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17 March 2016

Mr. Mike Bratcher
New Mexico Oil Conservation Division
811 South First St.
Artesia, New Mexico 88210

Via Email: Mike.Bratcher@state.nm.us

Re: Monitoring Well Installation Plan
Candelario 24 #1 SWD Battery
Project No. 2RP-2400
UL/E Section 24 T23S R28E
API No. 30-015-26536

Dear Mr. Bratcher:

SQ Environmental prepared this plan to describe the proposed well installation and sampling activities at the Candelario 24 #1 Saltwater Disposal Well (SWD) Battery site. The scope of work includes the evaluation of groundwater concentrations in the area of the Candelario 24 #1 site to resolve remaining issues associated with the release. This work is being performed on behalf of Rockcliff Energy, LLC ("Rockcliff"). Rockcliff has just recently acquired assets in the Loving, New Mexico area from Vanguard Natural Resources, LLC.

Background

A release of produced fluid from one of the flow lines to the Candelario 24 #1 SWD occurred in July 2014. The release site is located approximately three miles east of Loving, Eddy County, New Mexico. Notice was provided to the New Mexico Oil Conservation Division (NMOCD), and an initial C-141 form was submitted. Release identification number 2RP-2400 was assigned to the incident by NMOCD. A Corrective Action Plan (CAP) dated 13 October 2014 was submitted to NMOCD. In accordance with the CAP, the upper 4 feet of soil within an approximately 2,251 square feet area was removed. A 20-mil reinforced poly liner was placed in the excavation and "seated" to minimize infiltration through the soil. The excavation was backfilled with imported fill material, contoured to match the surrounding grade, and seeded with a blend of native vegetation.

Based on the results of soil samples collected from soil borings in the area, the CAP proposed that a groundwater monitoring well be installed to evaluate whether groundwater in the vicinity of the release had been impacted. The installation of the groundwater monitoring well was approved by the NMOCD in an e-mail dated 20 October 2014. It was recommended by NMOCD that the well be installed as close to the excavation area as practical, on the apparent downgradient side.

Well Installation

As documented in the CAP and requested by the NMOCD, one monitoring well will be installed as close as possible to the former excavation area to evaluate potential chloride impacts to groundwater. The attached figure shows the approximate planned location of the well. The location of the well will be measured by

global positioning system (GPS) methods and the well will be installed in accordance with EPA guidelines and general industry practices. Based on field measurements of conductivity in purged groundwater from the initial installed monitoring well, additional wells may be installed to delineate chloride concentrations in groundwater.

The monitoring well borehole will be drilled by air rotary methods to total depth. The soil cuttings from the boring will be continuously logged and a boring log will be prepared to document the shallow lithology. Groundwater is expected to be encountered at a depth of approximately 40 feet (ft) below ground surface (bgs) in the area. The boring will be advanced approximately 10 ft deeper than the top of the saturated zone. After total depth is achieved, a two inch diameter schedule 40 polyvinyl chloride (PVC) well will be installed in the borehole. The well will be completed with 10 ft of slotted (0.01-inch) PVC screen with a PVC bottom cap. The PVC screen will be set approximately 8 ft below the top of the saturated zone, so that the screen is across the vadose zone/saturated zone interface. The well will be completed with blank PVC casing to ground surface. A #20/40 silica sand filter pack will be installed around the well to a depth of approximately 2 ft above the top of the screen, and a two ft thick bentonite seal will be installed above the sand pack. The bentonite seal will be hydrated and allowed to cure for a minimum of two hours before continuing with the well completion. Tremie pipe will be used to install a bentonite-cement grout mixture in the borehole annular space from the top of the bentonite seal to ground surface. A 2 to 5 percent mixture of bentonite will be used to mix the grout. The grout will be allowed to cure before installing the well surface completion. A concrete pad and locking flush mount cover surface completion will be installed on the well. The well completion specifications will be documented in the field and a well construction diagram will be prepared.

Following installation, the monitoring well will be developed with a dedicated bailer or submersible pump to clean the well screen and filter pack and remove fine grained material from the well casing. The well will be developed until the purge water is clear and field water quality parameters (temperature, pH, conductivity, and dissolved oxygen) have stabilized. At a minimum, three well volumes of groundwater will be removed from the well during the development activities. Documentation of the well development and field purge water measurements will be recorded by SQE on a well development log. After development is complete, the depth to water in the well will be gauged using an oil-water interface probe, and the well will be sampled by low-flow purge methods. The groundwater sample will be collected in laboratory supplied containers, placed on ice, and delivered to the laboratory for analysis of chloride by EPA Method 9056A. As discussed above, based on field observations of conductivity in the purged groundwater, additional wells may be installed.

Soil cuttings generated during the well installation will be contained in 55-gallon drums staged onsite, and will be disposed of as E&P waste. The purged groundwater will be handled with other produced water for salt water disposal, and will not require off-site disposal.

