

June 2, 2016

Mr. Randall Ferguson  
EHS Senior Compliance Specialist  
PDC Energy, Inc.  
1775 Sherman Street, Suite 3000  
Denver, CO 80203

**RE: Produced Water Vessel Closure Report**  
**Stonebraker 32, 42-28 Tank Battery**  
**Facility ID #: 305082**  
**SWNE S28 T2N R64W**  
**Blanket Remediation #: 9440**

Dear Mr. Ferguson,

On behalf of PDC Energy, Inc. (PDC), Tasman Geosciences, Inc. (Tasman) has prepared this Produced Water Vessel Closure Report (Report) to document environmental sampling activities performed at the above-referenced site. This Report is being submitted under the Form 27 Management Plan for Closure of Produced Water Vessels, which has been assigned Blanket Remediation #9440 by the Colorado Oil and Gas Conservation Commission (COGCC).

A summary of excavation and environmental sampling activities is provided below.

#### **Site Assessment Activities**

On May 26, 2016, excavation and sampling activities were conducted following the removal of the partially buried produced water vessel. Approximately 70 cubic yards of impacted material were removed and transported to the Buffalo Ridge Landfill in Keenesburg, Colorado for disposal under PDC waste manifests. The lateral and vertical extents of the excavations were guided by field screening volatile organic compound (VOC) concentrations in soil using a photoionization detector (PID). Five confirmation soil samples (SS01 - SS05) were collected from the sidewalls and base of the excavation area at approximately 10 feet and 11 feet below ground surface (bgs), respectively. Soil samples were submitted to Summit Scientific Laboratories in Golden, Colorado (Summit) for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by USEPA Method 8260B, and TPH – diesel range organics (DRO) by USEPA Method 8015. In addition, the soil sample collected from the base of the excavation (SS01) was submitted for laboratory analysis of pH and electrical conductivity (EC).

Analytical results indicated that constituent concentrations were below COGCC Table 910-1 soil standards at all five soil sample locations. EC was in exceedance of regulatory standards in soil sample SS01, however no further soil removal is required as the sample was collected below the COGCC designated root zone.

The excavation extent and soil sample locations are illustrated on Figure 1. Soil analytical data is summarized in Table 1 and the laboratory analytical report is included as Attachment A.

## Conclusions

Based on the soil analytical data described herein, petroleum hydrocarbon impacts were successfully removed by excavation activities. Consequently, no further site investigation is recommended at this time. The facility was decommissioned following site assessment activities.

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

Sincerely,



Christine Wasko  
Project Manager  
Tasman Geosciences, Inc.

Enclosures:

Figure 1 – Excavation Site Map

Table 1 – Soil Analytical Results Summary Table

Attachment A – Laboratory Analytical Report



Surface  
Drainage

SS02 @ 10'  
+  
SS05 @ 10' + SS01 @ 11' + SS04 @ 10'  
+  
SS03 @ 10'

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

0 ft 20 ft 40 ft

Google Earth: Google Earth 2015

DRAWN BY: EMB

DATE: 5/31/2016

**Facility Diagram**  
PDC Energy – DJ Basin  
Stonebraker 32, 42-28 Tank Battery  
SWNE S28 T2N R64W  
Weld County, CO



**TASMAN**  
GEOSCIENCES 6899 Pecos St., Unit C  
Denver, CO 80221

LEGEND

— Excavation Extent  
X Point of Release  
+ Soil Sample Location

All locations are  
approximate unless  
otherwise noted

FIGURE 1  
EXCAVATION  
SITE MAP

**TABLE 1**  
**STONEBRAKER 32, 42-28 TANK BATTERY**  
**SOIL ANALYTICAL RESULTS SUMMARY TABLE**

Sample ID	Date Sampled	Depth (feet bgs)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Naphthalene (mg/kg)	TPH <sup>(2)</sup> (mg/kg)	pH (units)	EC (mmhos/cm)
COGCC standards for soil (mg/kg) <sup>(1)</sup>			0.17	85	100	175	23	500	6-9	<4
SS01 @ 11'	5/26/2016	11	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	9.35	2.56
SS02 @ 10'	5/26/2016	10	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	N/A	N/A
SS03 @ 10'	5/26/2016	10	<0.0020	0.024	<0.0050	0.042	<0.010	0.87	N/A	N/A
SS04 @ 10'	5/26/2016	10	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	N/A	N/A
SS05 @ 10'	5/26/2016	10	<0.0020	0.031	<0.0050	0.063	<0.010	0.86	N/A	N/A

**Notes:**

1. Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective March 16, 2016.

