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

Reviewed by CS 6/8/2020

RE: Quarter 1 2020 - Quarterly SVE System Update
Hilcorp Energy Company
OH Randel #5
San Juan County, New Mexico
API # 30-045-05964
Incident # NVF1602039091

Dear Mr. Smith:

LT Environmental, Inc. (LTE), on behalf of Hilcorp Energy Company (Hilcorp), presents the following quarterly summary report discussing the soil vapor extraction (SVE) system performance at the OH Randel #5 natural gas production well (Site). This report is being submitted as part of the proposed timeline of remediation events in the *Pilot Test Results* submitted to the New Mexico Oil Conservation Division (NMOCD) on August 6, 2019.

An SVE system was originally installed by XTO Energy in 2016. Based on prior delineation events and the pilot test, an additional five SVE wells were installed on August 23, 2019 by Hilcorp. SVE well configuration and screen intervals are presented in Figure 1. The SVE system consists of a two horsepower Atlantic AB-301 regenerative blower capable of producing 110 cubic feet per minute (cfm) at 72 inches of water column vacuum. The blower is connected to an adjustable manifold that allows control over which SVE wells are currently active. The active SVE wells are rotated during bi-weekly site visits to maximize vacuum and SVE system coverage of the impacted plume. The SVE system was shut down and unable to restart during a site visit July 8, 2019. A new blower was installed on October 3, 2019, to replace the damaged blower.

Between re-startup, October 3, 2019, and the last site visit on March 10, 2020, there have been 158 days of operation, with 3,261 hours of operation, resulting in the system operating for 86 percent of available run-time. An air sample was collected during the pilot test on June 28, 2019 from the SVE system inlet after the confluence of all SVE wells. Subsequent air samples have been collected quarterly with the last sample collected on March 10, 2020. 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 and complete laboratory reports are included as Attachment 1.

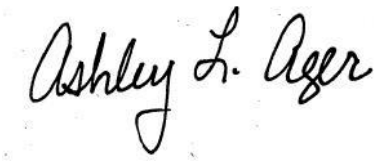
The air sample data collected to date and measured stack flow rate were utilized to calculate total emissions (Table 2). The impacted mass source removal via the SVE system to date is an estimated 493,696 pounds of TVPH.

During the upcoming 2nd quarter of operations, Site visits will resume on a bi-weekly basis by Hilcorp and LTE personnel to continue rotating the active SVE wells, maximize runtime efficiency and conduct any required system maintenance. 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 Clara Cardoza at (505) 793-2784 or at ccardoza@hilcorp.com.

Sincerely,

LT ENVIRONMENTAL, INC.



