NV

TIMBERWOLF ENVIRONMENTAL

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Bryan, Texas 77807
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April 13, 2022

Mr. Cory Smith, Environmental Specialist
New Mexico Oil Conservation Division – District 3
1000 Rio Brazos Road
Aztec, New Mexico 87410

Re: Status Report – 1st Quarter 2022
San Juan 28-7 Unit 183M
Rio Arriba County, New Mexico
OCD Incident No. NCS1901627746

Dear Mr. Smith:

On behalf of Hilcorp Energy Company (Hilcorp), Timberwolf Environmental, LLC (Timberwolf) presents this report to document remedial activities conducted during the first quarter of 2022 (1Q22) at the San Juan 28-7 Unit 183M (Site).

Environmental Setting and Site Geology

The Site is situated on federal land managed by the Bureau of Land Management (BLM) in western Rio Arriba County, New Mexico (Figure 1). The area consists of sparse vegetative cover comprised primarily of scrub brush and native grasses. Area terrain is comprised of plateaus divided by canyons. The primary canyon in the area is Carrizo Canyon, which drains to the northwest into the San Juan River, approximately 19 miles from the Site (Figures 2 and 3).

The Site is situated along the rimrock of an unnamed side canyon to Carrizo Canyon. Average elevation at the Site is approximately 6,523 feet (ft) above mean sea level. The closest surface water is a first order tributary of Carrizo Creek, situated 1,500 ft southeast of the Site and 330 ft lower in elevation.

According to the U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS), the Site soil consists of the Vessilla-Menefee-Orlie complex, 2 to 30 percent slopes. The surface horizon is comprised of a sandy loam, underlain by bedrock encountered between 15 to 19 inches below ground surface (bgs). Native salinity of the soil is nonsaline to very slightly saline (0.0 to 2.0 millimhos per centimeter (mmhos/cm)).

Site History

Release Event

Corrosion near the base of the former oil tank resulted in the release of approximately 150 barrels (bbls) of oil and 7 bbls of produced water. All released fluid was contained by the berm. Standing fluid was recovered; the tank was removed from service and disposed off-site. The initial investigation identified the area of the former tank battery as the primary area of concern (AOC).

Hilcorp constructed a new tank battery northeast of the original tank battery. Tanks and interconnective piping were removed from the original tank battery.

Investigation and Site Characterization

A soil investigation, conducted during March 2019, revealed the constituents of concern (COC) were: total BTEX (i.e., benzene, toluene, ethylbenzene, and xylene) and total petroleum hydrocarbons (TPH). Impacted soil was horizontally and vertically delineated; the vertical extent of impacted soil was approximately 27 ft bgs. Additionally, the soil investigation revealed that subsurface soil is unconsolidated to a depth of 10 ft below ground surface (bgs) which is underlain by sandstone. Findings of the investigation are documented in Timberwolf's report entitled: *Site Characterization Report and Remedial Action Plan*, dated May 21, 2019.

Remediation – SVE System

To remediate hydrocarbon impacted soil, a soil vapor extraction (SVE) system was designed, constructed, and installed at the Site. System start-up date was 12/18/19. The SVE system is comprised of 11 SVE wells, four vent wells, and a SVE trailer. The SVE trailer is comprised of a regenerative blower (i.e., vacuum pump), hour meter, moisture separator and filter, sampling port, and a manifold with three independent legs. Additionally, the SVE trailer is equipped with a programmable automation panel to control valves for each manifold leg. A natural gas generator powers the trailer.

The SVE system creates a treatment field of approximately 0.15 acres and treats soil to a depth of approximately 30 ft bgs for a total volume of approximately 7,021 cubic yards of soil. The SVE wells, measured radius of influence of 25 ft, and leg configurations are shown in Figure 4.

The work conducted is documented in the following reports:

- *Site Characterization Plan,* dated 03/05/19
- *Site Characterization and Remedial Action Plan*, dated 05/21/19
- *Status Report – 4th Quarter 2019,* dated 01/31/20
- *Status Report – 1st Quarter 2020,* dated 04/30/20
- *Status Report – 2nd Quarter 2020,* dated 09/03/20
- *Status Report – 3rd Quarter 2020,* dated 11/25/20
- *Status Report – 4th Quarter 2020,* dated 01/28/21
- *Status Report – 1st Quarter 2021,* dated 05/05/21
- *Status Report – 2nd Quarter 2021,* dated 07/28/21
- *Status Report – 3rd Quarter 2021,* dated 10/29/22

- *Status Report – 4th Quarter 2021, dated 01/28/22*

SVE System Operations

The SVE system was designed with three independent legs (i.e., Leg 1, Leg 2, and Leg 3). Legs 1 and 3 provide vacuum extraction to the deep SVE wells; Leg 2 is piped to the shallow wells. The automation panel was programmed to oscillate between Legs 1 and 3 every four hours for continuous 24-hr operations. Note: Leg 2 (i.e., shallow wells) was bypassed to increase runtimes in the deeper strata to optimize in-situ bioremediation efforts documented in the 4Q21 report. Programmed runtimes are presented in Table 1 below.

Table 1. Programmed Runtimes and Leg Configurations

Leg	SVE Wells and Location	Scheduled Runtime
Leg 1	Deep Wells SVE7, SVE8, and SVE9 Eastern side of treatment zone	4 hours
Leg 2	Shallow Wells SVE1, SVE2, SVE3, and SVE4	0 hours
Leg 3	Deep Wells SVE5, SVE6, SVE10, and SVE11 Central and Western side of treatment zone	4 hours
Leg 1	Deep Wells SVE7, SVE8, and SVE9 Eastern side of treatment zone	4 hours
Leg 2	Shallow Wells SVE1, SVE2, SVE3, and SVE4	0 hours
Leg 3	Deep Wells SVE5, SVE6, SVE10, and SVE11 Central and Western side of treatment zone	4 hours

SVE – soil vapor extraction well

Note: Scheduled runtimes were altered during 1Q22 by bypassing Leg 2 (i.e., shallow legs) to maximize airflow in the deeper stratus to enhance in-situ bioremediation efforts documented in the *Status Report – 4th Quarter 2021*, dated, 01/28/22.

Water and condensate are collected in the moisture separator, which is fitted with a 1-inch PVC pipe to transfer fluids to an open-top tank fitted with bird netting. Thirty-seven (37.0) gallons of water/condensate was recovered during 1Q22. Runtime, flow rates, and percentage of runtime for 1Q22 are documented in Table 2 below.

Table 2. System Runtime and Flow Rates – 1Q22

Measurement	Leg 1	Leg 2	Leg 3	Total
Runtime (hours)	1,060	0	1,060	2,120
Runtime (min)	64,740	0	64,740	122,100
Average CFM	20	0	10	--
Runtime Percentage	49.1%	0%	49.1%	98.2%

min – minutes
CFM – cubic feet per minute

The 1Q22 had 2,159 hours in the quarter. The SVE system was shut-in for 1 hour for routine maintenance; reducing the available quarterly hours to 2,158. The system ran for 2,120 hours based on hour meter readings collected on 01/05/22 and 03/29/22; therefore, the system runtime in 1Q22 was 98.2 percent (%). Photographs of relevant meter readings are documented in the attached Photographic Log.

During 1Q22, Hilcorp personnel six (6) operation and maintenance (O&M) events and Timberwolf personnel conducted one (1) O&M event. A field log of O&M events and maintenance performed is provided in the attached Table A-1.

Note: subsequent O&M events revealed that the hour meter appeared to fail at 10,888 hours. The hour meter will be replaced as soon as possible.

Mass Removal

Timberwolf used the results from the soil gas analysis (collected by Hilcorp on 03/04/22), flow rates, and runtimes to calculate constituent mass removal. Mass removal of GRO and BTEX and associated recovered volume for 1Q22 are presented in Table 3 below; cumulative totals are provided in the attached Table A–2.

