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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-467, 2016 Annual Groundwater Assessment and Monitoring Report**

Dear Mr. Griswold:

Enclosed is the 2016 Annual Groundwater Monitoring Report for the Marcotte No. 1 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 written in a cursive, flowing style.

J. Brady Crouch

Enc



# **Groundwater Assessment and Monitoring Report 2016**

Marcotte No. 1  
Unit Letter G, S8, T31N, R10W  
Aztec, NM  
API# 30-045-10923  
NMOCD# 3R-467

ConocoPhillips Company

**GHD** | 6121 Indian School Rd NE Suite 200 Albuquerque NM 87110 USA  
085692 | Report No 3 | December 23, 2016



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## 1. Introduction

This report presents the results of groundwater monitoring activities conducted on behalf of ConocoPhillips Company (ConocoPhillips) by GHD Services, Inc. (GHD) in September 2016 at the Marcotte No. 1 Well Site (Site). The Site is situated on private land within Unit Letter G, Section 8, Township 31N, Range 10W, off County Road 2391, next to the Miller Canyon Wash, in San Juan County, New Mexico. Geographical coordinates for the Site are 36.915560° North, 107.901902° West. The location and Site layout are presented as Figures 1 and 2, respectively.

## 2. Background

Hydrocarbon impacted soil was discovered at the Site in 2003 during excavation work to reset the production equipment. Approximately 3,000 cubic yards of impacted soil was removed from the former pit in September 2003. Soil was land farmed on the adjacent Marcotte No. 2 site with approval from both the New Mexico Oil Conservation Division (NMOCD) and U.S. Bureau of Land Management.

Impacted soils were excavated to approximately 30 feet below ground surface (ft bgs). Groundwater was also encountered at a depth of 30 ft bgs. Observation of the water in the bottom of the open excavation showed minor light non-aqueous phase liquid (LNAPL). An unknown quantity of water and LNAPL was removed from the excavation using a pump truck over a period of 2 months. Prior to backfilling the excavation, no LNAPL were visible on the water surface.

Once the excavation was backfilled, two of the original soil borings were converted into groundwater monitoring wells MW-2 and MW-3, completed September 30 and October 1, 2003, respectively. Monitoring well MW 1 was subsequently installed through the center of the excavation in September 2004 (Figure 2). Initial groundwater sampling took place in 2003 (MW 2 and MW 3 only) and 2004, but was not sampled again until 2010.

A groundwater monitoring event took place on April 2, 2014. During this event, monitor well MW-2 was the only well with measureable groundwater. Groundwater in this well was encountered at a depth of 31.85 feet below ground surface (ft bgs) with a total well depth of 37.60 ft bgs. Monitor well MW-1 evidently was obstructed at 23.20 ft bgs. Monitor well MW-3 was dry at 38.68 ft bgs. An unsuccessful attempt was made to open the obstruction in MW-1 using a weighted surge block.

To assess groundwater quality at the Site, GHD was onsite with National Exploration and Wells (National) of Peralta, NM on April 28th and April 29th, 2015. The obstructed monitoring well MW-1 was plugged and abandoned in April 2015 and well MW-1R drilled at approximately the same location as a replacement. An attempt was also made at this time to install an up gradient monitoring well (B 1, Figure 2) but the boring failed to intercept the apparent perched Site groundwater aquifer at this location.



## 3. Groundwater Monitoring

### 3.1 Groundwater Monitoring Methodology

#### *Groundwater Elevation Measurements*

Depth to groundwater was gauged at monitoring wells MW-1R, MW-2 and MW-3 using an oil/water interface probe prior to sampling (see Table 1). A groundwater potentiometric surface map depicting groundwater elevations and the derived groundwater flow direction are presented as Figure 3.

Groundwater flow direction at the site is to the northwest.

#### *Groundwater Sampling*

Site monitoring wells were purged of at least three casing volumes using 1.5 inch diameter, polyethylene, dedicated bailers. Groundwater parameter data, including temperature, pH, conductivity, dissolved oxygen, and oxidation reduction potential were collected using a YSI 556 multi parameter Sonde while purging each well. When parameters stabilized, representative samples were collected.

Groundwater samples were placed in laboratory prepared bottles, packed on ice, and shipped under chain of custody documentation to Pace Analytical. Purge water generated during the event was disposed of in the on Site produced water tank.

Groundwater samples were analyzed for the presence of BTEX by EPA Method 8260, dissolved manganese by EPA Method 6010, sulfates by EPA 300 and total dissolved solids (TDS) by EPA Method 2540.

### 3.2 Groundwater Monitoring Results

The New Mexico Water Quality Control Commission (NMWQCC) regulates groundwater quality in New Mexico under Title 20, Chapter 6, Part 2, Section 3103 of the New Mexico Administrative Code (20.6.2.3103 NMAC).

Groundwater concentrations were above NMWQCC standard of 0.2 mg/L for dissolved manganese in monitoring wells MW-1R and MW-2. Monitoring wells MW-1R, MW-2 and MW-3 were above the NMWQCC standard of 1000 mg/L for TDS and 600 mg/L for sulfates. A summary of most recent and historical laboratory analytical results is presented in Table-2. Groundwater laboratory analytical reports are included as Appendix A.

