2017 Annual Groundwater Monitoring Report

Mangum No. 1
S27, T29N, R11W
San Juan County, New Mexico
API# 30-045-07835
NMOCD# 3R-1038

Hilcorp Energy Company

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

11146006| Report No 1 |January 31, 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) conducted on behalf of Hilcorp Energy Company (Hilcorp) at the Mangum No. 1 natural gas well site (hereafter referred to as the "Site"). Hilcorp acquired the Site with the sale of San Juan Basin assets from ConocoPhillips in August 2017. The Site is located on federal land in Section 27, Township 29N, Range 11W of San Juan County, New Mexico. Geographical coordinates for the Site are 36.6965°North, 107.9840°West. The Site consists of a natural gas well and associated equipment. The Site Location Map and Site Plan are presented as Figure 1 and 2, respectively.

1.1 Site History

Site remediation was performed in February 2016 to address soil impacts from an historical release of produced water and condensate. An excavation with dimensions of approximately 100 feet (ft) by 40 ft, from 9 ft to 17 ft deep was completed. Approximately 1,400 cubic yards (cy) of impacted soils were hauled away for off-Site disposal at the Industrial Ecosystems, Inc. (IEI) landfarm in Aztec, New Mexico. Groundwater was encountered in the excavation at 16 ft below ground surface (bgs). Approximately 1 foot of groundwater saturated soil was removed from beneath the water table. The groundwater accumulation at the bottom of the excavation was evacuated using a vacuum truck. Groundwater was allowed to recharge overnight and was evacuated for three consecutive days. Approximately 275 barrels (bbls) of groundwater were removed and transported for off-Site disposal at IEI.

Subsequent to the vacuum truck removal from the excavation, a sample of the groundwater was obtained for laboratory analyses. The groundwater sample was analyzed for VOCs, dissolved metals including arsenic, barium, cadmium, calcium, chromium, iron, manganese, magnesium, sodium, and zinc, and for general chemistry analytes including chloride, potassium, nitrate, sulfate, fluoride, total alkalinity, bicarbonate, total hardness, pH, and specific conductivity. The groundwater sample indicated analytical results exceeding the applicable New Mexico Water Quality Control Commission (NMWQCC) groundwater quality standards for benzene, xylenes, dissolved manganese, and sulfate. The excavation was backfilled with segregated field screened soils (i.e., below 100 parts per million (ppm) on photo-ionization detector)) and clean, imported fill. A report summarizing the soil excavation and subsequent groundwater recovery and sampling activities was submitted April 7, 2016.

In May 2016, four groundwater monitoring wells were installed at the Site to assess the extent of impacts to groundwater. Following the installation and development of the new wells, groundwater samples have been collected on a quarterly basis, beginning June 2016.

2. Groundwater Monitoring

2.1 Groundwater Monitoring Methodology

GHD conducted groundwater monitoring at the Site March 6, June 21, October 26 and December 4, 2017. Depth to groundwater was gauged at monitoring wells MW-1, MW-2, MW-3 and MW-4 using an oil/water interface probe prior to sampling. A summary of historical depths to water and groundwater elevations can be found in Table 1. Groundwater potentiometric surface maps detailing groundwater elevations and groundwater flow direction using data collected during the reporting period are presented as Figures 3, 4, 5 and 6. Groundwater flow direction at the site varies seasonally from north-northeast to north-northwest.

Prior to sample collection, monitor wells MW-1, MW-2, MW-3 and MW-4 were purged of at least three casing volumes of water using a dedicated polyethylene bailer prior to sampling. Groundwater quality parameters including pH, temperature, oxidation reduction potential, total dissolved solids, and conductivity were collected using a calibrated YSI 556 Multi Parameter sonde and were recorded on GHD groundwater sampling field forms. Field parameters collected during sampling are included in Table 2.

Groundwater samples were placed in laboratory prepared bottles, packed on ice and shipped under chain of custody documentation to Pace Analytical Laboratories (Pace) located in Lenexa, Kansas. Groundwater samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8260 (all wells) and for dissolved manganese and iron by EPA Method 6010B, and for sulfate by EPA Method 300.0.

2.2 Analytical Results

Concentrations of benzene were above the NMWQCC standard in groundwater from MW-3 and MW-4 for all four quarterly events in 2017 and for the March event in MW-2. Dissolved manganese concentrations were above the regulatory limit across all wells and dates in 2017 and xylenes were above standards for all four quarters in MW-3 and MW-4. Concentrations of sulfates were above the regulatory limit in monitor well MW-4 only and for all 4 quarters of the reporting period. Dissolved iron concentrations were above standards in monitor wells MW-2 and MW-3 in October samples.

A summary of historical laboratory analytical results is presented as Table 3. Groundwater laboratory analytical reports are included as Appendix B.

3. Conclusions and Recommendations

Based on analytical results from the groundwater samples collected from Site monitor wells to date, the following observations and recommendations are made:

- Concentrations of BTEX constituents, dissolved manganese and iron, and sulfates occur in Site groundwater at levels above NMWQCC standards.
- Continuation of quarterly groundwater monitoring through 2018 is also recommended. The next quarterly groundwater monitoring event is scheduled for March 2018.

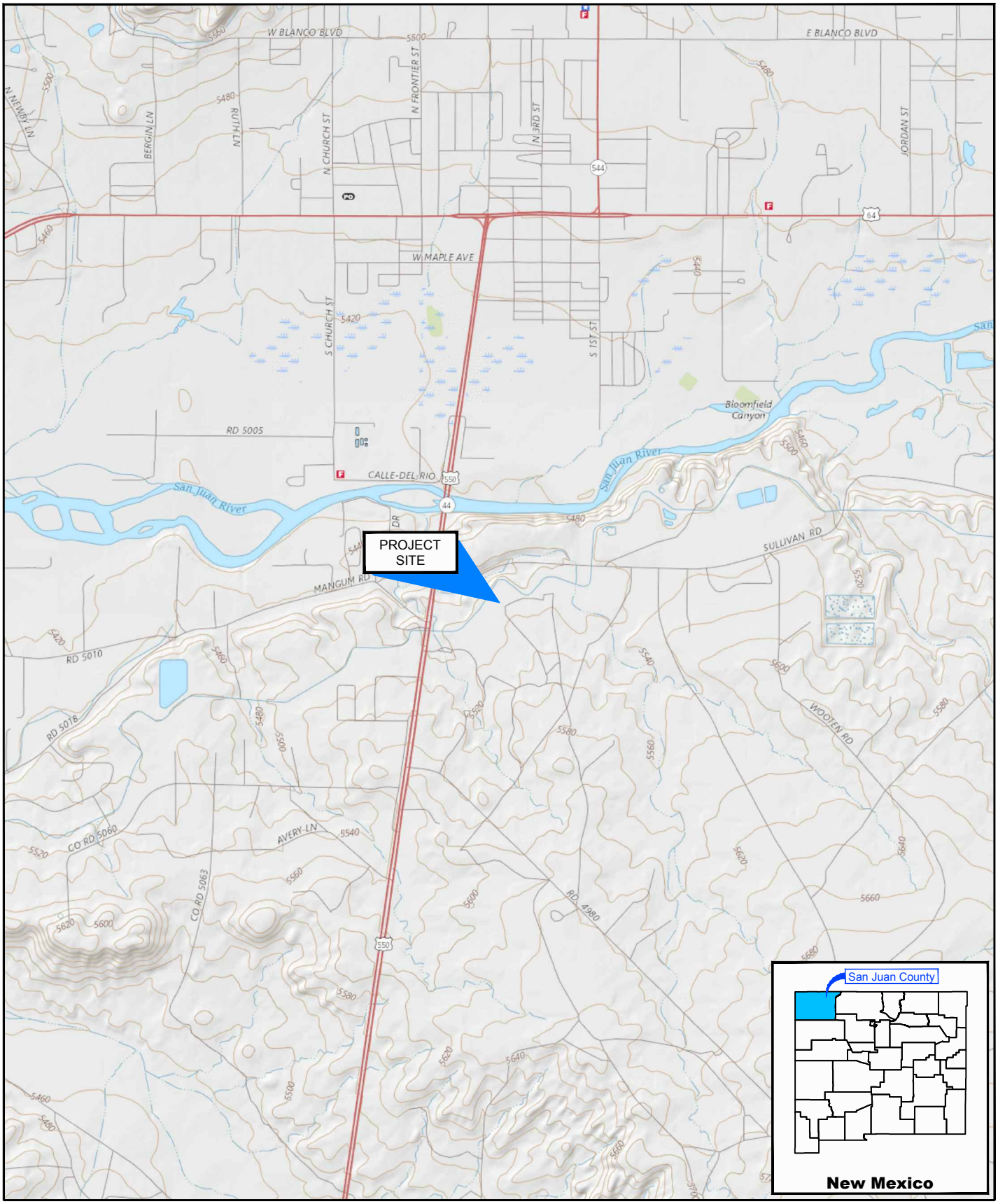
Respectfully Submitted,

GHD

Jeff Walker
Senior Project Manager

Bernard Bockisch
Albuquerque Office Manager

Figures



Source: USGS 7.5 Minute Quad "Bloomfield and Horn Canyon, New Mexico"

Lat/Long: 36.6955° North, 107.9840° West

0 1000 2000ft

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

HILCORP ENERGY COMPANY
SAN JUAN COUNTY, NEW MEXICO
MANGUM No. 1

11146006-00

Jan 16, 2018

SITE LOCATION MAP

FIGURE 1

CAD File: I:\CAD\Files\Eight Digit Job Numbers\1114----\11146006-Hilcorp-Mangum No.1\11146006-00\11146006-00(001)\11146006-00(001)GN-DL001.dwg

Source: Image © 2017 Google - Imagery Date: March 15, 2015

Lat/Long: 36.6955° North, 107.9840° West

0 20 60ft

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

HILCORP ENERGY COMPANY
SAN JUAN COUNTY, NEW MEXICO
MANGUM No. 1

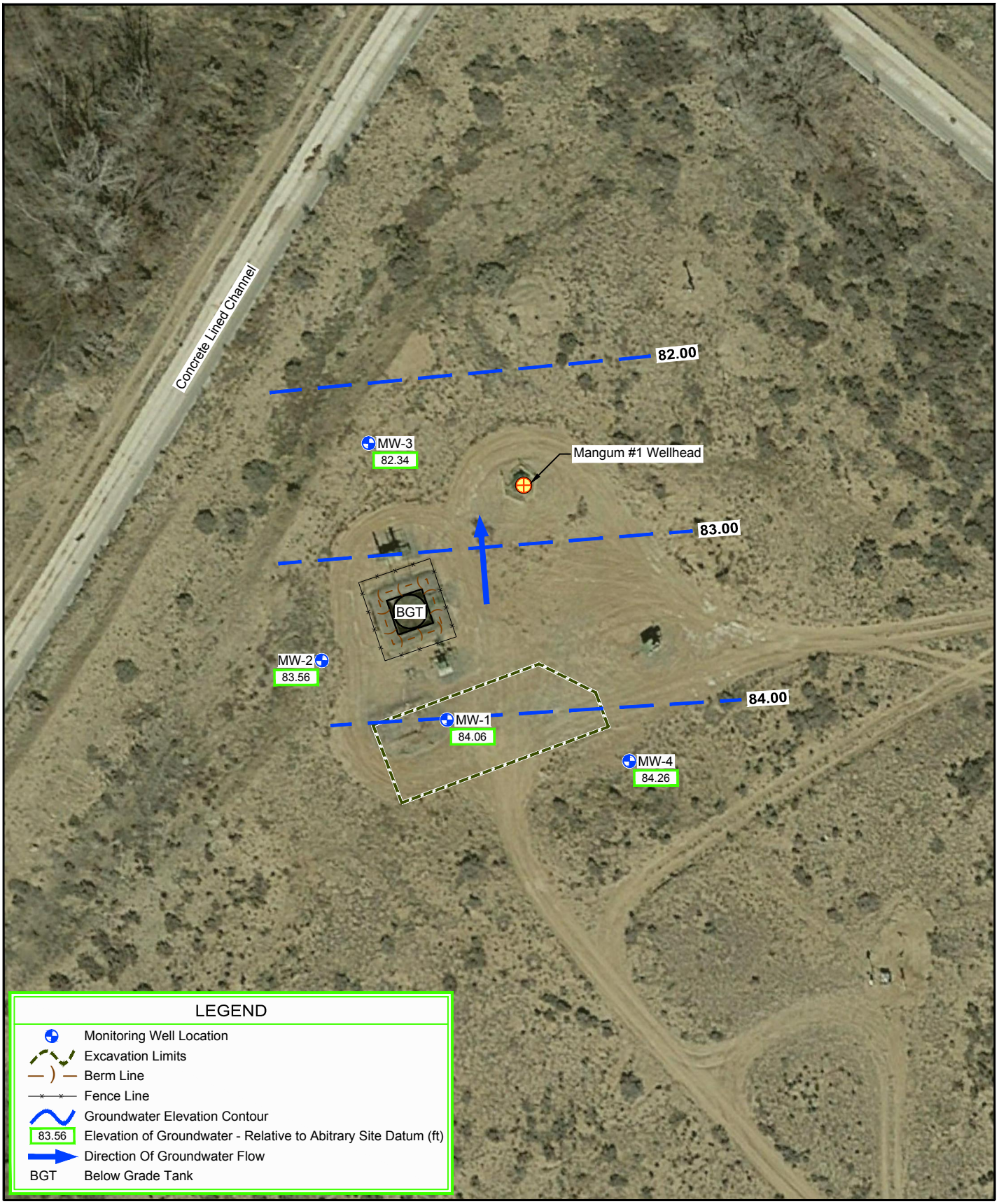
11146006-00

Jan 16, 2018

SITE PLAN

FIGURE 2

CAD File: I:\CAD\Files\Eight Digit Job Numbers\1114----\11146006-Hilcorp-Mangum No.1\11146006-00\11146006-00(001)\11146006-00(001)GN-DL001.dwg



