

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303) 894-2100 Fax 894-2109



FOR OGCC USE ONLY

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

OGCC Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No:

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☒ Spill or Release ☒ Plug & Abandon ☐ Central Facility Closure ☐ Site/Facility Closure ☐ Other (describe): _____

GENERAL INFORMATION

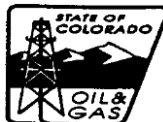
OGCC Operator Number: 69175		Contact Name and Telephone	
Name of Operator: PDC Energy, Inc.		Name: Karen Shanahan Olson	
Address: 1775 Sherman Street, Suite 3000		No: (303) 860-5800	
City: Denver State: CO Zip: 80203		Fax: (303) 318-6106	
API/Facility No: 05-123-20464		County: Weld	
Facility Name: Williamson 43-12		Facility Number: 331302	
Well Name: Williamson 43-12		Well Number: Williamson 43-12	
Location (QtrQtr, Sec, Twp, Rng, Meridian): NESE S12 T6N R65W		Latitude: 40.49941 Longitude: -104.60199	

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.):		Produced Water	
Site Conditions: Is location within a sensitive area (according to Rule 901e)?		<input checked="" type="checkbox"/> Y <input type="checkbox"/> N If yes, attach evaluation. ** Please see 'Potential Receptors' section below.	
Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.):		Cropland	
Soil type, if not previously identified on Form 2A or Federal Surface Use Plan:		Thedalund loam, 1 to 3 percent slopes	
Potential receptors (water wells within 1/4 mi, surface waters, etc.):		A residence is located approximately 1,275' south of the location. The nearest surface water is 1,470' north and the nearest water well is 850' southwest. No other water wells are located within a 1/4-mile radius. Depth to groundwater is approx. 13 feet bgs.	
Description of Impact (if previously provided, refer to that form or document):			
Impacted Media (check):		Extent of Impact:	
<input checked="" type="checkbox"/> Soils		Refer to the attached Figure 2 and Table 1	
<input type="checkbox"/> Vegetation			
<input checked="" type="checkbox"/> Groundwater		Refer to the attached Figure 3 and Table 2	
<input type="checkbox"/> Surface water			
		How Determined:	
		Excavation and soil sampling	
		Excavation and groundwater sampling	

REMEDIATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document): On February 18, 2016, a historic release was discovered below the produced water vessel during plug and abandonment activities at the Williamson 43-12 production facility. Excavation activities were summarized in an Initial Form 19 submitted on February 19, 2016 (Doc # 400992777) and a Supplemental Form 19 submitted on February 26, 2016 (Doc # 400996105). A topographic map of the site is included as Figure 1.
Describe how source is to be removed: Between February 18 and March 8, 2016, approximately 1,450 cubic yards of impacted material were removed and transported to the Waste Management Facility in Ault, Colorado for disposal under PDC waste manifests. Soil samples collected from the sidewalls of the final excavation extent exhibited constituent concentrations below COGCC Table 910-1 soil standards. Groundwater was encountered in the excavation area at approximately 13 feet below ground surface (bgs). Approximately 550 barrels of groundwater were removed from the excavation area using a vacuum truck and transported to a licensed water disposal facility. The groundwater sample (GW01) collected from the excavation area exhibited benzene concentrations in exceedance of COGCC Table 910-1 groundwater standards at a detection of 5.1 µg/l. The excavation extent and soil and groundwater sample locations are illustrated on Figure 2. Soil analytical data is summarized in Table 1 and groundwater analytical data is summarized in Table 2. The laboratory analytical reports are included as Attachment A. A No Further Action (NFA) request was submitted to the COGCC via a Supplemental Form 19 on March 15, 2016 (Doc# 401004170). In response, the COGCC requested additional site investigation to determine the extent of possible remaining dissolved phase hydrocarbon impacts.
Describe how remediation of existing impacts is to be accomplished , including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.: PDC will install five (5) temporary monitoring wells using direct push drilling methods, as illustrated on Figure 3. One (1) source well will be installed adjacent to groundwater sample GW01, in addition to four (4) wells in each cardinal direction of the former excavation area. Groundwater samples will be collected from each of the temporary monitoring wells and submitted to Summit Scientific Laboratories for analysis benzene, toluene, ethylbenzene, total xylenes (BTEX) by USEPA Method 8260. Should analytical results confirm dissolved phase hydrocarbon impacts are not present in any site monitoring well, a NFA request will be submitted to the COGCC. However, should analytical results indicate BTEX concentrations are in exceedance of COGCC Table 910-1 standards, quarterly groundwater monitoring will be initiated. PDC will conduct quarterly groundwater monitoring at the temporary monitoring well locations until BTEX concentrations are in compliance with COGCC Table 910-1 standards for four consecutive quarters.

State of Colorado
Oil and Gas Conservation Commission1120 Lincoln Street, Suite 801, Denver, Colorado
(303) 894-2100 Fax 894-2109

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REMEDATION WORKPLAN (CONT.)

OGCC Employee: _____

Tracking Number: _____

Name of Operator: PDC Energy, Inc.

OGCC Operator No: 69175

Received Date: _____

Well Name & No: Williamson 43-12

Facility Name & No.: Williamson 43-12

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

Groundwater samples will be collected from the five (5) temporary monitoring wells and submitted to Summit Scientific Laboratories for analysis benzene, toluene, ethylbenzene, total xylenes (BTEX) by USEPA Method 8260. Should analytical results indicate BTEX concentrations are below COGCC Table 910-1 standards in the five (5) temporary wells, a NFA request will be submitted to the COGCC. However, should analytical results indicate an exceedance in regulatory standards, quarterly groundwater monitoring will be initiated. PDC will conduct quarterly groundwater monitoring at the temporary well locations until BTEX concentrations are in compliance with COGCC Table 910-1 standards for four consecutive quarters.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

The excavation area was backfilled, compacted, and re-contoured to match pre-existing conditions. The decommissioned facility location was reclaimed in accordance with COGCC 1004 Series rules. Subsequent to attainment of closure, the temporary monitoring wells will be plugged and abandoned.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

Is further site investigation required? ☒ Y ☐ N If yes, describe:

Based on soil analytical data, the extent of soil impacts was successfully delineated and removed during excavation activities. However, the extent of dissolved phase impacts on site has not yet been determined. As such, PDC will install temporary monitoring wells within and adjacent to the former excavation area. Soil analytical data is summarized in Table 1 and groundwater analytical data is summarized in Table 2. The laboratory analytical reports are included as Attachment A.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

Soil was disposed of at the Waste Management Facility in Ault, Colorado under PDC waste manifests. Impacted groundwater was disposed of at a licensed water disposal facility.

