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Mr. Jim Griswold
New Mexico Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

January 30, 2017

Re: NMOCD Case No. 3R-426, 2016 Annual Groundwater Monitoring Report

Dear Mr. Griswold:

Enclosed is the 2016 Annual Groundwater Monitoring Report for the San Juan 27-5 No. 34A site. This report, prepared by GHD Services, Inc., contains the results of groundwater monitoring activities in 2016.

Please let me know if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Joseph B. Crouch". The signature is fluid and cursive.

J. Brady Crouch

Enc



2016 Annual Groundwater Monitoring Report

San Juan 27-5 Number 34A
Unit Letter E, Section 30, Township 27N, Range 05W
Rio Arriba County, New Mexico

Prepared For: ConocoPhillips Company

December 2016

Prepared By: GHD Services, Inc. 6121 Indian School Road, Suite 200, Albuquerque, New Mexico
074934 | 2016 | Report No. 7

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1. Introduction

1.1 Introduction

This 2016 Annual Groundwater Monitoring Report presents the results of groundwater monitoring conducted by GHD Services, Inc. (GHD) at the ConocoPhillips Company (ConocoPhillips) San Juan 27-5 Number 34A natural gas production wellsite (Site). The Site is situated on federal land within Unit Letter E, Section 30, Township 27N, Range 05W of Rio Arriba County, New Mexico (Figure 1). The Site consists of a natural gas production well and associated equipment. General features of the Site are depicted on Figure 2.

1.2 Background

Hydrocarbon impacts were discovered beneath an aboveground storage tank (AST) during tank removal on January 30, 2009. Envirotech Inc. of Farmington, NM (Envirotech) was contacted for spill assessment services following the discovery. Envirotech collected a five-point composite soil sample from beneath the AST, four grab soil samples from test holes advanced around the AST, and an additional five-point composite soil sample collected from an excavation that was approximately 17 feet deep (Envirotech, 2009). Soil samples were collected and field analyzed for total petroleum hydrocarbons (TPH) using Environmental Protection Agency (EPA) method 418.1, and for organic vapors using a photoionization detector (PID). In addition, the five-point composite soil samples were sent for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021 and for TPH analysis by EPA Method 8015. Soil sample results from both five-point composite samples and from one of the test holes exceeded the New Mexico Oil Conservation Division (NMOCD) recommended risk action levels (RRALs).

On March 3, 2009, Envirotech returned to the Site to continue sampling activities. A 49 feet by 49 feet by 20 feet deep area had been excavated prior to Envirotech's arrival on Site. Groundwater was encountered at 20 ft below ground surface (bgs). Envirotech sampled groundwater from the excavation and analyzed the sample for volatile organic compounds (VOCs) using EPA method 8260B (Envirotech, 2009). A benzene concentration of 96 micrograms per liter ($\mu\text{g/L}$) was detected in the groundwater sample. Composite soil samples were collected from the bottom of the excavation and from each of the four excavation side-walls, then field analyzed for organic vapors and TPH. Results from these samples were below RRALs for organic vapors. TPH concentrations were below RRALs in all soil samples except for the sample collected from the south excavation side-wall. Subsequently, excavation of impacted soil was continued to the south and additional 4 feet. Final dimensions of the excavation were reported to be 53 feet by 49 feet by 20 feet deep. A total of 1,900 cubic yards of impacted soil were removed from the Site and transported to a NMOCD permitted facility located in Farmington, New Mexico.

Envirotech recommended the installation of groundwater monitor wells to "determine groundwater gradient and the extent of groundwater contamination" (Envirotech, 2009). Between July 15, 2009 and July 16, 2009, EnviroDrill of Albuquerque, New Mexico installed four groundwater monitor wells at the Site under the supervision of Tetra Tech.

Tetra Tech began quarterly groundwater quality monitoring of the Site on July 28, 2009. In March of 2011, after eight consecutive quarters of compliance with NMWQCC standards for BTEX,

Tetra Tech recommended discontinuation of monitoring for BTEX. Monitoring of dissolved manganese was recommended to continue on an annual basis.

On June 15, 2011, Site consulting responsibilities were transferred from Tetra Tech to GHD (formerly CRA) of Albuquerque, NM. Groundwater has been sampled annually at the Site since September 2011. A generalized geologic cross section for the Site is provided as Figure 3. Site history is summarized in Table 1.

2. Groundwater Monitoring Summary, Methodology, and Analytical Results

2.1 Groundwater Monitoring Summary

Groundwater elevation measurements were recorded from Site monitor wells using an oil/water interface probe on September 14, 2016. Groundwater elevations for the Site are presented in Table 2.

September 2016 groundwater data indicates groundwater flow is towards the north-northwest, consistent with historical records. Groundwater gradient was estimated to be 0.0032 feet per foot (ft/ft). A groundwater potentiometric surface map is presented as Figure 4.

2.2 Groundwater Monitoring Methodology

Monitoring 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 3.

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 dissolved manganese by EPA Method 6010B.

2.3 Groundwater Monitoring Analytical Results

Groundwater concentrations for dissolved manganese were compared to the NMWQCC standard of 0.2 mg/L. Downgradient monitoring well (MW-2) was below 0.2 mg/L. Groundwater collected from monitoring well MW-2 has consistently been under NMWQCC standard for all contaminants of concern since 2011. The highest concentrations of dissolved manganese were detected in the cross-gradient well (MW-3) and the up-gradient well (MW-4) at 0.56 milligrams per kilogram (mg/kg) and 0.36 mg/kg, respectively. A groundwater concentration map is included as Figure 5.

