April 5, 2010

Mr. Mike Bratcher
Oil Conservation Division
New Mexico Energy, Minerals and Natural Resources Department
1301 W. Grand Avenue
Artesia, New Mexico 88210

**Re: Remediation Workplan,**
**Marks and Garner Production LTD Co., Cave State #4**
**Unit Letter F (SE/4, NW/4), Section 4, Township 17 South, Range 29 East,**
**Eddy County, New Mexico**
**(Latitude: N 32.86636°, Longitude: W 104.08299°)**
**2RP #307**

Dear Mr. Bratcher:

Marks and Garner Production LTD Co. (M&G), has retained Ocotillo Environmental, LLC (Ocotillo) to remediate impacts to soil from a leak at the Cave State #4 wellhead. The well is located in the southeast quarter (SE/4) of the northwest quarter (NW/4), Section 4, Township 17 South, Range 29 East, Eddy County, New Mexico (Site). The date and volume of the release are unknown. A C-141 was submitted to the New Mexico Oil Conservation Division (NMOCD) on April 9, 2009. Appendix A provides a copy of the C141. Figure 1 shows the site location.

Based on published literature (1961), well records of the New Mexico State Engineer, and well records of the United States Geological Survey, groundwater occurs at approximately 65 feet bgs in the well located nearest the Site. No domestic water wells are located within 1,000 feet of the site. The NMOCD has established recommended remediation action levels (RRALs) for benzene, total BTEX and TPH resulting from spills of natural gas liquids ("Guidelines for Remediation of Leaks, Spills and Releases, August 13, 1993"). Remediation levels for benzene, total BTEX and TPH were calculated using the following NMOCD criteria:

| Criteria | Result | Ranking Score |
|---|---|---|
| Depth-to-Groundwater | 50 - 99 Feet | 10 |
| Wellhead Protection Area | No | 0 |
| Distance to Surface Water Body | >1000 Horizontal Feet | 0 |
| | | **Total: 10** |

The following RRALs have been assigned based on NMOCD criteria:

| | |
|---|---|
| **Benzene** | **10 mg/kg** |
| **Total BTEX** | **50 mg/kg** |
| **TPH** | **1,000 mg/kg** |

## Initial Investigation

On September 10, 2009, a letter was prepared for the NMOCD by R.T. Hicks Consultants, Ltd. (Hicks), that reported results of soil samples collected at the site in order to provide horizontal delineation of the spill. Hicks also provided documentation that groundwater in the area is confined, thereby making the depth to groundwater "not relevant". Appendix B provides a copy of the "Hicks" diagram (Plate 2D) showing sample point locations and chloride

concentrations, as well as a copy of the "Hicks" table of Field and Laboratory Data – Soil Samples.

**Current Investigation**

On March 2, 2010, Ocotillo installed two (2) soil borings (BH-1 and BH-2) at the site, using an air rotary drilling rig, in order to further assess the horizontal and vertical limits of the spill. Soil samples from the exploratory borings were collected in five foot intervals from the ground surface to a depth of approximately 21 feet below ground surface (bgs). The soil borings were plugged with bentonite. Figure 2 shows the locations of the soil borings. Appendix C provides copies of the Well Record and Logs provided to the Office of the State Engineer.

The soil samples from borings BH-1 and BH-2 were placed in clean glass sample jars, labeled, and delivered under chain-of-custody control to Xenco Laboratories, located in Odessa, Texas. All soil samples collected from borings BH-1 and BH-2 were analyzed for chlorides by EPA method E300. Table 1 presents a summary of the laboratory analysis of soil samples. Laboratory analysis and chain of custody documentation are included in Appendix D.

Referring to Table 1, chloride concentrations in samples from boring BH-1 were above the NMOCD standard of 250 mg/kg until a depth of 20–21' bgs (123 mg/kg). The soil samples collected from background boring BH-2 all reported chloride concentrations below 250 mg/kg.

**Proposed Remediation**

Marks and Garner proposes to conduct excavation of the chloride impacted soil in the vicinity of soil boring BH-1 to a depth of approximately five (5) feet bgs. Horizontal delineation will be determined by laboratory analysis of samples collected during excavation. All excavated soil with a chloride concentration greater than 5,000 mg/kg will be hauled to an NMOCD approved disposal facility. Excavated soil with a chloride concentration less than 5,000 mg/kg will be blended on-site with organic material, in order to reduce the chloride concentrations to less than 1,000 mg/kg. A 20 mil plastic liner will be installed at the five foot depth, and the excavated areas will be backfilled with either clean soil or blended soil with a chloride concentration less than 1,000 mg/kg. Excess blended soil (with a chloride concentration less than 1,000 mg/kg) will be used to construct firewalls around the Marks and Garner tank batteries and / or other ancillary equipment.

If you have any questions or need additional information, please call Mr. Quinton Welborn at (575) 631-0949, or myself at (575) 441-7244. We may also be reached by email at qwelborn@valornet.com or Cindy.Crain@gmail.com.

Sincerely,
*Ocotillo Environmental, LLC*

Cindy K. Crain, P.G.
Environmental Manager

cc: Quinton Welborn, Marks & Garner

# FIGURES

# TABLE

# APPENDIX A

# INITIAL C141 DOCUMENTATION

# APPENDIX B

## R.T. HICKS INITIAL INVESTIGATION

## PLATE 2D
## And
## TABLE OF FIELD AND LABORATORY DATA

# APPENDIX C

# WELL RECORD AND LOGS

# APPENDIX D

# ANALYTICAL DATA AND CHAIN OF CUSTODY DOCUMENTATION