



Accepted - 09/27/2022

NV

January 11, 2022

New Mexico Oil Conservation Division
New Mexico Energy, Minerals, and Natural Resources Department
1000 Rio Brazos Road
Aztec, NM 87410

**Subject: Fourth Quarter 2021 - Quarterly SVE System Update
Hilcorp Energy Company
Lambe 2C
API #: 30-045-30747
NMOCD Incident Number: NVF1836050592
San Juan County, New Mexico**

To Whom It May Concern:

WSP USA Inc. (WSP), on behalf of Hilcorp Energy Company (Hilcorp), presents the following fourth quarter 2021 summary report discussing the soil vapor extraction (SVE) system at the Lambe 2C natural gas production well (Site, shown on Figure 1). This report is being submitted as part of the proposed timeline of remediation events in the *Update Report and Updated Remediation Workplan* submitted to the New Mexico Oil Conservation Division (NMOCD) and dated September 30, 2021. This report documents air sampling and system operations to monitor SVE remediation progress.

FOURTH QUARTER 2021 ACTIVITIES

A permanent SVE system was installed at the Site on September 24, 2021. The layout of the SVE system and piping is shown on Figure 2. During the fourth quarter of 2021, Hilcorp and WSP personnel conducted bi-weekly operation and maintenance visits to ensure the system was operating, to maximize runtime efficiency, and conduct any required system maintenance.

A fourth quarter air sample was collected on December 2, 2021 from the inlet side of the SVE blower using a high-vacuum air sampler. The air sample was collected directly into a 1-Liter Tedlar® bag and submitted to Hall Environmental Analysis Laboratory (Hall) for analysis of volatile organic compounds (VOCs) by United States Environmental Protection Agency (EPA) Method 8260, fixed gas analysis of oxygen and carbon dioxide, and total volatile petroleum hydrocarbons (TVPH) by EPA Method 8015. Prior to collection, the air from the influent side was field screened with a photoionization detector (PID) for organic vapor monitoring (OVM). Table 1 presents a summary of analytical data collected during this sampling event, with the full laboratory analytical report included in Enclosure A. Table 1 also includes historical data collected during past sampling events.

The air sample data collected to date and measured stack flow rate were utilized to calculate total emissions for the system up to December 2, 2021 (Table 2). As of December 2021, the total operational time of the system was 1,587.7 hours with an estimated mass source removal via the SVE system of 71.44 pounds of TVPH. The operational runtime for the fourth quarter 2021 was 95%. Based on Site visit observation and runtime calculations, the system was operating as anticipated during the fourth quarter of 2021.

RECOMMENDATIONS

Regular operation and maintenance (O&M) visits will continue to be conducted bi-weekly by WSP and/or Hilcorp personnel. During O&M visits, personnel will ensure that the SVE system is operating within normal working temperature, pressure, and vacuum ranges. Any deviations from regular operations will be noted and included in the subsequent quarterly report.

WSP USA
848 EAST 2ND AVENUE
DURANGO CO 81301

Tel.: 970-385-1096
wsp.com



WSP 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 stuart.hyde@wsp.com or Mitch Killough at (713) 757-5247 or at mkillough@hilcorp.com.

Kind regards,

A handwritten signature in black ink, appearing to read 'Stuart'.

Stuart Hyde, L.G.
Senior Geologist

A handwritten signature in black ink, appearing to read 'Ashley L. Ager'.