A summary of groundwater laboratory analytical results is presented in Table 4.. The September 2016 laboratory analytical report is included as Appendix A.

3. Conclusions and Recommendations

3.1 Conclusions

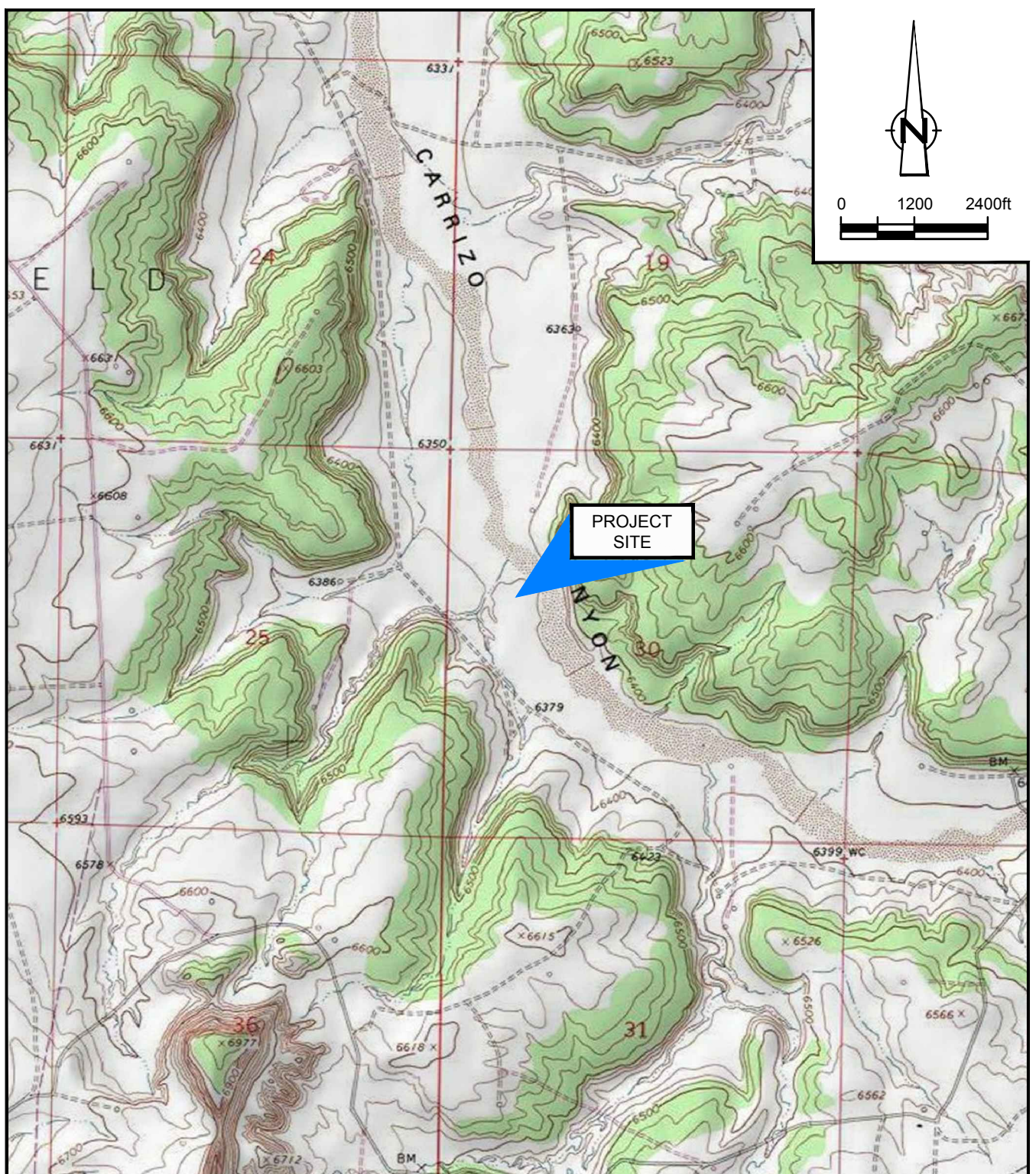
Based on the above referenced information, the following conclusions are presented below:

-) Groundwater flow is towards the north-northwest and is consistent with historical records.
-) Hydrocarbons have never been detected in Site groundwater monitoring wells at concentrations above laboratory detection limits.
-) Concentrations of dissolved manganese in the cross-gradient (MW-3) and up-gradient (MW-4) Site monitoring wells have not attenuated since groundwater monitoring began at the Site, suggesting that observed dissolved manganese are background concentrations for the area.

3.2 Recommendations

On behalf of ConocoPhillips, GHD recommends Site closure and a No Further Action Status be granted based on the fact that historical concentrations of hydrocarbons have never been detected in Site groundwater, manganese observed in Site wells are consistent with background, and the Site is located in a remote area with no identified receptors located on or off-site.