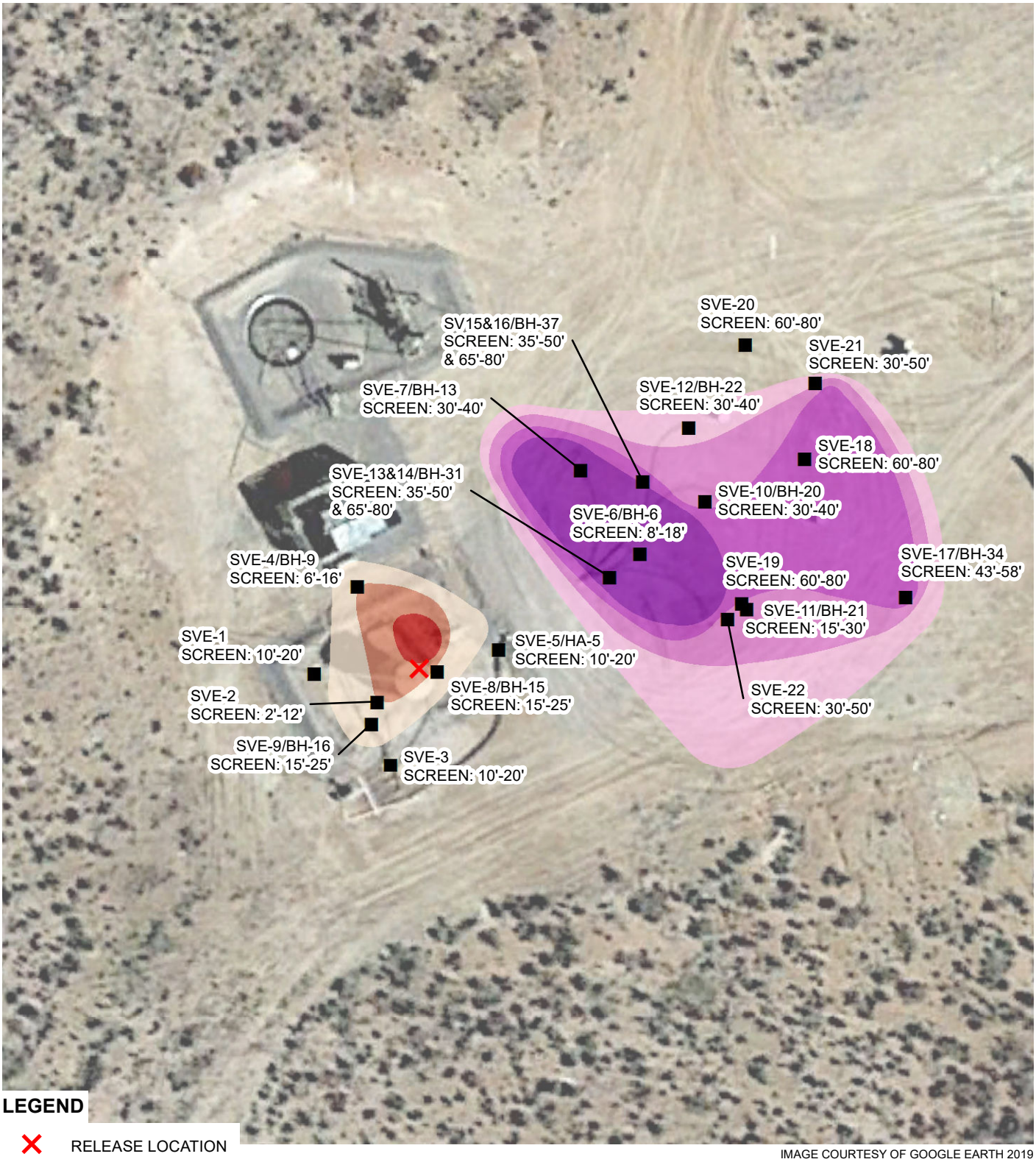
Danny Burns
Project Geologist

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

cc: Clara Cardoza, Hilcorp Energy Company

Attachments:

Figure 1 – Site Location Map
Table 1 – Air Sample Results Summary
Table 2 – Soil Vapor Extraction System Recovery & Emissions Summary
Attachment 1 – Analytical Laboratory Reports



LEGEND

RELEASE LOCATION

SOIL VAPOR EXTRACTION (SVE) WELL

INFERRED BTEX ISOCONCENTRATION (PARTS PER MILLION)

- 50.00 - 200.00
- 50.00 - 100.00
- 200.01 - 400.00
- 100.01 - 200.00
- 400.01 - 600.00
- 200.01 - 300.00
- > 600.00

IMAGE COURTESY OF GOOGLE EARTH 2019

0 30 60

Feet

N

FIGURE 1
SVE SYSTEM LAYOUT
OH RANDEL #5
NWNW SEC 10 T26N R11W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

P:\Hilcorp\GIS\MXD\017818016_OH RANDEL #5\017818016_OH RANDEL #5_FIG01_SVE_LAYOUT_2020.mxd

TABLE 1
AIR SAMPLE RESULTS SUMMARY

OH RANDEL #5
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	TVPH (µg/L)	PID (ppm)
08/11/16	160	1,700	61	500	46,000	4,072
08/17/18	130	230	10	110	8,900	719
06/28/19	7,200	15,000	360	3,000	460,000	1,257
12/16/19	1,800	4,400	83	660	170,000	1,685
03/10/20	1,700	3,300	89	700	130,000	897

Notes:
µg/L - micrograms per Liter
PID - photoionization detector
ppm - parts per million
TVPH - total volatile petroleum hydrocarbons

TABLE 2
SOIL VAPOR EXTRACTION SYSTEM RECOVERY & EMISSIONS SUMMARY

OH RANDEL #5
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Sample Information and Lab Analysis

Date	Total Flow (cf)	Delta Flow (cf)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	TVPH (µg/L)	PID (ppm)
08/11/16	31,185	31,185	160	1,700	61	500	46,000	4,072
08/17/18	59,647,485	59,616,300	130	230	10	110	8,900	719
12/16/19	59,647,485	59,616,300	1,800	4,400	83	660	170,000	1,902
03/10/20	71,718,885	12,071,400	1,700	3,300	89	700	130,000	897
		Average	948	2,408	61	493	88,725	1,898

Vapor Extraction Calculations

Date	Flow Rate (cfm)	Benzene (lb/hr)	Toluene (lb/hr)	Ethylbenzene (lb/hr)	Xylenes (lb/hr)	TVPH (lb/hr)
08/11/16	105	0.1	0.7	0.02	0.2	18.1
08/17/18	100	0.1	0.4	0.01	0.1	10.3
12/16/19	110	0.4	1.0	0.02	0.2	36.8
03/10/20	110	0.7	1.6	0.04	0.3	61.7
Average	106	0.3	0.9	0.02	0.2	31.7

