1R - 425-38

REPORTS

DATE:

3-1-11

Texerra

75 Wuthering Hts Drive Colorado Springs, CO 80921
Tel: 719-339-6791 E-mail: lpg@texerra.com

March 1st, 2011

Mr. Edward Hansen
New Mexico Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87504

RE: Corrective Action Plan Report and **Remediation Termination Request**
Rice Operating Company, Vacuum M-5 Junction Box, Unit M Sec 5 T18S R35E
NMOCD Case Number - 1R425-38

Sent via Email and U.S. Certified Mail Return Receipt No. 7008 1830 0004 2694 4286

Mr. Hansen,

Rice Operating Company (ROC) has completed the remedial work for the VAC M-5 Jct project (location given in Figure 1) outlined in our Corrective Action Plan (CAP) of October 12th, 2010 and CAP Addendum of October 26th, 2010:

1) Removed the upper (approximately) four feet of chloride impacted soils across the area affected by past operations of the M-5 junction box (approximately 80x40 ft) and disposed of these in an NMOCD approved facility.
2) Installed and properly seated a 20-mil plastic infiltration barrier at this depth encompassing the area impacted by the former junction box and backfill with clean fill dirt with a chloride concentration below 500 mg/kg and a PID (field) reading below 100 ppm.
3) Prepared the surface soils over and surrounding the site and seeded to a native vegetation mix.

A photographic record of this work is given in Figure 2, and PID readings of imported and backfilled (blended) soil are given in Figures 3 & 4. A summary of groundwater monitoring data for a near-source down-gradient monitor well is given in Table 1.

We have employed a simple spreadsheet model (provided to you as an e-mail attachment) to illustrate how contributed, residual soil chlorides would be expected to move from the unsaturated zone into groundwater and to affect groundwater chloride concentrations over time. Input parameters for the model are given in Table 2. We estimate that there are approximately 6,800 kg of residual, contributed chlorides presently beneath the site. We ran the model to see how the system would be expected to behave under two scenarios: with and without a soil infiltration barrier. The model predicts that with the soil infiltration barrier that we installed, groundwater chloride concentrations are expected to gradually diminish over time from their present value of approximately 340 mg/kg to below 250 mg/kg over the next few years (Figures 5 & 6).

Having ensured the protection of future groundwater quality and restored the surface to productive, natural use we respectfully request that this project be granted remediation termination or similar closure status, to include the plugging and abandonment of the monitor well (MW-1) at this location.

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

We appreciate your consideration of this request.

Sincerely,

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

Copy: Rice Operating Company

Figure 1 – VAC M-5 Jct location.

Vacuum Jct. M-5 (1R425-38)
Unit M, Section 5, T18S, R35E

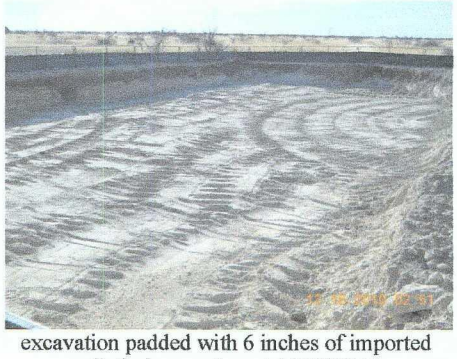
excavating the south side of the site, facing west 12/8/2010

screening the excavated material, facing east 12/8/2010

hauling in blow sand 12/16/2010

hauling off contaminated soil 12/16/2010

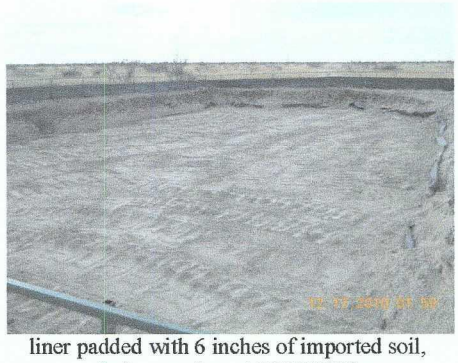
final 80x40x4.5-ft deep excavation, facing southwest 12/10/2010