Figures



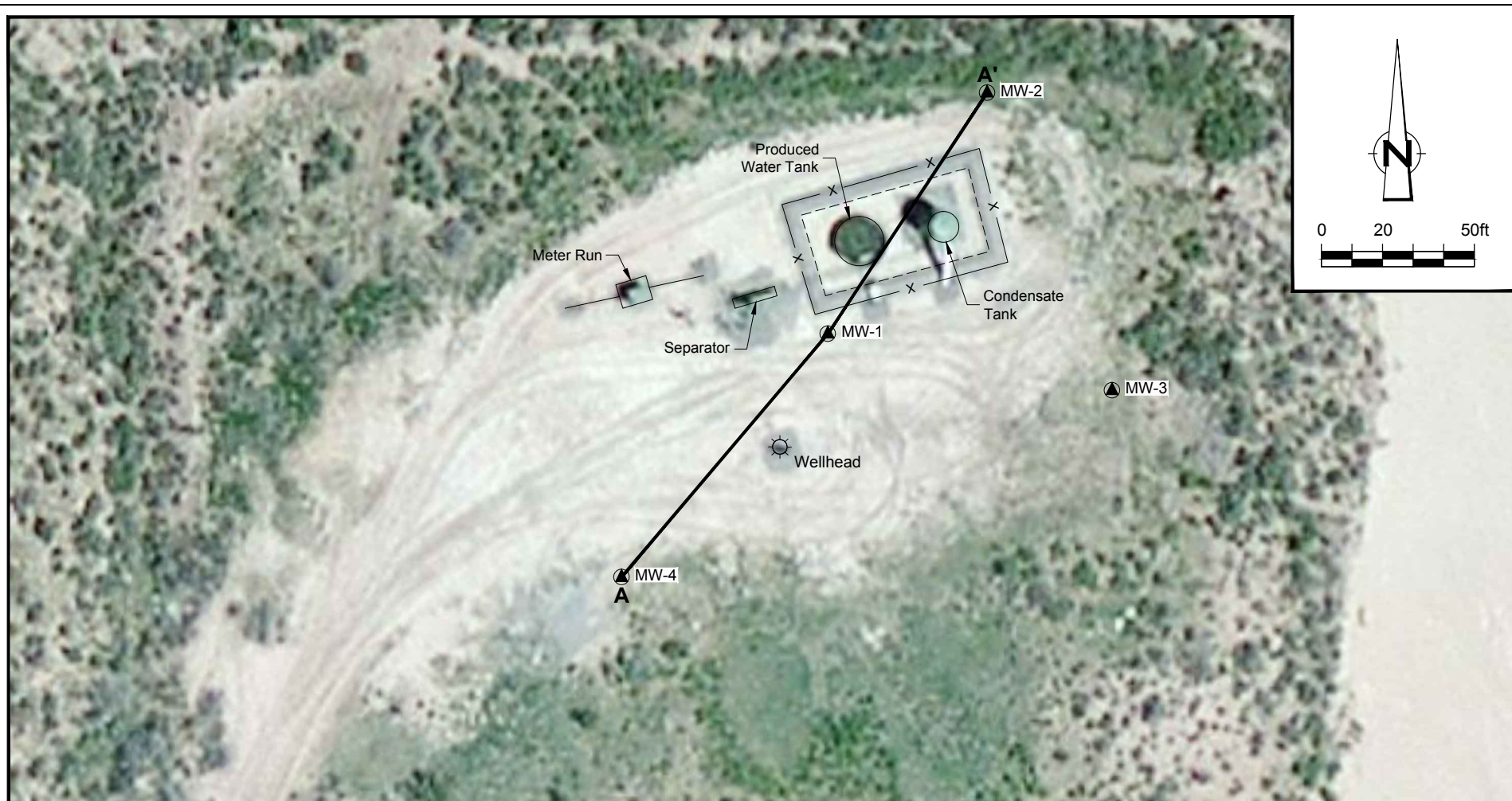
SOURCE: USGS 7.5 MINUTE QUAD
"SANTOS PEAK, NEW MEXICO"

LAT/LONG: 36.5471° NORTH, 107.4066° WEST
COORDINATE: NAD83 DATUM, U.S. FOOT
STATE PLANE ZONE - NEW MEXICO CENTRAL



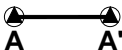
Figure 1

SITE LOCATION MAP
SAN JUAN 27-5 No. 34A
COUNTY, NEW MEXICO
ConocoPhillips Company





