



April 25, 2022

New Mexico Oil Conservation Division

New Mexico Energy, Minerals, and Natural Resources Department
1000 Rio Brazos Road
Aztec, New Mexico 87410

Re: First Quarter 2022 – Remediation System Quarterly Report

Federal 18 #1T
San Juan County, New Mexico
Hilcorp Energy Company
NMOCD Incident Number: NCS2103335776
Ensolum Project No.: 07A1988003

To Whom it May Concern:

Ensolum, LLC (Ensolum), on behalf of Hilcorp Energy Company (Hilcorp), presents this *First Quarter 2022 – Remediation System Quarterly Report* summarizing first quarter 2022 activities at the former Federal 18 #1T coalbed methane gas well (Site), located in Unit M, Section 18, Township 30 North, Range 12 West in the City of Farmington, New Mexico. The casing of the original gas well has been modified to vent gas and purge water from the Ojo Alamo and Nacimiento Formations. Since initiation of the remediation system in 2010, quarterly reports have been submitted to the New Mexico Oil Conservation Division (NMOCD) to record activities performed at the Site, as well as document well-casing pressures from nearby domestic water well SJ-01737, the volume of gas vented from the Site's well, and groundwater analytical results collected from the Site's well.

SITE BACKGROUND

As part of an ongoing effort between the NMOCD and Hilcorp (Site originally operated by XTO Energy, Inc. [XTO]), the agreed upon remedial option for the Site was to install a vacuum system at the Site to vent gas from the Nacimiento formation, which overlies the Ojo Alamo Formation. Gas found in the Nacimiento formation could have originated from several contributing sources in the area including existing and abandoned gas wells near the Site. In agreement with the NMOCD, XTO modified the Site's production well to vent gas and recover contaminated groundwater by setting a plug at a depth of approximately 513 feet below ground surface (bgs). Perforations were made in the casing at 437 to 452 feet bgs and 457 to 473 feet bgs in order to monitor groundwater and vent gas from the Nacimiento Formation. Based on initial groundwater sampling results, XTO recommended pumping the aquifer until groundwater results were below the New Mexico Water Quality Control Commission (NMWQCC) standards for benzene, toluene, ethylbenzene, total xylenes (referred to as BTEX), and chloride.

A submersible water pump was installed in the Site's well in November 2010 at a depth of approximately 485 feet bgs in order to recover impacted groundwater. Based on aquifer tests performed by XTO, the water pump was set to maintain a static water level of approximately 473 feet bgs. The water pump is plumbed into the existing water lines and stored in the on-Site 210-barrel (bbl) water tank, which is regularly emptied for off-Site disposal. A vacuum pump was subsequently installed at the Site's well to

Hilcorp Energy Company
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also remove gas entrained in the formation. A portable generator was originally placed at the Site to power both the vacuum and water pumps. Generator maintenance issues led to the system being electrified on February 3, 2011.

Operation and maintenance (O&M) inspections are conducted by Hilcorp personnel regularly to check the system and verify proper water and vacuum pump operation, record water meter volumes, and verify that no other Site conditions dictate system maintenance and/or adjustment. Possible pressure variations in the subsurface due to the vacuum pump are monitored using nearby water well SJ-01737. Casing pressure measurements from the SJ-01737 are included in Table 1.

FIRST QUARTER 2022 SITE ACTIVITIES AND RESULTS

Approximately 13,116 gallons (312 bbls) of water was removed from the Site's well during the first quarter of 2022. To date, approximately 1,156,355 gallons (27,532 bbls) of impacted water have been removed from the Site. A water sample from the well was collected on February 17, 2022 and submitted to Hall Environmental Analysis Laboratory (Hall) for laboratory analysis. Specifically, the water sample was analyzed for the following constituents: volatile organic compounds (VOCs), including BTEX by Environmental Protection Agency (EPA) Method 8260, chloride by EPA Method 300.0, specific conductance (or electrical conductivity) by Standard Method (SM) 2510B, pH by Method SM4500-H+B, and total dissolved solids (TDS) by Method SM2540C.

