1R - 498

WORKPLANS

Amendment

Date:

6-30-10

Chaparral ENERGY

RECEIVED OCD

2010 JUL -6 P 1:10

30 June 2010

VIA "EMAIL" (Letter to follow via US Mail)

New Mexico Oil Conservation Division
Energy, Minerals & Natural Resources Division
Attn: Edward Hansen, Hydrologist, Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: Gladiola SWD System, Lea County, New Mexico

Dear Sir:

In response to your email of 17 June 2010 the following is provided:

1. Please submit a map of the sites referenced in the plan (the figure referenced in the plan was not provided to the OCD).

Attached are two aerial photographs that were taken on 28 and 29 November 2005 provide to us by Google Earth's website. One is without any notes and the other has various spots marked and labeled. Also attached is a narrative for each of the labeled spots on the aerial photograph.

2. Please submit a plan map for each site indicating the approximate locations of the proposed borings with the proposed depth of each boring. If borings have been performed in the past at any of the sites, please include the location of the former borings with each plan map.

No plan maps have been prepared by either Chaparral or its environmental consultant. None will be prepared until after the Geonics EM-38 and EM-31 remote sensing surveys have been completed and analyzed. These screenings will delineate the length and breadth of any release as well as the depth to which the saltwater may have migrated. Wells will be drilled based on the results of the remote sensing. (See Scope of Work, page 2, on the Whole Earth Environmental, Inc.'s letter of 9 April 2010 which you should already have in hand.) Where former borings have been performed this information will be placed on each map as appropriate. If data is available from these borings it will also be attached or referred to if the information was previously submitted to the state.

3. Please submit a plan for using a PID and soil sampling for BTEX and TPH if the PID reading is over 100 ppm.

While no hydrocarbons are expected to be found a PID will be kept on-site should evidence of a hydrocarbon release is seen. Whole Earth Environmental, Inc. will include the use of a PID in its

next proposal. In the proposal of 9 April 2010, in the paragraphs under Proposed Soil Sampling and Laboratory Programs, soil sampling is discussed, as is the expected laboratory work. This will include soil sampling for BTEX and TPH if the PID reading is over 100 ppm; laboratory analysis for pH, EC, sodium, potassium, calcium, magnesium and chloride using a 1:1 soil: water extract, as well as the SAR and the ESP. Further testing will be conducted for routine fertility parameters including plant available nitrogen, phosphorus, potassium, calcium, magnesium, sodium and sulfur. Laboratory suggestions as to how best to bring the soil to its greatest potential will be requested.

4. Please submit descriptive documentation for the "Geonics EM-38" and "Geonics EM-31" remote sensing devices.

Whole Earth Environmental, Inc. has been asked to forward this information to your office. When the required reports are written up this information will be included as an appendix in the submittal. Attached is a short description of the devices.

5. Please provide the OCD remediation plan numbers (i.e., OCD case #; e.g., 1R-1739 & 1R-498; see below) for the respective release sites as identified in the plan. (As the OCD understands, not all of the sites identified in the plan may have OCD case #'s. If a site does not have a case # currently assigned, then Chaparral must submit a form C-141 to the OCD Hobbs District Office for each of those sites; and, if ground water has been impacted, to the OCD Santa Fe Office, Environmental Bureau Chief, in accordance with 19.15.29 NMAC.)

A careful screening of all available C-141 reports, reports from other environmental reporters, reports from landowners and similar information has been made. Comments on each site, as well as others, are given below.

6. In addition, the approved investigation plans for 1R-1739 & 1R-498 have been conditioned to commence on Monday, June 21, 2010. The OCD suggests that Chaparral submit to the OCD a formal request for extension for commencement of the investigation plans prior to Monday.

A formal request for an extension was submitted on 23 June 2010, via email after our conversation that morning. It is our understanding Chaparral's request for an extension has been granted. Providing Chaparral is granted permission to operate the Houston #1-A SWDW, it will need to begin implementation of its plan not later than 23 July 2010 with a report completed and delivered to the NMOCD not later than 23 August 2010.

7. Below are release sites that have been identified by Purvis Operating Company:

[Chaparral assumes you desire comments on each as well as any other sites Chaparral may presently be aware of.]

Gladiola No. 2 Release Site, T 12S R38E Section 30 Unit Letter D,
NMOCD Case # Not Assigned (Property owner: Tommy Burrus)

Gladiola No. 2 Release Site appears to be the remains of a borrow pit used by the NMDOT when US Highway 380 was constructed or repaired. It will be surveyed to ascertain if a spill did in fact take place there. If one did take place it will be duly reported.

