R. T. HICKS CONSULTANTS, LTD.

PO Box 7624 ▲ Midland, TX 79708 ▲ 432.528-3878 ▲ Fax: 432.689-4578

August 12, 2009

Mr. Mike Bratcher
New Mexico Oil and Conservation Division
District II - Artesia Field Office
1301 West Grand Avenue
Artesia, NM 88210

VIA EMAIL AND USPS

RE: Seven Produced Fluid Releases at sites operated by Marks and Garner Production Ltd, Company in Eddy County, NM as follows:

Site Name (type)	Location (T-R-Sec.-Unit)	OCD Reference No.
Levers Fed. No. 7 (battery)	T-16-S, R-29-E, Sec 33 (J)	2RP-304
Levers No. 3Y (well)	T-16-S, R-29-E, Sec 33 (N)	2RP-305
Red 12 Fed. No. 1 (battery)	T-16-S, R-29-E, Sec 33 (O)	2RP-306
Cave State No. 4 (well)	T-17-S, R-29-E, Sec 4 (F)	2RP-307
Red 12 State No. 2 (battery)	T-17-S, R-29-E, Sec 4 (H)	2RP-308
Red 12 State No. 3 (battery)	T-17-S, R-29-E, Sec 5 (J)	2RP-309
Red 12 State No. 4 (battery)	T-17-S, R-29-E, Sec 5 (O)	2RP-310

Dear Mr. Bratcher:

R.T. Hicks Consultants is pleased to submit the results of the initial characterization activities on the behalf of Marks and Garner Production Ltd. The production area is approximately 6.5 miles northwest of Loco Hills, New Mexico. Plate 1 depicts the location of each site relative to lease roads, sections lines, and Bear Grass Draw. On June 22 and 23, 2009 Hicks Consultants inspected each of the sites to document the source and type of release, describe the resulting environmental impact, and recover "worst case" soil samples in order to determine the corrective actions required under NMOCD Rule Part 29.

In order to improve the appearance of the sites and protect the area livestock, Marks and Garner has contracted a roustabout crew to remove or repair the leaking vessels and excavate the free hydrocarbons and stained soil. Hydrocarbon-impacted soil will be mixed with clean soil and used to enhance the firewalls. These activities are scheduled to be completed by the end of August 2009. Once the corrective actions described below are complete, the sites will be revisited by an RT Hicks Consultants representative to document the results.

Description of Investigation

Levers Federal No. 3Y and Cave State No. 4
These sites contained hydrocarbon-impacted soil associated with operational well head leakage. Hand auger borings advanced up to six feet below the surface were used to delineate the vertical extent of the affected soil.

Levers Federal No. 7, Red-12 Federal No. 1, Red-State No. 2, and Red-State No. 3
These sites contained heavy paraffin "tank bottom" liquids that had spilled from the base of a tank or separation vessel resulting in hydrocarbon-impacted shallow soil. At these sites soil samples were recovered within the spill area footprint, at the surface and immediately below the free liquid.

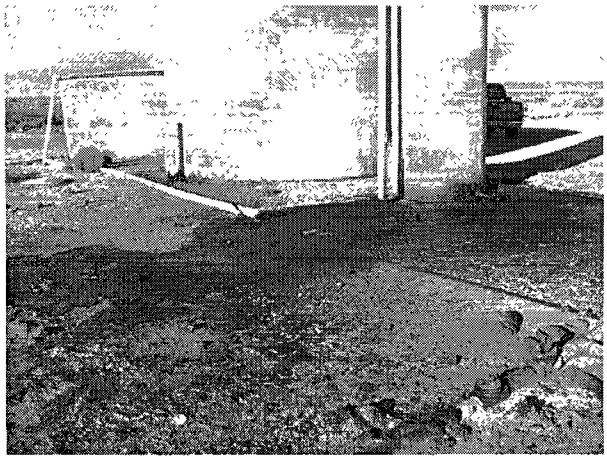
Red-12 State No. 4 Battery
This sites contained historic (asphalt-like) hydrocarbon-impacted soil within the tank battery and chloride-impacted soil down slope of the tank battery and near the injection well. Surface soil samples were recovered within the tank battery and a hand auger was used in an attempt to delineate the vertical extent of the chloride-impacted soil in three topographically low areas surround the battery.