LEGEND

-  Monitor Well Location
-  Wellhead
-  Trend of Figure 3 Cross-Section

LAT/LONG: 36.8089° NORTH, 107.9463° WEST
 COORDINATE: NAD83 DATUM, U.S. FOOT
 STATE PLANE ZONE - NEW MEXICO WEST

Figure 2

SITE MAP

SAN JUAN 27-5 No. 34A

SECTION 30, T27N, R5W, RIO ARRIBA COUNTY, NEW MEXICO

ConocoPhillips Company



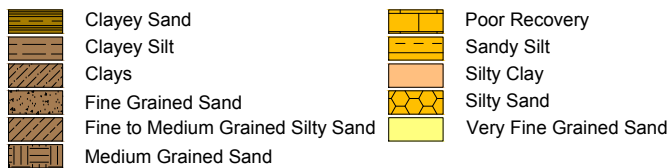
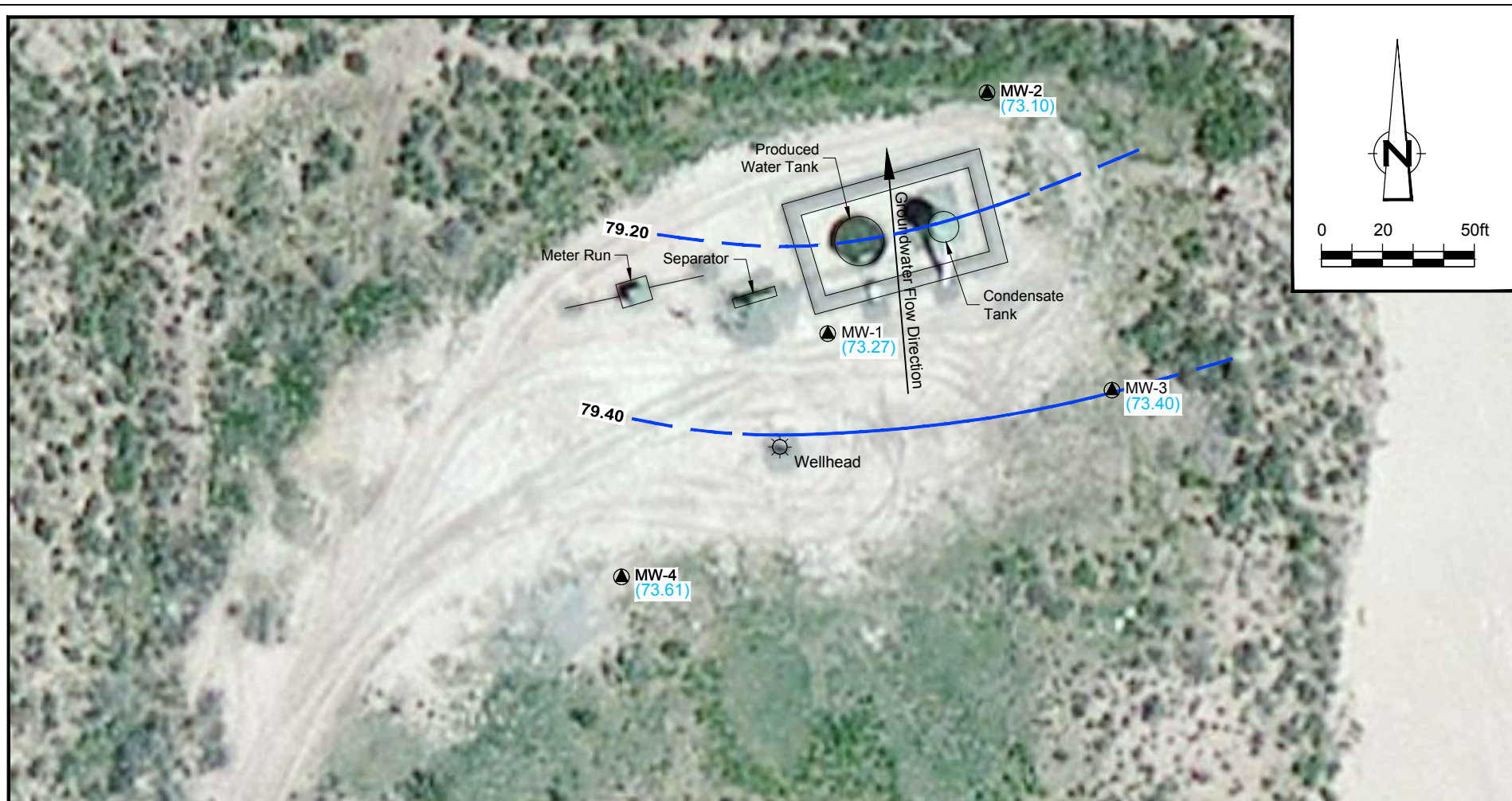





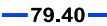

Figure 3

GEOLOGICAL CROSS SECTION
SAN JUAN 27-5 No. 34A
ARRIBA COUNTY, NEW MEXICO
ConocoPhillips Company





LEGEND

-  Monitor Well Location
-  Wellhead
-  (73.61) Groundwater Elevation, Ft
-  79.40 Groundwater Elevation Contour, Ft
-  Groundwater Flow Direction






LAT/LONG: 36.8089° NORTH, 107.9463° WEST
 COORDINATE: NAD83 DATUM, U.S. FOOT
 STATE PLANE ZONE - NEW MEXICO WEST

Figure 4

SEPTEMBER 2016 GROUNDWATER POTENTIOMETRIC SURFACE MAP
 SAN JUAN 27-5 No. 34A
 SECTION 30, T27N, R5W, RIO ARRIBA COUNTY, NEW MEXICO
ConocoPhillips Company



LEGEND

-  Monitor Well Location
-  Wellhead
-  Dissolved Mn (mg/L)

LAT/LONG: 36.8089° NORTH, 107.9463° WEST
 COORDINATE: NAD83 DATUM, U.S. FOOT
 STATE PLANE ZONE - NEW MEXICO WEST

Figure 5

SEPTEMBER 2016 GROUNDWATER CONCENTRATION MAP
 SAN JUAN 27-5 No. 34A
 SECTION 30, T27N, R5W, RIO ARRIBA COUNTY, NEW MEXICO
ConocoPhillips Company



Tables

Table 1

Site History Timeline
ConocoPhillips Company
San Juan 27-5 No. 34A
Rio Arriba County, New Mexico