Based on results from the February 2022 sampling event, benzene and TDS remain at concentrations above the applicable NMWQCC standards. Analytical results are summarized in Table 2, with complete laboratory reports attached as Appendix A.

Since the installation of a new vacuum pump in March 2021, the pump operated for 5 minutes every 2 hours (12 cycles for a total of 60 minutes runtime per day). As recommended in the *Fourth Quarter 2021 – Remediation System Update* report prepared by WSP USA, Inc. (dated January 25, 2022), Hilcorp incrementally increased the runtime of the vacuum pump during the first quarter of 2022 in order to increase the volume of gas vented by the system. On January 19, 2022, the pump runtime was increased to 24 cycles of 5 minutes on and 55 minutes off (120 minutes runtime per day). The runtime was subsequently increased on January 24, 2022 to two cycles of 690 minutes on and 30 minutes off (23 hours runtime per day). The system will be monitored during the second quarter of 2022 to assess if the vacuum pump can sustain this operational runtime. Approximately 29,991 thousand cubic feet (MCF) of gas/air have been emitted from the Site's well. Gas/air volumes vented by the system are summarized in Table 3.

RECOMMENDATIONS

O&M visits will continue to be performed by Hilcorp personnel to verify the system is operating as designed. Deviations from regular operations will be noted on field logs and included in the following quarterly report. Hilcorp will continue to remove and monitor water from the Site until benzene and TDS concentrations are compliant with NMWQCC standards for eight consecutive quarters.

Hilcorp Energy Company
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We appreciate the opportunity to provide this report to the NMOCD. If you should have any questions or comments regarding this proposal, please contact the undersigned.

Sincerely,
Ensolum, LLC

Stuart Hyde, LG
Senior Geologist
(970) 903-1607
shyde@ensolum.com

Daniel R. Moir, PG
Senior Managing Geologist
(303) 887-2946
dmoir@ensolum.com

Attachments:

Table 1	Well SJ-01737 Casing Pressure Readings
Table 2	Water Analytical Results
Table 3	Gas and Air Vented
Appendix A	Laboratory Analytical Reports



TABLES



TABLE 1
WELL SJ-01737 CASING PRESSURE READINGS
Hilcorp Energy Company - Federal 18 #1T
San Juan County, New Mexico

Ensolum Project No. 07A1988003

Sample Date	Casing Pressure (ounces)	Average
1/7/2020	0	0.000
1/17/2020	1.25	0.125
1/30/2020	0	0.000
2/12/2020	2.25	0.173
2/25/2020	0	0.000
4/3/2020	1.75	0.046
4/9/2020	0	0.000
4/15/2020	3	0.500
4/23/2020	0	0.000
4/30/2020	0.5	0.071
5/15/2020	0	0.000
5/21/2020	1.25	0.208
5/29/2020	0	0.000
6/5/2020	0.5	0.071
6/29/2020	0	0.000
7/8/2020	0.75	0.083
7/22/2020	0	0.000
8/11/2020	0	0.000
8/25/2020	0	0.000
9/16/2020	0	0.000
9/22/2020	0	0.000
10/26/2020	2.75	0.081
11/9/2020	0	0.000
12/8/2020	0	0.000
12/18/2020	0	0.000
1/5/2021	1.75	0.097
1/20/2021	0	0.000
2/11/2021	1.75	0.080
2/17/2021	0	0.000
3/25/2021	3.5	0.097
10/4/2021	0	0.000
10/11/2021	2.5	0.357
10/18/2021	0	0.000
10/26/2021	3.25	0.406
11/1/2021	0	0.000
11/9/2021	0.5	0.063
11/23/2021	3	0.214
11/29/2021	0	0.000
12/6/2021	3	0.429
12/14/2021	0	0.000
12/20/2021	0	0.000
12/30/2021	0	0.000
1/4/2022	0	0.000
1/11/2022	0	0.000
1/24/2022	0	0.000
1/31/2022	0	0.000
2/7/2022	0	0.000
2/17/2022	0	0.000
3/2/2022	0	0.000
3/7/2022	0	0.000
3/14/2022	0	0.000
3/21/2022	0	0.000
3/28/2022	0	0.000