Ashley Ager, M.S., P.G.
Assistant Vice President

Enclosures

Figure 1 – Site Location Map

Figure 2 – Estimated ROI and ROE

Table 1 – Air Sample Laboratory Analytical Results

Table 2 – Soil Vapor Extraction System Recovery & Emissions Summary

Enclosure A –Laboratory Analytical Reports

FIGURES

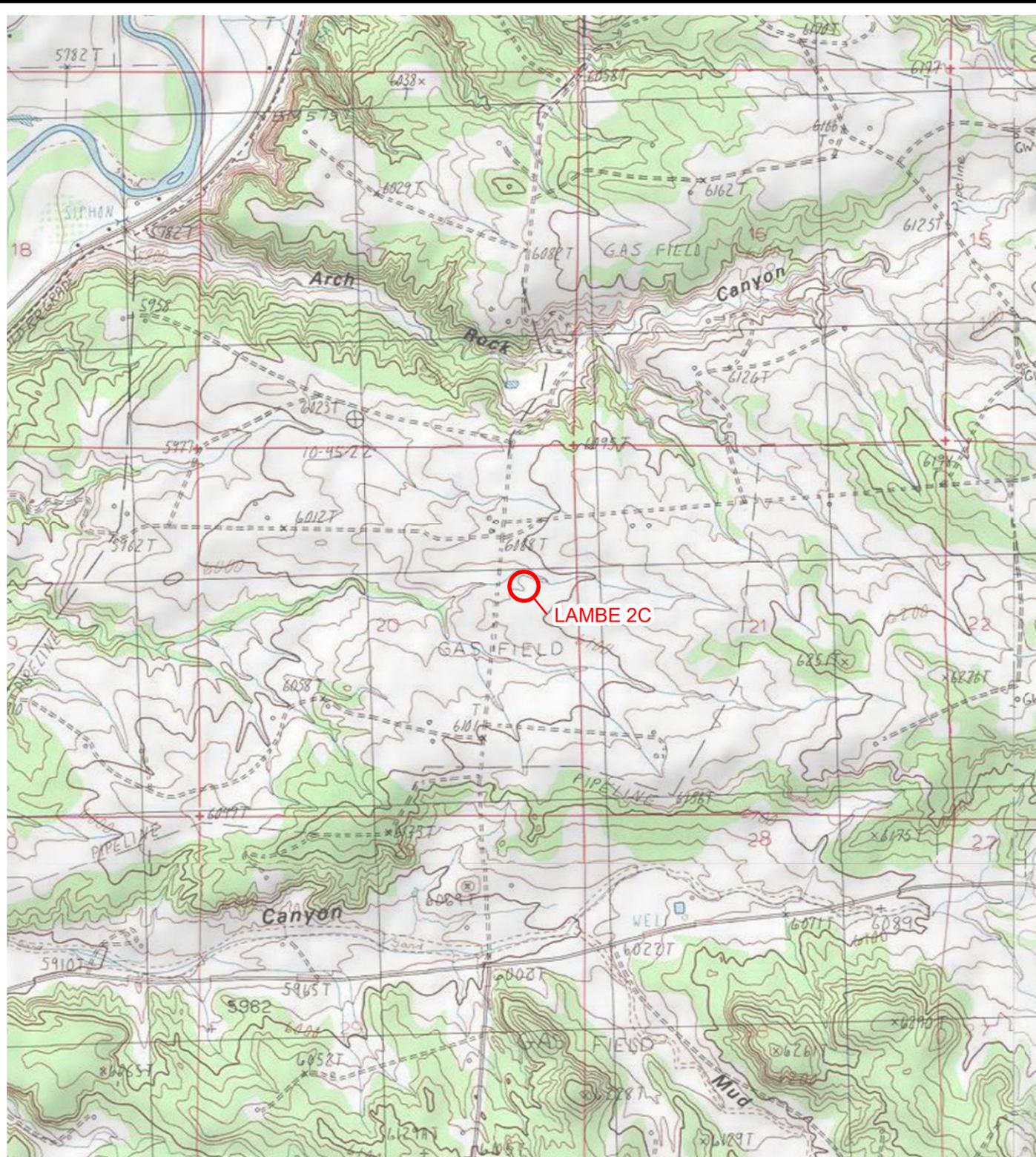


IMAGE COURTESY OF ESRI/USGS

LEGEND

○ SITE LOCATION

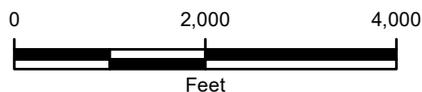


FIGURE 1
SITE LOCATION MAP
LAMBE 2C
SENE SEC 20 T31N R10W
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY



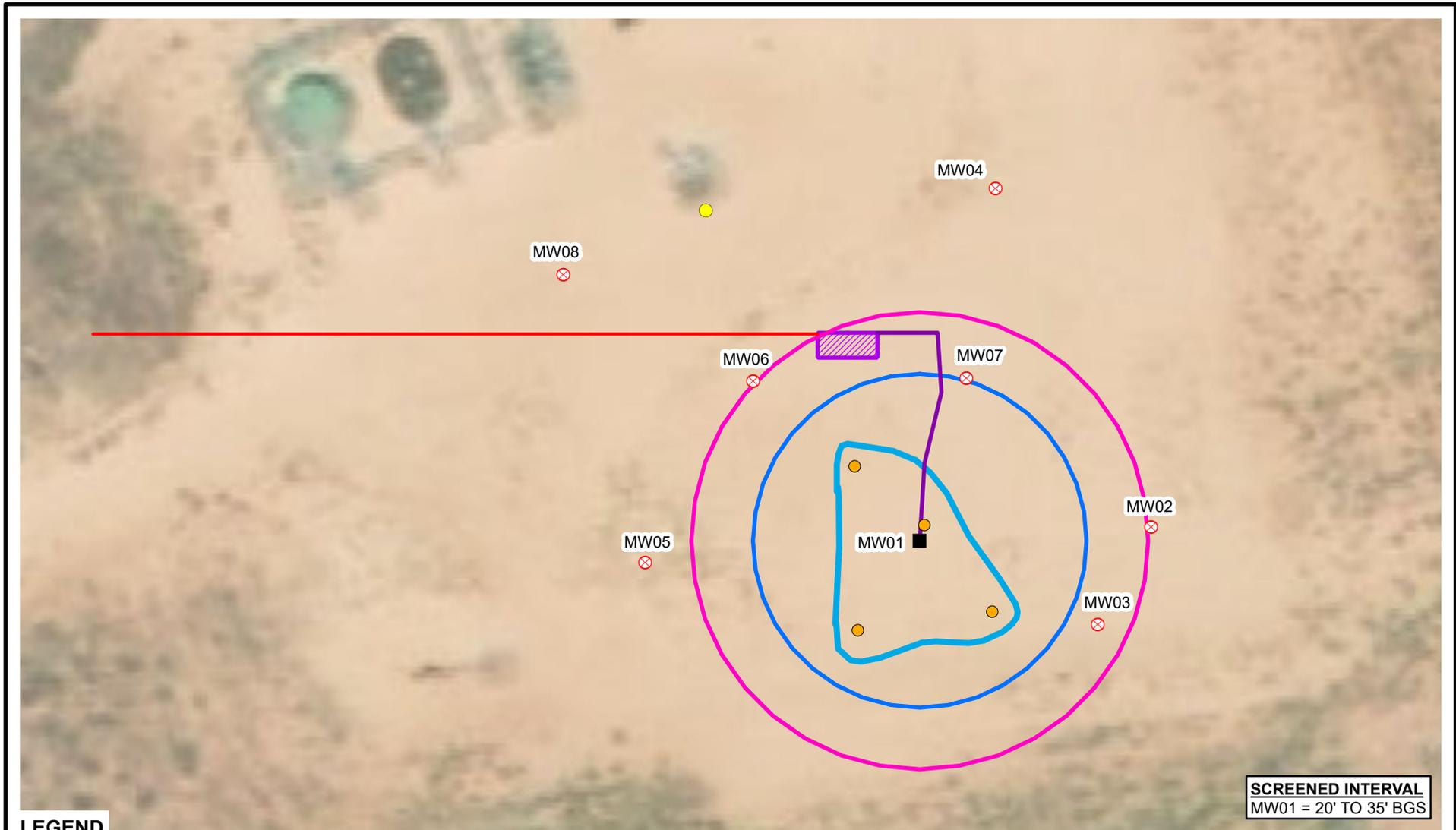


IMAGE COURTESY OF ESRI (MAXAR 2020)

LEGEND

- SVE WELL / MONITORING WELL
 - ⊗ MONITORING WELL
 - PROPOSED SOIL CONFIRMATION BORING LOCATIONS
 - WELLHEAD
 - SVE PIPING
 - ELECTRICAL SERVICE LINE
 - ▨ SVE SKID LOCATION
 - ▭ REMAINING IMPACTED SOIL
 - RADIUS OF EFFECT
 - RADIUS OF INFLUENCE
- BGS: BELOW GROUND SURFACE
SVE: SOIL VAPOR EXTRACTION

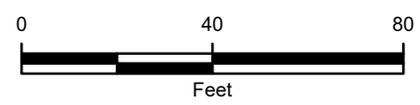


FIGURE 2
ESTIMATED ROI AND ROE
LAMBE 2C
 SENE SEC 20 T31N R10W
 SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY



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TABLES

**TABLE 1
AIR SAMPLE LABORATORY ANALYTICAL RESULTS**

**LAMBE 2C
SAN JUAN COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY**

Sample ID	Sample Date	PID Reading (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethyl- benzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)	Oxygen (%)	Carbon Dioxide (%)
Influent 9/25	9/25/2019	782	6.1	42	<5.0	56	NA	NA	NA
Influent-MW01	10/14/2019	431	7.3	26	2.6	36	3,600	NA	NA
Influent - Pilot Test	9/17/2021	78	<0.10	<0.10	<0.10	1.1	660	NA	NA
Influent-MW01	9/24/2021	97	<0.20	0.94	<0.20	4.3	880	NA	NA
Influent MW01	12/2/2021	92	<0.20	2.30	0.59	6.5	300	22.097	0.288

