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September 10, 2019

Mr. Bradford Billings
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: 2018 Semi-Annual Monitoring and Remedial Activities Report
ConocoPhillips, Vacuum Glorietta East Unit
Lea County, New Mexico (1RP-744).

Mr. Billings:

This report details the continuing groundwater monitoring and remedial activities at the ConocoPhillips Company ("COP") Vacuum Glorietta East Unit, Lea County, New Mexico (site). The site location is shown on Figures 1 and 2. The site was assigned the identifier order No. 1RP-744 by the New Mexico Oil Conservation Division (NMOCD).

1.0 BACKGROUND

Impacts to soil and groundwater are believed to be associated with a release that was reported to the NMOCD on October 28, 2002. Approximately 80 barrels of oil and 20 barrels of water were recovered after the release. The affected area was estimated to be approximately 80 feet by 150 feet in size.

An initial site investigation was performed by B&H Environmental Services in November 2002. A total of seven shallow soil borings were advanced during the investigation. Soil samples collected from the borings indicated the presence of chlorides and petroleum hydrocarbons above NMOCD Recommended Remedial Action Limits (RRALs).

2.0 PREVIOUS INVESTIGATIONS

Excavation of affected soil began in August 2004 and was extended to a depth of approximately 20 feet below ground surface (bgs). Approximately 3,240 cubic yards (yd^3) of petroleum-impacted soil were excavated from the site and disposed of at a regulated facility. However, historical hydrocarbon concentrations were observed during excavation and additional assessment work was required. The excavation was backfilled and additional soil borings and monitoring wells were installed.

The additional excavation work removed approximately 1,000 yd^3 of soil was performed in November and December 2008. Monitoring well VG-1 was abandoned because it was located within the footprint of the excavation.

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Backfilling and reseeding of the excavation was approved and performed in July 2009. Following backfilling and reseeding, monitoring wells VG-2 was installed down gradient of the excavation, VG-3 was installed up gradient of the excavation, and VG-4 was installed within the footprint of the excavation.

Three additional groundwater monitoring wells, VG-5, VG-6, and VG-7, were installed between December 4 and December 13, 2013. The additional wells were installed to further assess the northern, western, and southern extent of hydrocarbons and chlorides in the groundwater.

The use of mobile dual phase extraction (MDPE) was used at the site due to the presence of light non-aqueous phase liquid (LNAPL). The first MDPE event at the site took place on September 8 and 9, 2014. MDPE was performed for a total of eight hours and approximately 1,636 gallons of total fluids were extracted from monitoring well VG-4. Approximately 6.06 gallons of hydrocarbons (liquid and vapor) were extracted from VG-4. The second MDPE event performed at the site occurred from May 4 to 6, 2015. Approximately 6,349 gallons of total fluids were extracted from monitoring well VG-4, and approximately 14.51 gallons of hydrocarbons (liquid and vapor) were extracted from VG-4. Approximately 8.16 gallons of the total amount of hydrocarbons were removed as vapors. Both MDPE events were performed by AcuVac Remediation, LLC (AcuVac) of Houston, Texas.

The previous consultant, GHD, submitted a 2016 Annual Groundwater Monitoring Report summarizing the groundwater data from the April and October 2016 sampling events. The report documented trace LNAPL in VG-4 observed during the April 2016 event, benzene, toluene, ethylbenzene, and total xylenes (collectively referred to as BTEX) and chloride exceedances in VG-4, and a chloride exceedance in VG-5 in October 2016. GHD installed an oxygenating compound sock in VG-4 on July 21, 2016 to assist with the degradation of the hydrocarbons.

3.0 HYDROLOGY/GROUNDWATER

The water bearing zone consists of the Pliocene-age Ogallala aquifer under unconfined conditions at the site. The Ogallala aquifer is located at the base of the Ogallala Formation. In general, the Ogallala Formation consists of quartz sand and gravel that is poorly to well-cemented with calcium carbonate and contains minor amounts of clay. The wells installed at the site were drilled to depths of approximately 70 to 80 feet bgs with static groundwater water levels approximately 65 feet bgs.

4.0 2018 GROUNDWATER MONITORING

4.1 Groundwater Sampling and Analysis

Prior to purging the wells, each well was gauged to measure the depth to groundwater and phase separated hydrocarbons (PSH), if any. The water levels and the PSH measurements are summarized in Table 1, and well locations are shown on Figure 3. Monitoring wells containing PSH are gauged, but not sampled. Each monitoring well not containing PSH was sampled utilizing low flow sampling techniques. The semi-annual groundwater monitoring events occurred in July and

November 2018. Groundwater samples were collected and analyzed for BTEX by United States Environmental Protection Agency (EPA) Method 8260 and chlorides by Method 300.0. Groundwater samples were transported to Pace Analytical Services, LLC, in Mount Juliet, Tennessee under chain-of-custody control for the 2018 sampling events. Table 2 presents a summary of the groundwater analyses. The analytical report and chain-of-custody is presented in Appendix B.

4.2 Groundwater Gradient

Groundwater gradient maps were generated for the July and November 2018 sampling events. The hydraulic gradient for the aquifer was generally to the southeast, and consistent with historical data. The July 2018 and November 2018 groundwater gradient maps are included as Figure 4 and Figure 5, respectively.

4.3 Phase Separated Hydrocarbon (PSH)

The monitoring wells were gauged for the presence of PSH during groundwater sampling events. Monitoring well VG-4 exhibited 0.79 feet of PSH during the July 2018 sampling event and 1.08 feet of PSH during the November 2018 sampling event. VG-4 was not sampled during either sampling event.

5.0 GROUNDATER ANALYTICAL RESULTS

5.1 July 2018 Sampling Event

During the July 2018 sampling event, monitoring wells VG-2, VG-3, VG-5, VG-6, and VG-7 were sampled. The concentration of chlorides in VG-7 (254 milligrams per liter [mg/L]) exceeded the applicable New Mexico Water Quality Control Commission (NMWQCC) groundwater quality standard for chloride of 250 mg/L. No additional exceedances of NMWQCC standards were found.

5.2 November 2018 Sampling Event

During the November 2018 monitoring event, the monitoring wells, VG-2, VG-3, VG-5, VG-6, and VG-7, were sampled. No exceedances of the applicable NMWQCC standards were found.

6.0 WORK PLAN

Groundwater monitoring and sampling of the monitoring wells will be continued on a semi-annual basis, with annual reporting to the NMOCD. Tetra Tech will continue to monitor the oxygen release compound (ORC) sock in VG-4 and replace as needed. Furthermore, MDPE events are planned for this well in 2019.

If you have any questions please call me at (432) 258-3451.

Sincerely,
Tetra Tech, Inc.

Julie Evans
Project Manager

Reviewed By:

Greg W. Pope, P.G.
Program Manager

cc: Ms. Jenni Fortunato – ConocoPhillips

Attachments:

- Figure 1 – Overview Map
- Figure 2 – Topographic Map
- Figure 3 – Site Plan Map
- Figure 4 – Groundwater Gradient Map – July 2018
- Figure 5 – Groundwater Gradient Map – November 2018
- Table 1 – Summary of Groundwater Elevations and PSH Thickness
- Table 2 – Summary of Groundwater Analytical Data
- Appendix A – Laboratory Analytical Data Packages

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FIGURES

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TABLES

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APPENDIX A