2017 Annual Groundwater Monitoring Report

Charles et al No. 1
San Juan County, New Mexico
API# 30-045-06623
NMOCD# 3R-432

Hilcorp Energy Company

GHD | 6121 Indian School Rd NE Suite 200 Albuquerque NM 87110 USA

11146002| Report No 1 | January 30, 2018

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1. Introduction

This Annual Groundwater Monitoring Report presents groundwater data collected during the 2017 reporting period by GHD Services, Inc. (GHD) on behalf of Hilcorp Energy Company (Hilcorp) at the Charles et al. No. 1 site (hereafter referred to as the "Site"). The Site is operated by Hilcorp after their acquisition of ConocoPhillips Company (ConocoPhillips) San Juan Basin assets in August 2017. The Site is located on Navajo Nation allotted land near Angel Peak in Section 12, Township 27N, Range 9W, of San Juan County, New Mexico. Geographical coordinates for the site are 36°35'10.25" North, 107°44'24.89" West. A Site Vicinity Map and Site Detail Map are included as Figure 1 and 2, respectively.

A workplan detailing planned field activities, including the plugging and abandonment of all site monitor wells and the limited soils excavation, was submitted to the Federal Indian Minerals Office (FIMO), a division of the United States Department of the Interior's Office of Natural Resources Revenue, and the Federal Bureau of Land Management (BLM). Approvals from these agencies were received and a Pre-Construction Notification, required as a condition of the aquatic resources delineation (App. A wetlands study) was issued to the United States Army Corps of Engineers (USACE) and to the Navajo Environmental Protection Agency (NNEPA). The historical timeline for the Site is summarized below and is presented in Table 1.

1.1 Background

The Charles et al. No. 1 natural gas well was spudded in April 1965 by the Austral Oil Company of Houston, Texas. Operatorship of the well was transferred several times before a subsidiary of Burlington Resources became the operator in August 1992. ConocoPhillips acquired Burlington Resources on March 30, 2006. ConocoPhillips plugged and abandoned the well on June 11, 2010.

A ConocoPhillips employee discovered an area of dead vegetation approximately 100 feet from the Blanco Wash and approximately ¼ mile from the Charles et al. No. 1 wellhead while investigating a pipeline release on June 23, 2008. ConocoPhillips reported the release to the New Mexico Oil Conservation Division (NMOCD) by phone and email on June 24, 2008 Envirotech, Inc. (Envirotech) advanced several soil borings and installed seven piezometer/monitoring wells using a hand auger between June 25 and June 26, 2008. A solar powered fan apparatus was installed over monitoring well MW-1 on August 14, 2008 to facilitate soil vapor extraction (SVE) remediation of the area. To date, the SVE equipment continues to operate and remains in place over MW-1.

Envirotech conducted quarterly groundwater sampling events beginning June 25, 2008 and recommended discontinuing the sampling of monitoring wells MW-5, MW-6, and MW-7 in March 2009. Tetra Tech, Inc. (Tetra Tech) began monitoring the Charles et al. No. 1 remediation site in March 2010. Site consulting responsibilities were transferred from Tetra Tech to GHD (formerly CRA) on June 15, 2011.

In June 2016, the shallow monitor wells MW-1 through MW-7 were pulled from the ground using a backhoe. The wells had not displayed any hydrocarbon concentrations above standards (with the exception of MW-1) in 10 years.

A limited Site soil excavation and removal was conducted in June 2016 to address the pocket of hydrocarbon-impacted soils perceived to be impacting groundwater of MW-1. A wetlands study was conducted by SME Environmental Consultants of Durango, Colorado, prior to excavation activities to assess potential impacts on designated wetlands aquatic resources. Approximately 30 cubic yards of hydrocarbon impacted soils were removed and disposed at the Envirotech Landfarm. The excavation area was limited due to encroachment upon two different pipelines crossing through the Site. A replacement monitor well MW-1R was installed via hand auger in approximately the same location as the former MW-1.

2. Groundwater Monitoring Methodology and Analytical Results

Groundwater sampling at monitor well MW-1R was conducted by GHD at the Site on March 6, June 12, September 25, and December 4, 2017.

2.1 Groundwater Monitoring Methodology

Prior to collection of groundwater samples, depth to groundwater well was measured in MW-1R using a water level meter (Table 2).

The groundwater sample for each sampling event was analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8260. The purging of at least three casing volumes of groundwater was attempted at MW-1R using a 0.5 inch diameter, polyethylene, disposable bailer prior to sampling but this well typically went dry before this volume was removed. Groundwater quality parameters were not able to be collected during 2017 monitoring events due to insufficient quantity of groundwater to collect this information.

2.2 Analytical Results

The NNEPA has not established groundwater quality standards; however, drinking water quality on Navajo Nation land is mandated in Part II of the Navajo Nation Primary Drinking Water Regulations (NNPDWR). Drinking water quality standards have been set for the protection of human health, domestic water supply, and irrigation use. The 2017 analytical results of the quarterly groundwater sampling events are discussed below:

- Benzene: The NNPDWR drinking water quality standard for benzene is 0.005 milligrams per liter (mg/L). Groundwater samples collected from monitoring well MW-1R during the four quarterly events in 2017 contained benzene at concentrations ranging from 0.0126 mg/L to 0.0342 mg/L.
- Toluene: The NNPDWR drinking water quality standard for toluene is 1.0 mg/L. Groundwater samples collected from monitoring well MW-1R in 2017 contained toluene at concentrations ranging from below the laboratory detection limit to 1.88 mg/L.

- Ethylbenzene: The NNPDWR drinking water quality standard for ethylbenzene is 0.7 mg/L. Groundwater samples collected from monitoring well MW-1R in 2017 contained ethylbenzene at concentrations ranging from 0.304 mg/L to 0.946 mg/L
- Xylenes: The NNPDWR drinking water quality standard for ethylbenzene is 10 mg/L. Groundwater samples collected from monitoring well MW-1R in 2017 contained xylenes at concentrations ranging from 0.522 mg/L to 07.96 mg/L

An historical laboratory analytical summary is available as Table 3. Copies of laboratory analytical reports for the 2017 quarterly groundwater sampling events are included in Appendix C. A hydrocarbon concentration in groundwater map for the 2017 sampling events is included as Figure 3.

3. Conclusions and Recommendations

Groundwater concentrations exceeded the NNPDWR drinking water quality standards for benzene in all four quarters during 2017 and for toluene and ethylbenzene in December 2017.

Historical groundwater sampling results from former monitor wells MW-2 through MW-7, which were essentially non-detect for BTEX constituents from 2008 until their abandonment, would indicate that the BTEX plume that remains in groundwater near MW-1R is stable and immobile in the subsurface.

Because of the source removal and the stability and immobility of the groundwater plume in and around MW-1R, GHD recommends groundwater monitoring at the Site be reduced to a semi-annual event. If concentrations of BTEX constituents at MW-1R approach NNPDWR drinking water quality standards, quarterly groundwater monitoring may resume.

