

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

October 25, 2016

received 11/04/2016
REM 9281
Document 2527179

Ursula #2 Tank Battery
NENE Section 28 T2N R66W
Weld County, API # 05-123-09920
Facility # 441395
Remediation # 9281

This groundwater monitoring summary has been prepared by Tasman Geosciences, Inc. for the Ursula #2 tank battery. On September 21, 2016, groundwater sampling was conducted at eighteen (18) temporary groundwater monitoring locations (BH02, BH04, BH05, BH07 – BH10, BH13, BH15, BH16, BH18 – BH22, BH24, BH26, and BH28). All eighteen temporary monitoring wells were installed using a hand-auger, in active ranch or cropland. Temporary well casing was installed at each location and wells were purged, sampled, and subsequently abandoned. GPS points of the temporary wells were collected to ensure groundwater sample locations remain consistent between quarters. Eighteen groundwater samples were submitted to Summit Scientific Laboratories for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by 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. Third quarter 2016 analytical results indicate that BTEX concentrations are above applicable COGCC Table 910-1 groundwater standards in temporary monitoring wells BH02, BH04, BH05, BH07, BH09, BH15, BH18, BH19, BH20, and BH21. BTEX concentrations are below COGCC regulatory standards in the remaining eight temporary monitoring well locations.

Four mobile enhanced fluid recovery (EFR) and air sparge (AS) events were conducted on site between June 30, 2016, and August 11, 2016. A summary of the mobile EFR/AS operational data is provided in Table 2.

Between June 13 and June 27, 2016, a soil vapor extraction (SVE)/AS remediation system was installed on site to address remaining hydrocarbon impacts in soil and groundwater. Operation of the remediation system commenced on September 22, 2016. The remediation well network is illustrated on Figure 2. Volatile organic compound (VOC) samples will be collected from the system effluent on a monthly basis in order to monitor performance and calculate the total contaminant mass removed. An initial VOC sample will be collected in October 2016. Operation of the remediation system will continue through the fourth quarter 2016.

Fourth quarter 2016 groundwater sampling will be conducted during December 2016.

TABLE 1
URSULA #2 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE - BTEX

Sample Location ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
GW01	3/23/2015	800	<1.0	750	420	~ 6
GW01	10/29/2015	1.1	<1.0	<1.0	27	~ 7
GW02	10/29/2015	3.2	<1.0	16	180	~ 7
GW03	11/13/2015	21	<1.0	260	3,600	~ 7
GW03-R	11/18/2015	<1.0	<1.0	11	61	~ 7
GW04	11/18/2015	<1.0	<1.0	<1.0	2.6	~ 7
GW05	11/22/2015	3.3	<1.0	55	250	~ 7
GW06	12/1/2015	<1.0	<1.0	42	8.2	~ 7
GW07	12/9/2015	<1.0	<1.0	1.3	3.2	~ 7
GW08	12/16/2015	<1.0	<1.0	10	130	~ 7
BH01	4/6/2015	<1.0	<1.0	<1.0	<1.0	6.53
BH02	4/6/2015	24	<1.0	1,600	13,000	7.02
BH02	9/21/2016	11	<1.0	810	4,300	7.63
BH03	4/6/2015	<1.0	<1.0	<1.0	5.0	7.78
BH04	4/6/2015	1,100	6.4	920	8,900	6.99
BH04	9/21/2016	2,000	11	1,700	18,000	7.28
BH05	4/6/2015	1,100	7.0	1,200	9,400	9.23
BH05	9/21/2016	1,700	980	1,300	18,000	7.02
BH06	4/6/2015	<1.0	<1.0	<1.0	<1.0	7.75
BH07	4/6/2015	450	<1.0	12	540	6.69
BH07	9/21/2016	1,500	<1.0	260	720	7.16
BH08	4/6/2015	15	<1.0	4.0	3.5	5.20
BH08	9/21/2016	<1.0	<1.0	<1.0	<1.0	7.50
BH09	4/6/2015	28	200	130	2,700	6.00
BH09	9/21/2016	<1.0	<1.0	240	3,000	7.30
BH10	4/6/2015	2.5	1.6	2.5	5.0	8.81
BH10	9/21/2016	<1.0	<1.0	<1.0	<1.0	9.13
BH11	4/10/2015	<1.0	<1.0	<1.0	<1.0	8.03