Date/Time Period	Event/Action	Description/Comments
January 30, 2009	Site Assessment	Hydrocarbon impacts are visually confirmed during tank removal at the Site. Envirotech Inc. of Farmington, New Mexico (Envirotech) conducted spill assessment and initial soil sampling.
March 3, 2009	Soil Excavation	Envirotech oversees soil excavation at the Site. Final dimensions of excavated area are 53'x49'x20' deep. Groundwater is encountered at 20' bgs and sampled. Laboratory results for benzene were found at a concentration of 95.6 micrograms per liter (ug/L), above the NMWQCC standard.
March 20, 2009	Excavation Report	Envirotech excavation report states that a total of 1,900 cubic yards of soil was removed from the Site and transported to an OCD-permitted facility in Farmington, NM. Envirotech recommended the installation of groundwater monitor wells at the Site (Envirotech, 2009).
April 2, 2009	Site Assessment	Tetra Tech visits the Site visit to determine placement of proposed groundwater monitor wells.
July 15, 2009 & July 16, 2009	Monitor Well Installation	Four groundwater monitor wells are installed by EnviroDrill under the supervision of Tetra Tech (MW-1, MW-2, MW-3, MW-4).
July 28, 2009	Groundwater Monitoring	Baseline quarterly groundwater monitoring event was conducted at the Site by Tetra Tech.
September 29, 2009	Groundwater Monitoring	Quarterly groundwater monitoring event conducted at the Site by Tetra Tech.
December 15, 2009	Groundwater Monitoring	Quarterly groundwater monitoring event conducted at the Site by Tetra Tech.
April 8, 2010	Groundwater Monitoring	Quarterly groundwater monitoring event conducted at the Site by Tetra Tech.
June 8, 2010	Groundwater Monitoring	Quarterly groundwater monitoring event conducted at the Site by Tetra Tech.
September 21, 2010	Groundwater Monitoring	Quarterly groundwater monitoring event conducted at the Site by Tetra Tech.
December 15, 2010	Groundwater Monitoring	Seventh quarterly groundwater monitoring event conducted at the Site by Tetra Tech. Manganese concentrations exceed NMWQCC standards in monitor wells MW-1, MW-2, and MW-3.
March 15, 2011	Groundwater Monitoring	Eighth quarterly groundwater monitoring event conducted at the Site by Tetra Tech. Manganese concentrations exceed NMWQCC standards in monitor wells MW-1, MW-2, and MW-3. After eight consecutive quarters of compliance with BTEX standards, the monitoring schedule is changed to annual sampling for dissolved manganese only.
June 15, 2011	Transfer of Site Consulting Responsibilities	Site consulting responsibilities are transferred from Tetra Tech to Conestoga-Rovers & Associates, Inc. of Albuquerque, NM (CRA).
September 28, 2011	Groundwater Monitoring	Annual monitoring event for dissolved manganese only completed by CRA.
September 24, 2012	Groundwater Monitoring	Annual monitoring event for dissolved manganese only completed by CRA.
October 1, 2013	Groundwater Monitoring	Annual monitoring event for dissolved manganese only completed by CRA.
March 25, 2014	Groundwater Monitoring	Semi-Annual monitoring event for dissolved manganese only completed by CRA.
September 22, 2014	Groundwater Monitoring	Semi-Annual monitoring event for dissolved manganese only completed by CRA.
September 21, 2015	Groundwater Monitoring	Annual monitoring event for dissolved manganese only completed by GHD (formerly CRA).
September 14, 2016	Groundwater Monitoring	Annual monitoring event for dissolved manganese only completed by GHD.

Table 2

Monitor Well Specifications and Groundwater Elevations
ConocoPhillips Company
San Juan 27-5 No. 34A
Rio Arriba County, New Mexico

Well ID	Total Depth (ft bgs)	Screen Interval (ft)	* TOC Elevation (ft)	Date Measured	Depth to Groundwater (ft below TOC)	Relative Groundwater Elevation
MW-1	33.13	18.73 - 33.73	97.44	7/28/2009	23.21	74.23
				9/29/2009	23.88	73.56
				12/15/2009	24.15	73.29
				4/8/2010	21.76	75.68
				6/8/2010	22.26	75.18
				9/21/2010	23.24	74.20
				12/15/2010	23.60	73.84
				3/15/2011	22.92	74.52
				9/28/2011	24.10	73.34
				9/24/2012	25.20	72.24
				10/1/2013	22.77	74.67
				3/25/2014	23.65	73.79
				9/22/2014	24.40	73.04
				9/21/2015	23.71	73.73
				9/14/2016	24.17	73.27
MW-2	34.29	15 - 30	96.78	7/28/2009	22.72	74.06
				9/29/2009	23.40	73.38
				12/15/2009	23.66	73.12
				4/8/2010	21.21	75.57
				6/8/2010	21.81	74.97
				9/21/2010	22.78	74.00
				12/15/2010	23.13	73.65
				3/15/2011	22.44	74.34
				9/28/2011	23.62	73.16
				9/24/2012	24.72	72.06
				10/1/2013	22.20	74.58
				3/25/2014	23.19	73.59
				9/22/2014	23.93	72.85
				9/21/2015	23.24	73.54
				9/14/2016	23.68	73.10
MW-3	33.11	17.55 - 32.55	97.24	7/28/2009	22.84	74.40
				9/29/2009	23.54	73.70
				12/15/2009	23.80	73.44
				4/8/2010	21.22	76.02
				6/8/2010	21.90	75.34
				9/21/2010	22.90	74.34
				12/15/2010	23.27	73.97
				3/15/2011	22.55	74.69
				9/28/2011	23.73	73.51
				9/24/2012	24.89	72.35
				10/1/2013	22.21	75.03
				3/25/2014	23.33	73.91
				9/22/2014	24.08	73.16
				9/21/2015	23.38	73.86
				9/14/2016	23.84	73.40
MW-4	33.47	17.6 - 32.6	97.23	7/28/2009	22.62	74.61
				9/29/2009	23.31	73.92
				12/15/2009	23.57	73.66
				4/8/2010	21.25	75.98
				6/8/2010	21.75	75.48
				9/21/2010	22.67	74.56
				12/15/2010	23.03	74.20
				3/15/2011	22.35	74.88
				9/28/2011	23.50	73.73
				9/24/2012	24.62	72.61
				10/1/2013	22.30	74.93
				3/25/2014	23.10	74.13
				9/22/2014	23.85	73.38
				9/21/2015	23.18	74.05
				9/14/2016	23.62	73.61