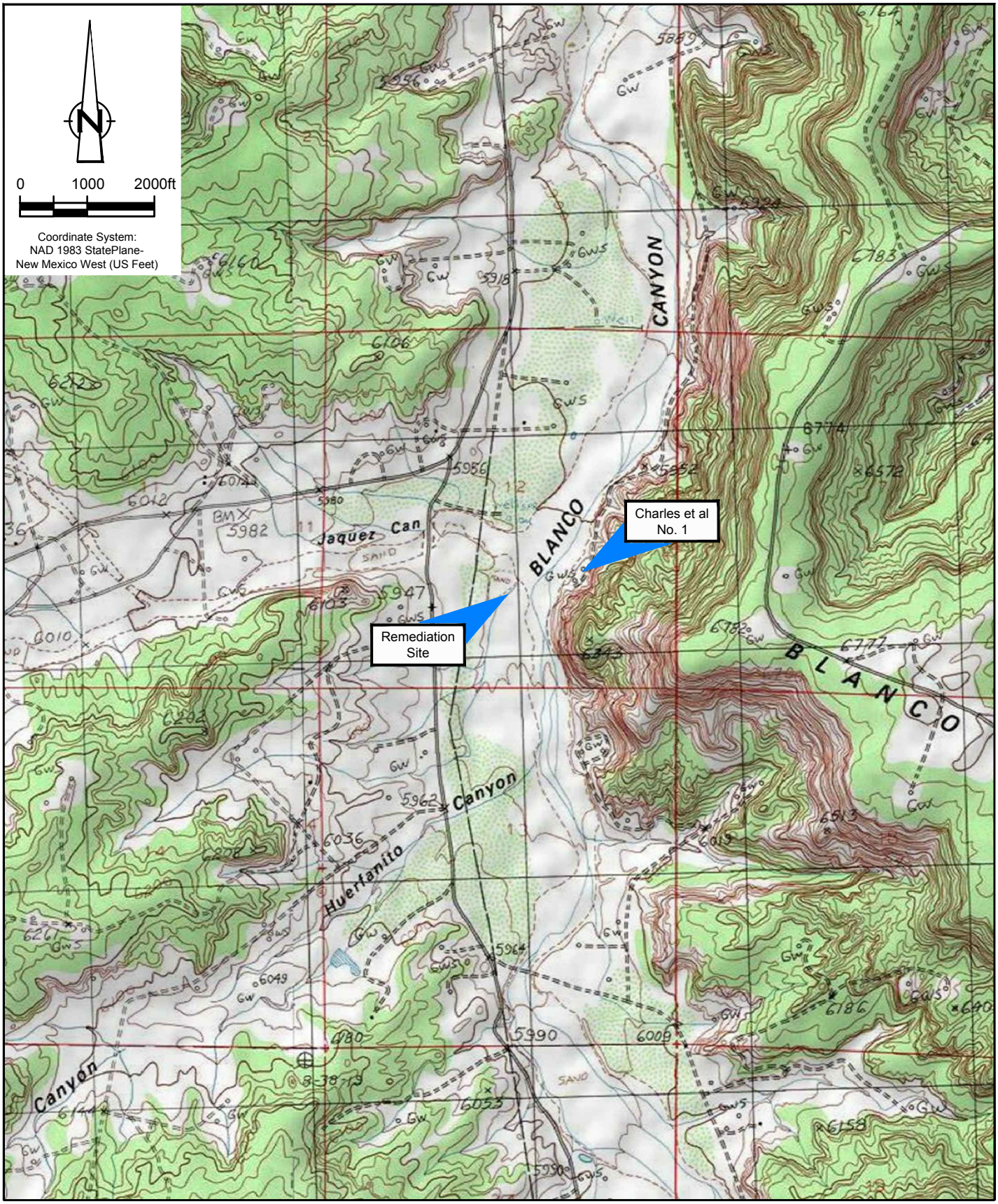
Respectfully Submitted,

GHD

Jeff Walker
Senior Project Manager

Bernard Bockisch
Albuquerque Office Manager

Figures



Source: USGS 7.5 Minute Quad "Fresno Canyon and Huerfanito Peak, New Mexico"

Lat/Long: 36.5861° North, 107.7401° West

HILCORP ENERGY COMPANY
SEC 12, T27N-R9W, SAN JUAN COUNTY, NEW MEXICO
CHARLES et al. No. 1

11146002-00

Dec 22, 2017

SITE LOCATION MAP

FIGURE 1

CAD File: I:\CAD\Files\Eight Digit Job Numbers\1114----\11146002-Hilcorp-Charles et al No. 1\11146002-00(000)GN-DL001.dwg

Source: Tetratech, Inc. figure, "Site Layout Map"

Lat/Long: 36.5861° North, 107.7401° West

0 10 30ft

Coordinate System:
NAD 1983 StatePlane-
New Mexico West (US Feet)

HILCORP ENERGY COMPANY
SEC 12, T27N-R9W, SAN JUAN COUNTY, NEW MEXICO
CHARLES et al. No. 1

11146002-00

Dec 22, 2017

SITE DETAIL MAP

FIGURE 2

CAD File: I:\CAD\Files\Eight Digit Job Numbers\1114----\11146002-Hilcorp-Charles et al No. 1\11146002-00(000)GN-DL001.dwg

Lat/Long: 36.5861° North, 107.7401° West

0 10 30ft

Coordinate System:
NAD 1983 StatePlane-
New Mexico West (US Feet)

HILCORP ENERGY COMPANY
SEC 12, T27N-R9W, SAN JUAN COUNTY, NEW MEXICO
CHARLES et al. No. 1

11146002-00

Dec 22, 2017

2017 GROUNDWATER CONCENTRATION MAP

Figure 3

CAD File: I:\CAD\Files\Eight Digit Job Numbers\1114----\11146002-Hilcorp-Charles et al No. 1\11146002-00(000)GN-DL001.dwg

Tables

Table 1

Site Historical Timeline
Hilcorp Energy Company
Charles et al. No. 1

Date/Time Period	*Event/Action*	*Description/Comments*
April 12, 1965	Well Spudded	Well spudded by Austral Oil Company Inc.
March 30, 1978	Operator Change	Change in operatorship to the Superior Oil Company.
September 1, 1986	Operator Change	Change in operatorship to Mobil Producing TX and NM Inc.
August 1, 1992	Operator Change	Change in operatorship to Meridian Oil Inc, a subsidiary of Burlington Resources.
August 1, 2001	Well Abandoned	Burlington Resources abandons well due to low production.
May 20, 2003	Well Returns to Production	The Charles et al. No. 1 natural gas well returned to production.
March 31, 2006	Operator Change	ConocoPhillips acquires Burlington Resources.
June 23, 2008	Release Discovered	A release was discovered from the pipeline running from the wellhead to the meter house; upon walking the pipeline, an area of dead vegetation was also discovered approximately 100 feet from Blanco Wash.
June 24, 2008	Release Reported	ConocoPhillips reported the release to the New Mexico Oil Conservation Division (NMOCD) via phone and email.
June 25-26, 2008	Initial Site Assessment	Envirotech, Inc. of Farmington, NM advances several soil borings and installed piezometers using a hand auger to determine the extent of impact (Envirotech, 2009). Envirotech also installed Monitor Wells MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, and MW-7; and obtained water level measurements and samples from all of the wells.
August 14, 2008	Soil Vapor Extraction System Installed	Envirotech, Inc. installed solar-powered Soil Vapor Extraction (SVE) equipment over the existing Monitor Well, MW-1; and obtained water level measurements and samples from all of the wells.
October 2, 2008	Groundwater Monitoring	Envirotech, Inc. completed the third round of groundwater sampling.
January 13, 2009	Groundwater Monitoring	Envirotech, Inc. completed the fourth round of groundwater sampling.
March 23, 2009	Groundwater Monitoring	Envirotech, Inc. completed the fifth round of groundwater sampling and recommended sampling only Monitor Wells MW-1, MW-2, MW-3, and MW-4.
June 29, 2009	Groundwater Monitoring	Envirotech, Inc. completed the sixth round of groundwater sampling and recommended drilling additional monitor wells downgradient of MW-2.
March 30, 2010	Groundwater Monitoring	Tetra Tech, Inc. completed quarterly groundwater sampling.
June 11, 2010	Well Abandoned	Charles et al. No. 1 is plugged and abandoned by ConocoPhillips.
June 11, 2010	Groundwater Monitoring	Tetra Tech, Inc. completed quarterly groundwater sampling.
September 21, 2010	Groundwater Monitoring	Tetra Tech, Inc. completed quarterly groundwater sampling. An oil absorbant sock was placed in MW-1.
December 16, 2010	Groundwater Monitoring	Tetra Tech, Inc. completed quarterly groundwater sampling. The benzene concentration in MW-1 exceeded the Navajo Nation Primary Drinking Water Regulations (NNPDWR) standard. Oil absorbant sock in MW-1 was replaced.
March 18, 2011	Groundwater Monitoring	Tetra Tech, Inc. completed quarterly groundwater sampling. The benzene concentration in MW-1 exceeded the NNPDWR standard. Oil absorbant sock in MW-1 was replaced.
June 15, 2011	Transfer of Site Consulting Responsibilities	On June 15, 2011, Site consulting responsibilities were transferred from Tetra Tech of Albuquerque, NM to Conestoga-Rovers & Associates (CRA) of Albuquerque, NM.
June 23, 2011	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene and ethylbenzene concentrations in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
September 26, 2011	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene and ethylbenzene concentrations in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
December 12, 2011	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene concentration in MW-1 exceeded the NNPDWR standard. Oil absorbant sock in MW-1 was replaced.
March 7, 2012	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene concentration in MW-1 exceeded the NNPDWR standard. Oil absorbant sock in MW-1 was replaced.
June 4, 2012	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene, toluene, and ethylbenzene levels in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
September 17, 2012	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene, toluene, and ethylbenzene concentrations in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
January 9, 2013	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene and toluene concentrations in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
March 18, 2013	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene concentration in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
June 14, 2013	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene and Toluene concentrations in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
September 13, 2013	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene and Toluene concentrations in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
December 13, 2013	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene concentration in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
March 21, 2014	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene concentration in MW-1 did not exceed the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
June 16, 2014	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene concentration in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
September 19, 2014	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene concentration in MW-1 exceeded the NNPDWR standards. Oil absorbant sock in MW-1 was replaced.
December 17, 2014	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene concentration in MW-1 exceeded the NNPDWR standards.
March 19, 2015	Groundwater Monitoring	CRA completed quarterly groundwater sampling. All constituents were below NNPDWR standards.
June 19, 2015	Groundwater Monitoring	CRA completed quarterly groundwater sampling. Benzene concentration in MW-1 exceeded the NNPDWR standards.
September 14, 2015	Groundwater Monitoring	GHD (formerly CRA) completed quarterly groundwater sampling. Benzene concentration in MW-1 exceeded the NNPDWR standards.
June 2, 2016	MW Plugging and Abandonment	GHD and contractor MMT plug and abandon all existing site monitor wells (MW-1 thru MW-7).
June 6, 2016	Soil Excavation/MW replacement	GHD and contractor MMT excavate 10 X 12 ft X 7 ft deep excavation (~30cy) centered around MW-1. MW-1 replaced with 1" PVC MW-1R
July 1, 2016	Reseeding	Excavation site reseeded with High Plains Foothills Wet Meadow Mix from Western Native Seed Co.
September 12, 2016	Groundwater Monitoring	Quarterly groundwater sampling: Benzene concentration in MW-1R below NNPDWR standard.
November 28, 2016	Groundwater Monitoring	Quarterly groundwater sampling: Benzene concentration in MW-1R exceeds NNPDWR standard.
March 6, 2017	Groundwater Monitoring	Quarterly groundwater sampling: Benzene concentration in MW-1R below NNPDWR standard.
April 13, 2017	Sale of San Juan Asset to Hilcorp Energy	Site sold as part of ConocoPhillips Company announced sale of San Juan Asset to Hilcorp Energy Company.
June 12, 2017	Groundwater Monitoring	Quarterly groundwater sampling: Benzene concentration in MW-1R exceeds NNPDWR standard.
September 25, 2017	Groundwater Monitoring	Quarterly groundwater sampling: Benzene concentration in MW-1R below NNPDWR standard.
December 4, 2017	Groundwater Monitoring	Quarterly groundwater sampling: Benzene concentration in MW-1R exceeds NNPDWR standard.

