1R - 426-117

REPORTS

DATE:

9-17-09

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

Texerra

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September 17th , 2009

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

RECEIVED
SEP 2 1 2009
Environmental Bureau
Oil Conservation Division

Re: Rice Operating Company-wide Case Study of Residual Soil Petroleum Hydrocarbons
In regard to NMOCD Case No. 1R426-117 (BD Oxy Owen A)

Sent via E-mail and U. Mail Certified Mail w/ Return Receipt No. 7006 0100 0001 2438 4125

Dear Mr. Hansen:

Texerra submitted an Investigation Characterization Report and Termination Request on behalf of Rice Operating Company (ROC) for the above-referenced project on April 7th of this year. (A site location map is given in Figure 1). Following our meeting in Santa Fe in June we updated and resubmitted the report on July 27th where we clarified certain points in modeling the effects of residual soil chlorides on groundwater quality. The available evidence indicates that the low levels of residual soil chlorides (averaging 223 ppm from the surface to the groundwater capillary fringe at 45 ft bgs) do not pose a threat to groundwater quality. However, the question remains whether residual soil hydrocarbons found during the site investigation were contributed by the former junction box at this location or whether they were/are likely contributed by another source.

Our initial assertion was that the high levels of residual hydrocarbons found at depth (GRO 515 ppm, DRO 2,400 ppm at 45 ft bgs) were not caused by ROC since we would have expected to also find high levels of residual soil chlorides but did not (Figure 2). That is, it would have taken a great deal of produced fluids (which are mostly and predominantly high chloride waters, oil being a minor "contaminant") to entrain and move hydrocarbons to this depth. During our June meeting and subsequently earlier this month you asked that we look at our historical data to see if we could find a site for which oil contamination was found in the absence of high residual soil chlorides. In response we subsequently compiled and analyzed available (since 2007) laboratory data where soil chlorides and hydrocarbons (as GRO and DRO) were analyzed.

Data for thirty-three (33) soil samples from junction box upgrade projects were retrieved from Cardinal Laboratories which encompassed all of the (junction box evaluation) soil boring samples which Cardinal had in electronic format for the period 2007 to present (Table 1). These are believed to be a representative subset of ROC project data in New Mexico.

Twenty-three (23) samples in this dataset exhibited soil chloride values greater than 150 ppm (which we may reasonably assume is above natural background levels). Only five (5) samples exhibited hydrocarbon concentrations (defined here as the sum of GRO and DRO) above 100 ppm, and all of these also had significant residual soil chloride concentrations.

ROC SWD systems move produced water which is occasionally laced with oil that is not completely removed at the producing wellheads. It is difficult to envision ROC (or their System Parties, for that matter) allowing substantial oil to move through their system as that would represent lost economic value and it would impair the function of the SWD system. Therefore, occasional "upsets" which may give rise to a "slug" of oil moving through the system are (and presumably have been in the past) quickly repaired. In the case of a junction box that exhibited some degree of leakage we would expect that most of the leakage would be of produced water with only occasional episodes of oil entrainment. In order to move oil to significant depths below the ground surface it would take a correspondingly larger volume of leaked produced water to entrain this oil and to move it downward. This would explain why junction box sites that have significant residual hydrocarbons at depth below also have significant residual chlorides, as chlorides are the reliable marker of SWD junction box leakage.

With respect to the Oxy Owen A site it thus appears certain that the high levels of residual hydrocarbons found at depth were not contributed by leakage from the former ROC junction box there because the profile of soil chlorides is low (averaging < 250 ppm). Conversely, the slight up tick in residual soil chlorides at 45 ft bgs (396 ppm) is very likely due to salt which was entrained with the movement of hydrocarbons beneath this ROC location from an adjacent location. We thus respectfully request that NMOCD assign "termination" or similar closure status with respect to ROC's activities at this location.

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

We submit this information for your review and consideration and look forward to discussing the matter in further detail during our meeting with you next week.

Thank you for your consideration.

