



January 13, 2014

Mr. Jacob Evans  
Noble Energy Inc.  
1600 Broadway  
Denver, CO 80202

Subject:     **Third Quarter 2014 Monitoring Report**  
              Betz 30-11, 30-14  
              API # 05-123-22861, Remediation #8392  
              Weld County, Colorado

Dear Mr. Evans:

Please find an enclosed copy of the above-referenced Groundwater Monitoring Report for the Betz 30-11, 30-14 site in Weld County, Colorado. The enclosed report describes groundwater monitoring activities conducted in accordance with the previously submitted Form 27 (COGCC Document #2148721). Please contact me at (303) 487-1228 if you require additional information.

Tasman appreciates the opportunity to provide this service.

Sincerely,  
Tasman Geosciences, LLC

A handwritten signature in blue ink, appearing to read 'Daniel Wade', is written in a cursive style.

Daniel Wade P.G.  
Senior Geologist

Enclosure:    Third Quarter 2014 Monitoring Report

**Betz 30-11, 30-14**

# **THIRD QUARTER 2014 MONITORING REPORT**

January 13, 2014



**PREPARED ON BEHALF OF**

Noble Energy, Inc.  
1600 Broadway  
Denver, CO 80202



**PREPARED BY**

Tasman Geosciences, LLC  
6899 Pecos Street, Unit C  
Denver, CO 80221



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- Attachment A – Laboratory Analytical Data Report

## 1.0 INTRODUCTION

This Third Quarter 2014 Monitoring Report (Report) presents the results of groundwater field monitoring activities performed during the third quarter 2014 at the Betz 30-11, 30-14 Tank Battery (Site). Field activities were performed by Tasman Geosciences, LLC (Tasman), on behalf of Noble Energy, Inc. (Noble).

Field activities described in this Report were conducted to evaluate groundwater flow and quality conditions across the Site. The data collected were used to develop the analytical summary tables and maps included herein.

### 1.1 Site Background

The Site is located in the NE  $\frac{1}{4}$  of the NE  $\frac{1}{4}$  of Section 30, Township 5 North, Range 67 West, approximately 2.8 miles northwest of the town of Johnstown, in Weld County, Colorado (Figure 1). Groundwater monitoring activities are being performed as a result of historic petroleum hydrocarbon impacts discovered beneath the produced water vault on November 22, 2013. In response to impacts observed, production equipment at the Site was shut in and the produced water vault was removed. A release was reported to the Colorado Oil and Gas Conservation Commission (COGCC) via Form 19 on November 25, 2013.

A summary of significant and/or recent environmental monitoring and remediation activities is provided below:

- On November 22, 2013 excavation activities were conducted to remove soil with petroleum hydrocarbon impacts in the vicinity of the produced water vault. The final dimensions of the excavation were 11 feet (ft.) by 12 ft. by 3.5 ft. below ground surface (bgs), as described in the Site Excavation Report dated April 9, 2014 and illustrated in Figure 2. Approximately 10 cubic yards of impacted soil were transported to the Buffalo Ridge Landfill for disposal. Clean fill was then returned to the Site.
- Four confirmation soil samples were collected and submitted for laboratory analysis for benzene, toluene, ethylbenzene, and total xylenes (collectively referred to as BTEX), naphthalene, and total petroleum hydrocarbons-gasoline range organics (TPH-GRO) using United States Environmental Protection Agency (USEPA) Method 8260, and total petroleum hydrocarbons-diesel range organics (TPH-DRO) using USEPA Method 8015. Soil sample analytical data are presented in Table 1 and illustrated in Figure 3.
- Groundwater was encountered during the excavation at a depth of approximately 3.5 ft. bgs. A laboratory sample (GW01) was collected and analyzed for BTEX using USEPA Method 8260B. The groundwater was found to have concentrations above the COGCC Table 910-1 standard for benzene and toluene. Groundwater laboratory analytical results are presented in Table 2.
- Two groundwater monitoring wells (MW-2 and MW-3) were installed at the Site on December 19, 2013, as shown in Figure 2. Soil samples from the well borings were

collected and submitted for laboratory analysis. Soil boring laboratory analytical results are presented in Table 1 and illustrated in Figure 3.

- Two additional groundwater monitoring wells (MW-1 and MW-4) were installed at the Site on January 10, 2014.
- An initial groundwater monitoring event was conducted on January 23, 2014.
- Three soil borings (SS05, SS06, and SS07) were advanced on the Site on February 17, 2014. Soil samples from the well borings were collected and submitted for laboratory analysis. Soil boring laboratory analytical results are presented in Table 1 and illustrated in Figure 3.
- The second quarter 2014 groundwater monitoring event was conducted on April 17, 2014.
- The third quarter 2014 groundwater monitoring event was conducted on July 10, 2014. Groundwater sampling procedures and results are described in subsequent sections of this Report.

