



PDC Energy, Inc.
First Quarter 2015 Groundwater Monitoring Summary

April 8, 2015

H&S (Mineral) #1 Tank Battery
NWSW S6 T4N R65W
Weld County, API # 05-123-14802

This groundwater summary has been prepared by Tasman Geosciences for the H&S (Mineral) #1 tank battery. On January 20 and January 22, 2015 groundwater monitoring was conducted at eight monitoring well locations. Groundwater samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260B. Analytical results are summarized in Table 1 below and the laboratory reports are included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. First quarter analytical results indicated that BTEX concentrations were in exceedance of COGCC Table 910-1 standards at monitoring wells BH01, BH02, and BH04. Constituent concentrations were below regulatory standards at the other five monitoring

Tasman initiated enhanced fluid recovery (EFR) and air sparge (AS) events at the site during the third quarter 2013. A summary of the EFR/AS operational data is provided in Table 2. EFR/AS will remain the selected remediation strategy through the second quarter 2015 to address residual dissolved phase petroleum hydrocarbon impacts on site.

The second quarter 2015 groundwater sampling event will be conducted during April 2015.

TABLE 1
H&S (MINERAL) #1
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Depth to Water (feet)
BH01	7/25/2013	6700	6200	1100	19000	16.53
BH01	10/31/2013	1700	1800	170	4400	15.65
BH01	1/24/2014	6.5	<1.0	<1.0	3000	17.19
BH01	4/30/2014	290	990	76	2700	17.35
BH01	7/25/2014	45	100	53	2100	14.68
BH01	10/27/2014	21	19	21	2100	13.75
BH01	1/20/2015	9.7	13	<1.0	1600	15.85
BH02	7/25/2013	3300	4700	2100	36000	17.63
BH02	10/31/2013	770	24	39	3300	16.75
BH02	1/24/2014	730	20	<1.0	2600	18.25
BH02	4/30/2014	84	12	3.8	410	18.39
BH02	7/25/2014	53	2.3	<1.0	68	15.75
BH02	10/27/2014	4.3	<1.0	<1.0	24	14.91
BH02	1/20/2015	160	<1.0	<1.0	390	17.02
BH03	7/25/2013	760	4400	1300	23000	15.98
BH03	10/31/2013	3.6	8.6	2.2	100	15.15
BH03	1/24/2014	2.6	2	<1.0	62	16.63
BH03	4/30/2014	1.1	1.6	<1.0	45	16.79
BH03	7/25/2014	33	20	<1.0	480	14.14
BH03	10/27/2014	17	3.3	<1.0	210	13.27
BH03	1/20/2015	<1.0	<1.0	<1.0	8.7	15.35
BH04	7/25/2013	1700	170	1200	19000	15.91
BH04	10/31/2013	2500	140	620	13000	15.09
BH04	1/24/2014	2100	320	740	14000	16.60
BH04	4/30/2014	1700	300	1100	19000	16.74
BH04	7/25/2014	410	9.3	36	6400	14.11
BH04	10/27/2014	37	2.4	<1.0	630	13.22
BH04	1/20/2015	45	<1.0	<1.0	520	15.46
BH05	7/25/2013	17	3300	930	15000	13.07
BH05	10/31/2013	<1.0	<1.0	2.0	85	12.01
BH05	1/24/2014	<1.0	<1.0	<1.0	<1.0	13.52
BH05	4/30/2014	<1.0	<1.0	<1.0	4.5	13.65
BH05	7/25/2014	<1.0	<1.0	<1.0	5.8	11.03
BH05	10/27/2014	<1.0	<1.0	<1.0	2.9	10.37
BH05	1/20/2015	<1.0	<1.0	<1.0	<1.0	12.50
BH06	7/25/2013	1.9	12	3100	46000	13.47