IMPLEMENTATION SCHEDULE

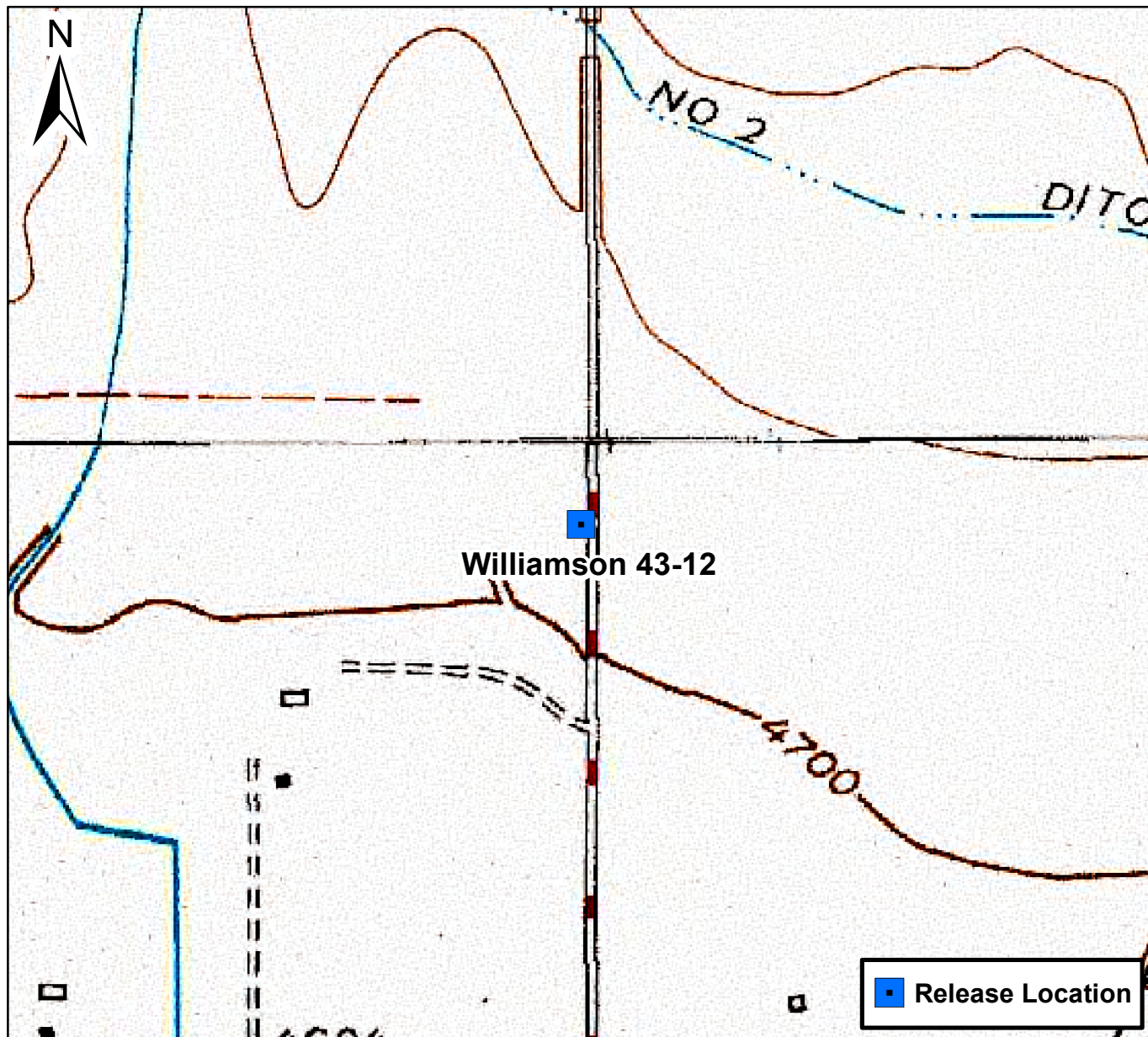
Date Site Investigation Began:	2/18/2016	Date Site Investigation Completed:	TBD	Remediation Plan Submitted:	
Remediation Start Date:	TBD	Anticipated Completion Date:	TBD	Actual Completion Date:	TBD

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Karen Shanahan Olson

Signed: _____ Title: Senior EHS Manager Date: _____

OGCC Approved: _____ Title: _____ Date: _____








0 750 1,500 Feet

Figure 1

Site Location Map
Williamson 43-12
NESE S12 T6N R65W
Weld County, Colorado





DRAWN BY: RKI	Facility Diagram PDC Energy, Inc. – DJ Basin Williamson 43-12 Tank Battery NESE S12 T6N R65W Weld County, CO	 TASMAN GEOSCIENCES 6899 Pecos Street, Unit C Denver, CO 80221	LEGEND  Excavation Extent (Trimble GPS)  Release Location  Soil Sample Location  Groundwater Sample Location	All locations are approximate unless otherwise noted	FIGURE 2 EXCAVATION SITE MAP
DATE: 3/8/2016					




DRAWN BY: CAW	Facility Diagram PDC Energy, Inc. – DJ Basin Williamson 43-12 Tank Battery NESE S12 T6N R65W Weld County, CO	 TASMAN GEOSCIENCES 6899 Pecos Street, Unit C Denver, CO 80221	LEGEND <ul style="list-style-type: none"> Excavation Extent (Trimble GPS) Release Location Groundwater Sample Location Proposed Monitoring Well Location <p>All locations are approximate unless otherwise noted</p>	FIGURE 3 PROPOSED WELL LOCATION MAP
DATE: 3/18/2016				

TABLE 1
WILLIAMSON 43-12 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 ⁽²⁾ (mg/kg)	EC (mmhos/cm)	pH (units)
COGCC standards for soil (mg/kg) ⁽¹⁾			0.17	85	100	175	23	500	<4	6-9
SS01 @ 6'	2/19/2016	6	<0.0020	<0.0050	0.016	0.098	0.019	60.8	2.50	7.96
SS02 @ 6'	2/19/2016	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	5.22	7.75
SS03 @ 6'	2/19/2016	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	1.15	8.40
SS04 @ 6'	2/19/2016	6	<0.0020	<0.0050	0.073	1.4	0.27	1,080	N/A	N/A
SS05 @ 6'	2/22/2016	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	3.18	7.84
SS06 @ 6'	2/22/2016	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	6.54	7.73
SS07 @ 6'	2/23/2016	6	<0.0020	<0.0050	<0.0050	0.013	<0.010	<50	2.00	8.48
SS08 @ 6'	2/23/2016	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	2.79	8.11
SS09 @ 6'	2/24/2016	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	1.15	8.25
SS10 @ 6'	2/24/2016	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	5.28	7.70
SS11 @ 6'	2/24/2016	6	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	0.610	8.29

Notes:

1. Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective January 30, 2015.

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.