Source: Image © 2017 Google - Imagery Date: March 15, 2015

Lat/Long: 36.6955° North, 107.9840° West

0 20 60ft

Coordinate System:
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New Mexico West (US Feet)

HILCORP ENERGY COMPANY
SAN JUAN COUNTY, NEW MEXICO
MANGUM No. 1

MARCH 2017 GROUNDWATER ELEVATION CONTOUR MAP

11146006-00

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FIGURE 3

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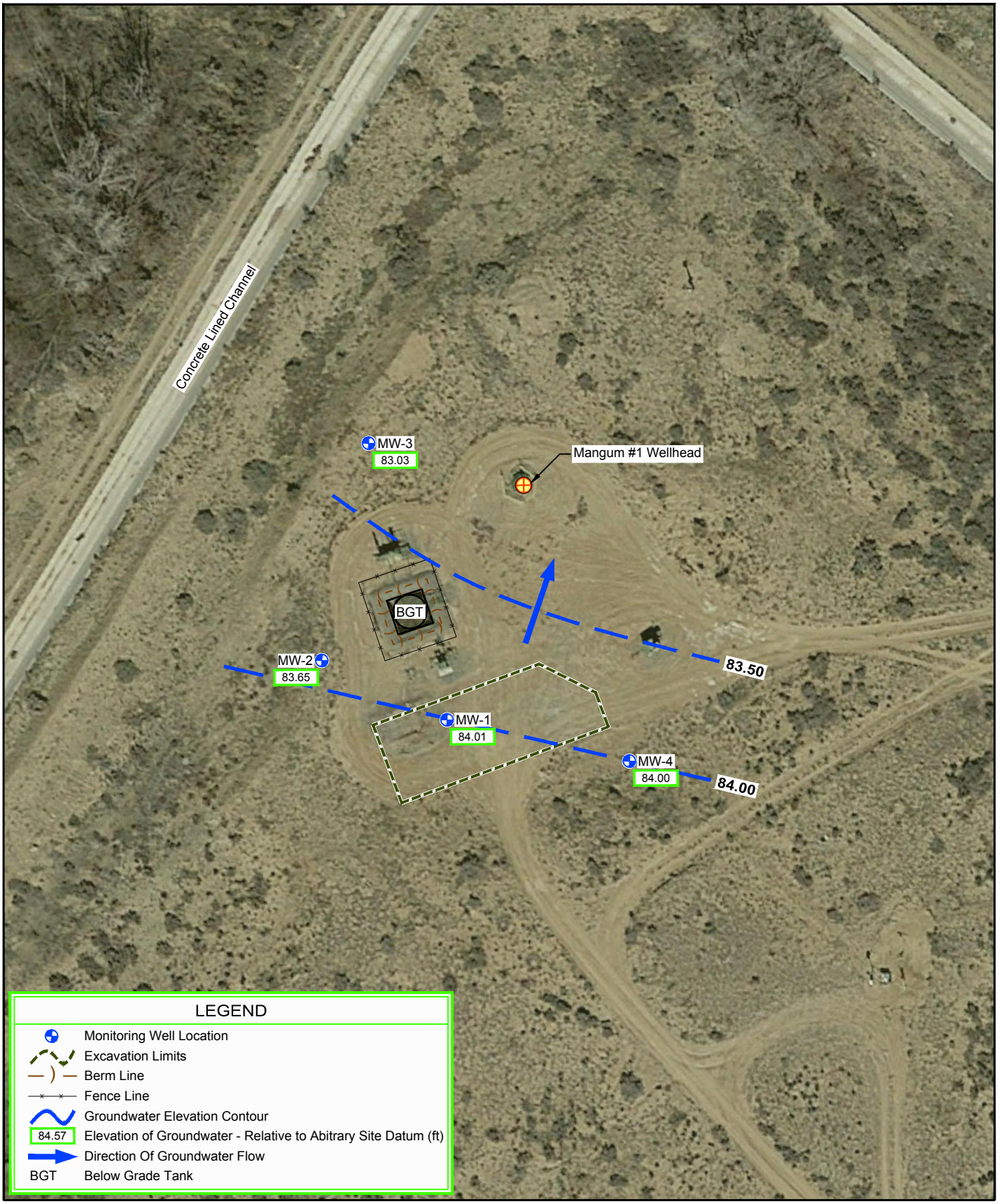

Source: Image © 2017 Google - Imagery Date: March 15, 2015

Lat/Long: 36.6955° North, 107.9840° West

0 20 60ft

Coordinate System:
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HILCORP ENERGY COMPANY
SAN JUAN COUNTY, NEW MEXICO
MANGUM No. 1

JUNE 2017 GROUNDWATER ELEVATION CONTOUR MAP

11146006-00

Jan 31, 2018

FIGURE 4

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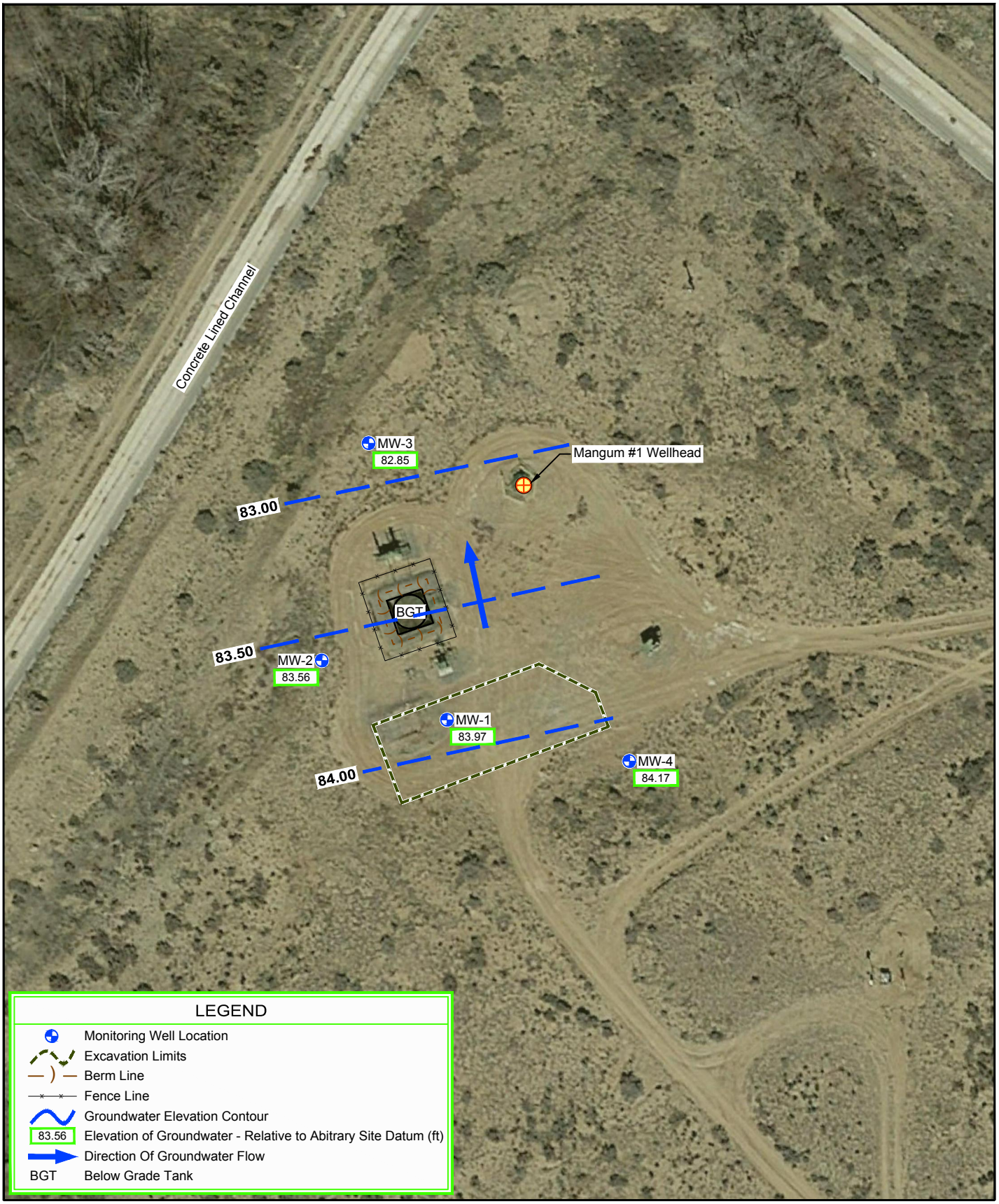

Source: Image © 2017 Google - Imagery Date: March 15, 2015

Lat/Long: 36.6955° North, 107.9840° West

0 20 60ft

Coordinate System:
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New Mexico West (US Feet)

HILCORP ENERGY COMPANY
SAN JUAN COUNTY, NEW MEXICO
MANGUM No. 1

11146006-00

Jan 16, 2018

OCTOBER 2017 GROUNDWATER ELEVATION CONTOUR MAP

FIGURE 5

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Source: Image © 2017 Google - Imagery Date: March 15, 2015

Lat/Long: 36.6955° North, 107.9840° West

0 20 60ft

Coordinate System:
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New Mexico West (US Feet)

HILCORP ENERGY COMPANY
SAN JUAN COUNTY, NEW MEXICO
MANGUM No. 1

11146006-00

Jan 16, 2018

DECEMBER 2017 GROUNDWATER ELEVATION CONTOUR MAP

FIGURE 6

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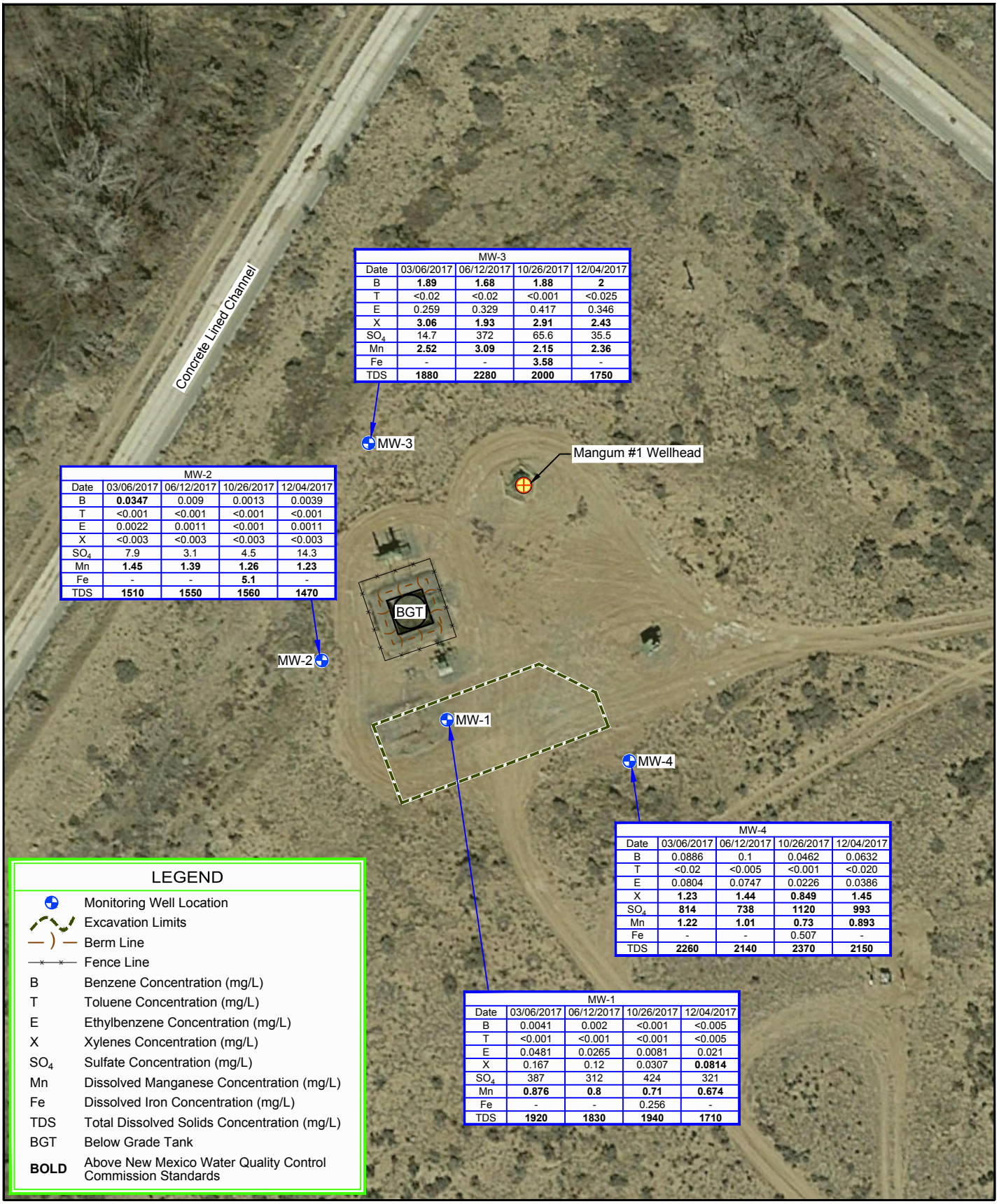

