vadose zone] remedy, Rice Operating Company (ROC) must provide soil sample analytical results for chloride from at least one boring in the center of each excavation at each of the two sites. The borings must be advanced to groundwater with soil samples taken at 5 feet intervals.*

Collection of soil data to within 5-feet of the water table will provide excellent data without creating a potential direct conduit between chloride in the vadose zone and the aquifer. Collapse of the borehole during sampling or drilling could create such a conduit.

Although we are interested in the NMOCD response to the query below, we will:

- drill one boring in the center of the excavations at each site
- collect samples from each boring at 5-foot intervals for field analysis of chloride and organic vapors using standard ROC protocols
- collect two samples from each boring for laboratory analysis of chloride
- submit no more than two samples to the laboratory for analysis of BTEX if field analysis of organic vapors exceeds 100 ppm

- collect 2-3 samples from each boring for laboratory analysis of soil moisture
- record observations of the physical nature of the vadose zone on a boring log
- construct a 4-inch recovery well at G-35 near the excavation using the well design shown in Figure 1 (attached).

As shown below in the response to item 5 (below) the timing of the boring program is academic. As mentioned above, we agree to conduct these borings as soon as we receive a go ahead from you and can schedule a rig to do so.

2. *Please provide TDS and chloride analytical results from new water samples from the vicinity production wells, SPS-27 and SPS-25.*

In a letter to Wayne Price dated September 28, 2006, we submitted the two attached plates showing regional ground water flow and background TDS and Chloride data collected from nearby wells. As the map shows, SPS-26 and SPS-25 are closest to the sites. Chloride and TDS recent data is presented in the table below. As we believe this data sufficiently establishes water quality in these wells, we do not propose additional sampling of these wells.

Table 1. Recent Xcel Well Data

Well	Sample Date	Cl^-	TDS
SPS 25	06/25/06	49	340
	08/02/06	28.4	346
	10/24/06	25.2	320
	01/10/07	29.2	334
SPS 26	06/25/06	30.6	340
	08/02/06	120	534
	10/24/06	71.4	388
	01/10/07	87.5	400

3. *Please submit the soil classification for the "native soil" that would be used in the proposed evapotranspiration cover and the percent standard Proctor density that would be used when installing the native soil portion of the cover.*

Our recent work shows that the native soil in the area is only several inches thick. As a lot of material from the site excavations was off hauled years ago, there is insufficient material at either site to use in the proposed capillary break or ET barrier. We propose to purchase and import sand and gravel as well as silty loam from the nearby surface owner for use as the capillary break and ET barriers in the excavation caps. During installation of these materials we will conduct a sieve analysis to and provide the results to NMOCD. We will compact the soil layer of the ET Barrier to 85-90% proctor density and provide field tests to demonstrate that construction is consistent with this design criteria.

4. *ROC must proceed with the proposed groundwater remedy (i.e., pump and treat with a R.O. unit and wildlife watering tank) at the F-35 site by Monday, April 2, 2007, and at the G-35 site by Monday, July 2, 2007.*

We submit with this letter a progress report demonstrating that the ground water treatment system at F-35 has been operating successfully for several weeks. Our experience with F-35 leads us to propose a minor modification to the Stage 1&2 Abatement Plan for the ground water remedy at the G-35 site. This proposed modification is explained in the progress report letter.

5. *In our phone conversation you indicated that a 5-foot thick soil layer is preferred to a 3-foot soil layer because the climate in Hobbs is wetter than the climate in Albuquerque, where Sandia National Laboratories conducted their tests on evapotranspiration barriers.*

We used HYDRUS-1D simulations to test the relative efficacy of a 3-foot thick and a 5-foot thick ET Barrier. The results show that a 5-foot layer does not perform measurably better than a 3-foot layer. We attach an explanation of this modeling effort in which we present the input data for these simulations and describe the simulation methods. Table 2 presents the predicted increase to ground water chloride concentration beneath 3-foot thick silt loam and 5-foot thick ET Barriers with a capillary barrier. In both cases, it is assumed that the root zone penetrates the full depth of the ET Barrier. The simulation assumed that the excavations are filled with appropriate materials to construct the caps and compacted to the proper density. Below the ET Barrier, the model assumed a zone of relatively moist sand-caliche with a constant chloride concentration existed from 10 feet below ground surface (bgs) to 20 feet bgs

Table 2. Maximum Possible Effect of Varying Chloride Loads on Ground Water

Chloride Concentration in Soil (in interval from 10 to 20 feet bgs)	Predicted Increase in Ground Water Chloride Concentration		Chloride Loading
	3 Feet of Silt Loam as an ET Barrier at long time	5 Feet of Silt Loam as an ET Barrier at long time	
mg/kg	**mg/L**	**mg/L**	**kg/m^2**
2,000	11.7	7.3	10.4
5,000	29.9	18	26
10,000	58.5	36	51.9

The left-hand column of Table 2 shows chloride concentrations in soil (calculated using the appropriate density and volumetric moisture content from within the model) and the corresponding predicted chloride increases in ground water for each ET Barrier. The right hand column of Table 2 lists corresponding chloride loads (the mass of chloride in the vadose zone per unit area). Typically, ROC encounters chloride concentrations in soil that are less than 10,000 mg/kg, therefore the comparison of the efficacy of a 3-foot thick barrier versus a 5-foot thick barrier for higher concentrations is of academic interest only.

The simulation data presented in the attachment shows that:

1. A properly designed and installed ET barrier is highly effective in sequestering chloride in the vadose zone and is protective of fresh water, public health and the environment,
2. The maximum chloride impact to ground water would occur several centuries or perhaps several millennia from now.
3. Ninety years from now, the chloride concentration in ground water beneath the 3-foot thick ET Barrier would increase by less than 0.008 mg/L and beneath a 5-foot thick barrier, the model predicts a chloride concentration increase of 0.002 mg/L - this difference cannot be accurately measured.
4. Knowledge of the nature of the material below the ET Barrier will not cause any modification of the design of the Stage 2 Abatement Plan, which is installation of an ET Barrier to sequester chloride in the vadose zone.

We do understand that better knowledge of the subsurface texture, chemistry and moisture content will provide additional certainty to a review process. As mentioned above, we will complete two borings through the center of the excavations at these sites for data collection, and agree to install a 5 foot thick ET barrier on excavation caps.

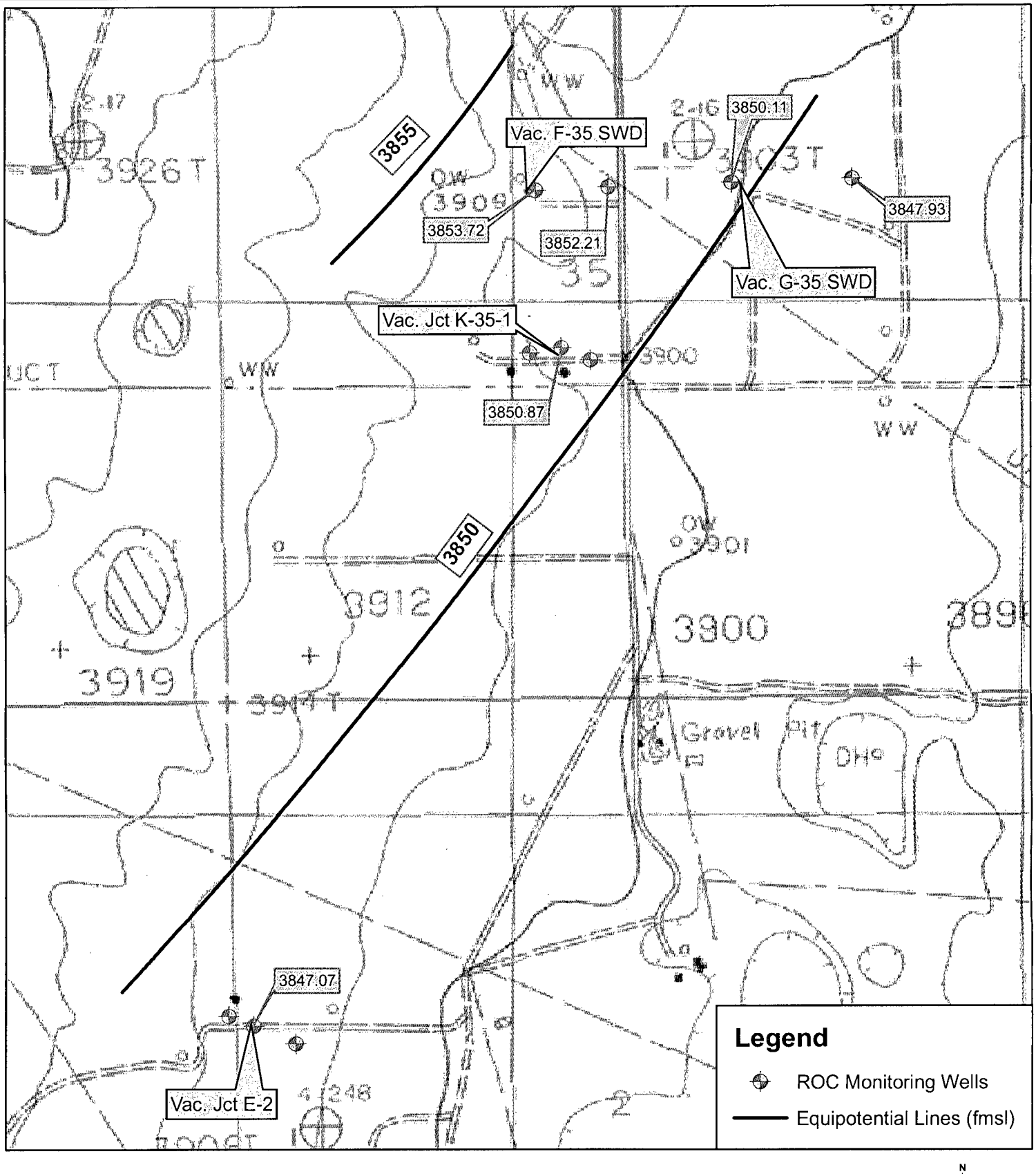
As mentioned in our November 2006 Vadose Zone Remedy Plan and demonstrated in quarterly monitoring, ground water quality will not begin to improve at these sites until an ET Barrier is installed. Moreover, we believe that excavation of the chloride mass (which reside at a depths exceeding 20 feet below ground surface) would cause ROC to violate NMOCD Rules. As these simulations and experience in the area show the marginal benefit (reduction of risk to fresh water) is not commensurate with the increased risk to the environment (creation of dust, site disturbance, creation of motor exhaust, etc.) and the risk to public health (risk due to truck traffic and excavation process). We therefore propose that once the data collection boreholes are completed at these sites, the excavations be backfilled and capped with the proposed capillary break and ET barrier materials. We are hopeful that you approval of our modified plan will allow us to install an ET barrier at these sites this spring. We look forward to your speedy response.