## **1.2 Site Topography, Geology, and Hydrogeology**

The Site is located approximately 4,795 feet above mean sea level (amsl), and the surface topography slopes gradually to the south towards the Big Thompson River. Groundwater is encountered at approximately 2 to 4 ft. bgs and is most likely influenced by flow of the Big Thompson River.

Site investigation activities indicate that the subsurface geology immediately beneath the ground surface consists of unconsolidated, loosely bedded, alluvial sediments. The alluvium is composed of poorly sorted, medium to coarse grain sand with minor gravel.

## **2.0 GROUNDWATER MONITORING ACTIVITIES**

Third quarter 2014 groundwater monitoring activities were performed at the Site on July 10, 2014. The activities included measurement of groundwater levels and collection of groundwater samples from each of the four Site monitoring wells.

### **2.1 Groundwater Level Measurements**

Both general and significant observations from the groundwater gauging event are presented in the following sections.

#### General

Groundwater levels are measured (i.e. gauged) in order to evaluate hydraulic characteristics and to provide information regarding seasonal and annual fluctuations in groundwater elevation at the Site. During the third quarter 2014 groundwater monitoring event, groundwater levels were measured at monitoring wells MW-1, MW-2, MW-3, and MW-4.

Groundwater levels are measured on the north side of the well casing to the nearest 0.01-foot using an oil-water interface probe (IP). Groundwater level data were subsequently converted to elevations (ft. amsl) by subtracting the measured groundwater depth-to-water (DTW) level from the well's top-of-casing (TOC) elevation survey datum.

### Significant Observations

The groundwater table was encountered at approximately 2 to 4 ft. bgs and slopes to the south with a gradient of approximately 0.004ft./ft., as measured between monitoring wells MW-4 and MW-2.

No measurable light non-aqueous phase liquid (LNAPL) was detected in groundwater monitoring wells during the third quarter 2014 groundwater monitoring event.

## **2.2 Groundwater Sampling**

This section summarizes the groundwater sampling activities that were performed and the protocols followed during the third quarter 2014 groundwater monitoring event.

### **2.2.1 Groundwater Sampling Points**

On July 10, 2014, Site groundwater monitoring wells MW-1, MW-2, MW-3, and MW-4 were sampled as part of the third quarter groundwater monitoring event. The Site monitoring locations are illustrated in Figure 2.

### **2.2.2 Groundwater Purging and Sampling Activities**

This section summarizes both general and significant observations from the groundwater purging and sampling activities.

#### General

Prior to collecting groundwater samples, groundwater levels were measured at each of the Site monitoring wells, as previously described. The presence of product was also evaluated using an IP. Subsequently, a minimum of three well casing volumes of groundwater (calculated from total well depth and groundwater level measurements) were purged from the subject well prior to collecting a groundwater sample.

Groundwater monitoring wells were sampled using individual, disposable, polyethylene bailers to limit the potential for cross-contamination between sampling points. Clean sample containers (40-milliliter [ml] volatile organic analysis [VOA] vials) supplied by the analytical laboratory were used to contain liquid for subsequent analyses.

VOA vials were overfilled and capped to reduce the potential for any headspace and to prevent the loss of volatile analytes, and subsequently inverted and gently tapped to dislodge any air bubbles that may have formed around the cap or sides. Sample bottles were then labeled with the

corresponding date, time, and well identification, and subsequently placed in an ice-filled cooler and maintained at approximately 4 degrees Celsius ( $^{\circ}\text{C}$ ) for transportation.

The groundwater samples were packed as designated by the analytical laboratory and transferred for analysis under chain-of-custody procedures to Summit Scientific in Golden, CO. The groundwater samples were submitted for analysis of BTEX using USEPA Method 8260B.

### Significant Observations

- No hydrocarbon sheen was observed in purge water collected from any of the four groundwater monitoring locations.
- No hydrocarbon odors were detected in purge water collected from any of the four groundwater monitoring locations.

## **3.0 GROUNDWATER MONITORING RESULTS AND EVALUATION**

Groundwater monitoring results are presented in the following sections.

### **3.1 Groundwater Monitoring Results**

During the third quarter 2014 groundwater monitoring event, groundwater elevations ranged from 4792.24 ft. amsl at MW-4 to 4791.91 ft. amsl at MW-2.

Groundwater elevation data are presented in Table 3 and groundwater potentiometric surface contours are illustrated in Figure 4. As illustrated, measured groundwater elevations from the four monitoring wells indicate a groundwater gradient to the south.

Groundwater analytical results for the third quarter 2014 groundwater monitoring event are summarized below, presented in Table 2, and illustrated in Figure 5. To evaluate Site conditions, groundwater analytical results are compared to the COGCC Table 910-1 standards for BTEX in groundwater. The laboratory analytical data reports are provided in Attachment A.