Table 2

Monitoring Well Specifications and Groundwater Elevations
Hilcorp Energy Company
Charles et al. No. 1

Well ID	TOC Elevation* (ft AMSL)	Date Measured	Depth to Groundwater (ft below TOC)	Relative Water Level (ft AMSL)
MW-1	5917.87	6/25/2008	4.71	5913.16
		8/14/2008	5.21	5912.66
	5917.05	10/2/2008	5.13	5911.92
		1/13/2009	4.41	5912.64
		3/23/2009	3.01	5914.04
		6/29/2009	2.12	5914.93
		3/30/2010	2.68	5914.37
		6/11/2010	4.74	5912.31
		9/21/2010	5.52	5911.53
		12/16/2010	3.71	5913.34
		3/18/2011	2.98	5914.07
		6/23/2011	4.99	5912.06
		9/27/2011	4.55	5912.50
		12/12/2011	3.23	5913.82
		3/7/2012	3.67	5913.38
		6/4/2012	4.75	5912.30
		9/17/2012	5.57	5911.48
		1/9/2013	3.87	5913.18
		3/18/2013	3.09	5913.96
		6/14/2013	4.83	5912.22
		9/13/2013	5.42	5911.63
		12/13/2013	3.67	5913.38
		3/21/2014	3.27	5913.78
		6/16/2014	5.13	5911.92
		9/19/2014	5.70	5911.35
		12/17/2014	4.22	5912.83
		3/19/2015	3.36	5913.69
		6/19/2015	4.34	5912.71
		9/14/2015	5.55	5911.50
		6/2/2016	Plugged and Abandoned	
MW-1R	Not Determined	6/23/2016	6.28	--
		9/12/2016	6.49	--
		11/28/2016	5.13	--
		3/6/2017	4.29	--
		6/12/2017	3.07	--
		9/25/2017	3.38	--
		12/4/2017	1.84*	--
MW-2	5917.33	6/25/2008	4.66	5912.67
		8/14/2008	5.35	5911.98
	5916.53	10/2/2008	5.12	5911.41
		1/13/2009	3.15	5913.38
		3/23/2009	2.65	5913.88
		6/29/2009	4.20	5912.33
		3/30/2010	2.57	5913.96
		6/11/2010	4.63	5911.90
		9/21/2010	5.53	5911.00
		12/16/2010	3.53	5913.00
		3/18/2011	2.70	5913.83
		6/23/2011	4.80	5911.73
		9/27/2011	4.30	5912.23
		12/12/2011	3.13	5914.20
		3/7/2012	2.58	5913.95
		6/4/2012	4.51	5912.02
		9/17/2012	5.56	5910.97
		1/9/2013	3.75	5912.78
		3/18/2013	3.02	5913.51
		6/14/2013	4.69	5911.84
		9/13/2013	5.09	5911.44
		12/13/2013	3.55	5912.98
		3/21/2014	3.15	5913.38
		6/16/2014	4.98	5911.55
		9/19/2014	5.49	5911.04
		12/17/2014	4.11	5912.42
		3/19/2015	3.30	5913.23
		6/19/2015	4.24	5912.29
		9/14/2015	5.57	5910.96
		6/2/2016	Plugged and Abandoned	

Table 2

Monitoring Well Specifications and Groundwater Elevations
Hilcorp Energy Company
Charles et al. No. 1

Well ID	TOC Elevation* (ft AMSL)	Date Measured	Depth to Groundwater (ft below TOC)	Relative Water Level (ft AMSL)
MW-3	5920.57	6/25/2008	7.16	5913.41
		8/14/2008	8.86	5911.71
	5919.8	10/2/2008	7.63	5912.17
		1/13/2009	5.56	5914.24
		3/23/2009	5.56	5914.24
		6/29/2009	1.10	5918.70
		3/30/2010	5.38	5914.42
		6/11/2010	7.44	5912.36
		9/21/2010	8.22	5911.58
		12/16/2010	6.06	5913.74
		3/18/2011	5.42	5914.38
		6/23/2011	7.68	5912.89
		9/27/2011	7.13	5912.67
		12/12/2011	5.78	5914.79
		3/7/2012	5.33	5914.47
		6/4/2012	7.27	5912.53
		9/17/2012	8.15	5911.65
		1/9/2013	6.37	5913.43
		3/18/2013	5.68	5914.12
		6/14/2013	7.36	5912.44
		9/13/2013	7.72	5912.08
		12/13/2013	6.20	5913.60
		3/21/2014	5.89	5913.91
		6/16/2014	7.71	5912.09
		9/19/2014	8.13	5911.67
		12/17/2014	6.71	5913.09
		3/19/2015	5.98	5913.82
		6/19/2015	7.01	5912.79
		9/14/2015	8.21	5911.59
		6/2/2016	Plugged and Abandoned	
MW-4	5920.48	6/25/2008	4.27	5916.21
		8/14/2008	7.89	5912.59
	5919.69	10/2/2008	7.73	5911.96
		1/13/2009	5.94	5913.75
		3/23/2009	5.64	5914.05
		6/29/2009	6.84	5912.85
		3/30/2010	5.40	5914.29
		6/11/2010	7.23	5912.46
		9/21/2010	8.17	5911.52
		12/16/2010	6.24	5913.45
		3/18/2011	5.50	5914.19
		6/23/2011	7.50	5912.19
		9/27/2011	6.98	5912.71
		12/12/2011	5.94	5914.54
		3/7/2012	5.36	5914.33
		6/4/2012	7.18	5912.51
		9/17/2012	8.18	5911.51
		1/9/2013	6.53	5913.16
		3/18/2013	5.81	5913.88
		6/14/2013	7.40	5912.29
		9/13/2013	7.77	5911.92
		12/13/2013	6.37	5913.32
		3/21/2014	6.03	5913.66
		6/16/2014	7.63	5912.06
		9/19/2014	8.09	5911.60
		12/17/2014	6.87	5912.82
		3/19/2015	6.05	5913.64
		6/19/2015	6.92	5912.77
		9/14/2015	DRY (1)	NA
		6/2/2016	Plugged and Abandoned	

Table 2

Monitoring Well Specifications and Groundwater Elevations
Hilcorp Energy Company
Charles et al. No. 1

