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# ENSOLUM

October 17, 2022

**New Mexico Oil Conservation Division**

New Mexico Energy, Minerals, and Natural Resources Department  
1220 South St. Francis Drive  
Santa Fe, New Mexico 87505

**Re: Third Quarter 2022 – Remediation System Quarterly Report  
Federal 18 #1T  
San Juan County, New Mexico  
Hilcorp Energy Company  
NMOCD Incident Number: NCS2103335776**

To Whom it May Concern:

Ensolum, LLC (Ensolum), on behalf of Hilcorp Energy Company (Hilcorp), presents this *Third Quarter 2022 – Remediation System Quarterly Report* summarizing third 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 owned and 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 feet to 452 feet bgs and 457 feet 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 applicable chemicals of concern (COCs).

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 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 well are included in Table 1.

### THIRD QUARTER 2022 SITE ACTIVITIES AND RESULTS

Approximately 22,298 gallons (530 bbls) of water were removed from the Site's well during the third quarter of 2022. To date, approximately 1,191,754 gallons (28,375 bbls) of impacted water have been removed from the Site. A water sample from the well was collected on July 15, 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 benzene, toluene, ethylbenzene, and xylenes (BTEX), following Environmental Protection Agency (EPA) Method 8260, chloride following EPA Method 300.0, specific conductance (or electrical conductivity) following Standard Method (SM) 2510B, pH following Method SM4500-H+B, and total dissolved solids (TDS) following Method SM2540C. Based on results from the July 2022 sampling event, benzene and TDS remain at concentrations exceeding the applicable NMWQCC standards and appear to be similar to historical results. Analytical results are summarized in Table 2, with complete laboratory reports attached as Appendix A.

Since January 24, 2022, the vacuum pump has operated for two cycles of 690 minutes on and 30 minutes off (23 hours runtime per day). Approximately 31,759 thousand cubic feet (MCF) of gas/air have been emitted from the Site's well since the system began operating in 2010. Gas/air volumes vented by the system are summarized in Table 3.

### RECOMMENDATIONS

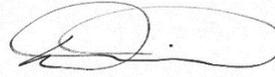
O&M visits will continue to be performed by Hilcorp personnel to verify the system is operating as designed. Deviations from regular operations will be noted on field logs and included in the following quarterly report. Hilcorp will continue to remove and monitor water from the Site until benzene and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

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.

## 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**  
 Federal 18 #1T  
 Hilcorp Energy Company  
 San Juan County, New Mexico

Sample Date	Casing Pressure (ounces)	Average
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
4/7/2022	0	0.000
4/19/2022	0	0.000
4/25/2022	0	0.000
5/2/2022	0	0.000
5/11/2022	0	0.000
5/16/2022	0	0.000
5/24/2022	0	0.000
6/2/2022	0	0.000
6/8/2022	0	0.000
6/14/2022	0	0.000
7/1/2022	0	0.000
7/8/2022	0	0.000
7/15/2022	0	0.000
7/22/2022	0	0.000
7/28/2022	0	0.000
8/3/2022	0	0.000
8/12/2022	0	0.000
8/17/2022	0	0.000
9/2/2022	0	0.000
9/6/2022	0	0.000
9/16/2022	0	0.000
9/21/2022	0	0.000
9/30/2022	0	0.000