TABLE 2
WATER ANALYTICAL RESULTS
Hilcorp Energy Company - Federal 18 #1T
San Juan County, New Mexico

Ensolum Project No. 07A1988003

Sample Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylene (µg/L)	Chlorides (mg/L)	TDS (mg/L)	Electrical Conductivity (umhos/cm)	pH	Purge Water Volume (gallons)
NMWQCC Standards	5.0	1,000	700	620	250	1,000	--	6 thru 9	--
11/5/2010	ND	5.2	ND	ND	15	1,400	2,600	7.2	NM
9/24/2010	150	ND	76	670	--	--	--	--	NM
9/24/2010	190	170	24	210	6,800	13,000	18,000	6.1	NM
9/24/2010	143	221	63.6	950	--	--	--	--	NM
9/24/2010	320	377	31.8	568	7,150	11,100	16,000	5.84	NM
12/10/2011	--	--	--	--	2,800	7,610	8,900	6.36	3,033
1/5/2011	67	93	7.9	25	--	--	--	--	7,798
1/5/2011	73	99	10	39	1,600	4,800	6,000	6.6	7,798
1/29/2011	60	93	10	33	930	--	4,900	6.4	10,791
2/28/2011	42	60	6.1	20	550	3,400	4,000	6.7	14,795
4/1/2011	23	27	1.8	6.8	260	2,700	3,100	6.8	31,238
4/29/2011	29	28	2.4	7.3	140	2,600	2,900	6.9	50,217
5/31/2011	14	19	1.4	4.9	89	2,500	2,800	6.7	76,513
6/14/2011	55	81	2.8	15	73	2,500	2,700	6.7	88,120
6/30/2011	52	67	2.6	12	61	2,500	2,700	6.9	101,209
8/15/2011	21	25	1.2	5.8	44	2,500	2,600	6.8	140,267
9/2/2011	10	12	0.64	3.2	41	2,500	2,600	7.2	155,801
9/16/2011	9.6	11	0.64	3	38	2,400	2,500	7.2	168,040
9/30/2011	7.2	8.7	0.64	2.5	35	2,500	2,600	7	180,393
10/28/2011	5.1	ND	1.8	2.7	31	2,300	2,600	6.9	205,220
11/30/2011	4	ND	3.9	2	27	2,500	2,600	7.1	233,488
12/30/2011	3.4	ND	ND	2.9	27	2,500	2,500	7.5	261,391
4/3/2012	6	ND	ND	1.6	--	--	--	--	351,300
4/9/2012	--	--	--	--	19	2,400	2,400	7.4	NM
7/3/2012	5.3	ND	ND	ND	16	2,300	2,400	7.4	NM
7/6/2012	--	--	--	--	--	--	--	--	441,053
9/19/2012	--	--	--	--	--	--	--	--	521,271
9/27/2012	6.2	ND	ND	ND	15	2,300	2,500	7.1	NM
12/14/2012	--	--	--	--	--	--	--	--	598,540
12/31/2012	13.9	1.1	ND	3.3	15.5	2,690	2,440	7.05	604,689
1/23/2013	160	190	ND	26	15	2,400	2,500	8	NM