TABLE 2
WILLIAMSON 43-12 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 bgs)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
GW01	3/8/2016	5.1	<1.0	1.4	11	~ 13

Notes:

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

COGCC = Colorado Oil and Gas Conservation Commission

µg/L= Micrograms per liter

bgs = Below ground surface

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

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

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

February 24, 2016

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Williamson 43-12

Enclosed are the results of analyses for samples received by Summit Scientific on 02/19/16 17:50. 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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@6'	1602153-01	Soil	02/19/16 10:00	02/19/16 17:50
SS02@6'	1602153-02	Soil	02/19/16 12:30	02/19/16 17:50
SS03@6'	1602153-03	Soil	02/19/16 13:15	02/19/16 17:50
SS04@6'	1602153-04	Soil	02/19/16 14:45	02/19/16 17:50

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: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

Summit Scientific 1602153

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

Page 1 of 1

Client: PDC
Address: _____
City/State/Zip: _____
Phone: 470.470.9042 Fax: _____
Sampler Name: Rob Travin

Project Manager: Mark Longhurst
E-Mail: mark.longhurst@pdc.com
Project Name: Williamson 43-12
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)	8240 GBZEN	8015 DLO	EC (on hold)	pH (on hold)		
S501@6'	2/19/16	1000	1			X			X				X	X	X	X	EC & pH on hold
S502@6'		1230	1														
S503@6'		1315	1														
S504@6'		1445	1														
Relinquished by: [Signature]		Date/Time: 2/19/2016		Received by: [Signature]		Date/Time: 2/19/16 1700		Turn Around Time (Check)				Notes:					
Relinquished by: [Signature]		Date/Time: 2/19/16 1750		Received by:		Date/Time:		Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/>				by 7 AM					
Relinquished by:		Date/Time:		Received in Lab by:		Date/Time:		24 Hours <input type="checkbox"/> Standard <input type="checkbox"/>				Saturday					
Relinquished by:		Date/Time:		Received in Lab by:		Date/Time:		48 Hours <input type="checkbox"/>				Sample Integrity:					
												Temperature Upon Receipt: 4.4°C					
												Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>					
												2/20/2016 on ice					

www.s2scientific.com

Summit Scientific

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

SS01@6'
1602153-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/19/16 10:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	56	50	mg/kg	1	1602202	02/19/16	02/20/16	8015M	

Date Sampled: 02/19/16 10:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		90.4 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 02/19/16 10:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	0.019	0.010	mg/kg	1	1602200	02/19/16	02/20/16	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.016	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.098	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	4.8	0.50	"	"	"	"	"	"	

Date Sampled: 02/19/16 10:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		85.0 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		107 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		90.8 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: 02/19/16 10:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	2.50	0.0100	mmhos/cm	1	1602223	02/23/16	02/23/16	SM 2510B	

Summit Scientific

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

Project: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

SS01@6'
1602153-01 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/19/16 10:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	7.96	0.100	pH Units	1	1602220	02/23/16	02/23/16	EPA 9045	

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

SS02@6'
1602153-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/19/16 12:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602202	02/19/16	02/20/16	8015M	

Date Sampled: 02/19/16 12:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		90.1 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 02/19/16 12:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602200	02/19/16	02/20/16	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: 02/19/16 12:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		86.2 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		105 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		83.3 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: 02/19/16 12:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	5.22	0.0100	mmhos/cm	1	1602223	02/23/16	02/23/16	SM 2510B	

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

Project: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

SS02@6'
1602153-02 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/19/16 12:30**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	7.75	0.100	pH Units	1	1602220	02/23/16	02/23/16	EPA 9045	

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

SS03@6'
1602153-03 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/19/16 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602202	02/19/16	02/20/16	8015M	

Date Sampled: **02/19/16 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		93.6 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **02/19/16 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602200	02/19/16	02/20/16	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: **02/19/16 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		77.8 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		107 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		84.3 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/19/16 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	1.15	0.0100	mmhos/cm	1	1602223	02/23/16	02/23/16	SM 2510B	

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

Project: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

SS03@6'
1602153-03 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/19/16 13:15**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	8.40	0.100	pH Units	1	1602220	02/23/16	02/23/16	EPA 9045	

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

SS04@6'
1602153-04 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/19/16 14:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	620	50	mg/kg	1	1602202	02/19/16	02/20/16	8015M	

Date Sampled: 02/19/16 14:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		98.4 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 02/19/16 14:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	0.27	0.010	mg/kg	1	1602200	02/19/16	02/20/16	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.073	0.0050	"	"	"	"	"	"	
Xylenes (total)	1.4	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	460	5.0	"	10	"	"	02/20/16	"	

Date Sampled: 02/19/16 14:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		93.7 %	23-173		"	"	02/20/16	"	
Surrogate: Toluene-d8		94.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		394 %	21-167		"	"	"	"	S-02

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

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 1602202 - EPA 3550A

Blank (1602202-BLK1)

Prepared & Analyzed: 02/19/16

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: o-Terphenyl	12.2		"	12.5		97.2	30-150			

LCS (1602202-BS1)

Prepared & Analyzed: 02/19/16

C10-C28 (DRO)	464	50	mg/kg	499		92.9	73-134			
Surrogate: o-Terphenyl	12.1		"	12.5		96.4	30-150			

Matrix Spike (1602202-MS1)

Source: 1602151-01

Prepared & Analyzed: 02/19/16

C10-C28 (DRO)	457	50	mg/kg	486	11.3	91.7	50-148			
Surrogate: o-Terphenyl	11.6		"	12.2		95.0	30-150			

Matrix Spike Dup (1602202-MSD1)

Source: 1602151-01

Prepared & Analyzed: 02/19/16

C10-C28 (DRO)	459	50	mg/kg	492	11.3	90.9	50-148	0.341	13	
Surrogate: o-Terphenyl	11.5		"	12.3		93.6	30-150			

Summit Scientific

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

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 1602200 - EPA 5030 Soil MS

Blank (1602200-BLK1)

Prepared & Analyzed: 02/19/16

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>0.0338</i>		<i>"</i>	<i>0.0400</i>		<i>84.6</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0401</i>		<i>"</i>	<i>0.0400</i>		<i>100</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0327</i>		<i>"</i>	<i>0.0400</i>		<i>81.8</i>	<i>21-167</i>			

LCS (1602200-BS1)

Prepared & Analyzed: 02/19/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0862	0.0020	"	0.100		86.2	58-130			
Toluene	0.108	0.0050	"	0.100		108	61-134			
Ethylbenzene	0.123	0.0050	"	0.0992		124	74-139			
m,p-Xylene	0.263	0.010	"	0.200		132	73-137			
o-Xylene	0.114	0.0050	"	0.0980		116	73-141			
Xylenes (total)	0.377	0.010	"				0-200			
Gasoline Range Hydrocarbons	3.67	0.50	"				30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0301</i>		<i>"</i>	<i>0.0400</i>		<i>75.3</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0436</i>		<i>"</i>	<i>0.0400</i>		<i>109</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0350</i>		<i>"</i>	<i>0.0400</i>		<i>87.4</i>	<i>21-167</i>			