Table 3. Mass Removal and Associated Volume – 1Q22

Constituent	Mass Removal by Leg (kg)[1]			Total Mass Removed[2] (lbs)	Recovered Volume[3] (bbl)
	Leg 1	Leg 2	Leg 3		
GRO	58.9	0.0	50.3	242.4	0.90
Benzene	0.24	0.0	0.20	0.44	NC
Toluene	1.96	0.0	1.64	3.60	NC
Ethylbenzene	0.17	0.0	0.15	0.32	NC
Xylenes	2.63	0.0	2.21	4.84	NC

[1]Calculation = minutes ran * CFM * Concentration (mg/m^3) * 1 M^3/35.3147 ft^3 *1g/1000 mg * 1 kg/1000 g
[2]Calculation = [Leg 1 + Leg 2 + Leg 3] * 2.2 lbs/kg
[3]Calculation = lbs / 6.42 lb/gal / 42 gal/bbl
GRO = from TPH (GC/MS) Low Fraction (i.e., gasoline range organics)
kg – kilograms
bbl -barrel
lbs – pounds
NC – not calculated
Assumptions:

- API Gravity = 52
- Concentrations of VOCs in soil gas vapor have remained static since the collection of SVE gas sample
- Runtime readings based on hour meter readings on 1/5/22 and 3/29/22. Cygnet remote monitoring confirmed minimal down time during 1Q22

Collection and Analysis of Soil-Gas Sample

On 3/4/22, Hilcorp personnel collected a quarterly soil gas sample utilizing a vacuum pump and Tedlar® bag. The vacuum pump was connected to the SVE systems sampling port while all three (3) legs were open. The valve on the sampling port was then opened and pump was activated to purge ambient air.

After purging, the Tedlar® bag was connected to the vacuum pump outlet using dedicated tubing, the valve on the Tedlar® bag was opened and the vacuum pump was activated to collect the SVE gas sample. Once the Tedlar® bag was filled, the valve on the bag was closed and disconnected from the tubing. The sampling port was then closed, and vacuum pump disconnected from sampling port.

The gas sample was shipped to Hall Environmental and Analytical Laboratory (HEAL) in Albuquerque, New Mexico. HEAL subcontracted the analysis to Pace National in Mt. Juliet, Tennessee for chemical analysis. All sample transfers were conducted under proper chain-of-custody protocol.

The sample was analyzed for volatile organic compounds (VOCs) using EPA Method Toxic Organics 15 (i.e., TO–15) and Organic Compounds (GC) by ASTM Method D1946. Laboratory report and chain-of-custody documents are attached.

Constituents that exceeded laboratory detection limits are presented in Table 4 below; laboratory results of all constituents are documented in the Attached Table A-3.

Table 4. Soil-Gas Analysis – 03/04/22

Constituents	SVE
Volatile Organic Carbons, mg/m^3	
Benzene	7.35
Cyclohexane	39.0
Ethylbenzene	5.42
4-Ethyltoluene	1.95
Heptane	57.7
N-Hexane	35.0
Isopropylbenzene	1.29
Toluene	61.0
1,2,3-Trimethylbenzene	1.47
1,2,4-Trimethylbenzene	9.77
1,3,5-Trimethylbenzene	8.54
Total Xylenes	82.0
TPH (GC/MS) Low Fraction (i.e., GRO)	1,900
Organic Compounds, %	
Oxygen	21.3
Carbon Dioxide	< 0.5

mg/m^3 – milligrams per cubic meter
% - percent
TPH – total petroleum hydrocarbons
GRO – gasoline range organics

Summary

The soil-gas sample and analysis revealed that total petroleum hydrocarbon gasoline range organics (TPH-GRO) increased between the March 2021 soil-gas sample and the March 2022 soil-gas sample from 661 milligrams per cubic meter (mg/m^3) to 1,900 mg/m^3. This represents a 287% increase in GRO recovery. This dramatic increase in recovery is a strong indication of the effectiveness of the surfactant treatment conducted during 4Q21.

Additionally, comparison of BTEX results from the March 2021 soil-gas sample and the March 2022 soil-gas sample revealed a decrease in constituents of BTEX that ranged between 46% and 70%. The decrease was greatest in benzene, which showed a reduction from 25.4 mg/m^3 to 7.35 mg/m^3, or a 71% decrease. Total xylenes were reduced from 150 mg/m^3 to 82.0 mg/m^3, or a 46% decrease.

System runtime during 1Q22 was 98.2% of total available hours in the quarter. Runtime hours based on hour meter readings taken on 1/5/22 and 3/29/22. Cygnet remote monitoring system confirms operation through the quarter. Mass removal calculations indicated 0.9 bbls of GRO recovered during the quarter.

Further Actions – Second Quarter 2022

During 2Q22, the following activities are planned for the Site:

- Reprogram SVE automation back to regular schedule
- Conduct bi-weekly Site O&M to ensure proper system function and drain any water/condensate accumulation in the moisture separator as needed
- Collect a quarterly soil vapor gas sample and analyze for TO-15, GRO, oxygen, and carbon dioxide
- Replace the mechanical hour meter on SVE system
- Prepare a 2Q22 status report

If you have any questions regarding this report, please call us at 979-324-2139.

Sincerely,
Timberwolf Environmental, LLC

Kevin Cole
Project Manager

Jim Foster
President

Attachments: Figures
Attached Tables
Photographic Log
Laboratory Data and Chain-of-Custody Documents

