March 6, 2017

Olivia Yu, Environmental Specialist
New Mexico Oil Conservation Division
Hobbs District Office
1625 French Drive
Hobbs, New Mexico 88240

SUBMITTED VIA EMAIL
Olivia.Yu@state.nm.us

RE: Remediation Workplan, NMOCD Case No. 1R-4587
Yates State #2, T12S, R38E, Sec 16, Unit H
33.2793°N, 103.0945°W
Lea County, New Mexico
Project No. RAMRNM0002

Dear Ms. Yu:

Enviro Clean Cardinal, LLC (ECC) has prepared the following remedial workplan to address the New Mexico Oil Conservation Division (OCD) correspondence concerning the January 27, 2017, release at the RAM Energy Resources (RAM) Yates State #2, in Lea County, New Mexico. The C-141 indicates the release was 37 barrels (bbls) of produced water, most of which was retained within the earthen firewall. Approximately 37 bbls of fluid was recovered.

This OCD workplan has been prepared to comply with 19.15.29.11 NMAC, the *Guidelines for Remediation of Leaks, Spills and Releases* (August 13, 1993), and WQCC's chloride delineation requirements. The following photographs represent current site conditions as seen on February 13th.

General Site Characteristics

The release site is in the Gladiola Oil Field, and is situated at approximately 3,835 feet above mean sea level, with a slight slope towards the southeast and the Sulphur Springs Draw. There is not an identified watercourse in the vicinity of the site. The primary land use is for livestock grazing, with significant oilfield development in the region. The area is semiarid, with a net annual average precipitation/evaporation loss of approximately 73 inches.

The surface soil surrounding the production pad site is listed by the USDA-Soil Conservation Service as “Kh” (Kimbrough-Lea complex) and is primarily a Petrocalcic Calciustoll. This indicates a loamy, mixed thermic soil that is well drained, and is derived of calcareous alluvium and/or eolian deposits derived from sedimentary rocks.

The surficial geologic unit is listed as “Qsu” (Quaternary sand deposits, undivided) and is described as windblown deposits, sand sheets and dunes, undivided. The underlying unit is the Tertiary-age Ogallala Formation (lower Pliocene to middle Miocene), which is comprised of alluvial and eolian deposits and petrocalcic soils of the southern High Plains.

The Ogallala Formation is part of the regional High Plains Aquifer system, with a surface expression at the Oho Tank. Water wells are nearby, and records indicate the depth to water is between 24 and 28 feet below ground surface (bgs).

Site History and Release Summary

Two environmental releases are documented at this site. The earliest release, 1RP-2781, was closed in July 2013 (see: *Earth Technologies of New Mexico Inc. Closure Report, Chaparral Energy LLC, Yates State #2 Leak … NMOCD 1RP-2781, March 22, 2012*). That release was an approximately 5 net barrels (bbls) outside and north of the containment berm, affecting approximately 1,200 square feet. The response was to remove the affected media exceeding 1,500 mg/kg chlorides by field titration screening methodology, and installing a Geo-Synthetic Bentonite impervious liner.

The release that is the subject of this workplan occurred on January 27, 2017. This release was 37 bbls of produced water, with almost all fluid being recovered. The spill was contained within the earthen berm, affecting an area about 3,200 square feet. The volume of three storage tanks further reduce the affected area.

Soil Remediation Action Levels

The OCD established the Recommended Remediation Action Level (RRAL) for soils contaminated with petroleum hydrocarbons. The ranking criteria is based on numeric scores to determine the appropriate soil remediation action level for relative threats to public health, fresh water, and the environment.

Ranking Score	Depth to Groundwater	<1000 feet from Water Source	<200 feet from Private Domestic Water Source	Distance to Surface Water Body
20	<50 feet	Yes	Yes	<200 feet
10	50 – 99 feet			200 – 1,000 feet
0	>100 feet	No	No	>1,000 feet
TOTAL	20			

The most stringent hydrocarbon cleanup values are assigned to sites with an RRAL greater than 19; this site has a ranking score of 20, which corresponds to clean-up values of:

- 10 parts per million (ppm) benzene,
- 50 ppm benzene, toluene, ethylbenzene, and total xylenes (BTEX), and
- 100 ppm total petroleum hydrocarbons (TPH).