- Benzene was not detected above the COGCC Table 910-1 standard of 5 micrograms per liter ( $\mu\text{g/L}$ ) in any of the 4 monitoring wells sampled.
- Toluene was not detected above the COGCC Table 910-1 standard of 560  $\mu\text{g/L}$  in any of the 4 monitoring wells sampled.
- Ethylbenzene was not detected above the COGCC Table 910-1 standard of 700  $\mu\text{g/L}$  in any of the 4 monitoring wells sampled.
- Total xylenes were not detected above the COGCC Table 910-1 standard of 1400  $\mu\text{g/L}$  in any of the 4 monitoring wells sampled.

## **4.0 CONCLUSIONS AND RECOMMENDATIONS**

This section of the Report presents conclusions from the findings of the third quarter activities as well as recommendations for future activities.

### **4.1 Conclusions**

Laboratory analytical data indicate that dissolved-phase petroleum hydrocarbon concentrations are not present above laboratory reporting limits in any of the Site groundwater monitoring well locations. These results are consistent with the previous two consecutive quarters of groundwater monitoring results.

These observations support the conclusion that petroleum hydrocarbon impacts are not present on-Site and have not migrated from the original release location.

### **4.2 Recommendations**

Recommendations for additional Site activities include ongoing quarterly groundwater monitoring during the fourth quarter 2014 for continued assessment of Site conditions and analysis of Site hydrocarbon concentration trends.

## **5.0 UPCOMING SITE ACTIVITIES**

Upcoming Site activities anticipated for the next quarterly monitoring period include the following items:

- Conduct the fourth quarter 2014 groundwater monitoring and sampling event in October 2014.

# **TABLES**

**TABLE 1**  
**SOIL ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - BETZ 30-11, 30-14**

Soil Sample ID	Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	Naphthalene (mg/kg)
<b>COGCC Standard</b>		<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>500</b>		<b>23</b>
SS01@3'	11/22/13	<0.0020	<0.0050	<0.0050	<0.010	<0.50	<50	<0.010
MW-2@1-3'	12/19/13	<0.0020	<0.0050	<0.0050	<0.010	<0.50	<50	<0.010
MW-3@1-3'	12/19/13	<0.0020	<0.0050	<0.0050	<0.010	<0.50	<50	<0.010
SS05@3'	02/17/14	<0.01	<0.01	<0.01	<0.01	<50	<50	<0.01
SS06@3'	02/17/14	<0.01	<0.01	<0.01	<0.01	<50	<50	<0.01
SS07@3'	02/17/14	<0.01	<0.01	<0.01	<0.01	<50	<50	<0.01

Soil Sample ID	Date	EC	pH	SAR
		<b>4 or 2x BG.</b>	<b>6-9</b>	<b>&lt;12</b>
SS01@3'	11/22/13	2.63	7.81	1.91

COGCC = Colorado Oil and Gas Conservation Commission  
 TPH-GRO = Total petroleum hydrocarbons - gasoline range organics  
 TPH-DRO = Total petroleum hydrocarbons - diesel range organics  
 mg/kg = Milligrams per kilogram  
 < = Analytical result is less than the indicated laboratory reporting limit  
 EC = Specific conductance  
 BG = Background  
 SAR = Sodium adsorption ratio  
 Soil standards referenced from COGCC Table 910-1

**Highlighted results exceed the COGCC Table 910-1 standard**

**TABLE 2**  
**GROUNDWATER ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - BETZ 30-11, 30-14**

Monitoring Well ID	Date	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)
<b>COGCC Standard</b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>
GW01	11/22/13	350	590	120	840
MW-1	01/23/14	<1.0	<1.0	<1.0	<1.0
MW-1	04/17/14	<1.0	<1.0	<1.0	<1.0
MW-1	07/10/14	<1.0	<1.0	<1.0	<1.0
MW-2	01/23/14	<1.0	<1.0	<1.0	<1.0
MW-2	04/17/14	<1.0	<1.0	<1.0	<1.0
MW-2	07/10/14	<1.0	<1.0	<1.0	<1.0
MW-3	01/23/14	<1.0	<1.0	<1.0	<1.0
MW-3	04/17/14	<1.0	<1.0	<1.0	<1.0
MW-3	07/10/14	<1.0	<1.0	<1.0	<1.0
MW-4	01/23/14	<1.0	<1.0	<1.0	<1.0
MW-4	04/17/14	<1.0	<1.0	<1.0	<1.0
MW-4	07/10/14	<1.0	<1.0	<1.0	<1.0