TABLE 1
H&S (MINERAL) #1
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE

Sample ID	Date Sampled	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)	Depth to Water (feet)
BH06	10/31/2013	<1.0	<1.0	1.9	57	12.46
BH06	1/24/2014	<1.0	<1.0	<1.0	2.9	13.95
BH06	4/30/2014	<1.0	<1.0	2.0	49	14.06
BH06	7/25/2014	<1.0	<1.0	<1.0	4.9	11.44
BH06	10/27/2014	<1.0	<1.0	<1.0	2.6	10.81
BH06	1/20/2015	<1.0	<1.0	<1.0	2.3	12.93
BH07	7/25/2013	<1.0	<1.0	<1.0	<1.0	15.33
BH07	10/31/2013	<1.0	<1.0	<1.0	<1.0	14.31
BH07	1/24/2014	<1.0	<1.0	<1.0	<1.0	15.81
BH07	4/30/2014	<1.0	<1.0	<1.0	<1.0	15.96
BH07	7/25/2014	<1.0	<1.0	<1.0	<1.0	13.27
BH07	10/27/2014	<1.0	<1.0	<1.0	<1.0	10.60
BH07	1/20/2015	<1.0	<1.0	<1.0	<1.0	14.78
BH08	7/25/2013	<1.0	<1.0	<1.0	<1.0	13.47
BH08	10/31/2013	<1.0	<1.0	<1.0	<1.0	12.41
BH08	1/24/2014	<1.0	<1.0	<1.0	<1.0	13.91
BH08	4/30/2014	<1.0	<1.0	<1.0	<1.0	14.05
BH08	7/25/2014	<1.0	<1.0	<1.0	<1.0	11.42
BH08	10/27/2014	NS	NS	NS	NS	NM
BH08	1/22/2015	<1.0	<1.0	<1.0	<1.0	12.88
COGCC standards for Groundwater (ug/L) ⁽¹⁾		5	560	700	1,400	

Notes:

1). The environmental cleanup standards for groundwater that are applicable to this site are the Colorado Oil and Gas Conservation Commission (COGCC) standards for contaminants in groundwater according to Table 910-1 of the COGCC 900 Series Rule for E&P Waste Management.

Bold red values indicate an exceedance of the COGCC groundwater standards for the site.

ug/L= Micrograms per liter

NM - Not Measured

TABLE 2
H&S (MINERAL) #1
AIR SPARGE/ EFR OPERATIONAL SUMMARY TABLE

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Injection Pressure (psi)
Third Quarter 2013					
8/6/2013	BH01, BH02, BH03, BH04, BH05, BH06	6	50	BH01, BH02, BH03, BH05, BH06	10
8/19/2013		6	80		10
9/8/2013		6	21		10
9/16/2013		6	80		10
9/30/2013		5	90		15
Quarterly Totals		29	321		-
Fourth Quarter 2013					
10/11/2013	BH01, BH02, BH03, BH04, BH05, BH06	6	80	BH01, BH02, BH03, BH05, BH06	10
10/24/2013		6	110		12
11/26/2013		6	40		10
12/17/2013		6	42		10
Quarterly Totals		24	272		-
First Quarter 2014					
1/7/2014	BH01, BH02, BH03, BH04, BH05, BH06	5.5	90	BH01, BH02, BH03, BH05, BH06	10
1/22/2014		6	230		10
2/24/2014		6	180		10
3/11/2014		6	90		10
3/20/2014		6	135		10
Quarterly Totals		29.5	725		-
Second Quarter 2014					
4/10/2014	BH01, BH02, BH03, BH04, BH05, BH06	8	230	BH01, BH02, BH03, BH04, BH05, BH06	10
4/23/2014		6	180		20
5/13/2014		6	220		10
5/28/2014		6	180		20
6/10/2014		8	270		25
6/23/2014		6	185		20
Quarterly Totals		40	1265		-

