



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

May 6, 2016

H&S (Mineral) #1 Tank Battery  
NWSW S6 T4N R65W  
Weld County, API # 05-123-11529  
Facility ID # 319594  
Remediation # 7945

This groundwater summary has been prepared by Tasman Geosciences, Inc. for the H&S (Mineral) #1 tank battery. On April 21, 2016 groundwater sampling was conducted at seven of the eight monitoring well locations (BH02 – BH08). Well BH01 was found to be damaged and could not be sampled. 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 analytical report is included as Attachment A. Sample locations and corresponding analytical results are illustrated on Figure 1. Second quarter 2016 analytical results indicate that benzene concentrations are above applicable COGCC Table 910-1 standards in monitoring well BH02 and total xylenes concentrations are above COGCC regulatory standards in monitoring well BH06. BTEX concentrations are below applicable COGCC regulatory standards in each of the remaining five monitoring well 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 remained the selected remediation strategy through the second quarter 2016. Additional remediation strategies will be evaluated during the third quarter 2016.

The third quarter 2016 groundwater sampling event will be conducted during July 2016.

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

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water <sup>(2)</sup> (feet)
<b>COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	
BH01	7/25/2013	<b>6,700</b>	<b>6,200</b>	<b>1,100</b>	<b>19,000</b>	16.53
BH01	10/31/2013	<b>1,700</b>	<b>1,800</b>	170	<b>4,400</b>	15.65
BH01	1/24/2014	<b>6.5</b>	<1.0	<1.0	<b>3,000</b>	17.19
BH01	4/30/2014	<b>290</b>	<b>990</b>	76	<b>2,700</b>	17.35
BH01	7/25/2014	<b>45</b>	100	53	<b>2,100</b>	14.68
BH01	10/27/2014	<b>21</b>	19	21	<b>2,100</b>	13.75
BH01	1/20/2015	<b>9.7</b>	13	<1.0	<b>1,600</b>	15.85
BH01	5/13/2015	4.9	13	5.2	<b>2,600</b>	15.90
BH01	7/30/2015	<1.0	6.5	<1.0	290	14.23
BH01	10/26/2015	1.1	15	5.3	400	13.57
BH01	1/26/2016	3.1	19	<1.0	980	16.04
BH01	4/21/2016	NS	NS	NS	NS	16.64
BH02	7/25/2013	<b>3,300</b>	<b>4,700</b>	<b>2,100</b>	<b>36,000</b>	17.63
BH02	10/31/2013	<b>770</b>	24	39	<b>3,300</b>	16.75
BH02	1/24/2014	<b>730</b>	20	<1.0	<b>2,600</b>	18.25
BH02	4/30/2014	<b>84</b>	12	3.8	410	18.39
BH02	7/25/2014	<b>53</b>	2.3	<1.0	68	15.75
BH02	10/27/2014	4.3	<1.0	<1.0	24	14.91
BH02	1/20/2015	<b>160</b>	<1.0	<1.0	390	17.02
BH02	5/13/2015	<b>93</b>	1.2	<1.0	75	17.14
BH02	7/30/2015	3.4	1.1	<1.0	57	15.61
BH02	10/26/2015	<b>39</b>	16	3.9	450	14.70
BH02	1/26/2016	<1.0	2.5	1.4	18	17.16
BH02	4/21/2016	<b>81</b>	<1.0	2.7	7.8	17.74
BH03	7/25/2013	<b>760</b>	<b>4,400</b>	<b>1,300</b>	<b>23,000</b>	15.98
BH03	10/31/2013	3.6	8.6	2.2	100	15.15
BH03	1/24/2014	2.6	2.0	<1.0	62	16.63
BH03	4/30/2014	1.1	1.6	<1.0	45	16.79
BH03	7/25/2014	<b>33</b>	20	<1.0	480	14.14