Sincerely,
R.T. Hicks Consultants, Ltd.

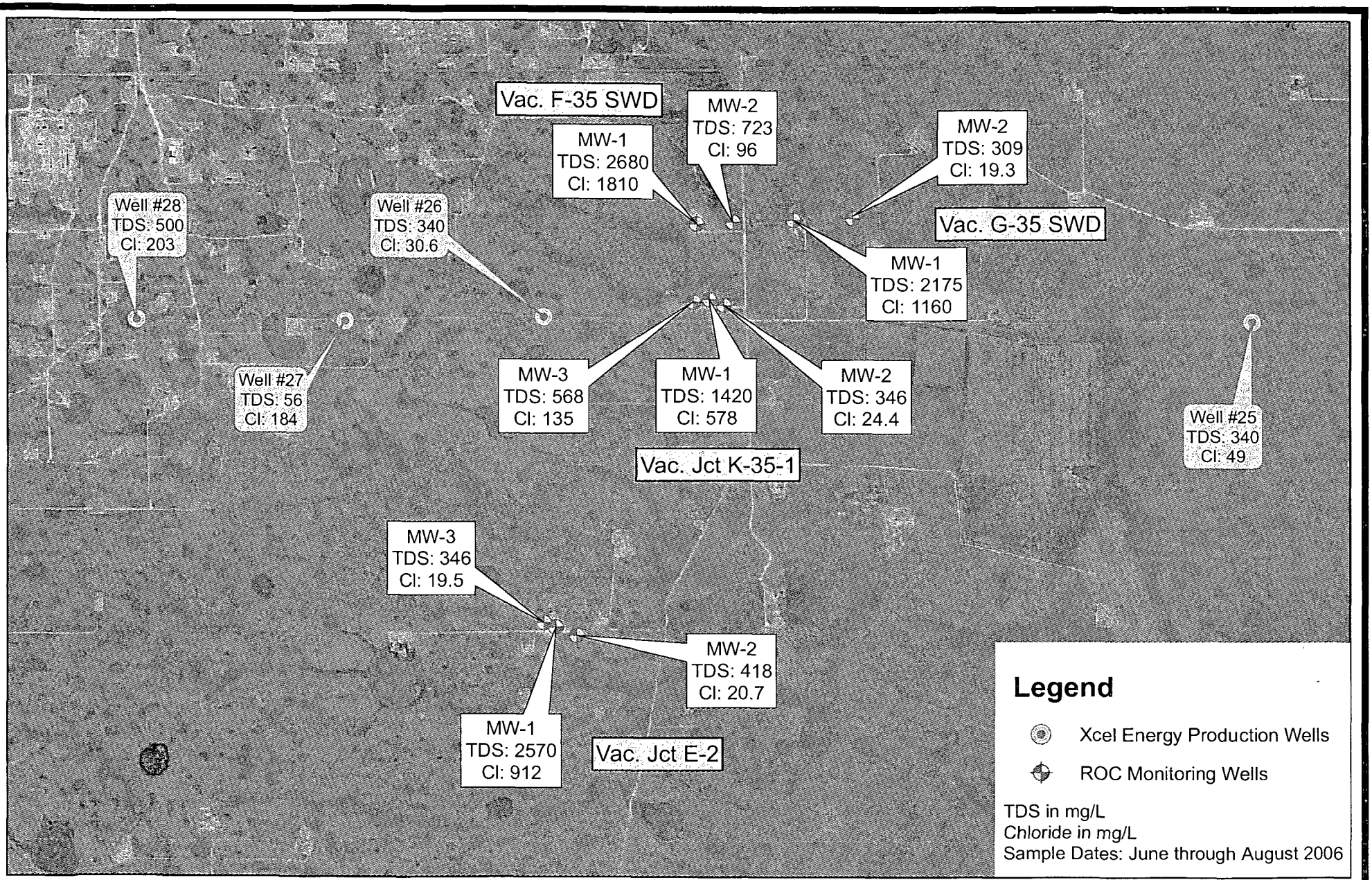
Katie Lee

Katie Lee
Staff Scientist

Copy: Rice Operating Company

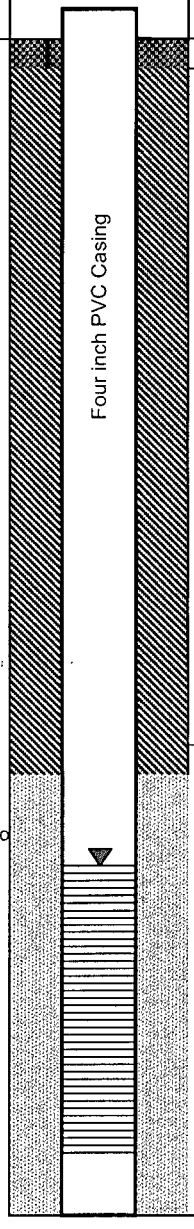


R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Potentiometric Surface at Vac. F-35 SWD and Vac. G-35 SWD (August 2006)	Plate 1
	Rice Operating Company	September 2006



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	2004 Aerial Photograph Showing TDS and Chloride Concentrations at Vac. F-35 SWD, Vac. G-35 SWD, and Nearby Wells.	Plate 2
	Rice Operating Company	September 2006

Client:	Rice Operting Company	**Well Description:**	Schematic Drawing of Well Construction for Proposed G-35 Down Gradient Wells
Project Name:	G-35		
Location:	T 17 S, R 35 E, Section 35		

Depth (feet)	Comments:		Material Descriptions:
0.0	Ground Water is assumed to be 55 feet below ground surface. Well Depths are to be adjusted to actual depth to water.		Cement, 0-2 feet Hydrated bentonite, 2-48 feet Sand, 50-80 feet Screen 55-75 feet
2.0			
4.0			
6.0			
8.0			
10.0			
12.0			
14.0			
16.0			
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R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	**ROC , G-35 Sites**	**Figure 1**
	Monitoring/Recovery Well Boring	**March 2007**

R. T. HICKS CONSULTANTS, LTD.

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

F-35 and G-35 Model Explanation

To model the effects of installation of the proposed vadose zone remedy over the current excavation, an ET Barrier was installed in the combined HYDRUS-1D/Ground Water mixing model of the F-35 and G-35 sites.

Two types of ET Barriers were modeled. The first ET barrier modeled is a three-foot thick layer of silt loam, the second ET barrier modeled is a five-foot thick layer of silt loam. Both ET Barriers are placed above a two-foot thick layer of coarse sand to act as a capillary break. Below the capillary break is fill material to the bottom of the excavation (at an assumed 10 feet below ground surface (bgs)). Below the barrier and fill is sand with some caliche, which is representative of materials at the site. Vegetation was allowed to root throughout the depth of the uppermost silt loam layer in both cases.

In the depth interval between 10 feet and 20 feet bgs, the model assumed a constant concentration of chloride in the vadose zone pore water to simulate the effects of allowing the material currently beneath the excavation to remain in place. A description of the model input parameters are listed below.

HYDRUS INPUTS:

Soil Profile - Information for the soil profile (or vadose zone thickness and texture) is based upon the boring logs from the borings made adjacent to the sites for installation of the monitoring wells. Depth to water measurements from these monitoring wells provide a vadose zone thickness of 50 feet at the site.

Dispersion lengths - Conservative dispersion lengths of less than 6% of the model length were employed. Standard practice calls for employing a dispersion length that is 10% of the model length.

Climate - Weather data used in the predictive modeling was from the Pearl Weather Station (46 years of data), which is less than 10 miles south-southeast of the F-35 and G-35 sites.