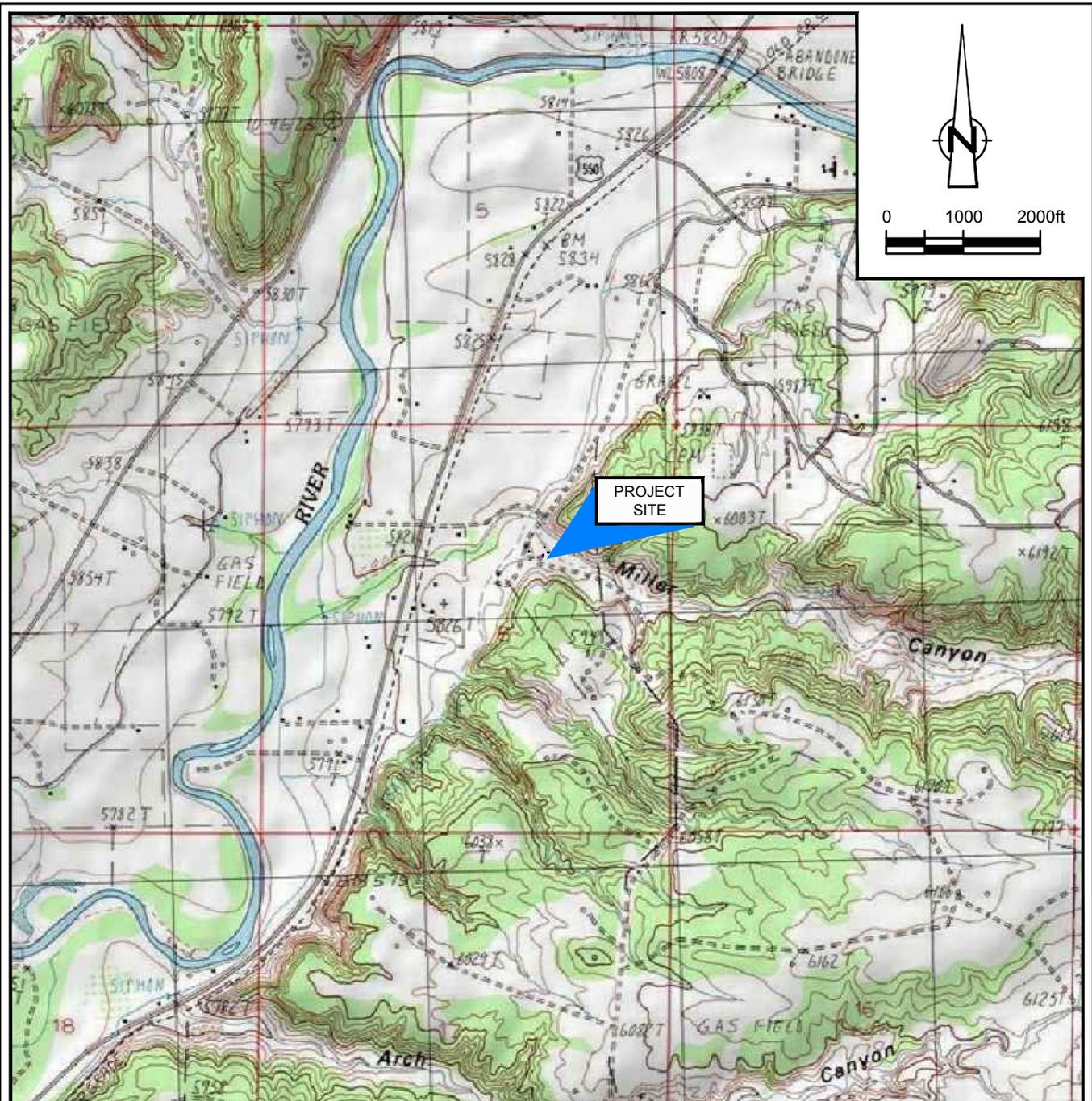
## 4. Conclusions and Recommendations

BTEX constituents have not been detected in Site monitoring wells at concentrations above NMWQCC standards since their installation in 2003/2004. Groundwater contaminants of concern consist of inorganic constituents which may or may not be associated with the release of hydrocarbons on Site.



GHD recommends groundwater quality at the Site continue to be monitored once annually. The next groundwater monitoring event is scheduled for September 2017

# Figures



SOURCE: USGS 7.5 MINUTE QUAD  
 "CEDAR HILL, NEW MEXICO"

LAT/LONG: 36.9155° NORTH, 107.9019° WEST  
 COORDINATE: NAD83 DATUM, U.S. FOOT  
 STATE PLANE ZONE - NEW MEXICO WEST

Figure 1  
 SITE VICINITY MAP  
 MARCOTTE No.1 NATURAL GAS WELL SITE  
 SECTION 8, T31N-R10W, SAN JUAN COUNTY, NEW MEXICO  
*ConocoPhillips Company*