Notes:

ft = Feet

TOC = Top of casing

bgs = below ground surface

*Groundwater elevation is relative to an arbitrary 100 feet

Table 3

**Field Parameters Summary
ConocoPhillips Company
San Juan 27-5 No. 34-A
Rio Arriba County, New Mexico**

Well ID	Sample Date	Temperature (°C)	pH	TDS (g/L)	Conductivity (μS/cm)	DO (mg/L)	ORP (mV)	Volume (gallons)
MW-1	9/23/2015	12.80	7.74	0.51	783	7.13	45.8	3.50
	9/23/2015	12.62	6.11	0.51	777	5.51	113.0	4.00
	9/23/2015	12.58	5.79	0.51	779	4.28	116.3	4.50
	9/14/2016	12.12	6.95	0.49	757	11.14	6.7	4.25
MW-2	9/23/2015	12.65	6.92	0.57	882	6.86	127.0	2.00
	9/14/2016	12.45	7.86	0.55	847	3.98	9.4	2.25
MW-3	9/23/2015	13.01	6.07	0.45	684	4.51	111.4	3.75
	9/23/2015	13.08	6.30	0.45	685	4.10	91.0	4.25
	9/23/2015	13.08	6.44	0.45	685	3.87	82.1	4.75
	9/14/2016	12.04	6.32	0.43	660	3.56	45.8	4.50
MW-4	9/23/2015	12.01	6.94	0.86	1315	6.42	63.8	2.00
	9/14/2016	11.84	7.70	0.80	1235	5.01	-1.8	2.50

Notes:

TDS = total dissolved solids

DO = dissolved oxygen

ORP = oxidation-reduction potential

Table 4

Groundwater Analytical Results Summary
ConocoPhillips Company
San Juan 27-5 No. 34A
Rio Arriba County, New Mexico

Well ID	Sample ID	Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (total) (mg/L)	Manganese (dissolved) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
	NMWQCC Groundwater Quality Standards			0.01	0.75	0.75	0.62	0.2	1000
MW-1	MW-1	7/28/2009	(orig)	< 0.005	< 0.005	< 0.005	< 0.005	--	--
	MW-1	9/29/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.694	--
	MW-1	12/15/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.576	--
	MW-1	4/8/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.896	640
	MW-1	6/8/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.612	--
	MW-1	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.784	--
	MW-1	12/15/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.933	--
	MW-1	3/15/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.732	--
	GW-074934-092811-CM-001	9/28/2011	(orig)	--	--	--	--	0.789	--
	GW-074934-092412-CM-MW-1	9/24/2012	(orig)	--	--	--	--	0.76	--
	GW-074934-100113-CM-MW-1	10/1/2013	(orig)	--	--	--	--	< 0.005	--
	GW-074934-032514-CM-MW-1	3/25/2014	(orig)	--	--	--	--	0.37	--
	GW-074934-092114-CB-MW-1	9/22/2014	(orig)	--	--	--	--	0.55	--
	GW-074934-092115-CB-MW-1	9/21/2015	(orig)	--	--	--	--	0.42	--
	GW-074934-092115-CB-DUP	9/21/2015	(duplicate)	--	--	--	--	0.30	--
MW-2	GW-074934-091416-CM-MW-1	9/14/2016	(orig)	--	--	--	--	0.27	--
	MW-2	7/28/2009	(orig)	< 0.005	< 0.005	< 0.005	< 0.005	--	--
	MW-2	9/29/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	1.38	--
	MW-2	12/15/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	1.92	--
	MW-2	4/8/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.43	700
	MW-2	6/8/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.12	--
	MW-2	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.25	--
	MW-2	12/15/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.17	--
	MW-2	3/15/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.01	--
	GW-074934-092811-CM-003	9/28/2011	(orig)	--	--	--	--	0.592	--
	GW-074934-092412-CM-MW-2	9/24/2012	(orig)	--	--	--	--	0.12	--
	GW-074934-092412-CM-DUP	9/24/2012	(duplicate)	--	--	--	--	0.13	--
	GW-074934-100113-CM-MW-2	10/1/2013	(orig)	--	--	--	--	0.0214	--
	GW-074934-100113-CM-DUP	10/1/2013	(duplicate)	--	--	--	--	0.0194	--
MW-3	GW-074934-032514-CM-MW-2	3/25/2014	(orig)	--	--	--	--	0.038	--
	GW-074934-092114-CB-MW-2	9/22/2014	(orig)	--	--	--	--	0.095	--
	GW-074934-092115-CB-MW-2	9/21/2015	(orig)	--	--	--	--	0.033	--
	GW-074934-091416-CM-MW-2	9/14/2016	(orig)	--	--	--	--	0.0084	--
	MW-3	7/28/2009	(orig)	< 0.005	< 0.005	< 0.005	< 0.005	--	--
	MW-3	9/29/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	1.7	--
	MW-3	12/15/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.04	--
	MW-3	4/8/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.51	525
	MW-3	6/8/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.51	--
	MW-3	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.87	--
	MW-3	12/15/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.69	--
	MW-3	3/15/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	2.01	--
	GW-074934-092811-JP-002	9/28/2011	(orig)	--	--	--	--	2.03	--
	GW-074934-092412-CM-MW-3	9/24/2012	(orig)	--	--	--	--	1.2	--
MW-4	GW-074934-100113-CM-MW-3	10/1/2013	(orig)	--	--	--	--	< 0.005	--
	GW-074934-032514-CM-MW-3	03/25/2014	(orig)	--	--	--	--	0.87	--
	GW-074934-032514-CM-DUP	03/25/2014	(duplicate)	--	--	--	--	0.89	--
	GW-074934-092114-CB-MW-3	9/22/2014	(orig)	--	--	--	--	0.97	--
	GW-074934-092115-CB-MW-3	9/21/2015	(orig)	--	--	--	--	1.2	--
	GW-074934-091416-CM-MW-3	9/14/2016	(orig)	--	--	--	--	0.56	--
	MW-4	7/28/2009	(orig)	< 0.005	< 0.005	< 0.005	< 0.005	--	--
	MW-4	9/29/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.269	--
	MW-4	12/15/2009	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.0579	--
	MW-4	4/8/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.121	684
	MW-4	6/8/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.0384	--
	MW-4	9/21/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.0301	--
	MW-4	12/15/2010	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.0088	--
	MW-4	3/15/2011	(orig)	< 0.001	< 0.001	< 0.001	< 0.001	0.008	--
	GW-074934-092811-CM-005	9/28/2011	(orig)	--	--	--	--	0.0461	--
MW-4	GW-074934-092412-CM-MW-4	9/24/2012	(orig)	--	--	--	--	0.026	--
	GW-074934-100113-CM-MW-4	10/1/2013	(orig)	--	--	--	--	0.157	--
	GW-074934-032514-CM-MW-4	3/25/2014	(orig)	--	--	--	--	0.31	--
	GW-074934-092114-CB-MW-4	9/22/2014	(orig)	--	--	--	--	0.18	--
	GW-074934-092115-CB-MW-4	9/21/2015	(orig)	--	--	--	--	0.54	--
	GW-074934-091416-CM-MW-4	9/14/2016	(orig)	--	--	--	--	0.36	--

