

1Q 2020

SVE

Report



LT Environmental, Inc.

*848 East Second Avenue
Durango, Colorado 81301
970.385.1096*

April 30, 2020

Mr. Cory Smith
New Mexico Oil Conservation Division
1000 Rio Brazos Road
Aztec, NM 87410

**RE: Quarter 1 2020 - Solar SVE System Update
Hilcorp Energy Company
Bell Federal GC B #1
San Juan County, New Mexico
API # 30-045-09772
Incident # NCS1729355513**

Dear Mr. Smith:

LT Environmental, Inc. (LTE), on behalf of Hilcorp Energy Company (Hilcorp), presents the following quarterly summary report discussing the solar soil vapor extraction (SVE) system performance at the Bell Federal GC B #1 natural gas production well (Site).

The solar SVE system was installed on January 16, 2018, to remediate subsurface soil impacts following an act of vandalism, resulting in the release of approximately 58 barrels (bbl) of condensate. SVE installation, soil sampling, and delineation activities are summarized in earlier reports submitted to the New Mexico Oil Conservation Division (NMOCD) on February 28, 2018, May 3, 2018, April 12, 2019, July 29, 2019, and January 29, 2020.

The solar SVE system consists of a 1/3 horsepower blower capable of producing 22 cubic feet per minute (cfm) at 29 inches of water column vacuum. The blower is powered by four 12-volt deep cycle batteries that are charged throughout the day via three solar panels with a nominal maximum power output of 915 watts. The blower runs off a timer that is scheduled to maximize runtime that coincides with the seasonally available solar recharge, typically 10 hours in the winter and 12 hours in the summer for Farmington, New Mexico. Between startup, January 16, 2018, and the last site visit on March 10, 2020, there have been 784 days of operation, with an estimated 8,154 total hours of available nominal daylight in which the solar SVE system should be in operation. Of the available runtime of 9,233 hours since installation, the system has an actual runtime of 8,939 hours, for an overall 96.8 percent (%) runtime efficiency. Below is a table of SVE runtime in comparison with nominal available daylight hours, per month, according to the National Oceanic and Atmospheric Administration's National Weather Service.

Time Period	January 16, 2018 to December 16, 2019	December 17, 2019 to December 31, 2019	January 2020	February 2020	March 1, 2020 to March 10, 2020
Days	699	15	31	29	10
Avg. Nominal Daylight Hrs	12	9	10	10	11
Available Runtime Hrs.	8,388	135	310	290	110
Total Available Daylight Runtime Hours					9,233
Actual Runtime Hours					8,939
% Runtime					96.8%

An initial air sample was collected on January 24, 2018, from the solar SVE system discharge exhaust stack. Subsequent air samples have been collected quarterly (Table 1) with the last sample collected on March 10, 2020. No air sample was collected during the second quarter of 2018, due to a change in operator from XTO Energy to Hilcorp, and no air sample was collected during the fourth quarter 2018 due to additional delineation in January 2019.

Samples were collected in Tedlar® bags and submitted to Hall Environmental Analysis Laboratory of Albuquerque, New Mexico for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (EPA) Method 8021, and total volatile petroleum hydrocarbons (TVPH) via EPA Method 8015. Laboratory analytical results are summarized in Table 1, with complete laboratory reports included as Attachment 1. Overall benzene concentrations have decreased since the solar SVE system installation from 280 micrograms per liter (µg/L) to 120 µg/L.

Since the solar SVE system installation, a total of approximately 56.1 gallons of liquid phase separated hydrocarbons (PSH) have been recovered from the SVE wells and liquid-vapor separator tank. Based on the air sample data collected to date, the estimated mass air emissions were calculated using air sample analytical results and exhaust flowrates (Table 2). The impacted mass source removal via the solar SVE system to date is an estimated 8,327 pounds of TVPH. Including the PSH and vapor phase hydrocarbons, an estimated total of 1,399 gallons or 33.3 bbl of PSH and air equivalent condensate has been recovered to date.

During the upcoming 2nd quarter 2020 of operations, Site visits will resume on a bi-weekly basis by Hilcorp and LTE personnel to ensure 90% runtime efficiency continues and that any maintenance issues are addressed. The average nominal daylight hours will increase through the 2nd quarter, so the blower operation hours will be adjusted accordingly. An air sample will be collected in the 2nd quarter and analyzed for BTEX by EPA Method 8021 and TVPH by EPA Method 8015. In addition, the annual sampling event will be conducted in the 2nd quarter and will include analysis for the full list of volatile organic compounds (VOCs) by EPA Method 8260 and oxygen/carbon dioxide by American Society for Testing and Materials (ASTM) Method D1946. An updated quarterly report with sample results, runtime, and mass source removal will be submitted under separate cover.

