Soil Vapor Extraction (SVE) Quarterly Progress Report

South Canyon B12

Q3 & Q4

2020

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I. Background

HRL Compliance Solutions Inc. (HRL) has prepared this report to document the operation and maintenance (O&M) activities conducted for soil vapor extraction (SVE) treatment under the direction of Utah Gas Corp. (UGC) at the South Canyon B12 well pad. HRL was contracted by UGC in August 2020 to conduct system startup activities, perform monthly O&M events and provide Quarterly reports.

Previous subsurface site investigation activities conducted by UGC at the site have detected soil impacts by several petroleum-related constituents that exceed the Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 constituents at multiple points, consequently, requiring remediation. Remediation efforts have included excavation, surface landfarming and ongoing passive SVE since 2016. The solar powered passive SVE system operated from January 2018 through April 2018, when it was moved to another location. Details of the initial system startup and pilot test show favorable results, with a determined Radius of Influence (ROI) of approximately 21 feet.

Analytical data indicates that hydrocarbon contamination exceeds COGCC Table 910-1 standards from 5 to 40 feet below ground surface (bgs). Historical well logs show that subsurface lithology consists of silty clays from 0 to 37 feet bgs, interbedded clay and pebbles from 37 to 45 feet bgs, sandy clays from 45 to 60 feet bgs and sandstone from 60 to 72 feet bgs. There are currently five (5) remediation wells present at the site SVEN01, SVEN02, SVES01, SVES02 and SVEW01 that are installed to depths ranging from 42 to 75 feet bgs. The attached Site Diagram illustrates the locations of each SVE well.

II. System Operation & Maintenance for the Period

The SVE system contained within an enclosed trailer currently operates a 1.5hp regenerative blower, KO tank, timer and effluent exhaust port. Power is supplied by 12 solar panels during daytime hours, when sunlight is visible and to avoid draining the battery supply, preventing nighttime operations.

UGC with the assistance of Telesto mobilized the SVE unit to the site B-12 on August 18, 2020 and connected the airlines to the SVE wells. HRL performed startup operations on August 19, 2020, commencing operation of the SVE treatment system. During the following month O&M reading conducted on September 23, 2020, it was noticed that equipment was not operating at the maximum efficiency and discovered that the SVE unit was not properly plumbed by pipping bypassing the KO tank. The system was rerouted and replumbed to the existing system to maximize air flow and efficiently. Immediately upon replumbing, instrument gauges begun working and properly reading airflow.

Since the system startup, HRL has performed monthly O&M reading until November 4, 2020. From August 19, 2020 through November 7, 2020, the system operated 4-5 hours per day, totaling approximately 398 hours. During that period the system operated on wells SVES01 and SVES02, at which time, the following measurements and readings were recorded.

- Radius of Influence (ROI) from nearby wells
- Vacuum at the vacuum extractions wellhead
- Flow rates
- Effluent VOC measurements
- Time

On Saturday, November 7, 2020, excessive winds from a winter storm disconnected and destroyed 10 out of 12 solar panels, forcing an early shutdown for the 2020 year. The system was disconnected November 11, 2020

and transported to a storage yard nearby. Ventilator turbines were secured to the top of each SVE well to continue remedial efforts through the winter months.