TABLE 1
URSULA #2 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE - BTEX

Sample Location ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
BH12	4/10/2015	<1.0	<1.0	<1.0	<1.0	9.16
BH13	4/10/2015	<1.0	<1.0	<1.0	<1.0	4.71
BH13	9/21/2016	<1.0	<1.0	3.3	2.2	7.91
BH14	4/10/2015	<1.0	<1.0	<1.0	<1.0	5.53
BH15	2/15/2016	520	<1.0	1,200	620	6.81
BH15	9/21/2016	1,000	<1.0	1,200	12,000	7.22
BH16	2/15/2016	<1.0	<1.0	<1.0	<1.0	6.76
BH16	9/21/2016	<1.0	<1.0	<1.0	<1.0	7.57
BH17	2/15/2016	<1.0	<1.0	<1.0	<1.0	7.74
BH18	2/15/2016	100	44	140	4,200	7.29
BH18	9/21/2016	740	<1.0	840	7,200	7.34
BH19	2/15/2016	320	210	250	3,000	6.97
BH19	9/21/2016	750	290	700	16,000	7.62
BH20	2/15/2016	1,100	45	340	2,600	6.84
BH20	9/21/2016	1,800	130	100	18,000	7.64
BH21	2/15/2016	34	<1.0	1.7	7.1	7.19
BH21	9/21/2016	12	<1.0	13	220	7.81
BH22	2/18/2016	<1.0	<1.0	<1.0	<1.0	3.59
BH22	9/21/2016	<1.0	<1.0	<1.0	<1.0	7.49
BH23	2/18/2016	<1.0	<1.0	<1.0	<1.0	3.79
BH24	2/18/2016	<1.0	<1.0	<1.0	<1.0	3.64
BH24	9/21/2016	2.4	<1.0	3.6	<1.0	7.92
BH25	2/18/2016	<1.0	<1.0	<1.0	<1.0	3.64
BH26	2/18/2016	<1.0	<1.0	<1.0	<1.0	3.40
BH26	9/21/2016	<1.0	<1.0	<1.0	<1.0	8.47
BH27	2/18/2016	<1.0	<1.0	<1.0	<1.0	3.55

TABLE 1
URSULA #2 TANK BATTERY
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE - BTEX

Sample Location ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
BH28	2/18/2016	<1.0	<1.0	<1.0	<1.0	3.42
BH28	9/21/2016	<1.0	<1.0	<1.0	<1.0	7.66
BH29	2/18/2016	<1.0	<1.0	<1.0	<1.0	3.48
BH30	2/18/2016	<1.0	<1.0	<1.0	<1.0	2.55

Notes:

COGCC = Colorado Oil and Gas Conservation Commission

1. Groundwater standards referenced from 2 CCR 404-1, Table 910-1, effective January 30, 2015.

2. Depth to water measured from top of well casing or ground surface for monitoring well samples and excavation samples, respectively.

Depth to water in samples BH22 - BH30 have been corrected to ground surface.