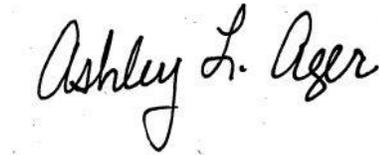
LTE appreciates the opportunity to provide this report to the NMOCD. If you have any questions or comments regarding this work plan, do not hesitate to contact me at (970) 385-1096 or via email at dburns@ltenv.com or Jennifer Deal at (505) 324-5128 or at jdeal@hilcorp.com.

Sincerely,

LT ENVIRONMENTAL, INC.



Danny Burns
Project Geologist



Ashley Ager, M.S., P.G.
Senior Geologist

cc: Jennifer Deal, Hilcorp Energy Company

Attachments:

Table 1 – Air Sample Analytical Results

Table 2 – Soil Vapor Extraction System Recovery & Emissions Summary

Attachment 1 – Analytical Laboratory Reports

**TABLE 1
AIR SAMPLE ANALYTICAL RESULTS**

**BELL FEDERAL GC B#1
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY**

Sample ID	Sample Date	Vapor (ppm)	Benzene (µg/L)	Toluene (µ/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)
Bell Fed GC B#1 SVE	1/24/2018	1,435	280	200	5.0	38	30,000
Stack Exhaust 01	8/17/2018	1,873	160	380	21	320	18,000
SVE Effluent	3/22/2019	1,607	490	920	24	480	NA
Influent 6/18	6/18/2019	1,026	72	270	27	290	NA
Bell Fed 9/25	9/25/2019	1,762	220	480	21	440	35,000
Influent 12/16	12/16/2019	1,902	130	840	21	220	22,000
Bell Fed 3/10/20	3/10/2020	1,171	120	380	19	330	31,000
	Percent change	-18%	-57%	90%	280%	768%	3%

NOTES:

µg/L - micrograms per liter

NA - not analyzed

ppm - parts per million

TVPH- total volatile petroleum hydrocarbons

Italics denote that the laboratory method detection limit was used for calculations for a non-detected result



**TABLE 2
SOIL VAPOR EXTRACTION SYSTEM RECOVERY & EMISSIONS SUMMARY**

**BELL FEDERAL GC B#1
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY**

Sample Information and Lab Analysis

Date	Total Flow (cf)	Delta Flow (cf)	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)
1/24/2018	164,400	164,400	1,435	280	200	5	38	30,000
8/17/2018	2,059,584	1,895,184	1,873	160	380	21	320	18,000
3/22/2019	6,554,304	4,494,720	1,607	490	920	24	480	NA
6/18/2019	12,009,024	5,454,720	1,026	72	270	27	290	NA
9/25/2019	17,848,704	5,839,680	1,762	220	480	21	440	35,000
12/16/2019	17,848,704	5,839,680	1,902	130	840	21	220	22,000
3/10/2020	28,575,504	10,726,800	1,171	120	380	19	330	31,000
Average			1,539	210	496	20	303	27,200

Vapor Extraction Calculations

Date	Flow Rate (cfm)	Benzene (lb/hr)	Toluene (lb/hr)	Ethylbenzene (lb/hr)	Total Xylenes (lb/hr)	TVPH (lb/hr)	
1/24/2018	40	0.0419	0.0299	0.0007	0.0057	4.4921	
8/17/2018	12	0.0072	0.0171	0.0009	0.0144	0.8086	
3/22/2019	16	0.0293	0.0551	0.0014	0.0287	NA	
6/18/2019	16	0.0043	0.0162	0.0016	0.0174	NA	
9/25/2019	14	0.0115	0.0252	0.0011	0.0231	1.8343	
12/16/2019	16	0.0078	0.0503	0.0013	0.0132	1.3177	
3/10/2020	20	0.0090	0.0284	0.0014	0.0247	2.3209	
Average		19	0.0159	0.0317	0.0012	0.0182	2.1547