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

-- = not analyzed

Appendices

Appendix A

2016 Annual Groundwater Laboratory Analytical Report

September 23, 2016

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

RE: Project: 074934 San Juan 27-5 No 34A
Pace Project No.: 60227931

Dear Christine Mathews:

Enclosed are the analytical results for sample(s) received by the laboratory on September 16, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI 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@pacelabs.com
Project Manager

Enclosures

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



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

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

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60227931001	GW-074934-091416-CM-MW-2	Water	09/14/16 10:00	09/16/16 09:10
60227931002	GW-074934-091416-CM-MW-3	Water	09/14/16 10:05	09/16/16 09:10
60227931003	GW-074934-091416-CM-MW-4	Water	09/14/16 10:15	09/16/16 09:10
60227931004	GW-074934-091416-CM-DUP	Water	09/14/16 00:00	09/16/16 09:10
60227931005	GW-074934-091416-CM-MW-1	Water	09/14/16 09:55	09/16/16 09:10

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SAMPLE ANALYTE COUNT

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60227931001	GW-074934-091416-CM-MW-2	EPA 6010	TDS	1
60227931002	GW-074934-091416-CM-MW-3	EPA 6010	TDS	1
60227931003	GW-074934-091416-CM-MW-4	EPA 6010	TDS	1
60227931004	GW-074934-091416-CM-DUP	EPA 6010	TDS	1
60227931005	GW-074934-091416-CM-MW-1	EPA 6010	TDS	1

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PROJECT NARRATIVE

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

Method: EPA 6010

Description: 6010 MET ICP, Dissolved

Client: GHD Services_COP NM

Date: September 23, 2016

General Information:

5 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:

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

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

Sample: GW-074934-091416-CM-MW-2		Lab ID: 60227931001	Collected: 09/14/16 10:00	Received: 09/16/16 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	0.0084	mg/L	0.0050	1	09/21/16 15:55	09/22/16 15:28	7439-96-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

Sample: GW-074934-091416-CM-MW-3		Lab ID: 60227931002	Collected: 09/14/16 10:05	Received: 09/16/16 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	0.56	mg/L	0.0050	1	09/21/16 15:55	09/22/16 12:59	7439-96-5	

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ANALYTICAL RESULTS

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

Sample: GW-074934-091416-CM-MW-4		Lab ID: 60227931003	Collected: 09/14/16 10:15	Received: 09/16/16 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	0.36	mg/L	0.0050	1	09/21/16 15:55	09/22/16 13:02	7439-96-5	

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ANALYTICAL RESULTS

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

Sample: GW-074934-091416-CM-DUP		Lab ID: 60227931004	Collected: 09/14/16 00:00	Received: 09/16/16 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	0.29	mg/L	0.0050	1	09/21/16 15:55	09/22/16 13:04	7439-96-5	

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ANALYTICAL RESULTS

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

Sample: GW-074934-091416-CM-MW-1		Lab ID: 60227931005	Collected: 09/14/16 09:55	Received: 09/16/16 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	0.27	mg/L	0.0050	1	09/21/16 15:55	09/22/16 13:11	7439-96-5	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