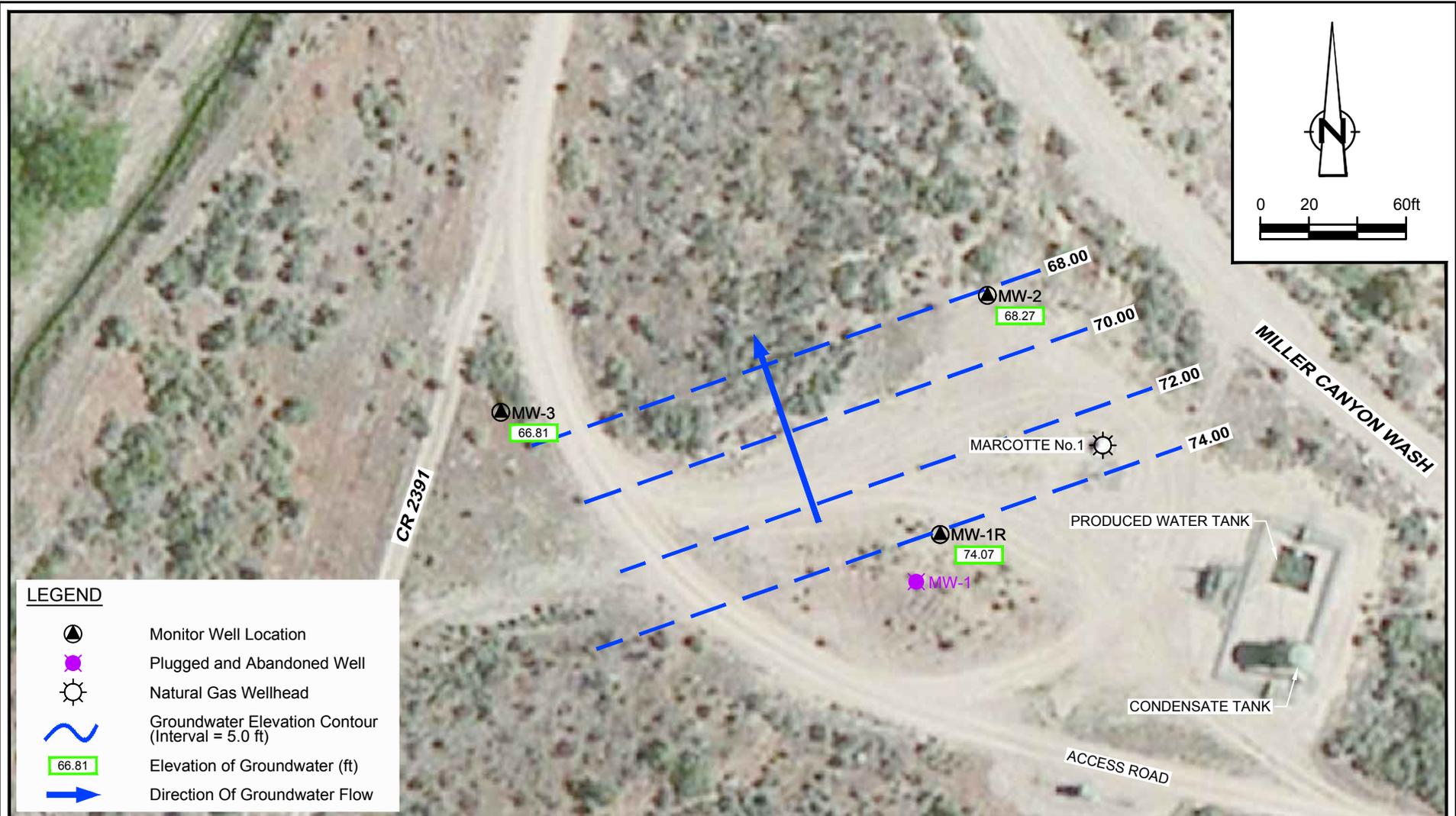




LAT/LONG: 36.9155° NORTH, 107.9019° WEST  
 COORDINATE: NAD83 DATUM, U.S. FOOT  
 STATE PLANE ZONE - NEW MEXICO WEST

Figure 2  
 SITE PLAN  
 MARCOTTE No.1 NATURAL GAS WELL SITE  
 SECTION 8, T31N-R10W, SAN JUAN COUNTY, NEW MEXICO  
*ConocoPhillips Company*





LAT/LONG: 36.9155° NORTH, 107.9019° WEST  
 COORDINATE: NAD83 DATUM, U.S. FOOT  
 STATE PLANE ZONE - NEW MEXICO WEST

Figure 3

SEPTEMBER 2016 GROUNDWATER POTENTIOMETRIC SURFACE MAP  
 MARCOTTE No.1 NATURAL GAS WELL SITE  
 SECTION 8, T31N-R10W, SAN JUAN COUNTY, NEW MEXICO  
*ConocoPhillips Company*



# Tables

Table 1

Monitoring Well Specifications and Groundwater Elevations  
 ConocoPhillips Company  
 Marcotte No. 1  
 San Juan County, New Mexico

<i>Well ID</i>	<i>Total Depth (ft below TOC)</i>	<i>Screen Interval (ft bgs)</i>	<i>Depth to Groundwater (ft below TOC)</i>	<i>Date Measured</i>	<i>Depth to Groundwater (ft below TOC)</i>	<i>Groundwater Elevation (ft)</i>
MW-1	23.20*	Unknown	94.32	9/29/2004	23.20	71.12
				12/13/2004	23.67	70.65
				4/2/2014	DRY	--
				Plugged/Abandoned 4/28/2015		
MW-1R	30.50	18-28	99.46	5/14/2015	26.48	72.98
				9/13/2016	25.39	74.07
MW-2	37.70	22-37	97.66	10/6/2003	29.71	67.95
				12/16/2003	30.09	67.57
				3/15/2004	30.62	67.04
				6/21/2004	30.05	67.61
				9/29/2004	--	--
				12/13/2004	29.88	67.78
				12/9/2010	29.78	67.88
				4/2/2014	31.85	65.81
				5/14/2015	31.97	65.69
				9/13/2016	29.39	68.27
MW-3	38.72	23-38	94.80	10/6/2003	30.74	64.06
				12/16/2003	34.14	60.66
				3/15/2004	--	--
				6/21/2004	36.62	58.18
				9/29/2004	28.72	66.08
				12/13/2004	32.35	62.45
				12/9/2010	35.51	59.29
				4/2/2014	DRY	--
				5/14/2015	38.09	56.71
9/13/2016	27.99	66.81				

Notes:

bgs = Below ground surface

ft = Feet

TOC = Top of casing

\*Total depth measured 4/2/2014-may represent an obstruction; well completion data unavailable.