Matrix Spike (1602200-MS1)

Source: 1602151-01

Prepared & Analyzed: 02/19/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0780	0.0020	"	0.0945	ND	82.6	30-131			
Toluene	0.101	0.0050	"	0.0945	ND	107	30-134			
Ethylbenzene	0.116	0.0050	"	0.0938	ND	123	22-153			
m,p-Xylene	0.269	0.010	"	0.189	ND	143	10-159			
o-Xylene	0.113	0.0050	"	0.0926	ND	122	31-151			
Xylenes (total)	0.382	0.010	"		ND		30-160			
Gasoline Range Hydrocarbons	3.89	0.50	"		ND		30-160			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0274</i>		<i>"</i>	<i>0.0378</i>		<i>72.4</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0381</i>		<i>"</i>	<i>0.0378</i>		<i>101</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0304</i>		<i>"</i>	<i>0.0378</i>		<i>80.3</i>	<i>21-167</i>			

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

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 1602200 - EPA 5030 Soil MS

Matrix Spike Dup (1602200-MSD1)		Source: 1602151-01			Prepared & Analyzed: 02/19/16					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.0840	0.0020	"	0.0984	ND	85.4	30-131	7.37	34	
Toluene	0.109	0.0050	"	0.0984	ND	111	30-134	8.02	30	
Ethylbenzene	0.120	0.0050	"	0.0976	ND	123	22-153	3.73	24	
m,p-Xylene	0.268	0.010	"	0.196	ND	136	10-159	0.597	68	
o-Xylene	0.113	0.0050	"	0.0965	ND	117	31-151	0.462	38	
Xylenes (total)	0.381	0.010	"		ND		30-160	0.283	30	
Gasoline Range Hydrocarbons	3.88	0.50	"		ND		30-160	0.125	30	
Surrogate: 1,2-Dichloroethane-d4	0.0293		"	0.0394		74.3	23-173			
Surrogate: Toluene-d8	0.0415		"	0.0394		105	20-170			
Surrogate: 4-Bromofluorobenzene	0.0323		"	0.0394		82.1	21-167			

Summit Scientific

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

Project: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

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 1602220 - General Preparation

LCS (1602220-BS1)

Prepared & Analyzed: 02/23/16

pH	8.00	0.100	pH Units	8.00	100	95-105
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Duplicate (1602220-DUP1)

Source: 1602137-05

Prepared & Analyzed: 02/23/16

pH	8.04	0.100	pH Units	8.19	1.85	20
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Batch 1602223 - General Preparation

Blank (1602223-BLK1)

Prepared & Analyzed: 02/23/16

Specific Conductance (EC)	ND	0.0100	mmhos/cm
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LCS (1602223-BS1)

Prepared & Analyzed: 02/23/16

Specific Conductance (EC)	0.502	0.0100	mmhos/cm	0.500	100	90-110
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Duplicate (1602223-DUP1)

Source: 1602137-05

Prepared & Analyzed: 02/23/16

Specific Conductance (EC)	4.97	0.0100	mmhos/cm	4.84	2.57	20
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Summit Scientific

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 08:01

Notes and Definitions

S-02 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.

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

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

February 23, 2016

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Williamson 43-12

Enclosed are the results of analyses for samples received by Summit Scientific on 02/22/16 17:55. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in dark ink, appearing to read "M. Clements", with a stylized flourish at the end.

Michelle Clements For Paul Shrewsbury
President



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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS05@6'	1602168-01	Soil	02/22/16 12:15	02/22/16 17:55
SS06@6'	1602168-02	Soil	02/22/16 14:15	02/22/16 17:55

Summit Scientific

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

Project: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

Summit Scientific

S₂

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

Page 1 of 1

Client: PDE Project Manager: Mark Longhurst
Address: _____ E-Mail: mark.longhurst@pdc.com
City/State/Zip: _____
Phone: 9704709042 Fax: _____ Project Name: Williamson 43-12
Sampler Name: R. Ervin 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)	DO/60 bTEXN	8015 DRD	EC (on hold)	
1	SS05 @ 6'	2/22/16	12:15	1			X			X			X	X	X	EL. PH on hold
2	SS06 @ 6'	2/22/16	14:15	1			X			X			X	X	X	
3																
4																
5																
6																
7																
8																
9																
10																

Relinquished by: <u>[Signature]</u>	Date/Time: <u>2/22/16 1755</u>	Received by: _____	Date/Time: _____	Turn Around Time (Check) Same Day <input checked="" type="checkbox"/> 72 hours _____ 24 hours _____ Standard _____ 48 hours _____	Notes: <u>on ice</u>
Relinquished by: _____	Date/Time: _____	Received by: _____	Date/Time: _____	Sample Integrity: Temperature Upon Receipt: <u>11.7°C</u> Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	
Relinquished by: _____	Date/Time: _____	Received by: <u>[Signature]</u>	Date/Time: <u>2/22/16 1755</u>		

www.s2scientific.com

Summit Scientific

M. Clements

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

SS05@6'
1602168-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/22/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602213	02/22/16	02/22/16	8015M	

Date Sampled: **02/22/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		92.1 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **02/22/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602212	02/22/16	02/23/16	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: **02/22/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		120 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		93.0 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/22/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	3.18	0.0100	mmhos/cm	1	1602223	02/23/16	02/23/16	SM 2510B	

Summit Scientific

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

Project: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

SS05@6'
1602168-01 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/22/16 12:15**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	7.84	0.100	pH Units	1	1602220	02/23/16	02/23/16	EPA 9045	

Summit Scientific

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

SS06@6'
1602168-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/22/16 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602213	02/22/16	02/22/16	8015M	

Date Sampled: **02/22/16 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		92.4 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **02/22/16 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602212	02/22/16	02/23/16	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: **02/22/16 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		93.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/22/16 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	6.54	0.0100	mmhos/cm	1	1602223	02/23/16	02/23/16	SM 2510B	

Summit Scientific

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

Project: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

SS06@6'
1602168-02 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/22/16 14:15**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	7.73	0.100	pH Units	1	1602220	02/23/16	02/23/16	EPA 9045	

Summit Scientific

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

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 1602213 - EPA 3550A

Blank (1602213-BLK1)

Prepared & Analyzed: 02/22/16

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: o-Terphenyl	11.7		"	12.5		93.4	30-150			

LCS (1602213-BS1)