Pounds Extracted Over Operating Time

Date	Total Operational Hours	Delta Hours	Benzene (lbs)	Toluene (lbs)	Ethylbenzene (lbs)	Xylenes (lbs)	TVPH (lbs)	TVPH (tons)
08/11/16	Startup							
08/11/16	5.0	5.0	0.3	3.3	0.1	1.0	89.4	0.0
08/17/18	9,941	9,936	539	3,586	132	1,133	102,009	51
12/16/19	17,515	7,574	3,007	7,214	145	1,200	278,728	139
3/10/20	19,344	1,829	1,317	2,897	65	512	112,870	56
		Total Extracted to Date	4,863	13,700	342	2,846	493,696	247

NOTES:

cf - cubic feet
cfm - cubic feet per minute
µg/l - micrograms per liter
lb/hr - pounds per hour
System startup occurred on 8/11/16 at 10 AM with 0 hours on the blower engine.
Blower replaced on 10/3/2019 with 16,038 hours on the blower engine

lbs - pounds
PID - photo-ionization detector
ppm - part per million
TVPH - total volatile petroleum hydrocarbons

ATTACHMENT 1: ANALYTICAL LABORATORY REPORTS

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

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

RE: OH Randel 5 OrderNo.: 2003510

Dear Danny Burns:

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,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report
Lab Order **2003510**
Date Reported: **3/24/2020**

CLIENT: HILCORP ENERGY
Client Sample ID: Influent 3/10/20
Project: OH Randel 5
Collection Date: 3/10/2020 11:20:00 AM
Lab ID: 2003510-001 **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)	130000	500	E	µg/L	100	3/20/2020 10:00:41 AM
Surr: BFB	144	53-256		%Rec	100	3/20/2020 10:00:41 AM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Benzene	1700	10	E	µg/L	100	3/20/2020 10:00:41 AM
Toluene	3300	10	E	µg/L	100	3/20/2020 10:00:41 AM
Ethylbenzene	89	10		µg/L	100	3/20/2020 10:00:41 AM
Xylenes, Total	700	20		µg/L	100	3/20/2020 10:00:41 AM
Surr: 4-Bromofluorobenzene	102	81.6-133		%Rec	100	3/20/2020 10:00:41 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 Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2003510**

24-Mar-20

Client: HILCORP ENERGY

Project: OH Randel 5

Sample ID: **2003510-001ADUP** SampType: **DUP** TestCode: **EPA Method 8015D: Gasoline Range**

Client ID: **Influent 3/10/20** Batch ID: **G67472** RunNo: **67472**

Prep Date: Analysis Date: **3/20/2020** SeqNo: **2328269** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	120000	500						11.7	20	E
Surr: BFB	300000		200000		152	53	256	0	0	

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 Quanitative Limit	RL	Reporting Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **2003510**

24-Mar-20

Client: HILCORP ENERGY

Project: OH Randel 5

Sample ID: **2003510-001ADUP** SampType: **DUP** TestCode: **EPA Method 8021B: Volatiles**

Client ID: **Influent 3/10/20** Batch ID: **B67472** RunNo: **67472**

Prep Date: Analysis Date: **3/20/2020** SeqNo: **2328706** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1600	10						8.75	20	E
Toluene	2900	10						10.6	20	E
Ethylbenzene	76	10						14.8	20	
Xylenes, Total	590	20						16.0	20	
Surr: 4-Bromofluorobenzene	240		200.0		119	81.6	133	0	0	

Qualifiers:

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

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: **HILCORP ENERGY FAR** Work Order Number: **2003510** RcptNo: 1

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

Completed By: **Yazmine Garduno** **3/11/2020 3:22:02 PM**

Reviewed By: JR 3/12/20

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)? Not required Yes ☑ No ☐
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? (Note discrepancies on chain of custody) Yes ☑ No ☐
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? (If no, notify customer for authorization.) Yes ☑ No ☐

# 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:

17. **Cooler Information**

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

Chain-of-Custody Record

Client: Hilcorp

Clara Cardoza

Mailing Address:

Phone #:

email or Fax#: ccardoza@hilcorp.com

QA/QC Package:

☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other_____

☐ EDD (Type) _____

Turn-Around Time:

☒ Standard ☐ Rush_____

Project Name: OH Randel #5

Project #:

Project Manager: Danny Burns

Sampler: Eric Carroll

On Ice: ☐ Yes ☒ No

# of Coolers: 1

Cooler Temp(including CF): N/A

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 2003510	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)						
3/10	1120	Air	Influent 3/10/20	1 Tedlar		-001	X	X														X

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
3/10/20	1415	Eric Carroll	Christin Wade		3/10/20	1415
3/10/20	1810	Christin Wade		Courier	3/11/20	0805

Remarks:

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.