



**K22 596 Flowline Release  
Initial Form 27  
Site Investigation and Remediation Workplan  
Spill/Release Point ID 457575**

**Initial Action Summary**

Please refer to Form 19 Documents 401767076 and 401776215 for work completed prior to September 21<sup>st</sup>, 2018. Laboratory analytical results associated with this work are attached and summarized in Table 1.

Upon receiving the September 21<sup>st</sup>, 2018 analytical results, which indicated impacts were still present, Caerus environmental staff determined delineation and remediation was no longer viable via hydrovac and/or mechanical excavation. A high concentration of existing flowlines, gas lift, and chemical lines running throughout the west end of the pad made delineation and removal of soil nearly impossible from a safety and logistical perspective. Therefore, native material from Caerus owned surface was brought in to backfill the excavation to the existing grade of the working pad surface so an in-situ approach could be utilized. While backfilling the excavation, a stick of 8" poly-vinyl chloride (PVC) pipe was placed in between flowlines at the point of release. The PVC was left exposed above ground, so a drill rig could advance a soil boring through the PVC to ensure a flowline would not be impacted. Besides the lone identified soil boring location at the point of release (POR), additional soil boring locations were not identified due to existing infrastructure, topography, and logistical complications. Please reference the attached location diagram (Figure 2) depicting existing infrastructure on the west end of location.

**Soil Boring Summary**

On November 8<sup>th</sup>, 2018, Caerus advanced one soil boring (SB POR) through the above-mentioned exposed PVC pipe to further delineate the extent of impact directly below the POR. The soil boring was logged by a geologist who inspected the soil for the presence or absence of petroleum hydrocarbon odor and/or staining. The soil was characterized by visual inspection of samples and field screened using a photo-ionization detector (PID) to monitor for the presence of volatile organic hydrocarbon vapors. Based on an absence of the above mentioned field screening data suggesting impacts migrated to groundwater, it was determined unnecessary to advance the boring to groundwater. Therefore, two samples (SB POR 19-20', SB POR 34-35') were collected from the boring and submitted for laboratory analysis of TPH, BTEX, benzo(a)pyrene, and naphthalene. Laboratory analytical results determined no exceedances of Table 910-1 Concentration Levels were present except for TPH at 19-20' suggesting the most concentrated impacts were removed during the hydrovac activities. Laboratory analytical results, summary table, and a sample location diagram are included as an attachment to this Initial Form 27.

Following the completion of SB POR, the boring was converted to a monitoring well (SVE01) using slotted screen PVC and solid stem PVC. Please reference the attached soil boring logs to view construction details for the monitoring well.

**Pilot Test Summary**

On December 4<sup>th</sup>, 2018, Caerus conducted a pilot test of SVE01 to determine the effectiveness of soil vapor extraction (SVE) as a remediation strategy. During the pilot test, six different rates of airflow were tested to determine the most effective equipment settings for site conditions. Based on results of the pilot test, SVE was found to be a viable option for in-situ remediation of hydrocarbons impacts at the site. Please refer to the attached pilot test results summary table (Table 2) for more details.

**Remedial Action Plan**

Caerus is in the process of assessing power sources and sizing equipment required to provide SVE to remediate the K22 596 flowline release. Once results of the sizing and power assessment are completed, Caerus will provide the information to the COGCC via eForm 27.