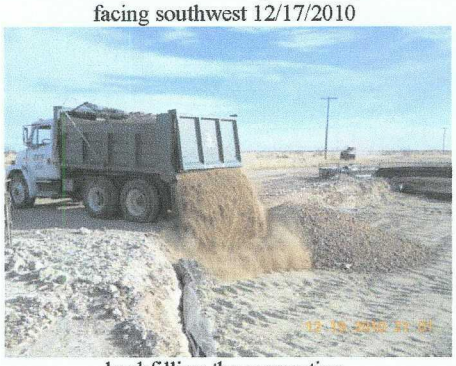
excavation padded with 6 inches of imported soil, facing southwest 12/17/2010

Figure 2 – Photographic record of work performed in December 2010.

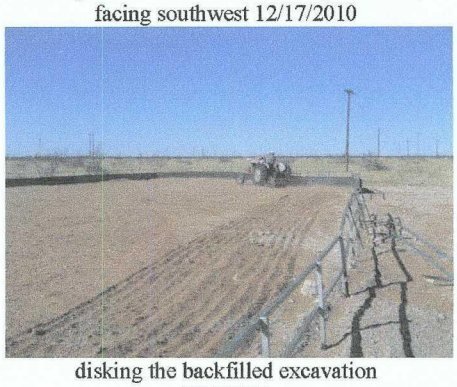
80x40-ft liner being installed,
facing southwest 12/17/2010



liner padded with 6 inches of imported soil,
facing southwest 12/17/2010



backfilling the excavation
12/20/2010



disking the backfilled excavation
2/15/2011

seeding the backfilled excavation
2/15/2011

site complete
2/15/2011

Figure 2(continued) – Photographic record of work performed in December 2010 and February 2011.

RICE OPERATING COMPANY

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

Check Model Number:

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

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO : 930737	EXPIRATION DATE: 6/16/13
METER READING ACCURACY:	100.0

ACCURACY : +/- 2%

SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
VAC	M-5	M	5	18 S	35 E

SAMPLE ID	PID	SAMPLE ID	PID
IMPORTED SOIL #1	0.1		
#2	0.0		

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

SIGNATUE: [signature] DATE: 12/15/10

Figure 3 – PID field measurement values for imported soil material.

RICE OPERATING COMPANY

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

Check Model Number:

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

GAS COMPOSITION: ISOBUTYLENE 100PPM / AIR: BALANCE

LOT NO : 930737	EXPIRATION DATE: 6/16/13
METER READING ACCURACY: 100.0	

ACCURACY : +/- 2%

SYSTEM	JUNCTION	UNIT	SECTION	TOWN SHIP	RANGE
VAC	M-5	M	5	18S	35E

SAMPLE ID	PID	SAMPLE ID	PID
BLENDED BACKFILL	4.3		

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

SIGNATUE: [signature] DATE: 12/20/10

Figure 4 – PID field measurement values for blended backfill soil material installed above liner.

Table 1 – Summary of laboratory analyses of groundwater data from near-source, down-gradient monitor well (MW-1).

Sample Date	Cl	TDS	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Sulfate
3/3/2009	**352**	972	<0.001	<0.001	<0.001	<0.003	47
4/29/2009	**368**	851	<0.001	<0.001	<0.001	<0.003	44
8/7/2009	**416**	1,090	<0.001	<0.001	<0.001	<0.003	47
10/22/2009	**380**	1,030	<0.001	<0.001	<0.001	<0.003	45
2/11/2010	**332**	929	<0.001	<0.001	<0.001	<0.003	54
4/26/2010	**344**	1,020	<0.001	<0.001	<0.001	<0.003	56
8/5/2010	**336**	945	<0.001	<0.001	<0.001	<0.003	51
10/28/2010	**340**	897	<0.001	<0.001	<0.001	<0.003	50

Table 2 – Soil Chloride/Groundwater Dilution Model Inputs and Calculated Parameters

Chloride Transport Model (CTM)

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Copyright: L. Peter Galusky, Jr. Ph.D
Date: 28-Feb-11