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

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)
<b>NMWQCC Standards</b>	<b>5.0</b>	<b>1,000</b>	<b>700</b>	<b>620</b>	<b>250</b>	<b>1,000</b>	--	<b>6 thru 9</b>	--
11/5/2010	ND	5.2	ND	ND	15	<b>1,400</b>	2,600	7.2	NM
9/24/2010	<b>150</b>	ND	76	<b>670</b>	--	--	--	--	NM
9/24/2010	<b>190</b>	170	24	210	<b>6,800</b>	<b>13,000</b>	18,000	6.1	NM
9/24/2010	<b>143</b>	221	63.6	<b>950</b>	--	--	--	--	NM
9/24/2010	<b>320</b>	377	31.8	568	<b>7,150</b>	<b>11,100</b>	16,000	<b>5.84</b>	NM
12/10/2011	--	--	--	--	<b>2,800</b>	<b>7,610</b>	8,900	6.36	3,033
1/5/2011	<b>67</b>	93	7.9	25	--	--	--	--	7,798
1/5/2011	<b>73</b>	99	10	39	<b>1,600</b>	<b>4,800</b>	6,000	6.6	7,798
1/29/2011	<b>60</b>	93	10	33	<b>930</b>	--	4,900	6.4	10,791
2/28/2011	<b>42</b>	60	6.1	20	<b>550</b>	<b>3,400</b>	4,000	6.7	14,795
4/1/2011	<b>23</b>	27	1.8	6.8	<b>260</b>	<b>2,700</b>	3,100	6.8	31,238
4/29/2011	<b>29</b>	28	2.4	7.3	140	<b>2,600</b>	2,900	6.9	50,217
5/31/2011	<b>14</b>	19	1.4	4.9	89	<b>2,500</b>	2,800	6.7	76,513
6/14/2011	<b>55</b>	81	2.8	15	73	<b>2,500</b>	2,700	6.7	88,120
6/30/2011	<b>52</b>	67	2.6	12	61	<b>2,500</b>	2,700	6.9	101,209
8/15/2011	<b>21</b>	25	1.2	5.8	44	<b>2,500</b>	2,600	6.8	140,267
9/2/2011	<b>10</b>	12	0.64	3.2	41	<b>2,500</b>	2,600	7.2	155,801
9/16/2011	<b>9.6</b>	11	0.64	3	38	<b>2,400</b>	2,500	7.2	168,040
9/30/2011	<b>7.2</b>	8.7	0.64	2.5	35	<b>2,500</b>	2,600	7	180,393
10/28/2011	<b>5.1</b>	ND	1.8	2.7	31	<b>2,300</b>	2,600	6.9	205,220
11/30/2011	4	ND	3.9	2	27	<b>2,500</b>	2,600	7.1	233,488
12/30/2011	3.4	ND	ND	2.9	27	<b>2,500</b>	2,500	7.5	261,391
4/3/2012	<b>6</b>	ND	ND	1.6	--	--	--	--	351,300
4/9/2012	--	--	--	--	19	<b>2,400</b>	2,400	7.4	NM
7/3/2012	<b>5.3</b>	ND	ND	ND	16	<b>2,300</b>	2,400	7.4	NM
7/6/2012	--	--	--	--	--	--	--	--	441,053
9/19/2012	--	--	--	--	--	--	--	--	521,271
9/27/2012	<b>6.2</b>	ND	ND	ND	15	<b>2,300</b>	2,500	7.1	NM
12/14/2012	--	--	--	--	--	--	--	--	598,540
12/31/2012	<b>13.9</b>	1.1	ND	3.3	15.5	<b>2,690</b>	2,440	7.05	604,689
1/23/2013	<b>160</b>	190	ND	26	15	<b>2,400</b>	2,500	8	NM
2/22/2013	<b>7.1</b>	77	ND	1.8	15	<b>2,100</b>	2,500	7.1	605,860
5/2/2013	<b>9</b>	6.9	ND	ND	15	<b>2,400</b>	2,600	7.5	612,601