Cc: Kate Kaufman, Hilcorp Energy Company

Figures

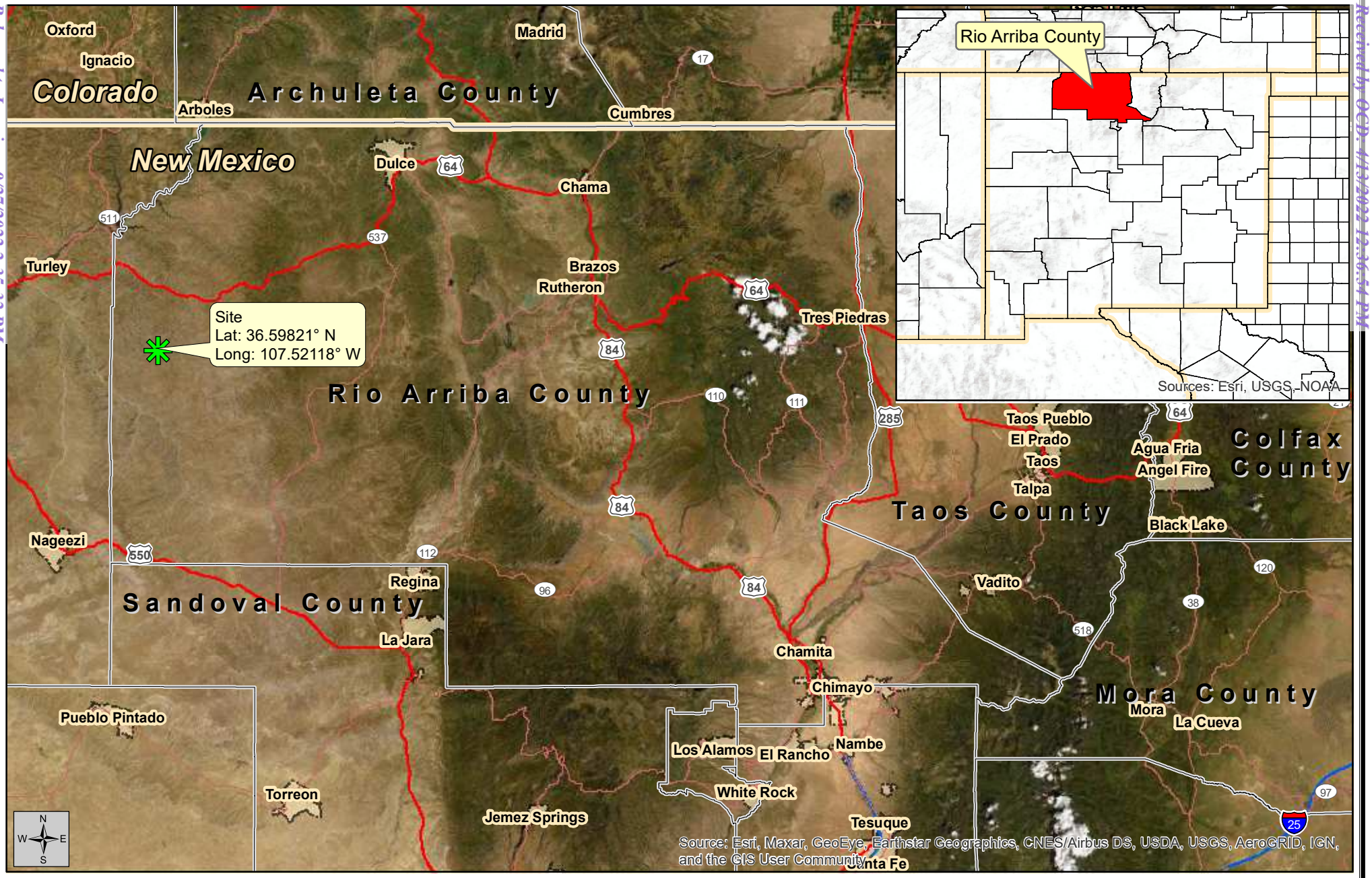


Figure 1 **Site Location Map**	**Status Report - 1st Quarter 2022**	**March 28, 2022**
TIMBERWOLF ENVIRONMENTAL	1:1,250,000 0 20 40 60 80 100 120 Miles **San Juan 28-7 Unit 183M (OCD Incident No. NCS1901627746)** **Hilcorp Energy Company** **Rio Arriba County, New Mexico**	* Site
Created By: Kevin Cole TE Project No.: HEC-190007	Datum: NAD83 Imagery Source: ESRI Vector Source: ESRI and TE	

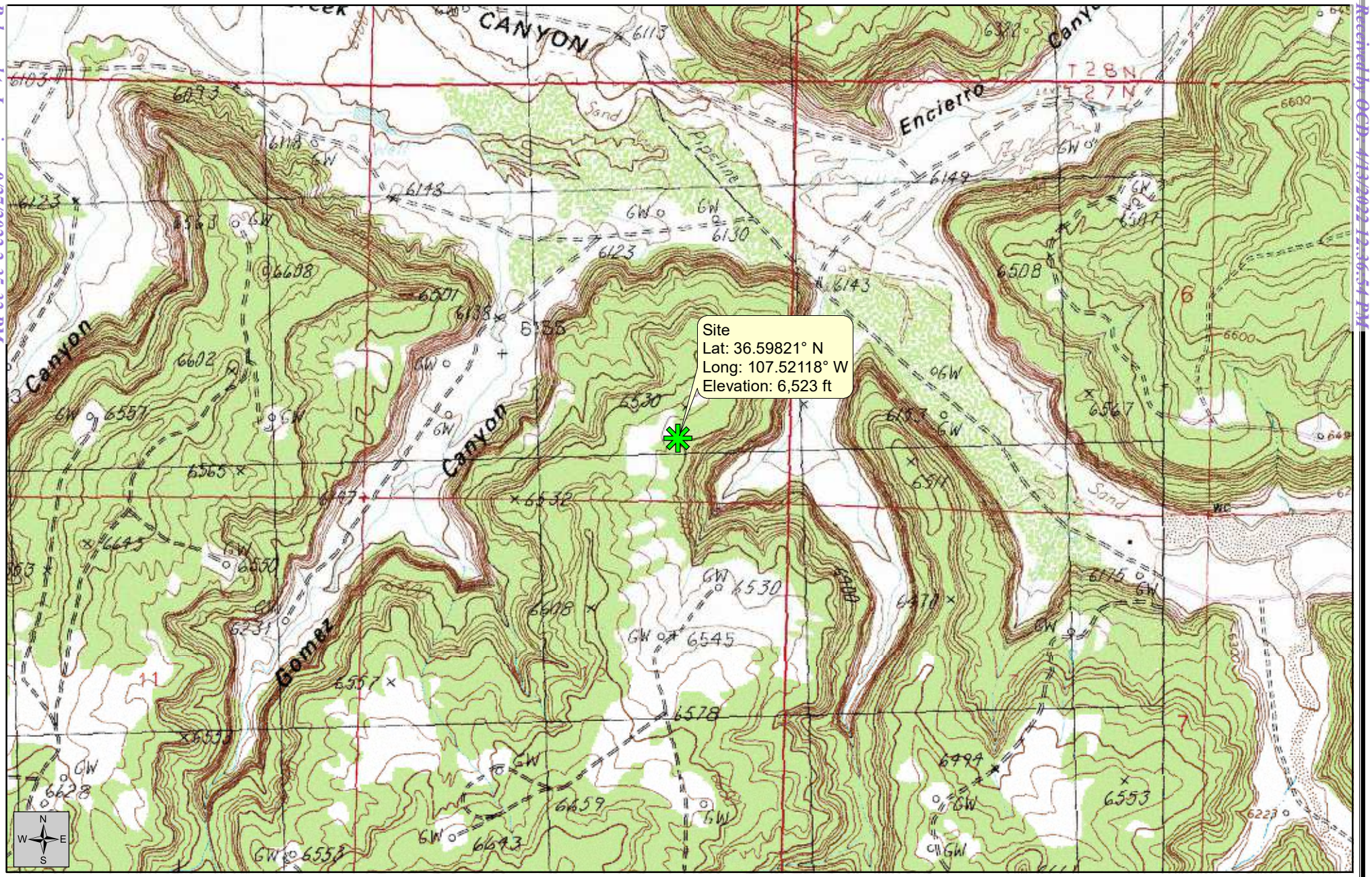


Figure 2
Topographic Map

Status Report - 1st Quarter 2022

March 28, 2022

1:24,000

0 0.5 1 1.5 2 Miles

TIMBERWOLF ENVIRONMENTAL

Created By:
Kevin Cole
TE Project No.: HEC-190007

San Juan 28-7 Unit 183M (OCD Incident No. NCS1901627746)
Hilcorp Energy Company
Rio Arriba County, New Mexico

Datum: NAD83
Imagery Source: USGS
Quads: Gould Pass and Santos Peak
Vector Source: TE

Site

Figure 3 **Aerial Map**	**Status Report - 1st Quarter 2022**	**March 28, 2022**
TIMBERWOLF ENVIRONMENTAL	1:10,000 0 0.25 0.5 0.75 1 Miles **San Juan 28-7 Unit 183M (OCD Incident No. NCS1901627746)** **Hilcorp Energy Company** **Rio Arriba County, New Mexico**	Site
Created By: Kevin Cole TE Project No.: HEC-190007	Datum: NAD83 Imagery Source: ESRI Vector Source: TE	