**Groundwater Analytical Results Summary  
ConocoPhillips Company  
Marcotte No. 1  
San Juan County, New Mexico**

Well ID	Sample ID	Date	Sample Type	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Total Hardness, dissolved (mg/L)	Arsenic, dissolved (mg/L)	Barium, dissolved (mg/L)	Cadmium, dissolved (mg/L)	Calcium, dissolved (mg/L)	Chromium, dissolved (mg/L)	Copper, dissolved (mg/L)	Iron, dissolved (mg/L)
<b>NMWQCC Groundwater Quality Standards</b>				<b>0.01</b>	<b>0.75</b>	<b>0.75</b>	<b>0.62</b>	--	<b>0.1</b>	<b>1.0</b>	<b>0.01</b>	--	<b>0.05</b>	<b>1.0</b>	<b>1.0</b>
MW-1	MW-1	9/29/2004	0	<0.0003	<0.0002	0.038	0.0369	--	<0.001	0.017	0.0009	286	0.0003	0.001	0.19
	MW-1	12/13/2004	(orig)	0.0004	0.0007	0.0007	0.0202	--	--	--	--	--	--	--	--
MW-1R	GW-085692-051415-CBMW-1R	5/14/2015	(orig)	.0071	<0.001	0.105	0.106	--	--	--	--	--	--	--	--
	GW-085692-091316-CM-MW-1R	9/13/2016	(orig)	0.0045	<0.001	0.0116	<0.003	--	--	--	--	--	--	--	--
MW-2	MW-2	10/8/2003	(orig)	<0.0003	<0.0002	<0.0002	<0.0002	--	0.0036	0.047	<0.0001	266	0.0008	0.0021	0.98
	MW-2	12/16/2003	(orig)	0.0004	<0.0002	<0.0002	<0.0002	--	--	--	--	--	--	--	--
	MW-2	3/15/2004	(orig)	0.0004	0.0003	<0.0002	0.0002	--	--	--	--	--	--	--	--
	MW-2	6/21/2004	(orig)	<0.0003	<0.0002	<0.0002	<0.0002	--	--	--	--	--	--	--	--
	MW-2	9/29/2004	(orig)	<0.0003	0.0003	0.0003	0.0007	--	--	--	--	--	--	--	--
	MW-2	12/13/2004	(orig)	0.0003	0.0013	0.0003	0.0112	--	--	--	--	--	--	--	--
	MW-2	12/9/2010	(orig)	<0.001	<0.001	<0.001	<0.001	1100	0.003	0.009	<0.001	360	<0.001	--	0.042
	GW-085692-040214-CM-MW-2	4/2/2014	(orig)	<0.001	<0.001	<0.001	<0.003	1180	0.0011	0.0128	<0.50	--	<1.0	<1.0	--
	GW-085692-051415-CBMW-2	5/14/2015	(orig)	--	--	--	--	--	--	--	--	--	--	--	--
GW-085692-091316-CM-MW-2	9/13/2016	(orig)	<0.001	<0.001	<0.001	<0.003	--	--	--	--	--	--	--	--	
MW-3	MW-3	10/8/2003	(orig)	<0.0003	0.0002	<0.0002	<0.002	--	0.0012	0.037	<0.0001	262	0.0012	0.0017	0.47
	MW-3	12/16/2003	(orig)	0.0005	<0.0002	<0.0002	<0.0002	--	--	--	--	--	--	--	--
	MW-3	6/21/2004	(orig)	<0.0003	<0.002	<0.0002	<0.002	--	--	--	--	--	--	--	--
	MW-3	9/29/2004	(orig)	<0.0003	<0.002	<0.0002	<0.002	--	--	--	--	--	--	--	--
	MW-3	12/13/2004	(orig)	<0.0003	0.0003	<0.0002	0.0016	--	--	--	--	--	--	--	--
	MW-3	12/9/2010	(orig)	<0.001	<0.001	<0.001	<0.001	1130	0.002	0.009	<0.001	367	<0.001	--	0.009
	GW-085692-051415-CBMW-3	5/14/2015	(orig)	--	--	--	--	--	--	--	--	--	--	--	--
	GW-085692-091316-CM-MW-3	9/13/2016	(orig)	<0.001	<0.001	<0.001	<0.003	--	--	--	--	--	--	--	--

Notes:

BDL = below detection limit (actual laboratory detection limit not available)

mg/L = milligrams per liter (parts per million)

NA = Not Analyzed

NMWQCC = New Mexico Water Quality Control Commission

**Groundwater Analytical Results Summary**  
**ConocoPhillips Company**  
**Marcotte No. 1**  
**San Juan County, New Mexico**