µg/L= Micrograms per liter

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

TABLE 2
URSULA 2 TANK BATTERY
EFR/AIR SPARGE OPERATIONAL SUMMARY TABLE

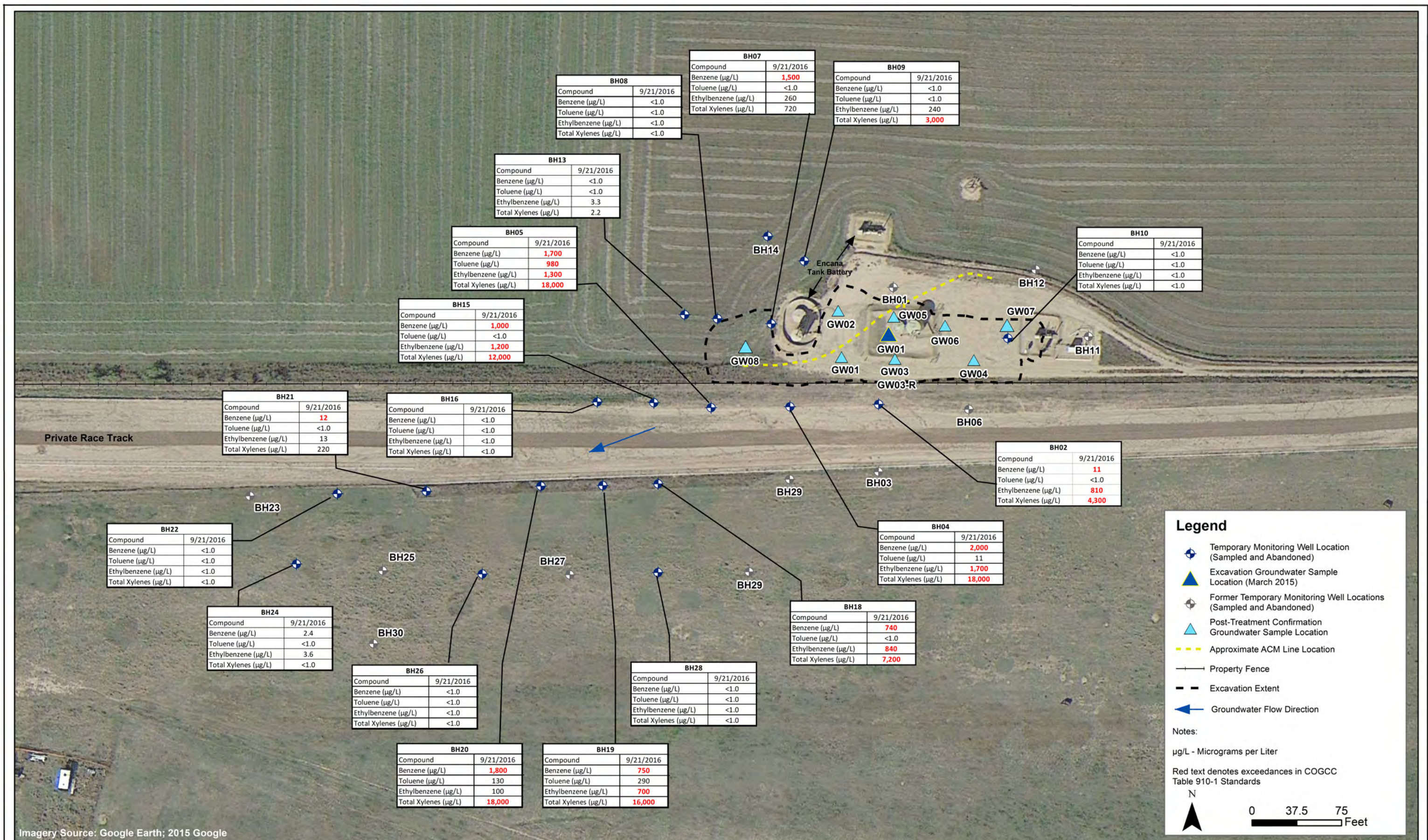
Date	EFR Wells	Total EFR Duration (hours)	Approximate Gallons Extracted	Air Sparge Wells	Air Injection Pressure (psi)
Third Quarter 2016 Data					
7/15/2016	RW03, RW08, RW10, RW12, RW14	6	1260	RW04, RW07, RW09, RW11, RW13	20
7/29/2016	EFR01, EFR02, EFR03, EFR04, EFR06, EFR07	6	210	AS02, AS03, AS04, AS05	20
8/11/2016	RW06, RW09, RW10, RW12, RW14	6	1470	RW04, RW05, RW08, RW11, RW13	20
Totals		18	2940		

Notes:

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch



DATE: October 2016

DESIGNED BY: C. Wasko

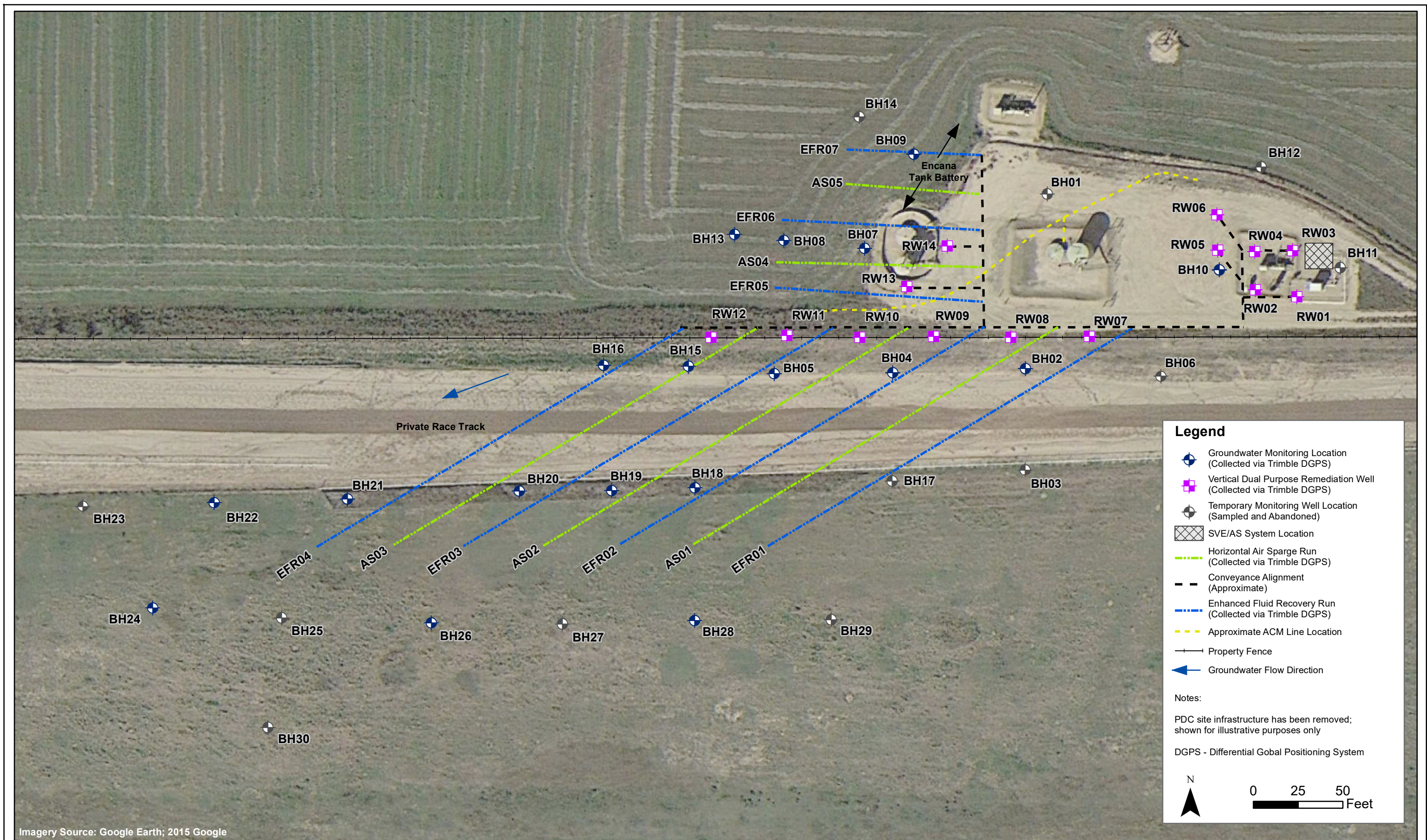
DRAWN BY: D. Arnold

TASMAN Tasman Geosciences, Inc.
6899 Pecos Street - Unit C
Denver, CO 80221

PDC Energy, Inc. - DJ Basin
Ursula #2
NENE Section 28, Township 2 North, Range 66 West
Weld County, Colorado

Groundwater Analytical Results
Map
(September 21, 2016)

Figure
1



DATE:	July 2016
DESIGNED BY:	C. Wasko
DRAWN BY:	D. Arnold



PDC Energy, Inc. - DJ Basin
Ursula #2
NENE Section 28, Township 2 North, Range 66 West
Weld County, Colorado

Remediation System
Overview Map

Figure
2

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

September 27, 2016

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Ursula 2

Enclosed are the results of analyses for samples received by Summit Scientific on 09/21/16 17:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury
President



