



**PDC Energy, Inc.**  
**Second Quarter 2016 Groundwater Monitoring Summary**

May 2, 2016

Ryan 23-25U & 25BU, 14-25U / Scott 24-25U / MVS #1 Tank Battery  
SESW Section 25 T5N R68W  
Larimer County, API # 05-069-06179  
Facility ID # 307148  
Remediation # 7239

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the Ryan 23-25U & 25BU, 14-25U/ Scott 24-25U/ MVS #1 tank battery. On April 13, 2016, groundwater sampling was conducted at five temporary monitoring well locations (BH01, BH02R – BH05R). Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) using USEPA Method 8260B. Analytical results are summarized in Table 1, and the laboratory report is included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. Second quarter 2016 analytical results indicate that BTEX concentrations are below applicable COGCC Table 910-1 groundwater standards in all five sample locations.

Tasman conducted enhanced fluid recovery (EFR) and air sparge (AS) events between second quarter 2012 and second quarter 2013. EFR/AS activities were discontinued in the third quarter 2013 due to decreased groundwater levels on site. A summary of EFR/AS operational data is provided in Table 2. Monitored natural attenuation (MNA) was selected as the remediation strategy in third quarter 2013 and will continue through the third quarter 2016.

Pending land owner approval, additional monitoring wells will be installed to the north, east, and southwest of the current monitoring well network to establish up-, cross-, and down-gradient point of compliance.

Third quarter 2016 groundwater sampling will be conducted during July 2016.

**TABLE 1**  
**RYAN 23-25U, 25BU, 14-25U/SCOTT 24-25U/MVS 1 TANK BATTERY**  
**GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water <sup>(2)</sup> (feet)
<b>COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	
GW01-BH01	4/13/2012	<b>320</b>	<b>810</b>	44	490	NM
BH01	7/17/2012	<1.0	<1.0	<1.0	<1.0	14.39
BH01	10/1/2012	<1.0	<1.0	<1.0	<1.0	14.67
BH01	1/28/2013	<1.0	<1.0	<1.0	<1.0	14.90
BH01	5/3/2013	<1.0	<1.0	<1.0	<1.0	15.50
BH01	7/25/2013	<1.0	<1.0	<1.0	<1.0	16.29
BH01	10/31/2013	<1.0	<1.0	<1.0	<1.0	15.90
BH01	1/24/2014	<1.0	<1.0	<1.0	<1.0	15.53
BH01	4/28/2014	<1.0	<1.0	<1.0	<1.0	15.26
BH01	7/25/2014	<1.0	<1.0	<1.0	<1.0	15.59
BH01	10/22/2014	<1.0	<1.0	<1.0	<1.0	16.25
BH01	1/13/2015	<1.0	<1.0	<1.0	<1.0	15.00
BH01	4/9/2015	<1.0	<1.0	<1.0	<1.0	15.38
BH01	7/27/2015	<1.0	<1.0	<1.0	<1.0	16.01
BH01	10/5/2015	<1.0	<1.0	<1.0	<1.0	16.53
BH01	1/4/2016	<1.0	<1.0	<1.0	<1.0	16.68
BH01	4/13/2016	<1.0	<1.0	<1.0	<1.0	15.77
GW02-BH02	4/13/2012	<b>7,100</b>	<b>14,000</b>	420	<b>4,400</b>	NM
BH02	7/17/2012	DRY	DRY	DRY	DRY	DRY
BH02	10/1/2012	DRY	DRY	DRY	DRY	DRY
BH02	1/28/2013	DRY	DRY	DRY	DRY	DRY
BH02	5/3/2013	DRY	DRY	DRY	DRY	DRY
BH02	7/25/2013	DRY	DRY	DRY	DRY	DRY
BH02	10/31/2013	DRY	DRY	DRY	DRY	DRY
BH02	1/24/2014	DRY	DRY	DRY	DRY	DRY
BH02R	4/28/2014	1.0	<1.0	<1.0	<1.0	17.06
BH02R	7/25/2014	<1.0	<1.0	<1.0	<1.0	17.38
BH02R	10/22/2014	<1.0	<1.0	<1.0	<1.0	17.01
BH02R	1/13/2015	<1.0	<1.0	<1.0	<1.0	16.74
BH02R	4/9/2015	<1.0	<1.0	<1.0	<1.0	17.13
BH02R	7/27/2015	<1.0	<1.0	<1.0	<1.0	18.05
BH02R	10/5/2015	<1.0	<1.0	<1.0	<1.0	18.66