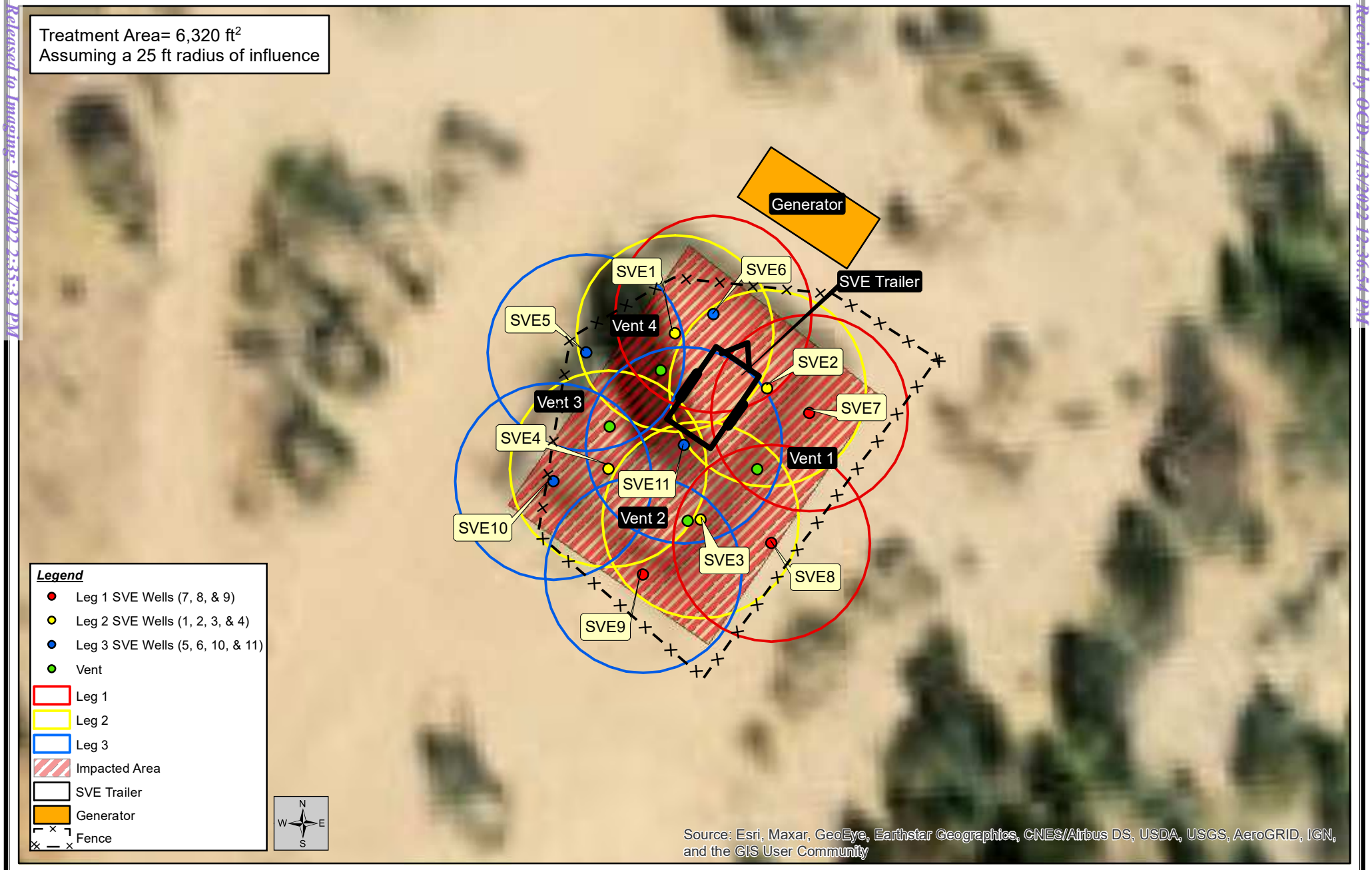


Figure 4
SVE System Overview

Status Report - 1st Quarter 2022

March 28, 2022

1:250

0 25 50 75 100 125 Feet

San Juan 28-7 Unit 183M (OCD Incident No. NCS1901627746)
Hilcorp Energy Company
Rio Arriba County, New Mexico

TIMBERWOLF ENVIRONMENTAL

Created By:
Kevin Cole
TE Project No.: HEC-190007

Datum: NAD83
Imagery Source: ESRI
Vector Source: TE

Attached Tables

Table A-1. Operation and Maintenance Events
Status Report - 1st Quarter 2022
San Juan 28-7 Unit 183M (OCD Incident No. NCS1901627746)

Date	Hour Meter (hrs)	Water/Condenstate Recovered (gal)	Maintenance Performed
01/05/22	8,899.7	6.0	• Kurt Hoekstra with Hilcorp performed SVE system O&M checks • System was down for approximately 15 minutes for O&M • Drained water from separator
01/17/22	9,188.2	10.0	• Kurt Hoekstra with Hilcorp performed SVE system O&M checks • System was down for approximately 10 minutes for O&M • Drained water from separator
02/01/22	9,506.0	6.5	• Kurt Hoekstra with Hilcorp performed SVE system O&M checks • System was down for approximately 10 minutes for O&M • Drained water from separator
02/15/22	9,845.7	5.0	• Kurt Hoekstra with Hilcorp performed SVE system O&M checks • System was down for approximately 10 minutes for O&M • Drained water from separator
03/04/22	10,252.0	7.0	• Kurt Hoekstra with Hilcorp performed SVE system O&M checks • System was down for approximately 10 minutes for O&M • Drained water from separator
03/08/22	10,352.1	2.5	• Jim Foster with Timberwolf Environmental performed SVE system O&M checks • System was down for approximately 10 minutes for O&M • Drained water from separator
03/29/22	10,851.0	0	• Brandon Sinclair with Hilcorp performed SVE system O&M checks • System was down for approximately 10 minutes for O&M

gal - gallons
hrs - hours

Table A-2. Cumulative Mass Removal
Status Report 1st Quarter 2022
San Juan 28-7 Unit 183M (OCD Incident No. NCS1901627746)

Quarter	Constituent (lbs)					Recovered Volume (bbl)
	Benzene	Toluene	Ethylbenzene	Xylene	GRO	GRO
4Q19	18.5	32.4	0.73	6.27	1,017	3.77
1Q20	5.01	18.01	0.48	3.65	403.47	1.50
2Q20	6.66	23.95	0.64	4.85	536.65	1.99
3Q20	14.82	53.32	1.43	10.80	1,194.72	4.43
4Q20	1.71	6.16	0.16	1.25	138.07	0.51
1Q21	22.85	82.18	2.20	16.65	1,841.41	6.83
2Q21	2.13	15.09	1.17	12.63	55.43	0.21
3Q21	2.51	17.78	1.38	14.88	65.30	0.24
4Q21	2.60	18.40	1.43	15.40	67.57	0.25
1Q22	0.24	1.96	0.17	2.63	70.00	0.41
Total	77.03	269.25	9.79	89.01	5,389.62	20.14

mass (mg) removed equation = ((CFM*volatile*runtime in minutes)/(35.3147))
lbs - pounds
bbl - barrels

Table A-3. Gas Analysis - 03/04/22
Status Report - 1st Quarter 2022
San Juan 28-7 Unit 183M
Rio Arriba County, New Mexico

Volatiles	SVE (mg/m^3)
Acetone	< 0.0594
Allyl Chloride	< 0.0125
Benzene	7.35
Benzyl Chloride	< 0.0208
Bromodichloromethane	< 0.0268
Bromoform	< 0.124
Bromomethane	< 0.0155
1,3-Butadiene	< 0.0885
Carbon Disulfide	< 0.0124
Carbon Tetrachloride	< 0.0252
Chlorobenzene	< 0.0185
Chlorodifluoromethane	< 0.0142
Chloroethane	< 0.0106
Chloroform	< 0.0195
Chloromethane	< 0.00826
2-Chlorotoluene	< 0.0206
Cyclohexane	39
Dibromochloromethane	< 0.034
1,2-Dibromoethane	< 0.0308
1,2-Dichlorobenzene	< 0.024
1,3-Dichlorobenzene	< 0.024
1,4-Dichlorobenzene	< 0.024
1,2-Dichloroethane	< 0.0162
1,1-Dichloroethane	< 0.016
1,1-Dichloroethene	< 0.0159
Cis-1,2-Dichloroethene	< 0.0159
Trans-1,2-Dichloroethene	< 0.0159
1,2-Dichloropropane	< 0.0185
Cis-1,3-Dichloropropene	< 0.0182
Trans-1,3-Dichloropropene	< 0.0182
1,1-Difluoroethane	< 0.054
1,4-Dioxane	< 0.0144
Ethanol	< 0.0471
Ethyl acetate	< 0.0144
Ethylbenzene	5.42
4-Ethyltoluene	1.95
Trichlorofluoromethane	< 0.0225
Dichlorodifluoromethane	< 0.0198
1,1,2-Trichlorotrifluoroethane	< 0.0307
1,2-Dichlorotetrafluoroethane	< 0.028

Table A-3. Gas Analysis - 03/04/22
Status Report - 1st Quarter 2022
San Juan 28-7 Unit 183M
Rio Arriba County, New Mexico