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Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water <sup>(2)</sup> (feet)
<b>COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	
BH03	10/27/2014	<b>17</b>	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
BH03	7/30/2015	<1.0	<1.0	<1.0	4.9	13.72
BH03	10/26/2015	<1.0	<1.0	<1.0	12	13.09
BH03	1/26/2016	<1.0	1.4	<1.0	9.7	15.55
BH03	4/21/2016	<1.0	1.0	<1.0	5.7	16.16
BH04	7/25/2013	<b>1,700</b>	170	<b>1,200</b>	<b>19,000</b>	15.91
BH04	10/31/2013	<b>2,500</b>	140	620	<b>13,000</b>	15.09
BH04	1/24/2014	<b>2,100</b>	320	<b>740</b>	<b>14,000</b>	16.60
BH04	4/30/2014	<b>1,700</b>	300	<b>1,100</b>	<b>19,000</b>	16.74
BH04	7/25/2014	<b>410</b>	9.3	36	<b>6,400</b>	14.11
BH04	10/27/2014	<b>37</b>	2.4	<1.0	630	13.22
BH04	1/20/2015	<b>45</b>	<1.0	<1.0	520	15.46
BH04	5/13/2015	2.6	<1.0	<1.0	110	15.40
BH04	7/30/2015	<b>8.8</b>	1.2	2.4	780	13.76
BH04	10/26/2015	3.2	3.9	7.2	450	13.05
BH04	1/26/2016	<1.0	2.2	2.4	43	15.51
BH04	4/21/2016	<1.0	<1.0	<1.0	10	16.10
BH05	7/25/2013	<b>17</b>	<b>3,300</b>	<b>930</b>	<b>15,000</b>	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
BH05	7/30/2015	<1.0	<1.0	<1.0	2.3	10.91
BH05	10/26/2015	<1.0	<1.0	<1.0	<1.0	10.17

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Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water <sup>(2)</sup> (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup>		5	560	700	1,400	
BH05	1/26/2016	<1.0	<1.0	<1.0	<1.0	12.79
BH05	4/21/2016	<1.0	<1.0	<1.0	<1.0	13.20
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
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
BH06	7/30/2015	<1.0	<1.0	<1.0	<1.0	11.32
BH06	10/26/2015	<1.0	<1.0	<1.0	<1.0	10.59
BH06	1/26/2016	<1.0	<1.0	<1.0	<1.0	13.09
BH06	4/21/2016	<1.0	<1.0	270	4,800	13.55
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
BH07	7/30/2015	<1.0	<1.0	<1.0	<1.0	13.17
BH07	10/26/2015	<1.0	<1.0	<1.0	<1.0	12.37
BH07	1/26/2016	<1.0	<1.0	<1.0	<1.0	14.92
BH07	4/21/2016	<1.0	<1.0	<1.0	<1.0	15.39
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

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

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Depth to Water <sup>(2)</sup> (feet)
<b>COGCC Table 910-1 Groundwater Standard (µg/L) <sup>(1)</sup></b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>	
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
BH08	7/30/2015	<1.0	<1.0	<1.0	<1.0	11.30
BH08	10/26/2015	<1.0	<1.0	<1.0	<1.0	10.56
BH08	1/26/2016	<1.0	<1.0	<1.0	<1.0	13.04
BH08	4/21/2016	<1.0	<1.0	<1.0	<1.0	13.57