Sincerely,

L. Peter Galusky, Jr.

Copy: Rice Operating Company

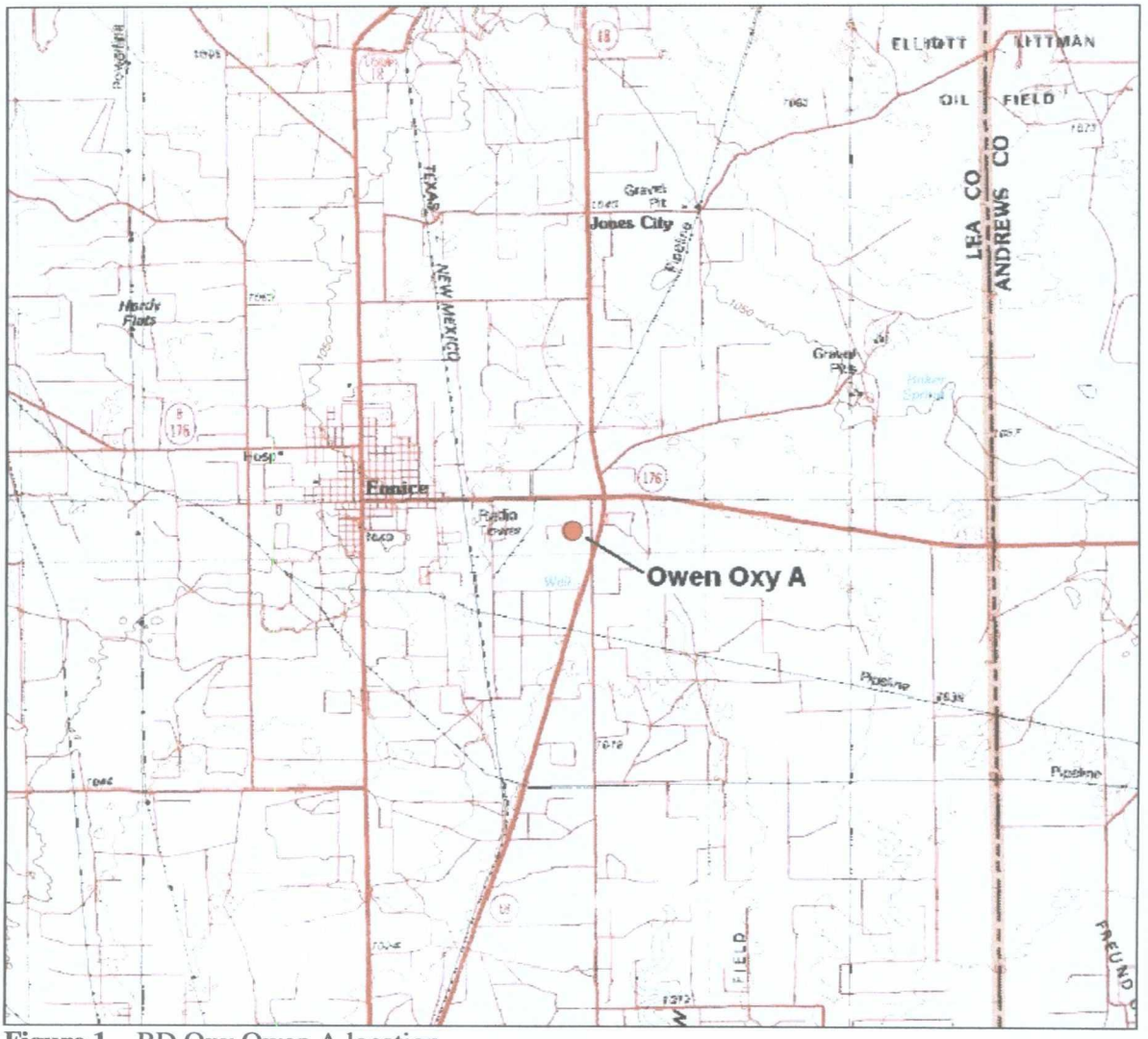

Figure 1 – BD Oxy Owen A location.

Soil Boring Log
Rice Operating Company **BD SWD System**
BD Oxy Owen A **Identification:** **SB-1**
Location: Approx. 5 ft W of Rice marker
Date: 9/9/2008
Driller: Harrison & Cooper, Inc. (Ken Cooper supervising)
Drill method: Air rotary
Logged by: L. Peter Galusky, Jr., Texerra
Total depth: 50 ft below ground surface
Screened interval: n/a (no well installed)
Pipe diameter: "

Depth (ft below ground surface)	Field Chloride Test (ppm)	Lab Chloride Test (ppm)	Field PID test (ppm)	Lab GRO test (ppm)	Lab DRO test (ppm)	Cutting Description
-5	261		99			oil stained sandy loam
-10	305		207			"
-15	177	192	594	1,210	3,280	"
-20	233		265			oil stained reddish brown coarse sandy loam
-25	155		147			light olive loamy sand, common small gravels
-30	168		229			"
-35	149		429			variegated olive brown and grayish white fine gravelly sandy loam
-40	167		504			"
-45	396	464	356	515	2,400	"
-50						oil stained olive brown coarse loamy sand, moist
avg	223		314			

