



April 15, 2022

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

Subject: First Quarter 2022 - Quarterly SVE System Update
San Juan 28-6 Unit #31
Hilcorp Energy Company
API #: 30-039-07290
NMOCD Incident Number: NVF1816655680
Rio Arriba County, New Mexico

To Whom it May Concern:

WSP USA Inc. (WSP), on behalf of Hilcorp Energy Company (Hilcorp), presents the following first quarter 2022 summary report discussing the soil vapor extraction (SVE) system at the San Juan 28-6 Unit #31 natural gas production well (Site, shown on Figure 1). The layout of the SVE system and piping is shown on Figure 2. This report is being submitted as part of the proposed timeline of remediation events in the *Updated Remediation Work Plan* submitted to the New Mexico Oil Conservation Division (NMOCD) on October 7, 2021. The previous quarterly report summarizing SVE remediation activities through December 16, 2021, was submitted to the NMOCD on January 13, 2022. This report documents air sampling and system operations to monitor SVE remediation progress from December 16, 2021, through March 24, 2022.

FIRST QUARTER 2022 ACTIVITIES

Between December 16, 2021, and January 6, 2022, the system continued to operate on shallow impacts present on the east side of the Site, with wells SVE-1, 2RS, 4, 11S, 13S, and 14S isolated and all other wells were turned off. All other wells were shut off and the fresh-air bypass valve on the SVE manifold was adjusted so that the blower remained within the vacuum-operating capacity. With this configuration, the remediation system operated at an approximate flow of 30 cubic feet per minute (cfm) of at a vacuum of 50 inches of water column (IWC). On January 6, 2022, an air sample was collected with this configuration (active wells SVE-1, 2RS, 4, 11S, 13S, and 14S) to assess analytical results and contaminant mass removal.

After the air sample was collected, the SVE manifold was reconfigured with wells SVE-7D, 10, 12S, and 15 isolated and all other wells were turned off. Again, the fresh-air bypass valve on the SVE manifold was adjusted so that the blower remained within the vacuum-operating capacity. This configuration focused on the deep impacts towards the center of the Site. With this configuration, the remediation system operated at an approximate flow of 9 to 18 cfm at a vacuum of 44 to 49 IWC. After allowing subsurface conditions to stabilize, an air sample was collected on January 6, 2022, with active wells SVE-7D, 10, 12S, and 15.

During subsequent operation and maintenance (O&M) visits, the SVE system was reconfigured and additional SVE wells were activated. This was done to maximize the SVE system flow and vacuum capacity in the subsurface and reduce the amount of fresh-air bypass dilution. From January 21, 2022, to March 24, 2022, the active wells SVE-1, 2RS, 4, 7D, 10, 11S, 12S, 13S, 14S, and 15 operated at an approximate flow of 18 to 50 cfm at a vacuum of 26 to 44 IWC.

On March 24, 2022, the SVE system was reconfigured again to activate all 19 remediation wells (SVE-1, 2RS, 2RD, 3, 4, 5, 6, 7S, 7D, 8, 9, 10, 11S, 11D, 12S, 13S, 13D, 14S, and 15). After allowing the subsurface conditions to equilibrate, the existing SVE system was used to retest the radius of influence and effect. Two tests were performed to confirm system influence in the deep well network and a shallow well network. The tests were conducted by

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DURANGO CO 81301

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operating the wells above and then turning off each one measured one by one to confirm the presence of vacuum, thus showing that there is overlap within the well network with observed vacuum.

The first test on the deep well network sequentially confirmed overlapping vacuum influence in wells SVE-15, 3, 2RD, 13S, 13D, 5, and 11D. Vacuum measurements when the wells were shutoff one at a time ranged from 0.3 IWC to 22.5 IWC. The observed vacuum verified the deep well network has overlap utilizing the existing system.

The second test on the shallow well network sequentially confirmed overlapping vacuum influence in wells SVE-9, 8, 6, 12S, 7S, 7D, 10, and 11S. Vacuum measurements when the wells were shutoff one at a time ranged from 0.0 IWC to 0.3 IWC. Of the eight wells tested only two wells did not show overlapping vacuum. This can likely be accounted for due to the shallow nature of wells and the ability to propagate vacuum. The verification of vacuum in 75% of the wells tested illustrates overlapping vacuum influence. The other 25% of the wells are influencing their respective areas as shown through elevated PID measurements.

Overall, the pilot testing confirmed the current system is influencing both the deep and shallow soil. Overlapping influence is being observed. While two wells did not show vacuum the PID response and recovery indicate removal of hydrocarbons from both the deep and shallow intervals. System optimization will continue to occur and once a decline in vapor concentrations is observed further investigation and optimization will be conducted to ensure influence in the remaining impacted areas.

All air samples were collected from the influent side of the blower, via high vacuum air sampler, and directly into 1-Liter Tedlar® bags. Samples were submitted to Hall Environmental Analysis Laboratory (Hall) for analysis of volatile organic compounds (VOCs) by EPA Method 8260, total volatile petroleum hydrocarbons (TVPH) by EPA Method 8015, and fixed gas analysis of oxygen and carbon dioxide. Prior to collection of samples during each event, the air from the influent side was field screened with a PID for organic vapor monitoring (OVM). Table 1 presents a summary of analytical data collected during the first quarter of 2022, with the full analytical laboratory reports included in Enclosure A.

The air-sample data collected to date and measured flow rates were utilized to calculate total emissions and contaminants mass removal for the system up to March 24, 2022 (Table 2). As of March 24, 2022, the total operational time of the system was 3,999 hours with an estimated mass source removal via the SVE system of 6,738.9 pounds of TVPH. The operational runtime for the first quarter 2022 was 91.9%. Based on Site visit observations and runtime calculations, the system was operating as anticipated during the first quarter of 2022.

RECOMMENDATIONS

On March 24, 2022, the pilot test confirmation activities confirmed that the existing SVE system influence the shallow and deeper petroleum hydrocarbon impacts in the subsurface. Operating the system with all wells open and active reduces the need for any fresh air bypass dilution and increases the efficiency and capacity of the vacuum blower. WSP and Hilcorp will continue operating the SVE system with all wells open and active during the second quarter of 2022 and determine if there is continued decline in air emissions. Updated analytical data, emissions calculations, and contaminant mass removal volumes for the current optimal operation setup will be updated in the second quarter 2022 report. The next quarterly report will also detail any alterations or suggestions of system reconfiguration, if necessary.

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 appreciates the opportunity to provide this report to the NMOCD. If you have any questions or comments regarding this report, do not hesitate to contact Danny Burns at (970) 385-1096 or via email at danny.burns@wsp.com or Billy Ginn at (346) 237-2073 or at William.ginn@hilcorp.com.



Kind regards,

A handwritten signature in blue ink, appearing to read 'D. Burns'.

Danny Burns
Consultant, Geologist

A handwritten signature in blue ink, appearing to read 'Robert T. Rebel'.

Rob Rebel, P.E.
Technical Principal, Sr. Lead Consultant

Enclosures:

Figure 1 – Site Location Map

Figure 2 – SVE System Layout

Table 1 – Soil Vapor Extraction System Analytical Results

Table 2 – Soil Vapor Extraction System Recovery & Emissions Summary

Table 3 – March 24, 2022, Pilot Test Confirmation

Enclosure A – Analytical Laboratory Reports

FIGURES

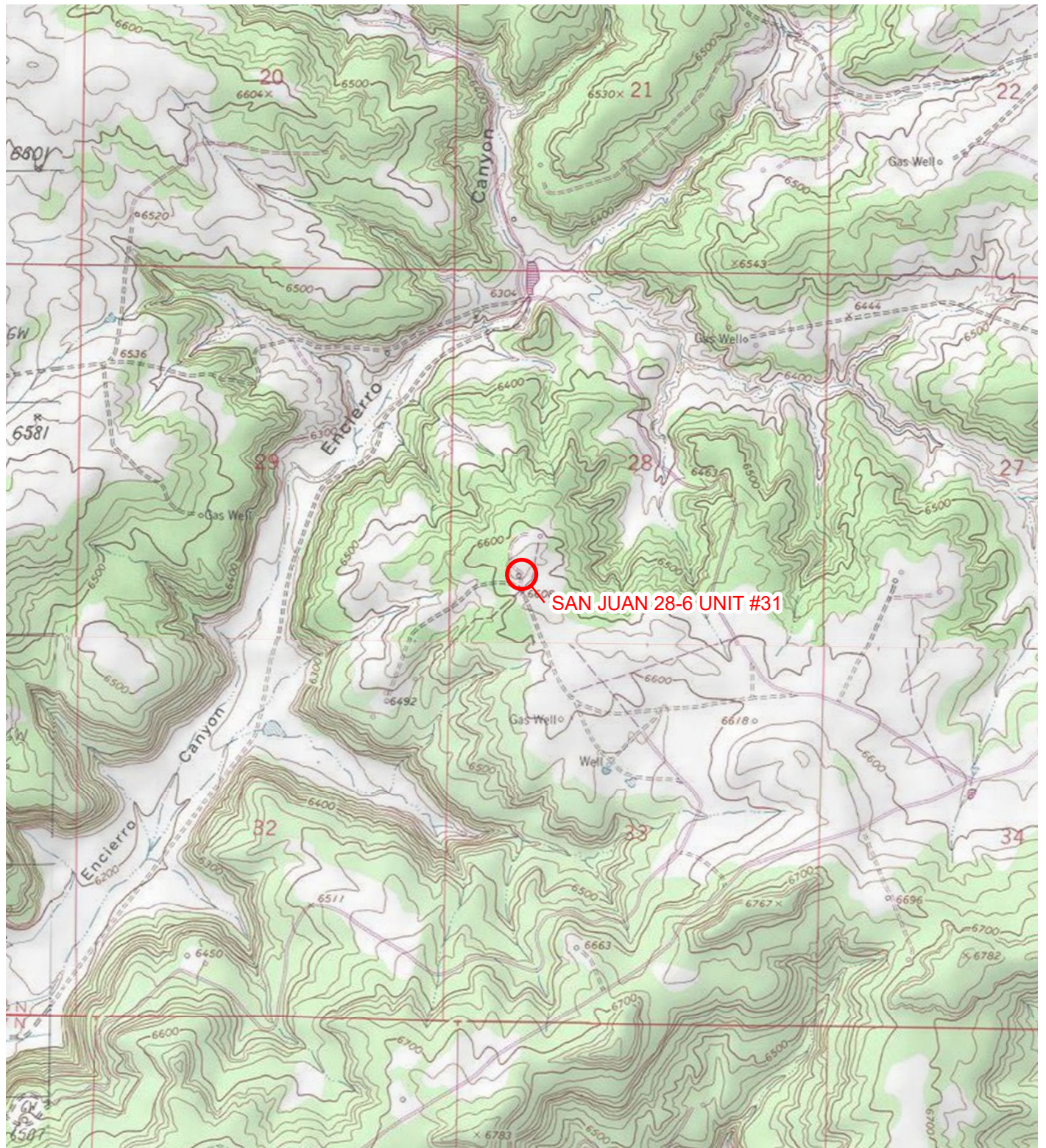


IMAGE COURTESY OF ESRI/USGS

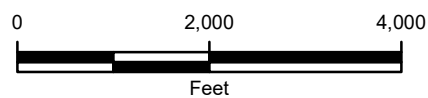
LEGEND SITE LOCATIONNEW
MEXICO

FIGURE 1
SITE LOCATION MAP
SAN JUAN 28-6 UNIT #31
SWSW SEC 28-T28N-R6W
RIO ARRIBA COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY



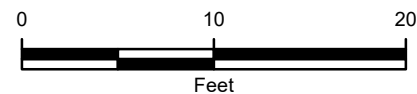
C:\Users\USJG689584\OneDrive - WSP\0365\Documents\TE017821011_SAN JUAN 28-6 UNIT_#31\MXD\017821011_FIG01_SJ 28-6_31_SL_2021.mxd



IMAGE COURTESY OF ANIMAS ENVIRONMENTAL SERVICES

LEGEND

▲ SVE WELL

 GENERATOR AND SVE BLOWER LOCATION


SVE: SOIL VAPOR EXTRACTION

FIGURE 2
SVE SYSTEM LAYOUT
SAN JUAN 28-6 UNIT #31
SWSW SEC 28-T28N-R6W
RIO ARriba COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY



TABLES

TABLE 1
SOIL VAPOR EXTRACTION SYSTEM ANALYTICAL RESULTS

SAN JUAN 28-6 UNIT #31
RIO ARriba COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Date	Sample ID	Operating SVE Wells	PID (ppm)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylenes (µg/L)	TVPH (µg/L)	Oxygen (%)	Carbon Dioxide (%)
9/20/2021	Pilot Test	All Wells	1,287	720	1,600	15	320	250,000	17.870%	2.054%
9/28/2021	Influent A+B	All Wells	736	240	720	27	350	53,000	NA	NA
10/21/2021	Influent A+B	All Wells	615	60	170	6.7	74	13,000	NA	NA
11/5/2021	Leg A Deep	2RD, 3, 5, 11D, 13D	1,177	620	1,700	29	390	72,000	NA	NA
12/16/2021	Leg A Deep	2RD, 3, 5, 11D, 13D	1,398	470	950	11	190	96,000	21.004%	0.834%
12/16/2021	Leg A Shallow	1, 2RS, 4, 11S, 13S, 14S	298	9.8	32	1.1	19	2,300	21.998%	0.116%
1/6/2022	Leg A Shallow	1, 2RS, 4, 11S, 13S, 14S	283	12	34	1.2	15	2,500	22.131%	0.129%
1/6/2022	Leg B-1	7D, 10, 12S, 15	158	2.3	10	<0.50	6.7	1,100	21.973%	0.103%
3/24/2022	Influent All Wells	All Wells	604	48	92	1.2	19	6,300	22.097%	0.179%

Notes:

% - percent

µg/L - micrograms per Liter

NA - not analyzed

PID - photoionization detector

ppm - parts per million

TVPH - total volatile petroleum hydrocarbons

TABLE 2
SOIL VAPOR EXTRACTION SYSTEM RECOVERY & EMISSIONS SUMMARY

SAN JUAN 28-6 UNIT #31
RIO ARriba COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Sample Information and Lab Analysis

Date	Total Flow (cf)	Delta Flow (cf)	Benzene (µg/L)	Toluene (µg/L)	Ethyl- benzene (µg/L)	Xylenes (µg/L)	TVPH (µg/L)	PID (ppm)
9/28/2021	17,280	17,280	240	720	27	350	53,000	736
10/21/2021	1,648,680	1,631,400	60	170	7	74	13,000	615
11/5/2021	1,864,392	215,712	620	1,700	29	390	72,000	1,177
12/16/2021	2,496,696	632,304	470	950	11	190	96,000	1,398
12/16/2021	2,499,936	3,240	9.8	32	1.1	6.7	2,300	298
1/6/2022	3,456,096	956,160	12	34	1.2	15.0	2,500	283
1/6/2022	3,457,176	1,080	2.3	10	0.5	6.7	1,100	158
3/24/2022	4,624,296	1,167,120	48	92	1	19	6,300	604
Average			183	464	10	131	30,775	659

Vapor Extraction Calculations

Vapor Extraction Calculations						
Date	Flow Rate (cfm)	Benzene (lb/hr)	Toluene (lb/hr)	Ethyl- benzene (lb/hr)	Xylenes (lb/hr)	TVPH (lb/hr)
9/28/2021	60	0.054	0.162	0.006	0.079	11.893
10/21/2021	50	0.011	0.032	0.001	0.014	2.431
11/5/2021	8	0.019	0.051	0.001	0.012	2.154
12/16/2021	12	0.021	0.043	0.0005	0.009	4.309
12/16/2021	30	0.001	0.004	0.0001	0.001	0.258
1/6/2022	32	0.001	0.004	0.0001	0.002	0.299
1/6/2022	9	0.0001	0.0003	0.00002	0.0002	0.037
3/24/2022	12	0.002	0.004	0.0001	0.001	0.283
Average	27	0.01	0.04	0.001	0.01	2.7

Pounds Extracted Over Operating Time

Date	Total Operational Hours	Delta Hours	Benzene (lbs)	Toluene (lbs)	Ethyl- benzene (lbs)	Xylenes (lbs)	TVPH (lbs)	TVPH (tons)
9/28/2021	5	5	0.259	0.776	0.029	0.377	57.1	0.029
10/21/2021	549	544	6.102	17.288	0.681	7.525	1,322.0	0.661
11/9/2021 (1)	998	449	8.337	22.859	0.390	5.244	968.1	0.484
12/16/2021	1,876	878	18.525	37.444	0.434	7.489	3,783.8	1.892
12/16/2021	1,878	2	0.002	0.006	0.0002	0.001	0.5	0.0002
1/6/2022	2,376	498	0.715	2.026	0.072	0.894	149.0	0.075
1/6/2022	2,378	2	0.0002	0.001	0.00003	0.0005	0.1	0.00004
3/24/2022	3,999	1,621	3.492	6.693	0.087	1.382	458.3	0.229
Total Extracted to Date			37.431	87.093	1.693	22.913	6,738.9	3.4

Notes:

(1) - total operational hours collected during site visit on 11/9/21 lb/hr - pounds per hour
 cf - cubic feet PID - photo-ionization detector
 cfm - cubic feet per minute ppm - part per million
 µg/l - micrograms per liter TVPH - total volatile petroleum hydrocarbons
 lbs - pounds

TABLE 3
MARCH 24, 2022 PILOT TEST CONFIRMATION

SAN JUAN 28-6 UNIT #31
RIO ARRIBA COUNTY, NEW MEXICO
HILCORP ENERGY COMPANY

Deep Pilot Test

Active Wells	Distance from 11D (feet)	Vacuum (IWC)
SVE-15	14	0.3
SVE-3	17	22.5
SVE-2RD	21	17.0
SVE-13S	12	3.5
SVE-13D	12	21.0
SVE-5	26	16.0
SVE-11D	---	21.5

Shallow Pilot Test

Active Wells	Distance from 12S (feet)	Vacuum (IWC)
SVE-9	15	0.2
SVE-8	11	0.1
SVE-6	11	0.1
SVE-12S	---	0.0
SVE-7S	12	0.3
SVE-7D	11	0.2
SVE-10	14	0.0
SVE-11S	15	0.2

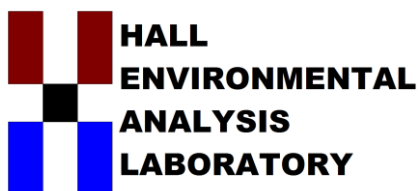
Operational Pilot Test

Active Wells	Vacuum (IWC)	Well Diameter (inch)	Screened Interval (feet)
9	0.0	2	7-12
6	0.1	2	7-12
12S	0.0	1	9-14
7S	0.0	2	5-10
7D	0.0	2	8-13
15	0.0	1	15-20
11S	0.0	1	10-15
11D	11.5	1	25-30
3	12.7	2	10-25
2RS	2.9	1	5-10
2RD	11.7	1	10-20
13S	0.7	1	17-22
13D	13.6	1	25-30
4	4.8	2	7-12
14S	0.1	1	9-14
1	0.0	1	7-12
5	10.2	2	10-25
10	0.0	2	7-12
8	0.1	2	7-12

Notes

IWC - inches water column

ENCLOSURE A – ANALYTICAL LABORATORY REPORTS



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

Danny Burns
Hilcorp Energy
PO Box 61529
Houston, TX 77208-1529
TEL: (337) 276-7676
FAX

RE: San Juan 28 6 31

OrderNo.: 2112B19

Dear Danny Burns:

Hall Environmental Analysis Laboratory received 2 sample(s) on 12/17/2021 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 horizontal line.

