ENVIRONMENTAL WORKS

Science. Safety. Grit. Ingenuity.

July 12, 2022

Dave Brazeal
Dale Hunt
Taproot Energy Partners
518 17th Street, Suite 1800
Denver, Colorado 80202

Submitted via e-mail to dbrazeal@taprootep.com

RE: Confirmation Soil Sampling Following Produce Water Release – Boomslang Pad Spill/Release ID Point 480564 near Briggsdale, Colorado

Dear Mr. Brazeal and Mr. Hunt,

Environmental Works, Inc. (EWI) is pleased to submit this letter report summarizing the additional investigation activities completed in conjunction with the initial release response on August 18, 2021, and follow-up confirmation sampling completed on September 23, 2021 and on April 27, 2022 at Taproot's Boomlsang Release Spill/Release Point ID 480564 near Briggsdale, Colorado (the Site). The purpose of this report is to aid with the submission of the Final Form 27 to the Colorado Oil and Gas Conservation Commission (COGCC) and to satisfy the requirements to achieve Site closure in accordance with COGCC Guidance Rule 913.

Summary of Work Completed

During the initial release response, EWI collected excavation floor and sidewall samples from the main excavation in accordance with Rule 915. EWI re-mobilized to the Site on September 23, 2021 after discussions with the COGCC and surveying of the aerial extent. Additional sidewall and excavation floor samples were collected from the retention pond, as well as shallow excavation samples from surface soil minimally impacted by the release. Surveying of Site features and sampling locations was completed by Avery Technical Resources. GPS coordinates, sample names, and sample depths are recorded in Appendix A in accordance with COGCC Guidance Rule 915. Sample locations, the produced water line, excavation extents, and select site features for reference are depicted on Figures 1A and 1B.

Based on evaluation of Site survey data, the following samples were recommended in accordance COGCC Guidance Table 915-1:

- Five (5) sidewall samples (SW1 through SW5) for the primary excavation where the release occurred.
- Eight (8) sidewall samples (SW6 through SW13) for the excavation of the retention pond where produced water collected.

- One (1) floor sample (FS1) for the primary excavation where the release occurred of less than 500 square feet (sq. ft.). The floor sample was collected from the bottom of the excavation (approximately 11' below ground surface [bgs]) from the area where the highest impacts to soil would be expected, in accordance with COGCC Guidance Rule 915.
- One (1) additional floor sample (FS2) was collected from the floor of the retention pond (~480 sq. ft. floor area)

Following discussions with COGCC inspectors, a total of seven (7) soil samples were collected initially from the area of shallow excavation over an area of approximately 5,000 sq. ft. Surface samples (SS1 through SS7) were collected from approximately 0.5-1 feet bgs with a hand auger. Following initial surface sample results, additional shallow soil samples (SS8, SS9, and SS10) were collected on April 27, 2022 after further excavation was completed in the area north of the retention pond.

One additional sample (BS1) was collected from outside the impacted area and analyzed for metals and soil suitability for reclamation parameters to compare background conditions with confirmation sample results.

Soil borings for sidewall samples were advanced with a hand auger while the excavations remained open following the initial release. Continuous soil screening for the presence of volatile organic compounds (VOCs) was also conducted on sidewall sample borings using a photoionization detector (PID) to aid in understanding Site conditions. No elevated PID readings were observed in any soil at the Site. Following sampling, soil borings were abandoned with clean soil cuttings and the hand auger was decontaminated between borings.

Samples were immediately placed on ice and shipped to a COGCC approved lab (Pace Analytical). All samples collected for the initial release response and on September 27 were analyzed for the full list of Table 915-1 analytes. Table 1 presents the full analytical results and compares them with the Residential Soil Screening Level Concentrations (RSSLs) and the Protection of Groundwater Soil Screening Level Concentrations listed in Table 915-1. According to COGCC Rule 915 RSSLs will be used unless otherwise required by the COGCC. Full Analytical Results are attached as Appendix B. Groundwater is located at an estimated 43 feet below ground surface based on topography and nearby well data. Well data backup was attached on the Final Form 19 Supplemental.

A photographic log is attached as Appendix C to aid with the determination that appropriate action was taken to remove impacted material with the goal of achieving Site closure.

Results and Conclusions

Initial emergency response activities including excavation, hydroexcavation, and hand digging around facility infrastructure were nearly sufficient to spatially and vertically delineate all exceedances of Table 915-1 in soil, including reclamation parameters within the root zone at the Site. Subsequent excavations of the retention pond and area where the retention pond overflowed slightly achieved analytical results below Table 915-1 levels.

Exceedances of the RSSLs were only observed for arsenic, pH, and sodium absorption ration (SAR). pH was detected at a concentration slightly above the soil suitability for reclamation standard of 8.3 standard units (s.u.) in 14 soil samples, including background sample BS1 at 8.58 s.u. The highest pH observed was in sidewall sample SW11, collected from the retention pond. In discussions with the COGCC, the elevated pH in retention pond samples should not be attributed to the release, but rather to

the evaporitic nature of a retention pond. The retention pond remains a part of facility infrastructure and does not require reclamation at this time.

SAR exceeded the suitability for reclamation standard of 6 in SS1 (17.9) and SW1 (6.92). Floor samples did not exceed the standard for SAR. An additional excavation was completed to address elevated SAR in sample SS1. Confirmation samples SS8, SS9, and SS10 demonstrate all impacted soil has been removed within the root zone at this Site.

No soil samples exceeded the suitability for reclamation standard for conductivity of 4 mmhos/cm.

Arsenic was detected at concentrations above the RSSL in all soil samples that were analyzed, including the background sample, BS1 (3.24 milligrams per kilogram [mg/kg]). Concentrations of arsenic can vary significantly within a vertical section of soil due to natural variations within soil types. Although arsenic was higher in some sidewall and surface samples than the background, that could be a function of depth and/or soil type. Arsenic concentrations in floor samples FS1 and FS2 were lower than background concentrations observed in BS1. The concentrations observed at the Site are similar to elevated arsenic levels found in soils across the state and should not be a barrier to Site closure.

No semi-volatile or volatile compounds were detected above RSSLs. Limited total petroleum hydrocarbon (TPH) compounds were detected above the laboratory reporting limit, but well below the Cleanup Standards.

Soil samples at the Site exhibited few exceedances of the RSSLs and Protection of Groundwater Screening Level Concentrations, and many of the exceedances were also observed in the background sample. Additionally, no detections of VOCs were present from PID screening of the soil at the time of sample collection. With the data collected from initial and confirmation soil sampling, EWI believes horizontal and vertical delineation has been adequately completed, and no additional Site investigation is needed. A final Form 27 shall be submitted to the COGCC requesting no further action. If the closure request is approved by the COGCC, Taproot should restore site conditions to the Commission's 1000 series rules, as applicable for a currently operating facility.

We appreciate the opportunity to provide this letter report to Taproot Energy Partners. Please contact me at 507-475-2825 or akubat@environmentalworks.com if you have questions or we can be of further service.

Sincerely,

Adam Kubat
Project Geologist
Environmental Works, Inc.