Prepared & Analyzed: 02/22/16

C10-C28 (DRO)	463	50	mg/kg	499		92.7	73-134			
Surrogate: o-Terphenyl	11.6		"	12.5		93.2	30-150			

Matrix Spike (1602213-MS1)

Source: 1602166-04

Prepared & Analyzed: 02/22/16

C10-C28 (DRO)	445	50	mg/kg	494	ND	90.1	50-148			
Surrogate: o-Terphenyl	11.4		"	12.4		92.5	30-150			

Matrix Spike Dup (1602213-MSD1)

Source: 1602166-04

Prepared & Analyzed: 02/22/16

C10-C28 (DRO)	445	50	mg/kg	494	ND	90.1	50-148	0.00355	13	
Surrogate: o-Terphenyl	11.1		"	12.4		89.7	30-150			

Summit Scientific

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

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 1602212 - EPA 5030 Soil MS

Blank (1602212-BLK1)

Prepared & Analyzed: 02/22/16

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>0.0387</i>		<i>"</i>	<i>0.0400</i>		<i>96.8</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0385</i>		<i>"</i>	<i>0.0400</i>		<i>96.2</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0401</i>		<i>"</i>	<i>0.0400</i>		<i>100</i>	<i>21-167</i>			

LCS (1602212-BS1)

Prepared & Analyzed: 02/22/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.118	0.0020	"	0.100		118	58-130			
Toluene	0.104	0.0050	"	0.100		104	61-134			
Ethylbenzene	0.127	0.0050	"	0.0992		128	74-139			
m,p-Xylene	0.241	0.010	"	0.200		121	73-137			
o-Xylene	0.116	0.0050	"	0.0980		118	73-141			
Xylenes (total)	0.357	0.010	"				0-200			
Gasoline Range Hydrocarbons	2.47	0.50	"				30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0376</i>		<i>"</i>	<i>0.0400</i>		<i>94.0</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0424</i>		<i>"</i>	<i>0.0400</i>		<i>106</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0385</i>		<i>"</i>	<i>0.0400</i>		<i>96.2</i>	<i>21-167</i>			

Matrix Spike (1602212-MS1)

Source: 1602166-04

Prepared & Analyzed: 02/22/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.121	0.0020	"	0.0992	ND	122	30-131			
Toluene	0.108	0.0050	"	0.0992	ND	109	30-134			
Ethylbenzene	0.135	0.0050	"	0.0984	ND	137	22-153			
m,p-Xylene	0.260	0.010	"	0.198	ND	131	10-159			
o-Xylene	0.124	0.0050	"	0.0972	ND	128	31-151			
Xylenes (total)	0.384	0.010	"		ND		30-160			
Gasoline Range Hydrocarbons	2.50	0.50	"		ND		30-160			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0407</i>		<i>"</i>	<i>0.0397</i>		<i>103</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0404</i>		<i>"</i>	<i>0.0397</i>		<i>102</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0399</i>		<i>"</i>	<i>0.0397</i>		<i>100</i>	<i>21-167</i>			

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

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 1602212 - EPA 5030 Soil MS

Matrix Spike Dup (1602212-MSD1)		Source: 1602166-04			Prepared & Analyzed: 02/22/16					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.123	0.0020	"	0.0992	ND	124	30-131	2.00	34	
Toluene	0.108	0.0050	"	0.0992	ND	109	30-134	0.193	30	
Ethylbenzene	0.138	0.0050	"	0.0984	ND	140	22-153	2.31	24	
m,p-Xylene	0.266	0.010	"	0.198	ND	135	10-159	2.56	68	
o-Xylene	0.127	0.0050	"	0.0972	ND	130	31-151	1.94	38	
Xylenes (total)	0.393	0.010	"		ND		30-160	2.36	30	
Gasoline Range Hydrocarbons	2.63	0.50	"		ND		30-160	5.18	30	
Surrogate: 1,2-Dichloroethane-d4	0.0419		"	0.0397		106	23-173			
Surrogate: Toluene-d8	0.0399		"	0.0397		100	20-170			
Surrogate: 4-Bromofluorobenzene	0.0394		"	0.0397		99.4	21-167			

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

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 1602220 - General Preparation

LCS (1602220-BS1)				Prepared & Analyzed: 02/23/16							
pH	8.00	0.100	pH Units	8.00	100	95-105					
Duplicate (1602220-DUP1)				Source: 1602137-05		Prepared & Analyzed: 02/23/16					
pH	8.04	0.100	pH Units	8.19	1.85	20					

Batch 1602223 - General Preparation

Blank (1602223-BLK1)				Prepared & Analyzed: 02/23/16							
Specific Conductance (EC)	ND	0.0100	mmhos/cm								
LCS (1602223-BS1)				Prepared & Analyzed: 02/23/16							
Specific Conductance (EC)	0.502	0.0100	mmhos/cm	0.500	100	90-110					
Duplicate (1602223-DUP1)				Source: 1602137-05		Prepared & Analyzed: 02/23/16					
Specific Conductance (EC)	4.97	0.0100	mmhos/cm	4.84	2.57	20					

Summit Scientific

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

Project: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/23/16 16:30

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

A handwritten signature in black ink, appearing to read 'M. Clement'.

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.

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

February 24, 2016

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Williamson 43-12

Enclosed are the results of analyses for samples received by Summit Scientific on 02/23/16 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 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury
President



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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS07@6'	1602180-01	Soil	02/23/16 09:00	02/23/16 17:00
SS08@6'	1602180-02	Soil	02/23/16 11:11	02/23/16 17:00

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: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

741 Corporate Circle Suite I Golden, Colorado 80401
303-277-9310 303-277-9531 Fax

Client: PDC
Address: _____
City/State/Zip: _____
Phone: 970 470 9042 Fax: _____
Sampler Name: R. Irvin

Page 1 of 1

Project Manager: Mark Longhurst
E-Mail: mark.longhurst@pdc.com
Project Name: Williamson 43-12
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)	9260 GBTEX	9015 DRU	EC (on hold)		pH (on hold)
5507@6'	2/23/16	0900	1		X			X				X	X	X	X	EC & pH on Hold
5508@6'	2/23/16	1111	1		X			X				X	X	X	X	
Relinquished by: <u>[Signature]</u> Date/Time: <u>2/23/2016 1700</u>				Received by: <u>[Signature]</u> Date/Time: <u>2/23/16 1700</u>				Turn Around Time (Check)				Notes:				
Relinquished by: <u>[Signature]</u> Date/Time: <u>2/23/16 1745</u>				Received by: <u>[Signature]</u> Date/Time: <u>2/23/16 1745</u>				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"/>				On Hold				
Relinquished by: _____ Date/Time: _____				Received in Lab by: _____ Date/Time: _____				Sample Integrity: Temperature Upon Receipt: <u>4.8°C</u> Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No								

www.s2scientific.com

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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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