**TABLE 1**  
**RYAN 23-25U, 25BU, 14-25U/SCOTT 24-25U/MVS 1 TANK BATTERY**  
**GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water <sup>(2)</sup> (feet)
<b>COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	
BH02R	1/4/2016	<1.0	<1.0	<1.0	2.3	18.58
BH02R	4/13/2016	<1.0	<1.0	<1.0	<1.0	17.68
GW03-BH03	4/13/2012	<b>11,000</b>	<b>13,000</b>	300	<b>3,500</b>	NM
BH03	7/17/2012	<b>1,400</b>	<b>710</b>	20	250	13.82
BH03	10/1/2012	<b>41</b>	47	3.0	32	14.20
BH03	1/28/2013	DRY	DRY	DRY	DRY	DRY
BH03	5/3/2013	<1.0	<1.0	<1.0	<1.0	14.81
BH03	7/25/2013	DRY	DRY	DRY	DRY	DRY
BH03	10/31/2013	DRY	DRY	DRY	DRY	DRY
BH03	1/24/2014	<1.0	<1.0	<1.0	<1.0	14.82
BH03R	7/25/2014	3.4	<1.0	<1.0	<1.0	15.43
BH03R	10/22/2014	<b>7.3</b>	<1.0	1.2	<1.0	15.40
BH03R	4/28/2014	<1.0	<1.0	<1.0	<1.0	16.08
BH03R	7/25/2014	3.4	<1.0	<1.0	<1.0	15.43
BH03R	10/22/2014	<b>7.3</b>	<1.0	1.2	<1.0	15.40
BH03R	1/13/2015	<1.0	<1.0	1.3	<1.0	15.15
BH03R	4/9/2015	<1.0	<1.0	<1.0	<1.0	15.47
BH03R	7/27/2015	<1.0	<1.0	<1.0	<1.0	16.21
BH03R	10/5/2015	<1.0	<1.0	<1.0	<1.0	16.41
BH03R	1/4/2016	<1.0	<1.0	<1.0	<1.0	16.71
BH03R	4/13/2016	<1.0	<1.0	<1.0	<1.0	15.65
GW04-BH04	4/13/2012	<b>3,100</b>	<b>3,900</b>	150	<b>1,700</b>	NM
BH04	7/17/2012	<b>1,500</b>	490	<1.0	<b>1,900</b>	13.21
BH04	10/1/2012	<b>2,400</b>	66	53	<b>1,800</b>	13.58
BH04R	1/28/2013	<b>26</b>	<1.0	<1.0	<b>77</b>	14.53
BH04R	5/3/2013	<1.0	<1.0	<1.0	<1.0	15.22
BH04R	7/25/2013	2.0	<1.0	<1.0	<1.0	16.12
BH04R	10/31/2013	<1.0	<1.0	4.1	<1.0	15.77
BH04R	1/24/2014	<1.0	<1.0	3.3	<1.0	15.24
BH04R	4/28/2014	<1.0	<1.0	4.1	<1.0	15.03
BH04R	7/25/2014	<1.0	<1.0	1.1	<1.0	15.17
BH04R	10/22/2014	<b>13</b>	<1.0	<1.0	<1.0	15.01