Reporting

Following completion of the field activities, a report will be prepared and submitted to NMOCD. The report will document the well installation and sampling activities, and provide logs of the boring lithology, and well development and sampling. A figure presenting the location of the well (or wells) will be included in the report, along with a table summarizing the laboratory analytical sample results. The report will provide conclusions regarding the sample results, and recommendations for the project (i.e. no further action or additional assessment activities).

Schedule

The well installation will be conducted following approval of this plan by NMOCD. The installation activities are tentatively scheduled for late March 2016, pending NMOCD approval. Please let us know if you have any questions regarding the plan or need any additional information.

Sincerely,
SQ Environmental, LLC

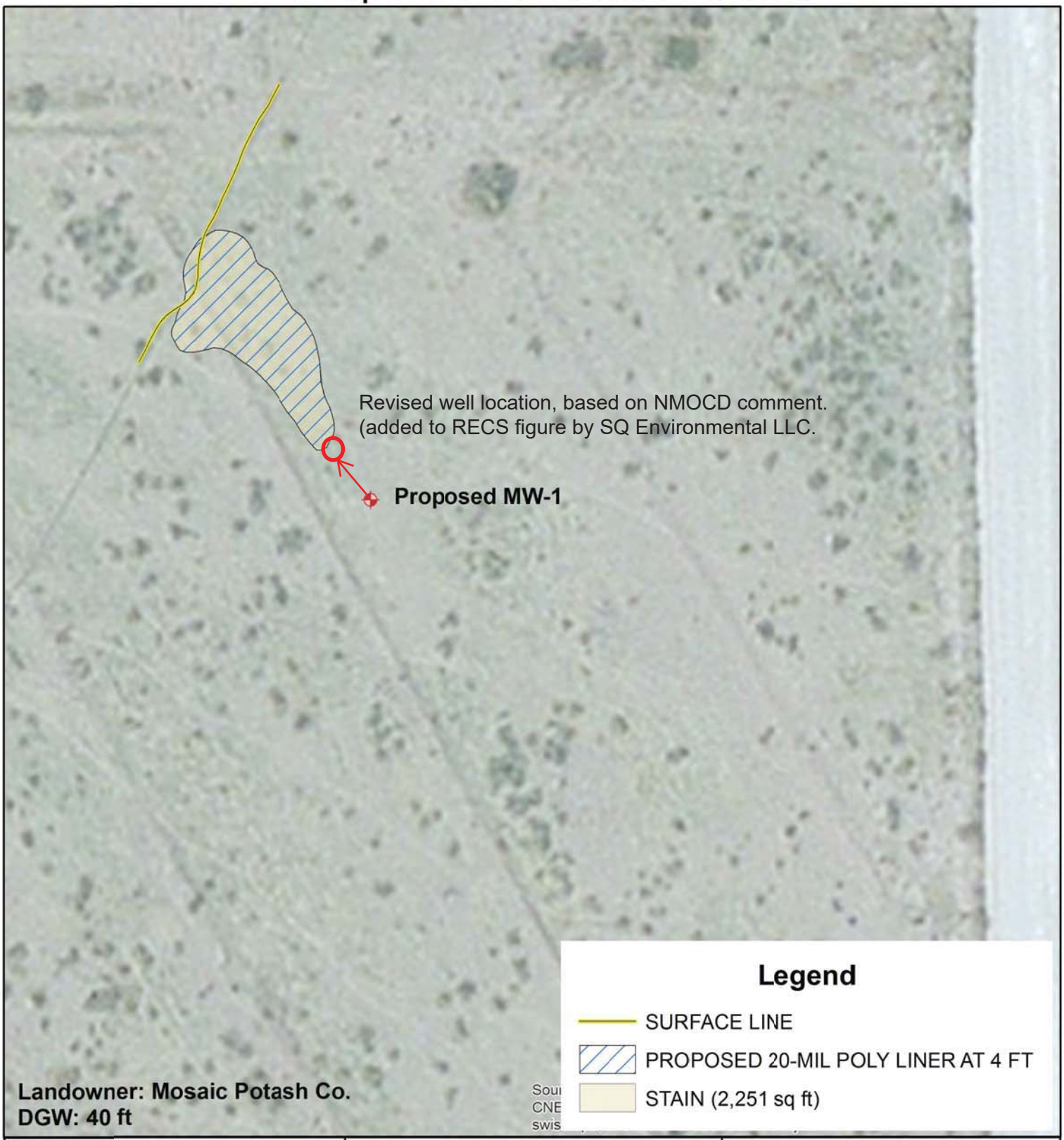
Samuel Enis, P.G.
Senior Geologist

Susan T. Litherland, P.E.
Principal

Cc: Nick Koch – Rockcliff Energy, LLC

Attachment

Proposed Corrective Actions



RECS
RICE ENVIRONMENTAL
CONSULTING & SAFETY

VANGUARD CANDELARIO 24 #1 SWD BATTERY

UL E SECTION 24
T-23-S R-28-E
EDDY COUNTY, NM

Figure 2

N
W E
S

0 40 80
Feet

GPS date: 7/15/14 CF, 8/4/14 KS
Drawing date: 9/29/14
Drafted by: L. Weinheimer