Volatiles	SVE (mg/m^3)
Heptane	57.7
Hexachloro-1,3-Butadiene	< 0.135
N-Hexane	35
Isopropylbenzene	1.29
Methylene Chloride	< 0.0139
Methyl Butyl Ketone	< 0.102
Methyl Cyclohexane	165
2-Butanone (Mek)	< 0.0737
4-Methyl-2-Pentanone (Mibk)	< 0.102
Methyl Methacrylate	< 0.0164
Methyl Tert-Butyl Ether	< 0.0144
Naphthalene	< 0.066
2-Propanol	< 0.0615
Propene	< 0.043
Styrene	< 0.017
Tert-Amyl Ethyl Ether	< 0.019
1,1,2,2-Tetrachloroethane	< 0.0275
Tetrachloroethene	< 0.0272
Tetrahydrofuran	< 0.0118
Toluene	61
1,2,4-Trichlorobenzene	< 0.0933
1,1,1-Trichloroethane	< 0.0218
1,1,2-Trichloroethane	< 0.0218
Trichloroethylene	< 0.0214
1,2,3-Trimethylbenzene	1.47
1,2,4-Trimethylbenzene	9.77
1,3,5-Trimethylbenzene	8.54
2,2,4-Trimethylpentane	< 0.0187
Vinyl Chloride	< 0.0102
Vinyl Bromide	< 0.0175
Vinyl Acetate	< 0.0141
Total Xylene	82
TPH (GC/MS) low fraction	1,900
Oxygen	283,515
Carbon Dioxide	< 5,000
Carbon Monoxide	< 20,000
Methane	< 4,000

Photographic Log

TIMBERWOLF ENVIRONMENTAL
1920 W. Villa Maria Suite 205
Bryan, TX 77807
(979) 485-9094
www.teamtimberwolf.com

PHOTOGRAPHIC LOG

Project No.:	HEC-190007	**Client:**	Hilcorp Energy Company
Project Name:	San Juan 28-7 No. 183M	**Site Location:**	Rio Arriba County, New Mexico
Task Description:	1st Quarter 2022 Report	**Date:**	January-March, 2022

Photo No.: 1

Direction: N/A

Comments: View of hour meter from January 2022.

Note: 9,506 hours

Photo No.: 2

Direction: N/A

Comments: View of hour meter from the end of March 2022.

Note: The hour meter appears to have failed at 10,880 hours but cygnet remote monitoring shows there was no system downtime. Hour meter will be replaced early 2nd quarter 2022.

Laboratory Data and Chain-of-Custody Documents

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

March 15, 2022

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

RE: S J 28 7 183M OrderNo.: 2203364

Dear Kate Kaufman:

Hall Environmental Analysis Laboratory received 1 sample(s) on 3/5/2022 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

Pace Analytical®

ANALYTICAL REPORT

March 10, 2022

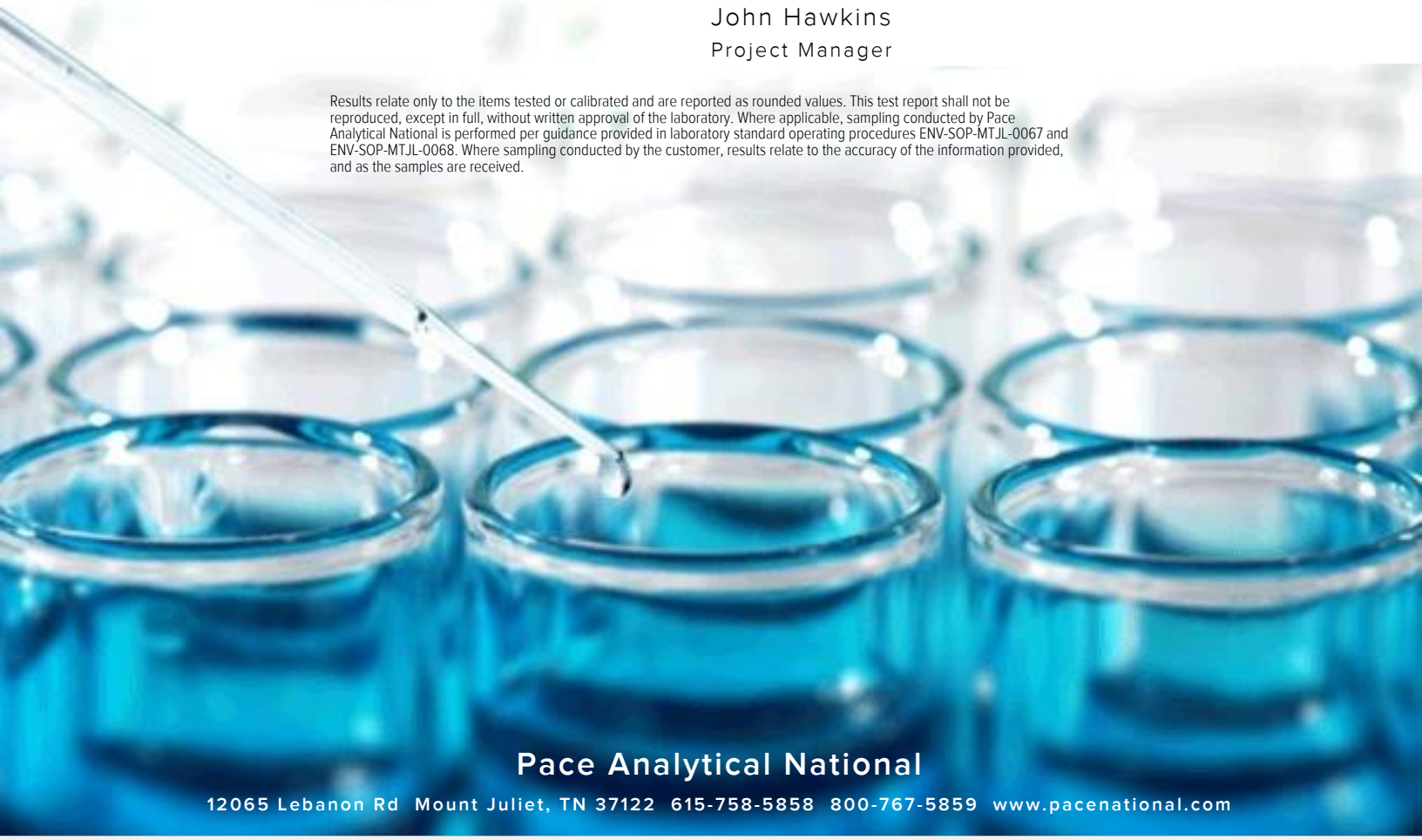
Hall Environmental Analysis Laboratory

Sample Delivery Group:	L1468664
Samples Received:	03/08/2022
Project Number:	
Description:	

Report To: Andy Freeman
4901 Hawkins NE
Albuquerque, NM 87109

Entire Report Reviewed By: John V Hawkins

John Hawkins
Project Manager



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

SAMPLE SUMMARY

2203364-001A S.J.28-7 #183M SVE SAMPLE L1468664-01 Air

Collected by	Collected date/time	Received date/time
	03/04/22 13:15	03/08/22 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG1828984	20	03/08/22 14:38	03/08/22 14:38	CEP	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG1829630	1000	03/09/22 14:12	03/09/22 14:12	CEP	Mt. Juliet, TN
Organic Compounds (GC) by Method D1946	WG1829780	1	03/09/22 14:34	03/09/22 14:34	DBB	Mt. Juliet, TN

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

John Hawkins
Project Manager

Sample Delivery Group (SDG) Narrative

Sample received in tedlar bag.