**Notes:**

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

2. Depth to water measured from top of well casing

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

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

NM = Not measured

NS = Not sampled

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

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

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)
<b>Third Quarter 2013</b>					
8/6/2013	BH02, BH03, BH04, BH05, BH06	6	50	BH01, BH02, BH03, BH05, BH06	10
8/19/2013	BH01, BH02, BH03, BH04, BH05, BH06	6	80	BH01, BH02, BH03, BH04, BH05, BH06	10
9/8/2013		6	21		10
9/16/2013		6	80		10
9/30/2013		5	90	BH01, BH02, BH03, BH05, BH06	20
<b>Quarterly Totals</b>		<b>29</b>	<b>321</b>		-
<b>Fourth Quarter 2013</b>					
10/11/2013	BH01, BH02, BH03, BH04, BH05, BH06	6	80	BH01, BH02, BH03, BH05, BH06	10
10/24/2013	BH01, BH02, BH03, BH04, BH06	6	110	BH01, BH02, BH03, BH05, BH06	12
11/26/2013	BH01, BH02, BH03,	6	40		10
12/17/2013	BH04, BH05, BH06	6	42		10
<b>Quarterly Totals</b>		<b>24</b>	<b>272</b>		-
<b>First Quarter 2014</b>					
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
<b>Quarterly Totals</b>		<b>29.5</b>	<b>725</b>		-
<b>Second Quarter 2014</b>					
4/10/2014	BH01, BH02, BH03, BH04, BH05	8	230	BH01, BH02, BH03, BH05	10
4/23/2014	BH01, BH02, BH03, BH04, BH05, BH06	6	180	BH01, BH02, BH03, BH04, BH05, BH06	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
<b>Quarterly Totals</b>		<b>40</b>	<b>1265</b>		-
<b>Third Quarter 2014</b>					
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
<b>Quarterly Totals</b>		<b>36</b>	<b>1520</b>		-

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

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)
<b>Fourth Quarter 2014</b>					
10/10/2014	BH01, BH02, BH03, BH04, BH05, BH06	6	100	BH01, BH02, BH03, BH04, BH05, BH06	20
10/24/2014	Pipe, BH01, BH02, BH03, BH05, BH06	6	50		15
11/7/2014	Pipe, BH01, BH02, BH03, BH05	6	207		20
11/25/2014	BH01, BH02, BH03, BH04, BH05, BH06	6	18		30
12/10/2014					
<b>Quarterly Totals</b>		<b>30</b>	<b>645</b>		-
<b>First Quarter 2015</b>					
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, BH03, BH04, BH05, BH06	6	250		20
3/13/2015		6	100		20
3/25/2015		6	160		20
<b>Quarterly Totals</b>		<b>35</b>	<b>1025</b>		-
<b>Second Quarter 2015</b>					
4/1/2015	Pipe, BH01, BH02, BH03, BH04, BH05, BH06	6	165	BH01, BH02, BH03, BH04, BH05, BH06	20
4/21/2015	Pipe, BH01, BH02, BH03, BH04, BH05	6	180	BH01, BH02, BH03, BH04, BH05	20
5/5/2015	Pipe, BH01, BH02, BH03, BH04, BH05, BH06	6	80	BH01, BH02, BH03, BH04, BH05, BH06	20
5/19/2015		6	250		20
6/2/2015		6	270		20
6/16/2015		6	350		20
6/30/2015		6	340		20
<b>Quarterly Totals</b>		<b>42</b>	<b>1635</b>		-
<b>Third Quarter 2015</b>					
7/14/2015	Pipe, BH01, BH02, BH03, BH04, BH05, BH06	6	375	BH01, BH02, BH03, BH04, BH05, BH06	20
7/28/2015		6	405	BH01, BH02, BH03, BH04, BH05, BH06	20
8/11/2015		6	320	BH01, BH02, BH03, BH04, BH05	20
8/25/2015		6	505	BH01, BH02, BH03, BH04, BH05, BH06	20
9/8/2015		6	90		20
9/22/2015		6	700		20
<b>Quarterly Totals</b>		<b>36</b>	<b>2395</b>		-