Chaparral has no designation for this site, but should it be found to be a release site it will be referred to as the Gladiola No. 2 Release Site.

Gladiola SWD Release Site, T 12S R37E Section 25 Unit Letter A,
NMOCD Case # 1R- 1739 (Property owner: Tommy Burrus)

This site has also been called the Burrus #3 and the Burrus #4. It appears it is two releases, one atop the other. It will be surveyed to ascertain its length, breadth and depth. Test holes will be advanced as per NMOCD rules and regulations.

Chaparral refers to this site as the Burrus #3 and #4 sites.

Gladiola NE Release Site, T 12S R38E Section 18 Unit Letter O,
NMOCD Case # 1R-498 (Property owner: Dean Kinsolving)

This site has also been referred to as the Kinsolving North. It appears to be a large saltwater impacted site. It will be surveyed to ascertain its length, breadth and depth. Test holes will be advanced as per NMOCD rules and regulations.

Chaparral refers to it as the Kinsolving North site.

Gladiola SWD Section 26 Release Site T-12-S R-37-E Section 26, Unit Letter J,
NMOCD #1RP 09-16-2366 (Property owner: Dean Kinsolving)

This site has also been referred to as the Kinsolving Central, Kinsolving South #1, and possibly Kinsolving #3. It appears to be a minor saltwater impacted site, but could also be a naturally occurring sodic soil condition. It will be surveyed to ascertain what it truly is and if found to be due to a release of saltwater its length, breadth and depth will be determined. Test holes will be advanced as per NMOCD rules and regulations. Chaparral has no copy of a C-141 on this site.

Chaparral refers to it as the Kinsolving Central site.

Gladiola SWD Section 26 Release Site T-12-S R-37-E Section 26 Unit Letter J, **NMOCD # 1RP-09-9-2284**. This is the same site as 2366 discussed above.

This site has also been referred to as the Kinsolving South and Kinsolving South #1739. It appears to be a saltwater impacted site. It will be surveyed to ascertain its length, breadth and depth. Test holes will be advanced as per NMOCD rules and regulations.

Chaparral refers to is as the Kinsolving South site.

Another environmental consultant has stated in their submissions to the NMOCD that 1R1481 is the same as 1R1739 (Chaparral's Burrus #4.) This is believed to be incorrect. *1R1481 should be assigned to the reported release on the Purvis Lowe #1, Unit A, Section 34-T12S-R37E, Lea County, New Mexico. This well has nothing to do with Chaparral's interests or those of the Gladiola SWDW System. Chaparral has a C-141 for this site.*

Other known or suspected sites Section 25-T12S-R37E, Unit Letter F.

It appears there has been a release attributed to Rice Engineering back when it operated the Gladiola SWD System. Depending on who one speaks to it appears to have taken place in the 1970's or earlier. It will be surveyed to ascertain its length, breadth and depth. Test holes will be advanced as per NMOCD rules and regulations.

Chaparral refers to this site as the Burrus #5.

We trust this answers the questions you asked in your email. If you desire any further information, please let me know. My contact numbers are below.

Sincerely,
Chaparral Energy, L.L.C.