MW-3				
Date	03/06/2017	06/12/2017	10/26/2017	12/04/2017
B	**1.89**	**1.68**	**1.88**	**2**
T	<0.02	<0.02	<0.001	<0.025
E	0.259	0.329	0.417	0.346
X	**3.06**	**1.93**	**2.91**	**2.43**
SO_4	14.7	372	65.6	35.5
Mn	**2.52**	**3.09**	**2.15**	**2.36**
Fe	-	-	**3.58**	-
TDS	**1880**	**2280**	**2000**	**1750**

MW-2				
Date	03/06/2017	06/12/2017	10/26/2017	12/04/2017
B	**0.0347**	0.009	0.0013	0.0039
T	<0.001	<0.001	<0.001	<0.001
E	0.0022	0.0011	<0.001	0.0011
X	<0.003	<0.003	<0.003	<0.003
SO_4	7.9	3.1	4.5	14.3
Mn	**1.45**	**1.39**	**1.26**	**1.23**
Fe	-	-	**5.1**	-
TDS	**1510**	**1550**	**1560**	**1470**

MW-4				
Date	03/06/2017	06/12/2017	10/26/2017	12/04/2017
B	0.0886	0.1	0.0462	0.0632
T	<0.02	<0.005	<0.001	<0.020
E	0.0804	0.0747	0.0226	0.0386
X	**1.23**	**1.44**	**0.849**	**1.45**
SO_4	**814**	**738**	**1120**	**993**
Mn	**1.22**	**1.01**	**0.73**	**0.893**
Fe	-	-	0.507	-
TDS	**2260**	**2140**	**2370**	**2150**

MW-1				
Date	03/06/2017	06/12/2017	10/26/2017	12/04/2017
B	0.0041	0.002	<0.001	<0.005
T	<0.001	<0.001	<0.001	<0.005
E	0.0481	0.0265	0.0081	0.021
X	0.167	0.12	0.0307	**0.0814**
SO_4	387	312	424	321
Mn	**0.876**	**0.8**	**0.71**	**0.674**
Fe	-	-	0.256	-
TDS	**1920**	**1830**	**1940**	**1710**

LEGEND

	Monitoring Well Location
	Excavation Limits
	Berm Line
	Fence Line
B	Benzene Concentration (mg/L)
T	Toluene Concentration (mg/L)
E	Ethylbenzene Concentration (mg/L)
X	Xylenes Concentration (mg/L)
SO_4	Sulfate Concentration (mg/L)
Mn	Dissolved Manganese Concentration (mg/L)
Fe	Dissolved Iron Concentration (mg/L)
TDS	Total Dissolved Solids Concentration (mg/L)
BGT	Below Grade Tank
BOLD	Above New Mexico Water Quality Control Commission Standards

Source: Image © 2017 Google - Imagery Date: March 15, 2015

Lat/Long: 36.6955° North, 107.9840° West

0 20 60ft

Coordinate System:
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New Mexico West (US Feet)

HILCORP ENERGY COMPANY
SAN JUAN COUNTY, NEW MEXICO
MANGUM No. 1

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Jan 16, 2018

SITE PLAN

FIGURE 7

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Tables

Table 1

Groundwater Elevations
Hilcorp Energy Company
Mangum No.1
San Juan County, New Mexico

Well ID	Top of Casing (feet)	Date of Measurement	Depth to Water (feet)	Groundwater Elevation (feet)
MW-1	98.97	6/8/2016	15.12	83.85
		9/12/2016	14.75	84.22
		11/29/2016	15.06	83.91
		3/6/2017	14.91	84.06
		6/12/2017	14.96	84.01
		10/26/2017	15.00	83.97
		12/4/2017	15.08	83.89
MW-2	101.05	6/8/2016	17.49	83.56
		9/12/2016	17.28	84.07
		11/29/2016	17.62	83.43
		3/6/2017	17.49	83.56
		6/12/2017	17.40	83.65
		10/26/2017	17.49	83.56
		12/4/2017	17.57	83.48

Table 1

Groundwater Elevations
Hilcorp Energy Company
Mangum No.1
San Juan County, New Mexico

Well ID	Top of Casing (feet)	Date of Measurement	Depth to Water (feet)	Groundwater Elevation (feet)
MW-3	101.35	6/8/2016	18.47	82.88
		9/12/2016	18.41	82.94
		11/29/2016	18.84	82.51
		3/6/2017	19.01	82.34
		6/12/2017	18.32	83.03
		10/26/2017	18.50	82.85
		12/4/2017	18.87	82.48
MW-4	103.76	6/8/2016	19.72	84.04
		9/12/2016	19.43	84.33
		11/29/2016	19.62	84.14
		3/6/2017	19.50	84.26
		6/21/2017	19.76	84.00
		10/26/2017	19.59	84.17
		12/4/2017	19.62	84.14

Table 2

Field Parameters
Hilcorp Energy Company
Mangum No.1
San Juan County, New Mexico

Well ID	Date	Temp˚C	pH	TDS (mg/L)	SC (µS/cm)	DO (mg/L)	ORP (mV)	Volume (gal)
MW-1	11/29/2016	16.54	7.42	--	2.607	1.52	-155.3	--
	3/6/2017	13.37	7.37	1.993	3057	1.48	-262.6	2
	6/12/2017	14.35	7.14	1.82	2800	0.89	-197.6	2
	10/26/2017	18	7.19	--	2600	1.85	-156	2.25
	12/4/2017	15.47	7.07	1.787	2748	1.3	-209.9	2
MW-2	11/29/2016	16.04	7.2	--	2.299	2.21	-109.3	--
	3/6/2017	12.74	7.15	1.744	2683	2.05	-171.7	1.5
	6/12/2017	13.5	6.95	1.558	2396	1.61	-155.8	1.5
	10/26/2017	18.7	7.01	--	2264	1.74	-92.8	1.5
	12/4/2017	15.41	7	1.517	2333	1.11	-178	1.5
MW-3	11/29/2016	15.01	7.09	--	3.091	2.52	-91	--
	3/6/2017	12.74	7.05	2.193	3376	4.17	-151.6	1
	6/12/2017	15.4	7.18	2.189	3360	6.7	-136	0.5
	10/26/2017	17.71	7.06	--	2653	1.8	-177.4	1.25
	12/4/2017	14.19	7.04	1.838	2835	3.05	-153.5	0.25
MW-4	6/23/2016	15.1	7.29	--	2.95	1.04	-148.5	1.5
	11/29/2016	16.01	7.4	--	2.396	1.59	-127.5	--
	3/6/2017	13.01	7.39	2.337	3608	2.01	-237.2	2
	6/21/2017	14.49	7.08	1.917	2955	1.36	-188.7	1.25
	10/26/2017	17.37	7.29	--	2830	1.74	-193.2	1.75
	12/4/2017	15.26	3.33	2.055	3161	0.66	-244.2	1.5

Notes:

TDS = total dissolved solids
SC = Soil Conductivity
DO = dissolved oxygen
ORP = oxidation-reduction potential
-- Not Measured

˚C = degrees Centigrade
mg/L = milligrams per liter
µS/cm = micro Siemens per centimeter
mV = millivolts
gal = gallons

Table 3

Groundwater Laboratory Analytical Results Summary
Hilcorp Energy Company
Mangum No.1
San Juan County, New Mexico

Well ID	Sample ID	Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (Total) (mg/L)	Sulfate (mg/L)	Manganese (Dissolved) (mg/L)	Iron (Dissolved) (mg/L)	Total Dissolved Solids (mg/L)
NMWQCC Groundwater Quality Standards			**0.01**	**0.75**	**0.75**	**0.62**	**600**	**0.2**	**1.0**	**1000**
MW-1	WT-11102646-060816-JWMW1	6/8/2016	**0.0388**	<0.020	0.358	**4.01**	**1170**	**1.69**	--	**2590**
	GW-11102646-091216-CM-MW-1	9/12/2016	**0.0111**	< 0.001	0.0946	0.382	577	**0.925**	--	--
	GW-11102646-112916-CN-MW-1	11/29/2016	**0.0132**	< 0.001	0.119	0.445	240	**0.99**	--	--
	GW-11102646-030617-CN-MW-1	3/6/2017	0.0041	< 0.001	0.0481	0.167	387	**0.876**	--	**1920**
	GW-11102646-061217-CN-MW-1	6/12/2017	0.002	< 0.001	0.0265	0.12	312	**0.8**	--	**1830**
	GW-11146006-102617-CM-MW-1	10/26/2017	< 0.001	< 0.001	0.0081	0.0307	424	**0.71**	0.256	**1940**
	GW-11145006-120417-SP-MW-1	12/4/2017	<0.005	< 0.005	0.021	0.0814	321	**0.674**	--	**1710**
MW-2	WT-11102646-060816-JW-MW-2	6/8/2016	**0.103**	< 0.001	0.0072	0.0448	3.0	**1.06**	--	**1580**
	GW-11102646-091216-CM-MW-2	9/12/2016	**0.0647**	< 0.001	0.0021	0.0032	2.8	**1.73**	--	--
	GW-11102646-112916-CN-MW-2	11/29/2016	**0.0257**	< 0.001	0.0021	< 0.003	2.6	**1.41**	--	--
	GW-11102646-030617-CN-MW-2	3/6/2017	**0.0347**	< 0.001	0.0022	< 0.003	7.9	**1.45**	--	**1510**
	GW-11102646-061217-CN-MW-2	6/12/2017	0.009	< 0.001	0.0011	< 0.003	3.1	**1.39**	--	**1550**
	GW-11146006-102617-CM-MW-2	10/26/2017	0.0013	< 0.001	< 0.001	< 0.003	4.5	**1.26**	**5.1**	**1560**
	GW-11145006-120417-SP-MW-2	12/4/2017	0.0039	< 0.001	0.0011	< 0.003	14.3	**1.23**	--	**1470**

Table 3

Groundwater Laboratory Analytical Results Summary
Hilcorp Energy Company
Mangum No.1
San Juan County, New Mexico