Results of Investigation and Recommended Corrective Action

Levers Federal No. 7 Battery (OCD Reference No. 2RP-304)
A release of heavy "tank bottom" oil occurred from a broken valve at the base of a large separator and extends approximately 30 feet down slope. We used a hand auger to obtain soil samples at depths of 0.5, 1.0, and 3.0 feet below the free liquid. Results of laboratory analyses on selected samples for benzene, toluene, ethylbenzene, xylenes; and gasoline, diesel, and oil range hydrocarbons as well as field screening and laboratory results are provided on the table below:

Depth (feet)	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenz. (mg/kg)	Xylenes (mg/kg)	C_{6-12} (mg/kg)	C_{12-28} (mg/kg)	C_{28-35} (mg/kg)
0.5	10	<0.0011	<0.0022	0.0015	<0.0011	<16.4	461	61.6
1.0	0	--	--	--	--	--	--	--
3.0	0	<0.0011	<0.0022	<0.0011	<0.0011	<16.7	20.9	<16.7

None of the hydrocarbon concentrations measured at the Levers Federal No. 7 site exceeds the 1993 NMOCD or 2006 NMED Guideline soil screening levels. The fact that the concentrations of regulated constituents do not exceed NMED Guidelines allows us to conclude that the impacted soil does not represent a threat to fresh water or public health. The recommended corrective action for this site is:



1. Remove out-of-service vessels or repair all leaks
2. Excavate the upper 6-inches of earth within the spill footprint
3. Mix the excavated spill material with 2-5 parts clean soil

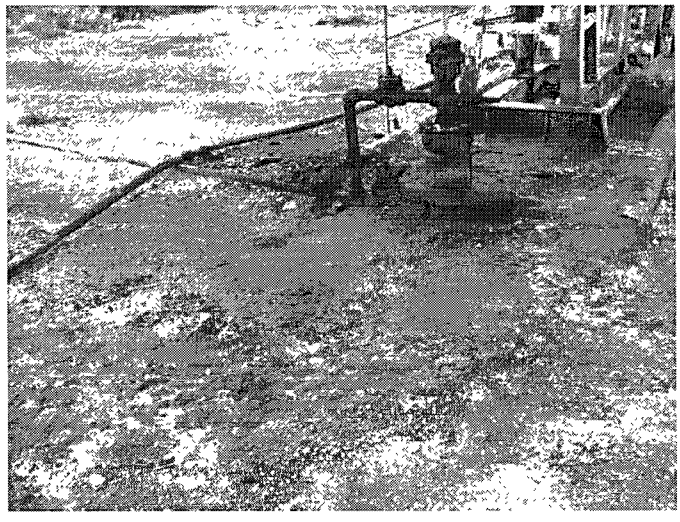
4. Use this blended soil for the construction of firewalls around tank batteries (use now or stockpile on site for future use)
5. At abandonment of the site the surface will be restored according to the landowner's specifications

Levers No. 3 Well (OCD Reference No. 2RP-305)

A release of oil occurred from the well head which extends approximately 10 feet in all directions. The table below presents field screening and the laboratory results from soil samples at the surface and at depths of 2.0, 3.0, 4.0, 5.0 and 6.0 feet below the stained area.

Depth (feet)	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenz. (mg/kg)	Xylenes (mg/kg)	C_{6-12} (mg/kg)	C_{12-28} (mg/kg)	C_{28-35} (mg/kg)
Surface	85	0.013	0.537	1.385	3.53	1,340	44,500	3,150
2.0	39	--	--	--	--	--	--	--
3.0	64	--	--	--	--	--	--	--
4.0	127	--	--	--	--	--	--	--
5.0	210	--	--	--	--	--	--	--
6.0	334	<0.0107	0.2115	0.6995	6.553	1,690	6,640	581

Total Petroleum Hydrocarbon (TPH) concentrations measured at the Levers No. 3 site exceeds the 1993 NMOCD Guideline levels but concentrations generally decrease from the surface to the auger refusal depth (6 feet below the surface). Most importantly, none of the regulated hydrocarbon concentrations exceed the 2006 NMED Guideline levels. The fact that the concentrations of regulated constituents do not exceed NMED Guidelines allows us to conclude that the impacted soil does not represent a threat to fresh water or public health. The recommended corrective action for this site is:

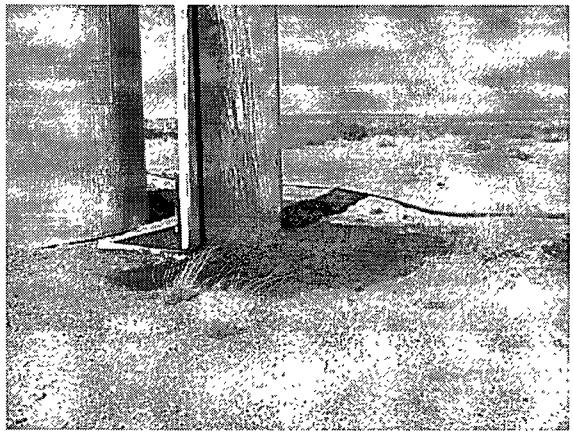


1. Remove out-of-service vessels or repair all leaks
2. Excavate the upper 1-2 feet of earth within the spill footprint
3. Mix the excavated spill material with 2-5 parts clean soil
4. Use this blended soil for the construction of firewalls around tank batteries (use now or stockpile on site for future use)
5. Collect a composite sample of the blended soil to demonstrate that constituents are at concentrations that comply with NMOCD Rules and provide letter report to NMOCD
6. At abandonment of the site the surface will be restored according to the landowner's specifications

Red-12 Federal No. 1 Battery (OCD Reference No. 2RP-306)
A release of heavy "tank bottom" oil occurred from a broken valve at the base and from a pipe joint near the top of the separator. The spill area extends approximately 30 feet down slope. Laboratory results of soil samples recovered using a hand auger at depths of 0.5, 1.0, and 3.0 feet below the free liquid and field screening are provided on the table below:

Depth (feet)	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenz. (mg/kg)	Xylenes (mg/kg)	C_{6-12} (mg/kg)	C_{12-28} (mg/kg)	C_{28-35} (mg/kg)
0.5	0	<0.0011	<0.0022	<0.0011	<0.0011	<335	23,600	2,280
1.0	0	--	--	--	--	--	--	--
3.0	0	<0.0011	<0.0023	<0.0011	<0.0011	<16.9	61.3	<16.9

TPH concentrations measured from near the surface at the Red-12 Federal No. 1 site exceeds the 1993 NMOCD Guideline levels but decreases to below the guideline levels at 3 feet below the surface. None of the regulated hydrocarbon concentrations exceed the 2006 NMED Guideline levels. The fact that the concentrations of regulated constituents do not exceed NMED Guidelines allows us to conclude that the impacted soil does not represent a threat to fresh water or public health. The recommended corrective action for this site is:

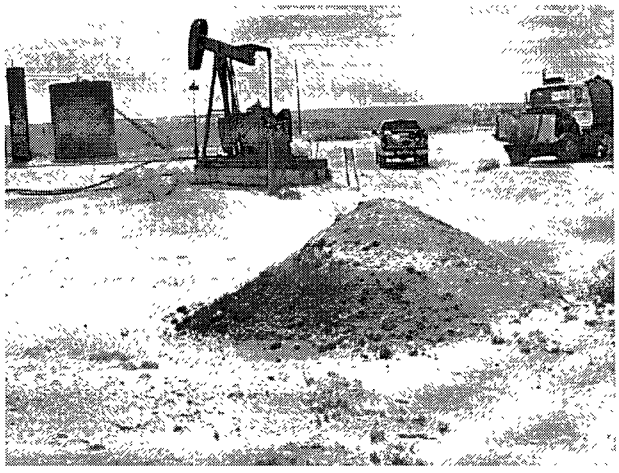


1. Remove out-of-service vessels or repair all leaks
2. Excavate the upper 6-12 inches of earth within the spill footprint
3. Mix the excavated spill material with 2-5 parts clean soil
4. Use this blended soil for the construction of firewalls around tank batteries (use now or stockpile on site for future use)
5. Collect a composite sample of the blended soil to demonstrate that constituents are at concentrations that comply with NMOCD Rules and provide letter report to NMOCD
6. At abandonment of the site the surface will be restored according to the landowner's specifications

Cave State No. 4 Well (OCD Reference No. 2RP-307)
The operator excavated and stockpiled soil from an apparent release of oil that occurred prior to our characterization. Laboratory and field results from soil samples recovered from the stockpile and below the spill footprint are provided on the table below:

Depth (feet)	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenz. (mg/kg)	Xylenes (mg/kg)	C_{6-12} (mg/kg)	C_{12-28} (mg/kg)	C_{28-35} (mg/kg)
Stkpl.	185	0.0519	1.22	4.45	9.284	2,050	38,400	2,820
2.0	0	--	--	--	--	--	--	--
4.0	0	<0.0012	<0.0024	<0.0012	<0.0024	<17.8	18.7	<17.8

The hydrocarbon concentrations from the removed stockpiled soil at Cave State No. 4 site exceeds the 1993 NMOCD Guideline levels for TPH and the 2006 NMED Guideline levels for benzene. None of the hydrocarbon concentrations measured from the remaining (deeper) soil exceeds either the 1993 NMOCD or 2006 NMED Guideline soil screening levels.



We recommend that the operator mix the stockpile with clean soil and utilize it for the construction of a firewall at one of the active tank batteries.

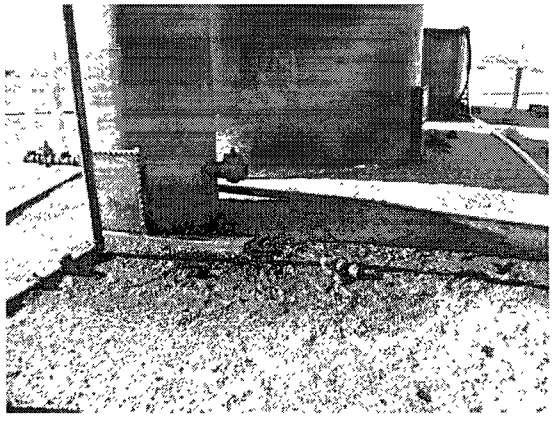
The fact that the concentrations of regulated constituents do not exceed NMED Guidelines allows us to conclude that the impacted soil below the original spill footprint does not represent a threat to fresh water or public health.

Red-12 State No. 2 Battery (OCD Reference No. 2RP-308)

A release of heavy "tank bottom" oil occurred from a broken valve at the base of a separator and extends approximately 20 feet down slope. Results of laboratory and field analyses of soil samples recovered using a hand auger at depths of 0.5, 1.0, and 3.0 feet below the free liquid are provided on the table below:

Depth (feet)	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenz. (mg/kg)	Xylenes (mg/kg)	C_{6-12} (mg/kg)	C_{12-28} (mg/kg)	C_{28-35} (mg/kg)
0.5	10	<0.0011	<0.0023	0.0099	0.0186	340	20,500	1,360
1.0	6	--	--	--	--	--	--	--
3.0	0	<0.0011	<0.0022	<0.0011	<0.0011	<16.2	58.6	<16.2

TPH concentrations measured from near the surface at the Red-12 State No. 2 site exceeds the 1993 NMOCD Guideline levels but decreases to below the guideline levels at 3 feet below the surface. None of the measured hydrocarbon concentrations exceed the 2006 NMED Guideline levels. The fact that the concentrations of regulated constituents do not exceed NMED Guidelines allows us to conclude that the impacted soil does not represent a threat to fresh water or public health. The recommended corrective action for this site is:



1. Remove out-of-service vessels or repair all leaks
2. Excavate the upper 6-12 inches of earth within the spill footprint
3. Mix the excavated spill material with 2-5 parts clean soil
4. Use this blended soil for the construction of firewalls around tank batteries (use now or stockpile on site for future use)
5. Collect a composite sample of the blended soil to demonstrate that constituents are at concentrations that comply with NMOCD Rules and provide letter report to NMOCD.
6. At abandonment of the site the surface will be restored according to the landowner's specifications.

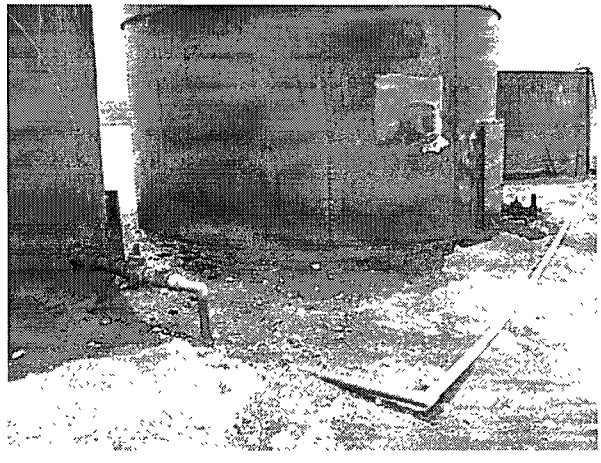
Red-12 State No. 3 Battery (OCD Reference No. 2RP-309)