TABLE 2
H&S (MINERAL) #1
AIR SPARGE/ EFR OPERATIONAL SUMMARY TABLE

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)
Third Quarter 2014					
7/11/2014	BH01, BH02, BH03, BH04, BH05, BH06	6	150	BH01, BH02, BH03, BH04, BH05, BH06	20
7/16/2014		6	240		15
8/8/2014		6	250		15
8/25/2014		6	230		20
9/10/2014		6	300		20
9/22/2014		6	350		20
Quarterly Totals		36	1520		-
Fourth Quarter 2014					
10/10/2014	Pipe, BH01, BH02, BH03,BH05, BH06	6	100	BH01, BH02, BH03, BH04, BH05, BH06	20
10/24/2014		6	50		15
11/7/2014		6	270		20
Quarterly Totals		18	420		-
First Quarter 2015					
1/2/2015	Pipe, BH01, BH02, BH03,BH05, BH06	6	150	BH01, BH02, BH03, BH04, BH05, BH06	15
1/14/2015		5	245		20
Quarterly Totals		11	395		-



BH03		
Compound (ug/L)	10/27/2014	1/20/2015
Benzene	17	<1.0
Toluene	3.3	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	210	8.7

BH02		
Compound (ug/L)	10/27/2014	1/20/2015
Benzene	4.3	160
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	24	390

Surface Drainage



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

Fence Line

Steep Grade

Immobile Magna Equipment

Above Ground Gas Line

M

Separator 10 bbl

100 bbl PW tank

300 bbl Oil Tank

Flow Line

DCP Buried Gas Line

BH01		
Compound (ug/L)	10/27/2014	1/20/2015
Benzene	21	9.7
Toluene	19	13
Ethylbenzene	21	<1.0
Total Xylenes	2100	1600

BH05		
Compound (ug/L)	10/27/2014	1/20/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	2.9	<1.0

BH08		
Compound (ug/L)	10/27/2014	1/22/2015
Benzene	NS	<1.0
Toluene	NS	<1.0
Ethylbenzene	NS	<1.0
Total Xylenes	NS	<1.0

Wellhead

BH04		
Compound (ug/L)	10/27/2014	1/20/2015
Benzene	37	45
Toluene	2.4	<1.0
Ethylbenzene	36	<1.0
Total Xylenes	630	520

BH06		
Compound (ug/L)	10/27/2014	1/20/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	2.6	2.3

BH07		
Compound (ug/L)	10/27/2014	1/20/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

DRAWN BY: PJD

DATE: 2/4/2015

Facility Diagram
 PDC Energy – DJ Basin
 H&S (Mineral) #1
 NWSW S6 T4N R65W
 Weld County, CO



6899 Pecos Street
 Unit C
 Denver, CO 80221

LEGEND

- Earthen Berm
- Approximate Area of Excavation
- Temporary Monitoring Well
- Temporary Monitoring Well – SVE Screen
- Horizontal Remediation Pipe
- Meter House

FIGURE 1

GROUNDWATER ANALYTICAL RESULTS

Not to Scale

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite J ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.374.5933 - fax

January 26, 2015

Brandon Bruns
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: H&S Mineral #1

Enclosed are the results of analyses for samples received by Summit Scientific on 01/20/15 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 "Joseph J. Egry IV". The signature is fluid and cursive, with a small "IV" superscripted at the end.

Joseph J Egry IV For Paul Shrewsbury
President

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

Project: H&S Mineral #1
Project Number: [none]
Project Manager: Brandon Brunns

Reported:
01/26/15 14:28

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1501134-01	Water	01/20/15 13:10	01/20/15 17:00
BH02	1501134-02	Water	01/20/15 13:40	01/20/15 17:00
BH03	1501134-03	Water	01/20/15 13:35	01/20/15 17:00
BH04	1501134-04	Water	01/20/15 13:30	01/20/15 17:00
BH05	1501134-05	Water	01/20/15 13:25	01/20/15 17:00
BH06	1501134-06	Water	01/20/15 13:15	01/20/15 17:00
BH07	1501134-07	Water	01/20/15 13:20	01/20/15 17:00

Summit Scientific

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Joseph J Egry IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/26/15 14:28

Summit Scientific ¹⁵⁰¹¹³⁴

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

Client: ~~H&S Mineral #1~~ ^{PDC Energy} #1 Page 1 of 1

Address: _____ Project Manager: Brandon Bruns

City/State/Zip: _____ E-Mail: brandonbruns@pdc.com

Phone: _____ Fax: _____ Project Name: H&S mineral #1

Sampler Name: _____ 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)				
BH 01	1/20/15	13:40	3	x											
BH 02		13:40													
BH 03		13:35													
BH 04		13:30													
BH 05		13:25													
BH 06		13:15													
BH 07		13:20													