The Water Quality Control Commission's (WQCC's) *Standards for Ground Water of 10,000 mg/l TDS Concentration or Less* (20.6.2.3102 NMAC, aka the 3102 list) establishes a 250 ppm chloride delineation standard.

Based on the negotiated values granted during the previously closed release, ECC respectfully requests that the delineation and cleanup requirements for chlorides be established at 1,500 ppm.

Proposed Remediation and Waste Management

The constituent expected to be the driver for remediation is chlorides. During the initial viewing of the release site a skim of high-TPH bottom sludge was observed in the south portion of the containment, approximating the high level of fluids in the tankhold. Since chlorides cannot be reduced using degradation processes, the proposed remedial option is the excavation of impacted media for disposal.

Field screening will be performed using an electrical conductivity meter calibrated for chlorides to guide excavation activities. When the field measurements are below the levels that are assumed would meet the chloride delineation values, laboratory samples will be collected for confirmation.

The operating equipment will not be removed, and a pedestal slightly larger than each tank will be left in place so as to not damage the integrity of the tanks.

If bedrock is encountered, or the depth of the excavation exceeds three feet before delineation to the RRALs, then a workplan for second-phase of assessment will be prepared, requesting either: alternative clean-up standards; the installation of an impervious liner; delineation by drilling adjacent and outside the tankhold; or other technologies as appropriate for the site conditions identified during the excavation.

Disposal for wastes generated at the Yates release site will most likely be at the Gandy-Marley facility in Tatum, NM. Suitable backfill material will be sources either from the disposal facility, or from the landowner, dependent on RAM's contractual requirements.

Personnel conducting the evaluations will have completed OSHA Hazwoper and Safeland training. Fire resistant clothing, H_2S monitor, and Level D personal protective equipment will be used by personnel.

Soil Sampling and Analyses

Soil samples will be collected from the base of each wall of the excavation at the approximate mid-point, and on both the north and south side of each tank. At least ten delineation soil samples for all analytes will be submitted for laboratory confirmation.

All confirmation soil samples will be submitted to a National Environmental Laboratory Accreditation Program (NELAP) environmental laboratory for OCD-approved TPH, benzene/BTEX, and chloride analytical methods, requesting the results on the OCD-preferred wet-weight basis. Analytical methods will include:

- TPH by EPA SW-846 method 8015M (modified for OCD carbon ranges)
- BTEX by EPA SW-846 8000-series (either 8021B or 8260B at the laboratory's discretion)
- Chlorides by EPA CWA inorganic anion method 300 series

Activities Timeline

Within ten business days of the workplan approval, begin the approved scope of work (this assumes delineation by excavation will be the accepted remedial technology).

Within ten business days of receipt of all data (laboratory reports, waste documentation, clean fill receipts, etc.), compile and submit electronically, a final form C-141 and report of remedial actions to the OCD with all supporting documentation.