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

Project: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH02	1609132-01	Water	09/21/16 14:08	09/21/16 17:00
BH04	1609132-02	Water	09/21/16 14:00	09/21/16 17:00
BH05	1609132-03	Water	09/21/16 13:55	09/21/16 17:00
BH07	1609132-04	Water	09/21/16 14:48	09/21/16 17:00
BH08	1609132-05	Water	09/21/16 14:45	09/21/16 17:00
BH10	1609132-06	Water	09/21/16 15:00	09/21/16 17:00
BH09	1609132-07	Water	09/21/16 14:55	09/21/16 17:00
BH13	1609132-08	Water	09/21/16 14:41	09/21/16 17:00
BH15	1609132-09	Water	09/21/16 13:48	09/21/16 17:00
BH16	1609132-10	Water	09/21/16 13:42	09/21/16 17:00
BH18	1609132-11	Water	09/21/16 12:55	09/21/16 17:00
BH19	1609132-12	Water	09/21/16 12:50	09/21/16 17:00
BH20	1609132-13	Water	09/21/16 12:45	09/21/16 17:00
BH21	1609132-14	Water	09/21/16 12:40	09/21/16 17:00
BH22	1609132-15	Water	09/21/16 12:30	09/21/16 17:00
BH24	1609132-16	Water	09/21/16 12:25	09/21/16 17:00
BH26	1609132-17	Water	09/21/16 12:18	09/21/16 17:00
BH28	1609132-18	Water	09/21/16 12:10	09/21/16 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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

Summit Scientific 1609132.1

741 Corporate Circle Suite I • Golden, Colorado 80401
303-277-9310 • 303-374-5933 Fax

Client: PDC / Tasman Geosciences

Address: 6899 Pecos St. Unit C

City/State/Zip: Denver, CO 80221

Phone: _____ Fax: _____

Sampler Name: Mitch Keller

Project Manager: Mark Longhurst

E-Mail: mark.longhurst@pdc.com

Project Name: Ursula #2

Project Number: _____

Page 1 of 2

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix		Analyze For:				Special Instructions
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	BTEX	8260	
BH 02	9-21-16	1408	3			X								
BH 04		1400												
BH 05		1355												
BH 07		1448												
BH 08		1445												
BH 10		1500												
BH 09		1455												
BH 13		1441												
BH 15		1348												
BH 16	✓	1348	✓											

Relinquished by: <u>Mitch Keller</u>	Date/Time: <u>9-21-16 1700</u>	Received by: <u>[Signature]</u>	Date/Time: <u>9/21/16 1700</u>	Turn Around Time (Check)	Notes:
Relinquished by: <u>[Signature]</u>	Date/Time: <u>9/21/16 1730</u>	Received by: <u>[Signature]</u>	Date/Time: <u>9/21/16 1730</u>	Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 Hours <input type="checkbox"/>	on ice
Relinquished by: _____	Date/Time: _____	Received in Lab by: _____	Date/Time: _____	Sample Integrity: Temperature Upon Receipt: <u>1.3°C</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

www.s2scientific.com

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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

Summit Scientific

1609132.2

741 Corporate Circle Suite 1 • Golden, Colorado 80401
303-277-9310 • 303-374-5933 Fax

Page 2 of 2

Client: PDC / Tasman Geosciences

Address: 6849 Pecos St, Unit C

City/State/Zip: Denver, CO 80221

Phone:

Fax:

Sampler Name: Mitch Weller

Project Manager: Mark Longhurst

E-Mail: mark.longhurst@pdce.com

Project Name: Ursula #2

Project Number:

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix		Analyze For:				Special Instructions
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	BTEX	SVOC	
BH 18	9-21-16	1855	3			X								
BH 19		1850												
BH 20		1845												
BH 21		1840												
BH 22		1830												
BH 24		1825												
BH 26		1815												
BH 28		1810												
Relinquished by: <u>Mitch Weller</u>		Date/Time: <u>9-21-16 1700</u>		Received by: <u>MS</u>		Date/Time: <u>9/21/16 1700</u>		Turn Around Time (Check)				Notes:		
Relinquished by: <u>MS</u>		Date/Time: <u>9/21/16 1730</u>		Received by: <u>MS</u>		Date/Time: <u>9-21-16 1730</u>		Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 Hours <input type="checkbox"/>				on ice		
Relinquished by:		Date/Time:		Received in Lab by:		Date/Time:		Sample Integrity: <u>1.3°C</u> Temperature Upon Receipt: <u>1.3°C</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>						

www.szscientific.com

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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