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report

Lab Order 2112B19

Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Influent- Leg A Deep

Project: San Juan 28 6 31

Collection Date: 12/16/2021 12:55:00 PM

Lab ID: 2112B19-001

Matrix: AIR

Received Date: 12/17/2021 7:31:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	96000	500	E	µg/L	100	12/20/2021 12:41:09 PM	B84667
Surr: BFB	216	37.3-213	S	%Rec	100	12/20/2021 12:41:09 PM	B84667
EPA METHOD 8260B: VOLATILES							Analyst: CCM
Benzene	470	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Toluene	950	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Ethylbenzene	11	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Methyl tert-butyl ether (MTBE)	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,2,4-Trimethylbenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,3,5-Trimethylbenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,2-Dichloroethane (EDC)	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,2-Dibromoethane (EDB)	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Naphthalene	ND	20		µg/L	100	12/17/2021 5:09:00 PM	R84633
1-Methylnaphthalene	ND	40		µg/L	100	12/17/2021 5:09:00 PM	R84633
2-Methylnaphthalene	ND	40		µg/L	100	12/17/2021 5:09:00 PM	R84633
Acetone	ND	100		µg/L	100	12/17/2021 5:09:00 PM	R84633
Bromobenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Bromodichloromethane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Bromoform	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Bromomethane	ND	20		µg/L	100	12/17/2021 5:09:00 PM	R84633
2-Butanone	ND	100		µg/L	100	12/17/2021 5:09:00 PM	R84633
Carbon disulfide	ND	100		µg/L	100	12/17/2021 5:09:00 PM	R84633
Carbon tetrachloride	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Chlorobenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Chloroethane	ND	20		µg/L	100	12/17/2021 5:09:00 PM	R84633
Chloroform	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Chloromethane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
2-Chlorotoluene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
4-Chlorotoluene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
cis-1,2-DCE	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
cis-1,3-Dichloropropene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,2-Dibromo-3-chloropropane	ND	20		µg/L	100	12/17/2021 5:09:00 PM	R84633
Dibromochloromethane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Dibromomethane	ND	20		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,2-Dichlorobenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,3-Dichlorobenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,4-Dichlorobenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Dichlorodifluoromethane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,1-Dichloroethane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,1-Dichloroethene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633

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	Estimated value
	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		

Page 1 of 4

Analytical Report

Lab Order 2112B19

Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Influent- Leg A Deep

Project: San Juan 28 6 31

Collection Date: 12/16/2021 12:55:00 PM

Lab ID: 2112B19-001

Matrix: AIR

Received Date: 12/17/2021 7:31:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: CCM
1,2-Dichloropropane	43	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,3-Dichloropropane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
2,2-Dichloropropane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,1-Dichloropropene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Hexachlorobutadiene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
2-Hexanone	ND	100		µg/L	100	12/17/2021 5:09:00 PM	R84633
Isopropylbenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
4-Isopropyltoluene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
4-Methyl-2-pentanone	ND	100		µg/L	100	12/17/2021 5:09:00 PM	R84633
Methylene chloride	ND	30		µg/L	100	12/17/2021 5:09:00 PM	R84633
n-Butylbenzene	ND	30		µg/L	100	12/17/2021 5:09:00 PM	R84633
n-Propylbenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
sec-Butylbenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Styrene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
tert-Butylbenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,1,1,2-Tetrachloroethane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,1,2,2-Tetrachloroethane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Tetrachloroethene (PCE)	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
trans-1,2-DCE	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
trans-1,3-Dichloropropene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,2,3-Trichlorobenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,2,4-Trichlorobenzene	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,1,1-Trichloroethane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,1,2-Trichloroethane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Trichloroethene (TCE)	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Trichlorofluoromethane	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
1,2,3-Trichloropropane	ND	20		µg/L	100	12/17/2021 5:09:00 PM	R84633
Vinyl chloride	ND	10		µg/L	100	12/17/2021 5:09:00 PM	R84633
Xylenes, Total	190	15		µg/L	100	12/17/2021 5:09:00 PM	R84633
Surr: Dibromofluoromethane	100	70-130		%Rec	100	12/17/2021 5:09:00 PM	R84633
Surr: 1,2-Dichloroethane-d4	88.6	70-130		%Rec	100	12/17/2021 5:09:00 PM	R84633
Surr: Toluene-d8	106	70-130		%Rec	100	12/17/2021 5:09:00 PM	R84633
Surr: 4-Bromofluorobenzene	98.0	70-130		%Rec	100	12/17/2021 5:09:00 PM	R84633

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	Estimated value
	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 Report

Lab Order 2112B19

Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Influent- Leg A Shallow

Project: San Juan 28 6 31

Collection Date: 12/16/2021 2:00:00 PM

Lab ID: 2112B19-002

Matrix: AIR

Received Date: 12/17/2021 7:31:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	2300	50		µg/L	10	12/20/2021 1:04:48 PM	B84667
Surr: BFB	164	37.3-213		%Rec	10	12/20/2021 1:04:48 PM	B84667
EPA METHOD 8260B: VOLATILES							Analyst: CCM
Benzene	9.8	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Toluene	32	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Ethylbenzene	1.1	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,2,4-Trimethylbenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,3,5-Trimethylbenzene	1.1	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Naphthalene	ND	2.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1-Methylnaphthalene	ND	4.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
2-Methylnaphthalene	ND	4.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Acetone	ND	10		µg/L	10	12/18/2021 2:06:00 PM	R84647
Bromobenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Bromodichloromethane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Bromoform	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Bromomethane	ND	2.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
2-Butanone	ND	10		µg/L	10	12/18/2021 2:06:00 PM	R84647
Carbon disulfide	ND	10		µg/L	10	12/18/2021 2:06:00 PM	R84647
Carbon tetrachloride	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Chlorobenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Chloroethane	ND	2.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Chloroform	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Chloromethane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
2-Chlorotoluene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
4-Chlorotoluene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
cis-1,2-DCE	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
cis-1,3-Dichloropropene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Dibromochloromethane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Dibromomethane	ND	2.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,2-Dichlorobenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,3-Dichlorobenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,4-Dichlorobenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Dichlorodifluoromethane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,1-Dichloroethane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,1-Dichloroethene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647

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	Estimated value
	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 Report

Lab Order 2112B19

Date Reported:

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Influent- Leg A Shallow

Project: San Juan 28 6 31

Collection Date: 12/16/2021 2:00:00 PM

Lab ID: 2112B19-002

Matrix: AIR

Received Date: 12/17/2021 7:31:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: CCM
1,2-Dichloropropane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,3-Dichloropropane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
2,2-Dichloropropane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,1-Dichloropropene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Hexachlorobutadiene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
2-Hexanone	ND	10		µg/L	10	12/18/2021 2:06:00 PM	R84647
Isopropylbenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
4-Isopropyltoluene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
4-Methyl-2-pentanone	ND	10		µg/L	10	12/18/2021 2:06:00 PM	R84647
Methylene chloride	ND	3.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
n-Butylbenzene	ND	3.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
n-Propylbenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
sec-Butylbenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Styrene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
tert-Butylbenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Tetrachloroethene (PCE)	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
trans-1,2-DCE	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
trans-1,3-Dichloropropene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,2,3-Trichlorobenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,2,4-Trichlorobenzene	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,1,1-Trichloroethane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,1,2-Trichloroethane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Trichloroethene (TCE)	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Trichlorofluoromethane	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
1,2,3-Trichloropropane	ND	2.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Vinyl chloride	ND	1.0		µg/L	10	12/18/2021 2:06:00 PM	R84647
Xylenes, Total	19	1.5		µg/L	10	12/18/2021 2:06:00 PM	R84647
Surr: Dibromofluoromethane	102	70-130		%Rec	10	12/18/2021 2:06:00 PM	R84647
Surr: 1,2-Dichloroethane-d4	98.2	70-130		%Rec	10	12/18/2021 2:06:00 PM	R84647
Surr: Toluene-d8	103	70-130		%Rec	10	12/18/2021 2:06:00 PM	R84647
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	10	12/18/2021 2:06:00 PM	R84647

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	Estimated value
	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 29, 2021

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

Work Order: G21120389

Project Name: Not Indicated

Energy Laboratories Inc. Gillette WY received the following 2 samples for Hall Environmental on 12/22/2021 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
G21120389-001	2112B19-001B; Influent-Leg A Deep	12/16/21 12:55	12/22/21	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
G21120389-002	2112B19-002B; Influent-Leg A Shallow	12/16/21 14:00	12/22/21	Gas	Same As Above

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:



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LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Hall Environmental
Project: Not Indicated
Client Sample ID: 2112B19-001B; Influent-Leg A Deep
Location:
Lab ID: G21120389-001

Report Date: 12/29/21
Collection Date: 12/16/21 12:55
Date Received: 12/22/21
Sampled By: Not Provided

Analyses

Result Units Qualifier Method Analysis Date / By

NATURAL GAS CHROMATOGRAPHIC ANALYSIS REPORT

Oxygen	21.004 Mol %	GPA 2261	12/28/21 09:24 / djb
Nitrogen	77.427 Mol %	GPA 2261	12/28/21 09:24 / djb
Carbon Dioxide	0.834 Mol %	GPA 2261	12/28/21 09:24 / djb
Hydrogen Sulfide	< 0.001 Mol %	GPA 2261	12/28/21 09:24 / djb
Methane	< 0.001 Mol %	GPA 2261	12/28/21 09:24 / djb
Ethane	< 0.001 Mol %	GPA 2261	12/28/21 09:24 / djb
Propane	< 0.001 Mol %	GPA 2261	12/28/21 09:24 / djb
Isobutane	0.001 Mol %	GPA 2261	12/28/21 09:24 / djb
n-Butane	0.004 Mol %	GPA 2261	12/28/21 09:24 / djb
Isopentane	0.028 Mol %	GPA 2261	12/28/21 09:24 / djb
n-Pentane	0.035 Mol %	GPA 2261	12/28/21 09:24 / djb
Hexanes plus	0.667 Mol %	GPA 2261	12/28/21 09:24 / djb

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

GPM Ethane	< 0.0003 gal/MCF	GPA 2261	12/28/21 09:24 / djb
GPM Propane	< 0.0003 gal/MCF	GPA 2261	12/28/21 09:24 / djb
GPM Isobutane	< 0.0003 gal/MCF	GPA 2261	12/28/21 09:24 / djb
GPM n-Butane	0.0010 gal/MCF	GPA 2261	12/28/21 09:24 / djb
GPM Isopentane	0.0100 gal/MCF	GPA 2261	12/28/21 09:24 / djb
GPM n-Pentane	0.0130 gal/MCF	GPA 2261	12/28/21 09:24 / djb
GPM Hexanes plus	0.2900 gal/MCF	GPA 2261	12/28/21 09:24 / djb
GPM Pentanes plus	0.3130 gal/MCF	GPA 2261	12/28/21 09:24 / djb
GPM Total	0.3150 gal/MCF	GPA 2261	12/28/21 09:24 / djb

CALCULATED PROPERTIES

Calculation Pressure Base	14.730 psia	GPA 2261	12/28/21 09:24 / djb
Calculation Temperature Base	60 °F	GPA 2261	12/28/21 09:24 / djb
Compressibility Factor, Z	1.0000 unitless	GPA 2261	12/28/21 09:24 / djb
Molecular Weight	29.44 unitless	GPA 2261	12/28/21 09:24 / djb
Pseudo-critical Pressure, psia	548 psia	GPA 2261	12/28/21 09:24 / djb
Pseudo-critical Temperature, deg R	246 deg R	GPA 2261	12/28/21 09:24 / djb
Specific Gravity (air=1.000)	1.020 unitless	GPA 2261	12/28/21 09:24 / djb
Gross BTU per cu ft @ std cond, dry	36.99 BTU/cu ft	GPA 2261	12/28/21 09:24 / djb
Gross BTU per cu ft @ std cond, wet	36.35 BTU/cu ft	GPA 2261	12/28/21 09:24 / djb