SS07@6'
1602180-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/23/16 09:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602229	02/23/16	02/23/16	8015M	

Date Sampled: 02/23/16 09:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		87.8 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 02/23/16 09:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602228	02/23/16	02/23/16	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.013	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 02/23/16 09:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: 02/23/16 09:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	2.00	0.0100	mmhos/cm	1	1602235	02/24/16	02/24/16	SM 2510B	

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

SS07@6'
1602180-01 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/23/16 09:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	8.48	0.100	pH Units	1	1602234	02/24/16	02/24/16	EPA 9045	

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

SS08@6'
1602180-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/23/16 11:11

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602229	02/23/16	02/23/16	8015M	

Date Sampled: 02/23/16 11:11

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		87.3 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 02/23/16 11:11

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602228	02/23/16	02/23/16	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: 02/23/16 11:11

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.2 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: 02/23/16 11:11

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	2.79	0.0100	mmhos/cm	1	1602235	02/24/16	02/24/16	SM 2510B	

Summit Scientific

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

Project: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

SS08@6'
1602180-02 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/23/16 11:11**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	8.11	0.100	pH Units	1	1602234	02/24/16	02/24/16	EPA 9045	

Summit Scientific

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

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 1602229 - EPA 3550A

Blank (1602229-BLK1)

Prepared & Analyzed: 02/23/16

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: o-Terphenyl	11.4		"	12.5		91.2	30-150			

LCS (1602229-BS1)

Prepared & Analyzed: 02/23/16

C10-C28 (DRO)	506	50	mg/kg	499		101	73-134			
Surrogate: o-Terphenyl	11.6		"	12.5		92.8	30-150			

Matrix Spike (1602229-MS1)

Source: 1602180-01

Prepared & Analyzed: 02/23/16

C10-C28 (DRO)	430	50	mg/kg	471	14.8	88.2	50-148			
Surrogate: o-Terphenyl	10.6		"	11.8		90.2	30-150			

Matrix Spike Dup (1602229-MSD1)

Source: 1602180-01

Prepared & Analyzed: 02/23/16

C10-C28 (DRO)	433	50	mg/kg	470	14.8	89.0	50-148	0.629	13	
Surrogate: o-Terphenyl	10.7		"	11.8		91.0	30-150			

Summit Scientific

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

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 1602228 - EPA 5030 Soil MS

Blank (1602228-BLK1)

Prepared & Analyzed: 02/23/16

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>0.0401</i>		<i>"</i>	<i>0.0400</i>		<i>100</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0392</i>		<i>"</i>	<i>0.0400</i>		<i>97.9</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0402</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>21-167</i>			

LCS (1602228-BS1)

Prepared & Analyzed: 02/23/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.259	0.0020	"	0.300		86.2	58-130			
Toluene	0.229	0.0050	"	0.300		76.5	61-134			
Ethylbenzene	0.294	0.0050	"	0.298		98.9	74-139			
m,p-Xylene	0.567	0.010	"	0.599		94.7	73-137			
o-Xylene	0.272	0.0050	"	0.294		92.4	73-141			
Xylenes (total)	0.839	0.010	"				0-200			
Gasoline Range Hydrocarbons	5.82	0.50	"				30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0387</i>		<i>"</i>	<i>0.0400</i>		<i>96.7</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0399</i>		<i>"</i>	<i>0.0400</i>		<i>99.8</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0399</i>		<i>"</i>	<i>0.0400</i>		<i>99.8</i>	<i>21-167</i>			

Matrix Spike (1602228-MS1)

Source: 1602180-01

Prepared & Analyzed: 02/23/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.234	0.0020	"	0.274	ND	85.2	30-131			
Toluene	0.203	0.0050	"	0.274	0.00332	72.8	30-134			
Ethylbenzene	0.259	0.0050	"	0.272	0.00425	93.6	22-153			
m,p-Xylene	0.494	0.010	"	0.547	0.0100	88.4	10-159			
o-Xylene	0.237	0.0050	"	0.269	0.00344	87.1	31-151			
Xylenes (total)	0.731	0.010	"		0.0134		30-160			
Gasoline Range Hydrocarbons	5.02	0.50	"		0.215		30-160			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0384</i>		<i>"</i>	<i>0.0366</i>		<i>105</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0361</i>		<i>"</i>	<i>0.0366</i>		<i>98.6</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0366</i>		<i>"</i>	<i>0.0366</i>		<i>100</i>	<i>21-167</i>			

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

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 1602228 - EPA 5030 Soil MS

Matrix Spike Dup (1602228-MSD1)		Source: 1602180-01			Prepared & Analyzed: 02/23/16					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.234	0.0020	"	0.279	ND	84.0	30-131	0.288	34	
Toluene	0.206	0.0050	"	0.279	0.00332	72.7	30-134	1.54	30	
Ethylbenzene	0.264	0.0050	"	0.277	0.00425	94.0	22-153	2.03	24	
m,p-Xylene	0.504	0.010	"	0.557	0.0100	88.7	10-159	2.01	68	
o-Xylene	0.242	0.0050	"	0.273	0.00344	87.5	31-151	2.09	38	
Xylenes (total)	0.746	0.010	"		0.0134		30-160	2.03	30	
Gasoline Range Hydrocarbons	5.07	0.50	"		0.215		30-160	1.07	30	
Surrogate: 1,2-Dichloroethane-d4	0.0383		"	0.0372		103	23-173			
Surrogate: Toluene-d8	0.0367		"	0.0372		98.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.0369		"	0.0372		99.2	21-167			

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

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 1602234 - General Preparation

LCS (1602234-BS1)

Prepared & Analyzed: 02/24/16

pH	8.02	0.100	pH Units	8.00	100	95-105
----	------	-------	----------	------	-----	--------

Duplicate (1602234-DUP1)

Source: 1602180-01

Prepared & Analyzed: 02/24/16

pH	8.51	0.100	pH Units	8.48	0.353	20
----	------	-------	----------	------	-------	----

Batch 1602235 - General Preparation

Blank (1602235-BLK1)

Prepared & Analyzed: 02/24/16

Specific Conductance (EC)	ND	0.0100	mmhos/cm
---------------------------	----	--------	----------

LCS (1602235-BS1)

Prepared & Analyzed: 02/24/16

Specific Conductance (EC)	0.502	0.0100	mmhos/cm	0.500	100	90-110
---------------------------	-------	--------	----------	-------	-----	--------

Duplicate (1602235-DUP1)

Source: 1602180-01

Prepared & Analyzed: 02/24/16

Specific Conductance (EC)	1.94	0.0100	mmhos/cm	2.00	3.35	20
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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: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/24/16 14:45

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

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.