Pounds Extracted Over Total Operating Time

Date	Total Operational Hours	Delta Hours	Benzene (lbs)	Toluene (lbs)	Ethylbenzene (lbs)	Total Xylenes (lbs)	TVPH (lbs)	TVPH (tons)
1/24/2018	68.5	69	2.9	2.1	0.1	0.4	308	0.2
8/17/2018	2,632	2,564	18.4	43.8	2.4	36.9	2,073	1.0
3/22/2019	4,682	2,050	60.2	112.9	2.9	58.9	NA	NA
6/26/2019	5,682	1,000	4.3	16.2	1.6	17.4	NA	NA
9/25/2019	6,952	1,270	14.6	31.9	1.4	29.3	2,330	1.2
12/16/2019	7,943	991	7.7	49.9	1.2	13.1	1,306	0.7
3/10/2020	8,939	996	8.9	28.3	1.4	24.6	2,312	1.2
Avg. Mass Extracted Per Period			16.7	40.7	1.6	25.8	1,666	0.8
Total Mass Extracted to Date			117.1	285.1	11.1	180.5	8,328	4.2

NOTES

cf - cubic feet

cfm - cubic feet per minute

lbs - pounds

lb/hr - pounds per hour

µg/L - microgram per liter

NA - not analyzed

PID - photoionization detector

ppm - parts per million

TVPH - total volatile petroleum hydrocarbons

Italics denote that the laboratory method detection limit was used for calculations for a non-detected result







Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 24, 2020

Clara Cardoza
HILCORP ENERGY
PO Box 4700
Farmington, NM 87499
TEL: (505) 564-0733
FAX

RE: Bell Federal

OrderNo.: 2003511

Dear Clara Cardoza:

Hall Environmental Analysis Laboratory received 1 sample(s) on 3/11/2020 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

A handwritten signature in black ink, appearing to read 'Andy Freeman', is written over a light blue horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 2003511

Date Reported: 3/24/2020

CLIENT: HILCORP ENERGY

Client Sample ID: Bell Fed 3/10/20

Project: Bell Federal

Collection Date: 3/10/2020 1:40:00 PM

Lab ID: 2003511-001

Matrix: AIR

Received Date: 3/11/2020 8:05:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015D: GASOLINE RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	31000	500		µg/L	100	3/20/2020 9:36:56 AM
Surr: BFB	167	53-256		%Rec	100	3/20/2020 9:36:56 AM
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	120	10		µg/L	100	3/20/2020 9:36:56 AM
Toluene	380	10		µg/L	100	3/20/2020 9:36:56 AM
Ethylbenzene	19	10		µg/L	100	3/20/2020 9:36:56 AM
Xylenes, Total	330	20		µg/L	100	3/20/2020 9:36:56 AM
Surr: 4-Bromofluorobenzene	105	81.6-133		%Rec	100	3/20/2020 9:36:56 AM

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	* Value exceeds Maximum Contaminant Level.	B Analyte detected in the associated Method Blank
	D Sample Diluted Due to Matrix	E Value above quantitation range
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	ND Not Detected at the Reporting Limit	P Sample pH Not In Range
	PQL Practical Quantitative Limit	RL Reporting Limit
	S % Recovery outside of range due to dilution or matrix	

Sample Log-In Check List

Client Name: **HILCORP ENERGY FAR**

Work Order Number: **2003511**

RcptNo: 1

Received By: **Erin Melendrez** 3/11/2020 8:05:00 AM

Completed By: **Yazmine Garduno** 3/11/2020 3:28:58 PM

Reviewed By: **JR 3/12/20**

EM
Y. Garduno

Chain of Custody

1. Is Chain of Custody sufficiently complete? Yes No Not Present
2. How was the sample delivered? Courier

Log In

3. Was an attempt made to cool the samples? Yes No NA
4. Were all samples received at a temperature of >0° C to 6.0°C Yes No NA
5. Sample(s) in proper container(s)? Yes No **Not required**
6. Sufficient sample volume for indicated test(s)? Yes No
7. Are samples (except VOA and ONG) properly preserved? Yes No
8. Was preservative added to bottles? Yes No NA
9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes No NA
10. Were any sample containers received broken? Yes No
11. Does paperwork match bottle labels? Yes No
 (Note discrepancies on chain of custody)
12. Are matrices correctly identified on Chain of Custody? Yes No
13. Is it clear what analyses were requested? Yes No
14. Were all holding times able to be met? Yes No
 (If no, notify customer for authorization.)

of preserved bottles checked for pH: _____
 (<2 or >12 unless noted)
 Adjusted? _____
 Checked by: **DAD 3/12/20**

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes No NA

Person Notified: _____ Date _____
 By Whom: _____ Via: eMail Phone Fax In Person
 Regarding: _____
 Client Instructions: _____

16. Additional remarks:

Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	NA					