COGCC = Colorado Oil and Gas Conservation Commission

µg/l = Micrograms per liter

< = Analytical result is less than the indicated laboratory reporting limit

Groundwater standards referenced from COGCC Table 910-1

**Highlighted results exceed the COGCC Table 910-1 standard**

**TABLE 3**  
**GROUNDWATER ELEVATION DATA**  
**NOBLE ENERGY, INC. - BETZ 30-11, 30-14**

<b>Monitoring Well ID</b>	<b>Date</b>	<b>Top of Casing Elevation (ft. AMSL)</b>	<b>Total Depth (ft. BTOC)</b>	<b>Depth to Water (ft. BTOC)</b>	<b>Depth to LNAPL (ft. BTOC)</b>	<b>LNAPL Thickness (ft.)</b>	<b>Groundwater Elevation* (ft. AMSL)</b>
MW-1	01/23/14	4797.84	7.94	5.58	ND	ND	4792.26
MW-1	04/17/14	4797.84	7.94	5.81	ND	ND	4792.03
MW-1	07/10/14	4797.84	7.94	5.68	ND	ND	4792.16
MW-2	01/23/14	4794.00	9.78	1.92	ND	ND	4792.08
MW-2	04/17/14	4794.00	9.40	2.11	ND	ND	4791.89
MW-2	07/10/14	4794.00	9.43	2.09	ND	ND	4791.91
MW-3	01/23/14	4794.24	9.54	2.12	ND	ND	4792.12
MW-3	04/17/14	4794.24	9.41	2.31	ND	ND	4791.93
MW-3	07/10/14	4794.24	9.34	2.25	ND	ND	4791.99
MW-4	01/23/14	4798.62	7.82	6.30	ND	ND	4792.32
MW-4	04/17/14	4798.62	7.84	6.53	ND	ND	4792.09
MW-4	07/10/14	4798.62	7.87	6.38	ND	ND	4792.24

ft. = Feet

AMSL = Above mean sea level

BTOC = Below top of casing

LNAPL = Light non-aqueous phase liquid

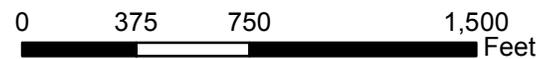
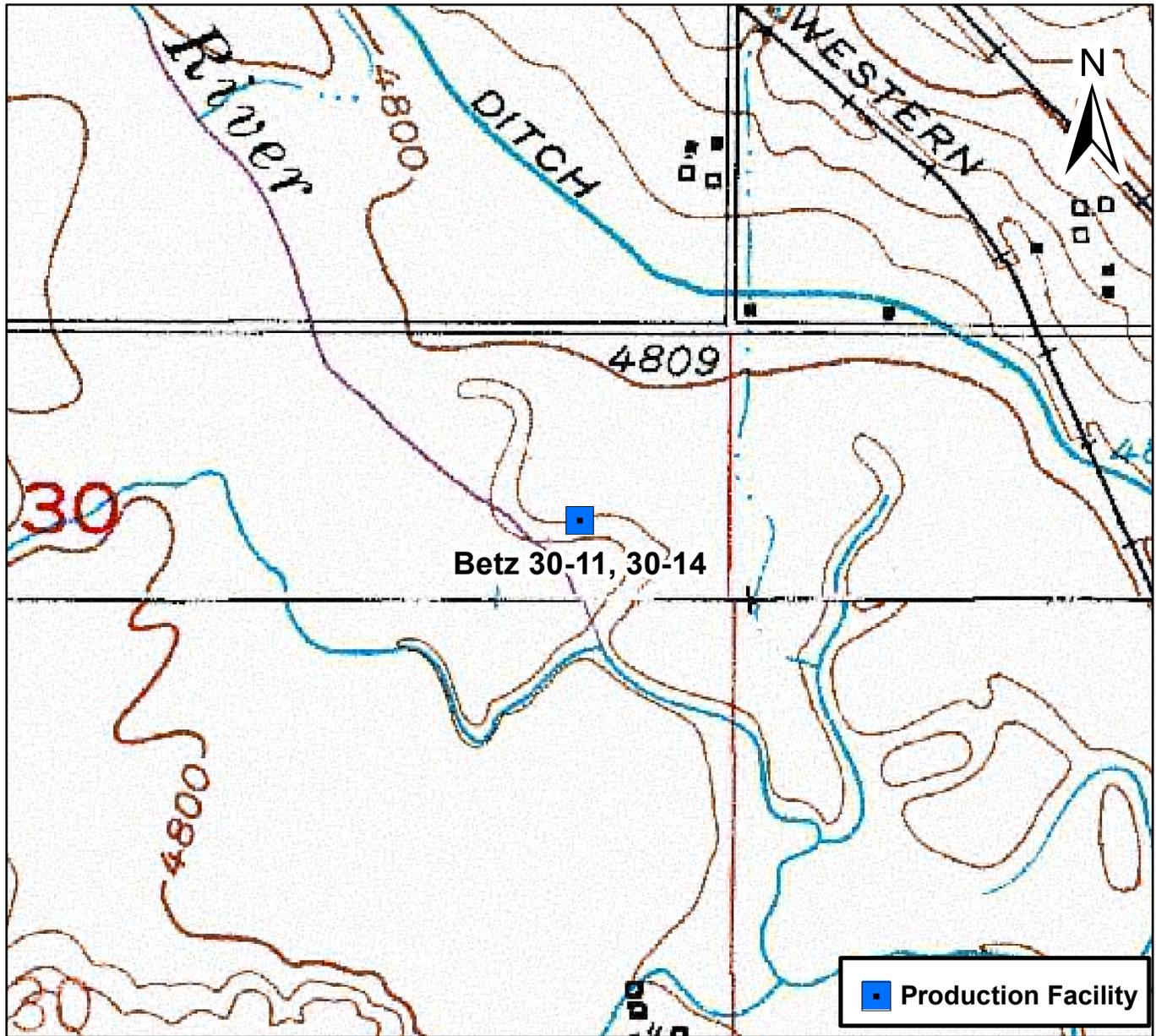
ND = No LNAPL detected