Lab Sample ID	Project Sample ID	Method
L1468664-01	2203364-001A S.J.28-7 #183M SVE SAMPLE	TO-15

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	25.0	59.4	ND	ND	T8	20	WG1828984
Allyl chloride	107-05-1	76.53	4.00	12.5	ND	ND	T8	20	WG1828984
Benzene	71-43-2	78.10	200	639	2300	7350	T8	1000	WG1829630
Benzyl Chloride	100-44-7	127	4.00	20.8	ND	ND	T8	20	WG1828984
Bromodichloromethane	75-27-4	164	4.00	26.8	ND	ND	T8	20	WG1828984
Bromoform	75-25-2	253	12.0	124	ND	ND	T8	20	WG1828984
Bromomethane	74-83-9	94.90	4.00	15.5	ND	ND	T8	20	WG1828984
1,3-Butadiene	106-99-0	54.10	40.0	88.5	ND	ND	T8	20	WG1828984
Carbon disulfide	75-15-0	76.10	4.00	12.4	ND	ND	T8	20	WG1828984
Carbon tetrachloride	56-23-5	154	4.00	25.2	ND	ND	T8	20	WG1828984
Chlorobenzene	108-90-7	113	4.00	18.5	ND	ND	T8	20	WG1828984
Chloroethane	75-00-3	64.50	4.00	10.6	ND	ND	T8	20	WG1828984
Chloroform	67-66-3	119	4.00	19.5	ND	ND	T8	20	WG1828984
Chloromethane	74-87-3	50.50	4.00	8.26	ND	ND	T8	20	WG1828984
2-Chlorotoluene	95-49-8	126	4.00	20.6	ND	ND	T8	20	WG1828984
Cyclohexane	110-82-7	84.20	200	689	11400	39300	T8	1000	WG1829630
Dibromochloromethane	124-48-1	208	4.00	34.0	ND	ND	T8	20	WG1828984
1,2-Dibromoethane	106-93-4	188	4.00	30.8	ND	ND	T8	20	WG1828984
1,2-Dichlorobenzene	95-50-1	147	4.00	24.0	ND	ND	T8	20	WG1828984
1,3-Dichlorobenzene	541-73-1	147	4.00	24.0	ND	ND	T8	20	WG1828984
1,4-Dichlorobenzene	106-46-7	147	4.00	24.0	ND	ND	T8	20	WG1828984
1,2-Dichloroethane	107-06-2	99	4.00	16.2	ND	ND	T8	20	WG1828984
1,1-Dichloroethane	75-34-3	98	4.00	16.0	ND	ND	T8	20	WG1828984
1,1-Dichloroethene	75-35-4	96.90	4.00	15.9	ND	ND	T8	20	WG1828984
cis-1,2-Dichloroethene	156-59-2	96.90	4.00	15.9	ND	ND	T8	20	WG1828984
trans-1,2-Dichloroethene	156-60-5	96.90	4.00	15.9	ND	ND	T8	20	WG1828984
1,2-Dichloropropane	78-87-5	113	4.00	18.5	ND	ND	T8	20	WG1828984
cis-1,3-Dichloropropene	10061-01-5	111	4.00	18.2	ND	ND	T8	20	WG1828984
trans-1,3-Dichloropropene	10061-02-6	111	4.00	18.2	ND	ND	T8	20	WG1828984
1,4-Dioxane	123-91-1	88.10	4.00	14.4	ND	ND	T8	20	WG1828984
Ethanol	64-17-5	46.10	25.0	47.1	ND	ND	T8	20	WG1828984
Ethylbenzene	100-41-4	106	4.00	17.3	1250	5420	T8	20	WG1828984
4-Ethyltoluene	622-96-8	120	4.00	19.6	398	1950	T8	20	WG1828984
Trichlorofluoromethane	75-69-4	137.40	4.00	22.5	ND	ND	T8	20	WG1828984
Dichlorodifluoromethane	75-71-8	120.92	4.00	19.8	ND	ND	T8	20	WG1828984
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	4.00	30.7	ND	ND	T8	20	WG1828984
1,2-Dichlorotetrafluoroethane	76-14-2	171	4.00	28.0	ND	ND	T8	20	WG1828984
Heptane	142-82-5	100	200	818	14100	57700	T8	1000	WG1829630
Hexachloro-1,3-butadiene	87-68-3	261	12.6	135	ND	ND	T8	20	WG1828984
n-Hexane	110-54-3	86.20	630	2220	9930	35000	T8	1000	WG1829630
Isopropylbenzene	98-82-8	120.20	4.00	19.7	263	1290	T8	20	WG1828984
Methylene Chloride	75-09-2	84.90	4.00	13.9	ND	ND	T8	20	WG1828984
Methyl Butyl Ketone	591-78-6	100	25.0	102	ND	ND	T8	20	WG1828984
2-Butanone (MEK)	78-93-3	72.10	25.0	73.7	ND	ND	T8	20	WG1828984
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	25.0	102	ND	ND	T8	20	WG1828984
Methyl methacrylate	80-62-6	100.12	4.00	16.4	ND	ND	T8	20	WG1828984
MTBE	1634-04-4	88.10	4.00	14.4	ND	ND	T8	20	WG1828984
Naphthalene	91-20-3	128	12.6	66.0	ND	ND	T8	20	WG1828984
2-Propanol	67-63-0	60.10	25.0	61.5	ND	ND	T8	20	WG1828984
Propene	115-07-1	42.10	25.0	43.0	ND	ND	T8	20	WG1828984
Styrene	100-42-5	104	4.00	17.0	ND	ND	T8	20	WG1828984
1,1,2,2-Tetrachloroethane	79-34-5	168	4.00	27.5	ND	ND	T8	20	WG1828984
Tetrachloroethylene	127-18-4	166	4.00	27.2	ND	ND	T8	20	WG1828984
Tetrahydrofuran	109-99-9	72.10	4.00	11.8	ND	ND	T8	20	WG1828984
Toluene	108-88-3	92.10	500	1880	16200	61000	T8	1000	WG1829630
1,2,4-Trichlorobenzene	120-82-1	181	12.6	93.3	ND	ND	T8	20	WG1828984

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1,1-Trichloroethane	71-55-6	133	4.00	21.8	ND	ND	T8	20	WG1828984
1,1,2-Trichloroethane	79-00-5	133	4.00	21.8	ND	ND	T8	20	WG1828984
Trichloroethylene	79-01-6	131	4.00	21.4	ND	ND	T8	20	WG1828984
1,2,4-Trimethylbenzene	95-63-6	120	4.00	19.6	1990	9770	T8	20	WG1828984
1,3,5-Trimethylbenzene	108-67-8	120	200	982	1740	8540	T8	1000	WG1829630
2,2,4-Trimethylpentane	540-84-1	114.22	4.00	18.7	ND	ND	T8	20	WG1828984
Vinyl chloride	75-01-4	62.50	4.00	10.2	ND	ND	T8	20	WG1828984
Vinyl Bromide	593-60-2	106.95	4.00	17.5	ND	ND	T8	20	WG1828984
Vinyl acetate	108-05-4	86.10	4.00	14.1	ND	ND	T8	20	WG1828984
m&p-Xylene	1330-20-7	106	400	1730	15500	67200	T8	1000	WG1829630
o-Xylene	95-47-6	106	200	867	3440	14900	T8	1000	WG1829630
TPH (GC/MS) Low Fraction	8006-61-9	101	200000	826000	461000	1900000	T8	1000	WG1829630
1,1-Difluoroethane	75-37-6	66.05	20.0	54.0	ND	ND	T8	20	WG1828984
1,2,3-Trimethylbenzene	526-73-8	120.10	4.00	19.6	299	1470	T8	20	WG1828984
Chlorodifluoromethane	75-45-6	86.50	4.00	14.2	ND	ND	T8	20	WG1828984
Ethyl acetate	141-78-6	88	4.00	14.4	ND	ND	T8	20	WG1828984
Methyl Cyclohexane	108-87-2	98.1860	200	803	41200	165000	T8	1000	WG1829630
Tert-Amyl Ethyl Ether	919-94-8	116.20	4.00	19.0	ND	ND	T8	20	WG1828984
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*396*		J1		WG1828984
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*99.7*				WG1829630

Sample Narrative:

L1468664-01 WG1828984: Surrogate failure due to matrix interference

Organic Compounds (GC) by Method D1946

Analyte	CAS #	Mol. Wt.	RDL %	Result %	Qualifier	Dilution	Batch
Oxygen	7782-44-7	32	5.00	21.3		1	WG1829780
Carbon Monoxide	630-08-0	28	2.00	ND		1	WG1829780
Carbon Dioxide	124-38-9	44.01	0.500	ND		1	WG1829780
Methane	74-82-8	16	0.400	ND		1	WG1829780