QC Batch: 447446 Analysis Method: EPA 6010
QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved
Associated Lab Samples: 60227931001, 60227931002, 60227931003, 60227931004, 60227931005

METHOD BLANK: 1830368 Matrix: Water
Associated Lab Samples: 60227931001, 60227931002, 60227931003, 60227931004, 60227931005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Manganese, Dissolved	mg/L	ND	0.0050	09/22/16 15:26	

LABORATORY CONTROL SAMPLE: 1830369

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	mg/L	1	1.0	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1830370 1830371

Parameter	Units	60227652001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Manganese, Dissolved	mg/L	925 ug/L	1	1	1.9	1.9	96	96	75-125	0	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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QUALIFIERS

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

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.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 074934 San Juan 27-5 No 34A

Pace Project No.: 60227931

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60227931001	GW-074934-091416-CM-MW-2	EPA 3010	447446	EPA 6010	447531
60227931002	GW-074934-091416-CM-MW-3	EPA 3010	447446	EPA 6010	447531
60227931003	GW-074934-091416-CM-MW-4	EPA 3010	447446	EPA 6010	447531
60227931004	GW-074934-091416-CM-DUP	EPA 3010	447446	EPA 6010	447531
60227931005	GW-074934-091416-CM-MW-1	EPA 3010	447446	EPA 6010	447531

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt
ESI Tech Spec Client

WO# : 60227931



60227931

Client Name: GHD Col NM

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

Tracking #: 6203 7044 6652 7970 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: T-266 / T-239 Type of Ice: Wet Blue ☐ None ☐

Cooler Temperature (°C): As-read 2.1 Corr. Factor CF +1.1 CF -0.1 Corrected 3.2

Date and initials of person
examining contents: JS 9/16/16

Temperature should be above freezing to 6°C

Chain of Custody present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Chain of Custody relinquished:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Samples arrived within holding time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Short Hold Time analyses (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Rush Turn Around Time requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
Sufficient volume:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Correct containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Pace containers used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Containers intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Filtered volume received for dissolved tests?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Sample labels match COC: Date / time / ID / analyses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Samples contain multiple phases? Matrix: <u>water</u>	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Containers requiring pH preservation in compliance? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Cyanide water sample checks: <input type="checkbox"/> N/A	
Lead acetate strip turns dark? (Record only)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Potassium iodide test strip turns blue/purple? (Preserve)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Trip Blank present:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Samples from USDA Regulated Area: State:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Additional labels attached to 5035A / TX1005 vials in the field?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> 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: 09/16/16

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

Start: 1345 Start:

End: 1350 End:

Temp: _____ Temp:

CHAIN-OF-CUSTODY / Analytical Request Document

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

Section A		Section B		Section C	
Required Client Information:		Required Project Information:		Invoice Information:	
Company:	GHD Services, COP NM	Report To:	Jeffrey Walker	Attention:	
Address:	6121 Indian School Rd NE	Copy To:	Christine Mathews, Cale Kanack	Company Name:	
Albuquerque, NM 87110				Address:	
Email:	jeff.walker@ghd.com	Purchase Order #:		Pace Quote:	
Phone:	505-377-3920	Project Name:	074934 San Juan 27-5 No 34A	Pace Project Manager:	alice.spiller@paceclabs.com
Requested Due Date:		Project #:		Pace Profile #:	8644, 18
				State / Location NM	
				Regulatory Agency	

ITEM #	MATRIX	CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		DATE	TIME	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	DATE	TIME	SAMPLE CONDITIONS	Received on	Ice (Y/N)	Custody (Y/N)	Sealed (Y/N)	Cooler (Y/N)	Samples Intact (Y/N)
				START	END																
1	Water	DW	WT	09/15/16	09:45	09/15/16	10:00	09/15/16	14:45	Christine Mathews	09/15/16	14:45	09/16/16	9:10	3-2	Y	Y	Y	Y	Y	Y
2	Water	DW	WT	09/15/16	10:00	09/15/16	10:05	09/15/16	10:15	Christine Mathews	09/15/16	10:15	09/16/16	9:10	3-2	Y	Y	Y	Y	Y	Y
3	Water	DW	WT	09/15/16	10:05	09/15/16	10:15	09/15/16	10:15	Christine Mathews	09/15/16	10:15	09/16/16	9:10	3-2	Y	Y	Y	Y	Y	Y
4	Water	DW	WT	09/15/16	10:15	09/15/16	10:15	09/15/16	10:15	Christine Mathews	09/15/16	10:15	09/16/16	9:10	3-2	Y	Y	Y	Y	Y	Y
5	Water	DW	WT	09/15/16	10:15	09/15/16	10:15	09/15/16	10:15	Christine Mathews	09/15/16	10:15	09/16/16	9:10	3-2	Y	Y	Y	Y	Y	Y
6	Water	DW	WT	09/15/16	10:15	09/15/16	10:15	09/15/16	10:15	Christine Mathews	09/15/16	10:15	09/16/16	9:10	3-2	Y	Y	Y	Y	Y	Y
7	Water	DW	WT																		
8	Water	DW	WT																		
9	Water	DW	WT																		
10	Water	DW	WT																		
11	Water	DW	WT																		
12	Water	DW	WT																		

SAMPLER NAME AND SIGNATURE		DATE SIGNED: 9/15/16	
PRINT Name of SAMPLER: Christine Mathews			
SIGNATURE of SAMPLER: [Signature]			