Sample Receipt Checklist

S2 Work Order: 1609132

Client: PDC / Tasman

Client Project ID: Ursula #2

Shipped Via: PV

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

Airbill #:

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

Cooler ID					
Temp (°C)	<u>1.3</u>				

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 ⁽¹⁾ ?	<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 ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?			<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<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) ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect				
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				
⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.				

Nakita
Custodian Printed Name

MA
Signature or Initials of Custodian

9/21/16 1730
Date/Time



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

Project: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH02
1609132-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 14:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	11	1.0	ug/l	1	1609170	09/22/16	09/22/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	810	100	"	100	"	"	"	"	
Xylenes (total)	4300	100	"	"	"	"	"	"	

Date Sampled: **09/21/16 14:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		103 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.0 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		96.9 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH04
1609132-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	2000	100	ug/l	100	1609170	09/22/16	09/22/16	EPA 8260B	
Toluene	11	1.0	"	1	"	"	"	"	
Ethylbenzene	1700	100	"	100	"	"	"	"	
Xylenes (total)	18000	100	"	"	"	"	"	"	

Date Sampled: **09/21/16 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		104 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.3 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		96.2 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH05
1609132-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 13:55**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	1700	100		ug/l	100	1609170	09/22/16	09/22/16	EPA 8260B	
Toluene	980	100		"	"	"	"	"	"	
Ethylbenzene	1300	100		"	"	"	"	"	"	
Xylenes (total)	18000	100		"	"	"	"	"	"	

Date Sampled: **09/21/16 13:55**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<i>Surrogate: 1,2-Dichloroethane-d4</i>		101 %		37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.1 %		45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		94.7 %		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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH07
1609132-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 14:48**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	1500	10	ug/l	10	1609170	09/22/16	09/22/16	EPA 8260B	
Toluene	ND	1.0	"	1	"	"	"	"	
Ethylbenzene	260	10	"	10	"	"	"	"	
Xylenes (total)	720	10	"	"	"	"	"	"	

Date Sampled: **09/21/16 14:48**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		104 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		101 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		95.9 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH08
1609132-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 14:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1609170	09/24/16	09/24/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **09/21/16 14:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		102 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		95.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.9 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH10
1609132-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1609170	09/24/16	09/24/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **09/21/16 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		108 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.4 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.0 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH09
1609132-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 14:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1609170	09/23/16	09/23/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	240	10	"	10	"	"	"	"	
Xylenes (total)	3000	10	"	"	"	"	"	"	

Date Sampled: **09/21/16 14:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		102 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.3 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		96.2 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH13
1609132-08 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 14:41**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1609170	09/24/16	09/24/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	3.3	1.0	"	"	"	"	"	"	
Xylenes (total)	2.2	1.0	"	"	"	"	"	"	

Date Sampled: **09/21/16 14:41**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		108 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		96.2 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		97.9 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH15
1609132-09 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 13:48**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	1000	10	ug/l	10	1609170	09/23/16	09/23/16	EPA 8260B	
Toluene	ND	1.0	"	1	"	"	"	"	
Ethylbenzene	1200	10	"	10	"	"	"	"	
Xylenes (total)	12000	100	"	100	"	"	"	"	

Date Sampled: **09/21/16 13:48**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		101 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		101 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.8 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH16
1609132-10 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 13:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1609170	09/24/16	09/24/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **09/21/16 13:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.9 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.4 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH18
1609132-11 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 12:55**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	740	10		ug/l	10	1609170	09/23/16	09/23/16	EPA 8260B	
Toluene	ND	1.0		"	1	"	"	"	"	
Ethylbenzene	840	10		"	10	"	"	"	"	
Xylenes (total)	7200	100		"	100	"	"	"	"	