2. TPH - Total volatile and extractable petroleum hydrocarbons. Value calculated by adding GRO and DRO concentrations.

COGCC = Colorado Oil and Gas Conservation Commission

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

GRO = Total volatile petroleum hydrocarbons - gasoline range organics

DRO = Total extractable petroleum hydrocarbons - diesel range organics

mg/kg = Milligrams per kilogram

bgs = Below ground surface

EC = Electrical conductivity

mmhos/cm = millimhos per centimeter

N/A = Not analyzed

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

## **ATTACHMENT A**

# Summit Scientific

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

May 27, 2016

Mark Longhurst  
PDC Energy  
1775 Sherman St. STE. 3000  
Denver, CO 80203  
RE: Stone Breaker 32, 42-28

Enclosed are the results of analyses for samples received by Summit Scientific on 05/26/16 18:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

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

Paul Shrewsbury  
President



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

Project: Stone Breaker 32, 42-28

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/27/16 06:42

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@11'	1605245-01	Soil	05/26/16 10:00	05/26/16 18:00
SS02@10'	1605245-02	Soil	05/26/16 10:08	05/26/16 18:00
SS03@10'	1605245-03	Soil	05/26/16 10:10	05/26/16 18:00
SS04@10'	1605245-04	Soil	05/26/16 10:30	05/26/16 18:00
SS05@10'	1605245-05	Soil	05/26/16 10:15	05/26/16 18:00

Summit Scientific

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

Project: Stone Breaker 32, 42-28

Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
05/27/16 06:42

# Summit Scientific 1605245

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

Client: PDC  
Address:  
City/State/Zip:  
Phone: Fax:  
Sampler Name: Matt Peterson  
Project Manager: Mark Longhurst  
E-Mail: Mark.Longhurst@PDC.E.COM  
Project Name: Stone breaker 32, 42-28  
Project Number:

Page 1 of 1

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix		Analyze For:				Special Instructions	
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	GBTEXN (5260)	PCO (8015)		PH
SS01 @ 11'	5/26/16	1000	1												
SS02 @ 10'		1008	1												
SS03 @ 10'		1010	1												
SS04 @ 10'		1030	1												
SS05 @ 10'		1015	1												
Relinquished by:		Date/Time: 5/26/16 1715		Received by:		Date/Time: 5/26/16 1715		Turn Around Time (Check)				Notes:			
Relinquished by:		Date/Time: 5/26/16 1715		Received by:		Date/Time:		Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>							
Relinquished by:		Date/Time:		Received in Lab by:		Date/Time:		Sample Integrity: Temperature Upon Receipt: 58°C Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>							

www.s2scientific.com





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

Project: Stone Breaker 32, 42-28

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/27/16 06:42

**SS01@11'**  
**1605245-01 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **05/26/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1605263	05/26/16	05/26/16	8015M	

Date Sampled: **05/26/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		106 %	30-150		"	"	"	"	

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

Date Sampled: **05/26/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1605262	"	05/26/16	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **05/26/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		119 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

#### Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **05/26/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	<b>2.56</b>	0.0100	mmhos/cm	1	1605271	05/26/16	05/26/16	SM 2510B	

Summit Scientific

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Denver CO, 80203

Project: Stone Breaker 32, 42-28

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/27/16 06:42

**SS01@11'**  
**1605245-01 (Soil)**

**Summit Scientific**

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **05/26/16 10:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>pH</b>	<b>9.35</b>	0.100	pH Units	1	1605270	05/26/16	05/26/16	EPA 9045	