Well ID	TOC Elevation* (ft AMSL)	Date Measured	Depth to Groundwater (ft below TOC)	Relative Water Level (ft AMSL)
MW-5	5923.63	6/26/2008	8.23	5915.40
		8/14/2008	8.68	5914.95
	5921.55	10/2/2008	8.70	5912.85
		1/13/2009	6.96	5914.59
		3/23/2009	6.58	5914.97
		6/29/2009	4.10	5917.45
		3/30/2010	NM	NM
		6/11/2010	8.20	5913.35
		9/21/2010	9.25	5912.30
		12/16/2010	7.40	5914.15
		3/18/2011	6.74	5914.81
		6/23/2011	NM	NM
		9/26/2011	8.25	5913.30
		12/12/2011	7.12	5916.51
		3/7/2012	6.65	5914.90
		6/4/2012	8.17	5913.38
		9/17/2012	9.30	5912.25
		1/9/2013	7.76	5913.79
		3/18/2013	7.05	5914.50
		6/14/2013	8.49	5913.06
		9/13/2013	8.97	5912.58
		12/13/2013	7.55	5914.00
		3/21/2014	7.17	5914.38
		6/16/2014	8.72	5912.83
		9/19/2014	9.35	5912.20
		12/17/2014	8.07	5913.48
		3/19/2015	7.33	5914.22
		6/19/2015	8.24	5913.31
		9/14/2015	9.48	5912.07
		6/2/2016	Plugged and Abandoned	
MW-6	5920.68	6/26/2008	6.75	5913.93
		8/14/2008	6.97	5913.71
	5918.64	10/2/2008	6.83	5911.81
		1/13/2009	4.89	5913.75
		3/23/2009	4.12	5914.52
		6/29/2009	1.80	5916.84
		3/30/2010	NM	NM
		6/11/2010	6.63	5912.01
		9/21/2010	7.41	5911.23
		12/16/2010	5.12	5913.52
		3/15/2011	4.49	5914.15
		6/23/2011	6.80	5911.84
		9/26/2011	6.33	5912.31
		12/12/2011	4.84	5915.84
		3/7/2012	4.46	5914.18
		6/4/2012	6.45	5912.19
		9/17/2012	7.37	5911.27
		1/9/2013	5.46	5913.18
		3/18/2013	4.80	5913.84
		6/14/2013	6.60	5912.04
		9/13/2013	6.90	5911.74
		12/13/2013	5.32	5913.32
		3/21/2014	5.03	5913.61
		6/16/2014	6.85	5911.79
		9/19/2014	7.34	5911.30
		12/17/2014	5.79	5912.82
		3/19/2015	5.22	5913.42
		6/19/2015	6.21	5912.43
		9/14/2015	DRY (1)	NA
		6/2/2016	Plugged and Abandoned	

Table 2

Monitoring Well Specifications and Groundwater Elevations
Hilcorp Energy Company
Charles et al. No. 1

Well ID	*TOC Elevation* (ft AMSL)*	*Date Measured*	*Depth to Groundwater (ft below TOC)*	*Relative Water Level (ft AMSL)*
MW-7	5920.75	6/26/2008	6.32	5914.43
		8/14/2008	7.17	5913.58
	5918.74	10/2/2008	6.42	5912.32
		1/13/2009	NM	NM
		3/23/2009	4.67	5914.07
		6/29/2009	1.56	5917.18
		3/30/2010	NM	NM
		6/11/2010	NM	NM
		9/21/2010	NM	NM
		12/16/2010	4.91	5913.83
		3/18/2011	DRY (1)	NA
		6/23/2011	6.55	5912.19
		9/26/2011	6.14	5912.60
		12/12/2011	DRY (1)	NA
		3/7/2012	DRY (1)	NA
		6/4/2012	6.08	5912.66
		9/17/2012	7.11	5911.63
		1/9/2013	5.28	5913.46
		3/18/2013	4.54	5914.20
		6/14/2013	6.31	5912.43
		9/13/2013	6.66	5912.08
		12/13/2013	5.35	5913.39
		3/21/2014	4.70	5914.04
		6/16/2014	6.59	5912.15
		9/19/2014	7.14	5911.60
		12/17/2014	5.59	5913.15
		3/19/2015	4.98	5913.76
		6/19/2015	6.10	5912.64
		9/14/2015	7.34	5911.40
		6/3/2016	Plugged and Abandoned	

Notes:
Measurements between 6/25/2008 and 6/29/2009 obtained by Envirotech, Inc.
ft = feet
AMSL = Above mean sea level
NA = Not available
NM = Not measured
* PVC casing stick up broken off, likely by cattle. Shallower depth to water reflects new top of casing measuri

Table 3

Groundwater Analytical Results Summary
Hilcorp Energy Company
Charles et al. No. 1

Well ID	Sample ID	Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)
	NNPDWR Standards			***0.005***	***1***	***0.7***	***10***
MW-1	MW-1	6/25/2008	(orig)	**1.85**	0.486	**0.971**	0.379
	MW-1	9/25/2008	(orig)	**0.575**	0.66	0.293	1.547
	MW-1	1/13/2009	(orig)	**0.494**	0.581	0.474	3.572
	MW-1	3/23/2009	(orig)	**0.21**	0.311	0.378	1.418
	MW-1	6/29/2009	(orig)	**0.839**	0.107	0.674	3.404
	MW-1	3/30/2010	(orig)	**0.48**	0.11	0.25	1.573
	MW-1	6/11/2010	(orig)	**3.2**	0.45	0.69	4.51
	MW-1	9/21/2010	(orig)	**2.3**	**1.1**	0.25	4.84
	MW-1	12/16/2010	(orig)	**0.18**	0.2	0.25	1.79
	MW-1	3/18/2011	(orig)	**0.15**	0.14	0.16	1.083
	GW-74935-062311-PG04	6/23/2011	(orig)	**3.2**	0.933	**0.972**	5.8
	GW-74935-062311-PG05	6/23/2011	(Duplicate)	**3.38**	**1.45**	**1.06**	6.76
	GW-074935-092611-CM-008	9/26/2011	(orig)	**1.56**	**2.61**	0.624	6.59
	GW-074935-092611-CM-009	9/26/2011	(Duplicate)	**1.57**	**3.02**	**0.756**	7.26
	GW-074935-121211-CB-MW-1	12/12/2011	(orig)	**0.232**	0.947	0.5	3.94
	GW-074935-121211-CB-DUP	12/12/2011	(Duplicate)	**0.244**	0.994	0.58	4.65
	GW-074935-3712-CB-MW-1	3/7/2012	(orig)	**0.0637**	0.366	0.293	2.23
	GW-074935-3712-CB-DUP	3/7/2012	(Duplicate)	**0.0693**	0.416	0.333	2.63
	GW-074935-060412-CB-MW-1	6/4/2012	(orig)	**0.956**	**2.38**	**0.919**	6.71
	GW-074935-060412-CB-DUP	6/4/2012	(Duplicate)	**0.934**	**2.26**	**0.966**	6.36
	GW-074935-091712-CM-MW-1	9/17/2012	(orig)	**0.941**	**3.51**	**0.785**	5.56
	GW-074935-091712-CM-DUP	9/17/2012	(Duplicate)	**0.984**	**3.04**	**0.852**	5.87
	GW-074935-010913-CM-MW-1	1/9/2013	(orig)	**0.125**	**1.14**	0.334	2.44
	GW-074935-010913-CM-DUP	1/9/2013	(Duplicate)	**0.142**	**1.52**	0.438	3.09
	GW-074935-031813-CM-MW-1	3/18/2013	(orig)	**0.012**	0.195	0.0871	0.581
	GW-074935-031813-CM-DUP	3/18/2013	(Duplicate)	**0.0114**	0.188	0.0891	0.575
	GW-074935-061413-JK-MW1	6/14/2013	(orig)	**0.174**	**1.41**	0.668	3.26
	GW-074935-061413-JK-DUP	6/14/2013	(Duplicate)	**0.189**	**2.02**	**0.742**	4.17
	GW-074935-091313-CM-MW-1	9/13/2013	(orig)	**0.0414**	**3.24**	0.123	4.34
	GW-074935-091313-CM-DUP	9/13/2013	(Duplicate)	**0.0372**	**3.3**	0.126	4.43
	GW-074935-121313-CM-MW-1	12/13/2013	(orig)	**0.0053**	0.188	0.122	0.681
	GW-074935-121313-CM-DUP	12/13/2013	(Duplicate)	**0.0071**	0.258	0.148	0.843
	GW-074935-032114-CK-MW-1	3/21/2014	(orig)	< 0.001	0.0348	0.0591	0.247
	GW-074935-032114-CK-DUP	3/21/2014	(Duplicate)	< 0.001	0.0385	0.0651	0.26
	GW-074935-061614-CK-MW-1	6/16/2014	(orig)	**0.133**	**1.94**	**0.994**	4.5
	GW-074935-061614-CK-DUP	6/16/2014	(Duplicate)	**0.134**	**1.92**	**0.921**	4.5
	GW-074935-091914-CB-MW-1	9/19/2014	(orig)	**0.159**	**2.34**	0.63	3.38
	GW-074935-121714-JW-MW-1	12/17/2014	(orig)	**0.0138**	0.422	0.248	1.48
	GW-074935-121714-JW-DUP	12/17/2014	(Duplicate)	**0.0137**	0.44	0.251	1.52
	GW-074935-031915-CM-MW-1	3/19/2015	(orig)	< 0.005	0.227	0.174	1.03
	GW-074935-061915-CB-MW-1	6/19/2015	(orig)	**0.025**	0.326	0.496	2.44
	GW-074935-061915-CB-DUP	6/19/2015	(Duplicate)	**0.0241**	0.306	0.472	2.31
	GW-074935-091415-CK-MW-1	9/14/2015	(orig)	**0.0339**	0.0257	0.242	0.504
	Plugged and Abandoned June 2016						
MW-1R	GW-074935-062316-SP-MW-1R	6/23/2016	(orig)	0.0026	0.002	0.0521	0.215
	GW-074935-091216-CM-MW-1R	9/23/2016	(orig)	< 0.001	< 0.001	0.191	0.518
	GW-074935-11282016-CN-MW-1R	11/28/2016	(orig)	**0.028**	0.0084	**0.901**	4.39
	GW-074635-030617-CN-MW-1R	3/6/2017	(orig)	**0.0342**	<0.020	0.333	1.94
	GW-074935-061217-CN-MW1R	6/12/2017	(orig)	**0.0162**	<0.010	0.304	0.522
	GW-11146002-092517-CN-MW-1R	9/25/2017	(orig)	**0.0126**	<0.010	0.600	1.05
	GW-11146002-120417-SP-MW-1R	12/4/2017	(dup)	**0.015**	**1.88**	**0.946**	7.96

