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Environmental Services

Mr. Gerry Guye
Deputy Field Inspector
New Mexico Oil Conservation Division
1301 W. Grand Avenue
Artesia, New Mexico 88210

Subject. 30-015-29931
Pronghorn State #2, Section 2, Township 21 South, Range 28 East, N.M.P.M., Eddy County, New Mexico.

Date.
November 1, 2007

Contact
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Dear Mr. Guye:

The following scope of work has been prepared to investigate the soil quality within and underlying an earthen pit associated with the Pronghorn State #2 site located in Section 2, Township 21 South, Range 28 East, N.M.P.M., Eddy County, New Mexico. The scope of work is being submitted to the New Mexico Oil Conservation Division (OCD) for approval prior to implementation. The scope is consistent with the discussions held between the interested parties at the meeting conducted at the site on August 23, 2007.

The pit remains open even though a well was not completed at this location. The objective of the investigation is to sample soils within and underlying the pit to determine the presence or absence of impacts from brine and/or petroleum hydrocarbons. The results of the investigation will allow a determination to be made as to whether remediation and/or additional investigation activities associated with closure of the pit are necessary.

SCOPE OF WORK

The scope of work to investigate soil quality within and underlying the earthen pit will focus on the upper twenty (20) feet of the soil profile assuming that groundwater will not be encountered within this interval. If groundwater is encountered within the upper 20 feet, then the depth of investigation for the soil profile will be adjusted accordingly.

Two primary investigative tools will be utilized for the investigation. Electromagnetic conductivity surveys will first be conducted to provide information on the vertical and

lateral extent, if any, of brine related impacts. This will be immediately followed by confirmation soil sampling to determine the presence or absence of impacts from brine or petroleum hydrocarbons. The following scope of work is proposed:

- An EM-31 and EM-38 electromagnetic conductivity survey will be conducted over a grid area covering approximately 200 feet by 200 feet and overlying and extending beyond the boundaries of the earthen pit. The objective of these surveys will be to determine background conductivity response and identify any conductivity anomalies within the surveyed area to target for confirmation soil sampling.

- Soil borings will be conducted using direct-push technology. Soil borings will be advanced to approximately 20 feet in depth at two locations; one in the center of the anomalous high conductivity area and one in the area of lowest conductivity based on the EM-31 survey results. In addition, eight (8) shallow soil borings will be advanced to a depth of approximately five (5) feet within the surveyed area to confirm the results obtained from the EM-38 survey.

- Discrete soil samples will be collected from each soil boring at one (1) foot intervals, as discussed below. Collected soil samples will be submitted to an analytical laboratory acceptable to the State of New Mexico. Soil sample collection and the proposed analytical program are presented below.

- The results of the field investigation work will be presented in a report to the OCD that will include conclusions and recommendations for additional investigation and/or remediation activities, if needed. At a minimum the report will include a proposed work scope that will be necessary to provide for pit closure and surface restoration.

Electromagnetic Conductivity Survey

Electromagnetic (EM) conductivity surveys of the area encompassing the earthen pit will be utilized to delineate areas potentially impacted by oil field brine. The particularly high electrical conductivity of oilfield production water (brine) makes the detection of brine related soil impacts by EM conductivity methods an especially reliable geophysical application. Electromagnetic conductivity instruments consist of

a transmitter and receiver coil, and a power source that can be handled by one or two persons. During the operation of the instrument, the transmitter coil is energized by an alternating current and radiates an electromagnetic field into the earth. This primary field induces electrical currents (called eddy currents) in the earth below the instrument. The magnitude of these currents is proportional to the conductivity of the ground. These eddy currents, in turn, generate a secondary electromagnetic field that is detected by the receiver coil on the instrument. The receiver coil also detects the primary field and uses these two measurements to calculate the conductivity of the ground. This reading represents a bulk measurement of the conductivity of a volume of ground beneath the instrument down to its effective depth of penetration.

For this site, EM-31 and EM-38 surveys are proposed. The EM-38 instrument has an effective investigation depth of 5 feet and the EM-31 instrument has an effective depth of 18 feet. The effective depth difference will allow for some vertical discrimination of conductivity within the soil profile throughout the surveyed area. Additional vertical discrimination will be obtained by running the EM surveys in both the vertical and horizontal dipole mode. A survey grid of approximately 200 feet by 200 feet should be adequate to overlap and extend beyond the boundaries of the earthen pit to allow a comparison of background soil conditions with those underlying the pit. The survey will be completed by walking the area along survey lines that are 10 feet apart. Conductivity readings are recorded continuously as each survey line is traversed.

Soil Sampling Program

Approximately 10 soil borings are planned for this investigation; two deep borings (20 feet) and eight shallow borings (5 feet). A comparison of the collected data should allow for estimating the amount of produced water discharged to the pit and the potential threat to any underlying groundwater.

The borings will be installed using direct-push technology and continuous soil cores will be collected as the borings are advanced. The two deeper borings will be installed in the area of highest and lowest conductivity based on the EM-31 survey. For these borings, soil samples will be collected at one (1) foot intervals throughout the depth of the boring. Each soil sample will be analyzed for percent moisture, electrical conductivity, soluble chloride and sodium (on a 1:1 soil : water extract), and exchangeable sodium. A minimum of two (2) soil samples (collected from 0-5 feet and 5-10 feet) from each of the deeper borings will be analyzed for Total Petroleum Hydrocarbon (TPH) using Texas Method 1005. Additional TPH analyses will be

included if warranted based on visual, olfactory, and/or photoionization screening conducted at the time of sampling.

Eight (8) shallow soil borings will be advanced to a depth of approximately five (5) feet within the surveyed area to confirm the results obtained from the EM-38 survey. For these borings, soil samples will be collected at one (1) foot intervals throughout the depth of the boring. Each soil sample will be tested in the field for electrical conductivity (saturated paste) to ground truth the EM-38 results. For the two borings located in the area of highest conductivity, based on the EM-38 survey, a minimum of two soil samples per boring will be collected and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), TPH, and chloride.

SCHEDULE

The work described in this work plan can be scheduled within 45 days of the later of: (a) receipt of approval from OCD; or (b) agreement by the three parties to the litigation (NGX, Great Basin, and OXY) on a means for paying for the work. Concerning the latter issue, I have prepared an estimate of the cost for implementing this work plan and understand that the attorneys and parties are discussing how to proceed if the OCD approves this work plan. The proposed field work will require approximately two or three days to complete. A report covering the results of the investigation will be submitted within 60 days of completion of the field work.

Sincerely,

ARCADIS U.S., Inc.

Michael M. Gates
Project Advisor

Copies
Charles K. (Kip) Purcell, Esq.
John R. Cooney, Esq.
Paul T. Halajian, Esq.