Notes:

µg/L - micrograms per liter

NA - not analyzed

PID - photo-ionization detector

ppm - parts per million

TVPH- total volatile petroleum hydrocarbons

% - percent

< - indicates result is less than the stated laboratory reporting limit

TABLE 2
SOIL VAPOR EXTRACTION SYSTEM RECOVERY & EMISSIONS SUMMARY

LAMBE 2C
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)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	TVPH (µg/L)
9/24/2021	4,590	4,590	97	0.20	0.94	0.20	4.3	880
12/2/2021	3,806,880	3,802,290	92	0.20	2.30	0.59	6.5	300
		Average	95	0.20	1.62	0.40	5.4	590

Vapor Extraction Calculations

Date	Flow Rate (cfm)	Benzene (lb/hr)	Toluene (lb/hr)	Ethyl-benzene (lb/hr)	Xylenes (lb/hr)	TVPH (lb/hr)	
9/24/2021	51	0.00004	0.0002	0.00004	0.001	0.17	
12/2/2021	40	0.00003	0.0003	0.00009	0.001	0.04	
	Average	46	0.00003	0.00026	0.00006	0.0009	0.11

Pounds Extracted Over Operating Time

Date	Total Operational Hours	Delta Hours	Benzene (lbs)	Toluene (lbs)	Ethyl-benzene (lbs)	Xylenes (lbs)	TVPH (lbs)	TVPH (tons)
9/24/2021	Startup							
9/24/2021	1.5	1.5	0.0001	0.0003	0.0001	0.001	0.3	0.0001
12/2/2021	1,587.7	1,586.2	0.0475	0.546	0.140	1.54	71.19	0.0356
	Total Extracted to Date		0.0475	0.546	0.140	1.54	71.44	0.0357

Notes:

cf - cubic feet

cfm - cubic feet per minute

lbs - pounds

lb/hr - pounds per hour

µg/L - micrograms per hour

NA - not analyzed

PID - photoionization detector

ppm - parts per million

TVPH - total volatile petroleum hydrocarbons

Italics and gray indicate laboratory result was less than reporting limit. Reporting limit utilized in calculations.

ENCLOSURE A –LABORATORY ANALYTICAL REPORTS



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

December 17, 2021

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

RE: Lambe 2C

OrderNo.: 2112293

Dear Danny Burns:

Hall Environmental Analysis Laboratory received 1 sample(s) on 12/4/2021 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

Analytical Report

Lab Order **2112293**

Date Reported: **12/17/2021**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY

Client Sample ID: Influent MW01

Project: Lambe 2C

Collection Date: 12/2/2021 11:50:00 AM

Lab ID: 2112293-001

Matrix: AIR

Received Date: 12/4/2021 9:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015D: GASOLINE RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	300	10		µg/L	2	12/6/2021 10:40:10 AM
Surr: BFB	410	37.3-213	S	%Rec	2	12/6/2021 10:40:10 AM
EPA METHOD 8260B: VOLATILES						Analyst: CCM
Benzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Toluene	2.3	0.20		µg/L	2	12/9/2021 4:09:00 PM
Ethylbenzene	0.59	0.20		µg/L	2	12/9/2021 4:09:00 PM
Methyl tert-butyl ether (MTBE)	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,2,4-Trimethylbenzene	0.66	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,3,5-Trimethylbenzene	0.68	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,2-Dichloroethane (EDC)	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,2-Dibromoethane (EDB)	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Naphthalene	ND	0.40		µg/L	2	12/9/2021 4:09:00 PM
1-Methylnaphthalene	ND	0.80		µg/L	2	12/9/2021 4:09:00 PM
2-Methylnaphthalene	ND	0.80		µg/L	2	12/9/2021 4:09:00 PM
Acetone	ND	2.0		µg/L	2	12/9/2021 4:09:00 PM
Bromobenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Bromodichloromethane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Bromoform	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Bromomethane	ND	0.40		µg/L	2	12/9/2021 4:09:00 PM
2-Butanone	ND	2.0		µg/L	2	12/9/2021 4:09:00 PM
Carbon disulfide	ND	2.0		µg/L	2	12/9/2021 4:09:00 PM
Carbon tetrachloride	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Chlorobenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Chloroethane	ND	0.40		µg/L	2	12/9/2021 4:09:00 PM
Chloroform	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Chloromethane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
2-Chlorotoluene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
4-Chlorotoluene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
cis-1,2-DCE	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
cis-1,3-Dichloropropene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,2-Dibromo-3-chloropropane	ND	0.40		µg/L	2	12/9/2021 4:09:00 PM
Dibromochloromethane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Dibromomethane	ND	0.40		µg/L	2	12/9/2021 4:09:00 PM
1,2-Dichlorobenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,3-Dichlorobenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,4-Dichlorobenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Dichlorodifluoromethane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,1-Dichloroethane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,1-Dichloroethene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM

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 interference	

Analytical Report

Lab Order 2112293

Date Reported: 12/17/2021

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY

Client Sample ID: Influent MW01

Project: Lambe 2C

Collection Date: 12/2/2021 11:50:00 AM

Lab ID: 2112293-001

Matrix: AIR

Received Date: 12/4/2021 9:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
EPA METHOD 8260B: VOLATILES						Analyst: CCM
1,2-Dichloropropane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,3-Dichloropropane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
2,2-Dichloropropane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,1-Dichloropropene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Hexachlorobutadiene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
2-Hexanone	ND	2.0		µg/L	2	12/9/2021 4:09:00 PM
Isopropylbenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
4-Isopropyltoluene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
4-Methyl-2-pentanone	ND	2.0		µg/L	2	12/9/2021 4:09:00 PM
Methylene chloride	ND	0.60		µg/L	2	12/9/2021 4:09:00 PM
n-Butylbenzene	ND	0.60		µg/L	2	12/9/2021 4:09:00 PM
n-Propylbenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
sec-Butylbenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Styrene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
tert-Butylbenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,1,1,2-Tetrachloroethane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,1,1,2,2-Tetrachloroethane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Tetrachloroethene (PCE)	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
trans-1,2-DCE	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
trans-1,3-Dichloropropene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,2,3-Trichlorobenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,2,4-Trichlorobenzene	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,1,1-Trichloroethane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,1,2-Trichloroethane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Trichloroethene (TCE)	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Trichlorofluoromethane	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
1,2,3-Trichloropropane	ND	0.40		µg/L	2	12/9/2021 4:09:00 PM
Vinyl chloride	ND	0.20		µg/L	2	12/9/2021 4:09:00 PM
Xylenes, Total	6.5	0.30		µg/L	2	12/9/2021 4:09:00 PM
Surr: Dibromofluoromethane	89.7	70-130		%Rec	2	12/9/2021 4:09:00 PM
Surr: 1,2-Dichloroethane-d4	73.6	70-130		%Rec	2	12/9/2021 4:09:00 PM
Surr: Toluene-d8	109	70-130		%Rec	2	12/9/2021 4:09:00 PM
Surr: 4-Bromofluorobenzene	89.2	70-130		%Rec	2	12/9/2021 4:09:00 PM

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 interference		

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ANALYTICAL SUMMARY REPORT

December 14, 2021

Hall Environmental
4901 Hawkins St NE Ste D
Albuquerque, NM 87109-4372

Work Order: G21120163
Project Name: Not Indicated

Energy Laboratories Inc. Gillette WY received the following 1 sample for Hall Environmental on 12/8/2021 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
G21120163-001	2112293-001B; Influent MW01	12/02/21 11:50	12/08/21	Gas	Natural Gas Analysis - BTU Natural Gas Analysis - Compressibility Factor Natural Gas Analysis - GPM Natural Gas Analysis - Molecular Weight Natural Gas Analysis - Routine Natural Gas Analysis - Pressure Base Natural Gas Analysis - Psuedo-Critical Pressure Natural Gas Analysis - Psuedo-Critical Temperature Natural Gas Analysis - Specific Gravity Natural Gas Analysis - Temperature Base

The analyses presented in this report were performed by Energy Laboratories, Inc., 400 W. Boxelder Rd., Gillette, WY 82718, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these tests results, please contact your Project Manager.