Method Blank (MB)

(MB) R3767780-3 03/08/22 09:50

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Acetone	U		0.584	1.25
Allyl Chloride	U		0.114	0.200
Benzyl Chloride	U		0.0598	0.200
Bromodichloromethane	U		0.0702	0.200
Bromoform	U		0.0732	0.600
Bromomethane	U		0.0982	0.200
1,3-Butadiene	U		0.104	2.00
Carbon disulfide	U		0.102	0.200
Carbon tetrachloride	U		0.0732	0.200
Chlorobenzene	U		0.0832	0.200
Chloroethane	U		0.0996	0.200
Chloroform	U		0.0717	0.200
Chloromethane	U		0.103	0.200
2-Chlorotoluene	U		0.0828	0.200
Dibromochloromethane	U		0.0727	0.200
1,2-Dibromoethane	U		0.0721	0.200
1,2-Dichlorobenzene	U		0.128	0.200
1,3-Dichlorobenzene	U		0.182	0.200
1,4-Dichlorobenzene	U		0.0557	0.200
1,2-Dichloroethane	U		0.0700	0.200
1,1-Dichloroethane	U		0.0723	0.200
1,1-Dichloroethene	U		0.0762	0.200
cis-1,2-Dichloroethene	U		0.0784	0.200
trans-1,2-Dichloroethene	U		0.0673	0.200
1,2-Dichloropropane	U		0.0760	0.200
cis-1,3-Dichloropropene	U		0.0689	0.200
trans-1,3-Dichloropropene	U		0.0728	0.200
1,4-Dioxane	U		0.0833	0.200
Ethanol	U		0.265	1.25
Ethylbenzene	U		0.0835	0.200
4-Ethyltoluene	U		0.0783	0.200
Trichlorofluoromethane	U		0.0819	0.200
Dichlorodifluoromethane	U		0.137	0.200
1,1,2-Trichlorotrifluoroethane	U		0.0793	0.200
1,2-Dichlorotetrafluoroethane	U		0.0890	0.200
Hexachloro-1,3-butadiene	U		0.105	0.630
Isopropylbenzene	U		0.0777	0.200
Methylene Chloride	U		0.0979	0.200
Methyl Butyl Ketone	U		0.133	1.25
2-Butanone (MEK)	U		0.0814	1.25

Method Blank (MB)

(MB) R3767780-3 03/08/22 09:50

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
4-Methyl-2-pentanone (MIBK)	U		0.0765	1.25
Methyl Methacrylate	U		0.0876	0.200
MTBE	U		0.0647	0.200
Naphthalene	U		0.350	0.630
2-Propanol	U		0.264	1.25
Propene	U		0.0932	1.25
Styrene	U		0.0788	0.200
1,1,2,2-Tetrachloroethane	U		0.0743	0.200
Tetrachloroethylene	U		0.0814	0.200
Tetrahydrofuran	U		0.0734	0.200
1,2,4-Trichlorobenzene	U		0.148	0.630
1,1,1-Trichloroethane	U		0.0736	0.200
1,1,2-Trichloroethane	U		0.0775	0.200
Trichloroethylene	U		0.0680	0.200
1,2,4-Trimethylbenzene	U		0.0764	0.200
2,2,4-Trimethylpentane	U		0.133	0.200
Vinyl chloride	U		0.0949	0.200
Vinyl Bromide	U		0.0852	0.200
Vinyl acetate	U		0.116	0.200
1,1-Difluoroethane	U		0.129	1.00
1,2,3-Trimethylbenzene	U		0.0805	0.200
Chlorodifluoromethane	U		0.131	0.200
Ethyl acetate	U		0.100	0.200
Tert-Amyl Ethyl Ether	U		0.0778	0.200
(S) 1,4-Bromofluorobenzene	*97.1*			*60.0-140*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3767780-1 03/08/22 08:46 • (LCSD) R3767780-2 03/08/22 09:19

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	3.75	3.85	3.77	103	101	70.0-130			2.10	25
Allyl Chloride	3.75	3.99	4.03	106	107	70.0-130			0.998	25
Benzyl Chloride	3.75	4.35	4.31	116	115	70.0-152			0.924	25
Bromodichloromethane	3.75	4.07	3.97	109	106	70.0-130			2.49	25
Bromoform	3.75	3.77	3.80	101	101	70.0-130			0.793	25
Bromomethane	3.75	4.16	4.04	111	108	70.0-130			2.93	25
1,3-Butadiene	3.75	3.78	3.84	101	102	70.0-130			1.57	25
Carbon disulfide	3.75	4.16	4.16	111	111	70.0-130			0.000	25

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3767780-1 03/08/22 08:46 • (LCSD) R3767780-2 03/08/22 09:19

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Carbon tetrachloride	3.75	4.10	3.99	109	106	70.0-130			2.72	25
Chlorobenzene	3.75	3.90	3.87	104	103	70.0-130			0.772	25
Chloroethane	3.75	4.25	4.05	113	108	70.0-130			4.82	25
Chloroform	3.75	3.80	3.90	101	104	70.0-130			2.60	25
Chloromethane	3.75	3.88	4.08	103	109	70.0-130			5.03	25
2-Chlorotoluene	3.75	3.94	3.97	105	106	70.0-130			0.759	25
Dibromochloromethane	3.75	4.06	3.99	108	106	70.0-130			1.74	25
1,2-Dibromoethane	3.75	4.00	3.93	107	105	70.0-130			1.77	25
1,2-Dichlorobenzene	3.75	3.88	3.96	103	106	70.0-130			2.04	25
1,3-Dichlorobenzene	3.75	3.77	3.83	101	102	70.0-130			1.58	25
1,4-Dichlorobenzene	3.75	3.84	3.80	102	101	70.0-130			1.05	25
1,2-Dichloroethane	3.75	3.81	3.79	102	101	70.0-130			0.526	25
1,1-Dichloroethane	3.75	4.04	3.89	108	104	70.0-130			3.78	25
1,1-Dichloroethene	3.75	4.03	3.99	107	106	70.0-130			0.998	25
cis-1,2-Dichloroethene	3.75	3.81	3.85	102	103	70.0-130			1.04	25
trans-1,2-Dichloroethene	3.75	4.10	4.03	109	107	70.0-130			1.72	25
1,2-Dichloropropane	3.75	3.93	3.94	105	105	70.0-130			0.254	25
cis-1,3-Dichloropropene	3.75	4.02	3.79	107	101	70.0-130			5.89	25
trans-1,3-Dichloropropene	3.75	4.05	3.90	108	104	70.0-130			3.77	25
1,4-Dioxane	3.75	3.96	3.97	106	106	70.0-140			0.252	25
Ethanol	3.75	4.24	4.15	113	111	55.0-148			2.15	25
Ethylbenzene	3.75	3.96	3.91	106	104	70.0-130			1.27	25
4-Ethyltoluene	3.75	4.06	3.97	108	106	70.0-130			2.24	25
Trichlorofluoromethane	3.75	4.08	4.00	109	107	70.0-130			1.98	25
Dichlorodifluoromethane	3.75	4.15	4.07	111	109	64.0-139			1.95	25
1,1,2-Trichlorotrifluoroethane	3.75	4.17	4.08	111	109	70.0-130			2.18	25
1,2-Dichlorotetrafluoroethane	3.75	4.14	4.06	110	108	70.0-130			1.95	25
Hexachloro-1,3-butadiene	3.75	3.76	3.80	100	101	70.0-151			1.06	25
Isopropylbenzene	3.75	3.99	3.92	106	105	70.0-130			1.77	25
Methylene Chloride	3.75	3.94	3.86	105	103	70.0-130			2.05	25
Methyl Butyl Ketone	3.75	3.88	3.88	103	103	70.0-149			0.000	25
Methyl Ethyl Ketone	3.75	4.20	3.96	112	106	70.0-130			5.88	25
4-Methyl-2-pentanone (MIBK)	3.75	3.75	3.70	100	98.7	70.0-139			1.34	25
Methyl Methacrylate	3.75	3.93	3.99	105	106	70.0-130			1.52	25
MTBE	3.75	3.83	3.81	102	102	70.0-130			0.524	25
Naphthalene	3.75	3.79	3.86	101	103	70.0-159			1.83	25
2-Propanol	3.75	3.78	3.78	101	101	70.0-139			0.000	25
Propene	3.75	4.14	4.08	110	109	64.0-144			1.46	25
Styrene	3.75	4.01	3.96	107	106	70.0-130			1.25	25
1,1,2,2-Tetrachloroethane	3.75	4.14	4.05	110	108	70.0-130			2.20	25