**TABLE 1**  
**RYAN 23-25U, 25BU, 14-25U/SCOTT 24-25U/MVS 1 TANK BATTERY**  
**GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water <sup>(2)</sup> (feet)
<b>COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	
BH04R	1/13/2015	2.4	<1.0	1.5	4.0	14.81
BH04R	4/9/2015	1.7	<1.0	1.5	7.4	15.11
BH04R	7/27/2015	<b>130</b>	<1.0	1.0	18	15.73
BH04R	8/4/2015	<b>76</b>	<1.0	3.1	46	16.07
BH04R	10/5/2015	<b>25</b>	<1.0	15	45	15.99
BH04R	1/4/2016	<b>13</b>	<1.0	10	56	16.49
BH04R	4/13/2016	2.1	<1.0	<1.0	<1.0	15.48
GW05-BH05	4/13/2012	<b>510</b>	<b>3,400</b>	190	<b>2,200</b>	NM
BH05	7/17/2012	<1.0	<1.0	<1.0	<1.0	13.30
BH05	10/1/2012	<1.0	<1.0	<1.0	<1.0	15.60
BH05	1/28/2013	<1.0	<1.0	<1.0	<1.0	15.74
BH05	5/3/2013	<1.0	<1.0	<1.0	<1.0	16.45
BH05	7/25/2013	DRY	DRY	DRY	DRY	DRY
BH05	8/31/2013	DRY	DRY	DRY	DRY	DRY
BH05	10/31/2013	DRY	DRY	DRY	DRY	DRY
BH05	1/24/2014	<1.0	<1.0	<1.0	<1.0	16.49
BH05R	4/28/2014	<1.0	<1.0	<1.0	<1.0	15.89
BH05R	7/25/2014	<1.0	<1.0	<1.0	<1.0	16.15
BH05R	10/22/2014	<1.0	<1.0	<1.0	<1.0	15.90
BH05R	1/13/2015	<1.0	<1.0	<1.0	<1.0	15.65
BH05R	4/9/2015	<1.0	<1.0	<1.0	<1.0	15.94
BH05R	7/27/2015	<1.0	<1.0	<1.0	<1.0	16.80
BH05R	10/5/2015	<1.0	<1.0	<1.0	<1.0	17.22
BH05R	1/4/2016	<1.0	<1.0	<1.0	<1.0	17.39
BH05R	4/13/2016	<1.0	<1.0	<1.0	<1.0	16.44

**Notes:**

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective March 16, 2016.

2. Depth to water measured from top of well casing

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

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

DRY = Well contained insufficient volume to collect sample.

NM = Not Measured

**BOLD** = Analytical result is in exceedance of COGCC groundwater standards.

**TABLE 2**  
**RYAN 23-25U, 25BU, 14-25U/SCOTT 24-25U/MVS 1 TANK BATTERY**  
**EFR / AS OPERATIONAL SUMMARY TABLE**

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)
Second Quarter 2012					
5/29/2012	BH01, BH02, BH03, BH04, BH05	6	210	BH01, BH02, BH03, BH04, BH05	8
6/13/2012		6	210		8
Quarterly Totals		12	420		-
Third Quarter 2012					
7/2/2012	BH01, BH02, BH03, BH04, BH05	6	252	BH01, BH02, BH03, BH04, BH05	8
7/10/2012		6	210		8
7/25/2012		6	207		8
8/18/2012		7	124.5		7.5
8/21/2012		8	124.5		8
9/4/2012		7	0		8
Quarterly Totals		40	918		-
Fourth Quarter 2012					
10/3/2012	BH01, BH02, BH03, BH04, BH05	7	83	BH01, BH02, BH03, BH04, BH05	8
10/30/2012		6	11.5		8
11/13/2012		6	23		8
11/29/2012		6.5	14.6		8
12/6/2012		6.5	7.5		8
Quarterly Totals		32	139.6		-
First Quarter 2013					
1/7/2013	BH01, BH03, BH05	4.5	10	BH01, BH03, BH04	10
3/25/2013	BH03, BH04, BH05	6	26	BH03, BH04, BH05	10
Quarterly Totals		10.5	36		
Second Quarter 2013					
4/14/2013	BH03, BH04, BH05	6	23.5	BH03, BH04, BH05	10
4/25/2013		6	16		10
5/10/2013	BH03, BH04R	6	22	BH03, BH04R	10
Quarterly Totals		18	61.5		