II. Data Evaluation

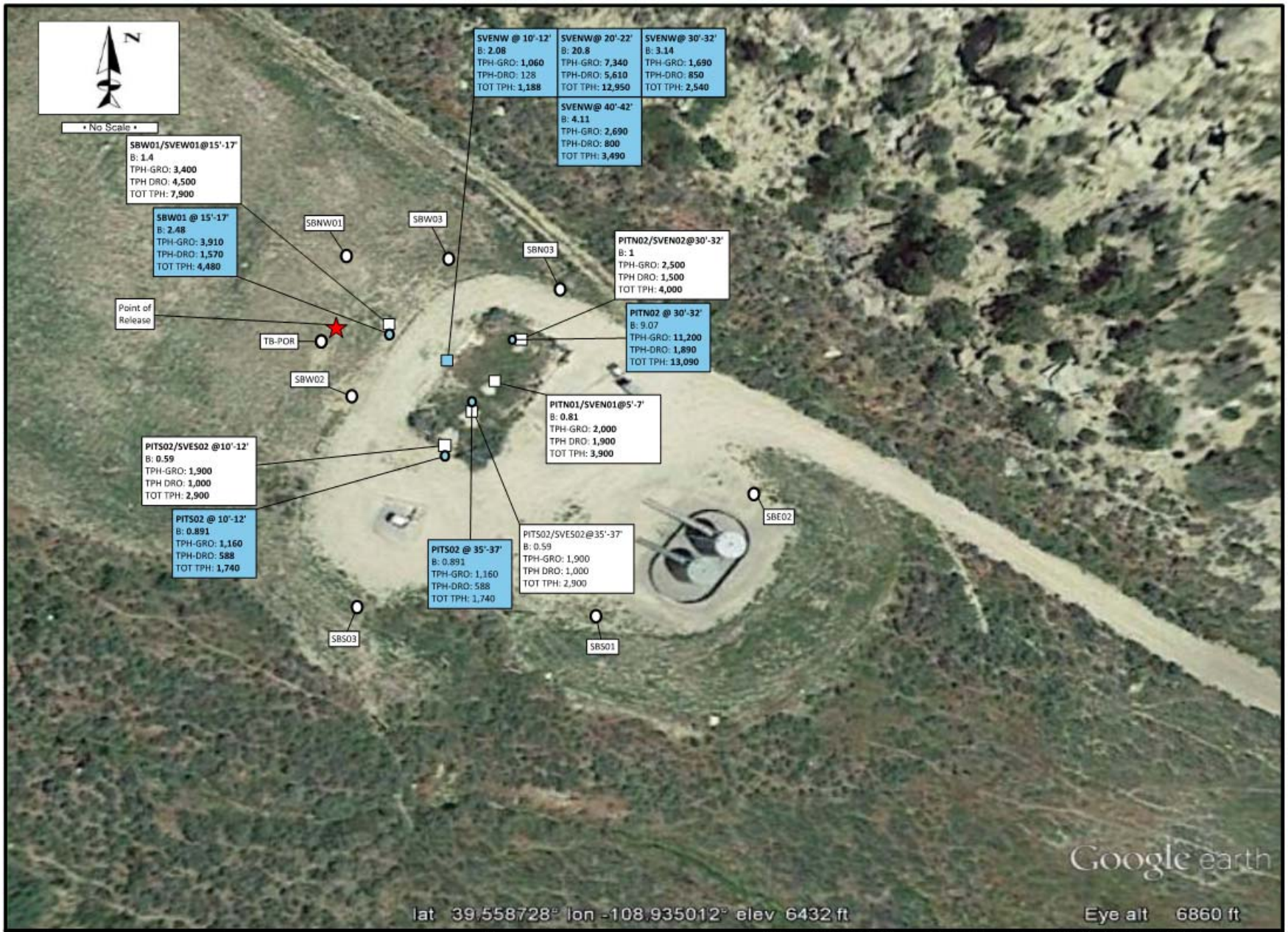
During this reporting period the system operated for approximately 398 hours or 80 days for 4-5 hours a day. In that time the system removed 797 lbs of Volatile Organic Compounds (VOCs), with a daily VOC effluent average of 1,623ppm. HRL utilized a Photo-Ionization Detector (PID) to record VOCs emissions, measured system air flow rates and recorded the effluent temperature to calculate the mass removal for the system during the reporting period. Calculations are summarized in Table 1.

During each event, the ROI was monitored in nearby wells. Optimal ROI readings were recorded within 20 feet or less with an average measurement of 1.2 in/H_2O. ROI readings greater than 20 feet were recorded at less than 1.0 in/H_2O but were observed at the furthest distance of 35 feet from the extraction well.

IV. Conclusion

The results of the 3rd and 4th Quarter remedial efforts at the South Canyon B12 location indicate that *in situ* via SVE treatment is an appropriate form of remediation due to the underlying geology and lithology, as well as the most effective due to the depth of impacts. Additionally, positive results found through effluent and ROI readings show that airflow through the formation is occurring. Passive remediation via ventilator turbines will continue remedial efforts through the winter months and SVE equipment will be re-evaluated in the Spring of 2021.

Figure 1



○ - 2015 Boring ◯ - 2018 Sample

□ - 2015 SVE Well ▭ - 2018 Sample/SVE Well

UTAH GAS CORP

Pad: B12 6104 Young Cattle (Location# 322420) (Pit#111214)

Area: South Canyon (Baxter Pass – Garfield County)

NWNE, Sec. 12, T6S, R104W, 6th PM

Table 1

Client: Utah Gas Corporation
Location: S.C B-12
Facility ID: 111214
REM# 9341

SVE System Performance

SVE Unit Performance								Mass Removal					
Date	Operation Time During Period	Induced Vacuum at unit (in H_2O)	Effluent Temperature (F)	System Airflow (scfm)	VOCs (PID ppm)	Benzene (mg/L)	TVPH (mg/L)	VOC Emissions for Period (lbs)	VOC Emissions for Period TVPH (lbs)	Benzene Emissions for Period (lbs)	Total VOC Emissions for Period PID (lbs)	Total VOC Emissions TVPH (lbs)	Total Benzene Emissions (lbs)
8/19/2020	0	35	99	95	985			0.00	0.00	0.00	0.00	0.00	0.00
9/18/2020	144	35	104	90	950			139.29	0.00	0.00	139.29	0.00	0.00
9/23/2020	25	55	59.5	100	1980			61.22	0.00	0.00	61.22	0.00	0.00
10/23/2020	150	55	60	100	2100			389.21	0.00	0.00	389.21	0.00	0.00
11/7/2020	80	55	60	100	2100			207.58	0.00	0.00	207.58	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
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								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
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								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
								0.00	0.00	0.00	0.00	0.00	0.00
Total								797.30	0.00	0.00	797.30	0.00	0.00

Total emission mass removal (lbs)=	797.30
Total hydrocarbons removed (gal)=	95.54000034