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

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

February 25, 2016

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Williamson 43-12

Enclosed are the results of analyses for samples received by Summit Scientific on 02/24/16 18:45. 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: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS09@6'	1602191-01	Soil	02/24/16 08:15	02/24/16 18:45
SS10@6'	1602191-02	Soil	02/24/16 10:00	02/24/16 18:45
SS11@6'	1602191-03	Soil	02/24/16 10:05	02/24/16 18:45

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: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

Summit Scientific 1602191

S₂

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

Page 1 of 1

Client: PDC Project Manager: Mark Longhurst
Address: E-Mail: mark.longhurst@pdc.com
City/State/Zip: Project Name: Williamson 43-12
Phone: 970 470 9042 Fax: Project Number:
Sampler Name: Res Frin

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)	8240 GBTEX	8015 DRD	EC (on hold)	pH (on hold)	
1	SS0906'	2/24/16	0815	1			X			X			X	X	X		EC & pH on hold
2	SS1006'		1000							X			X	X	X		
3	SS1106'		1205							X			X	X	X		
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Relinquished by: [Signature]	Date/Time: 2/24/16 18:45	Received by: [Signature]	Date/Time: 2-24-16 1845	Turn Around Time (Check)	Notes:
Relinquished by:	Date/Time:	Received by:	Date/Time:	Same Day <input checked="" type="checkbox"/> 72 hours	on ice
Relinquished by:	Date/Time:	Received by:	Date/Time:	24 hours <input type="checkbox"/> Standard	
Relinquished by:	Date/Time:	Received by:	Date/Time:	48 hours <input type="checkbox"/>	
				Sample Integrity:	
				Temperature Upon Receipt: 13.0	
				Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

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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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

SS09@6'
1602191-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/24/16 08:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602247	02/24/16	02/24/16	8015M	

Date Sampled: 02/24/16 08:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		86.8 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 02/24/16 08:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602245	"	02/24/16	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: 02/24/16 08:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: 02/24/16 08:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	1.15	0.0100	mmhos/cm	1	1602250	02/25/16	02/25/16	SM 2510B	

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

SS09@6'
1602191-01 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/24/16 08:15**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	8.25	0.100	pH Units	1	1602249	02/25/16	02/25/16	EPA 9045	

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

SS10@6'
1602191-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/24/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602247	02/24/16	02/24/16	8015M	

Date Sampled: **02/24/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		93.2 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **02/24/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602245	"	02/24/16	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: **02/24/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/24/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	5.28	0.0100	mmhos/cm	1	1602250	02/25/16	02/25/16	SM 2510B	

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: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

SS10@6'
1602191-02 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/24/16 10:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	7.70	0.100	pH Units	1	1602249	02/25/16	02/25/16	EPA 9045	

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

SS11@6'
1602191-03 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/24/16 10:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1602247	02/24/16	02/24/16	8015M	

Date Sampled: 02/24/16 10:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		94.7 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 02/24/16 10:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1602245	"	02/24/16	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: 02/24/16 10:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: 02/24/16 10:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.610	0.0100	mmhos/cm	1	1602250	02/25/16	02/25/16	SM 2510B	

Summit Scientific

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

Project: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

SS11@6'
1602191-03 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **02/24/16 10:05**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	8.29	0.100	pH Units	1	1602249	02/25/16	02/25/16	EPA 9045	

Summit Scientific

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

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 1602247 - EPA 3550A

Blank (1602247-BLK1)

Prepared & Analyzed: 02/24/16

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: o-Terphenyl	11.0		"	12.5		87.7	30-150			

LCS (1602247-BS1)

Prepared & Analyzed: 02/24/16

C10-C28 (DRO)	432	50	mg/kg	499		86.6	73-134			
Surrogate: o-Terphenyl	11.2		"	12.5		89.6	30-150			

Matrix Spike (1602247-MS1)

Source: 1602188-01

Prepared & Analyzed: 02/24/16

C10-C28 (DRO)	417	50	mg/kg	474	17.0	84.2	50-148			
Surrogate: o-Terphenyl	10.6		"	11.9		89.1	30-150			

Matrix Spike Dup (1602247-MSD1)

Source: 1602188-01

Prepared & Analyzed: 02/24/16

C10-C28 (DRO)	418	50	mg/kg	470	17.0	85.4	50-148	0.431	13	
Surrogate: o-Terphenyl	10.5		"	11.8		88.9	30-150			

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

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

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

Batch 1602245 - EPA 5030 Soil MS

Blank (1602245-BLK1)

Prepared & Analyzed: 02/24/16

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>0.0397</i>		<i>"</i>	<i>0.0400</i>		<i>99.2</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0389</i>		<i>"</i>	<i>0.0400</i>		<i>97.2</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0393</i>		<i>"</i>	<i>0.0400</i>		<i>98.2</i>	<i>21-167</i>			

LCS (1602245-BS1)

Prepared & Analyzed: 02/24/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.102	0.0020	"	0.100		102	58-130			
Toluene	0.0908	0.0050	"	0.100		90.8	61-134			
Ethylbenzene	0.119	0.0050	"	0.0992		120	74-139			
m,p-Xylene	0.231	0.010	"	0.200		116	73-137			
o-Xylene	0.114	0.0050	"	0.0980		117	73-141			
Xylenes (total)	0.345	0.010	"				0-200			
Gasoline Range Hydrocarbons	2.21	0.50	"				30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0397</i>		<i>"</i>	<i>0.0400</i>		<i>99.2</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0385</i>		<i>"</i>	<i>0.0400</i>		<i>96.2</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0394</i>		<i>"</i>	<i>0.0400</i>		<i>98.6</i>	<i>21-167</i>			

Matrix Spike (1602245-MS1)

Source: 1602188-01

Prepared & Analyzed: 02/24/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0968	0.0020	"	0.0938	ND	103	30-131			
Toluene	0.0864	0.0050	"	0.0938	ND	92.1	30-134			
Ethylbenzene	0.113	0.0050	"	0.0931	ND	121	22-153			
m,p-Xylene	0.217	0.010	"	0.187	ND	116	10-159			
o-Xylene	0.105	0.0050	"	0.0919	ND	114	31-151			
Xylenes (total)	0.322	0.010	"		ND		30-160			
Gasoline Range Hydrocarbons	2.11	0.50	"		0.195		30-160			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0375</i>		<i>"</i>	<i>0.0375</i>		<i>100</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0367</i>		<i>"</i>	<i>0.0375</i>		<i>97.7</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0374</i>		<i>"</i>	<i>0.0375</i>		<i>99.6</i>	<i>21-167</i>			

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: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