Table 3

Groundwater Analytical Results Summary
Hilcorp Energy Company
Charles et al. No. 1

Well ID	Sample ID	Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)
NNPDWR Standards				***0.005***	***1***	***0.7***	***10***
MW-2	MW-2	6/25/2008	(orig)	0.0042	0.0046	0.0016	0.0011
	MW-2	9/25/2008	(orig)	**0.0195**	0.0258	0.0051	0.1008
	MW-2	1/13/2009	(orig)	0.0021	0.002	0.0022	0.0281
	MW-2	3/23/2009	(orig)	0.0014	0.0004	0.0006	0.0073
	MW-2	6/29/2009	(orig)	0.0015	< 0.0002	0.0002	0.0004
	MW-2	3/30/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-2	6/11/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-2	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-2	12/16/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-2	3/18/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	GW-74935-062311-PG02	6/23/2011	(orig)	0.0006	< 0.001	< 0.001	< 0.003
	GW-074935-092611-JP-010	9/26/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-121211-CB-MW-2	12/12/2011	(orig)	0.00034	< 0.001	< 0.001	< 0.003
	GW-074935-3712-CB-MW-2	3/7/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-060412-CB-MW-2	6/4/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-091712-CM-MW-2	9/17/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-010913-CM-MW-2	1/9/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-031813-CM-MW-2	3/18/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-061413-JK-MW-2	6/14/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-091313-CM-MW-2	9/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-121313-CM-MW-2	12/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-032114-CK-MW-2	3/21/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-061614-CK-MW-2	6/16/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-091914-CB-MW-2	9/19/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-121714-JW-MW-2	12/17/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	Plugged and Abandoned June 2016						
MW-3	MW-3	6/25/2008	(orig)	ND	ND	ND	ND
	MW-3	9/25/2008	(orig)	ND	0.0023	0.0009	0.0121
	MW-3	1/13/2009	(orig)	ND	ND	ND	ND
	MW-3	3/23/2009	(orig)	< 0.0002	0.0002	0.0002	0.0014
	MW-3	6/29/2009	(orig)	< 0.0002	0.0017	0.0007	0.0082
	MW-3	3/30/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-3	6/11/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-3	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-3	12/16/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-3	3/18/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	GW-74935-062311-PG01	6/23/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-092611-CM-006	9/26/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-121211-CB-MW-3	12/12/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-3712-CB-MW-3	3/7/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-060412-CB-MW-3	6/4/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-091712-CM-MW-3	9/17/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-010913-CM-MW-3	1/9/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-031813-CM-MW-3	3/18/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-061413-JK-MW-3	6/14/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-091313-CM-MW-3	9/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-121313-CM-MW-3	12/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-032114-CK-MW-3	3/21/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-061614-CK-MW-3	6/16/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-091914-CB-MW-3	9/19/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-091914-CB-DUP	9/19/2014	(Duplicate)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-121714-JW-MW-3	12/17/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	Plugged and Abandoned June 2016						

Table 3

Groundwater Analytical Results Summary
Hilcorp Energy Company
Charles et al. No. 1

Well ID	*Sample ID*	*Date*	*Sample Type*	*Benzene (mg/L)*	*Toluene (mg/L)*	*Ethylbenzene (mg/L)*	*Xylenes (total) (mg/L)*
NNPDWR Standards				***0.005***	***1***	***0.7***	***10***
MW-4	MW-4	6/25/2008	(orig)	0.0038	0.0199	0.0014	0.007
	MW-4	9/25/2008	(orig)	ND	ND	ND	ND
	MW-4	1/13/2009	(orig)	ND	ND	ND	ND
	MW-4	3/23/2009	(orig)	< 0.0002	< 0.0002	< 0.0002	< 0.0002
	MW-4	6/29/2009	(orig)	< 0.0002	< 0.0002	0.0002	0.0029
	MW-4	3/30/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-4	6/11/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-4	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-4	12/16/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	MW-4	3/18/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001
	GW-74935-062311-PG03	6/23/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-092611-SP-007	9/26/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-121211-CB-MW-4	12/12/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-3712-CB-MW-4	3/7/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-060412-CB-MW-4	6/4/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-010913-CM-MW-4	1/9/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-091712-CM-MW-4	9/17/2012	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-031813-CM-MW-4	3/18/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-061413-JK-MW-4	6/14/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-091313-CM-MW-4	9/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-121313-CM-MW-4	12/13/2013	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-032114-CK-MW-4	3/21/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-061614-CK-MW-4	6/16/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-091914-CB-MW-4	9/19/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	GW-074935-121714-JW-MW-4	12/17/2014	(orig)	< 0.001	< 0.001	< 0.001	< 0.003
	Plugged and Abandoned June 2016						
MW-5	MW-5	6/26/2008	(orig)	ND	ND	ND	ND
	MW-5	9/25/2008	(orig)	ND	ND	ND	ND
	MW-5	1/13/2009	(orig)	ND	ND	ND	ND
	MW-5	3/23/2009	(orig)	ND	ND	ND	ND
	Plugged and Abandoned June 2016						
MW-6	MW-6	6/26/2008	(orig)	ND	ND	ND	ND
	MW-6	9/25/2008	(orig)	ND	ND	ND	ND
	MW-6	1/13/2009	(orig)	ND	ND	ND	ND
	MW-6	3/23/2009	(orig)	ND	ND	ND	ND
	Plugged and Abandoned June 2016						
MW-7	MW-7	6/26/2008	(orig)	ND	ND	ND	ND
	MW-7	9/25/2008	(orig)	ND	ND	ND	ND
	MW-7	3/23/2009	(orig)	ND	ND	ND	ND
	Plugged and Abandoned June 2016						

Notes:

1. MW = monitoring well
2. ND = Not Detected
3. NNPDWR = Navajo Nation Primary Drinking Water Regulations
4. mg/L = milligrams per liter (parts per million)
5. < 1.0 = Below laboratory detection limit of 1.0 mg/L
6. **Bold** = concentrations that exceed the NNEPA limits
7. Analytes sampled between 6/25/2008 and 6/29/2009 obtained by Envirotech, Inc.

Appendix A
Groundwater Laboratory Analytical Reports

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

March 15, 2017

Christine Mathews
GHD Services, Inc.
6212 Indian School Rd. NE St2
Albuquerque, NM 87110

RE: Project: 074935 COP Charles at al No1
Pace Project No.: 60239483

Dear Christine Mathews:
Enclosed are the analytical results for sample(s) received by the laboratory on March 10, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Alice Spiller

Alice Spiller
alice.spiller@pacelabs.com
(913)563-1409
Project Manager

Enclosures

cc: Angela Bown, GHD Services, Inc,
Jeffrey Walker, GHD Services, Inc

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: 074935 COP Charles at al No1
Pace Project No.: 60239483

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: 074935 COP Charles at al No1
Pace Project No.: 60239483

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60239483001	**074935-030617-CN-MW-1R**	Water	03/06/17 12:37	03/10/17 09:10
60239483002	**TRIP BLANK**	Water	03/06/17 12:37	03/10/17 09:10

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE ANALYTE COUNT

Project: 074935 COP Charles at al No1
Pace Project No.: 60239483

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60239483001	**074935-030617-CN-MW-1R**	EPA 8260	EAG	8	PASI-K
60239483002	**TRIP BLANK**	EPA 8260	EAG	8	PASI-K

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

PROJECT NARRATIVE

Project: 074935 COP Charles at al No1
Pace Project No.: 60239483

Method: **EPA 8260**
Description: 8260 MSV UST, Water
Client: GHD Services_COP NM
Date: March 15, 2017

General Information:
2 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 468677

A matrix spike/matrix spike duplicate was not performed due to insufficient sample volume.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: 074935 COP Charles at al No1
Pace Project No.: 60239483