**Notes:**

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch



BH03R		
Compound (µg/L)	1/4/2016	4/13/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH03R  
BH03

BH04R		
Compound (µg/L)	1/4/2016	4/13/2016
Benzene	13	2.1
Toluene	<1.0	<1.0
Ethylbenzene	10	<1.0
Total Xylenes	56	<1.0

BH04R  
BH04

BH05R		
Compound (µg/L)	1/4/2016	4/13/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH05  
BH05R

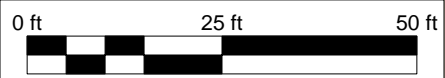
Surface  
Drainage

BH01

BH01		
Compound (µg/L)	1/4/2016	4/13/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH02R  
BH02

BH02R		
Compound (µg/L)	1/4/2016	4/13/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	2.3	<1.0



**Note:** Surface drainage direction is estimated based on site topography and is not related to regional topography.

DRAWN BY: ESS

DATE: 4/21/2016

**Facility Diagram**  
PDC Energy – DJ Basin  
Ryan 23-25U & 25BU, 14-25U/ Scott 24-25U/ MVS #1  
Tank Battery  
SESW S25 T5N R68W  
Larimer County, CO



6899 Pecos St., Unit C  
Denver CO 80221

**LEGEND**

- Excavation Extent
- Monitoring Well Location
- Monitoring Well Location – Well Destroyed
- Point of Release

Groundwater Flow Direction

All locations are approximate unless otherwise noted

**FIGURE 1**  
GROUNDWATER ANALYTICAL RESULTS MAP

## **ATTACHMENT A**

# Summit Scientific

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

April 18, 2016

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1

Enclosed are the results of analyses for samples received by Summit Scientific on 04/13/16 17:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury

President





PDC Energy  
1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/18/16 14:29

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1604088-01	Water	04/13/16 12:05	04/13/16 17:00
BH02R	1604088-02	Water	04/13/16 12:11	04/13/16 17:00
BH03R	1604088-03	Water	04/13/16 12:34	04/13/16 17:00
BH04R	1604088-04	Water	04/13/16 12:24	04/13/16 17:00
BH05R	1604088-05	Water	04/13/16 12:18	04/13/16 17:00

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.*





PDC Energy  
1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1

Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
04/18/16 14:29

### Sample Receipt Checklist

S2 Work Order: PDC 1604088

Client: PDC Energy Client Project ID: Ryan 23-25U & 25BU/Scott 24-25U/MVS #1

Shipped Via: PV

(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Airbill #:

Matrix (check all that apply):    Air    Soil/Solid    ☒ Water    Other:   

Cooler ID					(Describe)
Temp (°C)	4.8°C				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?				
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?				
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	<input checked="" type="checkbox"/>			
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?				
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.

Mindy Mach  
Custodian Printed Name

MM  
Signature or Initials of Custodian

4/15/16 9:44  
Date/Time



PDC Energy  
1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/18/16 14:29

**BH01**  
**1604088-01 (Water)**

**Summit Scientific**

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

Date Sampled: **04/13/16 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604149	04/14/16	04/14/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/13/16 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		99.8 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		105 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		107 %	45-146		"	"	"	"	

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.*



PDC Energy  
1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/18/16 14:29

**BH02R**  
**1604088-02 (Water)**

**Summit Scientific**

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

Date Sampled: **04/13/16 12:11**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604149	04/14/16	04/14/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/13/16 12:11**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		94.1 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		104 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		108 %	45-146		"	"	"	"	

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PDC Energy  
1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/18/16 14:29

**BH03R**  
**1604088-03 (Water)**

**Summit Scientific**

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

Date Sampled: **04/13/16 12:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604149	04/14/16	04/14/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/13/16 12:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		97.8 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		105 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		107 %	45-146		"	"	"	"	