Date Sampled: **09/21/16 12:55**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		105 %		37-154		"	"	"	"	
Surrogate: Toluene-d8		101 %		45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.3 %		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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH19
1609132-12 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 12:50**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	750	10		ug/l	10	1609170	09/23/16	09/23/16	EPA 8260B	
Toluene	290	10		"	"	"	"	"	"	
Ethylbenzene	700	10		"	"	"	"	"	"	
Xylenes (total)	16000	100		"	100	"	"	"	"	

Date Sampled: **09/21/16 12:50**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<i>Surrogate: 1,2-Dichloroethane-d4</i>		104 %		37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		100 %		45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.6 %		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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH20
1609132-13 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	1800	100	ug/l	100	1609170	09/23/16	09/23/16	EPA 8260B	
Toluene	130	10	"	10	"	"	"	"	
Ethylbenzene	100	10	"	"	"	"	"	"	
Xylenes (total)	18000	100	"	100	"	"	"	"	

Date Sampled: **09/21/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>100 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>111 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>125 %</i>	<i>45-146</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</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.



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

Project: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH21
1609132-14 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 12:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	12	1.0	ug/l	1	1609170	09/24/16	09/24/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	13	1.0	"	"	"	"	"	"	
Xylenes (total)	220	1.0	"	"	"	"	"	"	

Date Sampled: **09/21/16 12:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.6 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH22
1609132-15 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1609170	09/24/16	09/24/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **09/21/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		93.4 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.1 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH24
1609132-16 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 12:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	2.4	1.0	ug/l	1	1609170	09/24/16	09/24/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	3.6	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **09/21/16 12:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		104 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		96.6 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		93.3 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH26
1609132-17 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 12:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1609170	09/24/16	09/24/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **09/21/16 12:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		94.5 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.8 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

BH28
1609132-18 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/21/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1609170	09/24/16	09/24/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **09/21/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.5 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.7 %	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

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 1609170 - EPA 5030 Water MS

Blank (1609170-BLK1)

Prepared & Analyzed: 09/22/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.1		"	13.3		98.0	37-154			
Surrogate: Toluene-d8	12.9		"	13.3		96.5	45-149			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.8	45-146			

LCS (1609170-BS1)

Prepared & Analyzed: 09/22/16

Benzene	41.4	1.0	ug/l	33.3		124	51-132			
Toluene	40.3	1.0	"	33.3		121	51-138			
Ethylbenzene	41.4	1.0	"	33.1		125	58-146			
m,p-Xylene	79.3	2.0	"	66.5		119	57-144			
o-Xylene	41.3	1.0	"	32.7		126	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.8		"	13.3		103	37-154			
Surrogate: Toluene-d8	13.6		"	13.3		102	45-149			
Surrogate: 4-Bromofluorobenzene	13.1		"	13.3		98.0	45-146			

Matrix Spike (1609170-MS1)

Source: 1609132-08

Prepared & Analyzed: 09/22/16

Benzene	43.6	1.0	ug/l	33.3	ND	131	34-141			
Toluene	42.1	1.0	"	33.3	ND	126	27-151			
Ethylbenzene	49.4	1.0	"	33.1	3.28	139	29-160			
m,p-Xylene	87.7	2.0	"	66.5	2.23	128	20-166			
o-Xylene	45.8	1.0	"	32.7	ND	140	33-159			
Surrogate: 1,2-Dichloroethane-d4	14.4		"	13.3		108	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		99.4	45-149			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.3	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

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 1609170 - EPA 5030 Water MS

Matrix Spike Dup (1609170-MSD1)		Source: 1609132-08			Prepared & Analyzed: 09/22/16					
Benzene	44.0	1.0	ug/l	33.3	ND	132	34-141	0.891	32	
Toluene	42.3	1.0	"	33.3	ND	127	27-151	0.450	25	
Ethylbenzene	49.6	1.0	"	33.1	3.28	140	29-160	0.425	50	
m,p-Xylene	88.4	2.0	"	66.5	2.23	130	20-166	0.818	36	
o-Xylene	46.3	1.0	"	32.7	ND	142	33-159	1.19	26	
Surrogate: 1,2-Dichloroethane-d4	14.4		"	13.3		108	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.7	45-149			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.3	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: Ursula 2
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 13:47

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

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.

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