Sample: 074935-030617-CN-MW-1R **Lab ID: 60239483001** Collected: 03/06/17 12:37 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**34.2**	ug/L	20.0	20		03/15/17 00:39	71-43-2	
Ethylbenzene	**333**	ug/L	20.0	20		03/15/17 00:39	100-41-4	
Toluene	ND	ug/L	20.0	20		03/15/17 00:39	108-88-3	
Xylene (Total)	**1940**	ug/L	60.0	20		03/15/17 00:39	1330-20-7	
Surrogates								
Toluene-d8 (S)	99	%	80-108	20		03/15/17 00:39	2037-26-5	
4-Bromofluorobenzene (S)	103	%	80-113	20		03/15/17 00:39	460-00-4	
1,2-Dichloroethane-d4 (S)	92	%	80-114	20		03/15/17 00:39	17060-07-0	
Preservation pH	**1.0**		1.0	20		03/15/17 00:39		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: 074935 COP Charles at al No1
Pace Project No.: 60239483

Sample: TRIP BLANK **Lab ID: 60239483002** Collected: 03/06/17 12:37 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		03/15/17 00:53	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		03/15/17 00:53	100-41-4	
Toluene	ND	ug/L	1.0	1		03/15/17 00:53	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/15/17 00:53	1330-20-7	
Surrogates								
Toluene-d8 (S)	99	%	80-108	1		03/15/17 00:53	2037-26-5	
4-Bromofluorobenzene (S)	103	%	80-113	1		03/15/17 00:53	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	80-114	1		03/15/17 00:53	17060-07-0	
Preservation pH	**1.0**		1.0	1		03/15/17 00:53		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA

Project: 074935 COP Charles at al No1
Pace Project No.: 60239483

QC Batch: 468677 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60239483001, 60239483002

METHOD BLANK: 1918546 Matrix: Water
Associated Lab Samples: 60239483001, 60239483002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	03/14/17 22:20	
Ethylbenzene	ug/L	ND	1.0	03/14/17 22:20	
Toluene	ug/L	ND	1.0	03/14/17 22:20	
Xylene (Total)	ug/L	ND	3.0	03/14/17 22:20	
1,2-Dichloroethane-d4 (S)	%	94	80-114	03/14/17 22:20	
4-Bromofluorobenzene (S)	%	103	80-113	03/14/17 22:20	
Toluene-d8 (S)	%	100	80-108	03/14/17 22:20	

LABORATORY CONTROL SAMPLE: 1918547

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	19.8	99	82-115	
Ethylbenzene	ug/L	20	19.9	99	83-112	
Toluene	ug/L	20	19.2	96	78-113	
Xylene (Total)	ug/L	60	58.5	98	83-114	
1,2-Dichloroethane-d4 (S)	%			97	80-114	
4-Bromofluorobenzene (S)	%			101	80-113	
Toluene-d8 (S)	%			99	80-108	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALIFIERS

Project: 074935 COP Charles at al No1
Pace Project No.: 60239483

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

BATCH QUALIFIERS

Batch: 468677

[M5]	A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 074935 COP Charles at al No1
Pace Project No.: 60239483

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60239483001	**074935-030617-CN-MW-1R**	EPA 8260	468677		
60239483002	**TRIP BLANK**	EPA 8260	468677		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60239483

60239483

Client Name: GHD COP

Courier: FedEx ☒ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☐ Client ☐ Other ☐

Tracking #: 7044 6660 1540 Pace Shipping Label Used? Yes ☐ No ☐

Custody Seal on Cooler/Box Present: Yes ☒ No ☐ Seals intact: Yes ☒ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☒ Foam ☐ None ☐ Other ☐

Thermometer Used: (CF +1.5 T-266) / CF +0.9 T-239 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): **As-read** 2.5 **Corr. Factor** CF +1.5 CF +0.9 **Corrected** 4.0

Date and initials of person examining contents: JD 3/10/17

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☐Yes ☐No ☒N/A	
Cyanide water sample checks: ☒ N/A Lead acetate strip turns dark? (Record only) Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No ☐Yes ☐No	
Trip Blank present:	☒Yes ☐No ☐N/A	
Headspace in VOA vials (>6mm):	☐Yes ☒No ☐N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Alice Date: 03/10/17

Temp Log: Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.

Start: 1210	Start:
End: 1215	End:
Temp:	Temp:

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	GHD Services_COP NM	Report To:	Christine Mathews	Attention:	
Address	6212 Indian School Rd. NE St2	Copy To:		Company Name:	
Albuquerque, NM 87110				Address:	
Email:	christine.mathews@ghd.com	Purchase Order #:		Pace Quote:	
Phone:	505-884-0672 Fax:	Project Name:	074935 COP Charles et al No1	Pace Project Manager:	alice.spiller@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	8644, line 25

Regulatory Agency

State / Location: NM

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	8260 BTEX	Residual Chlorine (Y/N)	600239483
1	GHD-074935-030617-CN-MW-17	WT	G	3-6-17	1237				3				✓						✓		2) DLGH 001
2																					3) DLGH TB 002
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
		3-9-17	1500		3/10/17	0910	4.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Charles McLaughlin

SIGNATURE of SAMPLER:

DATE Signed: 3-9-17

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

June 23, 2017

Christine Mathews
GHD Services, Inc.
6212 Indian School Rd. NE St2
Albuquerque, NM 87110

RE: Project: 074935 CHARLES ET AL
Pace Project No.: 60246782

Dear Christine Mathews:
Enclosed are the analytical results for sample(s) received by the laboratory on June 17, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Alice Spiller

Alice Spiller
alice.spiller@pacelabs.com
(913)563-1409
Project Manager

Enclosures

cc: Angela Bown, GHD Services, Inc,
Jeffrey Walker, GHD Services, Inc

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: 074935 CHARLES ET AL
Pace Project No.: 60246782

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

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SAMPLE SUMMARY

Project: 074935 CHARLES ET AL
Pace Project No.: 60246782

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60246782001	**GW-074935-061217-CN-MW-1R**	Water	06/12/17 13:20	06/17/17 08:30

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SAMPLE ANALYTE COUNT

Project: 074935 CHARLES ET AL
Pace Project No.: 60246782

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60246782001	**GW-074935-061217-CN-MW-1R**	EPA 8260	JTK	8	PASI-K

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PROJECT NARRATIVE

Project: 074935 CHARLES ET AL
Pace Project No.: 60246782

Method: **EPA 8260**
Description: 8260 MSV UST, Water
Client: GHD Services_COP NM
Date: June 23, 2017

General Information:
1 sample was analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

pH: Post-analysis pH measurement indicates insufficient VOA sample preservation.
- GW-074935-061217-CN-MW-1R (Lab ID: 60246782001)

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:
All criteria were within method requirements with any exceptions noted below.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 482265

A matrix spike/matrix spike duplicate was not performed due to insufficient sample volume.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 074935 CHARLES ET AL
Pace Project No.: 60246782

Sample: GW-074935-061217-CN-MW-1R **Lab ID: 60246782001** Collected: 06/12/17 13:20 Received: 06/17/17 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**16.2**	ug/L	10.0	10		06/23/17 00:36	71-43-2	
Ethylbenzene	**304**	ug/L	10.0	10		06/23/17 00:36	100-41-4	
Toluene	ND	ug/L	10.0	10		06/23/17 00:36	108-88-3	
Xylene (Total)	**522**	ug/L	30.0	10		06/23/17 00:36	1330-20-7	
Surrogates								
Toluene-d8 (S)	102	%	80-108	10		06/23/17 00:36	2037-26-5	
4-Bromofluorobenzene (S)	105	%	80-113	10		06/23/17 00:36	460-00-4	
1,2-Dichloroethane-d4 (S)	101	%	80-114	10		06/23/17 00:36	17060-07-0	
Preservation pH	**7.0**		1.0	10		06/23/17 00:36		pH

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: 074935 CHARLES ET AL
Pace Project No.: 60246782

QC Batch: 482265
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60246782001

METHOD BLANK: 1975455 Matrix: Water
Associated Lab Samples: 60246782001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	06/23/17 00:21	
Ethylbenzene	ug/L	ND	1.0	06/23/17 00:21	
Toluene	ug/L	ND	1.0	06/23/17 00:21	
Xylene (Total)	ug/L	ND	3.0	06/23/17 00:21	
1,2-Dichloroethane-d4 (S)	%	94	80-114	06/23/17 00:21	
4-Bromofluorobenzene (S)	%	108	80-113	06/23/17 00:21	
Toluene-d8 (S)	%	107	80-108	06/23/17 00:21	

LABORATORY CONTROL SAMPLE: 1975456

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	20.0	100	82-115	
Ethylbenzene	ug/L	20	20.8	104	83-112	
Toluene	ug/L	20	21.2	106	78-113	
Xylene (Total)	ug/L	60	65.2	109	83-114	
1,2-Dichloroethane-d4 (S)	%			98	80-114	
4-Bromofluorobenzene (S)	%			107	80-113	
Toluene-d8 (S)	%			104	80-108	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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QUALIFIERS

Project: 074935 CHARLES ET AL
Pace Project No.: 60246782

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

BATCH QUALIFIERS

Batch: 482265

[M5]	A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

pH	Post-analysis pH measurement indicates insufficient VOA sample preservation.

