

March 1, 2016

Mr. Bob Chesson
Environmental Protection Specialist, Northeast Region
Colorado Oil and Gas Conservation Commission
1120 Lincoln Street, Suite 801
Denver, CO 80203

**Re: 2015 Annual Groundwater Monitoring Report
H&S Mineral #1 Tank Battery
NWSW Section 6 T4N R65W
Weld County, Colorado
Facility #: 319594
Spill Tracking #: 2145651
Remediation #: 7945**

Dear Mr. Chesson,

On behalf of PDC Energy, Inc. (PDC), Tasman Geosciences, Inc. (Tasman) is submitting this 2015 Annual Groundwater Monitoring Report for quarterly groundwater monitoring activities conducted at the H&S Mineral #1 tank battery (Site). This report documents the results of groundwater gauging, groundwater sampling, and remediation activities conducted at the Site during 2015. As per discussions with COGCC staff, PDC is providing this summary annual report to assist in updating the COGCC on the progress and status of this open remediation Site.

A historic release was discovered at the Site on June 20, 2013, during replacement of the produced water vault. Following excavation and well installation activities, groundwater monitoring was initiated during the fourth quarter 2013. The monitoring well network at the Site consists of 8 temporary monitoring and remediation wells (BH01 - BH08), as shown in Figure 1. Historic groundwater monitoring results are presented in Table 1. Groundwater monitoring results for 2015 are summarized below.

Sampling Event	Wells Exceeding COGCC Standards	Maximum Benzene Concentration (µg/L)
1Q 2015	BH01, BH02, BH04	160
2Q 2015	BH01, BH02, BH06	93
3Q 2015	BH04	8.8
4Q 2015	BH02	39

Tasman initiated enhanced fluid recovery (EFR) and air sparge (AS) events at the site during the third quarter 2013. EFR/AS will remain the selected remediation strategy for this site through the first quarter 2016. Following the completion of remediation activities, four additional quarters of compliance groundwater monitoring will be conducted to confirm that BTEX concentrations remain below applicable COGCC Table 910-1 groundwater standards.

Please contact me at (720) 409-8791 if you have any questions regarding this report.

Sincerely,



Christine Wasko
Project Manager
Tasman Geosciences, Inc.








DRAWN BY: ESS	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  Point of Release	FIGURE 1 GROUNDWATER MONITORING SITE MAP
DATE: 2/2/2016			All locations are approximate unless otherwise noted	

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 (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
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
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
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
BH02	7/30/2015	3.4	1.1	<1.0	57	15.61
BH02	10/26/2015	39	16	3.9	450	14.70
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	2.0	<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
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
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

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COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
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
BH04	7/30/2015	8.8	1.2	2.4	780	13.76
BH04	10/26/2015	3.2	3.9	7.2	450	13.05
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
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
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
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

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COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
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
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
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

Notes:

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

COGCC = Colorado Oil and Gas Conservation Commission

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

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.