Relinquished by:	Date/Time: 1/20/15	Received by:	Date/Time: 1/20/15 1700	Turn Around Time (Check)	Notes:
Relinquished by:	Date/Time:	Received by:	Date/Time:	Same Day <input type="checkbox"/>	Standard <input checked="" type="checkbox"/>
Relinquished by:	Date/Time:	Received by:	Date/Time:	24 Hours <input type="checkbox"/>	
Relinquished by:	Date/Time:	Received by:	Date/Time:	48 Hours <input type="checkbox"/>	
Sample Integrity:				Temperature Upon Receipt: 6.1°C	
Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					

www.s2scientific.com

Soil samples reported on a wet-weight basis unless otherwise indicated on results page.

Summit Scientific

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Joseph J Egry IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Bruns

Reported:
 01/26/15 14:28

Sample Receipt Checklist

S2 Work Order: 1501134

Client: PDC Client Project ID: H&S Mineral #1

Shipped Via: Pick Up (UPS, FedEx, Hand Delivered, Pick-up, etc.) Airbill #:

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

Cooler ID	<u>1</u>			
Temp (°C)	<u>6.1</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"/>		<u>Same Day</u>
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"/>			<u>HCl</u>
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, etc.				
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.				

Joseph J Egry IV
 Custodian Printed Name

Joseph J Egry IV
 Signature or Initials of Custodian

1/21/15
 Date/Time

Soil samples reported on a wet-weight basis unless otherwise indicated on results page.

Joseph J Egry IV



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Brunns

Reported:
 01/26/15 14:28

BH01
1501134-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/20/15 13:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	9.7	1.0	ug/l	1	1501216	01/23/15	01/23/15 01:18	EPA 8260B	
Toluene	13	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	1600	100	"	100	"	"	"	"	

Date Sampled: **01/20/15 13:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	98.5 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	93.2 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	97.4 %	45-146			"	"	"	"	

Summit Scientific

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Joseph J Egrý IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Brunns

Reported:
 01/26/15 14:28

BH02
1501134-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/20/15 13:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	160	1.0	ug/l	1	1501216	01/23/15	01/23/15 01:43	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	390	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/15 13:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	103 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	97.5 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	93.6 %	45-146			"	"	"	"	

Summit Scientific

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Joseph J Egrý IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Bruns

Reported:
 01/26/15 14:28

BH03
1501134-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/20/15 13:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1501216	01/23/15	01/23/15 02:10	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	8.7	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/15 13:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	102 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	95.6 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	98.3 %	45-146			"	"	"	"	

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Joseph J Egrý IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Brunns

Reported:
 01/26/15 14:28

BH04
1501134-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/20/15 13:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	45	1.0	ug/l	1	1501216	01/23/15	01/23/15 02:38	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	520	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/15 13:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	102 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	94.2 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	97.6 %	45-146			"	"	"	"	

Summit Scientific

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Joseph J Egrý IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Brunns

Reported:
 01/26/15 14:28

BH05
1501134-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/20/15 13:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1501216	01/23/15	01/23/15 03:02	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/15 13:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	101 %	37-154				"	"	"	"
Surrogate: Toluene-d8	92.8 %	45-149				"	"	"	"
Surrogate: 4-Bromofluorobenzene	98.3 %	45-146				"	"	"	"

Summit Scientific

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Joseph J Egrý IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Brunns

Reported:
 01/26/15 14:28

BH06
1501134-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/20/15 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1501216	01/23/15	01/23/15 03:27	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	2.3	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/15 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	102 %	37-154			"	"	"	"	
Surrogate: Toluene-d8	94.0 %	45-149			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	95.4 %	45-146			"	"	"	"	

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Joseph J Egrý IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Bruns

Reported:
 01/26/15 14:28

BH07
1501134-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/20/15 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1501216	01/23/15	01/23/15 03:51	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/20/15 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	102 %	37-154				"	"	"	"
Surrogate: Toluene-d8	93.2 %	45-149				"	"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	45-146				"	"	"	"

Summit Scientific

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Joseph J Egrý IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/26/15 14:28

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 1501216 - EPA 5030 Water MS

Blank (1501216-BLK1)

Prepared & Analyzed: 01/22/15

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.1</i>		<i>"</i>	<i>13.2</i>		<i>99.2</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>12.6</i>		<i>"</i>	<i>13.3</i>		<i>94.7</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.1</i>		<i>"</i>	<i>13.3</i>		<i>98.2</i>	<i>45-146</i>			

LCS (1501216-BS1)

Prepared & Analyzed: 01/23/15

Benzene	24.8	1.0	ug/l	33.3	ND	74.3	51-132			
Toluene	28.5	1.0	"	33.3	ND	85.6	51-138			
Ethylbenzene	32.0	1.0	"	33.1	ND	96.8	58-146			
m,p-Xylene	63.2	2.0	"	66.5	ND	95.0	57-144			
o-Xylene	33.2	1.0	"	32.8	ND	101	53-146			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.4</i>		<i>"</i>	<i>13.2</i>		<i>102</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.0</i>		<i>"</i>	<i>13.3</i>		<i>97.8</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.0</i>		<i>"</i>	<i>13.3</i>		<i>97.2</i>	<i>45-146</i>			

Matrix Spike (1501216-MS1)

Source: 1501134-05

Prepared & Analyzed: 01/23/15

Benzene	24.9	1.0	ug/l	33.3	ND	74.7	34-141			
Toluene	28.3	1.0	"	33.3	ND	85.0	27-151			
Ethylbenzene	33.2	1.0	"	33.1	ND	101	29-160			
m,p-Xylene	64.9	2.0	"	66.5	ND	97.5	20-166			
o-Xylene	34.2	1.0	"	32.8	ND	104	33-159			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.2</i>		<i>"</i>	<i>13.2</i>		<i>100</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>12.8</i>		<i>"</i>	<i>13.3</i>		<i>96.3</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.6</i>		<i>"</i>	<i>13.3</i>		<i>94.3</i>	<i>45-146</i>			

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Joseph J Egry IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Brunns

Reported:
 01/26/15 14:28

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		

Batch 1501216 - EPA 5030 Water MS

Matrix Spike Dup (1501216-MSD1)	Source: 1501134-05			Prepared & Analyzed: 01/23/15						
Benzene	25.1	1.0	ug/l	33.3	ND	75.4	34-141	0.840	32	
Toluene	28.4	1.0	"	33.3	ND	85.4	27-151	0.423	25	
Ethylbenzene	33.1	1.0	"	33.1	ND	100	29-160	0.331	50	
m,p-Xylene	64.4	2.0	"	66.5	ND	96.7	20-166	0.805	36	
o-Xylene	33.7	1.0	"	32.8	ND	103	33-159	1.41	26	
Surrogate: 1,2-Dichloroethane-d4	13.3		"	13.2		101	37-154			
Surrogate: Toluene-d8	12.6		"	13.3		94.4	45-149			
Surrogate: 4-Bromofluorobenzene	12.6		"	13.3		94.1	45-146			

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

Project: H&S Mineral #1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/26/15 14:28

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

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Joseph J Egry IV For Paul Shrewsbury, President

Summit Scientific

741 Corporate Circle – Suite J ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.374.5933 - fax

January 26, 2015

Brandon Bruns
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: H&S Mineral #1

Enclosed are the results of analyses for samples received by Summit Scientific on 01/22/15 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Joseph J Egry IV For Paul Shrewsbury
President

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

Project: H&S Mineral #1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/26/15 14:45

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH08	1501148-01	Water	01/22/15 13:10	01/22/15 17:30

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

Project: H&S Mineral #1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/26/15 14:45

Sample Receipt Checklist

S2 Work Order: 1501148

Client: PDC Energy Client Project ID: H + S (Mineral) #1

Shipped Via: Pick-up (UPS, FedEx, Hand Delivered, Pick-up, etc.) Airbill #: _____

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

Cooler ID	<u>1</u>			
Temp (°C)	<u>4.8</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"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact ⁽¹⁾ ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? if yes, contact client and note in narrative.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, etc.				<u>HCl</u>
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Additional Comments (if any):				
⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.				

Mindy Mach
Custodian Printed Name

[Signature]
Signature or Initials of Custodian

1/23/15
Date/Time

Soil samples reported on a wet-weight basis unless otherwise indicated on results page.

Summit Scientific

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[Signature]

Joseph J Egry IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Brunns

Reported:
 01/26/15 14:45

BH08
1501148-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/22/15 13:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1501221	01/24/15	01/24/15 00:19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **01/22/15 13:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	102 %	37-154				"	"	"	"
Surrogate: Toluene-d8	95.3 %	45-149				"	"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	45-146				"	"	"	"

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Joseph J Egrý IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/26/15 14:45

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 1501221 - EPA 5030 Water MS

Blank (1501221-BLK1)

Prepared & Analyzed: 01/23/15

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.2</i>		<i>"</i>	<i>13.2</i>		<i>99.8</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>12.6</i>		<i>"</i>	<i>13.3</i>		<i>94.6</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.2</i>		<i>"</i>	<i>13.3</i>		<i>98.8</i>	<i>45-146</i>			

LCS (1501221-BS1)

Prepared & Analyzed: 01/23/15

Benzene	24.5	1.0	ug/l	33.3		73.5	51-132			
Toluene	28.2	1.0	"	33.3		84.6	51-138			
Ethylbenzene	32.7	1.0	"	33.1		98.9	58-146			
m,p-Xylene	64.6	2.0	"	66.5		97.0	57-144			
o-Xylene	34.0	1.0	"	32.8		104	53-146			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.4</i>		<i>"</i>	<i>13.2</i>		<i>102</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>12.7</i>		<i>"</i>	<i>13.3</i>		<i>95.2</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.7</i>		<i>"</i>	<i>13.3</i>		<i>95.0</i>	<i>45-146</i>			

Matrix Spike (1501221-MS1)

Source: 1501149-01

Prepared & Analyzed: 01/23/15

Benzene	27.1	1.0	ug/l	33.3	2.21	74.7	34-141			
Toluene	30.8	1.0	"	33.3	2.45	85.1	27-151			
Ethylbenzene	97.5	1.0	"	33.1	72.8	74.8	29-160			
m,p-Xylene	635	2.0	"	66.5	620	22.7	20-166			
o-Xylene	100	1.0	"	32.8	73.6	80.4	33-159			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.6</i>		<i>"</i>	<i>13.2</i>		<i>103</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.1</i>		<i>"</i>	<i>13.3</i>		<i>98.2</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.4</i>		<i>"</i>	<i>13.3</i>		<i>92.8</i>	<i>45-146</i>			

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Joseph J Egry IV For Paul Shrewsbury, President



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

Project: H&S Mineral #1
 Project Number: [none]
 Project Manager: Brandon Brunns

Reported:
 01/26/15 14:45

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 1501221 - EPA 5030 Water MS

Matrix Spike Dup (1501221-MSD1)	Source: 1501149-01			Prepared & Analyzed: 01/23/15						
Benzene	26.7	1.0	ug/l	33.3	2.21	73.5	34-141	1.52	32	
Toluene	30.8	1.0	"	33.3	2.45	85.2	27-151	0.130	25	
Ethylbenzene	92.7	1.0	"	33.1	72.8	60.3	29-160	5.03	50	
m,p-Xylene	618	2.0	"	66.5	620	NR	20-166	2.75	36	QM-4X
o-Xylene	96.2	1.0	"	32.8	73.6	68.9	33-159	3.85	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.3</i>		<i>"</i>	<i>13.2</i>		<i>101</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.0</i>		<i>"</i>	<i>13.3</i>		<i>97.5</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.6</i>		<i>"</i>	<i>13.3</i>		<i>94.3</i>	<i>45-146</i>			

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

Project: H&S Mineral #1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/26/15 14:45

Notes and Definitions

QM-4X The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.

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

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