Well ID	Sample ID	Date	Sample Type	Magnesium, dissolved (mg/L)	Manganese, dissolved (mg/L)	Molybdenum, dissolved (mg/L)	Potassium, dissolved (mg/L)	Selenium (mg/L)	Silver (mg/L)	Sodium, dissolved (mg/L)	Zinc, dissolved (mg/L)	Alkalinity, total as CaCO <sub>3</sub> (mg/L)	TDS (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	
<b>NMWQCC Groundwater Quality Standards</b>				--	<b>0.2</b>	<b>1.0</b>	--	<b>0.05</b>	<b>0.05</b>	--	<b>10</b>	--	<b>1000</b>	<b>250</b>	<b>1.6</b>	
MW-1	MW-1	9/29/2004	0	39.9	0.65	--	2.5	--	--	727	<0.02	318	--	99	--	
	MW-1	12/13/2004	(orig)	--	--	--	--	--	--	--	--	--	--	--	--	
MW-1R	GW-085692-051415-CBMW-1R	5/14/2015	(orig)	--	<b>1.76</b>	--	--	--	--	--	--	--	<b>3030</b>	53.3	--	
	GW-085692-091316-CM-MW-1R	9/13/2016	(orig)	--	<b>2.14</b>	--	--	--	--	--	--	--	<b>2940</b>	--	--	
MW-2	MW-2	10/8/2003	(orig)	34.9	<b>2.39</b>	--	1.6	--	--	419	0.02	302	--	45	--	
	MW-2	12/16/2003	(orig)	--	--	--	--	--	--	--	--	--	--	--	--	
	MW-2	3/15/2004	(orig)	--	--	--	--	--	--	--	--	--	--	--	--	
	MW-2	6/21/2004	(orig)	--	--	--	--	--	--	--	--	--	--	--	--	
	MW-2	9/29/2004	(orig)	--	--	--	--	--	--	--	--	--	--	--	--	
	MW-2	12/13/2004	(orig)	--	--	--	--	--	--	--	--	--	--	--	--	
	MW-2	12/9/2010	(orig)	50	--	--	6.56	0.005	0.031	603	--	410	<b>2750</b>	<b>1460</b>	BDL	
	GW-085692-040214-CM-MW-2	4/2/2014	(orig)	--	<b>0.853</b>	0.0039	--	--	--	--	--	--	290	<b>3030</b>	41.3	0.68
	GW-085692-051415-CBMW-2	5/14/2015	(orig)	--	<b>0.806</b>	--	--	--	--	--	--	--	--	<b>3230</b>	43.3	--
GW-085692-091316-CM-MW-2	9/13/2016	(orig)	--	<b>0.547</b>	--	--	--	--	--	--	--	--	<b>3250</b>	--	--	
MW-3	MW-3	10/8/2003	(orig)	34.5	0.063	--	1.6	--	--	409	<0.01	291	--	48	--	
	MW-3	12/16/2003	(orig)	--	--	--	--	--	--	--	--	--	--	--	--	
	MW-3	6/21/2004	(orig)	--	--	--	--	--	--	--	--	--	--	--	--	
	MW-3	9/29/2004	(orig)	--	--	--	--	--	--	--	--	--	--	--	--	
	MW-3	12/13/2004	(orig)	--	--	--	--	--	--	--	--	--	--	--	--	
	MW-3	12/9/2010	(orig)	50.9	--	--	4.28	0.027	0.031	550	--	370	<b>2630</b>	<b>1420</b>	1.14	
	GW-085692-051415-CBMW-3	5/14/2015	(orig)	--	0.0195	--	--	--	--	--	--	--	--	<b>1580</b>	45.1	--
GW-085692-091316-CM-MW-3	9/13/2016	(orig)	--	<0.005	--	--	--	--	--	--	--	--	<b>2720</b>	--	--	

Notes:

BDL = below detection limit (actual laboratory detection limit not av

mg/L = milligrams per liter (parts per million)

NA = Not Analyzed

NMWQCC = New Mexico Water Quality Control Commission

Table 2

**Groundwater Analytical Results Summary  
ConocoPhillips Company  
Marcotte No. 1  
San Juan County, New Mexico**

Well ID	Sample ID	Date	Sample Type	Sulfate (mg/L)	Nitrate, NO3 as N (mg/L)	Orthophosphate, as P (mg/L)	Cyanide (mg/L)	pH
<b>NMWQCC Groundwater Quality Standards</b>				<b>600</b>	<b>10</b>	<b>--</b>	<b>0.2</b>	<b>6 - 9</b>
MW-1	MW-1	9/29/2004	0	2100	--	--	--	7.1
	MW-1	12/13/2004	(orig)	--	--	--	--	--
MW-1R	GW-085692-051415-CBMW-1R	5/14/2015	(orig)	1740				
	GW-085692-091316-CM-MW-1R	9/13/2016	(orig)	1530				
MW-2	MW-2	10/8/2003	(orig)	1340	--	--	--	7.9
	MW-2	12/16/2003	(orig)	--	--	--	--	--
	MW-2	3/15/2004	(orig)	--	--	--	--	--
	MW-2	6/21/2004	(orig)	--	--	--	--	--
	MW-2	9/29/2004	(orig)	--	--	--	--	--
	MW-2	12/13/2004	(orig)	--	--	--	--	--
	MW-2	12/9/2010	(orig)	15.3	6.36	--	0.003	6.71
	GW-085692-040214-CM-MW-2	4/2/2014	(orig)	2360	<0.10	0.10	--	7.3
	GW-085692-051415-CBMW-2	5/14/2015	(orig)	2180	--	--	--	--
GW-085692-091316-CM-MW-2	9/13/2016	(orig)	1810	--	--	--	--	
MW-3	MW-3	10/8/2003	(orig)	1420		--	--	7.9
	MW-3	12/16/2003	(orig)	--	--	--	--	--
	MW-3	6/21/2004	(orig)	--	--	--	--	--
	MW-3	9/29/2004	(orig)	--	--	--	--	--
	MW-3	12/13/2004	(orig)	--	--	--	--	--
	MW-3	12/9/2010	(orig)	15.2	<0.10	--	0.002	6.92
	GW-085692-051415-CBMW-3	5/14/2015	(orig)	1840	--	--	--	--
	GW-085692-091316-CM-MW-3	9/13/2016	(orig)	1540	--	--	--	--