Summit Scientific

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PDC Energy  
1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/18/16 14:29

**BH04R**  
**1604088-04 (Water)**

**Summit Scientific**

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

Date Sampled: **04/13/16 12:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>2.1</b>	1.0	ug/l	1	1604149	04/14/16	04/14/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/13/16 12:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		95.6 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		103 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		105 %	45-146		"	"	"	"	

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PDC Energy  
1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/18/16 14:29

**BH05R**  
**1604088-05 (Water)**

**Summit Scientific**

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

Date Sampled: **04/13/16 12:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604149	04/14/16	04/14/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/13/16 12:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		96.2 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		104 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		109 %	45-146		"	"	"	"	

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Denver CO, 80203

Project: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/18/16 14:29

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

### Summit Scientific

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

#### Batch 1604149 - EPA 5030 Water MS

##### Blank (1604149-BLK1)

Prepared & Analyzed: 04/14/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.0		"	13.3		97.4	37-154			
Surrogate: Toluene-d8	13.9		"	13.3		104	45-149			
Surrogate: 4-Bromofluorobenzene	14.2		"	13.3		107	45-146			

##### LCS (1604149-BS1)

Prepared & Analyzed: 04/14/16

Benzene	33.0	1.0	ug/l	33.3		98.9	51-132			
Toluene	32.0	1.0	"	33.3		96.1	51-138			
Ethylbenzene	35.0	1.0	"	33.1		106	58-146			
m,p-Xylene	72.5	2.0	"	66.5		109	57-144			
o-Xylene	34.1	1.0	"	32.7		105	53-146			
Surrogate: 1,2-Dichloroethane-d4	12.9		"	13.3		96.5	37-154			
Surrogate: Toluene-d8	13.8		"	13.3		103	45-149			
Surrogate: 4-Bromofluorobenzene	14.3		"	13.3		107	45-146			

##### Matrix Spike (1604149-MS1)

Source: 1604088-01

Prepared & Analyzed: 04/14/16

Benzene	33.2	1.0	ug/l	33.3	ND	99.6	34-141			
Toluene	32.4	1.0	"	33.3	ND	97.1	27-151			
Ethylbenzene	35.2	1.0	"	33.1	ND	106	29-160			
m,p-Xylene	72.6	2.0	"	66.5	ND	109	20-166			
o-Xylene	34.0	1.0	"	32.7	ND	104	33-159			
Surrogate: 1,2-Dichloroethane-d4	12.7		"	13.3		95.3	37-154			
Surrogate: Toluene-d8	13.7		"	13.3		103	45-149			
Surrogate: 4-Bromofluorobenzene	14.1		"	13.3		105	45-146			

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Denver CO, 80203

Project: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/18/16 14:29

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

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

**Batch 1604149 - EPA 5030 Water MS**

Matrix Spike Dup (1604149-MSD1)		Source: 1604088-01			Prepared & Analyzed: 04/14/16					
Benzene	32.9	1.0	ug/l	33.3	ND	98.6	34-141	0.999	32	
Toluene	32.2	1.0	"	33.3	ND	96.7	27-151	0.434	25	
Ethylbenzene	34.4	1.0	"	33.1	ND	104	29-160	2.27	50	
m,p-Xylene	70.8	2.0	"	66.5	ND	106	20-166	2.58	36	
o-Xylene	33.7	1.0	"	32.7	ND	103	33-159	0.974	26	
Surrogate: 1,2-Dichloroethane-d4	13.9		"	13.3		104	37-154			
Surrogate: Toluene-d8	14.0		"	13.3		105	45-149			
Surrogate: 4-Bromofluorobenzene	14.4		"	13.3		108	45-146			

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1775 Sherman St. STE. 3000  
Denver CO, 80203

Project: Ryan 23-25U & 25BU,14-25U/Scott 24-25U/MVS #1

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/18/16 14:29

### 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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A handwritten signature in black ink, appearing to be 'MSM'.