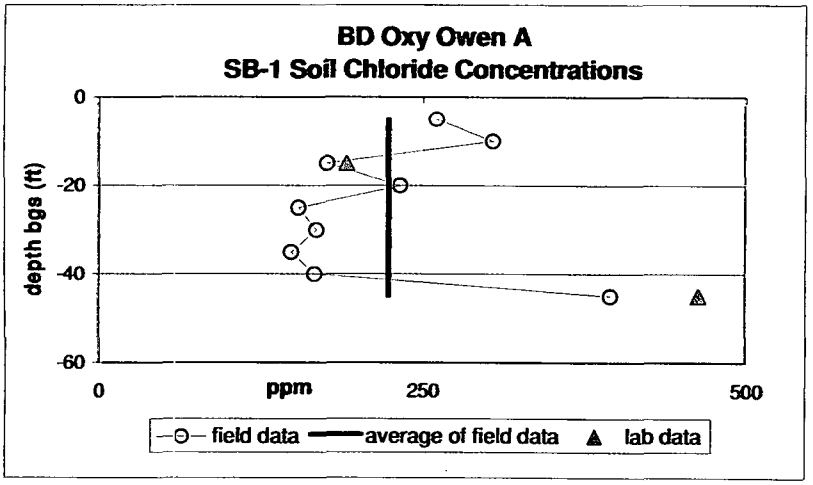

Figure 2 – BD Oxy Owen A at/near source soil boring log with residual chloride and hydrocarbon concentrations.

Table 1 - Residual soil chloride and hydrocarbon data from Cardinal Laboratories.

Site Name	Sampling Date	Sampling ID	Dampling Depth ft bgs	Cl- ppm	GRO ppm	DRO ppm	Sum GRO DRO ppm
EME JCT. A-20	05/29/2009	SB #8 @ 16'	16	5,040	10	10	20
VAC N-6-1	06/19/2006	BORE #1 120' BGS	120	2,687	10	10	20
VACUUM JCT. M-5	02/02/2009	SB #1 @ 50'	50	1,540	10	10	20
VACUUM JCT. M-5	02/02/2009	SB #3 @ 60'	60	1,540	10	10	20
VAC N-6-1	06/19/2006	MW #1 90' BGS	90	1,248	10	10	20
BD CHESAPEAKE OPERATING EOL	10/24/2008	SB #1 @ 20'	20	1,180	10	10	20
HOBBS A-6 VENT	10/23/2008	SB #1 @ 25'	25	1,150	614	4,790	5,404
VACUUM JCT. M-5	02/02/2009	SB #1 @ 25'	25	912	10	168	178
EME STATE 'Q' EOL	11/29/2007	15'-20' SOIL BORE #1	20	880	10	10	20
EME JCT. O-19	09/09/2008	SB#1 @ 15'	15	704	25	25	50
HOBBS A-6 VENT	10/23/2008	SB #1 @ 40'	40	656	2,180	5,510	7,690
VACUUM JCT. M-5	02/02/2009	SB #2 @ 20'	20	624	10	10	20
EME JCT. A-20	05/29/2009	SB #1 @ 16'	16	512	10	10	20
BD OXY OWEN 'A' EOL	09/09/2008	SB #1 @ 45'	45	464	515	2,400	2,915
BD JCT. N-10	10/23/2008	SB #2 @ 60'	60	432	10	10	20
BD CHESAPEAKE OPERATING EOL	10/24/2008	SB #1 @ 70'	70	352	10	10	20
VACUUM MARATHON McALISTER	02/09/2009	SB #1 @ 20'	20	352	10	10	20
EME L-15-1	11/29/2007	35'-40' SOIL BORE #1	40	288	10	70	80
VACUUM MARATHON McALISTER	02/09/2009	SB #2 @ 30'	30	272	10	32	42
BD JCT J-1-2	10/24/2008	SB #1 @ 40'	40	240	10	10	20
EME STATE 'Q' EOL	11/29/2007	30'-35' SOIL BORE #1	35	224	10	10	20
BD POGO MATTERN EOL	02/23/2007	SOURCE @ 40"	40	216	10	999	1,009
VAC N-6-1	06/19/2006	MW #1 40' BGS	40	160	10	10	20
EME PHILLIPS 'B' EOL	09/08/2008	SB #5 @ 50'	50	144	25	25	50
EME PHILLIPS 'B' EOL	09/08/2008	SB #1 @ 40'	40	128	25	25	50
EME PHILLIPS 'B' EOL	09/08/2008	SB #2 @ 50'	50	112	25	25	50
EME PHILLIPS 'B' EOL	09/08/2008	SB #4 @ 50'	50	112	25	25	50
EME PHILLIPS 'B' EOL	09/08/2008	SB #3 @ 55'	55	96	25	25	50
BD JCT L-32-2	09/10/2008	SB #1 @ 60'	60	32	25	25	50
VACUUM JCT. M-5	02/02/2009	MW #1 @ 60'	60	32	10	10	20
VACUUM JCT. M-5	02/02/2009	SB #2 @ 60'	60	32	10	10	20
VAC N-6-1	06/19/2006	MW #2 115' BGS	115	16	10	14	24
VACUUM C-7	02/09/2009	SB #1 @ 30'	30	16	10	10	20

R.T. Hicks Consultants Web Mapping Portal

RT Hicks Consultants AMIGO DECISION TOOL (user:amigo123 password:go) Designed by Source3 Co

Additional Information

Longitude, Latitude (WGS84):
-103.12533, 32.42027

Scale = 1 : 24K

Cl search by
E.J.H., OCD