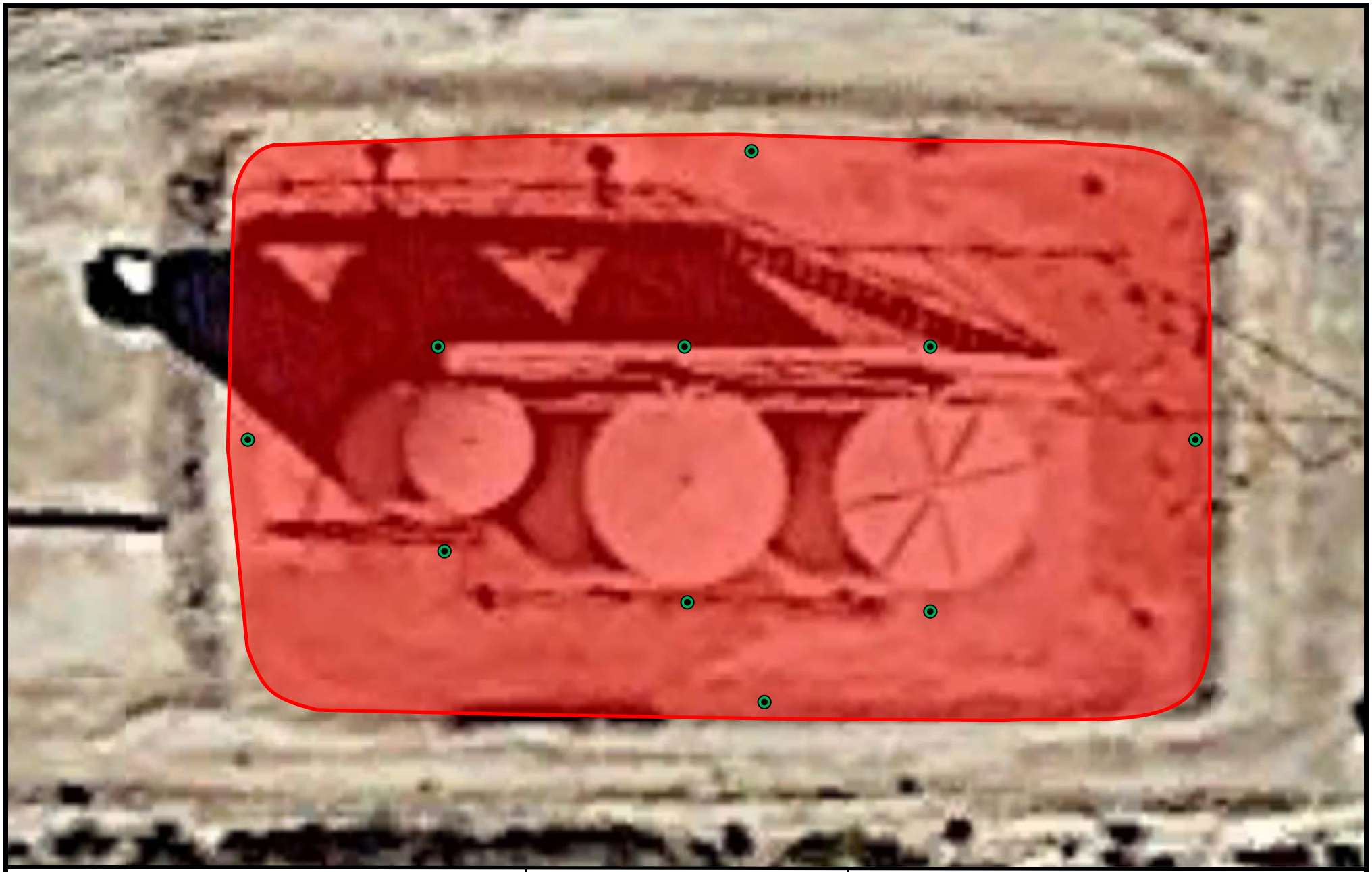
Please feel free to contact me at 432.301.0209 if you have questions or concerns, or would like to discussed the proposed activities.

Sincerely,

Enviro Clean Cardinal, LLC

William "Bill" Green, PG No. 136, CPM
Texas Professional Geologist, Certified Project Manager
Hydrogeologist/Environmental Compliance Specialist

Attached: Proposed Sample Location Map



Legend

- Proposed Sample Location
- Release Affected/Proposed Excavation Area

N

Proposed Sample Location Map

RAM Energy Resources - Yates State #2

33.2793°N, 103.0945°W

Lea County, New Mexico

Approx. Scale:		Date:
1” = 10’	ENVIRO CLEAN CARDINAL	3/6/2017
2405 E. Co. Rd. 123, Midland, Texas 79706		Project No.: RAMRNM0002