Soil Moisture - Because soils are relatively dry in this climate and vadose zone hydraulic

conductivity varies with moisture content, it is important that simulation experiments begin with a representative soil moisture content. Commonly, the calculation of soil moisture content begins with using professional judgment as an initial input and then running sufficient years of weather data through the model to establish a "steady state" moisture content. For these simulations, only minimal changes in the HYDRUS-1D soil moisture content profile occurred after year 25 of the initial condition calculation, 92 years (2 cycles of the 46 years of weather data) was considered more than sufficient to establish an initial moisture condition. This vadose zone moisture content profile was the basis for the subsequent initial condition simulation.

Because the sites were active until about four years ago, this "steady state" vadose zone moisture content profile was considered to be too "dry" to represent the current site for modeling purposes. Therefore to generate a "wetter" soil moisture content profile, a model was constructed featuring approximately seven additional 25 cm precipitation events a year for 30 years. This length of time is sufficiently long to generate a "wetter" soil profile through the vadose zone.

A "wetter" soil moisture content profile was taken at a time about two years after cessation of additional precipitation. This choice is conservative of ground water quality as the "wetter" profile has a higher hydraulic conductivity.

Initial Chloride Profile – In the depth interval between 10 feet and 20 feet bgs, a constant concentration of chloride was installed in the vadose zone to simulate the native soil materials in place as mentioned above. The moisture content from the HYDRUS-1D initial condition moisture content calculation was summed over the depth interval and the chloride concentration (1,508 mg/L) was calculated. This corresponds to a chloride loading of 1.0 kg/m^2.

MIXING MODEL INPUTS:

Influence Distance - The influence distance is defined as the maximal length of the release parallel to ground water flow direction. From the dimensions of the former tank and reserve pits, an influence distance of 100 feet was used.

Background Chloride Concentration – to demonstrate solely the effect of this simulation on

ground water, a 0.0 mg/L chloride concentration in ground water was used.

Hydraulic Conductivity - R.T. Hicks Consultants believes that the hydraulic conductivity of the saturated zone at the release site is similar to that observed for the Ogallala Aquifer throughout the general area. McAda (1984) simulated water level declines using a two-dimensional digital model and employed hydraulic conductivity values of 51-75 feet/day (1.9 E-4 to 2.8 E-4 m/s) in the area. More recently, Musharrafieh and Chudnoff (1999) employed values for hydraulic conductivity within this area of interest between 21 and 40 ft/day, for their simulation. According to Freeze and Cherry (1979), these values correspond to clean sand, which agrees with nearby lithologic descriptions of the saturated zone. For this simulation, a saturated hydraulic conductivity of the uppermost saturated zone is assumed as 40 feet/day.

Groundwater Gradient - From USGS well data (1996), ground water flows southeast in the area under a hydraulic gradient of approximately 0.0036 ft/ft. The resulting ground water flux is 3.7 cm/day.

Aquifer Thickness - A restricted aquifer thickness of 10 feet was employed in the mixing model as a conservative measure to cause over-estimation of chloride concentration in a simulated receptor well.

For all variables for which field data did not exist, assumptions conservative of ground water quality were made. A summary of the input parameters and a description of the source information used in the HYDRUS-1D model for this application are provided in Table 1 below.

Table 1: Modeling Inputs for the F-35 and G-35 Remedy Simulations

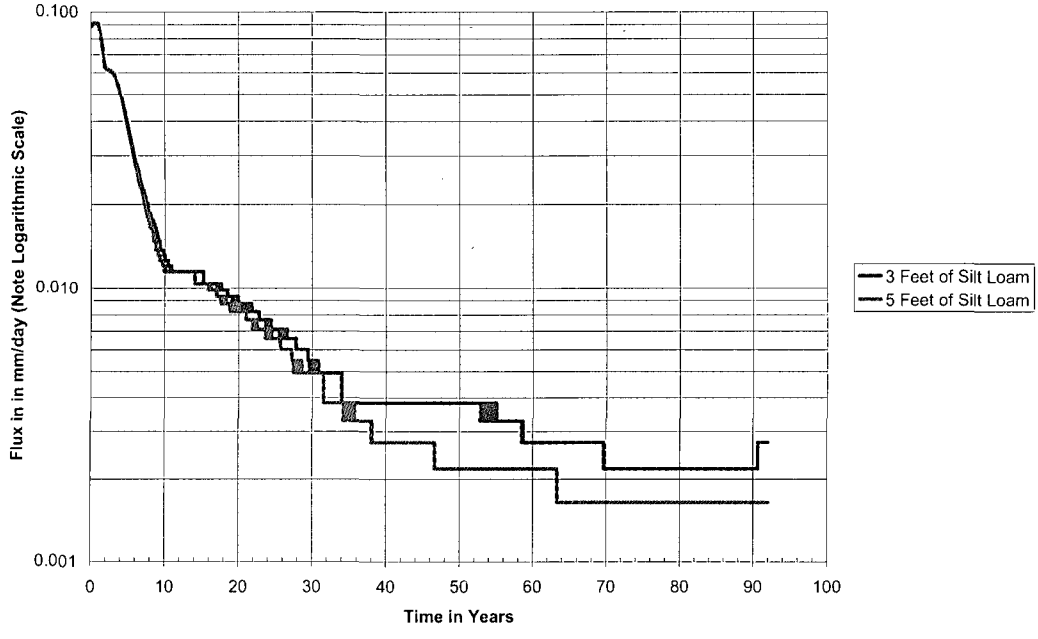
Input Parameter	Source
Vadose Zone Thickness - 50 feet	From monitoring wells on the sites
Vadose Zone Texture	Boring Logs and professional judgment
Dispersion Length - 6% or less of model length	Professional judgment
Climate	Pearl, N.M. Weather Station data
Soil Moisture	HYDRUS-1D initial condition simulation

Initial soil chloride concentration profile	From Monitoring Well Boring samples within site
Length of release parallel to ground water flow - 100 feet	From site dimensions
Background Chloride in Ground Water - 100 ppm	Regional Data
Ground Water Flux – 3.6 cm/day	Calculated from regional data
Aquifer Thickness - 10-feet	Aquifer thickness penetrated by on-site wells

Modeling Results

With both ET barrier simulations, infiltration is decreased resulting in lower vadose zone moisture contents and corresponding decreases in hydraulic conductivities (See Figure 1).

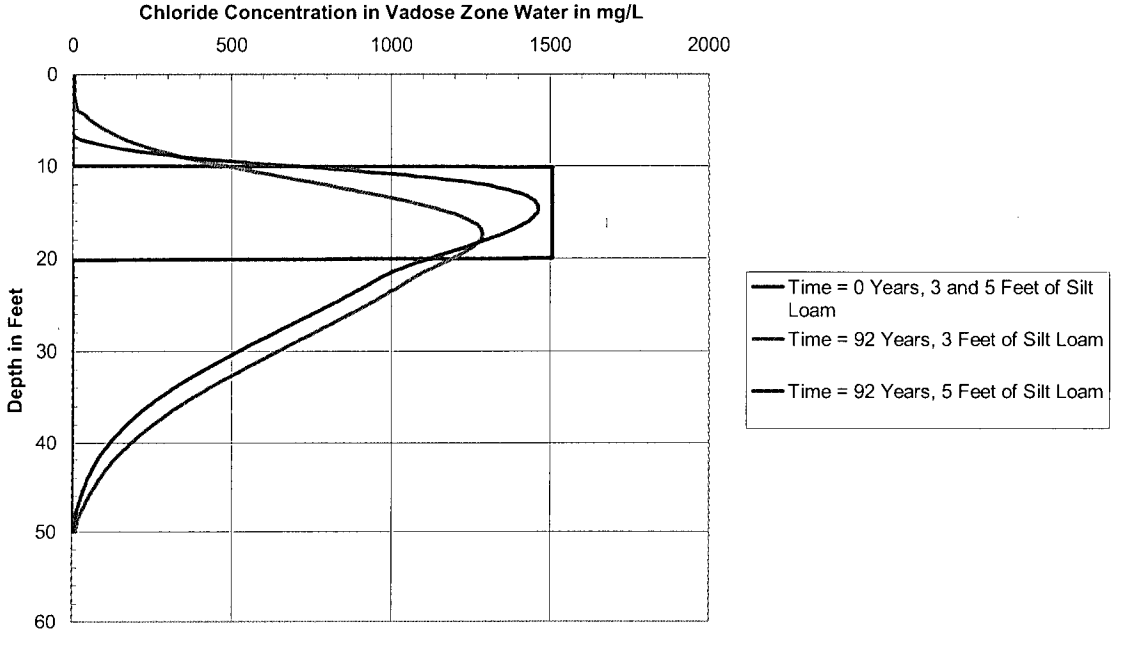
Figure 1: Vadose Zone Water Flux into the Aquifer with Different Thicknesses of ET Barriers, F-35 and G-35 Sites



Vadose zone chloride flux is reduced to the extent that the model simulation of the first 92 years suggests that peak chloride concentration will not enter ground water for one to two

thousand years (See Figure 2). The slow rates of chloride migration are demonstrated in Figure 2. The black line represents the initial chloride concentration in vadose zone soil water at Time = 0 years. A constant concentration of 1,500 mg/L exists between 10 feet and 20 feet bgs. For the remedy composed of three feet of silt loam as an ET barrier, peak chloride concentration (1,380 mg/L) is at a depth of 17.5 feet at Time = 92 years. For the remedy composed of five feet of silt loam as an ET barrier, peak chloride concentration (1,460 mg/L) is at a depth of 15.0 feet at Time = 92 years. An algebraic calculation suggests that the peak chloride concentration in the vadose zone of the remedy composed of three feet of silt loam will take about 1,200 years to enter ground water. Longer time will be necessary for peak chloride concentration to enter ground water for the remedy composed of five feet of silt loam.