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

Date	EFR Wells	Total EFR/AS Duration (hours)	Approximate Gallons Extracted	AS Wells	Air Injection Pressure (psi)	
<b>Fourth Quarter 2015</b>						
10/6/2015	Pipe, BH01, BH02, BH03, BH04, BH05, BH06	6	550	BH01, BH02, BH03, BH04, BH05, BH06	20	
10/20/2015		6	400		20	
11/3/2015		6	552		20	
11/19/2015		6	320		BH01, BH02, BH03, BH04, BH05	20
12/1/2015		6	142			20
12/22/2015	Pipe, BH01, BH02, BH03	6	260	BH02, BH03, BH04	20	
<b>Quarterly Totals</b>		<b>36</b>	<b>2224</b>		-	
<b>First Quarter 2016</b>						
1/13/2016	Pipe, BH01, BH03, BH05, BH06	6	20	BH01, BH02, BH03, BH04, BH05	20	
2/12/2016		6	200		20	
2/25/2016		6	420		20	
3/10/2016		6	250		20	
3/24/2016		6	320		24	
<b>Quarterly Totals</b>		<b>30</b>	<b>1210</b>		-	
<b>Second Quarter 2016</b>						
4/7/2016	Pipe, BH03, BH05, BH06	6	840	BH01, BH02, BH03, BH04, BH05, BH06	20	
4/22/2016		6	250		25	
<b>Quarterly Totals</b>		<b>12</b>	<b>1090</b>		-	

**Notes:**

EFR = Enhanced fluid recovery

AS = Air sparge

psi = Pounds per square inch



BH02		
Compound (µg/L)	1/26/2016	4/21/2016
Benzene	<1.0	81
Toluene	2.5	<1.0
Ethylbenzene	1.4	2.7
Total Xylenes	18	7.8

BH01		
Compound (µg/L)	1/26/2016	4/21/2016
Benzene	3.1	NS
Toluene	19	NS
Ethylbenzene	<1.0	NS
Total Xylenes	980	NS

BH04		
Compound (µg/L)	1/26/2016	4/21/2016
Benzene	<1.0	<1.0
Toluene	2.2	<1.0
Ethylbenzene	2.4	<1.0
Total Xylenes	43	10

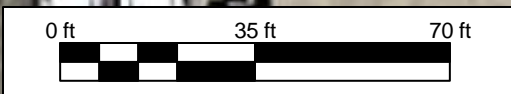
BH07		
Compound (µg/L)	1/26/2016	4/21/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH03		
Compound (µg/L)	1/26/2016	4/21/2016
Benzene	<1.0	<1.0
Toluene	1.4	1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	9.7	5.7

BH06		
Compound (µg/L)	1/26/2016	4/21/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	270
Total Xylenes	<1.0	4,800

BH05		
Compound (µg/L)	1/26/2016	4/21/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0

BH08		
Compound (µg/L)	1/26/2016	4/21/2016
Benzene	<1.0	<1.0
Toluene	<1.0	<1.0
Ethylbenzene	<1.0	<1.0
Total Xylenes	<1.0	<1.0



Surface Drainage

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

DRAWN BY: KBW

DATE: 4/29/2016

**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**

- Excavation Extent
- Monitoring Well Location
- Monitoring Well Location – SVE Screen
- Horizontal Remediation Well Location
- Groundwater Flow Direction
- Point of Release

All locations are approximate unless otherwise noted

**FIGURE 1**  
 GROUNDWATER ANALYTICAL RESULTS MAP

**ATTACHMENT A**

# Summit Scientific

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

April 27, 2016

Mark Longhurst  
PDC Energy  
1775 Sherman St. STE. 3000  
Denver, CO 80203  
RE: HS Mineral #1

Enclosed are the results of analyses for samples received by Summit Scientific on 04/21/16 18:12. 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', written in a cursive style.