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Denver CO, 80203

Project: Stone Breaker 32, 42-28

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/27/16 06:42

**SS02@10'**  
**1605245-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **05/26/16 10:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1605263	05/26/16	05/26/16	8015M	

Date Sampled: **05/26/16 10:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		106 %	30-150		"	"	"	"	

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

Date Sampled: **05/26/16 10:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1605262	"	05/26/16	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **05/26/16 10:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		113 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	21-167		"	"	"	"	

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Denver CO, 80203

Project: Stone Breaker 32, 42-28

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/27/16 06:42

**SS03@10'**  
**1605245-03 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **05/26/16 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1605263	05/26/16	05/26/16	8015M	

Date Sampled: **05/26/16 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		105 %	30-150		"	"	"	"	

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

Date Sampled: **05/26/16 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1605262	"	05/26/16	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
<b>Toluene</b>	<b>0.024</b>	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.042</b>	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>0.87</b>	0.50	"	"	"	"	"	"	

Date Sampled: **05/26/16 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

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Denver CO, 80203

Project: Stone Breaker 32, 42-28

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/27/16 06:42

**SS04@10'**  
**1605245-04 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **05/26/16 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1605263	05/26/16	05/26/16	8015M	

Date Sampled: **05/26/16 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		104 %	30-150		"	"	"	"	

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

Date Sampled: **05/26/16 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1605262	"	05/26/16	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **05/26/16 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

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Denver CO, 80203

Project: Stone Breaker 32, 42-28

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/27/16 06:42

**SS05@10'**  
**1605245-05 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **05/26/16 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1605263	05/26/16	05/26/16	8015M	

Date Sampled: **05/26/16 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		106 %	30-150		"	"	"	"	

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

Date Sampled: **05/26/16 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1605262	"	05/26/16	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
<b>Toluene</b>	<b>0.031</b>	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.063</b>	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>0.86</b>	0.50	"	"	"	"	"	"	

Date Sampled: **05/26/16 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

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

Project: Stone Breaker 32, 42-28  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/27/16 06:42

**Extractable Petroleum Hydrocarbons by 8015 - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1605263 - EPA 3550A**

**Blank (1605263-BLK1)**

Prepared & Analyzed: 05/26/16

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: o-Terphenyl	13.4		"	12.5		107	30-150			

**LCS (1605263-BS1)**

Prepared & Analyzed: 05/26/16

C10-C28 (DRO)	560	50	mg/kg	499		112	73-134			
Surrogate: o-Terphenyl	13.4		"	12.5		108	30-150			

**Matrix Spike (1605263-MS1)**

Source: 1605213-01

Prepared & Analyzed: 05/26/16

C10-C28 (DRO)	519	50	mg/kg	499	37.1	96.7	50-148			
Surrogate: o-Terphenyl	13.3		"	12.5		107	30-150			

**Matrix Spike Dup (1605263-MSD1)**

Source: 1605213-01

Prepared & Analyzed: 05/26/16

C10-C28 (DRO)	532	50	mg/kg	499	37.1	99.2	50-148	2.40	13	
Surrogate: o-Terphenyl	13.2		"	12.5		106	30-150			

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

Project: Stone Breaker 32, 42-28  
Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
05/27/16 06:42

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1605262 - EPA 5030 Soil MS**

**Blank (1605262-BLK1)**

Prepared & Analyzed: 05/26/16

Naphthalene	ND	0.010	mg/kg							
Benzene	ND	0.0020	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0419</i>		<i>"</i>	<i>0.0400</i>		<i>105</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0392</i>		<i>"</i>	<i>0.0400</i>		<i>98.1</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0421</i>		<i>"</i>	<i>0.0400</i>		<i>105</i>	<i>21-167</i>			

**LCS (1605262-BS1)**

Prepared & Analyzed: 05/26/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.109	0.0020	"	0.100		109	58-130			
Toluene	0.117	0.0050	"	0.100		117	61-134			
Ethylbenzene	0.128	0.0050	"	0.0992		129	74-139			
m,p-Xylene	0.241	0.010	"	0.200		121	73-137			
o-Xylene	0.120	0.0050	"	0.0980		122	73-141			
Xylenes (total)	0.360	0.010	"				0-200			
Gasoline Range Hydrocarbons	4.86	0.50	"				30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0404</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0432</i>		<i>"</i>	<i>0.0400</i>		<i>108</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0410</i>		<i>"</i>	<i>0.0400</i>		<i>103</i>	<i>21-167</i>			