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

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



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LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Hall Environmental
Project: Not Indicated
Client Sample ID: 2112B19-002B; Influent-Leg A Shallow
Location:
Lab ID: G21120389-002

Report Date: 12/29/21
Collection Date: 12/16/21 14:00
Date Received: 12/22/21
Sampled By: Not Provided

Analyses

Result Units Qualifier Method Analysis Date / By

NATURAL GAS CHROMATOGRAPHIC ANALYSIS REPORT

Oxygen	21.998 Mol %	GPA 2261	12/28/21 09:41 / djb
Nitrogen	77.876 Mol %	GPA 2261	12/28/21 09:41 / djb
Carbon Dioxide	0.116 Mol %	GPA 2261	12/28/21 09:41 / djb
Hydrogen Sulfide	< 0.001 Mol %	GPA 2261	12/28/21 09:41 / djb
Methane	< 0.001 Mol %	GPA 2261	12/28/21 09:41 / djb
Ethane	< 0.001 Mol %	GPA 2261	12/28/21 09:41 / djb
Propane	< 0.001 Mol %	GPA 2261	12/28/21 09:41 / djb
Isobutane	< 0.001 Mol %	GPA 2261	12/28/21 09:41 / djb
n-Butane	< 0.001 Mol %	GPA 2261	12/28/21 09:41 / djb
Isopentane	0.001 Mol %	GPA 2261	12/28/21 09:41 / djb
n-Pentane	0.001 Mol %	GPA 2261	12/28/21 09:41 / djb
Hexanes plus	0.008 Mol %	GPA 2261	12/28/21 09:41 / djb

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

GPM Ethane	< 0.0003 gal/MCF	GPA 2261	12/28/21 09:41 / djb
GPM Propane	< 0.0003 gal/MCF	GPA 2261	12/28/21 09:41 / djb
GPM Isobutane	< 0.0003 gal/MCF	GPA 2261	12/28/21 09:41 / djb
GPM n-Butane	< 0.0003 gal/MCF	GPA 2261	12/28/21 09:41 / djb
GPM Isopentane	< 0.0004 gal/MCF	GPA 2261	12/28/21 09:41 / djb
GPM n-Pentane	< 0.0004 gal/MCF	GPA 2261	12/28/21 09:41 / djb
GPM Hexanes plus	0.0030 gal/MCF	GPA 2261	12/28/21 09:41 / djb
GPM Pentanes plus	0.0040 gal/MCF	GPA 2261	12/28/21 09:41 / djb
GPM Total	0.0040 gal/MCF	GPA 2261	12/28/21 09:41 / djb

CALCULATED PROPERTIES

Calculation Pressure Base	14.730 psia	GPA 2261	12/28/21 09:41 / djb
Calculation Temperature Base	60 °F	GPA 2261	12/28/21 09:41 / djb
Compressibility Factor, Z	1.0000 unitless	GPA 2261	12/28/21 09:41 / djb
Molecular Weight	28.91 unitless	GPA 2261	12/28/21 09:41 / djb
Pseudo-critical Pressure, psia	547 psia	GPA 2261	12/28/21 09:41 / djb
Pseudo-critical Temperature, deg R	239 deg R	GPA 2261	12/28/21 09:41 / djb
Specific Gravity (air=1.000)	1.001 unitless	GPA 2261	12/28/21 09:41 / djb
Gross BTU per cu ft @ std cond, dry	0.49 BTU/cu ft	GPA 2261	12/28/21 09:41 / djb
Gross BTU per cu ft @ std cond, wet	0.48 BTU/cu ft	GPA 2261	12/28/21 09:41 / djb

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

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



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QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental

Work Order: G21120389

Report Date: 12/29/21

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261							Analytical Run: R268728		
Lab ID: ICV-2112280838	Initial Calibration Verification Standard						12/28/21 08:38		
Oxygen	0.384	Mol %	0.001	96	75	110			
Nitrogen	5.086	Mol %	0.001	101	90	110			
Carbon Dioxide	4.909	Mol %	0.001	99	90	110			
Hydrogen Sulfide	0.129	Mol %	0.001	130	100	136			
Methane	73.239	Mol %	0.001	100	90	110			
Ethane	5.008	Mol %	0.001	101	90	110			
Propane	5.010	Mol %	0.001	100	90	110			
Isobutane	1.985	Mol %	0.001	99	90	110			
n-Butane	1.966	Mol %	0.001	98	90	110			
Isopentane	0.984	Mol %	0.001	98	90	110			
n-Pentane	0.995	Mol %	0.001	99	90	110			
Hexanes plus	0.305	Mol %	0.001	101	90	110			
Lab ID: CCV-2112280845	Continuing Calibration Verification Standard						12/28/21 08:45		
Oxygen	0.587	Mol %	0.001	98	90	110			
Nitrogen	1.244	Mol %	0.001	89	85	110			
Carbon Dioxide	0.955	Mol %	0.001	96	90	110			
Hydrogen Sulfide	0.026	Mol %	0.001	104	70	130			
Methane	93.618	Mol %	0.001	100	90	110			
Ethane	1.015	Mol %	0.001	101	90	110			
Propane	1.012	Mol %	0.001	101	90	110			
Isobutane	0.495	Mol %	0.001	99	90	110			
n-Butane	0.494	Mol %	0.001	99	90	110			
Isopentane	0.200	Mol %	0.001	100	90	110			
n-Pentane	0.200	Mol %	0.001	100	90	110			
Hexanes plus	0.154	Mol %	0.001	103	90	110			
Lab ID: CCV-2112280953	Continuing Calibration Verification Standard						12/28/21 09:54		
Oxygen	0.608	Mol %	0.001	101	90	110			
Nitrogen	1.309	Mol %	0.001	94	85	110			
Carbon Dioxide	0.954	Mol %	0.001	95	90	110			
Hydrogen Sulfide	0.026	Mol %	0.001	104	70	130			
Methane	93.540	Mol %	0.001	100	90	110			
Ethane	1.012	Mol %	0.001	101	90	110			
Propane	1.010	Mol %	0.001	101	90	110			
Isobutane	0.494	Mol %	0.001	99	90	110			
n-Butane	0.494	Mol %	0.001	99	90	110			
Isopentane	0.199	Mol %	0.001	99	90	110			
n-Pentane	0.200	Mol %	0.001	100	90	110			
Hexanes plus	0.154	Mol %	0.001	103	90	110			
Method: GPA 2261							Batch: R268728		
Lab ID: G21120389-001ADUP	Sample Duplicate						Run: Varian GC_211228A		
Oxygen	21.003	Mol %	0.001				0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



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QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental

Work Order: G21120389

Report Date: 12/29/21

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261							Batch: R268728		
Lab ID: G21120389-001ADUP	Sample Duplicate		Run: Varian GC_211228A				12/28/21 09:28		
Nitrogen	77.419	Mol %	0.001				0.0	10	
Carbon Dioxide	0.835	Mol %	0.001				0.1	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				0.0	10	
n-Butane	0.004	Mol %	0.001				0.0	10	
Isopentane	0.028	Mol %	0.001				0.0	10	
n-Pentane	0.035	Mol %	0.001				0.0	10	
Hexanes plus	0.675	Mol %	0.001				1.2	10	
Lab ID: G21120389-002ADUP	Sample Duplicate		Run: Varian GC_211228A				12/28/21 09:45		
Oxygen	21.998	Mol %	0.001				0.0	10	
Nitrogen	77.876	Mol %	0.001				0.0	10	
Carbon Dioxide	0.116	Mol %	0.001				0.0	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				0.0	10	
n-Pentane	0.001	Mol %	0.001				0.0	10	
Hexanes plus	0.008	Mol %	0.001				0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



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Work Order Receipt Checklist

Hall Environmental

G21120389

Login completed by: Jill S. Jeffress

Date Received: 12/22/2021

Reviewed by: Misty Stephens

Received by: csj

Reviewed Date: 12/27/2021

Carrier name: FedEx

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

Standard Reporting Procedures:

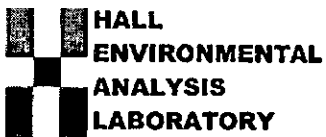
Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

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 Hawks 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	2112B19-001B	Influent- Leg A Deep	TEDLAR	Air	12/16/2021 12:55:00 PM	1	FIXED GASES O2, CO2
2	2112B19-002B	Influent- Leg A Shallow	TEDLAR	Air	12/16/2021 2:00:00 PM	1	FIXED 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	Date 12/20/2021	Time 4:42 PM	Received By	Date 12/20/2021	Time 1:30 PM	REPORT TRANSMITTAL DESIRED:	
Relinquished By	Date	Time	Received By	Date	Time	<input type="checkbox"/> HARDCOPY (extra cost) <input type="checkbox"/> FAX <input type="checkbox"/> EMAIL <input type="checkbox"/> ONLINE	
Relinquished By	Date	Time	Received By	Date	Time	FOR LAB USE ONLY	
TAT Standard <input checked="" type="checkbox"/> RUSH Next BD <input type="checkbox"/> 2nd BD <input type="checkbox"/> 3rd BD <input type="checkbox"/>						Temp of samples 2 °C Attempt to Cool? N/A	
Comments G21120389							



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: 2112B19

RcptNo: 1

Received By: Tracy Casarrubias 12/17/2021 7:31:00 AM

Completed By: Tracy Casarrubias 12/17/2021 9:49:04 AM

Reviewed By: KPA 12/17/21

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 $>0^{\circ}\text{C}$ to 6.0°C ? Yes ☐ No ☒ NA ☐
5. Sample(s) in proper container(s)? Yes ☒ No ☐ Not required
6. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☒ No ☐
8. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
9. Received at least 1 vial with headspace $<1/4$ " for AQ VOA? Yes ☐ No ☐ NA ☒
10. Were any sample containers received broken? Yes ☐ No ☒
11. Does paperwork match bottle labels?
(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: JN 12/17/21

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	N/A	Good	Yes			

Released to Imaging: 9/23/2022 8:35:15 AM





[illegible][illegible]

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

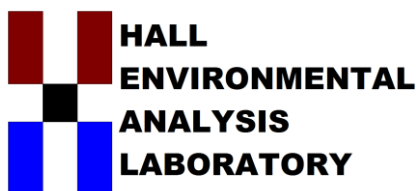
Tel. 505-345-3975 Fax 505-345-4107

	BTEX / MTBE / TMB's (8021)
XX	TPH:8015D(GRO / DRO / MRO)
	8081 Pesticides/8082 PCB's
	EDB (Method 504.1)
	PAHs by 8310 or 8270SIMS
	RCRA 8 Metals
XX	Cl, F, Br, NO ₃ , NO ₂ , PO ₄ , SO ₄
XX	8260 (VOA)
	8270 (Semi-VOA)
	Total Coliform (Present/Absent)
XX	Fixed Gas O ₂ , CO ₂

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
12-16-21	15:30			Waz	12/16/21	1530
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
12/16/21	1743			Cash	12/17/21	7:31

Remarks:	cc: danny.burns@wsp.com stuart.hyde@wsp.com devin.henemann@wsp.com
this possibility. Any sub-contracted data will be clearly noted on the analytical report.	