Paul Shrewsbury  
President



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

Project: HS Mineral #1

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/27/16 09:14

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH02	1604177-01	Water	04/21/16 11:39	04/21/16 18:12
BH03	1604177-02	Water	04/21/16 11:13	04/21/16 18:12
BH04	1604177-03	Water	04/21/16 11:25	04/21/16 18:12
BH05	1604177-04	Water	04/21/16 11:05	04/21/16 18:12
BH06	1604177-05	Water	04/21/16 10:54	04/21/16 18:12
BH07	1604177-06	Water	04/21/16 10:38	04/21/16 18:12
BH08	1604177-07	Water	04/21/16 10:48	04/21/16 18:12

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

Project: HS Mineral #1  
 Project Number: [none]  
 Project Manager: Mark Longhurst

Reported:  
 04/27/16 09:14

# Summit Scientific

1604177

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

Page 1 of 1

Client: PDC Energy  
 Address: \_\_\_\_\_  
 City/State/Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Sampler Name: MW # EB

Project Manager: Mark Longhurst  
 E-Mail: Mark.Longhurst@PDCE.com  
 Project Name: HS Mineral  
 Project Number: \_\_\_\_\_

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:						Special Instructions	
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Seal	Air - Canister Serial #	Other (Specify)							
BH02	4/21/16	11:39	3	X				X										
BH03	4/21/16	11:13	3	X				X										
BH04	4/21/16	11:25	3	X				X										
BH05	4/21/16	11:05	3	X				X										
BH06	4/21/16	10:51	3	X				X										
BH07	4/21/16	10:38	3	X				X										
BH08	4/21/16	10:48	3	X				X										

Relinquished by: <u>Michael Walker</u>	Date/Time: <u>4-21-16 1812</u>	Received by: <u>MS</u>	Date/Time: <u>4-21-16 1812</u>	Turn Around Time (Check) 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"/>	Notes:
Relinquished by:	Date/Time:	Received by:	Date/Time:		
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:		
				Sample Integrity: Temperature Upon Receipt: <u>6.0</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

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

Project: HS Mineral #1

Project Number: [none]  
 Project Manager: Mark Longhurst

Reported:  
 04/27/16 09:14

**Sample Receipt Checklist**

S2 Work Order: 1604177

Client: PDC Energy Client Project ID: HS Mineral

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

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

Cooler ID					
Temp (°C)	<u>6.0°C</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 <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.	<u>6.0</u>			
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?			<input checked="" type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.			<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				

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

Nindy Mach  
 Custodian Printed Name

MLM  
 Signature or Initials of Custodian

4/22/16 9:50  
 Date/Time



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

Project: HS Mineral #1

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/27/16 09:14

**BH02**  
**1604177-01 (Water)**

**Summit Scientific**

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

Date Sampled: **04/21/16 11:39**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>81</b>	1.0	ug/l	1	1604250	04/23/16	04/23/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>2.7</b>	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>7.8</b>	1.0	"	"	"	"	"	"	

Date Sampled: **04/21/16 11:39**

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>		98.5 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	45-146		"	"	"	"	

Summit Scientific

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

Project: HS Mineral #1  
 Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/27/16 09:14

**BH03**  
**1604177-02 (Water)**

**Summit Scientific**

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

Date Sampled: **04/21/16 11:13**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604250	04/23/16	04/23/16	EPA 8260B	
<b>Toluene</b>	<b>1.0</b>	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>5.7</b>	1.0	"	"	"	"	"	"	

Date Sampled: **04/21/16 11:13**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		107 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.4 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	45-146		"	"	"	"	

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

Project: HS Mineral #1  
 Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/27/16 09:14

**BH04**  
**1604177-03 (Water)**

**Summit Scientific**

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

Date Sampled: **04/21/16 11:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604250	04/23/16	04/23/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>10</b>	1.0	"	"	"	"	"	"	

Date Sampled: **04/21/16 11:25**

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>		99.0 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.8 %	45-146		"	"	"	"	

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

Project: HS Mineral #1

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/27/16 09:14

**BH05**  
**1604177-04 (Water)**

**Summit Scientific**

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

Date Sampled: **04/21/16 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604250	04/23/16	04/23/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/21/16 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		105 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.7 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.2 %	45-146		"	"	"	"	

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

Project: HS Mineral #1  
 Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/27/16 09:14