Well ID	Sample ID	Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (Total) (mg/L)	Sulfate (mg/L)	Manganese (Dissolved) (mg/L)	Iron (Dissolved) (mg/L)	Total Dissolved Solids (mg/L)
NMWQCC Groundwater Quality Standards			**0.01**	**0.75**	**0.75**	**0.62**	**600**	**0.2**	**1.0**	**1000**
MW-3	WT-11102646-060816-JW-MW-3	6/8/2016	**2.95**	< 0.020	**0.813**	**7.78**	110	**2.65**	--	**2190**
	GW-11102646-091216-CM-MW-3	9/12/2016	**2.27**	< 0.001	0.44	**2.49**	112	**3.62**	--	--
	GW-11102646-091216-CN-MW-3	11/29/2016	**2.97**	< 0.001	**0.845**	**5.44**	22.5	**3.12**	--	--
	GW-11102646-030617-CN-MW-3	3/6/2017	**1.89**	< 0.02	0.259	**3.06**	14.7	**2.52**	--	**1880**
	GW-11102646-061217-CN-MW-3	6/12/2017	**1.68**	< 0.02	0.329	**1.93**	372	**3.09**	--	**2280**
	GW-11146006-102617-CM-MW-3	10/26/2017	**1.88**	< 0.001	0.417	**2.91**	65.6	**2.15**	**3.58**	**2000**
	GW-11145006-120417-SP-MW-3	12/4/2017	**2.00**	< 0.025	0.346	**2.43**	35.5	**2.36**	--	**1750**
MW-4	GW-11102646-062316-SP-MW-4	6/23/2016	**0.118**	< 0.001	0.186	**1.06**	**838**	**0.983**	--	--
	GW-11102646-091216-CM-MW-4	9/12/2016	**0.0742**	< 0.001	0.114	**0.803**	**735**	**1.32**	--	--
	GW-11102646-112916-CN-MW-4	11/29/2016	**0.0853**	< 0.001	0.0929	**0.967**	382	**1.26**	--	--
	GW-11102646-030617-CN-MW-4	3/6/2017	**0.0886**	< 0.02	0.0804	**1.23**	**814**	**1.22**	--	**2260**
	GW-11102646-061217-CN-MW-4	6/12/2017	**0.1**	< 0.005	0.0747	**1.44**	**738**	**1.01**	--	**2140**
	GW-11146006-102617-CM-MW-4	10/26/2017	**0.0462**	< 0.001	0.0226	**0.849**	**1120**	**0.73**	0.507	**2370**
	GW-11145006-120417-SP-MW-4	12/4/2017	**0.0632**	<0 .020	0.0386	**1.45**	**993**	**0.893**	--	**2150**
	GW-11145006-120417-SP-DUP	12/4/2017	**0.064**	<0.020	0.0421	**1.7**	**--**	**--**	--	**--**

Notes:

NMWQCC = New Mexico Water Quality Control Commission
mg/L = milligrams per liter (parts per million)
< 0.001 = Below Laboratory Detection Limit of 0.001 mg/L, etc
-- = Not Analyzed

Appendix A
Groundwater Laboratory Analytical Reports

Pace Analytical Services, LLC
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(913)599-5665

March 23, 2017

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

RE: Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

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: 11102646 COP Mangum No1
Pace Project No.: 60239509

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
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Lenexa, KS 66219
(913)599-5665

June 26, 2017

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

RE: Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

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

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CERTIFICATIONS

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

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
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SAMPLE SUMMARY

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60246776001	**GW-11102646-061217-CN-MW-1**	Water	06/12/17 15:10	06/17/17 08:30
60246776002	**GW-11102646-061217-CN-MW-3**	Water	06/12/17 16:15	06/17/17 08:30
60246776003	**GW-11102646-061217-CN-MW-2**	Water	06/12/17 15:30	06/17/17 08:30
60246776004	**GW-11102646-061217-CN-MW-4**	Water	06/12/17 15:55	06/17/17 08:30

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60246776001	**GW-11102646-061217-CN-MW-1**	EPA 6010	SMW	1	PASI-K
		EPA 8260	PGH	8	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	RAD	1	PASI-K
60246776002	**GW-11102646-061217-CN-MW-3**	EPA 6010	SMW	1	PASI-K
		EPA 8260	PGH	8	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	RAD	1	PASI-K
60246776003	**GW-11102646-061217-CN-MW-2**	EPA 6010	SMW	1	PASI-K
		EPA 8260	PGH	8	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	RAD	1	PASI-K
60246776004	**GW-11102646-061217-CN-MW-4**	EPA 6010	SMW	1	PASI-K
		EPA 8260	PGH	8	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	RAD	1	PASI-K

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PROJECT NARRATIVE

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Method: **EPA 6010**
Description: 6010 MET ICP, Dissolved
Client: GHD Services_COP NM
Date: June 26, 2017

General Information:
4 samples were analyzed for EPA 6010. 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.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 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.

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.

Additional Comments:

Pace Analytical Services, LLC
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PROJECT NARRATIVE

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Method: **EPA 8260**
Description: 8260 MSV GRO and Oxygenates
Client: GHD Services_COP NM
Date: June 26, 2017

General Information:
4 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: 482024

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

Additional Comments:

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PROJECT NARRATIVE

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: GHD Services_COP NM
Date: June 26, 2017

General Information:
4 samples were analyzed for SM 2540C. 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.

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.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

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PROJECT NARRATIVE

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: GHD Services_COP NM
Date: June 26, 2017

General Information:
4 samples were analyzed for EPA 300.0. 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.

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.

Additional Comments:

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

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Sample: GW-11102646-061217-CN-MW-1 **Lab ID: 60246776001** Collected: 06/12/17 15:10 Received: 06/17/17 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**800**	ug/L	5.0	1	06/23/17 16:10	06/26/17 11:46	7439-96-5	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 8260							
Benzene	**2.0**	ug/L	1.0	1		06/21/17 23:16	71-43-2	
Ethylbenzene	**26.5**	ug/L	1.0	1		06/21/17 23:16	100-41-4	
Toluene	ND	ug/L	1.0	1		06/21/17 23:16	108-88-3	
Xylene (Total)	**120**	ug/L	3.0	1		06/21/17 23:16	1330-20-7	
Surrogates								
Toluene-d8 (S)	104	%	80-120	1		06/21/17 23:16	2037-26-5	
4-Bromofluorobenzene (S)	108	%	80-120	1		06/21/17 23:16	460-00-4	
1,2-Dichloroethane-d4 (S)	97	%	80-120	1		06/21/17 23:16	17060-07-0	
Preservation pH	**1.0**		0.10	1		06/21/17 23:16		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1830**	mg/L	5.0	1		06/20/17 09:34		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**312**	mg/L	50.0	50		06/21/17 02:03	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Sample: GW-11102646-061217-CN-MW-3 **Lab ID: 60246776002** Collected: 06/12/17 16:15 Received: 06/17/17 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**3090**	ug/L	5.0	1	06/23/17 16:10	06/26/17 11:49	7439-96-5	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 8260							
Benzene	**1680**	ug/L	20.0	20		06/21/17 23:45	71-43-2	
Ethylbenzene	**329**	ug/L	20.0	20		06/21/17 23:45	100-41-4	
Toluene	ND	ug/L	20.0	20		06/21/17 23:45	108-88-3	
Xylene (Total)	**1930**	ug/L	60.0	20		06/21/17 23:45	1330-20-7	
Surrogates								
Toluene-d8 (S)	100	%	80-120	20		06/21/17 23:45	2037-26-5	
4-Bromofluorobenzene (S)	100	%	80-120	20		06/21/17 23:45	460-00-4	
1,2-Dichloroethane-d4 (S)	99	%	80-120	20		06/21/17 23:45	17060-07-0	
Preservation pH	**1.0**		0.10	20		06/21/17 23:45		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2280**	mg/L	5.0	1		06/20/17 09:35		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**372**	mg/L	50.0	50		06/22/17 14:20	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Sample: GW-11102646-061217-CN-MW-2 **Lab ID: 60246776003** Collected: 06/12/17 15:30 Received: 06/17/17 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1390**	ug/L	5.0	1	06/23/17 16:10	06/26/17 11:51	7439-96-5	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 8260							
Benzene	**9.0**	ug/L	1.0	1		06/21/17 23:30	71-43-2	
Ethylbenzene	**1.1**	ug/L	1.0	1		06/21/17 23:30	100-41-4	
Toluene	ND	ug/L	1.0	1		06/21/17 23:30	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		06/21/17 23:30	1330-20-7	
Surrogates								
Toluene-d8 (S)	102	%	80-120	1		06/21/17 23:30	2037-26-5	
4-Bromofluorobenzene (S)	103	%	80-120	1		06/21/17 23:30	460-00-4	
1,2-Dichloroethane-d4 (S)	102	%	80-120	1		06/21/17 23:30	17060-07-0	
Preservation pH	**1.0**		0.10	1		06/21/17 23:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1550**	mg/L	5.0	1		06/20/17 09:36		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**3.1**	mg/L	1.0	1		06/21/17 03:05	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Sample: GW-11102646-061217-CN-MW-4 **Lab ID: 60246776004** Collected: 06/12/17 15:55 Received: 06/17/17 08:30 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1010**	ug/L	5.0	1	06/23/17 16:10	06/26/17 11:53	7439-96-5	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 8260							
Benzene	**100**	ug/L	5.0	5		06/21/17 23:59	71-43-2	
Ethylbenzene	**74.7**	ug/L	5.0	5		06/21/17 23:59	100-41-4	
Toluene	ND	ug/L	5.0	5		06/21/17 23:59	108-88-3	
Xylene (Total)	**1440**	ug/L	15.0	5		06/21/17 23:59	1330-20-7	
Surrogates								
Toluene-d8 (S)	110	%	80-120	5		06/21/17 23:59	2037-26-5	
4-Bromofluorobenzene (S)	101	%	80-120	5		06/21/17 23:59	460-00-4	
1,2-Dichloroethane-d4 (S)	99	%	80-120	5		06/21/17 23:59	17060-07-0	
Preservation pH	**1.0**		0.10	5		06/21/17 23:59		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2140**	mg/L	5.0	1		06/20/17 09:36		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**738**	mg/L	100	100		06/21/17 03:20	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

QC Batch: 482383 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60246776001, 60246776002, 60246776003, 60246776004

METHOD BLANK: 1975951 Matrix: Water
Associated Lab Samples: 60246776001, 60246776002, 60246776003, 60246776004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	06/26/17 11:09	

LABORATORY CONTROL SAMPLE: 1975952

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	1000	984	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1975953 1975954

Parameter	Units	60246772001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese, Dissolved	ug/L	839	1000	1000	1770	1780	93	94	75-125	1	20	

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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QUALITY CONTROL DATA

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

QC Batch: 482024 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV MO GRO Oxygenates
Associated Lab Samples: 60246776001, 60246776002, 60246776003, 60246776004

METHOD BLANK: 1974368 Matrix: Water
Associated Lab Samples: 60246776001, 60246776002, 60246776003, 60246776004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	06/21/17 19:16	
Ethylbenzene	ug/L	ND	1.0	06/21/17 19:16	
Toluene	ug/L	ND	1.0	06/21/17 19:16	
Xylene (Total)	ug/L	ND	3.0	06/21/17 19:16	
1,2-Dichloroethane-d4 (S)	%	99	80-120	06/21/17 19:16	
4-Bromofluorobenzene (S)	%	98	80-120	06/21/17 19:16	
Toluene-d8 (S)	%	102	80-120	06/21/17 19:16	

LABORATORY CONTROL SAMPLE: 1974369

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	21.1	106	82-115	
Ethylbenzene	ug/L	20	21.4	107	83-112	
Toluene	ug/L	20	21.9	110	78-113	
Xylene (Total)	ug/L	60	64.8	108	83-114	
1,2-Dichloroethane-d4 (S)	%			100	80-120	
4-Bromofluorobenzene (S)	%			99	80-120	
Toluene-d8 (S)	%			105	80-120	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

QC Batch: 481702 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60246776001, 60246776002, 60246776003, 60246776004

METHOD BLANK: 1973339 Matrix: Water
Associated Lab Samples: 60246776001, 60246776002, 60246776003, 60246776004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	06/20/17 09:33	

LABORATORY CONTROL SAMPLE: 1973340

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	949	95	80-120	

SAMPLE DUPLICATE: 1973341

Parameter	Units	60246776001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1830	1790	2	10	

SAMPLE DUPLICATE: 1973342

Parameter	Units	60246745004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	507	504	1	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

QC Batch: 481783 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60246776001, 60246776003, 60246776004

METHOD BLANK: 1973644 Matrix: Water
Associated Lab Samples: 60246776001, 60246776003, 60246776004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	06/20/17 20:39	

LABORATORY CONTROL SAMPLE: 1973645

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.6	93	90-110	

MATRIX SPIKE SAMPLE: 1973648

Parameter	Units	60246806004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	65.2	50	116	102	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

QC Batch: 482164 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60246776002

METHOD BLANK: 1974902 Matrix: Water
Associated Lab Samples: 60246776002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	06/22/17 08:34	

LABORATORY CONTROL SAMPLE: 1974903

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.1	103	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1974904 1974905

Parameter	Units	60247044001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	ND	1000	1000	1080	1050	100	98	80-120	2	15	

MATRIX SPIKE SAMPLE: 1974906

Parameter	Units	60246963002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	98.2	50	148	101	80-120	

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: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

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: 482024

[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: 11102646 COP MANGUM NO1
Pace Project No.: 60246776