Notes:

BDL = below detection limit (actual laboratory detection limit not available)  
 mg/L = milligrams per liter (parts per million)  
 NA = Not Analyzed  
 NMWQCC = New Mexico Water Quality Control Commission

# Appendices

Appendix A  
2016 Annual Groundwater Laboratory  
Analytical Report

September 28, 2016

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

RE: Project: 085692 COP Marcotte No 1  
Pace Project No.: 60227654

Dear Christine Mathews:

Enclosed are the analytical results for sample(s) received by the laboratory on September 14, 2016. 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@pacelabs.com  
Project Manager

Enclosures

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



## REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,  
without the written consent of Pace Analytical Services, Inc..

## CERTIFICATIONS

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

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### **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

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## REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, Inc..

## SAMPLE SUMMARY

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60227654001	GW-085692-091316-CM-MW-1R	Water	09/13/16 11:20	09/14/16 08:50
60227654002	GW-085692-091316-CM-MW-2	Water	09/13/16 11:25	09/14/16 08:50
60227654003	GW-085692-091316-CM-MW-3	Water	09/13/16 11:55	09/14/16 08:50
60227654004	GW-085692-091316-CM-DUP	Water	09/13/16 00:00	09/14/16 08:50
60227654005	TB-085692-091316-CM-001	Water	09/13/16 14:15	09/14/16 08:50

## REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

Lab ID	Sample ID	Method	Analysts	Analytes Reported
60227654001	GW-085692-091316-CM-MW-1R	EPA 6010	TDS	1
		EPA 8260	EAG	8
		SM 2540C	JMC1	1
		EPA 300.0	OL	1
60227654002	GW-085692-091316-CM-MW-2	EPA 6010	TDS	1
		EPA 8260	EAG	8
		SM 2540C	JMC1	1
		EPA 300.0	OL	1
60227654003	GW-085692-091316-CM-MW-3	EPA 6010	TDS	1
		EPA 8260	EAG	8
		SM 2540C	JMC1	1
		EPA 300.0	OL	1
60227654004	GW-085692-091316-CM-DUP	EPA 8260	EAG	8
60227654005	TB-085692-091316-CM-001	EPA 8260	EAG	8

### REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

---

**Method:** EPA 6010

**Description:** 6010 MET ICP, Dissolved

**Client:** GHD Services\_COP NM

**Date:** September 28, 2016

**General Information:**

3 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:**

## REPORT OF LABORATORY ANALYSIS

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## PROJECT NARRATIVE

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

---

**Method:** EPA 8260

**Description:** 8260 MSV UST, Water

**Client:** GHD Services\_COP NM

**Date:** September 28, 2016

**General Information:**

5 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: 447284

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

**Additional Comments:**

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## PROJECT NARRATIVE

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

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**Method:** SM 2540C

**Description:** 2540C Total Dissolved Solids

**Client:** GHD Services\_COP NM

**Date:** September 28, 2016

**General Information:**

3 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: 085692 COP Marcotte No 1

Pace Project No.: 60227654

---

**Method:** EPA 300.0

**Description:** 300.0 IC Anions 28 Days

**Client:** GHD Services\_COP NM

**Date:** September 28, 2016

**General Information:**

3 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.

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

**Sample:** GW-085692-091316-CM-MW-1R      **Lab ID:** 60227654001      Collected: 09/13/16 11:20      Received: 09/14/16 08:50      Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP, Dissolved</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3010						
Manganese, Dissolved	<b>2140</b>	ug/L	5.0	1	09/21/16 15:55	09/22/16 12:50	7439-96-5	
<b>8260 MSV UST, Water</b>		Analytical Method: EPA 8260						
Benzene	<b>4.5</b>	ug/L	1.0	1		09/20/16 22:30	71-43-2	
Ethylbenzene	<b>11.6</b>	ug/L	1.0	1		09/20/16 22:30	100-41-4	
Toluene	ND	ug/L	1.0	1		09/20/16 22:30	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/20/16 22:30	1330-20-7	
<b>Surrogates</b>								
Toluene-d8 (S)	98	%	80-120	1		09/20/16 22:30	2037-26-5	
4-Bromofluorobenzene (S)	107	%	77-130	1		09/20/16 22:30	460-00-4	
1,2-Dichloroethane-d4 (S)	105	%	81-127	1		09/20/16 22:30	17060-07-0	
Preservation pH	<b>1.0</b>		1.0	1		09/20/16 22:30		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C						
Total Dissolved Solids	<b>2940</b>	mg/L	5.0	1		09/20/16 16:14		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Sulfate	<b>1530</b>	mg/L	100	100		09/27/16 20:40	14808-79-8	