Figure 2: Chloride Concentration Profiles at Time = 0 and at Time = 92 Years, F-35 and G-35 Sites



Rather than modeling the two remedies for two millenia, a maximum vadose zone water flux and a maximum chloride concentration from the vadose zone chloride profile were taken from the second cycle of atmospheric data run through the HYDRUS-1D model. These values were used as constant variables through time as inputs to the mixing model (Table 2). With this assumption, a limit as time goes to infinity can be calculated for predicted

chloride concentration in a monitoring well at the edge of the mixing zone.

Table 2: Maximum Values used to Bound Chloride Flux to Ground Water		
All values are from year 47 of the simulation	**3 feet of silt loam**	**5 feet of silt loam**
Maximum vadose zone water flux to ground water [cm/day]	0.000383	0.000219
Maximum chloride concentration from the vadose zone chloride profile [mg/L]	1,370	1,480

These limit concentrations are the extreme "worst case scenarios" for two reasons. First, vadose zone flux to ground water is less than these values for all later time (Figure 1). Secondly, because of dispersion, these peak chloride concentrations will attenuate before entering ground water. Therefore, these assumptions are conservative of ground water quality.

Using soil densities and moisture contents from the HYDRUS-1D modeling, Table 3 presents the maximum predicted increase to ground water chloride concentration beneath the two ET barriers. Since chloride is conserved, the vadose zone chloride flux from the HYDRUS-1D model to the ground water mixing model can be multiplied to simulate the chloride loadings in Table 3.

Table 3. Maximum Possible Effect of Varying Chloride Loads on Ground Water

Chloride Concentration in Soil (in interval from 10 to 20 feet bgs)	Predicted Increase in Ground Water Chloride Concentration		Chloride Loading
	3 Feet of Silt Loam as an ET Barrier at long time	5 Feet of Silt Loam as an ET Barrier at long time	
mg/kg	**mg/L**	**mg/L**	**kg/m^2**
2,000	11.7	7.3	10.4
5,000	29.9	18	26
10,000	58.5	36	51.9

The left-hand column of Table 3 shows chloride concentrations in soil and the corresponding predicted chloride increases in ground water for each ET Barrier. The right

hand column lists corresponding chloride loads. Given the HYDRUS-1D calculated volumetric moisture contents, vadose zone pore water would have to have a chloride concentration (in mg/L) exceeding that of saturated brine to correspond to the hypothetical 40,000 mg/kg chloride in soil.

From this modeling simulation, either of the installed remedies will effectively decrease chloride flux to ground water. The predicted better performance of the 5 foot silt loam barrier cannot be distinguished from the performance of the 3 foot silt loam barrier using standard ground water monitoring.

From this simulation data we can conclude that:

1. A properly designed and installed ET barrier is highly effective in sequestering chloride in the vadose zone and is protective of fresh water, public health and the environment,
2. The maximum chloride impact to ground water would occur several centuries or perhaps several millennia from now.
3. Ninety years from now, the chloride concentration in ground water beneath the 3-foot thick ET Barrier would increase by less than 0.008 mg/L and beneath a 5-foot thick barrier, the model predicts a chloride concentration increase of 0.002 mg/L - this difference cannot be accurately measured.

Hansen, Edward J., EMNRD

From: Hansen, Edward J., EMNRD
Sent: Wednesday, February 28, 2007 10:29 AM
To: 'Kristin Pope'
Subject: RE: prioritized list of submissions

Kristin,
Thanks for sending the priority list - this will be very helpful for me.

I was discussing the Vacuum SWD F/G-35 Vadose Zone work plan with Wayne: can you please obtain and submit recent (say the past 5 years) monitoring data for the two water production wells, SPS 27 (upgradient of the sites) and SPS 25 (downgradient of the sites). Wayne says that these wells are considered public water supplies and data should be available from the power plant. Let me know if you have any questions.
Thanks

Edward J. Hansen
Hydrologist
Environmental Bureau
505-476-3489

From: Kristin Pope [mailto:kpope@riceswd.com]
Sent: Monday, February 26, 2007 4:00 PM
To: Price, Wayne, EMNRD; Hansen, Edward J., EMNRD
Cc: Carolyn Haynes; Scott Curtis
Subject: prioritized list of submissions

Wayne & Ed:

Here is the prioritized list of submissions that need OCD feedback as you requested at our last meeting on Feb. 21. Please feel free to contact me if you have any questions regarding these submissions. Thank you for your time.

Kristin Farris Pope
Project Scientist
RICE Operating Company
Hobbs, New Mexico
(505) 393-9174

R. T. HICKS CONSULTANTS, LTD.

2007 FEB 6 AM 10 54

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

February 5, 2007

Wayne Price
NMOCD Environmental Bureau Chief
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Via E-mail

RE: F-35 SWD & G-35 SWD, T17S, R35E; NMOCD Case #: AP-59

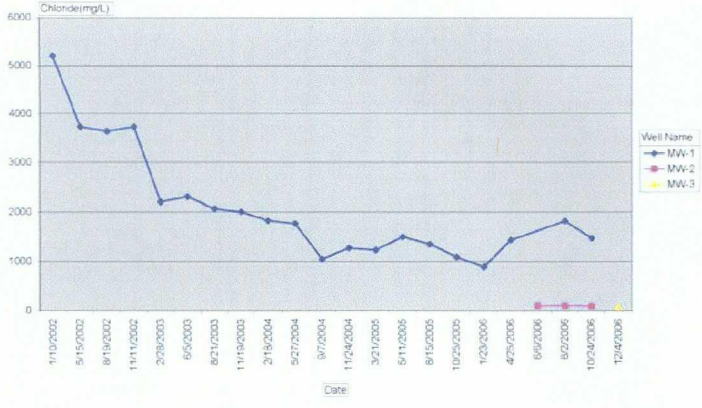
Dear Mr. Price,

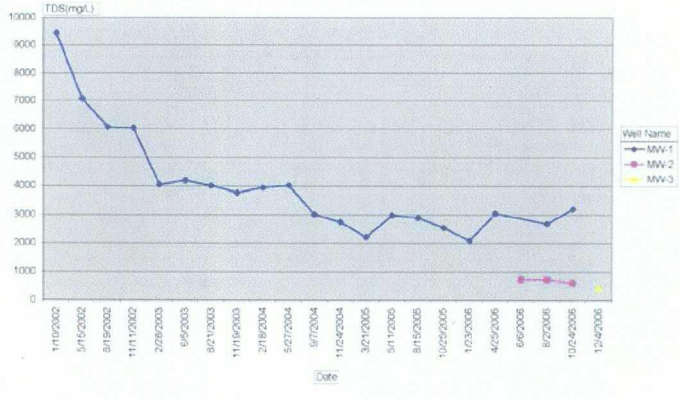
The purpose of this letter is two-fold: to inform you of on-going site conditions at G-35 and F-35 and update you on the installation of the treatment system at F-35.

Site Conditions
The following figures show that Chloride and TDS concentrations at the F-35 decreased significantly between 2002 and 2003. G-35 exhibited Chloride and TDS concentration spikes in 2005 and have decreased significantly in 2006. Concentrations at both sites appear to be stable at this time. We believe that the lack of infiltration barriers at these sites allows continued migration of chloride from the vadose zone to ground water. Therefore, the flux of chloride to ground water is balanced by the ground water flux and the result is concentrations above WQCC Standards.

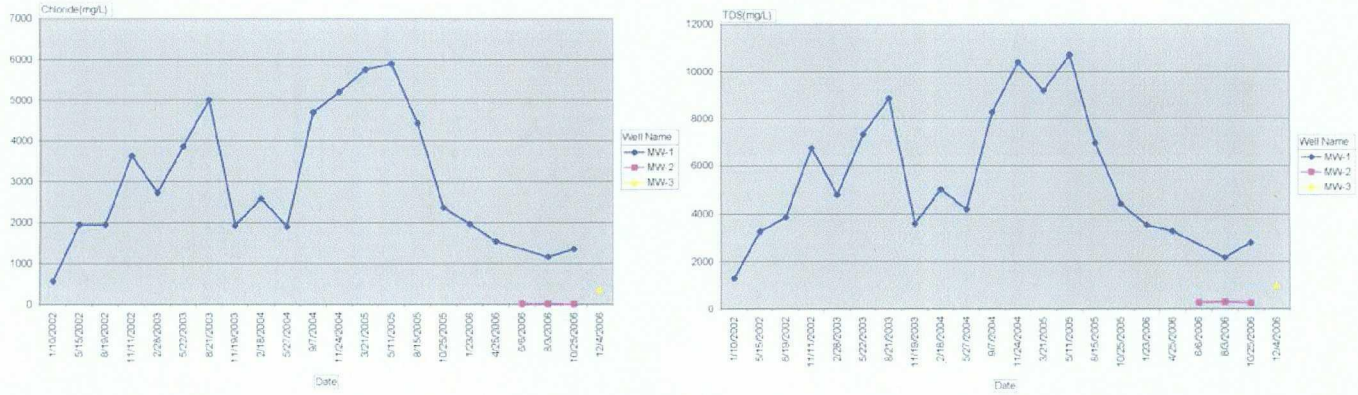
We proposed installation of an infiltration barrier in our Vadose Zone Remedy Plan (submitted 11-15-2006). NMOCD recently approved our infiltration barrier design (with minor modification) at the E-5 Junction Box (NMOCD Case #1R0427-91) site near Monument (10-11-2006). With this submission, we commit to compacting the fine-grained layer of the barrier and the soil layer of the barrier to at least 85% standard proctor at the F-35 and G-35 sites.