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.



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

January 24, 2022

Stuart Hyde

Hilcorp Energy

PO Box 61529

Houston, TX 77208-1529

TEL: (337) 276-7676

FAX:

RE: San Juan 28-6 31

OrderNo.: 2201274

Dear Stuart Hyde:

Hall Environmental Analysis Laboratory received 2 sample(s) on 1/7/2022 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,

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 2201274

Date Reported: 1/24/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Influent Leg A-Shallow

Project: San Juan 28-6 31

Collection Date: 1/6/2022 10:30:00 AM

Lab ID: 2201274-001

Matrix: AIR

Received Date: 1/7/2022 7:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	2500	50		µg/L	10	1/10/2022 9:05:24 AM	G85053
Surr: BFB	124	37.3-213		%Rec	10	1/10/2022 9:05:24 AM	G85053
EPA METHOD 8260B: VOLATILES							Analyst: CCM
Benzene	12	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Toluene	34	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Ethylbenzene	1.2	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Methyl tert-butyl ether (MTBE)	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,2,4-Trimethylbenzene	0.64	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,3,5-Trimethylbenzene	0.71	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,2-Dibromoethane (EDB)	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Naphthalene	ND	1.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
1-Methylnaphthalene	ND	2.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
2-Methylnaphthalene	ND	2.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
Acetone	ND	5.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
Bromobenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Bromodichloromethane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Bromoform	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Bromomethane	ND	1.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
2-Butanone	ND	5.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
Carbon disulfide	ND	5.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
Carbon tetrachloride	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Chlorobenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Chloroethane	ND	1.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
Chloroform	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Chloromethane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
2-Chlorotoluene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
4-Chlorotoluene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
cis-1,2-DCE	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
cis-1,3-Dichloropropene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
Dibromochloromethane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Dibromomethane	ND	1.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,2-Dichlorobenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,3-Dichlorobenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,4-Dichlorobenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Dichlorodifluoromethane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,1-Dichloroethane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,1-Dichloroethene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059

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	Estimated value
	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		

Page 1 of 7

Analytical Report

Lab Order 2201274

Date Reported: 1/24/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Influent Leg A-Shallow

Project: San Juan 28-6 31

Collection Date: 1/6/2022 10:30:00 AM

Lab ID: 2201274-001

Matrix: AIR

Received Date: 1/7/2022 7:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: CCM
1,2-Dichloropropane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,3-Dichloropropane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
2,2-Dichloropropane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,1-Dichloropropene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Hexachlorobutadiene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
2-Hexanone	ND	5.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
Isopropylbenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
4-Isopropyltoluene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
4-Methyl-2-pentanone	ND	5.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
Methylene chloride	ND	1.5		µg/L	5	1/11/2022 1:30:00 PM	R85059
n-Butylbenzene	ND	1.5		µg/L	5	1/11/2022 1:30:00 PM	R85059
n-Propylbenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
sec-Butylbenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Styrene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
tert-Butylbenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Tetrachloroethene (PCE)	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
trans-1,2-DCE	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
trans-1,3-Dichloropropene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,2,3-Trichlorobenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,2,4-Trichlorobenzene	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,1,1-Trichloroethane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,1,2-Trichloroethane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Trichloroethene (TCE)	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Trichlorofluoromethane	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
1,2,3-Trichloropropane	ND	1.0		µg/L	5	1/11/2022 1:30:00 PM	R85059
Vinyl chloride	ND	0.50		µg/L	5	1/11/2022 1:30:00 PM	R85059
Xylenes, Total	15	0.75		µg/L	5	1/11/2022 1:30:00 PM	R85059
Surr: Dibromofluoromethane	110	70-130		%Rec	5	1/11/2022 1:30:00 PM	R85059
Surr: 1,2-Dichloroethane-d4	99.7	70-130		%Rec	5	1/11/2022 1:30:00 PM	R85059
Surr: Toluene-d8	106	70-130		%Rec	5	1/11/2022 1:30:00 PM	R85059
Surr: 4-Bromofluorobenzene	101	70-130		%Rec	5	1/11/2022 1:30:00 PM	R85059

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	Estimated value
	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		

Page 2 of 7

Analytical Report

Lab Order 2201274

Date Reported: 1/24/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Influent Leg B-1

Project: San Juan 28-6 31

Collection Date: 1/6/2022 12:00:00 PM

Lab ID: 2201274-002

Matrix: AIR

Received Date: 1/7/2022 7:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	1100	50		µg/L	10	1/10/2022 9:28:36 AM	G85053
Surr: BFB	132	37.3-213		%Rec	10	1/10/2022 9:28:36 AM	G85053
EPA METHOD 8260B: VOLATILES							Analyst: CCM
Benzene	2.3	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Toluene	10	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Ethylbenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Methyl tert-butyl ether (MTBE)	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,2,4-Trimethylbenzene	0.68	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,3,5-Trimethylbenzene	0.76	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,2-Dichloroethane (EDC)	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,2-Dibromoethane (EDB)	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Naphthalene	ND	1.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
1-Methylnaphthalene	ND	2.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
2-Methylnaphthalene	ND	2.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
Acetone	ND	5.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
Bromobenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Bromodichloromethane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Bromoform	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Bromomethane	ND	1.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
2-Butanone	ND	5.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
Carbon disulfide	ND	5.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
Carbon tetrachloride	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Chlorobenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Chloroethane	ND	1.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
Chloroform	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Chloromethane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
2-Chlorotoluene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
4-Chlorotoluene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
cis-1,2-DCE	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
cis-1,3-Dichloropropene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,2-Dibromo-3-chloropropane	ND	1.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
Dibromochloromethane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Dibromomethane	ND	1.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,2-Dichlorobenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,3-Dichlorobenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,4-Dichlorobenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Dichlorodifluoromethane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,1-Dichloroethane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,1-Dichloroethene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059

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	Estimated value
	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 Report

Lab Order 2201274

Date Reported: 1/24/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Influent Leg B-1

Project: San Juan 28-6 31

Collection Date: 1/6/2022 12:00:00 PM

Lab ID: 2201274-002

Matrix: AIR

Received Date: 1/7/2022 7:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: CCM
1,2-Dichloropropane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,3-Dichloropropane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
2,2-Dichloropropane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,1-Dichloropropene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Hexachlorobutadiene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
2-Hexanone	ND	5.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
Isopropylbenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
4-Isopropyltoluene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
4-Methyl-2-pentanone	ND	5.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
Methylene chloride	ND	1.5		µg/L	5	1/11/2022 2:17:00 PM	R85059
n-Butylbenzene	ND	1.5		µg/L	5	1/11/2022 2:17:00 PM	R85059
n-Propylbenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
sec-Butylbenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Styrene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
tert-Butylbenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,1,1,2-Tetrachloroethane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,1,2,2-Tetrachloroethane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Tetrachloroethene (PCE)	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
trans-1,2-DCE	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
trans-1,3-Dichloropropene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,2,3-Trichlorobenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,2,4-Trichlorobenzene	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,1,1-Trichloroethane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,1,2-Trichloroethane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Trichloroethene (TCE)	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Trichlorofluoromethane	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
1,2,3-Trichloropropane	ND	1.0		µg/L	5	1/11/2022 2:17:00 PM	R85059
Vinyl chloride	ND	0.50		µg/L	5	1/11/2022 2:17:00 PM	R85059
Xylenes, Total	6.7	0.75		µg/L	5	1/11/2022 2:17:00 PM	R85059
Surr: Dibromofluoromethane	110	70-130		%Rec	5	1/11/2022 2:17:00 PM	R85059
Surr: 1,2-Dichloroethane-d4	101	70-130		%Rec	5	1/11/2022 2:17:00 PM	R85059
Surr: Toluene-d8	106	70-130		%Rec	5	1/11/2022 2:17:00 PM	R85059
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	5	1/11/2022 2:17:00 PM	R85059

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	Estimated value
	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

January 14, 2022

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

Work Order: G22010145

Project Name: Not Indicated

Energy Laboratories Inc. Gillette WY received the following 2 samples for Hall Environmental on 1/11/2022 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
G22010145-001	2201274-001B; Influent Leg A-Shallow	01/06/22 10:30	01/11/22	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
G22010145-002	2201274-002B; Influent Leg B-1	01/06/22 12:00	01/11/22	Gas	Same As Above

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:



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LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Hall Environmental
Project: Not Indicated
Client Sample ID: 2201274-001B; Influent Leg A-Shallow
Location:
Lab ID: G22010145-001

Report Date: 01/14/22
Collection Date: 01/06/22 10:30
Date Received: 01/11/22
Sampled By: Not Provided

Analyses

Result Units Qualifier Method Analysis Date / By

NATURAL GAS CHROMATOGRAPHIC ANALYSIS REPORT

Oxygen	22.131 Mol %	GPA 2261	01/13/22 14:18 / djb
Nitrogen	77.725 Mol %	GPA 2261	01/13/22 14:18 / djb
Carbon Dioxide	0.129 Mol %	GPA 2261	01/13/22 14:18 / djb
Hydrogen Sulfide	< 0.001 Mol %	GPA 2261	01/13/22 14:18 / djb
Methane	< 0.001 Mol %	GPA 2261	01/13/22 14:18 / djb
Ethane	< 0.001 Mol %	GPA 2261	01/13/22 14:18 / djb
Propane	< 0.001 Mol %	GPA 2261	01/13/22 14:18 / djb
Isobutane	< 0.001 Mol %	GPA 2261	01/13/22 14:18 / djb
n-Butane	< 0.001 Mol %	GPA 2261	01/13/22 14:18 / djb
Isopentane	0.002 Mol %	GPA 2261	01/13/22 14:18 / djb
n-Pentane	0.002 Mol %	GPA 2261	01/13/22 14:18 / djb
Hexanes plus	0.011 Mol %	GPA 2261	01/13/22 14:18 / djb