Report Approved By:



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Hall Environmental
Project: Not Indicated
Client Sample ID: 2112293-001B; Influent MW01
Location:
Lab ID: G21120163-001

Report Date: 12/14/21
Collection Date: 12/02/21 11:50
Date Received: 12/08/21
Sampled By: Not Provided

Analyses **Result** **Units** **Qualifier** **Method** **Analysis Date / By**

NATURAL GAS CHROMATOGRAPHIC ANALYSIS REPORT

Oxygen	22.097	Mol %	GPA 2261	12/13/21 14:25 / djb
Nitrogen	77.615	Mol %	GPA 2261	12/13/21 14:25 / djb
Carbon Dioxide	0.288	Mol %	GPA 2261	12/13/21 14:25 / djb
Hydrogen Sulfide	< 0.001	Mol %	GPA 2261	12/13/21 14:25 / djb
Methane	< 0.001	Mol %	GPA 2261	12/13/21 14:25 / djb
Ethane	< 0.001	Mol %	GPA 2261	12/13/21 14:25 / djb
Propane	< 0.001	Mol %	GPA 2261	12/13/21 14:25 / djb
Isobutane	< 0.001	Mol %	GPA 2261	12/13/21 14:25 / djb
n-Butane	< 0.001	Mol %	GPA 2261	12/13/21 14:25 / djb
Isopentane	< 0.001	Mol %	GPA 2261	12/13/21 14:25 / djb
n-Pentane	< 0.001	Mol %	GPA 2261	12/13/21 14:25 / djb
Hexanes plus	< 0.001	Mol %	GPA 2261	12/13/21 14:25 / djb

GPM @ STD COND/1000 CU.FT., MOISTURE FREE GAS

GPM Ethane	< 0.0003	gal/MCF	GPA 2261	12/13/21 14:25 / djb
GPM Propane	< 0.0003	gal/MCF	GPA 2261	12/13/21 14:25 / djb
GPM Isobutane	< 0.0003	gal/MCF	GPA 2261	12/13/21 14:25 / djb
GPM n-Butane	< 0.0003	gal/MCF	GPA 2261	12/13/21 14:25 / djb
GPM Isopentane	< 0.0004	gal/MCF	GPA 2261	12/13/21 14:25 / djb
GPM n-Pentane	< 0.0004	gal/MCF	GPA 2261	12/13/21 14:25 / djb
GPM Hexanes plus	< 0.0004	gal/MCF	GPA 2261	12/13/21 14:25 / djb
GPM Pentanes plus	< 0.0004	gal/MCF	GPA 2261	12/13/21 14:25 / djb
GPM Total	< 0.0004	gal/MCF	GPA 2261	12/13/21 14:25 / djb

CALCULATED PROPERTIES

Calculation Pressure Base	14.730	psia	GPA 2261	12/13/21 14:25 / djb
Calculation Temperature Base	60	°F	GPA 2261	12/13/21 14:25 / djb
Compressibility Factor, Z	1.0000	unitless	GPA 2261	12/13/21 14:25 / djb
Molecular Weight	28.94	unitless	GPA 2261	12/13/21 14:25 / djb
Pseudo-critical Pressure, psia	548	psia	GPA 2261	12/13/21 14:25 / djb
Pseudo-critical Temperature, deg R	240	deg R	GPA 2261	12/13/21 14:25 / djb
Specific Gravity (air=1.000)	1.002	unitless	GPA 2261	12/13/21 14:25 / djb
Gross BTU per cu ft @ std cond, dry	< 0.01	BTU/cu ft	GPA 2261	12/13/21 14:25 / djb
Gross BTU per cu ft @ std cond, wet	< 0.01	BTU/cu ft	GPA 2261	12/13/21 14:25 / djb

Report RL - Analyte Reporting Limit
Definitions: QCL - Quality Control Limit

MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)



Trust our People. Trust our Data.
www.energylab.com

Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental

Work Order: G21120163

Report Date: 12/14/21

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
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Method: GPA 2261 Analytical Run: R268490

Lab ID: ICV-2110130824 Initial Calibration Verification Standard 12/13/21 08:24

Oxygen	0.393	Mol %	0.001	98	75	110			
Nitrogen	5.137	Mol %	0.001	102	90	110			
Carbon Dioxide	4.901	Mol %	0.001	99	90	110			
Hydrogen Sulfide	0.124	Mol %	0.001	125	100	136			
Methane	73.196	Mol %	0.001	100	90	110			
Ethane	5.001	Mol %	0.001	101	90	110			
Propane	5.006	Mol %	0.001	100	90	110			
Isobutane	1.987	Mol %	0.001	99	90	110			
n-Butane	1.967	Mol %	0.001	98	90	110			
Isopentane	0.985	Mol %	0.001	98	90	110			
n-Pentane	0.995	Mol %	0.001	99	90	110			
Hexanes plus	0.308	Mol %	0.001	102	90	110			