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60246776001	**GW-11102646-061217-CN-MW-1**	EPA 3010	482383	EPA 6010	482480
60246776002	**GW-11102646-061217-CN-MW-3**	EPA 3010	482383	EPA 6010	482480
60246776003	**GW-11102646-061217-CN-MW-2**	EPA 3010	482383	EPA 6010	482480
60246776004	**GW-11102646-061217-CN-MW-4**	EPA 3010	482383	EPA 6010	482480
60246776001	**GW-11102646-061217-CN-MW-1**	EPA 8260	482024		
60246776002	**GW-11102646-061217-CN-MW-3**	EPA 8260	482024		
60246776003	**GW-11102646-061217-CN-MW-2**	EPA 8260	482024		
60246776004	**GW-11102646-061217-CN-MW-4**	EPA 8260	482024		
60246776001	**GW-11102646-061217-CN-MW-1**	SM 2540C	481702		
60246776002	**GW-11102646-061217-CN-MW-3**	SM 2540C	481702		
60246776003	**GW-11102646-061217-CN-MW-2**	SM 2540C	481702		
60246776004	**GW-11102646-061217-CN-MW-4**	SM 2540C	481702		
60246776001	**GW-11102646-061217-CN-MW-1**	EPA 300.0	481783		
60246776002	**GW-11102646-061217-CN-MW-3**	EPA 300.0	482164		
60246776003	**GW-11102646-061217-CN-MW-2**	EPA 300.0	481783		
60246776004	**GW-11102646-061217-CN-MW-4**	EPA 300.0	481783		

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60246776

60246776

Client Name: GHD P66

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 6/19/17

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

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

Start: 1012	Start:
End: 1020	End:
Temp:	Temp:

Pace Analytical

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:

Company: GHD Services_COP NM
Address: 6212 Indian School Rd. NE St2
Albuquerque, NM 87110
Email: christine.mathews@ghd.com
Phone: 505-884-0672 Fax:
Requested Due Date:

Section B
Required Project Information:

Report To: Christine Mathews
Copy To:
Purchase Order #:
Project Name: 11102646 COP Mangum No1
Project #:

Section C
Invoice Information:

Attention:
Company Name:
Address:
Pace Quote:
Pace Project Manager: alice.spiller@pacelabs.com,
Pace Profile #: 8644, line 31

Regulatory Agency:
State / Location: NM

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

SAMPLE ID — One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique

Requested Analysis Filtered (Y/N)

60246776

ITEM #	SAMPLE ID	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	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	8260 BTEX	Sulfate by 300.0	Dissolved Mn-field filtered	Total Dissolved Solids		Residual Chlorine (Y/N)	
1	GW-11102646-061217-CN-MW-1			6-12-17	1510				6										X	X	X	X	(2) BP Su BP3F (3) DG 9H		01
2	GW-11102646-061217-CN-MW-3			↓	1615				↓										↓	↓	↓	↓	↓	↓	02
3	GW-11102646-061217-CN-MW-2			↓	1530				↓										↓	↓	↓	↓	↓	↓	03
4	GW-11102646-061217-CN-MW-4			↓	1555				↓										↓	↓	↓	↓	↓	↓	04
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
				[signature]	6/17/17	0830	3.8	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Charles Nelrigh
SIGNATURE of SAMPLER: [signature] DATE Signed: 6-16-17

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SAMPLE SUMMARY

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60239509001	**GW-11102646-030617-CN-MW-1**	Water	03/06/17 14:31	03/10/17 09:10
60239509002	**GW-11102646-030617-CN-MW-2**	Water	03/06/17 14:42	03/10/17 09:10
60239509003	**GW-11102646-030617-CN-MW-3**	Water	03/06/17 08:20	03/10/17 09:10
60239509004	**GW-11102646-030617-CN-MW-4**	Water	03/06/17 14:22	03/10/17 09:10

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SAMPLE ANALYTE COUNT

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60239509001	**GW-11102646-030617-CN-MW-1**	EPA 6010	ZBM	1	PASI-K
		EPA 8260	EAG	8	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60239509002	**GW-11102646-030617-CN-MW-2**	EPA 6010	ZBM	1	PASI-K
		EPA 8260	JTK	8	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60239509003	**GW-11102646-030617-CN-MW-3**	EPA 6010	ZBM	1	PASI-K
		EPA 8260	EAG	8	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60239509004	**GW-11102646-030617-CN-MW-4**	EPA 6010	ZBM	1	PASI-K
		EPA 8260	EAG	8	PASI-K
		SM 2540C	LDF	1	PASI-K
		EPA 300.0	OL	1	PASI-K

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PROJECT NARRATIVE

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Method: **EPA 6010**
Description: 6010 MET ICP, Dissolved
Client: GHD Services_COP NM
Date: March 23, 2017

General Information:
4 samples were analyzed for EPA 6010. 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.

Sample Preparation:
The samples were prepared in accordance with EPA 3010 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.

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.

Additional Comments:

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PROJECT NARRATIVE

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Method: **EPA 8260**
Description: 8260 MSV GRO and Oxygenates
Client: GHD Services_COP NM
Date: March 23, 2017

General Information:
4 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: 468675

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

QC Batch: 469248

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

Additional Comments:

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PROJECT NARRATIVE

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Method: **SM 2540C**
Description: 2540C Total Dissolved Solids
Client: GHD Services_COP NM
Date: March 23, 2017

General Information:
4 samples were analyzed for SM 2540C. 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.

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.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

QC Batch: 468517

D6: The precision between the sample and sample duplicate exceeded laboratory control limits.
- DUP (Lab ID: 1918048)
  - Total Dissolved Solids

Additional Comments:

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PROJECT NARRATIVE

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Method: **EPA 300.0**
Description: 300.0 IC Anions 28 Days
Client: GHD Services_COP NM
Date: March 23, 2017

General Information:
4 samples were analyzed for EPA 300.0. 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.

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.

Additional Comments:

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

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ANALYTICAL RESULTS

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Sample: GW-11102646-030617-CN-MW-1 **Lab ID: 60239509001** Collected: 03/06/17 14:31 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**876**	ug/L	25.0	5	03/14/17 13:00	03/16/17 14:26	7439-96-5	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 8260							
Benzene	**4.1**	ug/L	1.0	1		03/14/17 16:03	71-43-2	
Ethylbenzene	**48.1**	ug/L	1.0	1		03/14/17 16:03	100-41-4	
Toluene	ND	ug/L	1.0	1		03/14/17 16:03	108-88-3	
Xylene (Total)	**167**	ug/L	3.0	1		03/14/17 16:03	1330-20-7	
Surrogates								
Toluene-d8 (S)	105	%	80-120	1		03/14/17 16:03	2037-26-5	
4-Bromofluorobenzene (S)	106	%	80-120	1		03/14/17 16:03	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	80-120	1		03/14/17 16:03	17060-07-0	
Preservation pH	**1.0**		0.10	1		03/14/17 16:03		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1920**	mg/L	5.0	1		03/13/17 15:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**387**	mg/L	50.0	50		03/22/17 16:41	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Sample: GW-11102646-030617-CN-MW-2 **Lab ID: 60239509002** Collected: 03/06/17 14:42 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1450**	ug/L	25.0	5	03/14/17 13:00	03/16/17 14:28	7439-96-5	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 8260							
Benzene	**34.7**	ug/L	1.0	1		03/17/17 15:06	71-43-2	
Ethylbenzene	**2.2**	ug/L	1.0	1		03/17/17 15:06	100-41-4	
Toluene	ND	ug/L	1.0	1		03/17/17 15:06	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		03/17/17 15:06	1330-20-7	
Surrogates								
Toluene-d8 (S)	99	%	80-120	1		03/17/17 15:06	2037-26-5	
4-Bromofluorobenzene (S)	103	%	80-120	1		03/17/17 15:06	460-00-4	
1,2-Dichloroethane-d4 (S)	101	%	80-120	1		03/17/17 15:06	17060-07-0	
Preservation pH	**1.0**		0.10	1		03/17/17 15:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1510**	mg/L	5.0	1		03/13/17 15:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**7.9**	mg/L	1.0	1		03/22/17 16:55	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Sample: GW-11102646-030617-CN-MW-3 **Lab ID: 60239509003** Collected: 03/06/17 08:20 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**2520**	ug/L	25.0	5	03/14/17 13:00	03/16/17 14:30	7439-96-5	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 8260							
Benzene	**1890**	ug/L	20.0	20		03/14/17 16:17	71-43-2	
Ethylbenzene	**259**	ug/L	20.0	20		03/14/17 16:17	100-41-4	
Toluene	ND	ug/L	20.0	20		03/14/17 16:17	108-88-3	
Xylene (Total)	**3060**	ug/L	60.0	20		03/14/17 16:17	1330-20-7	
Surrogates								
Toluene-d8 (S)	100	%	80-120	20		03/14/17 16:17	2037-26-5	
4-Bromofluorobenzene (S)	102	%	80-120	20		03/14/17 16:17	460-00-4	
1,2-Dichloroethane-d4 (S)	95	%	80-120	20		03/14/17 16:17	17060-07-0	
Preservation pH	**1.0**		0.10	20		03/14/17 16:17		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1880**	mg/L	5.0	1		03/13/17 15:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**14.7**	mg/L	1.0	1		03/22/17 17:10	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Sample: GW-11102646-030617-CN-MW-4 **Lab ID: 60239509004** Collected: 03/06/17 14:22 Received: 03/10/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1220**	ug/L	25.0	5	03/14/17 13:00	03/16/17 14:32	7439-96-5	
8260 MSV GRO and Oxygenates	Analytical Method: EPA 8260							
Benzene	**88.6**	ug/L	20.0	20		03/14/17 16:31	71-43-2	
Ethylbenzene	**80.4**	ug/L	20.0	20		03/14/17 16:31	100-41-4	
Toluene	ND	ug/L	20.0	20		03/14/17 16:31	108-88-3	
Xylene (Total)	**1230**	ug/L	60.0	20		03/14/17 16:31	1330-20-7	
Surrogates								
Toluene-d8 (S)	99	%	80-120	20		03/14/17 16:31	2037-26-5	
4-Bromofluorobenzene (S)	101	%	80-120	20		03/14/17 16:31	460-00-4	
1,2-Dichloroethane-d4 (S)	98	%	80-120	20		03/14/17 16:31	17060-07-0	
Preservation pH	**1.0**		0.10	20		03/14/17 16:31		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2260**	mg/L	5.0	1		03/13/17 15:17		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**814**	mg/L	100	100		03/22/17 17:53	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

QC Batch: 468661 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60239509001, 60239509002, 60239509003, 60239509004

METHOD BLANK: 1918472 Matrix: Water
Associated Lab Samples: 60239509001, 60239509002, 60239509003, 60239509004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	03/15/17 14:22	

LABORATORY CONTROL SAMPLE: 1918473

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	1000	993	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1918474 1918475

Parameter	Units	60239528001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese, Dissolved	ug/L	962	1000	1000	2010	2090	104	113	75-125	4	20	

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

QUALITY CONTROL DATA

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

QC Batch: 468675 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV MO GRO Oxygenates
Associated Lab Samples: 60239509001, 60239509003, 60239509004

METHOD BLANK: 1918541 Matrix: Water
Associated Lab Samples: 60239509001, 60239509003, 60239509004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	03/14/17 12:20	
Ethylbenzene	ug/L	ND	1.0	03/14/17 12:20	
Toluene	ug/L	ND	1.0	03/14/17 12:20	
Xylene (Total)	ug/L	ND	3.0	03/14/17 12:20	
1,2-Dichloroethane-d4 (S)	%	97	80-120	03/14/17 12:20	
4-Bromofluorobenzene (S)	%	104	80-120	03/14/17 12:20	
Toluene-d8 (S)	%	99	80-120	03/14/17 12:20	

LABORATORY CONTROL SAMPLE: 1918542

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	19.4	97	82-115	
Ethylbenzene	ug/L	20	19.2	96	83-112	
Toluene	ug/L	20	18.7	93	78-113	
Xylene (Total)	ug/L	60	57.7	96	83-114	
1,2-Dichloroethane-d4 (S)	%			96	80-120	
4-Bromofluorobenzene (S)	%			99	80-120	
Toluene-d8 (S)	%			98	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

QC Batch: 469248
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV MO GRO Oxygenates
Associated Lab Samples: 60239509002

METHOD BLANK: 1920739
Matrix: Water
Associated Lab Samples: 60239509002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	03/17/17 12:51	
Ethylbenzene	ug/L	ND	1.0	03/17/17 12:51	
Toluene	ug/L	ND	1.0	03/17/17 12:51	
Xylene (Total)	ug/L	ND	3.0	03/17/17 12:51	
1,2-Dichloroethane-d4 (S)	%	99	80-120	03/17/17 12:51	
4-Bromofluorobenzene (S)	%	101	80-120	03/17/17 12:51	
Toluene-d8 (S)	%	98	80-120	03/17/17 12:51	

LABORATORY CONTROL SAMPLE: 1920740

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	19.8	99	82-115	
Ethylbenzene	ug/L	20	20.4	102	83-112	
Toluene	ug/L	20	20.2	101	78-113	
Xylene (Total)	ug/L	60	61.0	102	83-114	
1,2-Dichloroethane-d4 (S)	%			98	80-120	
4-Bromofluorobenzene (S)	%			100	80-120	
Toluene-d8 (S)	%			100	80-120	

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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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

QC Batch: 468517 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60239509001, 60239509002, 60239509003, 60239509004

METHOD BLANK: 1918045 Matrix: Water
Associated Lab Samples: 60239509001, 60239509002, 60239509003, 60239509004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	03/13/17 15:14	

LABORATORY CONTROL SAMPLE: 1918046

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	999	100	80-120	

SAMPLE DUPLICATE: 1918047

Parameter	Units	60239509001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1920	1890	1	10	

SAMPLE DUPLICATE: 1918048

Parameter	Units	60239446005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	251	282	12	10	D6

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: 11102646 COP Mangum No1
Pace Project No.: 60239509

QC Batch: 469680 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60239509001, 60239509002, 60239509003, 60239509004

METHOD BLANK: 1922585 Matrix: Water
Associated Lab Samples: 60239509001, 60239509002, 60239509003, 60239509004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	03/22/17 13:31	

LABORATORY CONTROL SAMPLE: 1922586

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.1	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1922587 1922588

Parameter	Units	60239495001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	1250	500	500	1780	1790	106	108	80-120	1	15	

MATRIX SPIKE SAMPLE: 1922589

Parameter	Units	60239495002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	1350	500	1920	113	80-120	

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: 11102646 COP Mangum No1
Pace Project No.: 60239509

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: 468675

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

Batch: 469248

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

ANALYTE QUALIFIERS

D6	The precision between the sample and sample duplicate exceeded laboratory control limits.