\* Groundwater elevation was corrected for product thickness (when present) using the following calculation:

Groundwater elevation = (TOC Elevation - Measured Depth to Water)+(LNAPL Thickness in Well x LNAPL Relative Density)

LNAPL relative density was assumed to be approximately 0.75

## **FIGURES**



### Figure 1

Site Location Map  
 Betz 30-11, 30-14  
 NENE S30 T5N R67W  
 Weld County, Colorado

Drawn By: DBA  
 Date: 12/16/2013





PROJECT NO:  
 DRAWN BY: ATF  
 DATE: 3/05/2014



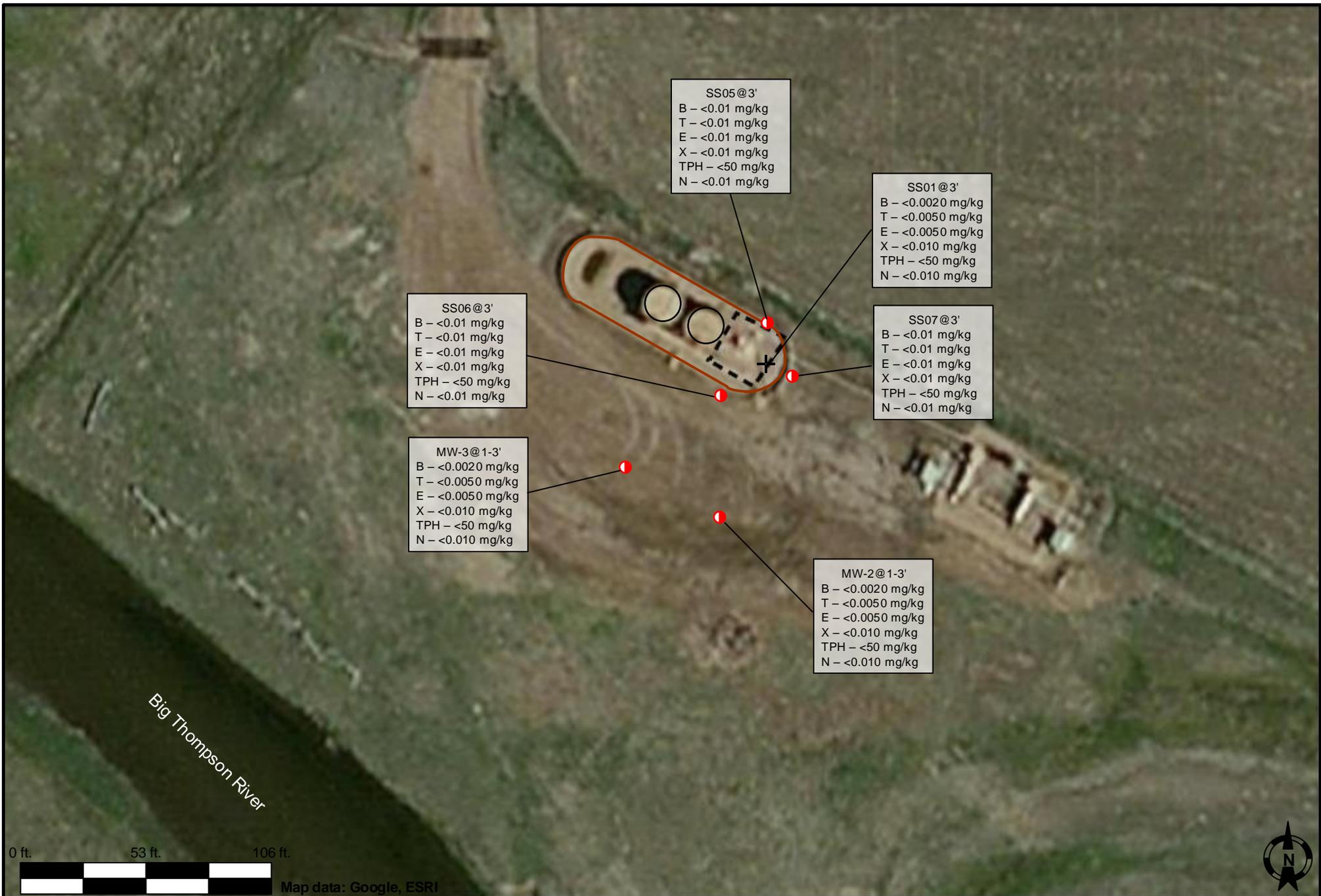
**Facility**  
 Betz 30-11, 30-14  
 Weld County, CO