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

GPM Ethane	< 0.0003 gal/MCF	GPA 2261	01/13/22 14:18 / djb
GPM Propane	< 0.0003 gal/MCF	GPA 2261	01/13/22 14:18 / djb
GPM Isobutane	< 0.0003 gal/MCF	GPA 2261	01/13/22 14:18 / djb
GPM n-Butane	< 0.0003 gal/MCF	GPA 2261	01/13/22 14:18 / djb
GPM Isopentane	0.0010 gal/MCF	GPA 2261	01/13/22 14:18 / djb
GPM n-Pentane	0.0010 gal/MCF	GPA 2261	01/13/22 14:18 / djb
GPM Hexanes plus	0.0050 gal/MCF	GPA 2261	01/13/22 14:18 / djb
GPM Pentanes plus	0.0060 gal/MCF	GPA 2261	01/13/22 14:18 / djb
GPM Total	0.0060 gal/MCF	GPA 2261	01/13/22 14:18 / djb

CALCULATED PROPERTIES

Calculation Pressure Base	14.730 psia	GPA 2261	01/13/22 14:18 / djb
Calculation Temperature Base	60 °F	GPA 2261	01/13/22 14:18 / djb
Compressibility Factor, Z	1.0000 unitless	GPA 2261	01/13/22 14:18 / djb
Molecular Weight	28.92 unitless	GPA 2261	01/13/22 14:18 / djb
Pseudo-critical Pressure, psia	547 psia	GPA 2261	01/13/22 14:18 / djb
Pseudo-critical Temperature, deg R	240 deg R	GPA 2261	01/13/22 14:18 / djb
Specific Gravity (air=1.000)	1.002 unitless	GPA 2261	01/13/22 14:18 / djb
Gross BTU per cu ft @ std cond, dry	0.69 BTU/cu ft	GPA 2261	01/13/22 14:18 / djb
Gross BTU per cu ft @ std cond, wet	0.68 BTU/cu ft	GPA 2261	01/13/22 14:18 / djb

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

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



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LABORATORY ANALYTICAL REPORT

Prepared by Gillette, WY Branch

Client: Hall Environmental
Project: Not Indicated
Client Sample ID: 2201274-002B; Influent Leg B-1
Location:
Lab ID: G22010145-002

Report Date: 01/14/22
Collection Date: 01/06/22 12:00
Date Received: 01/11/22
Sampled By: Not Provided

Analyses

Result Units Qualifier Method Analysis Date / By

NATURAL GAS CHROMATOGRAPHIC ANALYSIS REPORT

Oxygen	21.973 Mol %	GPA 2261	01/13/22 14:31 / djb
Nitrogen	77.922 Mol %	GPA 2261	01/13/22 14:31 / djb
Carbon Dioxide	0.103 Mol %	GPA 2261	01/13/22 14:31 / djb
Hydrogen Sulfide	< 0.001 Mol %	GPA 2261	01/13/22 14:31 / djb
Methane	< 0.001 Mol %	GPA 2261	01/13/22 14:31 / djb
Ethane	< 0.001 Mol %	GPA 2261	01/13/22 14:31 / djb
Propane	< 0.001 Mol %	GPA 2261	01/13/22 14:31 / djb
Isobutane	< 0.001 Mol %	GPA 2261	01/13/22 14:31 / djb
n-Butane	< 0.001 Mol %	GPA 2261	01/13/22 14:31 / djb
Isopentane	0.001 Mol %	GPA 2261	01/13/22 14:31 / djb
n-Pentane	0.001 Mol %	GPA 2261	01/13/22 14:31 / djb
Hexanes plus	< 0.001 Mol %	GPA 2261	01/13/22 14:31 / djb

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

GPM Ethane	< 0.0003 gal/MCF	GPA 2261	01/13/22 14:31 / djb
GPM Propane	< 0.0003 gal/MCF	GPA 2261	01/13/22 14:31 / djb
GPM Isobutane	< 0.0003 gal/MCF	GPA 2261	01/13/22 14:31 / djb
GPM n-Butane	< 0.0003 gal/MCF	GPA 2261	01/13/22 14:31 / djb
GPM Isopentane	< 0.0004 gal/MCF	GPA 2261	01/13/22 14:31 / djb
GPM n-Pentane	< 0.0004 gal/MCF	GPA 2261	01/13/22 14:31 / djb
GPM Hexanes plus	< 0.0004 gal/MCF	GPA 2261	01/13/22 14:31 / djb
GPM Pentanes plus	0.0010 gal/MCF	GPA 2261	01/13/22 14:31 / djb
GPM Total	0.0010 gal/MCF	GPA 2261	01/13/22 14:31 / djb

CALCULATED PROPERTIES

Calculation Pressure Base	14.730 psia	GPA 2261	01/13/22 14:31 / djb
Calculation Temperature Base	60 °F	GPA 2261	01/13/22 14:31 / djb
Compressibility Factor, Z	1.0000 unitless	GPA 2261	01/13/22 14:31 / djb
Molecular Weight	28.91 unitless	GPA 2261	01/13/22 14:31 / djb
Pseudo-critical Pressure, psia	547 psia	GPA 2261	01/13/22 14:31 / djb
Pseudo-critical Temperature, deg R	239 deg R	GPA 2261	01/13/22 14:31 / djb
Specific Gravity (air=1.000)	1.001 unitless	GPA 2261	01/13/22 14:31 / djb
Gross BTU per cu ft @ std cond, dry	0.06 BTU/cu ft	GPA 2261	01/13/22 14:31 / djb
Gross BTU per cu ft @ std cond, wet	0.06 BTU/cu ft	GPA 2261	01/13/22 14:31 / djb

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

MCL - Maximum Contaminant Level
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QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental

Work Order: G22010145

Report Date: 01/14/22

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261							Analytical Run: R268964		
Lab ID: ICV-2201131322	Initial Calibration Verification Standard						01/13/22 13:23		
Oxygen	0.385	Mol %	0.001	96	75	110			
Nitrogen	5.089	Mol %	0.001	101	90	110			
Carbon Dioxide	4.901	Mol %	0.001	99	90	110			
Hydrogen Sulfide	0.127	Mol %	0.001	128	100	136			
Methane	73.229	Mol %	0.001	100	90	110			
Ethane	5.008	Mol %	0.001	101	90	110			
Propane	5.013	Mol %	0.001	100	90	110			
Isobutane	1.987	Mol %	0.001	99	90	110			
n-Butane	1.968	Mol %	0.001	98	90	110			
Isopentane	0.986	Mol %	0.001	99	90	110			
n-Pentane	1.000	Mol %	0.001	100	90	110			
Hexanes plus	0.307	Mol %	0.001	102	90	110			
Lab ID: CCV-2201131333	Continuing Calibration Verification Standard						01/13/22 13:34		
Oxygen	0.602	Mol %	0.001	100	90	110			
Nitrogen	1.298	Mol %	0.001	93	85	110			
Carbon Dioxide	0.952	Mol %	0.001	95	90	110			
Hydrogen Sulfide	0.026	Mol %	0.001	104	70	130			
Methane	93.560	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	0.494	Mol %	0.001	99	90	110			
n-Butane	0.494	Mol %	0.001	99	90	110			
Isopentane	0.199	Mol %	0.001	99	90	110			
n-Pentane	0.200	Mol %	0.001	100	90	110			
Hexanes plus	0.154	Mol %	0.001	103	90	110			
Lab ID: CCV-2201131451	Continuing Calibration Verification Standard						01/13/22 14:51		
Oxygen	0.591	Mol %	0.001	98	90	110			
Nitrogen	1.261	Mol %	0.001	90	85	110			
Carbon Dioxide	0.952	Mol %	0.001	95	90	110			
Hydrogen Sulfide	0.026	Mol %	0.001	104	70	130			
Methane	93.610	Mol %	0.001	100	90	110			
Ethane	1.010	Mol %	0.001	101	90	110			
Propane	1.008	Mol %	0.001	101	90	110			
Isobutane	0.494	Mol %	0.001	99	90	110			
n-Butane	0.495	Mol %	0.001	99	90	110			
Isopentane	0.199	Mol %	0.001	99	90	110			
n-Pentane	0.200	Mol %	0.001	100	90	110			
Hexanes plus	0.154	Mol %	0.001	103	90	110			
Method: GPA 2261							Batch: R268964		
Lab ID: G22010145-001ADUP	Sample Duplicate						Run: Varian GC_220113A		
Oxygen	22.130	Mol %	0.001				0.0	10	01/13/22 14:23

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



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QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental

Work Order: G22010145

Report Date: 01/14/22

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261							Batch: R268964		
Lab ID: G22010145-001ADUP	Sample Duplicate		Run: Varian GC_220113A				01/13/22 14:23		
Nitrogen	77.726	Mol %	0.001				0.0	10	
Carbon Dioxide	0.129	Mol %	0.001				0.0	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	0.002	Mol %	0.001				0.0	10	
n-Pentane	0.002	Mol %	0.001				0.0	10	
Hexanes plus	0.011	Mol %	0.001				0.0	10	
Lab ID: G22010145-002ADUP	Sample Duplicate		Run: Varian GC_220113A				01/13/22 14:36		
Oxygen	21.973	Mol %	0.001				0.0	10	
Nitrogen	77.922	Mol %	0.001				0.0	10	
Carbon Dioxide	0.103	Mol %	0.001				0.0	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				0.0	10	
n-Pentane	0.001	Mol %	0.001				0.0	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

G22010145

Login completed by: Chantel S. Johnson

Date Received: 1/11/2022

Reviewed by: Misty Stephens

Received by: jsj

Reviewed Date: 1/13/2022

Carrier name: FedEx

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

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	2201274-001B	Influent Leg A-Shallow	TEDLAR	Air	1/6/2022 10:30:00 AM	1	Fixed Natural Gases O2 + CO2
2	2201274-002B	Influent Leg B-1	TEDLAR	Air	1/6/2022 12:00:00 PM	1	Fixed 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:	Date: <u>1/2/2022</u>	Time: <u>8:46 AM</u>	Received By: <u>Julie Jeffress</u>	Date: <u>1/11/22</u>	Time: <u>12:05</u>
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