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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 11102646 COP Mangum No1
Pace Project No.: 60239509

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60239509001	**GW-11102646-030617-CN-MW-1**	EPA 3010	468661	EPA 6010	468741
60239509002	**GW-11102646-030617-CN-MW-2**	EPA 3010	468661	EPA 6010	468741
60239509003	**GW-11102646-030617-CN-MW-3**	EPA 3010	468661	EPA 6010	468741
60239509004	**GW-11102646-030617-CN-MW-4**	EPA 3010	468661	EPA 6010	468741
60239509001	**GW-11102646-030617-CN-MW-1**	EPA 8260	468675		
60239509002	**GW-11102646-030617-CN-MW-2**	EPA 8260	469248		
60239509003	**GW-11102646-030617-CN-MW-3**	EPA 8260	468675		
60239509004	**GW-11102646-030617-CN-MW-4**	EPA 8260	468675		
60239509001	**GW-11102646-030617-CN-MW-1**	SM 2540C	468517		
60239509002	**GW-11102646-030617-CN-MW-2**	SM 2540C	468517		
60239509003	**GW-11102646-030617-CN-MW-3**	SM 2540C	468517		
60239509004	**GW-11102646-030617-CN-MW-4**	SM 2540C	468517		
60239509001	**GW-11102646-030617-CN-MW-1**	EPA 300.0	469680		
60239509002	**GW-11102646-030617-CN-MW-2**	EPA 300.0	469680		
60239509003	**GW-11102646-030617-CN-MW-3**	EPA 300.0	469680		
60239509004	**GW-11102646-030617-CN-MW-4**	EPA 300.0	469680		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60239509

60239509

Client Name: P66 GHD NM

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

Tracking #: 7044 6660 1653 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** 1.4 **Corr. Factor** (CF +1.5 CF +0.9) **Corrected** 2.9

Date and initials of person examining contents: JM 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: 03/13/17

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

Start: 1342	Start:
End: 1352	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:

Company:	GHD Services_COP NM
Address:	6212 Indian School Rd. NE St2
	Albuquerque, NM 87110
Email:	christine.mathews@ghd.com
Phone:	505-884-0672 Fax:
Requested Due Date:	

Section B
Required Project Information:

Report To:	Christine Mathews
Copy To:	
Purchase Order #:	
Project Name:	11102646 COP Mangum No1
Project #:	

Section C
Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote:	
Pace Project Manager:	alice.spiller@pacelabs.com,
Pace Profile #:	8644, line 31

Regulatory Agency

State / Location
NM

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

SAMPLE ID — One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	START TIME	END DATE	END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	8260 BTEX	Sulfate by 300.0	Dissolved Mn-field filtered	Total Dissolved Solids	Residual Chlorine (Y/N)	60239509
1	GW-11102646-030617-CN-MW-1	WT	G	3-6-17	1431				5										✓	✓	✓	✓		BR3F 1.5 BR3U 2(DG9H) 001
2	GW-11102646-030617-CN-MW-2	WT	G	3-6-17	1442				5										✓	✓	✓	✓		3(DG9H) 002
3	GW-11102646-03017-CN-MW-3	WT	G	[illegible]	[illegible]				5										✓	✓	✓	✓		2(DG9H) 003
4	GW-11102646-030617CN-MW-4	WT	G	3-6-17	1422				5										✓	✓	✓	✓		004
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	[signature]	3-9-17	1560	[signature] /PASI	3/10/17	0910	2.9	Y	Y	Y

SAMPLE CONDITIONS

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Charles Neligh

SIGNATURE of SAMPLER: [signature] DATE Signed: 3-9-17

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

November 09, 2017

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

RE: Project: 11146006 Mangam Noil
Pace Project No.: 60256793

Dear Jeff Walker:
Enclosed are the analytical results for sample(s) received by the laboratory on October 28, 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 for
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.
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(913)599-5665

CERTIFICATIONS

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

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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SAMPLE SUMMARY

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60256793001	**GW-11146006-102617-CM-MW-1**	Water	10/26/17 15:10	10/28/17 08:55
60256793002	**GW-11146006-102617-CM-MW-2**	Water	10/26/17 15:30	10/28/17 08:55
60256793003	**GW-11146006-102617-CM-MW-3**	Water	10/26/17 15:55	10/28/17 08:55
60256793004	**GW-11146006-102617-CM-MW-4**	Water	10/26/17 16:10	10/28/17 08:55
60256793005	**GW-11146006-102617-CM-DUP**	Water	10/26/17 08:00	10/28/17 08:55

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SAMPLE ANALYTE COUNT

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60256793001	**GW-11146006-102617-CM-MW-1**	EPA 6010	TDS	2	PASI-K
		EPA 8260	JDH	8	PASI-K
		SM 2540C	HMM	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60256793002	**GW-11146006-102617-CM-MW-2**	EPA 6010	TDS	2	PASI-K
		EPA 8260	JDH	8	PASI-K
		SM 2540C	HMM	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60256793003	**GW-11146006-102617-CM-MW-3**	EPA 6010	TDS	2	PASI-K
		EPA 8260	EAG, JDH	8	PASI-K
		SM 2540C	HMM	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60256793004	**GW-11146006-102617-CM-MW-4**	EPA 6010	TDS	2	PASI-K
		EPA 8260	EAG, JDH	8	PASI-K
		SM 2540C	HMM	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60256793005	**GW-11146006-102617-CM-DUP**	EPA 8260	JDH	8	PASI-K

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ANALYTICAL RESULTS

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

Sample: GW-11146006-102617-CM-MW-1 **Lab ID: 60256793001** Collected: 10/26/17 15:10 Received: 10/28/17 08:55 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	**256**	ug/L	100	2	11/06/17 16:22	11/07/17 13:46	7439-89-6	
Manganese, Dissolved	**710**	ug/L	5.0	1	11/06/17 16:22	11/07/17 13:34	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	1.0	1		11/03/17 04:52	71-43-2	
Ethylbenzene	**8.1**	ug/L	1.0	1		11/03/17 04:52	100-41-4	
Toluene	ND	ug/L	1.0	1		11/03/17 04:52	108-88-3	
Xylene (Total)	**30.7**	ug/L	3.0	1		11/03/17 04:52	1330-20-7	
Surrogates								
Toluene-d8 (S)	100	%	80-108	1		11/03/17 04:52	2037-26-5	
4-Bromofluorobenzene (S)	108	%	80-113	1		11/03/17 04:52	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%	80-114	1		11/03/17 04:52	17060-07-0	
Preservation pH	**1.0**		1.0	1		11/03/17 04:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1940**	mg/L	5.0	1		11/01/17 15:35		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**424**	mg/L	50.0	50		11/07/17 13:29	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

Sample: GW-11146006-102617-CM-MW-2 **Lab ID: 60256793002** Collected: 10/26/17 15:30 Received: 10/28/17 08:55 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	**5100**	ug/L	50.0	1	11/06/17 16:22	11/07/17 15:03	7439-89-6	
Manganese, Dissolved	**1260**	ug/L	5.0	1	11/06/17 16:22	11/07/17 13:36	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**1.3**	ug/L	1.0	1		11/03/17 05:52	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		11/03/17 05:52	100-41-4	
Toluene	ND	ug/L	1.0	1		11/03/17 05:52	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		11/03/17 05:52	1330-20-7	
Surrogates								
Toluene-d8 (S)	100	%	80-108	1		11/03/17 05:52	2037-26-5	
4-Bromofluorobenzene (S)	108	%	80-113	1		11/03/17 05:52	460-00-4	
1,2-Dichloroethane-d4 (S)	101	%	80-114	1		11/03/17 05:52	17060-07-0	
Preservation pH	**1.0**		1.0	1		11/03/17 05:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1560**	mg/L	5.0	1		11/01/17 15:35		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**4.5**	mg/L	1.0	1		11/07/17 13:44	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

Sample: GW-11146006-102617-CM-MW-3 **Lab ID: 60256793003** Collected: 10/26/17 15:55 Received: 10/28/17 08:55 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	**3580**	ug/L	50.0	1	11/06/17 16:22	11/07/17 15:06	7439-89-6	
Manganese, Dissolved	**2150**	ug/L	5.0	1	11/06/17 16:22	11/07/17 13:39	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**1880**	ug/L	20.0	20		11/03/17 14:35	71-43-2	
Ethylbenzene	**417**	ug/L	20.0	20		11/03/17 14:35	100-41-4	
Toluene	ND	ug/L	1.0	1		11/03/17 06:06	108-88-3	
Xylene (Total)	**2910**	ug/L	60.0	20		11/03/17 14:35	1330-20-7	
Surrogates								
Toluene-d8 (S)	105	%	80-108	1		11/03/17 06:06	2037-26-5	
4-Bromofluorobenzene (S)	103	%	80-113	1		11/03/17 06:06	460-00-4	
1,2-Dichloroethane-d4 (S)	104	%	80-114	1		11/03/17 06:06	17060-07-0	
Preservation pH	**1.0**		1.0	1		11/03/17 06:06		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2000**	mg/L	5.0	1		11/01/17 15:36		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**65.6**	mg/L	5.0	5		11/07/17 13:14	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

Sample: GW-11146006-102617-CM-MW-4 **Lab ID: 60256793004** Collected: 10/26/17 16:10 Received: 10/28/17 08:55 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Iron, Dissolved	**507**	ug/L	50.0	1	11/06/17 16:22	11/07/17 15:08	7439-89-6	
Manganese, Dissolved	**730**	ug/L	5.0	1	11/06/17 16:22	11/07/17 13:41	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**46.2**	ug/L	1.0	1		11/03/17 06:21	71-43-2	
Ethylbenzene	**22.6**	ug/L	1.0	1		11/03/17 06:21	100-41-4	
Toluene	ND	ug/L	1.0	1		11/03/17 06:21	108-88-3	
Xylene (Total)	**849**	ug/L	30.0	10		11/03/17 14:49	1330-20-7	
Surrogates								
Toluene-d8 (S)	103	%	80-108	1		11/03/17 06:21	2037-26-5	
4-Bromofluorobenzene (S)	107	%	80-113	1		11/03/17 06:21	460-00-4	
1,2-Dichloroethane-d4 (S)	104	%	80-114	1		11/03/17 06:21	17060-07-0	
Preservation pH	**1.0**		1.0	1		11/03/17 06:21		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2370**	mg/L	5.0	1		11/01/17 15:37		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**1120**	mg/L	100	100		11/08/17 09:08	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

Sample: GW-11146006-102617-CM-DUP **Lab ID: 60256793005** Collected: 10/26/17 08:00 Received: 10/28/17 08:55 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**1.5**	ug/L	1.0	1		11/03/17 06:36	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		11/03/17 06:36	100-41-4	
Toluene	ND	ug/L	1.0	1		11/03/17 06:36	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		11/03/17 06:36	1330-20-7	
Surrogates								
Toluene-d8 (S)	100	%	80-108	1		11/03/17 06:36	2037-26-5	
4-Bromofluorobenzene (S)	107	%	80-113	1		11/03/17 06:36	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%	80-114	1		11/03/17 06:36	17060-07-0	
Preservation pH	**1.0**		1.0	1		11/03/17 06:36		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