**BH06**  
**1604177-05 (Water)**

**Summit Scientific**

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

Date Sampled: **04/21/16 10:54**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604250	04/23/16	04/23/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>270</b>	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>4800</b>	1.0	"	"	"	"	"	"	

Date Sampled: **04/21/16 10:54**

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>		99.8 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		94.7 %	45-146		"	"	"	"	

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

Project: HS Mineral #1

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/27/16 09:14

**BH07**  
**1604177-06 (Water)**

**Summit Scientific**

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

Date Sampled: **04/21/16 10:38**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604250	04/23/16	04/23/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/21/16 10:38**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		106 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.6 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		100 %	45-146		"	"	"	"	

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

Project: HS Mineral #1

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/27/16 09:14

**BH08**  
**1604177-07 (Water)**

**Summit Scientific**

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

Date Sampled: **04/21/16 10:48**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604250	04/23/16	04/23/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/21/16 10:48**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		106 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.0 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.5 %	45-146		"	"	"	"	

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

Project: HS Mineral #1  
Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
04/27/16 09:14

**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 1604250 - EPA 5030 Water MS**

**Blank (1604250-BLK1)**

Prepared & Analyzed: 04/23/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	14.0		"	13.3		105	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		99.4	45-149			
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3		98.8	45-146			

**LCS (1604250-BS1)**

Prepared & Analyzed: 04/23/16

Benzene	29.0	1.0	ug/l	33.3		87.2	51-132			
Toluene	28.9	1.0	"	33.3		86.8	51-138			
Ethylbenzene	38.5	1.0	"	33.1		117	58-146			
m,p-Xylene	73.6	2.0	"	66.5		111	57-144			
o-Xylene	35.4	1.0	"	32.7		108	53-146			
Surrogate: 1,2-Dichloroethane-d4	14.0		"	13.3		105	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.6	45-149			
Surrogate: 4-Bromofluorobenzene	13.3		"	13.3		99.8	45-146			

**Matrix Spike (1604250-MS1)**

Source: 1604177-01

Prepared & Analyzed: 04/23/16

Benzene	93.2	1.0	ug/l	33.3	80.6	37.7	34-141			
Toluene	29.6	1.0	"	33.3	ND	89.0	27-151			
Ethylbenzene	41.1	1.0	"	33.1	2.66	116	29-160			
m,p-Xylene	79.6	2.0	"	66.5	5.47	111	20-166			
o-Xylene	37.5	1.0	"	32.7	2.30	108	33-159			
Surrogate: 1,2-Dichloroethane-d4	14.6		"	13.3		110	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.5	45-149			
Surrogate: 4-Bromofluorobenzene	13.1		"	13.3		98.5	45-146			

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

Project: HS Mineral #1

Project Number: [none]  
 Project Manager: Mark Longhurst

**Reported:**  
 04/27/16 09:14

**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 1604250 - EPA 5030 Water MS**

<b>Matrix Spike Dup (1604250-MSD1)</b>	<b>Source: 1604177-01</b>			<b>Prepared &amp; Analyzed: 04/23/16</b>						
Benzene	84.8	1.0	ug/l	33.3	80.6	12.7	34-141	9.37	32	QM-07
Toluene	30.8	1.0	"	33.3	ND	92.3	27-151	3.74	25	
Ethylbenzene	41.4	1.0	"	33.1	2.66	117	29-160	0.752	50	
m,p-Xylene	79.3	2.0	"	66.5	5.47	111	20-166	0.340	36	
o-Xylene	37.7	1.0	"	32.7	2.30	108	33-159	0.506	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>15.5</i>		<i>"</i>	<i>13.3</i>		<i>116</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.2</i>		<i>"</i>	<i>13.3</i>		<i>99.0</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.5</i>		<i>"</i>	<i>13.3</i>		<i>101</i>	<i>45-146</i>			

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

Project: HS Mineral #1

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
04/27/16 09:14

### Notes and Definitions

- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
- 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