REPORT TRANSMITTAL DESIRED:

☐ HARDCOPY (extra cost) ☐ FAX ☐ EMAIL ☐ ONLINE

FOR LAB USE ONLY

Temp of samples _____ C Attempt to Cool? _____

Comments: G2201274

TAT: Standard ☒ RUSH Next BD ☐ 2nd BD ☐ 3rd BD ☐

FED CX

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2201274

24-Jan-22

Client: Hilcorp Energy
Project: San Juan 28-6 31

Sample ID: 2201274-001adup		SampType: DUP		TestCode: EPA Method 8015D: Gasoline Range						
Client ID: Influent Leg A-Shall		Batch ID: G85053		RunNo: 85053						
Prep Date:		Analysis Date: 1/10/2022		SeqNo: 2992444		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	2500	50						1.92	20	
Surr: BFB	25000		20000		126	37.3	213	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 Quantitative Limit

S % Recovery outside of range due to dilution or matrix interference
- B Analyte detected in the associated Method Blank

E Estimated value

J Analyte detected below quantitation limits

P Sample pH Not In Range

RL Reporting Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2201274

24-Jan-22

Client: Hilcorp Energy
Project: San Juan 28-6 31

Sample ID: 2201274-001adup		SampType: DUP		TestCode: EPA Method 8260B: Volatiles						
Client ID: Influent Leg A-Shall		Batch ID: R85059		RunNo: 85059						
Prep Date:		Analysis Date: 1/11/2022		SeqNo: 2993302		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	12	0.50						0.321	20	
Toluene	35	0.50						3.83	20	
Ethylbenzene	1.3	0.50						4.38	20	
Methyl tert-butyl ether (MTBE)	ND	0.50						0	20	
1,2,4-Trimethylbenzene	0.68	0.50						6.64	20	
1,3,5-Trimethylbenzene	0.76	0.50						7.88	20	
1,2-Dichloroethane (EDC)	ND	0.50						0	20	
1,2-Dibromoethane (EDB)	ND	0.50						0	20	
Naphthalene	ND	1.0						0	20	
1-Methylnaphthalene	ND	2.0						0	20	
2-Methylnaphthalene	ND	2.0						0	20	
Acetone	ND	5.0						0	20	
Bromobenzene	ND	0.50						0	20	
Bromodichloromethane	ND	0.50						0	20	
Bromoform	ND	0.50						0	20	
Bromomethane	ND	1.0						0	20	
2-Butanone	ND	5.0						0	20	
Carbon disulfide	ND	5.0						0	20	
Carbon tetrachloride	ND	0.50						0	20	
Chlorobenzene	ND	0.50						0	20	
Chloroethane	ND	1.0						0	20	
Chloroform	ND	0.50						0	20	
Chloromethane	ND	0.50						0	20	
2-Chlorotoluene	ND	0.50						0	20	
4-Chlorotoluene	ND	0.50						0	20	
cis-1,2-DCE	ND	0.50						0	20	
cis-1,3-Dichloropropene	ND	0.50						0	20	
1,2-Dibromo-3-chloropropane	ND	1.0						0	20	
Dibromochloromethane	ND	0.50						0	20	
Dibromomethane	ND	1.0						0	20	
1,2-Dichlorobenzene	ND	0.50						0	20	
1,3-Dichlorobenzene	ND	0.50						0	20	
1,4-Dichlorobenzene	ND	0.50						0	20	
Dichlorodifluoromethane	ND	0.50						0	20	
1,1-Dichloroethane	ND	0.50						0	20	
1,1-Dichloroethene	ND	0.50						0	20	
1,2-Dichloropropane	ND	0.50						0	20	
1,3-Dichloropropane	ND	0.50						0	20	
2,2-Dichloropropane	ND	0.50						0	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
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		

Page 6 of 7

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2201274

24-Jan-22

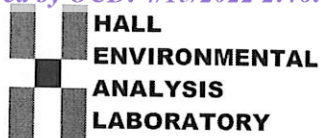
Client: Hilcorp Energy
Project: San Juan 28-6 31

Sample ID: 2201274-001adup		SampType: DUP		TestCode: EPA Method 8260B: Volatiles						
Client ID: Influent Leg A-Shall		Batch ID: R85059		RunNo: 85059						
Prep Date:		Analysis Date: 1/11/2022		SeqNo: 2993302		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
1,1-Dichloropropene	ND	0.50						0	20	
Hexachlorobutadiene	ND	0.50						0	20	
2-Hexanone	ND	5.0						0	20	
Isopropylbenzene	ND	0.50						0	20	
4-Isopropyltoluene	ND	0.50						0	20	
4-Methyl-2-pentanone	ND	5.0						0	20	
Methylene chloride	ND	1.5						0	20	
n-Butylbenzene	ND	1.5						0	20	
n-Propylbenzene	ND	0.50						0	20	
sec-Butylbenzene	ND	0.50						0	20	
Styrene	ND	0.50						0	20	
tert-Butylbenzene	ND	0.50						0	20	
1,1,1,2-Tetrachloroethane	ND	0.50						0	20	
1,1,2,2-Tetrachloroethane	ND	0.50						0	20	
Tetrachloroethene (PCE)	ND	0.50						0	20	
trans-1,2-DCE	ND	0.50						0	20	
trans-1,3-Dichloropropene	ND	0.50						0	20	
1,2,3-Trichlorobenzene	ND	0.50						0	20	
1,2,4-Trichlorobenzene	ND	0.50						0	20	
1,1,1-Trichloroethane	ND	0.50						0	20	
1,1,2-Trichloroethane	ND	0.50						0	20	
Trichloroethene (TCE)	ND	0.50						0	20	
Trichlorofluoromethane	ND	0.50						0	20	
1,2,3-Trichloropropane	ND	1.0						0	20	
Vinyl chloride	ND	0.50						0	20	
Xylenes, Total	16	0.75						5.74	20	
Surr: Dibromofluoromethane	5.3		5.000		107	70	130	0	0	
Surr: 1,2-Dichloroethane-d4	4.9		5.000		99.0	70	130	0	0	
Surr: Toluene-d8	5.5		5.000		109	70	130	0	0	
Surr: 4-Bromofluorobenzene	5.2		5.000		103	70	130	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Estimated value
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		

Page 7 of 7



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: 2201274

RcptNo: 1

Received By: Tracy Casarrubias 1/7/2022 7:50:00 AM

Completed By: Tracy Casarrubias 1/7/2022 8:24:46 AM

Reviewed By: *IO* 1/7/22Chain 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 $>0^{\circ}\text{C}$ 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: *jn-1/7/22*

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: _____

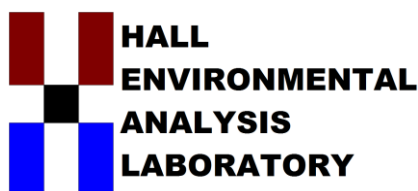
16. Additional remarks:

17. Cooler Information

Cooler No	Temp $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.5	Good	Yes			

Released to Imaging: 9/23/2022 8:35:15 AM

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 noted on the analytical report.



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

April 06, 2022

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

RE: San Juan 28-6 31

OrderNo.: 2203D61

Dear Danny Burns:

Hall Environmental Analysis Laboratory received 1 sample(s) on 3/25/2022 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,

A handwritten signature in black ink, appearing to read "Andy Freeman".

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order 2203D61

Date Reported: 4/6/2022

CLIENT: HILCORP ENERGY

Client Sample ID: Influent All Wells

Project: San Juan 28-6 31

Collection Date: 3/24/2022 1:30:00 PM

Lab ID: 2203D61-001

Matrix: AIR

Received Date: 3/25/2022 7:23:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8015D: GASOLINE RANGE							Analyst: CCM
Gasoline Range Organics (GRO)	6300	50		µg/L	10	3/31/2022 2:15:00 PM	R86909
Surr: BFB	98.4	70-130		%Rec	10	3/31/2022 2:15:00 PM	R86909
EPA METHOD 8260B: VOLATILES							Analyst: CCM
Benzene	48	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Toluene	92	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Ethylbenzene	1.2	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,2,4-Trimethylbenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,3,5-Trimethylbenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Naphthalene	ND	2.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1-Methylnaphthalene	ND	4.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
2-Methylnaphthalene	ND	4.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Acetone	ND	10		µg/L	10	3/31/2022 2:15:00 PM	R86909
Bromobenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Bromodichloromethane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Bromoform	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Bromomethane	ND	2.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
2-Butanone	ND	10		µg/L	10	3/31/2022 2:15:00 PM	R86909
Carbon disulfide	ND	10		µg/L	10	3/31/2022 2:15:00 PM	R86909
Carbon tetrachloride	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Chlorobenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Chloroethane	ND	2.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Chloroform	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Chloromethane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
2-Chlorotoluene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
4-Chlorotoluene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
cis-1,2-DCE	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
cis-1,3-Dichloropropene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Dibromochloromethane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Dibromomethane	ND	2.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,2-Dichlorobenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,3-Dichlorobenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,4-Dichlorobenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Dichlorodifluoromethane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,1-Dichloroethane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,1-Dichloroethene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909

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

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 Quantitative Limit
	S	% Recovery outside of range due to dilution or matrix interference

B	Analyte detected in the associated Method Blank
E	Estimated value
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Limit

Analytical Report

Lab Order 2203D61

Date Reported: 4/6/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: HILCORP ENERGY

Client Sample ID: Influent All Wells

Project: San Juan 28-6 31

Collection Date: 3/24/2022 1:30:00 PM

Lab ID: 2203D61-001

Matrix: AIR

Received Date: 3/25/2022 7:23:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: CCM
1,2-Dichloropropane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,3-Dichloropropane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
2,2-Dichloropropane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,1-Dichloropropene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Hexachlorobutadiene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
2-Hexanone	ND	10		µg/L	10	3/31/2022 2:15:00 PM	R86909
Isopropylbenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
4-Isopropyltoluene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
4-Methyl-2-pentanone	ND	10		µg/L	10	3/31/2022 2:15:00 PM	R86909
Methylene chloride	ND	3.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
n-Butylbenzene	ND	3.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
n-Propylbenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
sec-Butylbenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Styrene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
tert-Butylbenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,1,2,2-Tetrachloroethane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Tetrachloroethene (PCE)	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
trans-1,2-DCE	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
trans-1,3-Dichloropropene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,2,3-Trichlorobenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,2,4-Trichlorobenzene	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,1,1-Trichloroethane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,1,2-Trichloroethane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Trichloroethene (TCE)	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Trichlorofluoromethane	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
1,2,3-Trichloropropane	ND	2.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Vinyl chloride	ND	1.0		µg/L	10	3/31/2022 2:15:00 PM	R86909
Xylenes, Total	19	1.5		µg/L	10	3/31/2022 2:15:00 PM	R86909
Surr: Dibromofluoromethane	109	70-130		%Rec	10	3/31/2022 2:15:00 PM	R86909
Surr: 1,2-Dichloroethane-d4	108	70-130		%Rec	10	3/31/2022 2:15:00 PM	R86909
Surr: Toluene-d8	110	70-130		%Rec	10	3/31/2022 2:15:00 PM	R86909
Surr: 4-Bromofluorobenzene	114	70-130		%Rec	10	3/31/2022 2:15:00 PM	R86909