F-35 Ground Water Data





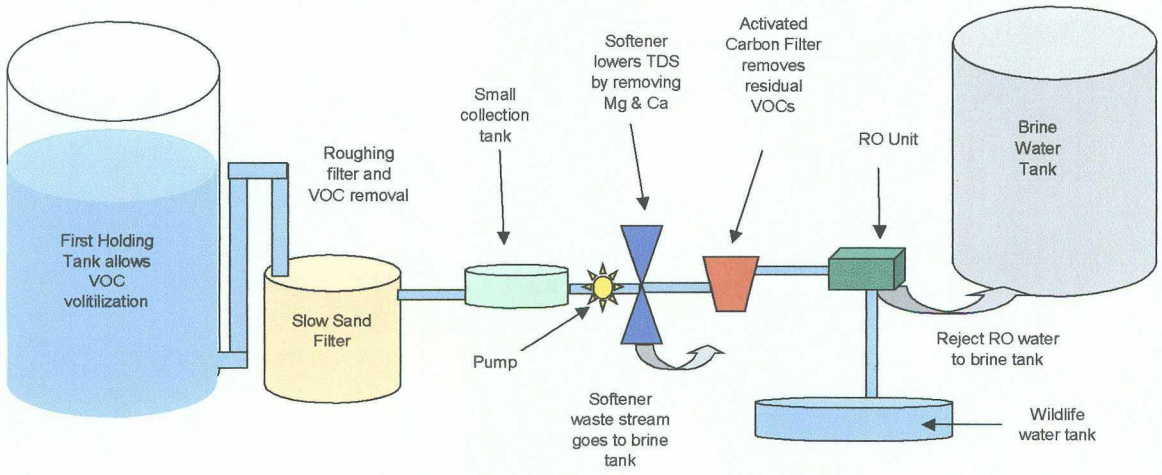
G-35 Ground Water Data



As shown in the pink and yellow data points in the lower right quadrants of each graph, new monitoring wells down gradient from these sites exhibit background concentrations of chloride and TDS. This finding is good news, demonstrating that the ground water quality impairment associated with the F-35 and G-35 sites is localized.

F-35 Water Treatment System

The water treatment system at F-35 is close to complete operation. As we've discussed in the past, our system has been designed to use off-the-shelf technology and is as robust and low maintenance as possible. As we've installed this system, our interactions with industry experts and trouble shooting in the field have yielded the following water treatment train:



As freezing temperatures can significantly inhibit or permanently damage portions of this system, we have housed the system from the small collection tank to the RO unit in a storage shed and outfitted it with a space heater. The first holding tank, the sand filter, the brine water tank and the wildlife water tank are all outside and placed within secondary containment. The photo below shows the system with F-35 MW-1 in the foreground. The wildlife water tank is

not visible because it is behind the storage shed outside of the fenced perimeter of the site. The small collection tank is visible in the entrance of the shed.

The activated carbon filter and RO unit are mounted on the wall in the shed, the wildlife water tank is situated behind the shed to the north of the site; both pictured below:

Interior plumbing is complete and outside plumbing is in process this week. We plan to conduct flow tests with the RO unit this week or next. Once flow tests are conducted, we will set the electronic timer to operate the RO unit for our desired capacity. We plan to pump 100 gallons and finish 50 gallons of clean water each day, but keep in mind these are estimations based on our vender's best hypothesis and observed site conditions. We are installing float valves and checking systems on all components to insure that no tank may overflow in case of a system

failure and will put a small heater in the wildlife water tank to keep it from freezing. We anticipate some initial unforeseen variables with the system and will let you know how operation and output progress.

Once we have this system running and the vadose zone remedy in place, we hope to move forward with a water treatment element at G-35. We anticipate the G-35 system will be improved and streamlined based on our experience at F-35.

In summary, we urge NMOCD to review our Vadose Zone Remedy Plan for these sites as soon as possible. If you have questions or comments, please contact Kristin Pope at Rice Operating Company.

Sincerely,
R.T. Hicks Consultants, Ltd.

Katie Lee

Katie Lee
Staff Scientist

Copy: Rice Operating Company

Hansen, Edward J., EMNRD

From: Katie Lee [katie@rthicksconsult.com]
Sent: Wednesday, January 24, 2007 5:29 PM
To: Hansen, Edward J., EMNRD; Price, Wayne, EMNRD; Kristin Pope
Cc: Randall Hicks
Subject: F-35 plans NMOCD Case #AP-59

Attachments: F-35 RO Diagram.pdf

F-35 RO
agram.pdf (54 K

Gentlemen,

R.T. Hicks Consultants, on behalf of Rice Operating Company, will be installing the last portion of our point source treatment system at the F-35 (NMOCD Case # AP-59) site the week of January 29th, 2007, depending on component shipping times.

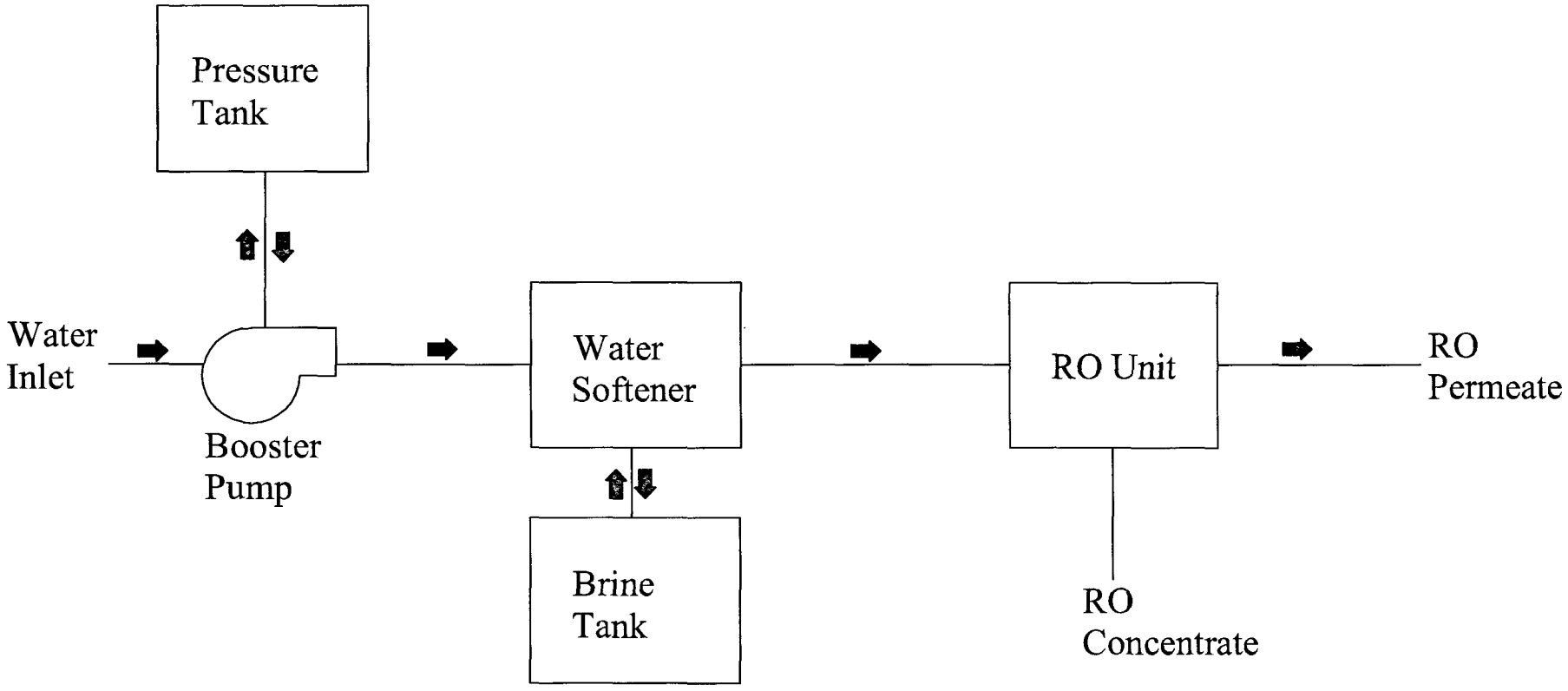
Attached, please find a simple drawing of the components of the treatment train for the system at F-35 that will be installed to complete the treatment of ground water at the site. As you may recall, the system utilizes a volatilization tank to allow residual VOCs to degrade and a small slow sand filter prior to the treatment train you will see attached. This system has been designed using "off-the-shelf" equipment with emphasis on durability, ease of use and low maintenance.