**LEGEND:**

-  Groundwater Monitoring Well
-  Excavation Extent (Surveyed Via Trimble GPS)

-  Earthen Berm
-  Oil Tank

Site Overview Map  
 Figure 2



SS06@3'  
 B - <0.01 mg/kg  
 T - <0.01 mg/kg  
 E - <0.01 mg/kg  
 X - <0.01 mg/kg  
 TPH - <50 mg/kg  
 N - <0.01 mg/kg

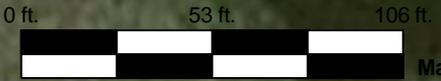
SS05@3'  
 B - <0.01 mg/kg  
 T - <0.01 mg/kg  
 E - <0.01 mg/kg  
 X - <0.01 mg/kg  
 TPH - <50 mg/kg  
 N - <0.01 mg/kg

SS01@3'  
 B - <0.0020 mg/kg  
 T - <0.0050 mg/kg  
 E - <0.0050 mg/kg  
 X - <0.010 mg/kg  
 TPH - <50 mg/kg  
 N - <0.010 mg/kg

SS07@3'  
 B - <0.01 mg/kg  
 T - <0.01 mg/kg  
 E - <0.01 mg/kg  
 X - <0.01 mg/kg  
 TPH - <50 mg/kg  
 N - <0.01 mg/kg

MW-3@1-3'  
 B - <0.0020 mg/kg  
 T - <0.0050 mg/kg  
 E - <0.0050 mg/kg  
 X - <0.010 mg/kg  
 TPH - <50 mg/kg  
 N - <0.010 mg/kg

MW-2@1-3'  
 B - <0.0020 mg/kg  
 T - <0.0050 mg/kg  
 E - <0.0050 mg/kg  
 X - <0.010 mg/kg  
 TPH - <50 mg/kg  
 N - <0.010 mg/kg



Map data: Google, ESRI



PROJECT NO:  
 DRAWN BY: ATF  
 DATE: 10/10/2014



**Facility**  
 Betz 30-11, 30-14  
 Weld County, CO

**LEGEND:** + Excavation Soil Sample Location  
 ● Borehole Sample Location  
 - - Excavation Extent (Surveyed Via Trimble GPS)

— Earthen Berm  
 ○ Oil Tank  
 Milligrams / Kilogram (mg/kg)