2/22/2013	7.1	77	ND	1.8	15	2,100	2,500	7.1	605,860
5/2/2013	9	6.9	ND	ND	15	2,400	2,600	7.5	612,601
8/19/2013	20	11	ND	2.3	16	2,200	2,600	7.2	NM
9/23/2013	13	11	ND	2.2	16	2,300	2,500	7.1	621,744
11/25/2013	4.6	5.2	ND	ND	15	2,200	2,700	7.7	631,430
2/4/2014	15	17	0.72	3.1	16	2,200	2,500	7.3	636,120
10/1/2015	54.2	57	1.37	9.77	21.3	2,260	2,640	6.98	639,410
10/20/2015	42.3	39.9	0.964	7.06	18.1	2,330	1,460	7.09	642,650
3/28/2016	38	34.1	0.835	4.82	21.6	2,230	2,570	6.86	650,850
6/14/2016	78.3	58.4	1.16	7.22	13.7	2,890	2,600	6.89	704,371
8/29/2016	19	ND	ND	2.18	14.8	2,410	2,590	7.02	763,261
11/18/2016	13.2	5.61	ND	2.33	13.9	2,470	2,580	7.03	842,610
3/31/2017	9.61	7.87	ND	ND	14.4	2,300	2,570	7.28	858,190
6/16/2017	64.6	29.2	0.781	5.4	14.2	2,360	2,570	7.05	927,854
9/7/2017	4.61	1.73	ND	ND	13.7	2,030	2,450	7.14	997,330
12/5/2017	138	51.5	1.65	9.378	14.4	2,230	2,590	7.2	1,080,550
3/6/2018	19.9	14.8	0.543	2.71	14.4	2,290	2,620	7.13	1,080,840
8/7/2018	7.9	8.06	<0.5	<1.5	13.7	2,200	2,300	7.19	1,082,751
1/3/2019	7.07	3.29	0.177	1.08	15.8	2,080	6,750	6.35	1,120,220
2/22/2019	19.8	11.1	<0.5	3.97	14.1	2,270	2,710	7.46	1,120,366
5/24/2019	11.9	10.8	ND	ND	13.4	2,380	2,760	7.15	1,123,853
9/10/2019	23.2	18.8	ND	ND	14.3	2,260	2,600	7.37	1,125,478
10/29/2019	5.41	5.68	ND	ND	14	2,300	2,530	7.09	1,127,076
2/27/2020	20.7	19.3	ND	ND	14.4	2,280	2,580	7.06	1,128,506
5/15/2020	10.3	8.91	ND	ND	13.6	2,460	2,570	7.27	1,131,033
8/25/2020	3.9	3.5	ND	ND	13.9	2,190	2,640	7.62	1,131,100
10/27/2020	31.1	24.4	ND	ND	13.9	2,240	2,530	7.43	1,131,119
2/17/2021	73	<1	<1	<1.5	18	2,200	2,400	7.42	1,131,123
6/29/2021 (2)	--	--	--	--	--	--	--	--	1,134,031
9/30/2021	130	87	<5.0	8.1	19	2,300	2,500	7.20	1,134,167
12/6/2021	33	20	<1.0	6.0	15	2,430	2,500	7.15	1,143,239
2/17/2022	25	3.1	<1.0	2.7	13	2,380	2,600	7.17	1,156,355