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 074935 CHARLES ET AL
Pace Project No.: 60246782

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60246782001	**GW-074935-061217-CN-MW-1R**	EPA 8260	482265		

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Sample Condition Upon Receipt

WO# : 60246782

60246782

Client Name: GHD

Courier: FedEx ☒ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☐ Client ☐ Other ☐

Tracking #: 7869 0826 1730 Pace Shipping Label Used? Yes ☐ No ☐

Custody Seal on Cooler/Box Present: Yes ☒ No ☐ Seals intact: Yes ☒ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☒ None ☐ Other ☐

Thermometer Used: CF +2.9 T-266 / CF +0.2 T-239 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 3.6 **Corr. Factor** CF +2.9 CF +0.2 **Corrected** 3.8

Date and initials of person examining contents: JB 6/17/17

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☐Yes ☐No ☒N/A	
Cyanide water sample checks: ☒N/A Lead acetate strip turns dark? (Record only) Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No ☐Yes ☐No	
Trip Blank present:	☐Yes ☒No ☐N/A	
Headspace in VOA vials (>6mm):	☐Yes ☒No ☐N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Alice Date: 06/19/17

CHAIN OF CUSTODY RECORD

COC NO.: 55541

Address: 1671 Indian School Rd NE, Albuquerque NM 87110 PAGE 1 OF 1
Phone: (505) 884-0672 Jeff.Walker@ghd.com Fax:

Project No/ Phase/Task Code: 074935	Laboratory Name: Pace	Lab Location:	SSOW ID:
Project Name: Charles ET AL	Lab Contact: Alice Spilker		Cooler No:
Project Location:			Carrier:
GHD Chemistry Contact:			Airbill No:
Sampler(s): CN			Total # of Containers: 3

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Filtered (Y/N)	BTEX 8260										Total Containers/sample	MS/MSD Request	Comments/ Special Instructions:
	PRESERVATION - (SEE BACK OF COC FOR ABBREVIATIONS)																		60246782
1	GW-074935-061217-CN-MW-1R	6/12/17	1320	WT	G	N	✓												(3) D6 9H 01
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			

TAT Required in business days (use separate COCs for different TATs):

☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 1 Week ☐ 2 Week ☐ Other: Standard.

Notes/ Special Requirements:

3.8°

	Relinquished By	Company	Date	Time		Received By	Company	Date	Time
1.	Charles Neligh	GHD	6/16/17		1.			6/17/17	0830
2.					2.				
3.					3.				

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT – ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE – Fully Executed Copy (CRA) YELLOW – Receiving Laboratory Copy PINK – Shipper GOLDENROD – Sampling Crew

GHD Form: COC-10B (20110804)

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

October 10, 2017

Jeff Walker
GHD Services
6121 indian School Rd
Ste 200
Albuquerque, NM 87110

RE: Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60254332

Dear Jeff Walker:
Enclosed are the analytical results for sample(s) received by the laboratory on September 29, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Alice Spiller

Alice Spiller
alice.spiller@pacelabs.com
(913)563-1409
Project Manager

Enclosures

cc: Angela Bown, GHD Services
Christine Mathews, GHD Services

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60254332

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 15-016-0
Illinois Certification #: 003097
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212008A
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

December 14, 2017

Jeff Walker
GHD Services
6121 indian School Rd
Ste 200
Albuquerque, NM 87110

RE: Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

Dear Jeff Walker:
Enclosed are the analytical results for sample(s) received by the laboratory on December 08, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Colleen Clyne

Colleen Clyne
colleen.clyne@pacelabs.com
1(913)563-1406
Project Manager

Enclosures

cc: Angela Bown, GHD Services
Christine Mathews, GHD Services

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
WY STR Certification #: 2456.01
Arkansas Certification #: 17-016-0
Illinois Certification #: 200030
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407
Utah Certification #: KS00021
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070

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(913)599-5665

SAMPLE SUMMARY

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60259864001	**GW-11146002-120417-SP-MW-1R**	Water	12/04/17 13:20	12/08/17 09:10
60259864002	**GW-11146002-120417-SP-MW-DUP**	Water	12/04/17 13:20	12/08/17 09:10
60259864003	**TRIP BLANK**	Water	12/04/17 13:20	12/08/17 09:10

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

SAMPLE ANALYTE COUNT

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60259864001	**GW-11146002-120417-SP-MW-1R**	EPA 8260	JTK	8	PASI-K
60259864002	**GW-11146002-120417-SP-MW-DUP**	EPA 8260	JTK	8	PASI-K
60259864003	**TRIP BLANK**	EPA 8260	JTK	8	PASI-K

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

Sample: GW-11146002-120417-SP-MW-1R **Lab ID: 60259864001** Collected: 12/04/17 13:20 Received: 12/08/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**15.0**	ug/L	10.0	10		12/13/17 05:05	71-43-2	
Ethylbenzene	**946**	ug/L	10.0	10		12/13/17 05:05	100-41-4	
Toluene	**1880**	ug/L	10.0	10		12/13/17 05:05	108-88-3	
Xylene (Total)	**7960**	ug/L	150	50		12/13/17 21:26	1330-20-7	
Surrogates								
Toluene-d8 (S)	102	%	80-108	10		12/13/17 05:05	2037-26-5	
4-Bromofluorobenzene (S)	105	%	80-113	10		12/13/17 05:05	460-00-4	
1,2-Dichloroethane-d4 (S)	93	%	80-114	10		12/13/17 05:05	17060-07-0	
Preservation pH	**1.0**		1.0	10		12/13/17 05:05		

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

Sample: GW-11146002-120417-SP-MW-DUP **Lab ID: 60259864002** Collected: 12/04/17 13:20 Received: 12/08/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**16.4**	ug/L	10.0	10		12/13/17 05:20	71-43-2	
Ethylbenzene	**1030**	ug/L	10.0	10		12/13/17 05:20	100-41-4	
Toluene	**2090**	ug/L	50.0	50		12/13/17 21:41	108-88-3	
Xylene (Total)	**7730**	ug/L	150	50		12/13/17 21:41	1330-20-7	
Surrogates								
Toluene-d8 (S)	101	%	80-108	10		12/13/17 05:20	2037-26-5	
4-Bromofluorobenzene (S)	107	%	80-113	10		12/13/17 05:20	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	80-114	10		12/13/17 05:20	17060-07-0	
Preservation pH	**1.0**		1.0	10		12/13/17 05:20		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

Sample: TRIP BLANK **Lab ID: 60259864003** Collected: 12/04/17 13:20 Received: 12/08/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		12/13/17 05:35	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		12/13/17 05:35	100-41-4	
Toluene	ND	ug/L	1.0	1		12/13/17 05:35	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		12/13/17 05:35	1330-20-7	
Surrogates								
Toluene-d8 (S)	101	%	80-108	1		12/13/17 05:35	2037-26-5	
4-Bromofluorobenzene (S)	108	%	80-113	1		12/13/17 05:35	460-00-4	
1,2-Dichloroethane-d4 (S)	93	%	80-114	1		12/13/17 05:35	17060-07-0	
Preservation pH	**1.0**		1.0	1		12/13/17 05:35		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

QC Batch: 506955 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60259864001, 60259864002, 60259864003

METHOD BLANK: 2076882 Matrix: Water
Associated Lab Samples: 60259864001, 60259864002, 60259864003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	12/13/17 03:35	
Ethylbenzene	ug/L	ND	1.0	12/13/17 03:35	
Toluene	ug/L	ND	1.0	12/13/17 03:35	
Xylene (Total)	ug/L	ND	3.0	12/13/17 03:35	
1,2-Dichloroethane-d4 (S)	%	95	80-114	12/13/17 03:35	
4-Bromofluorobenzene (S)	%	108	80-113	12/13/17 03:35	
Toluene-d8 (S)	%	102	80-108	12/13/17 03:35	

LABORATORY CONTROL SAMPLE: 2076883

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	20.1	100	82-115	
Ethylbenzene	ug/L	20	19.6	98	83-112	
Toluene	ug/L	20	20.2	101	78-113	
Xylene (Total)	ug/L	60	60.0	100	83-114	
1,2-Dichloroethane-d4 (S)	%			93	80-114	
4-Bromofluorobenzene (S)	%			106	80-113	
Toluene-d8 (S)	%			102	80-108	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

QC Batch: 507189 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60259864001, 60259864002

METHOD BLANK: 2077864 Matrix: Water
Associated Lab Samples: 60259864001, 60259864002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Toluene	ug/L	ND	1.0	12/13/17 18:11	
Xylene (Total)	ug/L	ND	3.0	12/13/17 18:11	
1,2-Dichloroethane-d4 (S)	%	97	80-114	12/13/17 18:11	
4-Bromofluorobenzene (S)	%	107	80-113	12/13/17 18:11	
Toluene-d8 (S)	%	103	80-108	12/13/17 18:11	