8/19/2013	<b>20</b>	11	ND	2.3	16	<b>2,200</b>	2,600	7.2	NM
9/23/2013	<b>13</b>	11	ND	2.2	16	<b>2,300</b>	2,500	7.1	621,744
11/25/2013	4.6	5.2	ND	ND	15	<b>2,200</b>	2,700	7.7	631,430
2/4/2014	<b>15</b>	17	0.72	3.1	16	<b>2,200</b>	2,500	7.3	636,120
10/1/2015	<b>54.2</b>	57	1.37	9.77	21.3	<b>2,260</b>	2,640	6.98	639,410
10/20/2015	<b>42.3</b>	39.9	0.964	7.06	18.1	<b>2,330</b>	1,460	7.09	642,650
3/28/2016	<b>38</b>	34.1	0.835	4.82	21.6	<b>2,230</b>	2,570	6.86	650,850
6/14/2016	<b>78.3</b>	58.4	1.16	7.22	13.7	<b>2,890</b>	2,600	6.89	704,371
8/29/2016	<b>19</b>	ND	ND	2.18	14.8	<b>2,410</b>	2,590	7.02	763,261
11/18/2016	<b>13.2</b>	5.61	ND	2.33	13.9	<b>2,470</b>	2,580	7.03	842,610
3/31/2017	<b>9.61</b>	7.87	ND	ND	14.4	<b>2,300</b>	2,570	7.28	858,190
6/16/2017	<b>64.6</b>	29.2	0.781	5.4	14.2	<b>2,360</b>	2,570	7.05	927,854
9/7/2017	4.61	1.73	ND	ND	13.7	<b>2,030</b>	2,450	7.14	997,330
12/5/2017	<b>138</b>	51.5	1.65	9.378	14.4	<b>2,230</b>	2,590	7.2	1,080,550
3/6/2018	<b>19.9</b>	14.8	0.543	2.71	14.4	<b>2,290</b>	2,620	7.13	1,080,840
8/7/2018	<b>7.9</b>	8.06	<0.5	<1.5	13.7	<b>2,200</b>	2,300	7.19	1,082,751
1/3/2019	<b>7.07</b>	3.29	0.177	1.08	15.8	<b>2,080</b>	6,750	6.35	1,120,220
2/22/2019	<b>19.8</b>	11.1	<0.5	3.97	14.1	<b>2,270</b>	2,710	7.46	1,120,366
5/24/2019	<b>11.9</b>	10.8	ND	ND	13.4	<b>2,380</b>	2,760	7.15	1,123,853
9/10/2019	<b>23.2</b>	18.8	ND	ND	14.3	<b>2,260</b>	2,600	7.37	1,125,478
10/29/2019	<b>5.41</b>	5.68	ND	ND	14	<b>2,300</b>	2,530	7.09	1,127,076
2/27/2020	<b>20.7</b>	19.3	ND	ND	14.4	<b>2,280</b>	2,580	7.06	1,128,506
5/15/2020	<b>10.3</b>	8.91	ND	ND	13.6	<b>2,460</b>	2,570	7.27	1,131,033
8/25/2020	3.9	3.5	ND	ND	13.9	<b>2,190</b>	2,640	7.62	1,131,100
10/27/2020	<b>31.1</b>	24.4	ND	ND	13.9	<b>2,240</b>	2,530	7.43	1,131,119
2/17/2021	<b>73</b>	<1	<1	<1.5	18	<b>2,200</b>	2,400	7.42	1,131,123
6/29/2021 (2)	--	--	--	--	--	--	--	--	1,134,031
9/30/2021	<b>130</b>	87	<5.0	8.1	19	<b>2,300</b>	2,500	7.20	1,134,167
12/6/2021	<b>33</b>	20	<1.0	6.0	15	<b>2,430</b>	2,500	7.15	1,143,239
2/17/2022	<b>25</b>	3.1	<1.0	2.7	13	<b>2,380</b>	2,600	7.17	1,156,355
4/12/2022	<b>27</b>	4.3	<1.0	2.0	12	<b>2,360</b>	2,500	7.13	1,169,456
7/15/2022	<b>33</b>	4.3	<1.0	1.3	13	<b>2,480</b>	2,600	7.13	1,191,754