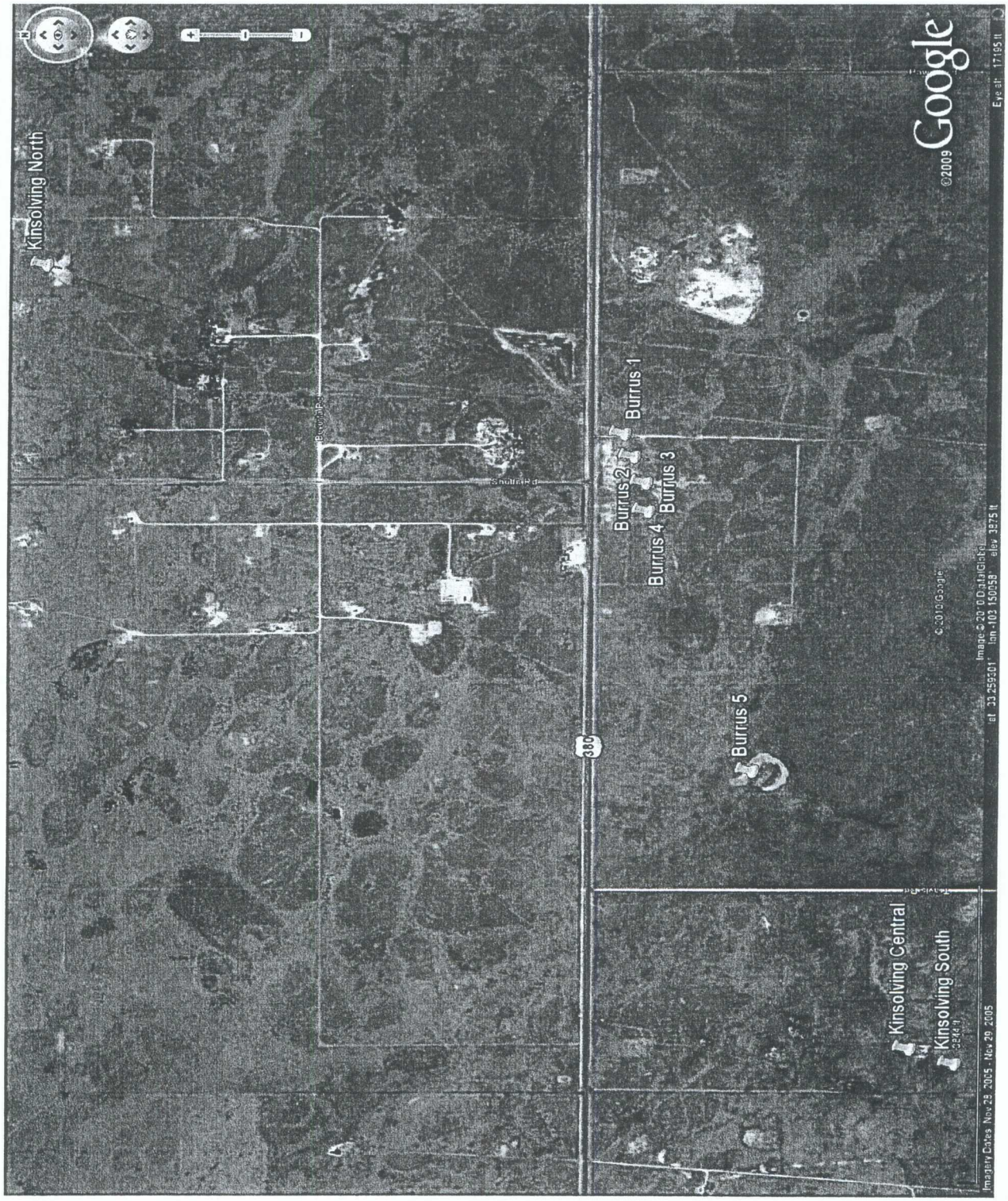
Robert C. Lang IV, REM, CEA
EH&S Manager
Direct Number: (405) 426-4330
Direct Fax: (405) 425-8830
Cell Number: (405) 850-2732
E-Mail: bobl@chaparralenergy.com

Enclosures

cc: David Carlson, Legal
Gene Daniel, Production
Larry Johnson, NMOCD, Hobbs
Mikal Altomare, NMOCD, Santa Fe

Aerial Photos – Gladiola SWDW Area
Lea County, NM

Aerial Photograph of the Gladiola SWD System
Aerial Photograph of the Gladiola SWD System with sites marked.


Kinsolving North
Burrus 1
Burrus 2
Burrus 3
Burrus 4
Burrus 5
380
Kinsolving Central
Kinsolving South
Google
©2009

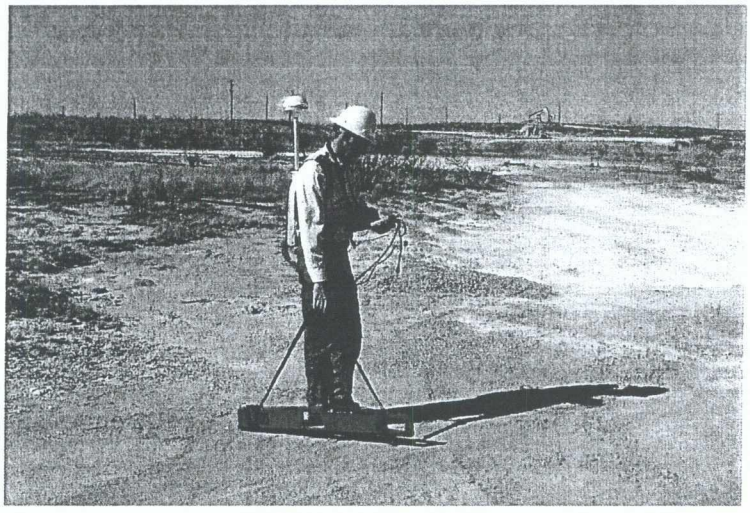
Geonics EM-31 and EM-38

Electromagnetic Surveys

Whole Earth employs Geonics EM-31 and EM-38 electromagnetic survey tools to determine the location and comparative concentrations of hydrocarbons and produced water within discreet soil horizons. Based on the design principles of inductive electromagnetics, ground conductivity meters provide a non-invasive method for measurement of subsurface conductivity and magnetic susceptibility. Without any requirement for soil-to-instrument contact, surveys can be performed quickly – facilitating dense data collection and, consequently, excellent spatial resolution – and over most geologic environments, including conditions of highly resistive surface materials such as sand and gravel.