Notes:

- (1): initial water sample
- (2): water pump not functioning
- µg/L: micrograms per liter
- mg/L: milligrams per liter
- ND: not detected, practical quantitation limit unknown
- NMWQCC: New Mexico Water Quality Control Commission
- : not analyzed
- <0.037: indicates result less than the stated laboratory reporting limit (RL)

Concentrations in **bold** and shaded exceed the New Mexico Water Quality Control Commission Standards, 20.6.2 of the New Mexico Administrative Code



TABLE 3
GAS AND AIR VENTED
 Hilcorp Energy Company - Federal 18 #1T
 San Juan County, New Mexico

Ensolum Project No. 07A1988003

Date	SCFM	ACFM	Total Vented Gas and Air (MCF)
9/17/2019	3	6	26,677
10/7/2019	3	6	26,849
10/21/2019	3	6	26,969
10/28/2019	3	6	27,030
12/5/2019	3	6	27,356
12/19/2019	3	6	27,477
1/7/2020	3	6	27,954
1/17/2020	3	6	28,040
1/30/2020	3	6	28,153
2/12/2020	3	6	28,265
2/25/2020	3	6	28,377
4/3/2020	3	6	28,705
4/9/2020	3	6	28,756
4/15/2020	3	6	28,808
4/23/2020	3	6	28,877
4/30/2020	3	6	28,937
5/15/2020	3	6	29,067
5/21/2020	3	6	29,118
5/29/2020	3	6	29,179
6/5/2020	3	6	29,239
6/29/2020	0	0	Hot, not running
7/8/2020	0	0	Unit Down
8/11/2020	0	0	Unit Down
8/25/2020	0	0	Unit Down
9/16/2020	0	0	Unit Down
9/22/2020	0	0	Unit Down
10/26/2020	0	0	Unit Down
11/9/2020	0	0	Unit Down
12/8/2020	0	0	Unit Down
1/5/2021	0	0	Unit Down
1/20/2021	0	0	Unit Down
2/11/2021	0	0	Unit Down
2/17/2021	0	0	Unit Down
3/22/2021	0	0	Unit Down
*3/31/2021	5.6	7	29,241
6/29/2021	5.6	7	29,262
9/30/2021	5.6	7	29,281
12/31/2021	5.6	7	29,320
1/19/2022	5.6	7	29,328
1/24/2022	5.6	7	29,353
3/31/2022	5.6	7	29,991

Notes:

ACFM - flow rate in actual cubic feet per minute

MCF - thousand cubic feet

SCFM - flow rate in standard cubic feet per minute

* - Pump operated from 3/23 - 3/31/2021.

SCFM per day based on manufacture specifications.

ACFM is estimated based on site elevation and/or observed vacuum



APPENDIX A

Laboratory Analytical Reports



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

February 28, 2022

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

RE: Federal 18 IT

OrderNo.: 2202904

Dear Mitch Killough:

Hall Environmental Analysis Laboratory received 1 sample(s) on 2/18/2022 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 2202904

Date Reported: 2/28/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Tubing

Project: Federal 18 IT

Collection Date: 2/17/2022 10:50:00 AM

Lab ID: 2202904-001

Matrix: GROUNDWA

Received Date: 2/18/2022 7:36:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	13	5.0		mg/L	10	2/18/2022 8:59:00 PM	R85947
SM2510B: SPECIFIC CONDUCTANCE							Analyst: CAS
Conductivity	2600	10		µmhos/c	1	2/21/2022 9:08:47 AM	R85975
SM2540C MOD: TOTAL DISSOLVED SOLIDS							Analyst: KS
Total Dissolved Solids	2380	40.0	*D	mg/L	1	2/28/2022 10:48:00 AM	65775
SM4500-H+B / 9040C: PH							Analyst: CAS
pH	7.17		H	pH units	1	2/21/2022 9:08:47 AM	R85975
EPA METHOD 8260B: VOLATILES							Analyst: JR
Benzene	25	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Toluene	3.1	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Ethylbenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Naphthalene	ND	2.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1-Methylnaphthalene	ND	4.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
2-Methylnaphthalene	ND	4.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Acetone	ND	10		µg/L	1	2/22/2022 7:11:37 PM	R86011
Bromobenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Bromodichloromethane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Bromoform	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Bromomethane	ND	3.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
2-Butanone	ND	10		µg/L	1	2/22/2022 7:11:37 PM	R86011
Carbon disulfide	ND	10		µg/L	1	2/22/2022 7:11:37 PM	R86011
Carbon Tetrachloride	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Chlorobenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Chloroethane	ND	2.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Chloroform	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Chloromethane	ND	3.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
2-Chlorotoluene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
4-Chlorotoluene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
cis-1,2-DCE	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Dibromochloromethane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011