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 1602245 - EPA 5030 Soil MS

Matrix Spike Dup (1602245-MSD1)		Source: 1602188-01			Prepared & Analyzed: 02/24/16					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.101	0.0020	"	0.0984	ND	103	30-131	4.69	34	
Toluene	0.0876	0.0050	"	0.0984	ND	89.0	30-134	1.36	30	
Ethylbenzene	0.113	0.0050	"	0.0976	ND	116	22-153	0.543	24	
m,p-Xylene	0.219	0.010	"	0.196	ND	112	10-159	0.971	68	
o-Xylene	0.106	0.0050	"	0.0965	ND	110	31-151	1.42	38	
Xylenes (total)	0.325	0.010	"		ND		30-160	1.12	30	
Gasoline Range Hydrocarbons	2.12	0.50	"		0.195		30-160	0.659	30	
Surrogate: 1,2-Dichloroethane-d4	0.0390		"	0.0394		99.1	23-173			
Surrogate: Toluene-d8	0.0383		"	0.0394		97.2	20-170			
Surrogate: 4-Bromofluorobenzene	0.0387		"	0.0394		98.4	21-167			

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: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

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 1602249 - General Preparation

LCS (1602249-BS1)

Prepared & Analyzed: 02/25/16

pH	8.02	0.100	pH Units	8.00	100	95-105
----	------	-------	----------	------	-----	--------

Duplicate (1602249-DUP1)

Source: 1602191-01

Prepared & Analyzed: 02/25/16

pH	8.30	0.100	pH Units	8.25	0.604	20
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Batch 1602250 - General Preparation

Blank (1602250-BLK1)

Prepared & Analyzed: 02/25/16

Specific Conductance (EC)	ND	0.0100	mmhos/cm
---------------------------	----	--------	----------

LCS (1602250-BS1)

Prepared & Analyzed: 02/25/16

Specific Conductance (EC)	0.512	0.0100	mmhos/cm	0.500	102	90-110
---------------------------	-------	--------	----------	-------	-----	--------

Duplicate (1602250-DUP1)

Source: 1602191-01

Prepared & Analyzed: 02/25/16

Specific Conductance (EC)	1.08	0.0100	mmhos/cm	1.15	6.37	20
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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: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
02/25/16 15:14

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

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

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.

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

March 09, 2016

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Williamson 43-12

Enclosed are the results of analyses for samples received by Summit Scientific on 03/08/16 18:30. 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: Williamson 43-12

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/09/16 07:06

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW01	1603061-01	Water	03/08/16 13:15	03/08/16 18:30

Summit Scientific *1603061*
S₂

741 Corporate Circle, Suite J ♦ 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: 970 470 9042 Fax: _____ Project Name: Williamson 43-12
Sampler Name: Rob Irvin 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	GW01	3/8/16	13:15	3	X				X			X	BTEX			
2																
3																
4																
5																
6																
7																
8																
9																
10																

Relinquished by: <u>[Signature]</u>	Date/Time: <u>3/8/16 19:30</u>	Received by: <u>BA</u>	Date/Time: <u>3-8-16 18:30</u>	Turn Around Time (Check) Same Day <u>X</u> 72 hours <u>—</u> 24 hours <u>—</u> Standard <u>—</u> 48 hours <u>—</u>	Notes: <u>on ice</u>
Relinquished by:	Date/Time:	Received by:	Date/Time:	Sample Integrity: Temperature Upon Receipt: <u>62.1</u>	
Relinquished by:	Date/Time:	Received by:	Date/Time:	Intact: <u>Yes</u> No	

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

Project: Williamson 43-12
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
03/09/16 07:06

GW01
1603061-01 (Water)

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Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **03/08/16 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	5.1	1.0	ug/l	1	1603078	03/09/16	03/09/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	1.4	1.0	"	"	"	"	"	"	
Xylenes (total)	11	1.0	"	"	"	"	"	"	

Date Sampled: **03/08/16 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		<i>147 %</i>	<i>37-154</i>		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		<i>103 %</i>	<i>45-149</i>		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>109 %</i>	<i>45-146</i>		"	"	"	"	

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Volatile Organic Compounds by EPA Method 8260B - Quality Control

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

Batch 1603078 - EPA 5030 Water MS

Blank (1603078-BLK1)

Prepared & Analyzed: 03/09/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	18.5		"	13.2		140	37-154			
Surrogate: Toluene-d8	13.5		"	13.3		101	45-149			
Surrogate: 4-Bromofluorobenzene	14.5		"	13.3		109	45-146			

LCS (1603078-BS1)

Prepared & Analyzed: 03/09/16

Benzene	32.5	1.0	ug/l	33.3		97.4	51-132			
Toluene	30.7	1.0	"	33.3		92.2	51-138			
Ethylbenzene	39.3	1.0	"	33.1		119	58-146			
m,p-Xylene	71.9	2.0	"	66.5		108	57-144			
o-Xylene	32.7	1.0	"	32.8		99.7	53-146			
Surrogate: 1,2-Dichloroethane-d4	19.6		"	13.2		148	37-154			
Surrogate: Toluene-d8	13.9		"	13.3		104	45-149			
Surrogate: 4-Bromofluorobenzene	14.1		"	13.3		106	45-146			

Matrix Spike (1603078-MS1)

Source: 1603061-01

Prepared & Analyzed: 03/09/16

Benzene	39.0	1.0	ug/l	33.3	5.11	102	34-141			
Toluene	31.2	1.0	"	33.3	ND	93.5	27-151			
Ethylbenzene	39.6	1.0	"	33.1	1.39	116	29-160			
m,p-Xylene	73.7	2.0	"	66.5	8.75	97.7	20-166			
o-Xylene	33.0	1.0	"	32.8	1.91	94.7	33-159			
Surrogate: 1,2-Dichloroethane-d4	19.2		"	13.2		145	37-154			
Surrogate: Toluene-d8	13.7		"	13.3		103	45-149			
Surrogate: 4-Bromofluorobenzene	14.6		"	13.3		109	45-146			

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Reported:
03/09/16 07:06

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 1603078 - EPA 5030 Water MS

Matrix Spike Dup (1603078-MSD1)	Source: 1603061-01			Prepared & Analyzed: 03/09/16						
Benzene	37.6	1.0	ug/l	33.3	5.11	97.6	34-141	3.57	32	
Toluene	30.7	1.0	"	33.3	ND	92.0	27-151	1.59	25	
Ethylbenzene	39.5	1.0	"	33.1	1.39	115	29-160	0.405	50	
m,p-Xylene	73.3	2.0	"	66.5	8.75	97.0	20-166	0.612	36	
o-Xylene	33.3	1.0	"	32.8	1.91	95.8	33-159	1.09	26	
Surrogate: 1,2-Dichloroethane-d4	20.1		"	13.2		152	37-154			
Surrogate: Toluene-d8	13.6		"	13.3		102	45-149			
Surrogate: 4-Bromofluorobenzene	14.6		"	13.3		110	45-146			

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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

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