QC Batch: 501914 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60256793001, 60256793002, 60256793003, 60256793004

METHOD BLANK: 2054732 Matrix: Water
Associated Lab Samples: 60256793001, 60256793002, 60256793003, 60256793004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Iron, Dissolved	ug/L	ND	50.0	11/07/17 12:52	
Manganese, Dissolved	ug/L	ND	5.0	11/07/17 12:52	

LABORATORY CONTROL SAMPLE: 2054733

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Iron, Dissolved	ug/L	10000	9900	99	80-120	
Manganese, Dissolved	ug/L	1000	1010	101	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2054734 2054735

Parameter	Units	60256788001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron, Dissolved	ug/L	6090	10000	10000	15400	15500	93	94	75-125	0	20	
Manganese, Dissolved	ug/L	4910	1000	1000	6040	6030	113	112	75-125	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

QC Batch: 501523
QC Batch Method: EPA 8260
Analysis Method: EPA 8260
Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60256793001

METHOD BLANK: 2052913 Matrix: Water
Associated Lab Samples: 60256793001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	11/02/17 23:54	
Ethylbenzene	ug/L	ND	1.0	11/02/17 23:54	
Toluene	ug/L	ND	1.0	11/02/17 23:54	
Xylene (Total)	ug/L	ND	3.0	11/02/17 23:54	
1,2-Dichloroethane-d4 (S)	%	105	80-114	11/02/17 23:54	
4-Bromofluorobenzene (S)	%	105	80-113	11/02/17 23:54	
Toluene-d8 (S)	%	99	80-108	11/02/17 23:54	

LABORATORY CONTROL SAMPLE: 2052914

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	20.0	100	82-115	
Ethylbenzene	ug/L	20	19.2	96	83-112	
Toluene	ug/L	20	19.3	97	78-113	
Xylene (Total)	ug/L	60	57.4	96	83-114	
1,2-Dichloroethane-d4 (S)	%			97	80-114	
4-Bromofluorobenzene (S)	%			106	80-113	
Toluene-d8 (S)	%			99	80-108	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

QC Batch: 501524 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60256793002, 60256793003, 60256793004, 60256793005

METHOD BLANK: 2052916 Matrix: Water
Associated Lab Samples: 60256793002, 60256793003, 60256793004, 60256793005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	11/03/17 05:37	
Ethylbenzene	ug/L	ND	1.0	11/03/17 05:37	
Toluene	ug/L	ND	1.0	11/03/17 05:37	
Xylene (Total)	ug/L	ND	3.0	11/03/17 05:37	
1,2-Dichloroethane-d4 (S)	%	107	80-114	11/03/17 05:37	
4-Bromofluorobenzene (S)	%	106	80-113	11/03/17 05:37	
Toluene-d8 (S)	%	97	80-108	11/03/17 05:37	

LABORATORY CONTROL SAMPLE: 2052917

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	20.6	103	82-115	
Ethylbenzene	ug/L	20	19.4	97	83-112	
Toluene	ug/L	20	20.1	100	78-113	
Xylene (Total)	ug/L	60	59.4	99	83-114	
1,2-Dichloroethane-d4 (S)	%			104	80-114	
4-Bromofluorobenzene (S)	%			105	80-113	
Toluene-d8 (S)	%			99	80-108	

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QUALITY CONTROL DATA

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

QC Batch: 501683 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60256793003, 60256793004

METHOD BLANK: 2053553 Matrix: Water
Associated Lab Samples: 60256793003, 60256793004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	11/03/17 13:53	
Ethylbenzene	ug/L	ND	1.0	11/03/17 13:53	
Xylene (Total)	ug/L	ND	3.0	11/03/17 13:53	
1,2-Dichloroethane-d4 (S)	%	106	80-114	11/03/17 13:53	
4-Bromofluorobenzene (S)	%	92	80-113	11/03/17 13:53	
Toluene-d8 (S)	%	104	80-108	11/03/17 13:53	

LABORATORY CONTROL SAMPLE: 2053554

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	18.0	90	82-115	
Ethylbenzene	ug/L	20	20.2	101	83-112	
Xylene (Total)	ug/L	60	61.6	103	83-114	
1,2-Dichloroethane-d4 (S)	%			104	80-114	
4-Bromofluorobenzene (S)	%			90	80-113	
Toluene-d8 (S)	%			103	80-108	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

QC Batch: 501318 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60256793001, 60256793002, 60256793003, 60256793004

METHOD BLANK: 2052228 Matrix: Water
Associated Lab Samples: 60256793001, 60256793002, 60256793003, 60256793004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	11/01/17 15:31	

LABORATORY CONTROL SAMPLE: 2052229

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1000	100	80-120	

SAMPLE DUPLICATE: 2052231

Parameter	Units	60256909001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	567	733	26	10	D6

SAMPLE DUPLICATE: 2052311

Parameter	Units	60256935001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	891	887	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

QC Batch: 501809 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60256793001, 60256793002, 60256793003

METHOD BLANK: 2054396 Matrix: Water
Associated Lab Samples: 60256793001, 60256793002, 60256793003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	11/07/17 00:18	

LABORATORY CONTROL SAMPLE: 2054397

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.5	110	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2054398 2054399

Parameter	Units	60257119002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	70.3	50	50	123	122	105	103	80-120	1	15	

MATRIX SPIKE SAMPLE: 2054400

Parameter	Units	60257119003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	70.8	50	121	101	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

QC Batch: 502279
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60256793004

METHOD BLANK: 2055760 Matrix: Water
Associated Lab Samples: 60256793004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	11/08/17 07:59	

LABORATORY CONTROL SAMPLE: 2055761

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2055762 2055763

Parameter	Units	60256793004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	1120	500	500	1590	1590	95	95	80-120	0	15	

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QUALIFIERS

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

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: 501523

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

Batch: 501524

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

Batch: 501683

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

ANALYTE QUALIFIERS

D6 The precision between the sample and sample duplicate exceeded laboratory control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 11146006 Mangam Noil
Pace Project No.: 60256793

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60256793001	**GW-11146006-102617-CM-MW-1**	EPA 3010	501914	EPA 6010	502045
60256793002	**GW-11146006-102617-CM-MW-2**	EPA 3010	501914	EPA 6010	502045
60256793003	**GW-11146006-102617-CM-MW-3**	EPA 3010	501914	EPA 6010	502045
60256793004	**GW-11146006-102617-CM-MW-4**	EPA 3010	501914	EPA 6010	502045
60256793001	**GW-11146006-102617-CM-MW-1**	EPA 8260	501523		
60256793002	**GW-11146006-102617-CM-MW-2**	EPA 8260	501524		
60256793003	**GW-11146006-102617-CM-MW-3**	EPA 8260	501524		
60256793003	**GW-11146006-102617-CM-MW-3**	EPA 8260	501683		
60256793004	**GW-11146006-102617-CM-MW-4**	EPA 8260	501524		
60256793004	**GW-11146006-102617-CM-MW-4**	EPA 8260	501683		
60256793005	**GW-11146006-102617-CM-DUP**	EPA 8260	501524		
60256793001	**GW-11146006-102617-CM-MW-1**	SM 2540C	501318		
60256793002	**GW-11146006-102617-CM-MW-2**	SM 2540C	501318		
60256793003	**GW-11146006-102617-CM-MW-3**	SM 2540C	501318		
60256793004	**GW-11146006-102617-CM-MW-4**	SM 2540C	501318		
60256793001	**GW-11146006-102617-CM-MW-1**	EPA 300.0	501809		
60256793002	**GW-11146006-102617-CM-MW-2**	EPA 300.0	501809		
60256793003	**GW-11146006-102617-CM-MW-3**	EPA 300.0	501809		
60256793004	**GW-11146006-102617-CM-MW-4**	EPA 300.0	502279		

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Sample Condition Upon Receipt

WO# : 60256793

60256793

Client Name: GHD

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

Tracking #: 7882 4048 1663 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

RLT 10-28-17

Cooler Temperature (°C): As-read 4.1 Corr. Factor CF 0.0 CF +0.3 Corrected 4.1

Date and initials of person examining contents:

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) 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: Date:

REVIEWED
By scarson at 5:51 pm, 10/31/17

CHAIN OF CUSTODY RECORD

COC NO.: 55581

Address: 6121 Indian School Rd #200 ABQ, NM 87110 PAGE 1 OF 1

Phone: 505-884-0672 Fax:

Project No/ Phase/Task Code: 11146006	Laboratory Name: Pace Analytical	Lab Location: Lenexa, KS	SSOW ID:
Project Name: Mangum No.1	Lab Contact: Alice Spiller		Cooler No:
Project Location: Bloomfield, NM			Carrier: FedEx
GHD Chemistry Contact: Angela Bown			Airbill No:
Sampler(s): C. Matteus S. Perez			Total # of Containers: 23

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	Diss Fe & Mn	Sulfate & TDS	Total Containers/sample	MS/MSD Request	Comments/ Special Instructions:
	PRESERVATION - (SEE BACK OF COC FOR ABBREVIATIONS)											60256793
1	GW-11146006-102617-CM-MW-1	10/26/17	1510	WG	G	Y	3	1	1	5		BP3F, BP2U, 3CDG9AH) (01
2	GW-11146006-102617-CM-MW-2	10/26/17	1530	WG	G	Y	3	1	1	5		(02
3	GW-11146006-102617-CM-MW-3	10/26/17	1555	WG	G	Y	3	1	1	5		(03
4	GW-11146006-102617-CM-MW-4	10/26/17	1610	WG	G	Y	3	1	1	5		(04
5	GW-11146006-102617-CM-DUP	10/26/17	—	WG	G	N	3			3		3CDG9AH) (05
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: metals containers were filtered

Relinquished By	Company	Date	Time	Received By	Company	Date	Time
1. [signature]	GHD	10/27/17	1400	1. [signature]	Pace	10-28-17	0855
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)

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Lenexa, KS 66219
(913)599-5665

December 19, 2017

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

RE: Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

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@pacelabs.com
1(913)563-1406
Project Manager

Enclosures

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

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CERTIFICATIONS

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

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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SAMPLE SUMMARY

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60259839001	**GW-11145006-120417-SP-MW-1**	Water	12/04/17 16:00	12/08/17 09:10
60259839002	**GW-11145006-120417-SP-MW-2**	Water	12/04/17 16:28	12/08/17 09:10
60259839003	**GW-11145006-120417-SP-MW-3**	Water	12/04/17 16:50	12/08/17 09:10
60259839004	**GW-11145006-120417-SP-MW-4**	Water	12/04/17 17:00	12/08/17 09:10
60259839005	**GW-11145006-120417-SP-DUP**	Water	12/04/17 16:00	12/08/17 09:10
60259839006	**TRIP BLANK**	Water	12/04/17 16:00	12/08/17 09:10

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SAMPLE ANALYTE COUNT

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60259839001	**GW-11145006-120417-SP-MW-1**	EPA 6010	TDS	1	PASI-K
		EPA 8260	JTK	8	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60259839002	**GW-11145006-120417-SP-MW-2**	EPA 6010	TDS	1	PASI-K
		EPA 8260	JTK	8	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60259839003	**GW-11145006-120417-SP-MW-3**	EPA 6010	TDS	1	PASI-K
		EPA 8260	JTK	8	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60259839004	**GW-11145006-120417-SP-MW-4**	EPA 6010	TDS	1	PASI-K
		EPA 8260	JTK	8	PASI-K
		SM 2540C	AGO	1	PASI-K
		EPA 300.0	OL	1	PASI-K
60259839005	**GW-11145006-120417-SP-DUP**	EPA 8260	JTK	8	PASI-K
60259839006	**TRIP BLANK**	EPA 8260	JTK	8	PASI-K

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ANALYTICAL RESULTS

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

Sample: GW-11145006-120417-SP-MW-1 **Lab ID: 60259839001** Collected: 12/04/17 16:00 Received: 12/08/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**674**	ug/L	5.0	1	12/13/17 10:38	12/15/17 14:42	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	ND	ug/L	5.0	5		12/12/17 20:37	71-43-2	
Ethylbenzene	**21.0**	ug/L	5.0	5		12/12/17 20:37	100-41-4	
Toluene	ND	ug/L	5.0	5		12/12/17 20:37	108-88-3	
Xylene (Total)	**81.4**	ug/L	15.0	5		12/12/17 20:37	1330-20-7	
Surrogates								
Toluene-d8 (S)	103	%	80-108	5		12/12/17 20:37	2037-26-5	
4-Bromofluorobenzene (S)	106	%	80-113	5		12/12/17 20:37	460-00-4	
1,2-Dichloroethane-d4 (S)	93	%	80-114	5		12/12/17 20:37	17060-07-0	
Preservation pH	**1.0**		1.0	5		12/12/17 20:37		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1710**	mg/L	5.0	1		12/11/17 17:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**321**	mg/L	50.0	50		12/17/17 10:28	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