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 2202904

Date Reported: 2/28/2022

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Tubing

Project: Federal 18 IT

Collection Date: 2/17/2022 10:50:00 AM

Lab ID: 2202904-001

Matrix: GROUNDWA

Received Date: 2/18/2022 7:36:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: JR
Dibromomethane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,2-Dichlorobenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,3-Dichlorobenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,4-Dichlorobenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Dichlorodifluoromethane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,1-Dichloroethane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,1-Dichloroethene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,2-Dichloropropane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,3-Dichloropropane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
2,2-Dichloropropane	ND	2.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,1-Dichloropropene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Hexachlorobutadiene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
2-Hexanone	ND	10		µg/L	1	2/22/2022 7:11:37 PM	R86011
Isopropylbenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
4-Isopropyltoluene	2.1	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
4-Methyl-2-pentanone	ND	10		µg/L	1	2/22/2022 7:11:37 PM	R86011
Methylene Chloride	ND	3.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
n-Butylbenzene	ND	3.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
n-Propylbenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
sec-Butylbenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Styrene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
tert-Butylbenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
trans-1,2-DCE	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,1,1-Trichloroethane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,1,2-Trichloroethane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Trichloroethene (TCE)	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Trichlorofluoromethane	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
1,2,3-Trichloropropane	ND	2.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Vinyl chloride	ND	1.0		µg/L	1	2/22/2022 7:11:37 PM	R86011
Xylenes, Total	2.7	1.5		µg/L	1	2/22/2022 7:11:37 PM	R86011
Surr: 1,2-Dichloroethane-d4	100	70-130		%Rec	1	2/22/2022 7:11:37 PM	R86011
Surr: 4-Bromofluorobenzene	107	70-130		%Rec	1	2/22/2022 7:11:37 PM	R86011
Surr: Dibromofluoromethane	96.6	70-130		%Rec	1	2/22/2022 7:11:37 PM	R86011

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 2202904

Date Reported: **2/28/2022**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Hilcorp Energy

Client Sample ID: Tubing

Project: Federal 18 IT

Collection Date: 2/17/2022 10:50:00 AM

Lab ID: 2202904-001

Matrix: GROUNDWA

Received Date: 2/18/2022 7:36:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: JR
Surr: Toluene-d8	103	70-130		%Rec	1	2/22/2022 7:11:37 PM	R86011

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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QC SUMMARY REPORT**Hall Environmental Analysis Laboratory, Inc.**

WO#: 2202904

28-Feb-22

Client: Hilcorp Energy**Project:** Federal 18 IT

Sample ID: MB	SampType: mblk	TestCode: EPA Method 300.0: Anions								
Client ID: PBW	Batch ID: R85947	RunNo: 85947								
Prep Date:	Analysis Date: 2/18/2022	SeqNo: 3027084	Units: mg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Sample ID: LCS	SampType: lcs	TestCode: EPA Method 300.0: Anions								
Client ID: LCSW	Batch ID: R85947	RunNo: 85947								
Prep Date:	Analysis Date: 2/18/2022	SeqNo: 3027086	Units: mg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.6	0.50	5.000	0	92.1	90	110			

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#: 2202904

28-Feb-22

Client: Hilcorp Energy**Project:** Federal 18 IT

Sample ID: 100ng lcs	SampType: LCS			TestCode: EPA Method 8260B: VOLATILES						
Client ID: LCSW	Batch ID: R86011			RunNo: 86011						
Prep Date:	Analysis Date: 2/22/2022			SeqNo: 3030269		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	103	70	130			
Toluene	21	1.0	20.00	0	106	70	130			
Chlorobenzene	21	1.0	20.00	0	103	70	130			
1,1-Dichloroethene	21	1.0	20.00	0	104	70	130			
Trichloroethene (TCE)	20	1.0	20.00	0	98.6	70	130			
Surr: 1,2-Dichloroethane-d4	9.8		10.00		98.3	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		104	70	130			
Surr: Dibromofluoromethane	10		10.00		102	70	130			
Surr: Toluene-d8	10		10.00		103	70	130			

Sample ID: mb	SampType: MBLK			TestCode: EPA Method 8260B: VOLATILES						
Client ID: PBW	Batch ID: R86011			RunNo: 86011						
Prep Date:	Analysis Date: 2/22/2022			SeqNo: 3030292		Units: µg/L				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								

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		

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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2202904