A release of heavy "tank bottom" oil occurred from leaks located at the base of a 500-bbl oil tank and a separator. The surface staining is present in an area of approximately 500 ft^2. A composite surface soil sample was recovered from the stained area and subsurface soil samples were recovered from two hand auger borings at depths of 1.0 and 2.0 feet below the free liquid. Laboratory analyses were performed to determine the concentrations of benzene, toluene, ethylbenzene, xylenes; and gasoline, diesel, and oil range hydrocarbons. Field screening and laboratory results are provided on the table below:

Depth (feet)	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenz. (mg/kg)	Xylenes (mg/kg)	C_{6-12} (mg/kg)	C_{12-28} (mg/kg)	C_{28-35} (mg/kg)
Surface	--	0.0016	<0.0022	0.0015	0.0054	1,780	57,000	5,510
H1 (2')	0	<0.0011	<0.0023	<0.0011	<0.0011	<16.9	35.8	<16.9
H2 (1')	0	<0.0011	<0.0022	<0.0011	<0.0022	<16.7	24.7	<16.7

TPH concentrations measured from near the surface at the Red-12 State No. 3 site exceeds the 1993 NMOCD Guideline levels but decreases to below the guideline levels at 1 and 2 feet below the surface. None of the measured hydrocarbon concentrations exceed the 2006 NMED Guideline soil screening levels. The fact that the concentrations of regulated constituents do not exceed NMED Guidelines allows us to conclude that the impacted soil does not represent a threat to fresh water or public health. The recommended corrective action for this site is:

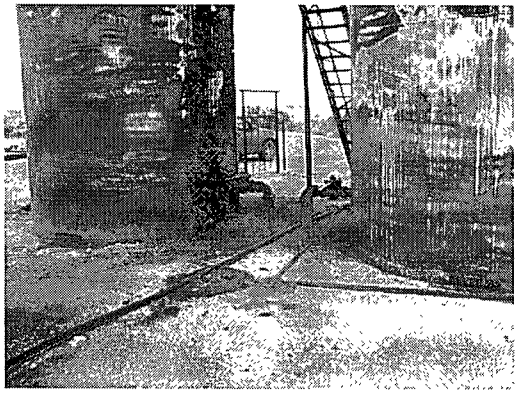
1. Remove out-of-service vessels or repair all leaks
2. Excavate the upper 1-2 feet of earth within the spill footprint
3. Mix the excavated spill material with 2-5 parts clean soil
4. Use this blended soil for the construction of firewalls around tank batteries (use now or stockpile on site for future use)
5. Collect a composite sample of the blended soil to demonstrate that constituents are at concentrations that comply with NMOCD

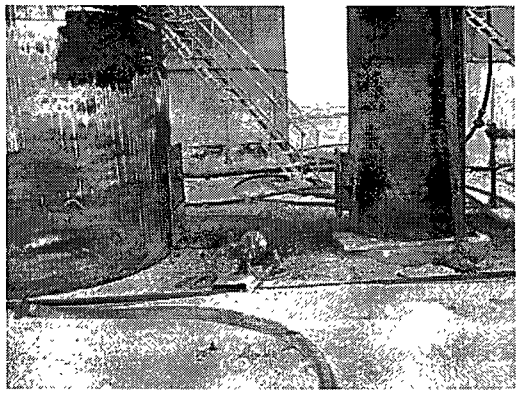


Rules and provide letter report to NMOCD
6. At abandonment of the site the surface will be restored according to the landowner's specifications.

Red-12 State No. 4 Battery and Injector (OCD Reference No. 2RP-310)
Historic spills within the tank battery have occurred resulting in an "asphalt-like" stained soil area of approximately 400 ft^2. A composite surface soil sample was recovered from the stained area and laboratory analyses were performed to determine the concentrations of benzene, toluene, ethylbenzene, xylenes; and gasoline, diesel, and oil range hydrocarbons. Laboratory results are provided on the table below:

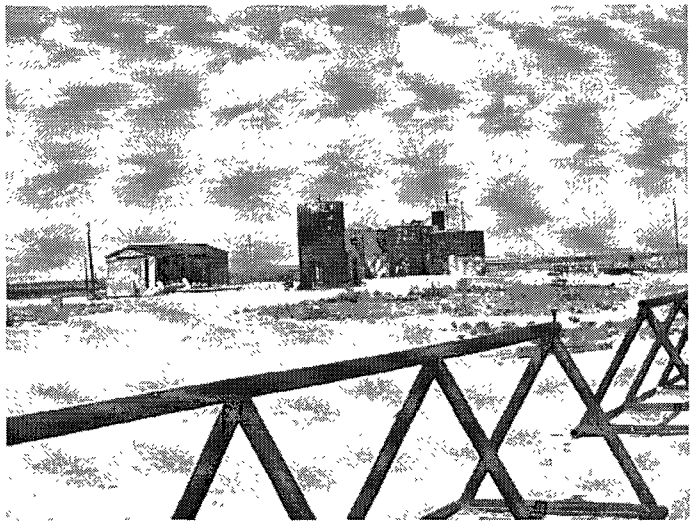
Depth (feet)	PID (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenz. (mg/kg)	Xylenes (mg/kg)	C_{6-12} (mg/kg)	C_{12-28} (mg/kg)	C_{28-35} (mg/kg)
Surface	--	0.0024	0.0040	0.0153	0.0411	<308	18,400	3,030





TPH concentrations measured from near the surface at the Red-12 State No. 4 battery site exceed the 1993 NMOCD Guideline levels but none of the measured hydrocarbon concentrations exceed the 2006 NMED Guideline levels. The fact that the concentrations of regulated constituents do not exceed NMED Guidelines allows us to conclude that the hydrocarbon-impacted soil does not represent a threat to fresh water or public health. The recommended corrective action for this site is:

1. Repair all leaks
2. Excavate the upper 1-2 feet of earth within the spill footprint
3. Mix the excavated spill material with 2-5 parts clean soil
4. Use this blended-asphaltic soil for the construction of firewalls around tank batteries (use now or stockpile on site for future use)
5. Collect a composite sample of the blended soil to demonstrate that constituents are at concentrations that comply with NMOCD Rules and provide letter report to NMOCD
6. At abandonment of the site, disc hay and other organic material into hydrocarbon-impacted soil to open soil structure and permit infiltration of precipitation. Repeat tilling and addition of organic material or other soil amendments as necessary to meet landowner mandates for surface restoration and thereby eliminate the threat to the environment (i.e. soil and habitat) posed by the hydrocarbon-impacted soils



The tank battery is located on a topographically high area and much of the soil within the bermed area and the surrounding topographically low areas exhibit characteristics of one or more historic brine water releases. Three hand auger borings were installed in the low areas surrounding the tank battery in order to better characterize the extent of the chloride-impacted soil. Plate 2 is a site map drawn on a July 2005 satellite photograph that depicts the current extent of stressed vegetation, the location of the hand auger borings, and the laboratory results from soil samples recovered at the site. It should be noted that the extent of the stressed vegetation observed during the inspection has changed since 2005. Some of the vegetation to the north and south has decreased while areas to the west appear to have recovered.

At the topographically low areas to the north and west of the tank batteries chloride concentrations in soil prevent re-vegetation. The vertical extent of the impacted soil could not be determined due to auger refusal. Further investigations at the Red-12 State No. 4 site will be conducted to verify the vertical extent of the chloride-impacted soil in order to determine the potential threat to ground water. Following the completion of these activities a final report will be submitted to the NMOCD.