**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**  
**Federal 18 #1T**  
**Hilcorp Energy Company**  
**San Juan County, New Mexico**

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
6/14/2022	5.6	7	30,715
9/30/2022	5.6	7	31,759

**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: www.hallenvironmental.com

July 27, 2022

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

RE: Federal 18 1T

OrderNo.: 2207820

Dear Mitch Killough:

Hall Environmental Analysis Laboratory received 1 sample(s) on 7/16/2022 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](http://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 white background.

Andy Freeman  
Laboratory Manager  
4901 Hawkins NE  
Albuquerque, NM 87109

**Analytical Report**

Lab Order **2207820**

Date Reported: **7/27/2022**

**Hall Environmental Analysis Laboratory, Inc.**

**CLIENT:** HILCORP ENERGY

**Client Sample ID:** W-1

**Project:** Federal 18 1T

**Collection Date:** 7/15/2022 12:10:00 PM

**Lab ID:** 2207820-001

**Matrix:** AQUEOUS

**Received Date:** 7/16/2022 10:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>EPA METHOD 300.0: ANIONS</b>						Analyst: <b>JMT</b>
Chloride	13	5.0		mg/L	10	7/18/2022 11:48:14 AM
<b>EPA METHOD 8260B: VOLATILES</b>						Analyst: <b>RAA</b>
Benzene	33	1.0		µg/L	1	7/18/2022 7:55:00 PM
Toluene	4.3	1.0		µg/L	1	7/18/2022 7:55:00 PM
Ethylbenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Naphthalene	ND	2.0		µg/L	1	7/18/2022 7:55:00 PM
1-Methylnaphthalene	ND	4.0		µg/L	1	7/18/2022 7:55:00 PM
2-Methylnaphthalene	ND	4.0		µg/L	1	7/18/2022 7:55:00 PM
Acetone	ND	10		µg/L	1	7/18/2022 7:55:00 PM
Bromobenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Bromodichloromethane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Bromoform	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Bromomethane	ND	3.0		µg/L	1	7/18/2022 7:55:00 PM
2-Butanone	ND	10		µg/L	1	7/18/2022 7:55:00 PM
Carbon disulfide	ND	10		µg/L	1	7/18/2022 7:55:00 PM
Carbon Tetrachloride	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Chlorobenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Chloroethane	ND	2.0		µg/L	1	7/18/2022 7:55:00 PM
Chloroform	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Chloromethane	ND	3.0		µg/L	1	7/18/2022 7:55:00 PM
2-Chlorotoluene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
4-Chlorotoluene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
cis-1,2-DCE	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	7/18/2022 7:55:00 PM
Dibromochloromethane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Dibromomethane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,2-Dichlorobenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,3-Dichlorobenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,4-Dichlorobenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Dichlorodifluoromethane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,1-Dichloroethane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,1-Dichloroethene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,2-Dichloropropane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM

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

<b>Qualifiers:</b>	* 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 **2207820**

Date Reported: **7/27/2022**

**Hall Environmental Analysis Laboratory, Inc.**

**CLIENT:** HILCORP ENERGY

**Client Sample ID:** W-1

**Project:** Federal 18 1T

**Collection Date:** 7/15/2022 12:10:00 PM

**Lab ID:** 2207820-001

**Matrix:** AQUEOUS

**Received Date:** 7/16/2022 10:15:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<b>EPA METHOD 8260B: VOLATILES</b>						Analyst: <b>RAA</b>
1,3-Dichloropropane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
2,2-Dichloropropane	ND	2.0		µg/L	1	7/18/2022 7:55:00 PM
1,1-Dichloropropene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Hexachlorobutadiene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
2-Hexanone	ND	10		µg/L	1	7/18/2022 7:55:00 PM
Isopropylbenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
4-Isopropyltoluene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
4-Methyl-2-pentanone	ND	10		µg/L	1	7/18/2022 7:55:00 PM
Methylene Chloride	ND	3.0		µg/L	1	7/18/2022 7:55:00 PM
n-Butylbenzene	ND	3.0		µg/L	1	7/18/2022 7:55:00 PM
n-Propylbenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
sec-Butylbenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Styrene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
tert-Butylbenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	7/18/2022 7:55:00 PM
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
trans-1,2-DCE	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,1,1-Trichloroethane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,1,2-Trichloroethane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Trichloroethene (TCE)	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Trichlorofluoromethane	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
1,2,3-Trichloropropane	ND	2.0		µg/L	1	7/18/2022 7:55:00 PM
Vinyl chloride	ND	1.0		µg/L	1	7/18/2022 7:55:00 PM
Xylenes, Total	1.3	1.0		µg/L	1	7/18/2022 7:55:00 PM
Surr: 1,2-Dichloroethane-d4	121	70-130		%Rec	1	7/18/2022 7:55:00 PM
Surr: 4-Bromofluorobenzene	96.2	70-130		%Rec	1	7/18/2022 7:55:00 PM
Surr: Dibromofluoromethane	117	70-130		%Rec	1	7/18/2022 7:55:00 PM
Surr: Toluene-d8	91.7	70-130		%Rec	1	7/18/2022 7:55:00 PM
<b>SM2510B: SPECIFIC CONDUCTANCE</b>						Analyst: <b>CAS</b>
Conductivity	2600	10		µmhos/c	1	7/19/2022 1:12:55 PM
<b>SM4500-H+B / 9040C: PH</b>						Analyst: <b>CAS</b>
pH	7.13		H	pH units	1	7/19/2022 1:12:55 PM
<b>SM2540C MOD: TOTAL DISSOLVED SOLIDS</b>						Analyst: <b>CJS</b>
Total Dissolved Solids	2480	40.0	*D	mg/L	1	7/21/2022 2:30:00 PM