Lab ID: CCV-2112130829 Continuing Calibration Verification Standard 12/13/21 08:29

Oxygen	0.605	Mol %	0.001	101	90	110			
Nitrogen	1.290	Mol %	0.001	92	85	110			
Carbon Dioxide	0.955	Mol %	0.001	96	90	110			
Hydrogen Sulfide	0.025	Mol %	0.001	100	70	130			
Methane	93.548	Mol %	0.001	100	90	110			
Ethane	1.016	Mol %	0.001	102	90	110			
Propane	1.012	Mol %	0.001	101	90	110			
Isobutane	0.496	Mol %	0.001	99	90	110			
n-Butane	0.496	Mol %	0.001	99	90	110			
Isopentane	0.200	Mol %	0.001	100	90	110			
n-Pentane	0.201	Mol %	0.001	100	90	110			
Hexanes plus	0.156	Mol %	0.001	104	90	110			

Lab ID: CCV-2112131444 Continuing Calibration Verification Standard 12/13/21 14:45

Oxygen	0.619	Mol %	0.001	103	90	110			
Nitrogen	1.337	Mol %	0.001	96	85	110			
Carbon Dioxide	0.957	Mol %	0.001	96	90	110			
Hydrogen Sulfide	0.026	Mol %	0.001	104	70	130			
Methane	93.505	Mol %	0.001	100	90	110			
Ethane	1.012	Mol %	0.001	101	90	110			
Propane	1.009	Mol %	0.001	101	90	110			
Isobutane	0.492	Mol %	0.001	98	90	110			
n-Butane	0.491	Mol %	0.001	98	90	110			
Isopentane	0.198	Mol %	0.001	99	90	110			
n-Pentane	0.199	Mol %	0.001	99	90	110			
Hexanes plus	0.155	Mol %	0.001	103	90	110			

Method: GPA 2261 Batch: R268490

Lab ID: G21120163-001ADUP	Sample Duplicate			Run: Varian GC_211213A	12/13/21 14:31
Oxygen	22.094	Mol %	0.001	0.0	10

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



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Billings, MT 800.735.4489 • Casper, WY 888.235.0515
Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental

Work Order: G21120163

Report Date: 12/14/21

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261							Batch: R268490		
Lab ID: G21120163-001ADUP	Sample Duplicate		Run: Varian GC_211213A				12/13/21 14:31		
Nitrogen	77.619	Mol %	0.001				0.0	10	
Carbon Dioxide	0.287	Mol %	0.001				0.4	10	
Hydrogen Sulfide	< 0.001	Mol %	0.001					10	
Methane	< 0.001	Mol %	0.001					10	
Ethane	< 0.001	Mol %	0.001					10	
Propane	< 0.001	Mol %	0.001					10	
Isobutane	< 0.001	Mol %	0.001					10	
n-Butane	< 0.001	Mol %	0.001					10	
Isopentane	< 0.001	Mol %	0.001					10	
n-Pentane	< 0.001	Mol %	0.001					10	
Hexanes plus	< 0.001	Mol %	0.001					10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



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Work Order Receipt Checklist

Hall Environmental

G21120163

Login completed by: Chantel S. Johnson

Date Received: 12/8/2021

Reviewed by: Misty Stephens

Received by: csj

Reviewed Date: 12/9/2021

Carrier name: FedEx

- Shipping container/cooler in good condition? Yes No Not Present
- Custody seals intact on all shipping container(s)/cooler(s)? Yes No Not Present
- Custody seals intact on all sample bottles? Yes No Not Present
- Chain of custody present? Yes No
- Chain of custody signed when relinquished and received? Yes No
- Chain of custody agrees with sample labels? Yes No
- Samples in proper container/bottle? Yes No
- Sample containers intact? Yes No
- Sufficient sample volume for indicated test? Yes No
- All samples received within holding time?
(Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.) Yes No
- Temp Blank received in all shipping container(s)/cooler(s)? Yes No Not Applicable
- Container/Temp Blank temperature: °C
- Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4"). Yes No No VOA vials submitted
- Water - pH acceptable upon receipt? Yes No Not Applicable

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None



CHAIN OF CUSTODY RECORD

PAGE: 1 OF 1

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

SUB CONTRACTOR	Energy Labs-Gillette	COMPANY	Energy Laboratories	PHONE	(866) 686-7175	FAX
ADDRESS	400 W Boxelder Rd		ACCOUNT #	EMAIL		
CITY, STATE, ZIP	Gillette, WY 82718					

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	2112293-001B	Influent MW01	TEDLAR	Air	12/22/2021 11:50:00 AM	1	Natural Gases O2, CO2

SPECIAL INSTRUCTIONS/COMMENTS:

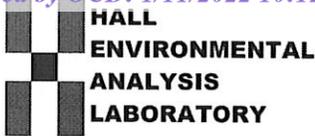
Please include the LAB ID and the CLIENT SAMPLE ID on all final reports. Please e-mail results to lab@hallenvironmental.com. Please return all coolers and blue ice. Thank you.