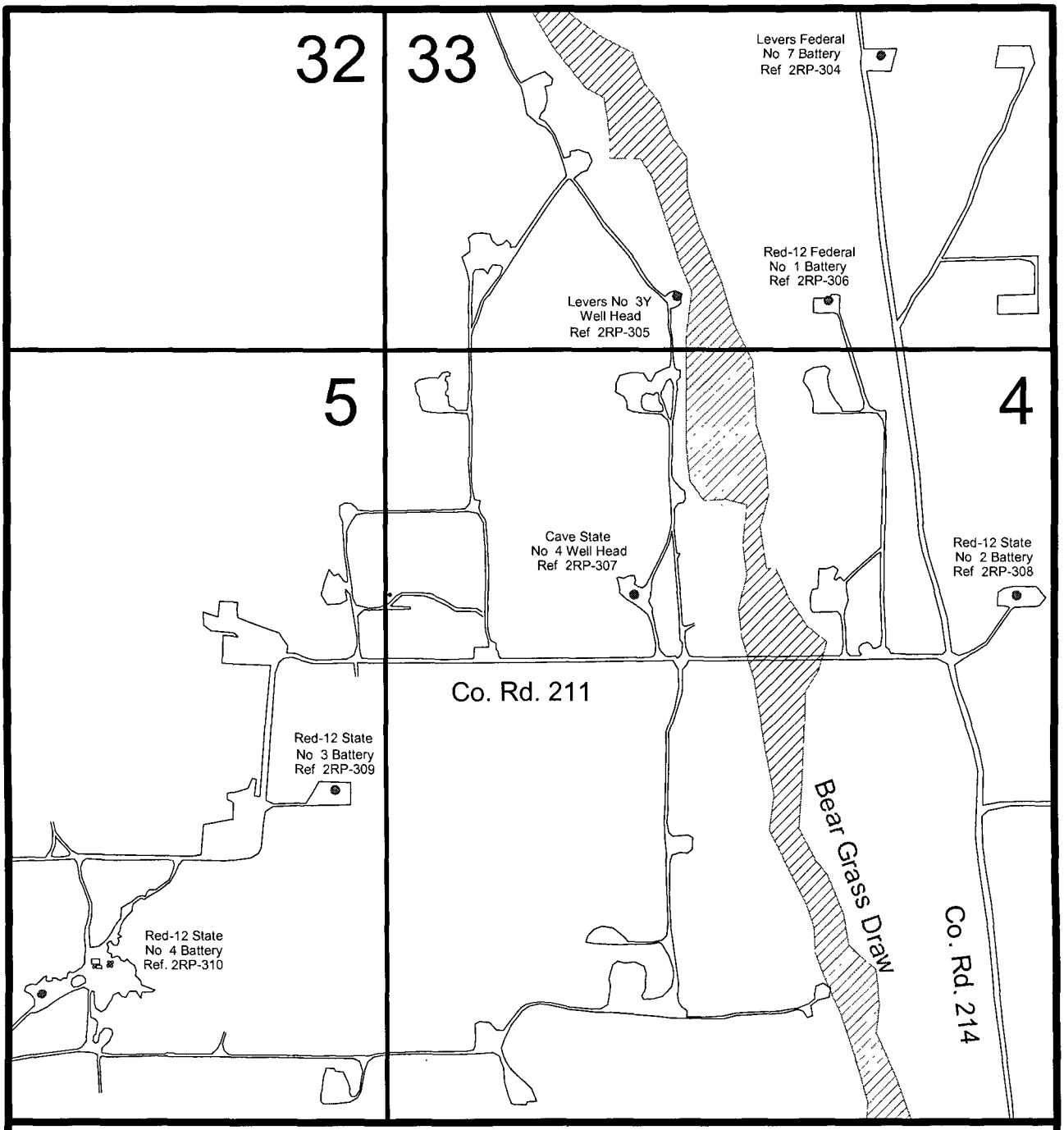
Please contact me if you have any questions, comments or require additional information prior to completion of the final report.

Sincerely,
R.T. Hicks Consultants, Ltd.

Dale T. Littlejohn

Dale T. Littlejohn
Project Manager
(432) 528-3878

Copy: Quinton Welborn, Marks and Garner Production Ltd, Co.



Marks and Garner
Production Ltd Co.