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

<b>Qualifiers:</b>	* 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	

# QC SUMMARY REPORT

## Hall Environmental Analysis Laboratory, Inc.

WO#: 2207820

27-Jul-22

**Client:** HILCORP ENERGY

**Project:** Federal 18 1T

Sample ID: <b>MB</b>	SampType: <b>mblk</b>	TestCode: <b>EPA Method 300.0: Anions</b>								
Client ID: <b>PBW</b>	Batch ID: <b>R89593</b>	RunNo: <b>89593</b>								
Prep Date:	Analysis Date: <b>7/18/2022</b>	SeqNo: <b>3189368</b>	Units: <b>mg/L</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	0.50								

Sample ID: <b>LCS</b>	SampType: <b>ics</b>	TestCode: <b>EPA Method 300.0: Anions</b>								
Client ID: <b>LCSW</b>	Batch ID: <b>R89593</b>	RunNo: <b>89593</b>								
Prep Date:	Analysis Date: <b>7/18/2022</b>	SeqNo: <b>3189369</b>	Units: <b>mg/L</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	4.9	0.50	5.000	0	97.1	90	110			

Sample ID: <b>2207820-001BMS</b>	SampType: <b>ms</b>	TestCode: <b>EPA Method 300.0: Anions</b>								
Client ID: <b>W-1</b>	Batch ID: <b>R89593</b>	RunNo: <b>89593</b>								
Prep Date:	Analysis Date: <b>7/18/2022</b>	SeqNo: <b>3189373</b>	Units: <b>mg/L</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	62	5.0	50.00	13.26	97.9	86.3	114			

Sample ID: <b>2207820-001BMSD</b>	SampType: <b>msd</b>	TestCode: <b>EPA Method 300.0: Anions</b>								
Client ID: <b>W-1</b>	Batch ID: <b>R89593</b>	RunNo: <b>89593</b>								
Prep Date:	Analysis Date: <b>7/18/2022</b>	SeqNo: <b>3189374</b>	Units: <b>mg/L</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	61	5.0	50.00	13.26	95.5	86.3	114	1.94	20	

**Qualifiers:**

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- 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#: 2207820

27-Jul-22

**Client:** HILCORP ENERGY**Project:** Federal 18 1T

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sample ID: <b>100ng lcs</b> SampType: <b>LCS</b> TestCode: <b>EPA Method 8260B: VOLATILES</b>										
Client ID: <b>LCSW</b> Batch ID: <b>R89575</b> RunNo: <b>89575</b>										
Prep Date: Analysis Date: <b>7/18/2022</b> SeqNo: <b>3189236</b> Units: <b>µg/L</b>										
Benzene	22	1.0	20.00	0	112	70	130			
Toluene	20	1.0	20.00	0	100	70	130			
Chlorobenzene	21	1.0	20.00	0	105	70	130			
1,1-Dichloroethene	20	1.0	20.00	0	101	70	130			
Trichloroethene (TCE)	21	1.0	20.00	0	107	70	130			
Surr: 1,2-Dichloroethane-d4	12		10.00		115	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		101	70	130			
Surr: Dibromofluoromethane	11		10.00		110	70	130			
Surr: Toluene-d8	9.4		10.00		93.6	70	130			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sample ID: <b>mb</b> SampType: <b>MBLK</b> TestCode: <b>EPA Method 8260B: VOLATILES</b>										
Client ID: <b>PBW</b> Batch ID: <b>R89575</b> RunNo: <b>89575</b>										
Prep Date: Analysis Date: <b>7/18/2022</b> SeqNo: <b>3189237</b> Units: <b>µg/L</b>										
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		

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

WO#: 2207820

27-Jul-22

**Client:** HILCORP ENERGY**Project:** Federal 18 1T

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sample ID: <b>mb</b>	SampType: <b>MBLK</b>		TestCode: <b>EPA Method 8260B: VOLATILES</b>							
Client ID: <b>PBW</b>	Batch ID: <b>R89575</b>		RunNo: <b>89575</b>							
Prep Date:	Analysis Date: <b>7/18/2022</b>		SeqNo: <b>3189237</b>		Units: <b>µg/L</b>					
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		

# QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 2207820

27-Jul-22

**Client:** HILCORP ENERGY

**Project:** Federal 18 1T

Sample ID: <b>mb</b>	SampType: <b>MBLK</b>	TestCode: <b>EPA Method 8260B: VOLATILES</b>								
Client ID: <b>PBW</b>	Batch ID: <b>R89575</b>	RunNo: <b>89575</b>								
Prep Date:	Analysis Date: <b>7/18/2022</b>	SeqNo: <b>3189237</b>			Units: <b>µg/L</b>					
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	12		10.00		117	70	130			
Surr: 4-Bromofluorobenzene	9.6		10.00		95.6	70	130			
Surr: Dibromofluoromethane	11		10.00		112	70	130			
Surr: Toluene-d8	9.2		10.00		92.5	70	130			

**Qualifiers:**

- \* Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
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- ND Not Detected at the Reporting Limit
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- 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#: 2207820

27-Jul-22

**Client:** HILCORP ENERGY

**Project:** Federal 18 1T

Sample ID: <b>Ics-1 99.6uS eC</b>	SampType: <b>Ics</b>	TestCode: <b>SM2510B: Specific Conductance</b>								
Client ID: <b>LCSW</b>	Batch ID: <b>R89632</b>	RunNo: <b>89632</b>								
Prep Date:	Analysis Date: <b>7/19/2022</b>	SeqNo: <b>3191250</b>	Units: <b>µmhos/cm</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	110	10	99.60	0	106	85	115			

Sample ID: <b>Ics-1 99.6uS eC</b>	SampType: <b>Ics</b>	TestCode: <b>SM2510B: Specific Conductance</b>								
Client ID: <b>LCSW</b>	Batch ID: <b>R89632</b>	RunNo: <b>89632</b>								
Prep Date:	Analysis Date: <b>7/19/2022</b>	SeqNo: <b>3191254</b>	Units: <b>µmhos/cm</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Conductivity	100	10	99.60	0	104	85	115			

**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#: 2207820

27-Jul-22

**Client:** HILCORP ENERGY

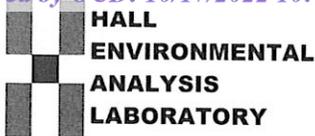
**Project:** Federal 18 1T

Sample ID: <b>MB-68912</b>	SampType: <b>MBLK</b>	TestCode: <b>SM2540C MOD: Total Dissolved Solids</b>								
Client ID: <b>PBW</b>	Batch ID: <b>68912</b>	RunNo: <b>89680</b>								
Prep Date: <b>7/20/2022</b>	Analysis Date: <b>7/21/2022</b>	SeqNo: <b>3192742</b>	Units: <b>mg/L</b>							
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Total Dissolved Solids	ND	20.0								

Sample ID: <b>LCS-68912</b>	SampType: <b>LCS</b>	TestCode: <b>SM2540C MOD: Total Dissolved Solids</b>								
Client ID: <b>LCSW</b>	Batch ID: <b>68912</b>	RunNo: <b>89680</b>								
Prep Date: <b>7/20/2022</b>	Analysis Date: <b>7/21/2022</b>	SeqNo: <b>3192743</b>	Units: <b>mg/L</b>							
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			

**Qualifiers:**

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- 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: www.hallenvironmental.com

Sample Log-In Check List

Client Name: HILCORP ENERGY Work Order Number: 2207820 RcptNo: 1

Received By: Isaiah Ortiz 7/16/2022 10:15:00 AM
Completed By: Cheyenne Cason 7/18/2022 7:23:26 AM
Reviewed By: CMC 7/18/22

Chain of Custody

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

Log In

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

# of preserved bottles checked for pH: (<2 or >12 unless noted) Adjusted? Checked by: jn 7/18/22

Special Handling (if applicable)

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

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

16. Additional remarks:

17. Cooler Information

Table with 7 columns: Cooler No, Temp °C, Condition, Seal Intact, Seal No, Seal Date, Signed By. Row 1: 1, 4.3, 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 151243

**CONDITIONS**

Operator: HILCORP ENERGY COMPANY 1111 Travis Street Houston, TX 77002	OGRID: 372171
	Action Number: 151243
	Action Type: [UF-GWA] Ground Water Abatement (GROUND WATER ABATEMENT)

**CONDITIONS**

Created By	Condition	Condition Date
nvelez	Accepted for the record. See app ID 179088 for most updated status.	2/28/2023