LABORATORY CONTROL SAMPLE: 2077865

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Toluene	ug/L	20	20.9	105	78-113	
Xylene (Total)	ug/L	60	62.6	104	83-114	
1,2-Dichloroethane-d4 (S)	%			96	80-114	
4-Bromofluorobenzene (S)	%			104	80-113	
Toluene-d8 (S)	%			103	80-108	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

QUALIFIERS

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

BATCH QUALIFIERS

Batch: 506955

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

Batch: 507189

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60259864

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60259864001	**GW-11146002-120417-SP-MW-1R**	EPA 8260	506955		
60259864001	**GW-11146002-120417-SP-MW-1R**	EPA 8260	507189		
60259864002	**GW-11146002-120417-SP-MW-DUP**	EPA 8260	506955		
60259864002	**GW-11146002-120417-SP-MW-DUP**	EPA 8260	507189		
60259864003	**TRIP BLANK**	EPA 8260	506955		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60259864

60259864

Client Name: GHD NM

Courier: FedEx ☒ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☐ Client ☐ Other ☐

Tracking #: 4122 4440 1307 Pace Shipping Label Used? Yes ☐ No ☐

Custody Seal on Cooler/Box Present: Yes ☒ No ☐ Seals intact: Yes ☒ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☒ Foam ☐ None ☐ Other ☐

Thermometer Used: CF 0.0 T-266 / CF +0.2 T-239 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): As-read 2.4 **Corr. Factor** (CF 0.0) CF +0.2 **Corrected** 2.4

CK

Date and initials of person examining contents: JB 12/6/17

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO3, H2SO4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☐Yes ☐No ☒N/A	
Cyanide water sample checks: ☒N/A Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☒Yes ☐No ☐N/A	12/6
Headspace in VOA vials (>6mm):	☐Yes ☒No ☐N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: Jenalee Comeaux for CBK Date: 12/11/17

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	GHD Services, New Mexico	Report To:	Jeff Walker	Attention:	
Address:	6121 Indian School Rd	Copy To:		Company Name:	
Albuquerque, NM 87110				Address:	
Email:	jeff.walker@ghd.com	Purchase Order #:		Pace Quote:	
Phone:	505-884-0672 Fax	Project Name:	11146002 Charles et al No 1	Pace Project Manager:	alice.spiller@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	10540, line 1

Regulatory Agency	
State / Location	NM

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test: 8260 BTEX	Residual Chlorine (Y/N)	60259864
1	GW-11146002-120417-SP-MW-1B	WT		12/4/17	1320			WT	3									X		(3) DGAH 001
2	GW-11146002-120417-SP-MW-DUP	WT		12/4/17				WT	3									X		↓ 002
3																				(2) DGAH^R 003
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Steven Perez	12/7/17	1420		12/8/17	0910	2.4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Steven Perez

SIGNATURE of SAMPLER: Steven Perez DATE Signed: 12/7/17

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60254332

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60254332001	**GW-11146002-092517-CN-MW-1R**	Water	09/25/17 11:50	09/29/17 08:35
60254332002	**GW-11146002-092517-CN-DUP**	Water	09/25/17 11:50	09/29/17 08:35
60254332003	**TRIP BLANK**	Water	09/25/17 11:50	09/29/17 08:35

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SAMPLE ANALYTE COUNT

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60254332

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60254332001	**GW-11146002-092517-CN-MW-1R**	EPA 8260	EAG	8	PASI-K
60254332002	**GW-11146002-092517-CN-DUP**	EPA 8260	EAG	8	PASI-K

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ANALYTICAL RESULTS

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60254332

Sample: GW-11146002-092517-CN-MW-1R **Lab ID: 60254332001** Collected: 09/25/17 11:50 Received: 09/29/17 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**12.6**	ug/L	10.0	10		10/06/17 14:39	71-43-2	
Ethylbenzene	**600**	ug/L	10.0	10		10/06/17 14:39	100-41-4	
Toluene	ND	ug/L	10.0	10		10/06/17 14:39	108-88-3	
Xylene (Total)	**1050**	ug/L	30.0	10		10/06/17 14:39	1330-20-7	
Surrogates								
Toluene-d8 (S)	99	%	80-108	10		10/06/17 14:39	2037-26-5	
4-Bromofluorobenzene (S)	98	%	80-113	10		10/06/17 14:39	460-00-4	
1,2-Dichloroethane-d4 (S)	100	%	80-114	10		10/06/17 14:39	17060-07-0	
Preservation pH	**1.0**		1.0	10		10/06/17 14:39		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60254332

Sample: GW-11146002-092517-CN-DUP **Lab ID: 60254332002** Collected: 09/25/17 11:50 Received: 09/29/17 08:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**11.1**	ug/L	10.0	10		10/06/17 14:54	71-43-2	
Ethylbenzene	**524**	ug/L	10.0	10		10/06/17 14:54	100-41-4	
Toluene	ND	ug/L	10.0	10		10/06/17 14:54	108-88-3	
Xylene (Total)	**968**	ug/L	30.0	10		10/06/17 14:54	1330-20-7	
Surrogates								
Toluene-d8 (S)	98	%	80-108	10		10/06/17 14:54	2037-26-5	
4-Bromofluorobenzene (S)	98	%	80-113	10		10/06/17 14:54	460-00-4	
1,2-Dichloroethane-d4 (S)	101	%	80-114	10		10/06/17 14:54	17060-07-0	
Preservation pH	**1.0**		1.0	10		10/06/17 14:54		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60254332

QC Batch: 497599 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60254332001, 60254332002

METHOD BLANK: 2035542 Matrix: Water
Associated Lab Samples: 60254332001, 60254332002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	10/06/17 11:01	
Ethylbenzene	ug/L	ND	1.0	10/06/17 11:01	
Toluene	ug/L	ND	1.0	10/06/17 11:01	
Xylene (Total)	ug/L	ND	3.0	10/06/17 11:01	
1,2-Dichloroethane-d4 (S)	%	102	80-114	10/06/17 11:01	
4-Bromofluorobenzene (S)	%	98	80-113	10/06/17 11:01	
Toluene-d8 (S)	%	98	80-108	10/06/17 11:01	

LABORATORY CONTROL SAMPLE: 2035543

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	19.2	96	82-115	
Ethylbenzene	ug/L	20	18.1	90	83-112	
Toluene	ug/L	20	17.9	90	78-113	
Xylene (Total)	ug/L	60	56.3	94	83-114	
1,2-Dichloroethane-d4 (S)	%			103	80-114	
4-Bromofluorobenzene (S)	%			98	80-113	
Toluene-d8 (S)	%			100	80-108	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALIFIERS

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60254332

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K Pace Analytical Services - Kansas City

BATCH QUALIFIERS

Batch: 497599

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 11146002 CHARLES ET AL NO 1
Pace Project No.: 60254332

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60254332001	**GW-11146002-092517-CN-MW-1R**	EPA 8260	497599		
60254332002	**GW-11146002-092517-CN-DUP**	EPA 8260	497599		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60254332

60254332

AFS

Client Name: GHD Services

Courier: FedEx ☒ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☐ Client ☐ Other ☐

Tracking #: 787890322276 Pace Shipping Label Used? Yes ☒ No ☐

Custody Seal on Cooler/Box Present: Yes ☐ No ☒ Seals intact: Yes ☐ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☒ Foam ☐ None ☐ Other ☐

Thermometer Used: CF 0.0 T-266 / CF +0.3 T-239 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 4.0 **Corr. Factor** CF 0.0 CF +0.3 **Corrected** 4.0

Date and initials of person examining contents: RT 9-29-17

Temperature should be above freezing to 6°C

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☐Yes ☐No ☒N/A	
Cyanide water sample checks: ☒N/A Lead acetate strip turns dark? (Record only) Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No ☐Yes ☐No	
Trip Blank present:	☒Yes ☐No ☐N/A	2 (DG9H)
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Alice Date: 10/03/17

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page : 1 Of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	GHD Services, New Mexico	Report To:	Jeff Walker	Attention:	
Address:	6121 indian School Rd	Copy To:		Company Name:	
	Albuquerque, NM 87110			Address:	
Email:	jeff.walker@ghd.com	Purchase Order #:		Pace Quote:	
Phone:	505-884-0672 Fax:	Project Name:	11146002 Charles et al No 1	Pace Project Manager:	alice.spiller@pacelabs.com,
Requested Due Date:		Project #:		Pace Profile #:	10540, line 1

Regulatory Agency	
State / Location	
NM	

ITEM #	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Requested Analysis Filtered (Y/N) Y/N	Analyses Test: 8260 BTEX	Residual Chlorine (Y/N)	60254532
1	GW-11146002-092517-CN-MW-1A			9/25/17	1150				3										X		3(DG9H) 001
2	GW-11146002-092517-(N)-DUP			↓					3										X		↓ 002
3																					
4																					2(DG9H)=TB 003
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature]	9/28/17	1105	[signature] Pace	9-29-17	0835	4.0	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Charles Nelish

SIGNATURE of SAMPLER: [signature] DATE Signed: 9-28-17

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)