Relinquished By	<i>[Signature]</i>	Date	12/4/2021	Time	10:43 AM	Received By		Date		Time	
Relinquished By		Date		Time		Received By	<i>[Signature]</i>	Date	12/18/2021	Time	12:51 PM
Relinquished By		Date		Time		Received By	<i>[Signature]</i>	Date	12/20/21	Time	

TAT Standard RUSH Next BD 2nd BD 3rd BD

REPORT TRANSMITTAL DESIRED
 HARDCOPY (extra cost) FAX EMAIL ONLINE

Temp of samples *N/A* FOR LAB USE ONLY
 Attempt to Cool? *0211201163*
 Comments:



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: 2112293 RcptNo: 1

Received By: Sean Livingston 12/4/2021 9:45:00 AM

Signature of Sean Livingston

Completed By: Sean Livingston 12/4/2021 10:39:38 AM

Signature of Sean Livingston

Reviewed By: SLL 12/4/21

Chain of Custody

- 1. Is Chain of Custody complete? Yes [checked] No [] Not Present []
2. How was the sample delivered? Courier

Log In

- 3. Was an attempt made to cool the samples? Yes [] No [] NA [checked]
4. Were all samples received at a temperature of >0° C to 6.0°C Yes [] No [] NA [checked]
5. Sample(s) in proper container(s)? Yes [checked] No []
6. Sufficient sample volume for indicated test(s)? Yes [checked] No []
7. Are samples (except VOA and ONG) properly preserved? Yes [checked] No []
8. Was preservative added to bottles? Yes [] No [checked] NA []
9. Received at least 1 vial with headspace <1/4" for AQ VOA? Yes [] No [] NA [checked]
10. Were any sample containers received broken? Yes [] No [checked]
11. Does paperwork match bottle labels? Yes [checked] No []
12. Are matrices correctly identified on Chain of Custody? Yes [checked] No []
13. Is it clear what analyses were requested? Yes [checked] No []
14. Were all holding times able to be met? Yes [checked] No []

of preserved bottles checked for pH: (<2 or >12 unless noted)
Adjusted?
Checked by: SLL 12/4/21

Special Handling (if applicable)

- 15. Was client notified of all discrepancies with this order? Yes [] No [] NA [checked]

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

16. Additional remarks:

17. Cooler Information

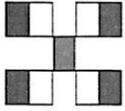
Table with 7 columns: Cooler No, Temp °C, Condition, Seal Intact, Seal No, Seal Date, Signed By. Row 1: 1, NA, Good, [], [], [], []

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

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



Chain-of-Custody Record

Client: *Hilcorp*
 Attn: *Mitch Killough*
 Mailing Address:

Turn-Around Time:
 Standard Rush
 Project Name:
Lambe 2C

Project #:

Project Manager:
Danny Burns

Sampler:
DB
 On Ice: Yes No
 # of Coolers:

Cooler Temp (including CF): *NA* (°C)

Container Type and #
2 Gallon

Preservative Type
—

HEAL No.
2112293

001

Analysis Request

BTEX / MTBE / TMBs (8021)	
TPH:8015D(GRO / DRO / MRO)	<i>X</i>
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) Full List	<i>X</i>
8270 (Semi-VOA)	
Total Coliform (Present/Absent)	<i>X Fixed gas O₂, CO₂</i>

Remarks:

*CC: Stuart, Hyde @wsp.com
 Devin. Henceman*

Received by: *Chit Wast* Date: *12/3/21* Time: *1402*
 Received by: *See corner* Date: *12/4/21* Time: *9:45*

Relinquished by: *[Signature]* Date: *12/3/21* Time: *1402*
 Relinquished by: *Chit Wast* Date: *12/3/21* Time: *1743*

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

Action 71618

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 71618
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See App ID 124692 for most updated status.	9/27/2022