Sample: GW-11145006-120417-SP-MW-2 **Lab ID: 60259839002** Collected: 12/04/17 16:28 Received: 12/08/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**1230**	ug/L	5.0	1	12/13/17 10:38	12/15/17 14:49	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**3.9**	ug/L	1.0	1		12/13/17 04:05	71-43-2	
Ethylbenzene	**1.1**	ug/L	1.0	1		12/13/17 04:05	100-41-4	
Toluene	ND	ug/L	1.0	1		12/13/17 04:05	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		12/13/17 04:05	1330-20-7	
Surrogates								
Toluene-d8 (S)	100	%	80-108	1		12/13/17 04:05	2037-26-5	
4-Bromofluorobenzene (S)	101	%	80-113	1		12/13/17 04:05	460-00-4	
1,2-Dichloroethane-d4 (S)	95	%	80-114	1		12/13/17 04:05	17060-07-0	
Preservation pH	**1.0**		1.0	1		12/13/17 04:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1470**	mg/L	5.0	1		12/11/17 17:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**14.3**	mg/L	1.0	1		12/17/17 12:21	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

Sample: GW-11145006-120417-SP-MW-3 **Lab ID: 60259839003** Collected: 12/04/17 16:50 Received: 12/08/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**2360**	ug/L	5.0	1	12/13/17 10:38	12/15/17 14:51	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**2000**	ug/L	25.0	25		12/13/17 20:41	71-43-2	
Ethylbenzene	**346**	ug/L	25.0	25		12/13/17 20:41	100-41-4	
Toluene	ND	ug/L	25.0	25		12/13/17 20:41	108-88-3	
Xylene (Total)	**2430**	ug/L	75.0	25		12/13/17 20:41	1330-20-7	
Surrogates								
Toluene-d8 (S)	104	%	80-108	25		12/13/17 20:41	2037-26-5	
4-Bromofluorobenzene (S)	108	%	80-113	25		12/13/17 20:41	460-00-4	
1,2-Dichloroethane-d4 (S)	97	%	80-114	25		12/13/17 20:41	17060-07-0	
Preservation pH	**1.0**		1.0	25		12/13/17 20:41		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**1750**	mg/L	5.0	1		12/11/17 17:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**35.5**	mg/L	2.0	2		12/17/17 12:36	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

Sample: GW-11145006-120417-SP-MW-4 **Lab ID: 60259839004** Collected: 12/04/17 17:00 Received: 12/08/17 09:10 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010 MET ICP, Dissolved	Analytical Method: EPA 6010 Preparation Method: EPA 3010							
Manganese, Dissolved	**893**	ug/L	5.0	1	12/13/17 10:38	12/15/17 14:54	7439-96-5	
8260 MSV UST, Water	Analytical Method: EPA 8260							
Benzene	**63.2**	ug/L	20.0	20		12/13/17 20:56	71-43-2	
Ethylbenzene	**38.6**	ug/L	20.0	20		12/13/17 20:56	100-41-4	
Toluene	ND	ug/L	20.0	20		12/13/17 20:56	108-88-3	
Xylene (Total)	**1450**	ug/L	60.0	20		12/13/17 20:56	1330-20-7	
Surrogates								
Toluene-d8 (S)	103	%	80-108	20		12/13/17 20:56	2037-26-5	
4-Bromofluorobenzene (S)	107	%	80-113	20		12/13/17 20:56	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	80-114	20		12/13/17 20:56	17060-07-0	
Preservation pH	**1.0**		1.0	20		12/13/17 20:56		
2540C Total Dissolved Solids	Analytical Method: SM 2540C							
Total Dissolved Solids	**2150**	mg/L	5.0	1		12/11/17 17:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0							
Sulfate	**993**	mg/L	100	100		12/19/17 09:31	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

Sample: GW-11145006-120417-SP-DUP **Lab ID: 60259839005** Collected: 12/04/17 16:00 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	**64.4**	ug/L	20.0	20		12/13/17 21:11	71-43-2	
Ethylbenzene	**42.1**	ug/L	20.0	20		12/13/17 21:11	100-41-4	
Toluene	ND	ug/L	20.0	20		12/13/17 21:11	108-88-3	
Xylene (Total)	**1700**	ug/L	60.0	20		12/13/17 21:11	1330-20-7	
Surrogates								
Toluene-d8 (S)	105	%	80-108	20		12/13/17 21:11	2037-26-5	
4-Bromofluorobenzene (S)	106	%	80-113	20		12/13/17 21:11	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	80-114	20		12/13/17 21:11	17060-07-0	
Preservation pH	**1.0**		1.0	20		12/13/17 21:11		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

Sample: TRIP BLANK **Lab ID: 60259839006** Collected: 12/04/17 16:00 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 03:50	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		12/13/17 03:50	100-41-4	
Toluene	ND	ug/L	1.0	1		12/13/17 03:50	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		12/13/17 03:50	1330-20-7	
Surrogates								
Toluene-d8 (S)	102	%	80-108	1		12/13/17 03:50	2037-26-5	
4-Bromofluorobenzene (S)	108	%	80-113	1		12/13/17 03:50	460-00-4	
1,2-Dichloroethane-d4 (S)	94	%	80-114	1		12/13/17 03:50	17060-07-0	
Preservation pH	**1.0**		1.0	1		12/13/17 03:50		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

QC Batch: 507060 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60259839001, 60259839002, 60259839003, 60259839004

METHOD BLANK: 2077289 Matrix: Water
Associated Lab Samples: 60259839001, 60259839002, 60259839003, 60259839004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	12/15/17 14:38	

LABORATORY CONTROL SAMPLE: 2077290

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	1000	1000	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2077291 2077292

Parameter	Units	60259839001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese, Dissolved	ug/L	674	1000	1000	1690	1700	102	103	75-125	1	20	

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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QUALITY CONTROL DATA

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

QC Batch: 506920 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60259839001

METHOD BLANK: 2076697 Matrix: Water
Associated Lab Samples: 60259839001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	12/12/17 16:08	
Ethylbenzene	ug/L	ND	1.0	12/12/17 16:08	
Toluene	ug/L	ND	1.0	12/12/17 16:08	
Xylene (Total)	ug/L	ND	3.0	12/12/17 16:08	
1,2-Dichloroethane-d4 (S)	%	92	80-114	12/12/17 16:08	
4-Bromofluorobenzene (S)	%	107	80-113	12/12/17 16:08	
Toluene-d8 (S)	%	101	80-108	12/12/17 16:08	

LABORATORY CONTROL SAMPLE: 2076698

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	20.4	102	82-115	
Ethylbenzene	ug/L	20	20.0	100	83-112	
Toluene	ug/L	20	20.3	102	78-113	
Xylene (Total)	ug/L	60	60.9	101	83-114	
1,2-Dichloroethane-d4 (S)	%			90	80-114	
4-Bromofluorobenzene (S)	%			104	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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QUALITY CONTROL DATA

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

QC Batch: 506955 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60259839002, 60259839006

METHOD BLANK: 2076882 Matrix: Water
Associated Lab Samples: 60259839002, 60259839006

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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QUALITY CONTROL DATA

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

QC Batch: 507189 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER
Associated Lab Samples: 60259839003, 60259839004, 60259839005

METHOD BLANK: 2077864 Matrix: Water
Associated Lab Samples: 60259839003, 60259839004, 60259839005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	12/13/17 18:11	
Ethylbenzene	ug/L	ND	1.0	12/13/17 18:11	
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
Benzene	ug/L	20	20.8	104	82-115	
Ethylbenzene	ug/L	20	20.6	103	83-112	
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
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

QC Batch: 506844 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60259839001, 60259839002, 60259839003, 60259839004

METHOD BLANK: 2076333 Matrix: Water
Associated Lab Samples: 60259839001, 60259839002, 60259839003, 60259839004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	12/11/17 17:14	

LABORATORY CONTROL SAMPLE: 2076334

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	964	96	80-120	

SAMPLE DUPLICATE: 2076335

Parameter	Units	60259839001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1710	1720	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

QC Batch: 507612 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60259839001, 60259839002, 60259839003

METHOD BLANK: 2079842 Matrix: Water
Associated Lab Samples: 60259839001, 60259839002, 60259839003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	12/17/17 09:16	

LABORATORY CONTROL SAMPLE: 2079843

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.4	108	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2079844 2079845

Parameter	Units	60259777001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	47.1	25	25	73.8	73.4	107	105	80-120	1	15	

MATRIX SPIKE SAMPLE: 2079846

Parameter	Units	60259839001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	321	250	592	108	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

QC Batch: 507832
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60259839004

METHOD BLANK: 2080939 Matrix: Water
Associated Lab Samples: 60259839004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	12/19/17 07:53	

LABORATORY CONTROL SAMPLE: 2080940

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.3	106	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2080941 2080942

Parameter	Units	60259839004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	993	500	500	1640	1550	130	111	80-120	6	15	M1

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

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: 506920
[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.
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.

ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 11146006 MANGUM NO 1
Pace Project No.: 60259839

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60259839001	**GW-11145006-120417-SP-MW-1**	EPA 3010	507060	EPA 6010	507123
60259839002	**GW-11145006-120417-SP-MW-2**	EPA 3010	507060	EPA 6010	507123
60259839003	**GW-11145006-120417-SP-MW-3**	EPA 3010	507060	EPA 6010	507123
60259839004	**GW-11145006-120417-SP-MW-4**	EPA 3010	507060	EPA 6010	507123
60259839001	**GW-11145006-120417-SP-MW-1**	EPA 8260	506920		
60259839002	**GW-11145006-120417-SP-MW-2**	EPA 8260	506955		
60259839003	**GW-11145006-120417-SP-MW-3**	EPA 8260	507189		
60259839004	**GW-11145006-120417-SP-MW-4**	EPA 8260	507189		
60259839005	**GW-11145006-120417-SP-DUP**	EPA 8260	507189		
60259839006	**TRIP BLANK**	EPA 8260	506955		
60259839001	**GW-11145006-120417-SP-MW-1**	SM 2540C	506844		
60259839002	**GW-11145006-120417-SP-MW-2**	SM 2540C	506844		
60259839003	**GW-11145006-120417-SP-MW-3**	SM 2540C	506844		
60259839004	**GW-11145006-120417-SP-MW-4**	SM 2540C	506844		
60259839001	**GW-11145006-120417-SP-MW-1**	EPA 300.0	507612		
60259839002	**GW-11145006-120417-SP-MW-2**	EPA 300.0	507612		
60259839003	**GW-11145006-120417-SP-MW-3**	EPA 300.0	507612		
60259839004	**GW-11145006-120417-SP-MW-4**	EPA 300.0	507832		

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Sample Condition Upon Receipt

WO# : 60259839

60259839

Client Name: GHD NM

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

Tracking #: 7888 1801 3516 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** 3.0 **Corr. Factor** CF 0.0 CF +0.2 **Corrected** 3.0

Date and initials of person examining contents: JB 12/8

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	7 day hold time for TDS 12/11
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 JB 12/8	
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	1062 DGH TB broken
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:	Regulatory Agency
Email: jeff.walker@ghd.com	Purchase Order #:	Pace Quote:	
Phone: 505-884-0672 Fax	Project Name: 11146006 Mangum No 1	Pace Project Manager: alice.spiller@pacelabs.com,	State / Location
Requested Due Date:	Project #:	Pace Profile #: 10540 line 1	NM

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

SAMPLE ID – One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	Collected Start DATE	Start TIME	End DATE	End TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	8260 BTEX	Total Dissolved Solids	300.0 Sulfate	Dissolved Mn-field filtered		Residual Chlorine (Y/N)	60259839
1	GW-1145006-120417-SP-MW-1	WT	G	12/4/17	1600				5	X		X	X						X	X	X	X	BP4U BP3F (3)VG9H	01	Run TDS before hold time expires
2	GW-1145006-120417-SP-MW-2	↓	↓	↓	1628				5	X		X	X						X	X	X	X	↓ ↓ ↓	02	↓
3	GW-11145006-120417-SP-MW-3	↓	↓	↓	1650				5	X		X	X						X	X	X	X	↓ ↓ ↓	03	↓
4	GW-1145006-120417-SP-MW-4	↓	↓	↓	1700				5	X		X	X						X	X	X	X	↓ ↓ ↓	04	↓
5	GW-11146006-120417-SP-DUP	↓	↓	↓					3	~~X~~			X						X	~~X~~			~~(2)DG4H~~ (1)DG4H	05	BTEX only OK
6																									
7																									
8																									
9																									
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
TDS needs to be run before 7-day expiration	Steven Perez	12/7/17	1426	[signature]	12/8/17	0410	3.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Steven Perez

SIGNATURE of SAMPLER: Steven Perez

DATE Signed: 12/7/17