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## ANALYTICAL RESULTS

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

**Sample:** GW-085692-091316-CM-MW-2     **Lab ID:** 60227654002     Collected: 09/13/16 11:25     Received: 09/14/16 08:50     Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP, Dissolved</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3010						
Manganese, Dissolved	<b>547</b>	ug/L	5.0	1	09/21/16 15:55	09/22/16 12:52	7439-96-5	
<b>8260 MSV UST, Water</b>		Analytical Method: EPA 8260						
Benzene	ND	ug/L	1.0	1		09/20/16 22:44	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		09/20/16 22:44	100-41-4	
Toluene	ND	ug/L	1.0	1		09/20/16 22:44	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/20/16 22:44	1330-20-7	
<b>Surrogates</b>								
Toluene-d8 (S)	99	%	80-120	1		09/20/16 22:44	2037-26-5	
4-Bromofluorobenzene (S)	106	%	77-130	1		09/20/16 22:44	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%	81-127	1		09/20/16 22:44	17060-07-0	
Preservation pH	<b>1.0</b>		1.0	1		09/20/16 22:44		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C						
Total Dissolved Solids	<b>3250</b>	mg/L	5.0	1		09/20/16 16:14		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Sulfate	<b>1810</b>	mg/L	200	200		09/27/16 20:54	14808-79-8	

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### ANALYTICAL RESULTS

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

**Sample:** GW-085692-091316-CM-MW-3    **Lab ID:** 60227654003    Collected: 09/13/16 11:55    Received: 09/14/16 08:50    Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP, Dissolved</b>		Analytical Method: EPA 6010 Preparation Method: EPA 3010						
Manganese, Dissolved	ND	ug/L	5.0	1	09/21/16 15:55	09/22/16 12:55	7439-96-5	
<b>8260 MSV UST, Water</b>		Analytical Method: EPA 8260						
Benzene	ND	ug/L	1.0	1		09/20/16 22:58	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		09/20/16 22:58	100-41-4	
Toluene	ND	ug/L	1.0	1		09/20/16 22:58	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/20/16 22:58	1330-20-7	
<b>Surrogates</b>								
Toluene-d8 (S)	97	%	80-120	1		09/20/16 22:58	2037-26-5	
4-Bromofluorobenzene (S)	106	%	77-130	1		09/20/16 22:58	460-00-4	
1,2-Dichloroethane-d4 (S)	108	%	81-127	1		09/20/16 22:58	17060-07-0	
Preservation pH	1.0		1.0	1		09/20/16 22:58		
<b>2540C Total Dissolved Solids</b>		Analytical Method: SM 2540C						
Total Dissolved Solids	2720	mg/L	5.0	1		09/20/16 16:14		
<b>300.0 IC Anions 28 Days</b>		Analytical Method: EPA 300.0						
Sulfate	1540	mg/L	100	100		09/27/16 21:08	14808-79-8	

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## ANALYTICAL RESULTS

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

**Sample:** GW-085692-091316-CM-DUP      **Lab ID:** 60227654004      Collected: 09/13/16 00:00      Received: 09/14/16 08:50      Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV UST, Water</b>		Analytical Method: EPA 8260						
Benzene	4.7	ug/L	1.0	1		09/20/16 23:12	71-43-2	
Ethylbenzene	11.9	ug/L	1.0	1		09/20/16 23:12	100-41-4	
Toluene	ND	ug/L	1.0	1		09/20/16 23:12	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/20/16 23:12	1330-20-7	
<b>Surrogates</b>								
Toluene-d8 (S)	99	%	80-120	1		09/20/16 23:12	2037-26-5	
4-Bromofluorobenzene (S)	106	%	77-130	1		09/20/16 23:12	460-00-4	
1,2-Dichloroethane-d4 (S)	106	%	81-127	1		09/20/16 23:12	17060-07-0	
Preservation pH	1.0		1.0	1		09/20/16 23:12		

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## ANALYTICAL RESULTS

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

**Sample: TB-085692-091316-CM-001**    **Lab ID: 60227654005**    Collected: 09/13/16 14:15    Received: 09/14/16 08:50    Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV UST, Water</b>		Analytical Method: EPA 8260						
Benzene	ND	ug/L	1.0	1		09/20/16 23:27	71-43-2	
Ethylbenzene	ND	ug/L	1.0	1		09/20/16 23:27	100-41-4	
Toluene	ND	ug/L	1.0	1		09/20/16 23:27	108-88-3	
Xylene (Total)	ND	ug/L	3.0	1		09/20/16 23:27	1330-20-7	
<b>Surrogates</b>								
Toluene-d8 (S)	99	%	80-120	1		09/20/16 23:27	2037-26-5	
4-Bromofluorobenzene (S)	107	%	77-130	1		09/20/16 23:27	460-00-4	
1,2-Dichloroethane-d4 (S)	103	%	81-127	1		09/20/16 23:27	17060-07-0	
Preservation pH	<b>1.0</b>		1.0	1		09/20/16 23:27		

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

QC Batch: 447446 Analysis Method: EPA 6010  
 QC Batch Method: EPA 3010 Analysis Description: 6010 MET Dissolved  
 Associated Lab Samples: 60227654001, 60227654002, 60227654003