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	Estimated value
	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		

Page 2 of 2



ANALYTICAL SUMMARY REPORT

April 05, 2022

Hall Environmental

4901 Hawkins St NE Ste D

Albuquerque, NM 87109-4372

Work Order: G22030468

Project Name: Not Indicated

Energy Laboratories Inc. Gillette WY received the following 1 sample for Hall Environmental on 3/29/2022 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
G22030468-001	2203D61-001B; Influent All Wells	03/24/22 13:30	03/29/22	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:



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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: 2203D61-001B; Influent All Wells
Location:
Lab ID: G22030468-001

Report Date: 04/05/22
Collection Date: 03/24/22 13:30
Date Received: 03/29/22
Sampled By: Not Indicated

Analyses

Result Units Qualifier Method Analysis Date / By

NATURAL GAS CHROMATOGRAPHIC ANALYSIS REPORT

Oxygen	22.097 Mol %	GPA 2261	04/04/22 13:51 / blb
Nitrogen	77.652 Mol %	GPA 2261	04/04/22 13:51 / blb
Carbon Dioxide	0.179 Mol %	GPA 2261	04/04/22 13:51 / blb
Hydrogen Sulfide	< 0.001 Mol %	GPA 2261	04/04/22 13:51 / blb
Methane	< 0.001 Mol %	GPA 2261	04/04/22 13:51 / blb
Ethane	< 0.001 Mol %	GPA 2261	04/04/22 13:51 / blb
Propane	< 0.001 Mol %	GPA 2261	04/04/22 13:51 / blb
Isobutane	< 0.001 Mol %	GPA 2261	04/04/22 13:51 / blb
n-Butane	0.001 Mol %	GPA 2261	04/04/22 13:51 / blb
Isopentane	0.003 Mol %	GPA 2261	04/04/22 13:51 / blb
n-Pentane	0.004 Mol %	GPA 2261	04/04/22 13:51 / blb
Hexanes plus	0.064 Mol %	GPA 2261	04/04/22 13:51 / blb

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

GPM Ethane	< 0.0003 gal/MCF	GPA 2261	04/04/22 13:51 / blb
GPM Propane	< 0.0003 gal/MCF	GPA 2261	04/04/22 13:51 / blb
GPM Isobutane	< 0.0003 gal/MCF	GPA 2261	04/04/22 13:51 / blb
GPM n-Butane	< 0.0003 gal/MCF	GPA 2261	04/04/22 13:51 / blb
GPM Isopentane	0.0010 gal/MCF	GPA 2261	04/04/22 13:51 / blb
GPM n-Pentane	0.0010 gal/MCF	GPA 2261	04/04/22 13:51 / blb
GPM Hexanes plus	0.0280 gal/MCF	GPA 2261	04/04/22 13:51 / blb
GPM Pentanes plus	0.0300 gal/MCF	GPA 2261	04/04/22 13:51 / blb
GPM Total	0.0300 gal/MCF	GPA 2261	04/04/22 13:51 / blb

CALCULATED PROPERTIES

Calculation Pressure Base	14.730 psia	GPA 2261	04/04/22 13:51 / blb
Calculation Temperature Base	60 °F	GPA 2261	04/04/22 13:51 / blb
Compressibility Factor, Z	1.0000 unitless	GPA 2261	04/04/22 13:51 / blb
Molecular Weight	28.97 unitless	GPA 2261	04/04/22 13:51 / blb
Pseudo-critical Pressure, psia	548 psia	GPA 2261	04/04/22 13:51 / blb
Pseudo-critical Temperature, deg R	240 deg R	GPA 2261	04/04/22 13:51 / blb
Specific Gravity (air=1.000)	1.003 unitless	GPA 2261	04/04/22 13:51 / blb
Gross BTU per cu ft @ std cond, dry	3.58 BTU/cu ft	GPA 2261	04/04/22 13:51 / blb
Gross BTU per cu ft @ std cond, wet	3.52 BTU/cu ft	GPA 2261	04/04/22 13:51 / blb

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

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



QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental

Work Order: G22030468

Report Date: 04/05/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261								Analytical Run: R270178		
Lab ID: ICV-2204041313	12 Initial Calibration Verification Standard								04/04/22 13:12	
Oxygen		0.392	Mol %	0.001	98	75	110			
Nitrogen		5.176	Mol %	0.001	103	90	110			
Carbon Dioxide		4.906	Mol %	0.001	99	90	110			
Hydrogen Sulfide		0.127	Mol %	0.001	128	100	136			
Methane		73.195	Mol %	0.001	100	90	110			
Ethane		5.000	Mol %	0.001	101	90	110			
Propane		4.997	Mol %	0.001	100	90	110			
Isobutane		1.974	Mol %	0.001	98	90	110			
n-Butane		1.959	Mol %	0.001	97	90	110			
Isopentane		0.980	Mol %	0.001	98	90	110			
n-Pentane		0.991	Mol %	0.001	99	90	110			
Hexanes plus		0.303	Mol %	0.001	100	90	110			
Lab ID: CCV-2204041318	12 Continuing Calibration Verification Standard								04/04/22 13:17	
Oxygen		0.618	Mol %	0.001	103	90	110			
Nitrogen		1.330	Mol %	0.001	95	85	110			
Carbon Dioxide		0.956	Mol %	0.001	96	90	110			
Hydrogen Sulfide		0.025	Mol %	0.001	100	70	130			
Methane		93.498	Mol %	0.001	100	90	110			
Ethane		1.016	Mol %	0.001	102	90	110			
Propane		1.010	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		0.154	Mol %	0.001	103	90	110			
Lab ID: CCV-2204041410	12 Continuing Calibration Verification Standard								04/04/22 14:11	
Oxygen		0.629	Mol %	0.001	105	90	110			
Nitrogen		1.366	Mol %	0.001	98	85	110			
Carbon Dioxide		0.954	Mol %	0.001	95	90	110			
Hydrogen Sulfide		0.025	Mol %	0.001	100	70	130			
Methane		93.469	Mol %	0.001	100	90	110			
Ethane		1.012	Mol %	0.001	101	90	110			
Propane		1.007	Mol %	0.001	101	90	110			
Isobutane		0.493	Mol %	0.001	98	90	110			
n-Butane		0.493	Mol %	0.001	98	90	110			
Isopentane		0.199	Mol %	0.001	99	90	110			
n-Pentane		0.200	Mol %	0.001	100	90	110			
Hexanes plus		0.153	Mol %	0.001	102	90	110			
Method: GPA 2261								Batch: R270178		
Lab ID: G22030468-001ADUP	12 Sample Duplicate							Run: Varian GC_220404A		
Oxygen		22.098	Mol %	0.001				0.0	10	
Nitrogen		77.652	Mol %	0.001				0.0	10	
Carbon Dioxide		0.179	Mol %	0.001				0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



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Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

QA/QC Summary Report

Prepared by Gillette, WY Branch

Client: Hall Environmental

Work Order: G22030468

Report Date: 04/05/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: GPA 2261									Batch: R270178	
Lab ID: G22030468-001ADUP 12 Sample Duplicate									Run: Varian GC_220404A 04/04/22 14:01	
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				0.0	10	
Isopentane		0.003	Mol %	0.001				0.0	10	
n-Pentane		0.004	Mol %	0.001				0.0	10	
Hexanes plus		0.063	Mol %	0.001				1.6	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



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Work Order Receipt Checklist

Hall Environmental

G22030468

Login completed by: Jill S. Jeffress

Date Received: 3/29/2022

Reviewed by: Misty Stephens

Received by: csj

Reviewed Date: 3/31/2022

Carrier name: FedEx

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

Standard Reporting Procedures:

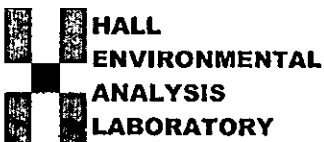
Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

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.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. 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

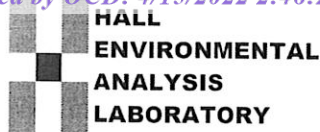
SUB CONTRACTOR Energy Labs-Gillette		COMPANY Energy Laboratories		PHONE (866) 686-7175	FAX
ADDRESS 400 W Boxelder Rd				ACCOUNT #	EMAIL
CITY STATE, ZIP Gillette, WY 82718					

ITEM	SAMPLE	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	COLLECTION DATE	# CONTAINERS	ANALYTICAL COMMENTS
1	2203D61-001B	Influent All Wells	TEDLAR	Air	3/24/2022 1:30:00 PM	1	Natural Gas Analysis, CO2, O2

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>CR</i>	Date 3/25/2022	Time 8:34 AM	Received By	Date	Time	REPORT TRANSMITTAL DESIRED:			
Relinquished By	Date	Time	Received By	Date	Time	HARDCOPY (extra cost)	FAX	EMAIL	ONLINE
Relinquished By	Date	Time	Received By <i>Chantel Johnson</i>	Date <i>3/29/2022</i>	Time <i>10:50</i>	FOR LAB USE ONLY			
TAT	Standard <input checked="" type="checkbox"/>	RUSH	Next BD	2nd BD	3rd BD	Temp of samples <input type="checkbox"/> Attempt to Cool <input type="checkbox"/> 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: 2203D61

RcptNo: 1

Received By: Cheyenne Cason 3/25/2022 7:23:00 AM

Completed By: Cheyenne Cason 3/25/2022 8:30:48 AM

Reviewed By: KRC 3/25/22

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 $>0^{\circ}\text{C}$ 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: me 3/25/22

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 $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	NA	Good	Yes			

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 98972

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 98972
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See App ID 125935 for most updated status.	9/23/2022