Unsaturated Zone Inputs

Parameter	Unit	Value	Notes
equivalent length (in direction of gw flow) of affected area	m	24	approx. surface footprint
equivalent width (perpendicular to gw flow) of affected area	m	12	approx. surface footprint
affected depth	m	15	measured/estimated
depth to water table	m	32	measured
avg Cl- conc of affected soil	mg/kg	1,200	measured/estimated
est. natural background Cl- conc	mg/kg	120	measured/estimated
unsat zone mass density	kg/m3	1,780	estimated/assumed (equiv to 3,000 lbs/cu yd)
rate of Cl- percolation	m/yr	0.250	estimated - present conditions
"	"	0.025	estimated - w/ infiltration barrier

Unsaturated Zone Calculated Parameters

Parameter	Unit	Value
affected area	m2	233
volume of affected soil	m3	3,557
total mass of affected soils	kg	6,330,741
Cl- conc attributed to source	mg/kg	1,080
mass of contributed residual soil chloride	kg	6,837
annual decline in residual chloride w/o infiltration barrier	per cent	0.8%
annual decline in residual chloride w/ infiltration barrier	per cent	0.1%

Saturated Zone Inputs

Parameter	Unit	Value	Notes
upgradient (baseline) Cl- conc	mg/kg	25	measured/estimated
initial Cl- conc (Co)	mg/kg	338	avg of last 4 qtrs
thickness of affected aquifer	m	3	prescribed by NMOCD
aquifer porosity	per cent	25%	estimated/assumed
rate of groundwater movement	m/yr	5.00	estimated/assumed

Saturated Zone Calculated Parameters

Parameter	Unit	Value
total volume of affected aquifer	m3	700
sat volume of initial affected aquifer volume	m3	175
mass of affected aquifer volume	kg	175,029
initial Cl- mass in affected aquifer volume	kg	59
annual dilution attenuation factor (DAF) in affected aquifer volume	per cent	21%
time for plume center to travel 100 meters	yrs	20.0
time for gw cross section to traverse affected area	yrs	4.9