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3767780-1 03/08/22 08:46 • (LCSD) R3767780-2 03/08/22 09:19

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Tetrachloroethylene	3.75	3.67	3.79	97.9	101	70.0-130			3.22	25
Tetrahydrofuran	3.75	3.77	3.62	101	96.5	70.0-137			4.06	25
1,2,4-Trichlorobenzene	3.75	3.98	3.92	106	105	70.0-160			1.52	25
1,1,1-Trichloroethane	3.75	3.98	3.91	106	104	70.0-130			1.77	25
1,1,2-Trichloroethane	3.75	3.83	3.80	102	101	70.0-130			0.786	25
Trichloroethylene	3.75	3.79	3.96	101	106	70.0-130			4.39	25
1,2,4-Trimethylbenzene	3.75	3.81	3.80	102	101	70.0-130			0.263	25
2,2,4-Trimethylpentane	3.75	3.84	3.81	102	102	70.0-130			0.784	25
Vinyl chloride	3.75	4.20	3.95	112	105	70.0-130			6.13	25
Vinyl Bromide	3.75	4.04	4.09	108	109	70.0-130			1.23	25
Vinyl acetate	3.75	3.85	3.66	103	97.6	70.0-130			5.06	25
1,1-Difluoroethane	3.75	4.14	3.89	110	104	70.0-130			6.23	25
1,2,3-Trimethylbenzene	3.75	3.96	3.96	106	106	70.0-130			0.000	25
Chlorodifluoromethane	3.75	3.77	3.89	101	104	70.0-130			3.13	25
Ethyl acetate	3.75	3.77	3.76	101	100	70.0-130			0.266	25
Tert-Amyl Ethyl Ether	3.75	3.73	3.85	99.5	103	70.0-130			3.17	25
(S) 1,4-Bromofluorobenzene				*99.9*	*99.1*	*60.0-140*				

Method Blank (MB)

(MB) R3768257-3 03/09/22 10:19

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Benzene	U		0.0715	0.200
Cyclohexane	U		0.0753	0.200
Heptane	U		0.104	0.200
n-Hexane	U		0.206	0.630
Toluene	U		0.0870	0.500
1,3,5-Trimethylbenzene	U		0.0779	0.200
m&p-Xylene	U		0.135	0.400
o-Xylene	U		0.0828	0.200
TPH (GC/MS) Low Fraction	U		39.7	200
Methyl Cyclohexane	U		0.0813	0.200
(S) 1,4-Bromofluorobenzene	*94.8*			*60.0-140*

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3768257-1 03/09/22 08:56 • (LCSD) R3768257-2 03/09/22 09:38

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	3.75	4.55	4.50	121	120	70.0-130			1.10	25
Cyclohexane	3.75	4.58	4.53	122	121	70.0-130			1.10	25
Heptane	3.75	4.42	4.49	118	120	70.0-130			1.57	25
n-Hexane	3.75	4.59	4.53	122	121	70.0-130			1.32	25
Toluene	3.75	4.49	4.45	120	119	70.0-130			0.895	25
1,3,5-Trimethylbenzene	3.75	4.59	4.54	122	121	70.0-130			1.10	25
m&p-Xylene	7.50	9.09	9.00	121	120	70.0-130			0.995	25
o-Xylene	3.75	4.48	4.44	119	118	70.0-130			0.897	25
TPH (GC/MS) Low Fraction	203	246	243	121	120	70.0-130			1.23	25
Methyl Cyclohexane	3.75	4.64	4.57	124	122	70.0-130			1.52	25
(S) 1,4-Bromofluorobenzene				*96.9*	*97.4*	*60.0-140*				

Method Blank (MB)

(MB) R3767991-3 03/09/22 14:26

Analyte	MB Result %	MB Qualifier	MB MDL %	MB RDL %
Oxygen	0.689		0.225	5.00
Carbon Monoxide	U		0.665	2.00
Carbon Dioxide	U		0.121	0.500
Methane	U		0.0584	0.400

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3767991-1 03/09/22 14:10 • (LCSD) R3767991-2 03/09/22 14:19

Analyte	Spike Amount %	LCS Result %	LCSD Result %	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Oxygen	20.0	23.7	23.6	119	118	70.0-130			0.423	20
Carbon Monoxide	2.50	2.80	2.80	112	112	70.0-130			0.000	20
Carbon Dioxide	2.50	2.40	2.40	96.0	96.0	70.0-130			0.000	20
Methane	2.00	1.92	1.92	96.0	96.0	70.0-130			0.000	20

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state “ND” (Not Detected) or “BDL” (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.
T8	Sample(s) received past/too close to holding time expiration.

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LAO000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

CHAIN OF CUSTODY RECORD

PAGE: 1 OF: 1

F058

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

SUB CONTRATOR: Pace TN	COMPANY: PACE TN		PHONE: (800) 767-5859	FAX: (615) 758-5859	
ADDRESS: 12065 Lebanon Rd			ACCOUNT #:	EMAIL:	
CITY, STATE, ZIP: Mt. Juliet, TN 37122					

L4166164

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	2203364-001A	S.J.28-7 #183M SVE Sample	TEDLAR	Air	3/4/2022 1:15:00 PM	2	CO2, Oxygen, TO-15 + TPH **3 Day TAT** -01

Std TAT
D 3/7/22

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N		

SPECIAL INSTRUCTIONS / COMMENTS:

Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By:	Date: 3/7/2022	Time: 8:33 AM	Received By:	Date: 3/8/22	Time: 930
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard ✓ RUSH Next BD 2nd BD 3rd BD

D 3/7/22

REPORT TRANSMITTAL DESIRED:
HARDCOPY (extra cost) FAX EMAIL ONLINE

FOR LAB USE ONLY
Temp of samples AMB °C Attempt to Cool ?
Comments:

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

Sample Log-In Check List

Client Name: HILCORP ENERGY Work Order Number: 2203364 RcptNo: 1

Received By: Cheyenne Cason 3/5/2022 8:55:00 AM

Completed By: Cheyenne Cason 3/7/2022 8:16:39 AM

Reviewed By: JN 3/7/22

Chain of Custody

1. Is Chain of Custody 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 ☐
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: KPG 3/7/22

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	Good	Yes			

Chain-of-Custody Record

Client: Hilcorp

Mailing Address:

Phone #: 505-486-9543

email or Fax#: kkaufman@hilcorp.com

QA/QC Package: khoekstra@hilcorp.com

☐ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance

☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:

☐ Standard ☒ Rush

Project Name: S.J. 28-7 # 183 M

Project #:

Project Manager: KATE KAUFMAN

Sampler: KWET

On Ice: ☒ Yes ☒ No

# of Coolers: 3

Cooler Temp(including CF): See Checklist (°C)

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. 2203364	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)	VOC by method TO-15	TPHGRO by TO-15	O_2,CO_2 by D1946		
3-4	1:15	AIR	S.J. 28-7 # 183M SVE SAMPLE	2 TEDLAR		001											X	X	X		

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
3-4	1629	[signature]	[signature]		3/4/22	1629
3/4/22	1930	[signature]	[signature]	cour	3/5/22	0855

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.

District I
1625 N. French Dr., Hobbs, NM 88240
Phone:(575) 393-6161 Fax:(575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone:(575) 748-1283 Fax:(575) 748-9720
District III
1000 Rio Brazos Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Operator:	OGRID:
HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	372171
	Action Number: 98277
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See App ID 125796 for most updated status.	9/23/2022