T-16-S, R-29-E, Section 33
T-17-S, R-29-E, Sec. 4 &5
Eddy County, New Mexico

Plate 1
Site VicinityMap

0 1,000 2,000

Feet

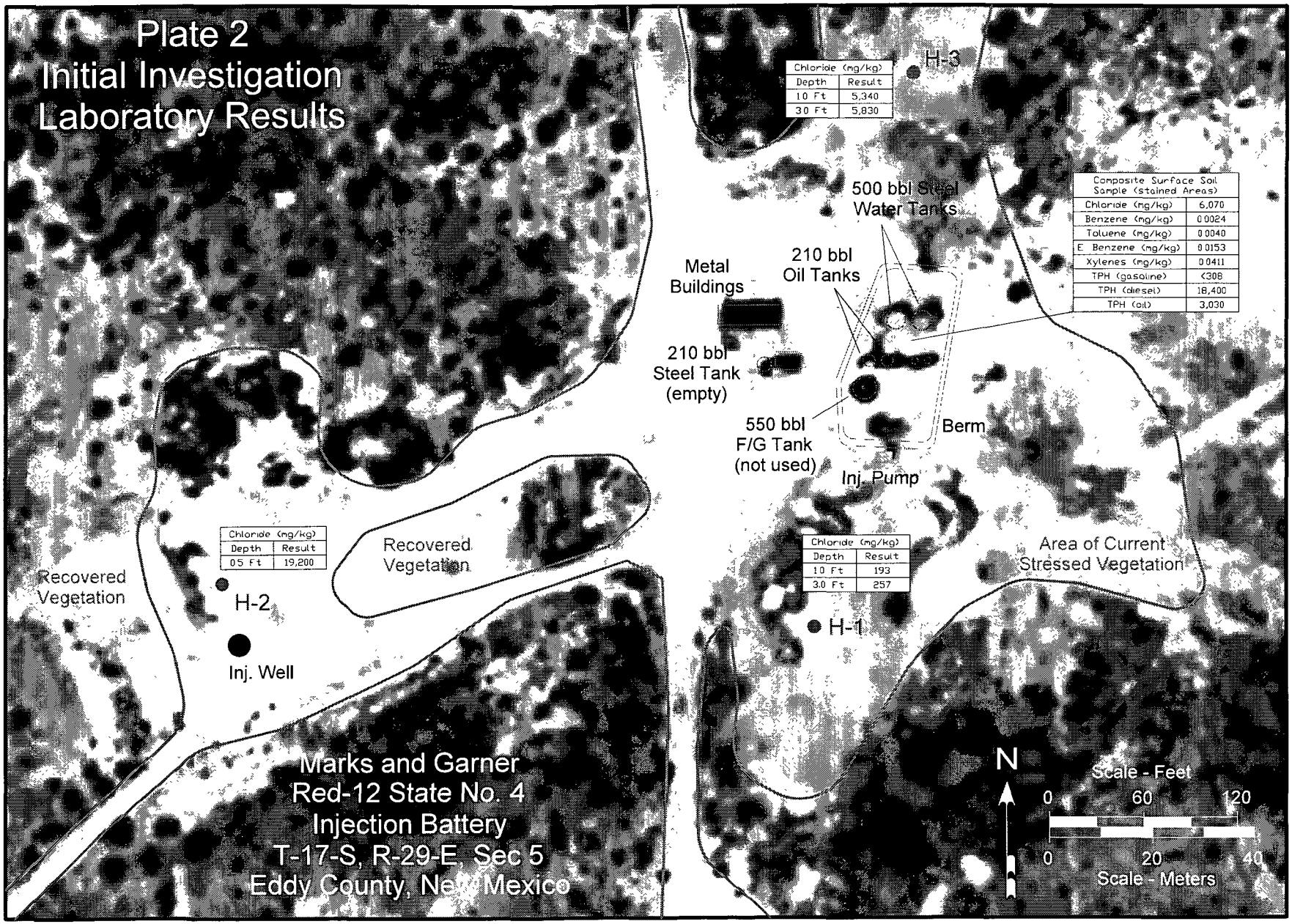


Plate 2
Initial Investigation
Laboratory Results
Chloride (mg/kg)
Depth | Result
10 Ft | 5,340
30 Ft | 5,830
H-3
500 bbl Steel
Water Tanks
Composite Surface Soil
Sample (Stained Areas)
Chloride (mg/kg) | 6,070
Benzene (mg/kg) | 0.0024
Toluene (mg/kg) | 0.0040
E. Benzene (mg/kg) | 0.0153
Xylenes (mg/kg) | 0.0411
TPH (gasoline) | <308
TPH (diesel) | 18,400
TPH (oil) | 3,030
210 bbl
Oil Tanks
Metal
Buildings
210 bbl
Steel Tank
(empty)
550 bbl
F/G Tank
(not used)
Berm
Inj. Pump
Chloride (mg/kg)
Depth | Result
0.5 Ft | 19,200
Recovered
Vegetation
Recovered
Vegetation
H-2
Inj. Well
Chloride (mg/kg)
Depth | Result
1.0 Ft | 193
3.0 Ft | 257
H-1
Area of Current
Stressed Vegetation
Marks and Garner
Red-12 State No. 4
Injection Battery
T-17-S, R-29-E, Sec 5
Eddy County, New Mexico
N
Scale - Feet
0
60
120
0
20
40
Scale - Meters