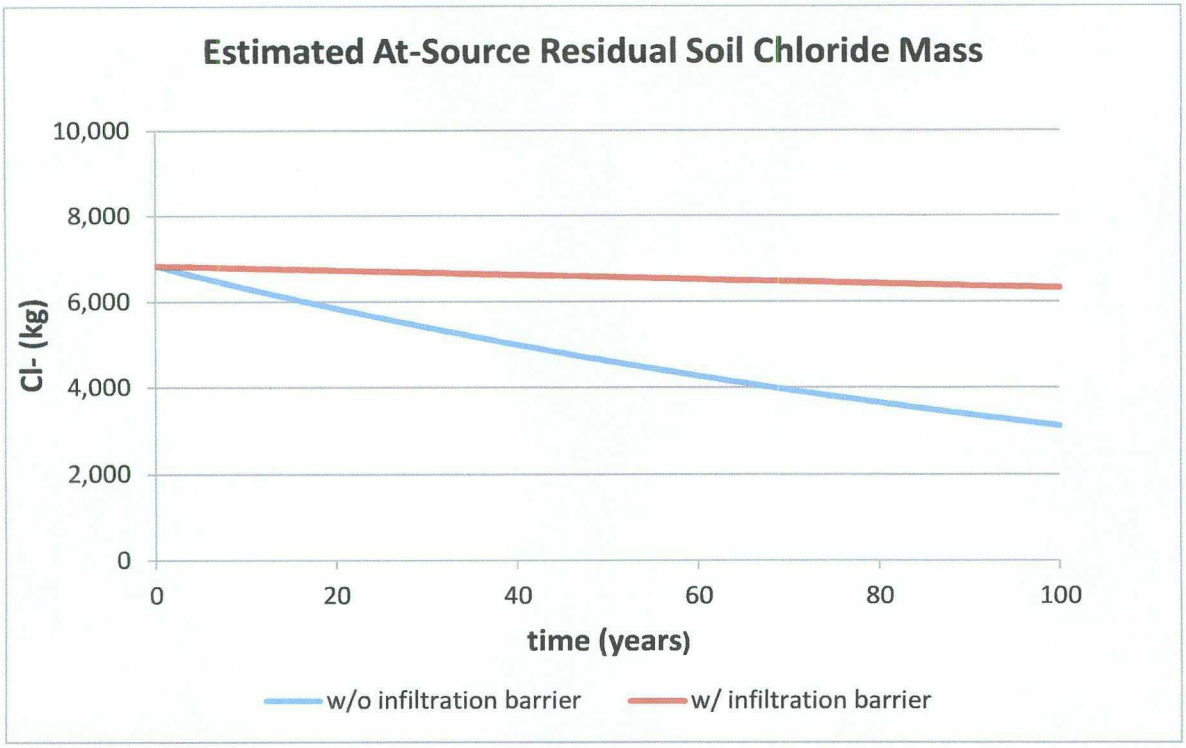

Figure 5 – Estimated (model predicted) soil chloride concentrations over time with and without an infiltration barrier. Note that soil chlorides move much more slowly with the presence of an infiltration barrier.

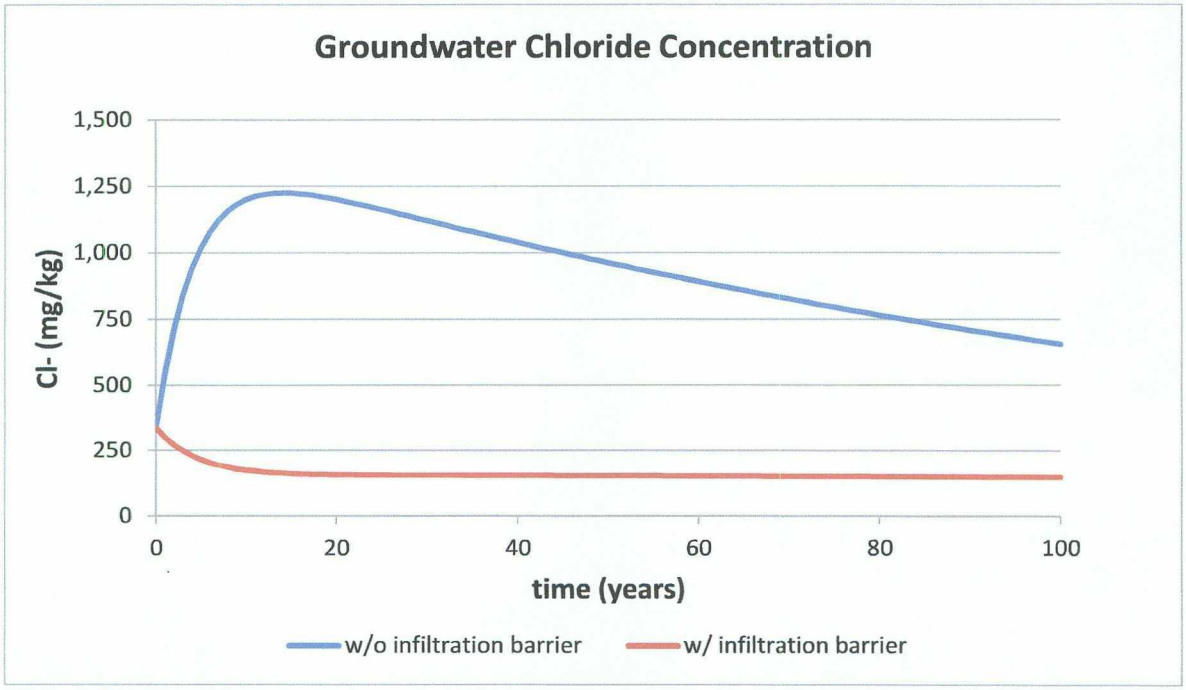

Figure 6 – Estimated (model predicted) groundwater chloride concentrations beneath the VAC M-5 site over time with and without an infiltration barrier. Note the impeding effect of the soil infiltration barrier.