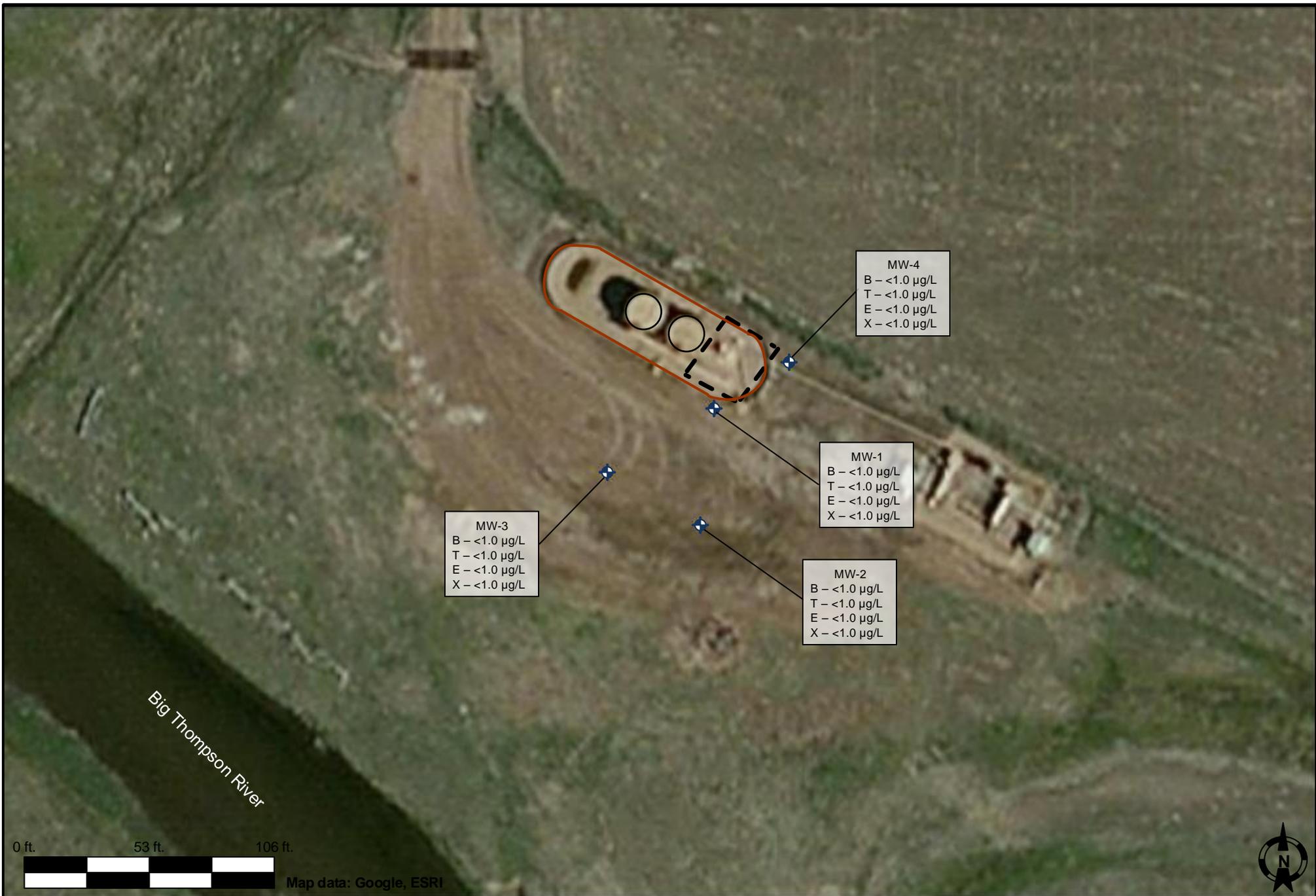
B - Benzene  
 T - Toluene  
 E - Ethylbenzene  
 X - Total Xylenes  
 TPH - Total Petroleum Hydrocarbons  
 N - Naphthalene

Soil Analytical Results Map

Figure 3



PROJECT NO:		<b>Facility</b> Betz 30-11, 30-14 Weld County, CO	<b>LEGEND:</b>  Oil Tank  Earthen Berm	 Groundwater Monitoring Well  Flow Direction  Groundwater Elevation Contour (Dashed where inferred)	<b>4792.16</b> Measured Groundwater Elevation  Excavation Extent (Surveyed Via Trimble GPS)	Groundwater Potentiometric Surface Contour Map (July 10, 2014) Figure 4
DRAWN BY: ATF						
DATE: 7/29/2014						



MW-3  
 B - <1.0 µg/L  
 T - <1.0 µg/L  
 E - <1.0 µg/L  
 X - <1.0 µg/L

MW-1  
 B - <1.0 µg/L  
 T - <1.0 µg/L  
 E - <1.0 µg/L  
 X - <1.0 µg/L

MW-2  
 B - <1.0 µg/L  
 T - <1.0 µg/L  
 E - <1.0 µg/L  
 X - <1.0 µg/L

MW-4  
 B - <1.0 µg/L  
 T - <1.0 µg/L  
 E - <1.0 µg/L  
 X - <1.0 µg/L

PROJECT NO:  
 DRAWN BY: ATF  
 DATE: 10/10/2014



**Facility**  
 Betz 30-11, 30-14  
 Weld County, CO

**LEGEND:**  
 - - - Excavation Extent (Surveyed Via Trimble GPS)  
 ○ Oil Tank

◆ Groundwater Monitoring Well  
 — Earthen Berm  
 Micrograms / Liter (µg/L)

B - Benzene  
 T - Toluene  
 E - Ethylbenzene  
 X - Total Xylenes

Groundwater Analytical Results Map (July 10, 2014)  
 Figure 5

**ATTACHMENT A**  
**LABORATORY ANALYTICAL DATA REPORT**

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

July 17, 2014

Daniel Wade  
Noble Energy  
804 Grand Avenue  
Platteville, CO 80651  
RE: Betz 30-11, 30-14

Enclosed are the results of analyses for samples received by Summit Scientific on 07/11/14 17:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'BS', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury  
President / Laboratory Manager