METHOD BLANK: 1830368 Matrix: Water

Associated Lab Samples: 60227654001, 60227654002, 60227654003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Manganese, Dissolved	ug/L	ND	5.0	09/22/16 15:26	

LABORATORY CONTROL SAMPLE: 1830369

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Manganese, Dissolved	ug/L	1000	996	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1830370 1830371

Parameter	Units	60227652001		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	% Rec	% Rec					
Manganese, Dissolved	ug/L	925	1000	1000	1880	1890	96	96	75-125	0	20		

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### QUALITY CONTROL DATA

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

QC Batch: 447284 Analysis Method: EPA 8260  
 QC Batch Method: EPA 8260 Analysis Description: 8260 MSV UST-WATER  
 Associated Lab Samples: 60227654001, 60227654002, 60227654003, 60227654004, 60227654005

METHOD BLANK: 1829652 Matrix: Water  
 Associated Lab Samples: 60227654001, 60227654002, 60227654003, 60227654004, 60227654005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	1.0	09/20/16 19:12	
Ethylbenzene	ug/L	ND	1.0	09/20/16 19:12	
Toluene	ug/L	ND	1.0	09/20/16 19:12	
Xylene (Total)	ug/L	ND	3.0	09/20/16 19:12	
1,2-Dichloroethane-d4 (S)	%	103	81-127	09/20/16 19:12	
4-Bromofluorobenzene (S)	%	105	77-130	09/20/16 19:12	
Toluene-d8 (S)	%	100	80-120	09/20/16 19:12	

LABORATORY CONTROL SAMPLE: 1829653

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	20	17.8	89	79-116	
Ethylbenzene	ug/L	20	17.5	88	81-110	
Toluene	ug/L	20	17.3	86	82-111	
Xylene (Total)	ug/L	60	53.1	88	80-111	
1,2-Dichloroethane-d4 (S)	%			104	81-127	
4-Bromofluorobenzene (S)	%			105	77-130	
Toluene-d8 (S)	%			98	80-120	

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### QUALITY CONTROL DATA

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

QC Batch: 447228

Analysis Method: SM 2540C

QC Batch Method: SM 2540C

Analysis Description: 2540C Total Dissolved Solids

Associated Lab Samples: 60227654001, 60227654002, 60227654003

METHOD BLANK: 1829317

Matrix: Water

Associated Lab Samples: 60227654001, 60227654002, 60227654003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	ND	5.0	09/20/16 16:10	

LABORATORY CONTROL SAMPLE: 1829318

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1030	103	80-120	

SAMPLE DUPLICATE: 1829319

Parameter	Units	60227588001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	264	252	5	10	

SAMPLE DUPLICATE: 1829320

Parameter	Units	60227653002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	857	840	2	10	

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### QUALITY CONTROL DATA

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

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QC Batch: 448121 Analysis Method: EPA 300.0  
 QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions  
 Associated Lab Samples: 60227654001, 60227654002, 60227654003

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METHOD BLANK: 1833255 Matrix: Water  
 Associated Lab Samples: 60227654001, 60227654002, 60227654003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Sulfate	mg/L	ND	1.0	09/27/16 14:46	

LABORATORY CONTROL SAMPLE: 1833256

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE SAMPLE: 1833259

Parameter	Units	60227617002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	43.0	25	68.7	103	80-120	

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## QUALIFIERS

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

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### 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.

### BATCH QUALIFIERS

Batch: 447284

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

## REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 085692 COP Marcotte No 1

Pace Project No.: 60227654

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60227654001	GW-085692-091316-CM-MW-1R	EPA 3010	447446	EPA 6010	447531
60227654002	GW-085692-091316-CM-MW-2	EPA 3010	447446	EPA 6010	447531
60227654003	GW-085692-091316-CM-MW-3	EPA 3010	447446	EPA 6010	447531
60227654001	GW-085692-091316-CM-MW-1R	EPA 8260	447284		
60227654002	GW-085692-091316-CM-MW-2	EPA 8260	447284		
60227654003	GW-085692-091316-CM-MW-3	EPA 8260	447284		
60227654004	GW-085692-091316-CM-DUP	EPA 8260	447284		
60227654005	TB-085692-091316-CM-001	EPA 8260	447284		
60227654001	GW-085692-091316-CM-MW-1R	SM 2540C	447228		
60227654002	GW-085692-091316-CM-MW-2	SM 2540C	447228		
60227654003	GW-085692-091316-CM-MW-3	SM 2540C	447228		
60227654001	GW-085692-091316-CM-MW-1R	EPA 300.0	448121		
60227654002	GW-085692-091316-CM-MW-2	EPA 300.0	448121		
60227654003	GW-085692-091316-CM-MW-3	EPA 300.0	448121		

### REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt  
ESI Tech Spec Client

WO#: 60227654



60227654

Client Name: GHD COP NM

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

Tracking #: 7044 6052 B50 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 3.6 Corr. Factor CF +1.1 CF -0.1 Corrected 4.7

Date and initials of person examining contents: 12/1/16

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 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 <sub>3</sub> , H <sub>2</sub> SO <sub>4</sub> , 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 checked="" 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 checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Headspace in VOA vials (>6mm):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input 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: 09/15/16

<b>Temp Log:</b> Record start and finish times when unpacking cooler, if >20 min, recheck sample temps.	
Start: <u>1440</u>	Start:
End: <u>1445</u>	End:
Temp:	Temp:

