



PDC Energy, Inc.
Second Quarter 2015 Groundwater Monitoring Summary

June 11, 2015

H&S (Mineral) #1 Tank Battery
NWSW S6 T4N R65W
Weld County, API # 05-123-14802
Spill Tracking # 2145651
Remediation # 7945

This groundwater summary has been prepared by Tasman Geosciences for the H&S (Mineral) #1 tank battery. On May 13, 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 and the laboratory report is included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. Second quarter 2015 analytical results indicate that BTEX concentrations are in exceedance of COGCC Table 910-1 standards at monitoring wells BH01, BH02, and BH06. Constituent concentrations are below regulatory standards at the remaining five monitoring locations.

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 third quarter 2015 to address residual dissolved phase petroleum hydrocarbon impacts on site.

The third quarter 2015 groundwater sampling event will be conducted during July 2015.

TABLE 1
H&S (MINERAL) #1 TANK BATTERY
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	6,700	6,200	1,100	19,000	16.53
BH01	10/31/2013	1,700	1,800	170	4,400	15.65
BH01	1/24/2014	6.5	<1.0	<1.0	3,000	17.19
BH01	4/30/2014	290	990	76	2,700	17.35
BH01	7/25/2014	45	100	53	2,100	14.68
BH01	10/27/2014	21	19	21	2,100	13.75
BH01	1/20/2015	9.7	13	<1.0	1,600	15.85
BH01	5/13/2015	4.9	13	5.2	2,600	15.90
BH02	7/25/2013	3,300	4,700	2,100	36,000	17.63
BH02	10/31/2013	770	24	39	3,300	16.75
BH02	1/24/2014	730	20	<1.0	2,600	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
BH02	5/13/2015	93	1.2	<1.0	75	17.14
BH03	7/25/2013	760	4,400	1,300	23,000	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
BH03	5/13/2015	<1.0	<1.0	<1.0	8.2	15.38
BH04	7/25/2013	1,700	170	1,200	19,000	15.91
BH04	10/31/2013	2,500	140	620	13,000	15.09
BH04	1/24/2014	2,100	320	740	14,000	16.60
BH04	4/30/2014	1,700	300	1,100	19,000	16.74
BH04	7/25/2014	410	9.3	36	6,400	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
BH04	5/13/2015	2.6	<1.0	<1.0	110	15.40
BH05	7/25/2013	17	3,300	930	15,000	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
BH05	5/13/2015	<1.0	<1.0	<1.0	<1.0	12.41
BH06	7/25/2013	1.9	12	3,100	46,000	13.47
BH06	10/31/2013	<1.0	<1.0	1.9	57	12.46

TABLE 1
H&S (MINERAL) #1 TANK BATTERY
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	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
BH06	5/13/2015	<1.0	<1.0	750	10,000	12.82
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
BH07	5/13/2015	<1.0	<1.0	<1.0	<1.0	14.53
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
BH08	5/13/2015	<1.0	<1.0	<1.0	<1.0	12.90
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 TANK BATTERY
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		-
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		-

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

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)
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
11/25/2014		6	207		20
12/10/2014		6	18		30
Quarterly Totals		30	645		-
First Quarter 2015					
1/2/2015	Pipe, BH01, BH02, BH03, BH05, BH06	6	150	BH01, BH02, BH03, BH04, BH05, BH06	15
1/14/2015	Pipe, BH01, BH02, BH03, BH04	5	245	BH01, BH02, BH03, BH04	20
2/3/2015	Pipe, BH01, BH02, BH03, BH05, BH06	6	120	BH01, BH02, BH03, BH04, BH05, BH06	20
2/18/2015	Pipe, BH01, BH02,	6	250		20
3/13/2015	BH03, BH04, BH05,	6	100		20
3/25/2015	BH06	6	160		20
Quarterly Totals		35	1025		-
Second Quarter 2015					
4/1/2015	Pipe, BH01, BH02, BH03, BH04, BH05, BH06	6	165	BH01, BH02, BH03, BH04, BH05, BH06	20
4/21/2015	BH01, BH02, BH03, BH04, BH05, BH06	6	180	BH01, BH02, BH03, BH04, BH05	20
5/5/2015	Pipe, BH01, BH02,	6	80	BH01, BH02, BH03, BH04, BH05, BH06	20
5/19/2015	BH03, BH04, BH05,	6	250		20
6/2/2015	BH06	6	230		20
Quarterly Totals		30	905		-



BH03		
Compound (ug/L)	1/20/2015	5/15/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	8.7	8.2

BH02		
Compound (ug/L)	1/20/2015	5/13/2015
Benzene	160	93
Toluene	<1.0	1.2
Ethylbenzene	<1.0	<1.0
Total Xylenes	390	75

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

BH02

Above Ground Gas Line Valve

PIPE

M

Separator 10 bbl

100 bbl PW tank

300 bbl Oil Tank

BH03

BH01

BH04

BH07

BH01		
Compound (ug/L)	1/20/2015	5/15/2015
Benzene	9.7	4.9
Toluene	13	13
Ethylbenzene	<1.0	5.2
Total Xylenes	1,600	2,600

BH05

BH06

BH04		
Compound (ug/L)	1/20/2015	5/13/2015
Benzene	45	2.6
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	520	110

BH05		
Compound (ug/L)	1/20/2015	5/13/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH08		
Compound (ug/L)	1/20/2015	5/13/2015
Benzene	NS	<1.0
Toluene	NS	<1.0
Ethylbenzene	NS	<1.0
Total Xylenes	NS	<1.0

BH06		
Compound (ug/L)	1/20/2015	5/13/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	750
Total Xylenes	2.3	10,000

BH07		
Compound (ug/L)	1/20/2015	5/13/2015
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

Wellhead

BH08

DRAWN BY: DEB

DATE: 5/20/2015

Facility Diagram
PDC Energy – DJ Basin
H&S (Mineral) #1 Tank Battery
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 I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

May 19, 2015

Mark Longhurst
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 05/13/15 16:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

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

Ben Shrewsbury For Paul Shrewsbury
President



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

Project: H&S Mineral #1

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/19/15 13:28

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1505140-01	Water	05/13/15 13:54	05/13/15 16:15
BH02	1505140-02	Water	05/13/15 14:03	05/13/15 16:15
BH03	1505140-03	Water	05/13/15 14:01	05/13/15 16:15
BH04	1505140-04	Water	05/13/15 14:08	05/13/15 16:15
BH05	1505140-05	Water	05/13/15 14:15	05/13/15 16:15
BH06	1505140-06	Water	05/13/15 14:10	05/13/15 16:15
BH07	1505140-07	Water	05/13/15 13:54	05/13/15 16:15
BH08	1505140-08	Water	05/13/15 13:48	05/13/15 16:15

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.



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

Project: H&S Mineral #1

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/19/15 13:28

Summit Scientific

1505140

S₂

741 Corporate Circle, Suite J&K ♦ Golden, Colorado 80401
303-277-9310 ♦ 303-374-5933

Client: PDC Project Manager: Mark Longhurst Page 1 of 1
Address: _____ E-Mail: mark.longhurst@pdc.com
City/State/Zip: _____
Phone: _____ Fax: _____ Project Name: H&S Mineral #1
Sampler Name: Kelke Forsmark Project Number: _____

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix			Analysis Requested				Special Instructions
					HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air-Canister #	Other (Specify)				
1	B101	5/13/15	1354	3	X				X							
2	B102		1403													
3	B103		1407													
4	B104		1408													
5	B105		1415													
6	B106		1410													
7	B107		1354													
8	B108		1348													
9																
10																

Relinquished by:	Date/Time: 5/13/15	Received by:	Date/Time: 5/13/15 1615	Turn Around Time (Check) Same Day <input type="checkbox"/> 72 hours 24 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 hours <input type="checkbox"/> Sample Integrity: Temperature Upon Receipt: 10.5°C Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	Notes: on ice
Relinquished by:	Date/Time: 5/13/15 1640	Received by:	Date/Time: 5/13/15 1640		
Relinquished by:	Date/Time:	Received by:	Date/Time:		

www.s2scientific.com

Summit Scientific

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

Project: H&S Mineral #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/19/15 13:28

Sample Receipt Checklist

S2 Work Order: 13,5140

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

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

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

Cooler ID				
Temp (°C)	10.5°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 ⁽¹⁾ ?	✓			
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⁾ ?	✓			
Was adequate sample volume provided ⁽¹⁾ ?	✓			
If custody seals are present, are they intact ⁽¹⁾ ?			✓	
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 ⁽¹⁾ ?	✓			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	✓			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	✓			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	✓			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		✓		
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ?	✓			
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⁾ ?			✓	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			✓	
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

5/15/15 8:39
 Date/Time

[Signature]



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

Project: H&S Mineral #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/19/15 13:28

BH01
1505140-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/13/15 13:54**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	4.9	1.0	ug/l	1	1505149	05/16/15	05/17/15	EPA 8260B	
Toluene	13	1.0	"	"	"	"	"	"	
Ethylbenzene	5.2	1.0	"	"	"	"	"	"	
Xylenes (total)	2600	100	"	100	"	"	05/16/15	"	

Date Sampled: **05/13/15 13:54**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		117 %	37-154		"	"	05/17/15	"	
<i>Surrogate: Toluene-d8</i>		88.8 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.5 %	45-146		"	"	"	"	

Summit Scientific

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

Project: H&S Mineral #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/19/15 13:28

BH02
1505140-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/13/15 14:03**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	93	1.0	ug/l	1	1505149	05/16/15	05/17/15	EPA 8260B	
Toluene	1.2	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	75	1.0	"	"	"	"	"	"	

Date Sampled: **05/13/15 14:03**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		127 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		101 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		95.7 %	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: Mark Longhurst

Reported:
 05/19/15 13:28

BH03
1505140-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/13/15 14:01**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1505149	05/16/15	05/16/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	8.2	1.0	"	"	"	"	"	"	

Date Sampled: **05/13/15 14:01**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		117 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		89.2 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.9 %	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: H&S Mineral #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/19/15 13:28

BH04
1505140-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/13/15 14:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	2.6	1.0	ug/l	1	1505149	05/16/15	05/17/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	110	1.0	"	"	"	"	"	"	

Date Sampled: **05/13/15 14:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		123 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		101 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		92.2 %	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: Mark Longhurst

Reported:
 05/19/15 13:28

BH05
1505140-05 (Water)

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Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/13/15 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1505149	05/16/15	05/16/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **05/13/15 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>120 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>103 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>103 %</i>	<i>45-146</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	

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Project: H&S Mineral #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/19/15 13:28

BH06
1505140-06 (Water)

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Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/13/15 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1505149	05/16/15	05/16/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	750	100	"	100	"	"	"	"	
Xylenes (total)	10000	100	"	"	"	"	"	"	

Date Sampled: **05/13/15 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		110 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		119 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		92.8 %	45-146		"	"	"	"	

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Project: H&S Mineral #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/19/15 13:28

BH07
1505140-07 (Water)

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Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/13/15 13:54**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1505149	05/16/15	05/16/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **05/13/15 13:54**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		125 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		96.5 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.9 %	45-146		"	"	"	"	

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Project: H&S Mineral #1

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 05/19/15 13:28

BH08
1505140-08 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/13/15 13:48**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1505149	05/16/15	05/16/15	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **05/13/15 13:48**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>118 %</i>	<i>37-154</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>		<i>94.1 %</i>	<i>45-149</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>102 %</i>	<i>45-146</i>		<i>"</i>	<i>"</i>	<i>"</i>	<i>"</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: Mark Longhurst

Reported:
05/19/15 13:28

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 1505149 - EPA 5030 Water MS

Blank (1505149-BLK1)

Prepared & Analyzed: 05/16/15

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	16.4		"	13.2		124	37-154			
Surrogate: Toluene-d8	12.8		"	13.3		95.7	45-149			
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3		101	45-146			

LCS (1505149-BS1)

Prepared & Analyzed: 05/16/15

Benzene	26.4	1.0	ug/l	33.3		79.3	51-132			
Toluene	25.3	1.0	"	33.3		75.8	51-138			
Ethylbenzene	28.9	1.0	"	33.1		87.3	58-146			
m,p-Xylene	57.3	2.0	"	66.5		86.2	57-144			
o-Xylene	29.6	1.0	"	32.8		90.2	53-146			
Surrogate: 1,2-Dichloroethane-d4	16.1		"	13.2		122	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.0	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.5	45-146			

Matrix Spike (1505149-MS1)

Source: 1505140-08

Prepared & Analyzed: 05/16/15

Benzene	26.9	1.0	ug/l	33.3	ND	80.7	34-141			
Toluene	26.0	1.0	"	33.3	ND	78.0	27-151			
Ethylbenzene	29.8	1.0	"	33.1	ND	90.1	29-160			
m,p-Xylene	58.6	2.0	"	66.5	6.54	78.3	20-166			
o-Xylene	30.5	1.0	"	32.8	ND	93.1	33-159			
Surrogate: 1,2-Dichloroethane-d4	16.2		"	13.2		123	37-154			
Surrogate: Toluene-d8	12.9		"	13.3		97.1	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.8	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: Mark Longhurst

Reported:
 05/19/15 13:28

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 1505149 - EPA 5030 Water MS

Matrix Spike Dup (1505149-MSD1)	Source: 1505140-08			Prepared & Analyzed: 05/16/15						
Benzene	27.5	1.0	ug/l	33.3	ND	82.4	34-141	2.10	32	
Toluene	26.4	1.0	"	33.3	ND	79.1	27-151	1.30	25	
Ethylbenzene	31.2	1.0	"	33.1	ND	94.5	29-160	4.79	50	
m,p-Xylene	61.8	2.0	"	66.5	6.54	83.1	20-166	5.30	36	
o-Xylene	31.8	1.0	"	32.8	ND	97.0	33-159	4.17	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>16.7</i>		<i>"</i>	<i>13.2</i>		<i>127</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.1</i>		<i>"</i>	<i>13.3</i>		<i>98.0</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.6</i>		<i>"</i>	<i>13.3</i>		<i>102</i>	<i>45-146</i>			

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PDC Energy
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Project: H&S Mineral #1

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
05/19/15 13:28

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

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