Noble Energy  
804 Grand Avenue  
Platteville CO, 80651

Project: Betz 30-11, 30-14

Project Number: [none]  
Project Manager: Daniel Wade

**Reported:**  
07/17/14 17:33

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-01	1407079-01	Water	07/10/14 10:40	07/11/14 17:15
MW-02	1407079-02	Water	07/10/14 10:45	07/11/14 17:15
MW-03	1407079-03	Water	07/10/14 10:50	07/11/14 17:15
MW-04	1407079-04	Water	07/10/14 10:55	07/11/14 17:15

Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





Noble Energy  
804 Grand Avenue  
Platteville CO, 80651

Project: Betz 30-11, 30-14

Project Number: [none]  
Project Manager: Daniel Wade

**Reported:**  
07/17/14 17:33

**MW-01**  
**1407079-01 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **07/10/14 10:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1407112	07/16/14	07/16/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **07/10/14 10:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>110 %</i>	<i>37-154</i>		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		<i>98.3 %</i>	<i>45-149</i>		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>104 %</i>	<i>45-146</i>		"	"	"	"	

Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



Noble Energy  
804 Grand Avenue  
Platteville CO, 80651

Project: Betz 30-11, 30-14

Project Number: [none]  
Project Manager: Daniel Wade

**Reported:**  
07/17/14 17:33

**MW-02**  
**1407079-02 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **07/10/14 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1407112	07/16/14	07/16/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **07/10/14 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		98.9 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	45-146		"	"	"	"	

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Noble Energy  
804 Grand Avenue  
Platteville CO, 80651

Project: Betz 30-11, 30-14

Project Number: [none]  
Project Manager: Daniel Wade

**Reported:**  
07/17/14 17:33

**MW-03**  
**1407079-03 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **07/10/14 10:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1407112	07/16/14	07/16/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **07/10/14 10:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		98.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	45-146		"	"	"	"	

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Project: Betz 30-11, 30-14

Project Number: [none]  
Project Manager: Daniel Wade

**Reported:**  
07/17/14 17:33

**MW-04**  
**1407079-04 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **07/10/14 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1407112	07/16/14	07/16/14	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **07/10/14 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		106 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.2 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	45-146		"	"	"	"	

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Project: Betz 30-11, 30-14

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Project Manager: Daniel Wade

Reported:  
07/17/14 17:33

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**

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Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

**Batch 1407112 - EPA 5030 Water MS**

**Blank (1407112-BLK1)**

Prepared & Analyzed: 07/14/14

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	14.7		"	13.2		111	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		99.0	45-149			
Surrogate: 4-Bromofluorobenzene	14.9		"	13.3		111	45-146			

**LCS (1407112-BS1)**

Prepared & Analyzed: 07/14/14

Benzene	34.3	1.0	ug/l	33.3		103	51-132			
Toluene	34.9	1.0	"	33.3		105	51-138			
Ethylbenzene	35.9	1.0	"	33.1		109	58-146			
m,p-Xylene	73.3	2.0	"	66.5		110	57-144			
o-Xylene	36.2	1.0	"	32.8		110	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.7		"	13.2		104	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.4	45-149			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3		100	45-146			

**Matrix Spike (1407112-MS1)**

Source: 1407052-01

Prepared & Analyzed: 07/14/14

Benzene	35.2	1.0	ug/l	33.3	ND	106	34-141			
Toluene	36.4	1.0	"	33.3	ND	109	27-151			
Ethylbenzene	37.8	1.0	"	33.1	ND	114	29-160			
m,p-Xylene	76.8	2.0	"	66.5	ND	115	20-166			
o-Xylene	38.2	1.0	"	32.8	ND	116	33-159			
Surrogate: 1,2-Dichloroethane-d4	13.5		"	13.2		102	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		98.7	45-149			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3		99.8	45-146			

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07/17/14 17:33

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source	%REC			RPD	Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

**Batch 1407112 - EPA 5030 Water MS**

<b>Matrix Spike Dup (1407112-MSD1)</b>	<b>Source: 1407052-01</b>			<b>Prepared &amp; Analyzed: 07/14/14</b>						
Benzene	33.4	1.0	ug/l	33.3	ND	100	34-141	5.19	32	
Toluene	34.4	1.0	"	33.3	ND	103	27-151	5.80	25	
Ethylbenzene	35.8	1.0	"	33.1	ND	108	29-160	5.47	50	
m,p-Xylene	73.3	2.0	"	66.5	ND	110	20-166	4.76	36	
o-Xylene	35.4	1.0	"	32.8	ND	108	33-159	7.53	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.9</i>		<i>"</i>	<i>13.2</i>		<i>105</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.1</i>		<i>"</i>	<i>13.3</i>		<i>98.3</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.3</i>		<i>"</i>	<i>13.3</i>		<i>99.8</i>	<i>45-146</i>			

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Project: Betz 30-11, 30-14

Project Number: [none]  
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**Reported:**  
07/17/14 17:33

### Notes and Definitions

DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis  
RPD Relative Percent Difference

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