**Matrix Spike (1605262-MS1)**

Source: 1605213-01

Prepared & Analyzed: 05/26/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.113	0.0020	"	0.0967	ND	117	30-131			
Toluene	0.122	0.0050	"	0.0967	ND	126	30-134			
Ethylbenzene	0.137	0.0050	"	0.0959	ND	143	22-153			
m,p-Xylene	0.259	0.010	"	0.193	ND	134	10-159			
o-Xylene	0.129	0.0050	"	0.0948	ND	136	31-151			
Xylenes (total)	0.388	0.010	"		ND		30-160			
Gasoline Range Hydrocarbons	5.55	0.50	"		0.352		30-160			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0418</i>		<i>"</i>	<i>0.0387</i>		<i>108</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0401</i>		<i>"</i>	<i>0.0387</i>		<i>104</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0394</i>		<i>"</i>	<i>0.0387</i>		<i>102</i>	<i>21-167</i>			

Summit Scientific

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

Project: Stone Breaker 32, 42-28

Project Number: [none]  
Project Manager: Mark Longhurst

Reported:  
05/27/16 06:42

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1605262 - EPA 5030 Soil MS**

Matrix Spike Dup (1605262-MSD1)		Source: 1605213-01			Prepared & Analyzed: 05/26/16					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.109	0.0020	"	0.0931	ND	117	30-131	4.03	34	
Toluene	0.121	0.0050	"	0.0931	ND	129	30-134	1.12	30	
Ethylbenzene	0.139	0.0050	"	0.0924	ND	150	22-153	1.23	24	
m,p-Xylene	0.262	0.010	"	0.186	ND	141	10-159	1.27	68	
o-Xylene	0.129	0.0050	"	0.0912	ND	142	31-151	0.0514	38	
Xylenes (total)	0.391	0.010	"		ND		30-160	0.830	30	
Gasoline Range Hydrocarbons	5.60	0.50	"		0.352		30-160	0.973	30	
Surrogate: 1,2-Dichloroethane-d4	0.0405		"	0.0372		109	23-173			
Surrogate: Toluene-d8	0.0372		"	0.0372		100	20-170			
Surrogate: 4-Bromofluorobenzene	0.0383		"	0.0372		103	21-167			

Summit Scientific

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

Project: Stone Breaker 32, 42-28  
Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/27/16 06:42

**Physical Parameters by APHA/ASTM/EPA Methods - Quality Control**  
**Summit Scientific**

Analyte	Reporting			Spike	Source	%REC		RPD		
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

**Batch 1605270 - General Preparation**

**LCS (1605270-BS1)**

Prepared & Analyzed: 05/26/16

pH	6.04	0.100	pH Units	6.00	101	95-105
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**Duplicate (1605270-DUP1)**

**Source: 1605245-01**

Prepared & Analyzed: 05/26/16

pH	9.42	0.100	pH Units	9.35	0.746	20
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**Batch 1605271 - General Preparation**

**Blank (1605271-BLK1)**

Prepared & Analyzed: 05/26/16

Specific Conductance (EC)	ND	0.0100	mmhos/cm
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**LCS (1605271-BS1)**

Prepared & Analyzed: 05/26/16

Specific Conductance (EC)	0.101	0.00200	mmhos/cm	0.100	101	90-110
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**Duplicate (1605271-DUP1)**

**Source: 1605245-01**

Prepared & Analyzed: 05/26/16

Specific Conductance (EC)	2.32	0.0100	mmhos/cm	2.56	10.1	20
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Summit Scientific

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

Project: Stone Breaker 32, 42-28

Project Number: [none]  
Project Manager: Mark Longhurst

**Reported:**  
05/27/16 06:42

### 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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Summit Scientific

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