We're looking forward to sending you a good report on the results of these efforts!

Best regards,

Katie Lee
Staff Scientist
R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW F-142
Albuquerque, NM 87104

Office Phone: 505-266-5004
Fax: 505-266-0745



REVISIONS

A

THIRD ANGLE PROJECTION

INDUSTRIAL WATER SERVICES
4500 TURF RD.
EL PASO, TX 79938-9730
PH:(915)849-0401 FAX:(915)849-6685

PROJECT: RO Diagram

COMMENTS:

DESIGNED BY: Paul Diaz

APPROVED BY:

DRAWN BY: Paul Diaz

SCALE: None

FILENAME:

DATE: 1/24/07

TOLERANCES
XX = ±.05
XXX = ±.002
XXXX = ±.0001
ANGLES = ±1°

UNLESS OTHERWISE SPECIFIED ALL TOLERANCES ARE AS FOLLOWS:

Price, Wayne, EMNRD

From: randall hicks [r@rthicksconsult.com]
Sent: Thursday, September 28, 2006 5:59 AM
To: Price, Wayne, EMNRD
Cc: 'Kristin Pope'; 'Katie Lee'; david@rthicksconsult.com
Subject: F-35 G-35
Attachments: Sept 06 Well Proposal.pdf

Wayne

As stated in the Minor Modification to the Abatement Plan, we will drill additional wells at this site in October. I think you will be interested in the well construction diagram as it is a little different that what you are used to. We will be using inflatable packers to isolate sampling zones.

The down gradient well for the F-35 site is probably farther down gradient than you would have expected. The ground water velocity calculations in the attached letter explain our rationale for this location.

Pipelines and other features in the area may require alternation of these locations by up to 100 feet. We are staking the locations today. No action is required on your part as this work element is already approved in the Minor Modification.

Randall Hicks
Tel: 505-266-5004
Cell 505-238-9515

R. T. HICKS CONSULTANTS, LTD.

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

September 28, 2006

Wayne Price
NMOCD Environmental Bureau Chief
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Via E-mail

RE: F-35 SWD & G-35 SWD, T17S, R35E; NMOCD Case #: 1R0330 & 1R0332

Dear Mr. Price,

Plate 1 is a potentiometric surface map documenting a southeast ground water flow direction in this area. Plate 2 presents chloride concentrations in ground water. The background chloride concentration is about 30 mg/L. However, chloride concentrations in excess of 180 mg/L exist at two up gradient supply wells. Plate 3 shows the location of two of the three additional wells proposed in our April 2006 Minor Modification to the Stage 1&2 Abatement Plan. The two wells are:

F-3 – located about 850 feet southeast and down gradient of the F-35 site,
G-3 – located about 250 feet southeast and down gradient of the G-35 site.

With the measured hydraulic gradient of 0.003 and an assumed hydraulic conductivity of 40 feet/day (see Appendix B), aquifer flux at the sites is 3.7 cm/day. Using an aquifer porosity of 0.25 the calculation of pore velocity is about 175 feet/year. Highest chloride concentrations in the monitoring well at the F-35 occurred in January, 2002. A pore velocity of 175 feet/year permits a conclusion that an additional monitoring well situated about 850 feet down gradient of the site would intercept any ground water which was beneath the F-35 site in early 2002.

These calculations also allow a conclusion that an additional monitoring well placed about 250 feet down gradient at the G-35 site would intercept ground water which was beneath the G-35 site in mid-2003 when the monitoring well measured the highest chloride concentrations.

The wells will be constructed with 4 inch diameter PVC. Plate 4 shows details of construction. The well screens are proposed in three intervals of:

1) from five feet above the water table to ten feet below the water table,
2) five feet of screen from 20 feet below the water table to 25 feet below the water table,
3) and five feet of screen from 35 feet below the water table to 40 feet below the water table.

In addition, the wells will feature two one-inch piezometers set to access the center of the lowermost two screened intervals. With this well construction and the use of movable well packers to isolate a pump, all three of the depths within the aquifer can be properly isolated and sampled. This design allows for any and all of the three zones to be pumped and treated if we find unacceptable concentrations of chloride in ground water distributed throughout the aquifer or only in one horizon.

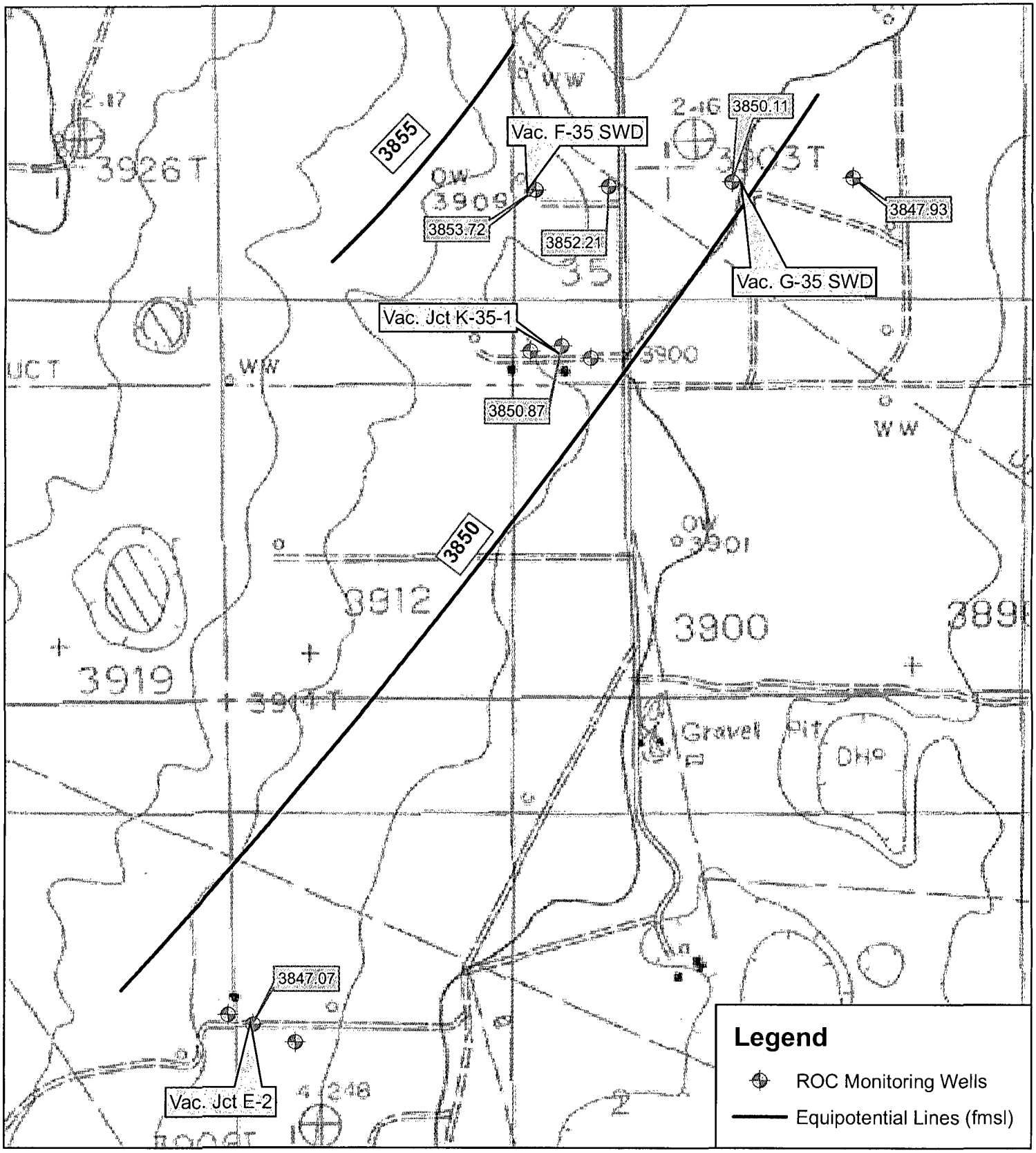
If any sampled zone in the new wells exhibit concentrations of constituents of concern that suggest additional characterization of the site is warranted to refine the design of the proposed remedy, we will install an additional monitoring well based upon the field data.

We have scheduled a drilling rig for October 2006 to install these wells. Please contact me if you have any questions.

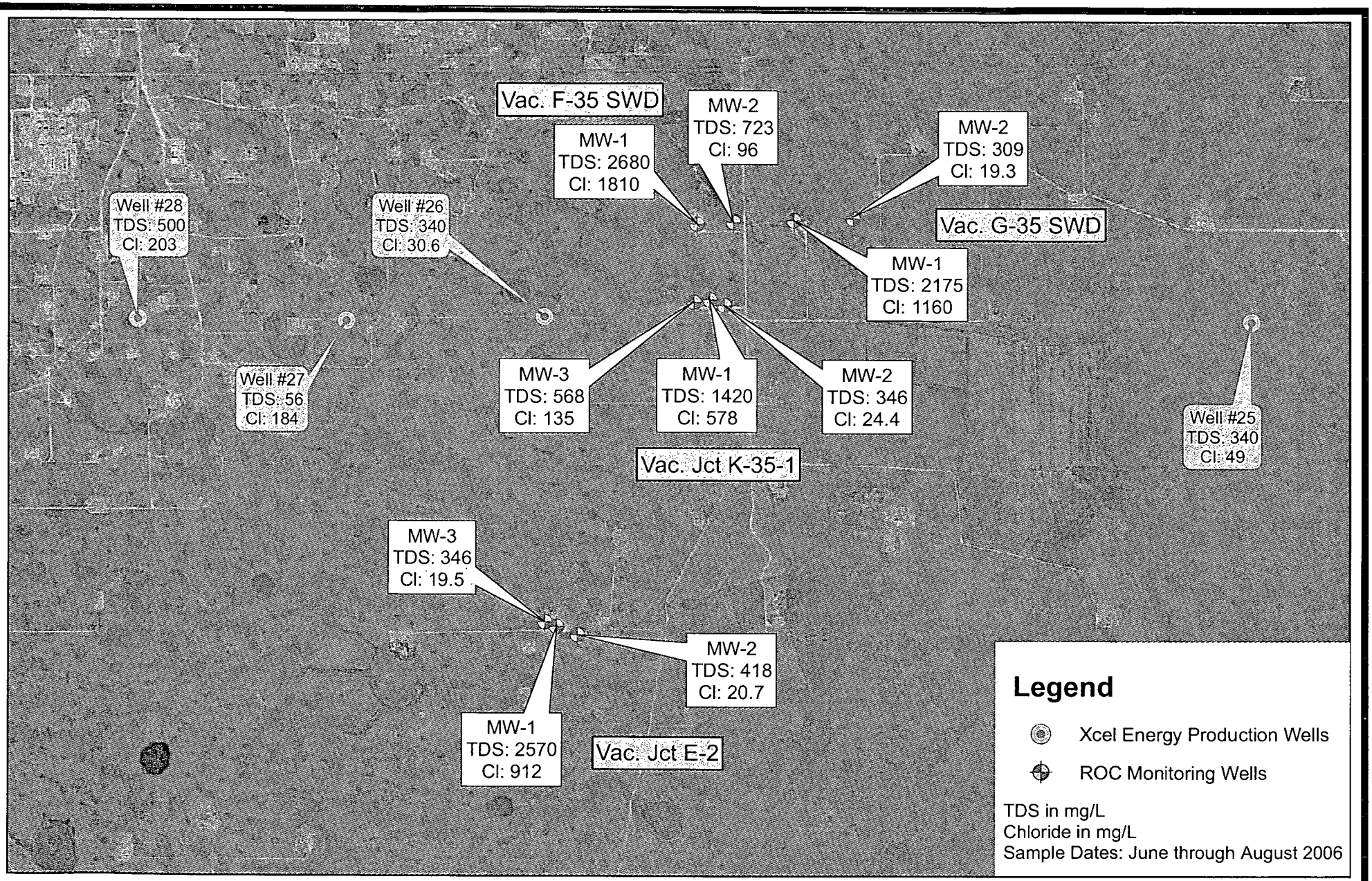
Sincerely,
R.T. Hicks Consultants, Ltd.

Randall Hicks
Principal

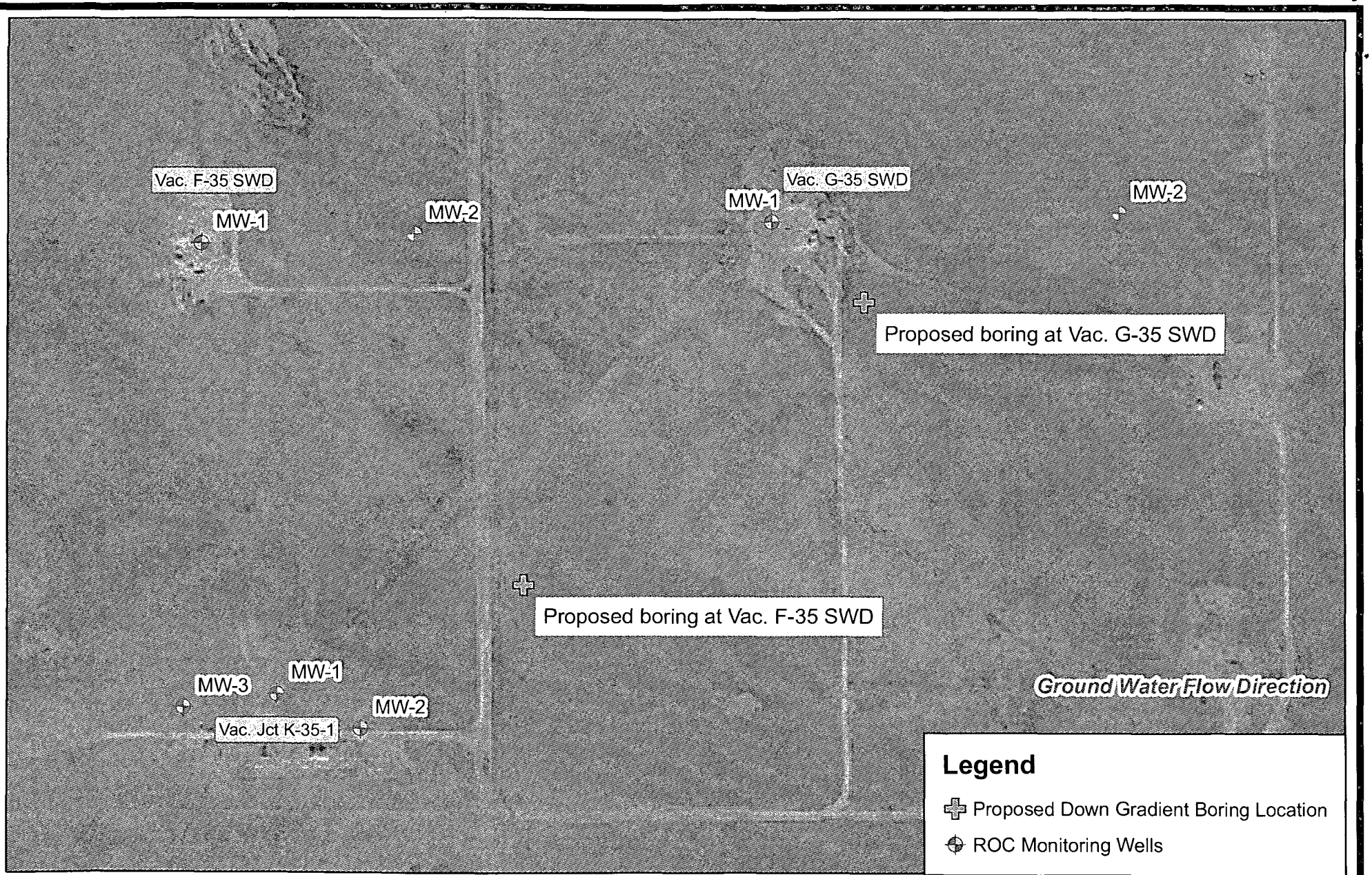
Copy: Rice Operating Company



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Potentiometric Surface at Vac. F-35 SWD and Vac. G-35 SWD (August 2006)	Plate 1
	Rice Operating Company	September 2006



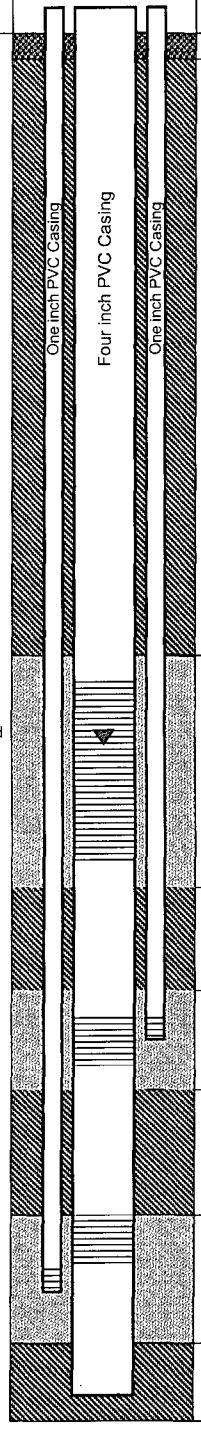
R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	2004 Aerial Photograph Showing TDS and Chloride Concentrations at Vac. F-35 SWD, Vac. G-35 SWD, and Nearby Wells.	Plate 2
	Rice Operating Company	September 2006



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Proposed Boring Locations at Vac. F-35 SWD and Vac. G-35 SWD	Plate 3
	Rice Operating Company	September 2006

Client:	Rice Operting Company	Well Description:	Schematic Drawing of Well Construction for Proposed F 35, G-35 Down Gradient Wells
Project Name:	F-35, G-35 Sites		
Location:	T 17 S, R 35 E, Section 35		