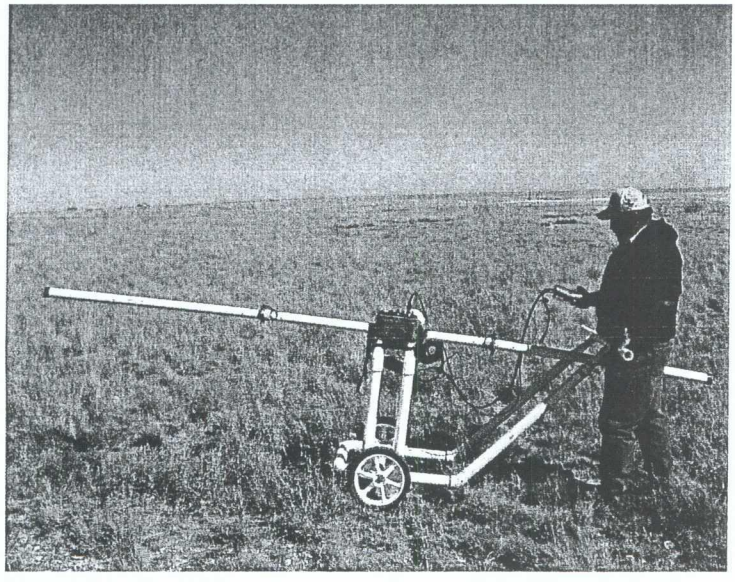
EM-31 survey of historic brine impact area affecting a shallow perched water table in southeast New Mexico.

The instrument can measure the comparative conductivity / resistivity in soils and groundwater to a depth of approximately 17' below ground surface.



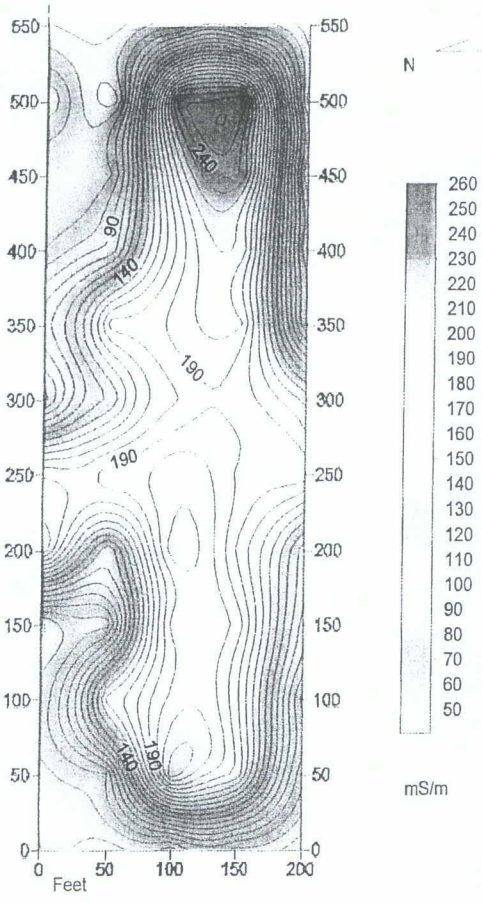
The EM-38 provides ground conductivity data at depths of 0-2.5' and 0-5' below ground surface. Here it is used to assess the impact of an historic brine water spill on the surface of an old production pad on BLM land.

When coupled with selective soil sampling we are able to calculate the amount of organics necessary to effectively phytoremediate the site without expensive haul off of the



When used in conjunction with a non-metallic cart of our own design, we are able to survey up to ten acres per day.

Our ProXH receiver can achieve eight inch accuracy for precise mapping and GIS data collection.



0 to 5 Feet Depth

Example of a typical EM-31 survey result. This site, covering 2.5 acres was surveyed, with the raw data analyzed on site. Based on the results, we were able to select the most relevant sampling points to "ground truth" the survey.

The statistical function of the survey allows us to calculate the average sodium chloride loading over the entire area and thus develop a remediation protocol based on mixing and blending those areas of higher chloride concentrations into less affected zones followed by organic loading and phytoremediation.