28-Feb-22

Client: Hilcorp Energy

Project: Federal 18 IT

Sample ID: mb	SampType: MBLK	TestCode: EPA Method 8260B: VOLATILES								
Client ID: PBW	Batch ID: R86011	RunNo: 86011								
Prep Date:	Analysis Date: 2/22/2022	SeqNo: 3030292	Units: µg/L							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								

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		

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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2202904

28-Feb-22

Client: Hilcorp Energy

Project: Federal 18 IT

Sample ID: mb		SampType: MBLK			TestCode: EPA Method 8260B: VOLATILES					
Client ID: PBW		Batch ID: R86011			RunNo: 86011					
Prep Date:		Analysis Date: 2/22/2022			SeqNo: 3030292		Units: µg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	11		10.00		108	70	130			
Surr: 4-Bromofluorobenzene	11		10.00		105	70	130			
Surr: Dibromofluoromethane	11		10.00		110	70	130			
Surr: Toluene-d8	10		10.00		105	70	130			

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#: 2202904

28-Feb-22

Client: Hilcorp Energy

Project: Federal 18 IT

Sample ID: Ics-1 100.2uS eC	SampType: Ics		TestCode: SM2510B: Specific Conductance							
Client ID: LCSW	Batch ID: R85975		RunNo: 85975							
Prep Date:	Analysis Date: 2/21/2022		SeqNo: 3028544		Units: µmhos/cm					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	100	10	100.2	0	101	85	115			

Sample ID: 2202904-001b dup	SampType: dup		TestCode: SM2510B: Specific Conductance							
Client ID: Tubing	Batch ID: R85975		RunNo: 85975							
Prep Date:	Analysis Date: 2/21/2022		SeqNo: 3028548		Units: µmhos/cm					
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	2600	10						0.349	20	

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

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QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2202904

28-Feb-22

Client: Hilcorp Energy

Project: Federal 18 IT

Sample ID: 2202904-001b dup		SampType: dup		TestCode: SM4500-H+B / 9040C: pH						
Client ID: Tubing		Batch ID: R85975		RunNo: 85975						
Prep Date:		Analysis Date: 2/21/2022		SeqNo: 3028564		Units: pH units				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
pH	7.18									H

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#: 2202904

28-Feb-22

Client: Hilcorp Energy**Project:** Federal 18 IT

Sample ID: MB-65775	SampType: MBLK	TestCode: SM2540C MOD: Total Dissolved Solids								
Client ID: PBW	Batch ID: 65775	RunNo: 86127								
Prep Date: 2/24/2022	Analysis Date: 2/28/2022	SeqNo: 3034868 Units: mg/L								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

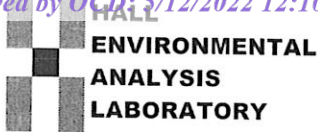
Sample ID: LCS-65775	SampType: LCS	TestCode: SM2540C MOD: Total Dissolved Solids								
Client ID: LCSW	Batch ID: 65775	RunNo: 86127								
Prep Date: 2/24/2022	Analysis Date: 2/28/2022	SeqNo: 3034869 Units: mg/L								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	1010	20.0	1000	0	101	80	120			

Sample ID: 2202904-001BDUP	SampType: DUP	TestCode: SM2540C MOD: Total Dissolved Solids								
Client ID: Tubing	Batch ID: 65775	RunNo: 86127								
Prep Date: 2/24/2022	Analysis Date: 2/28/2022	SeqNo: 3034871 Units: mg/L								
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	2360	40.0						0.506	10	*D

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



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: 2202904

RcptNo: 1

Received By: Tracy Casarrubias 2/18/2022 7:36:00 AM

Completed By: Cheyenne Cason 2/18/2022 8:48:16 AM

Reviewed By: *JC 2-18-22**Chad*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: *JA 2/18/22*

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	4.0	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 106389

CONDITIONS

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID:
	372171
	Action Number: 106389
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

CONDITIONS

Created By	Condition	Condition Date
nvelez	Accepted for the record. See App ID 132101 for most updated status.	9/8/2022