Depth (feet)	Comments:	Material Descriptions:
0.0	Ground Water is assumed to be 55 feet below ground surface. Well Depths are to be adjusted to actual depth to water.	Cement, 0-2 feet
2.0		
4.0		
6.0		
8.0		
10.0		
12.0		
14.0		
16.0		
18.0		
20.0		
22.0		
24.0		
26.0		
28.0		
30.0		
32.0		
34.0		
36.0		
38.0		
40.0		
42.0		
44.0		
46.0		Hydrated bentonite, 2-48 feet
48.0		
50.0		
52.0		
54.0		
56.0		
58.0		
60.0		
62.0		
64.0		
66.0		Sand, 48-66 feet Screen 50-65 feet
68.0		
70.0		
72.0		
74.0		Hydrated bentonite, 66-74 feet
76.0		
78.0		Sand, 74-81 feet Screen 75-80 feet Piezometer 77.5 feet
80.0		
82.0		
84.0		
86.0		Hydrated bentonite, 81-89 feet
88.0		
90.0		
92.0		
94.0		Sand 89-96 feet Screen 90-95 feet Piezometer 92.5 feet
96.0		
98.0		
100.0		
102.0		Slump, Hydrated Bentonite
104.0		
106.0		
108.0		



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 505-266-5004	ROC F-35, G-35 Sites	Plate 4
	Monitoring/Recovery Well Boring	September, 2006

Price, Wayne, EMNRD

From: Price, Wayne, EMNRD
Sent: Wednesday, November 23, 2005 9:24 AM
To: Price, Wayne, EMNRD; Carolyn Doran Haynes (riceswd@leaco.net)
Cc: Sanchez, Daniel J., EMNRD; Sheeley, Paul, EMNRD
Subject: RE: Abatement Plan requirement for Vacuum G-35/F35

Corrected version. The AP's are due Dec 30, 2005.

From: Price, Wayne, EMNRD
Sent: Wednesday, November 23, 2005 9:15 AM
To: Carolyn Doran Haynes (riceswd@leaco.net)
Cc: Sanchez, Daniel J., EMNRD; Sheeley, Paul, EMNRD
Subject: Abatement Plan requirement for Vacuum G-35/F35

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

November 23, 2005

Carolyn Doran Haynes
Rice Operating Company
122 West Taylor
Hobbs, New Mexico 88240

Re: Sites with confirmed Groundwater Contamination

Dear Ms. Haynes:

During our recent technical meeting held on November 03, 2005 ROC provided OCD with a list of projects with NMOCD Approval Pending. Two of these sites were the G-35/F-35. The ICP submitted by R.T. Hicks Consultants on 03/29/05 indicates that groundwater is impacted. Pursuant to the New Mexico Oil Conservation Division rule 19.15.1.19 (Rule 19) Prevention and Abatement of Water Pollution requires all responsible persons who are abating water pollution in excess of the standards shall do so pursuant to an abatement plan approved by the director.

Therefore, Rice Operating Company is hereby required to submit individual abatement plans for OCD approval by December 30, 2005 for each of the following sites:

Vacuum Sites;

G-35 SWD	Vacuum	UL	G	Sec 35, T17s, R35E	1R0332
F-35 SWD	Vacuum	UL	G	Sec 35, T17s, R37E	1R0330

After OCD receives the plans each site will be assigned a new Abatement Plan number (AP#) for tracking purposes. If you have any questions please do not hesitate to contact me at 505-476-3493 or E-mail DJSanchez@state.nm.us; or contact Wayne Price of my staff at 505-476-3487 or e-mail WPRICE@state.nm.us.

Sincerely;

Wayne Price FOR DANIEL SANCHEZ

Daniel Sanchez
Enforcement and Compliance Manager
Cc: OCD Hobbs office

R. T. HICKS CONSULTANTS, LTD.

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

March 29, 2005

Wayne Price
NMOCD Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Via E-mail and Federal Express

1R0330
AND F-35
DISK IS IN 1R0332

RE: G-35 Investigation Characterization Plan
1R0332

Dear Wayne:

On behalf of Rice Operating Company, R.T. Hicks Consultants, Ltd. is pleased to submit the attached G-35 Investigation Characterization Plan.

If you have any questions or concerns about the enclosed report, please let us know. Thank you for your time.

Sincerely,
R.T. Hicks Consultants, Ltd.

Katie Lee

Katie Lee
Associate Scientist

Copy: Rice Operating Company

March 2005

G-35 Investigation Characterization Plan

NEAR BUCKEYE, NEW MEXICO

Prepared for:

Rice Operating Company
122 West Taylor
Hobbs, NM 88240

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

Price, Wayne

From: Price, Wayne
Sent: Tuesday, November 23, 2004 11:06 AM
To: Carolyn Doran Haynes (E-mail); Kristin Farris Pope (E-mail)
Cc: Sheeley, Paul; Johnson, Larry
Subject: Vacuum G-35 1R0332 and F-35 1R0330 Groundwater contamination

OCD is in receipt of the Feb 09, 2004 monitoring reports for the Vacuum G-35 and F-35 sites. The reports indicate groundwater is contaminated. Please submit a groundwater investigation and remediation plan for OCD approval by December 24, 2004. The plan shall address how Rice intends on cleaning up the contaminated groundwater and prevent further contamination. Please include area maps, plot plan with all significant features, photos, etc.

OCD will not accept a dilution modeling plan at this time due to the fact the locations are located over the Ogallala water bearing formation and the fact that this area has had enormous amount of rainfall which would probably invalidate any model.

OCD feels that an active remediation plan may cure the problem in a relative short amount of time, thus forgoing OCD requiring a rigorous Abatement 19 plan.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

Price, Wayne

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Sent: Tuesday, November 23, 2004 11:06 AM
To: Carolyn Doran Haynes (E-mail); Kristin Farris Pope (E-mail)
Cc: Sheeley, Paul; Johnson, Larry
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Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

RICE Operating Company
122 West Taylor • Hobbs, New Mexico 88240
Phone: (505)393-9174 • Fax: (505) 397-1471

June 18, 2004

RECEIVED
JUN 2 1 2004
OIL CONSERVATION
DIVISION

Mr. Gary Wink
NMOCD District 1 Office
1625 N French Drive
Hobbs, NM 88240

Re: Abandonment of SWD Facility sites Vacuum G-35 and Hobbs E-15
Lea County, NM

Dear Mr. Wink:

This letter is a response to your letter to Rice Operating Company (ROC) dated March 24, 2004, inquiring about the abandonment of wells sites at Vacuum SWD G-35, Hobbs SWD E-15 and Hobbs SWD P-16.

The abandonment of the Hobbs SWD P-16 was completed soon after the P&A of the well. This information was submitted to the District 1 Office on May 13, 2004. There was only insignificant environmental impact at this well site, all of which was remediated to the landowner's (Bill McNeill) satisfaction.

The remaining two sites are in progress for abandonment.

The Vacuum G-35 Site abandonment began July 30, 2001 with a Closure Plan (under the approved Generic Redwood Tank and Pit Closure Plan) submission to Mr. Wayne Price, NMOCD Environmental Bureau, Santa Fe. As work was progressed the site was discovered to have deep vadose zone contaminant impact. This was reported to Roger Anderson and Wayne Price, NMOCD Environmental Bureau, Santa Fe on January 18, 2002 with a follow-up letter on July 1, 2002. A monitor well was installed and has been sampled quarterly with results sent to Mr. Price on an annual basis.

ROC submitted an AFE to the Vacuum System Partners for funding for this project. The Vacuum System Operating Committee then experienced a time of disruption (about 2 years) concerning the division of interest (costs) pertaining to historical environmental remediation. ROC believes this concern has been cleared to the degree that work may progress and funding will be agreeably divided among the System Partners.

RT Hicks Consultants of Albuquerque have since been contracted to manage the environmental work of the abandonment. A RBCA Work Plan has been submitted to Mr. Price and is awaiting

approval. ROC expects this project work to encompass 3 to 6 months with monitor well sampling for 2 years. This work will be done through the Environmental Bureau.

The Hobbs E-15 Site is part of the Hobbs SWD System Abandonment Project. The abandonment work at this site was delayed due to landowner dispute and lawsuit. The Property has since been purchased by Occidental Permian. Occidental Permian has granted ROC permission to continue with the abandonment and remediation work.

This site had preliminary delineation shortly after the well E-15 was P&A. The site was found to have significant vadose zone impact and considerable NORM impact of the surface and redwood tanks. The redwood tanks have been decontaminated and removed. The surface area has also been decontaminated. All of the NORM work was conducted through the NMED.

Arcadis G&M of Midland (Sharon Hall) has been contracted to manage the environmental work at this site. Extensive TPH modeling has been conducted (6 months of work) and the RBCA work plan is being developed based on this research and will be submitted to Mr. Price at the NMOCD Environmental Bureau. Salt impact appears to be less significant. Funding will be requested upon approval of the RBCA work plan.

All of this documentation is available at the ROC office and reports will be submitted to Santa Fe Environmental Bureau and District 1 Office at various stages of the work plan. Please don't hesitate to call the ROC office should you have any questions or concerns as these work plans are conducted. ROC plans to complete the surface-work at these two sites by December 31, 2004. Groundwater activities will continue for at least two years with annual submission of results to the Environmental Bureau.

Thank you for your patience and cooperation.

RICE OPERATING COMPANY

Carolyn Doran Haynes

Carolyn Doran Haynes
Engineering Manager

cc: Chris Williams
Wayne Price
JSC, KF, LBG, file