

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: <u>PDC Energy, Inc.</u>		Name: <u>Karen Shanahan Olson</u>	
Address: <u>1775 Sherman Street, Suite 3000</u>		No: <u>(303) 860-5800</u>	
City: <u>Denver</u> State: <u>CO</u> Zip: <u>80203</u>		Fax: <u>(303) 860-5838</u>	
API/Facility No: <u>05-123-19236</u>	County: <u>Weld</u>		
Facility Name: <u>Loustalet-65N64W15NENE</u>	Facility Number: <u>330519</u>		
Well Name: <u>Loustalet 41-15</u>	Well Number: <u>Loustalet 41-15</u>		
Location (QtrQtr, Sec, Twp, Rng, Meridian): <u>NENE S15 T5N R64W</u>		Latitude: <u>40.40355</u>	Longitude: <u>-104.527490</u>

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)? Y N If yes, attach evaluation. ** Please see 'Potential Receptors' section below.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Non-Cropland

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Haverson loam, 1 to 3 percent slopes

Potential receptors (water wells within 1/4 mi, surface waters, etc.): An occupied building is located 715 ft. west and surface water is located 90 ft. south of the site. The nearest water well is located 485 ft. north. Depth to shallow groundwater is approximately 18 feet bgs.

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):	Extent of Impact:	How Determined:
<input checked="" type="checkbox"/> Soils	<u>Refer to the attached Figure 2 and Table 1</u>	<u>Excavation, drilling, and soil sampling</u>
<input type="checkbox"/> Vegetation	_____	_____
<input checked="" type="checkbox"/> Groundwater	<u>Refer to the attached Figure 2 and Table 2</u>	<u>Drilling and groundwater sampling</u>
<input type="checkbox"/> Surface water	_____	_____

REMEDIATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

On March 7, 2016, a produced water dump line release was discovered at the Loustalet 41-15 production facility as summarized in the Initial Form 19 (Doc# 401002236) submitted to the Colorado Oil and Gas Conservation Commission (COGCC) on March 9, 2016, and in the Supplemental Form 19 (Doc# 401010057) submitted on March 17, 2016. A topographic map of the site is included as Figure 1.

Describe how source is to be removed:

On September 23, 2016, approximately 140 cubic yards of impacted material were excavated and transported to the Waste Management Facility in Ault, Colorado for disposal under PDC water manifests. Soil samples were collected from the sidewalls and base of the excavation area and submitted to Summit Scientific Laboratories (Summit) in Golden, Colorado for analysis of benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons (TPH) - gasoline range organics (GRO) by USEPA Method 8260, and TPH - diesel range organics (DRO) by USEPA Method 8015. Analytical results indicated that TPH concentrations were above applicable COGCC Table 910-1 standards in the soil samples collected from the base and north sidewall (SS04 and SS01) of the excavation. Remaining soil samples exhibited constituent concentrations below applicable regulatory standards. Initial excavation activities were temporarily discontinued due to unstable and sloughing soils, site constraints, and the Weld County Right-of-Way. Consequently, a sub-surface site assessment was completed to determine the lateral and vertical extent of hydrocarbon impacts related to the release. On October 18 - 19, 2016, eight soil borings (BH01 - BH08) were advanced to approximately 20 feet and 25 feet below ground surface (bgs). The varying depths were a result of significant change in ground elevation between the containment and the surrounding native surface. Grab soil samples were collected from the borings in 1-foot intervals and field screened for volatile organic compound (VOC) concentrations using a photoionization detector (PID). One soil sample was collected above the groundwater table in each of the eight borings at depths ranging between 10 feet and 17 feet bgs. Samples were submitted to Summit in Golden, Colorado for analysis of BTEX, naphthalene, and TPH - GRO by USEPA Method 8260, and TPH - DRO by USEPA Method 8015. Analytical results indicated constituent concentrations were below COGCC Table 910-1 standards in all eight soil sample locations. Groundwater was encountered in the soil borings between 11 feet and 18 feet bgs and as a result, temporary monitoring wells were installed. Temporary monitoring wells were developed and subsequently sampled. Eight groundwater samples (BH01 - BH08) were submitted for laboratory analysis of BTEX by USEPA Method 8260B. Analytical results indicated that the benzene concentration detected in monitoring well BH07 was above the applicable COGCC Table 910-1 groundwater standard. BTEX concentrations were below regulatory standards in the remaining seven monitoring wells. The excavation extent and soil boring/temporary monitoring well locations are illustrated on Figure 2. Soil analytical data is summarized in Table 1 and groundwater analytical data is summarized in Table 2. Laboratory analytical reports are included as Attachment A.

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.:

Remaining hydrocarbon impacted soil will be excavated under an approved Weld County ROW and transported to the Waste Management Facility in Ault, Colorado under PDC waste manifests. Confirmation soil samples will be collected from the sidewalls of the final extent of the excavation and submitted for laboratory analysis. Open-excavation chemical oxidation treatment will be conducted subsequent to soil removal activities to address remaining hydrocarbon impacts in groundwater and soil within the saturated interval. Confirmation groundwater samples will be collected from the excavation following chemical treatment activities prior to backfilling. Monitoring wells will be replaced, if necessary, following excavation activities. In addition, one source monitoring well will be installed within the former excavation area. Post-chemical treatment groundwater conditions will be evaluated and a new remedial strategy may be selected. Quarterly groundwater monitoring will continue until four consecutive quarters of BTEX concentrations in compliance with COGCC Table 910-1 standards are achieved.

State of Colorado Oil and Gas Conservation Commission

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



Tracking Number: Name of Operator: PDC Energy, Inc. OGCC Operator No: 69175 Received Date: Well Name & No: Loustalet 41-15 Facility Name & No.: Loustalet 41-15

REMEDIATION WORKPLAN (CONT.)

OGCC Employee:

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.): Groundwater was encountered during excavation activities at approximately 18 feet below ground surface (bgs). The groundwater sample (BH07) collected during the sub-surface site assessment exhibited a benzene concentration in exceedance of COGCC Table 910-1 standard. Following excavation and chemical treatment activities, quarterly groundwater monitoring will commence at the existing well network and one new source well using USEPA Method 8260. Monitoring activities will continue until four consecutive post-remediation quarters of constituent concentrations in compliance with with COGCC regulatory standards are achieved.

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 will be backfilled, compacted, and re-contoured to match pre-existing conditions.

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 [X] N If yes, describe: Based on the results of the initial site assessment conducted in October 2016, the lateral extent of hydrocarbon impacts in soil and groundwater have been delineated. Soil analytical results are summarized in Table 1 and groundwater analytical results are summarized in Table 2. Laboratory analytical reports are included as Attachment A.

Final disposition of E&P waste (land treated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.): Soil removed during excavation activities was disposed of at the Waste Management Facility in Ault, Colorado under PDC waste manifests.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 9/23/2016 Date Site Investigation Completed: 10/19/2016 Remediation Plan Submitted: Remediation Start Date: NA Anticipated Completion Date: NA 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: Sr. EHS Manager Date:

OGCC Approved: Title: Date:

TABLE 1
LOUSTALET 41-15 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)
COGCC standards for soil (mg/kg) ⁽¹⁾			0.17	85	100	175	23	500
SS01 @ 12'	9/23/2016	12	<0.0020	0.30	0.75	17	1.3	2,600
SS02 @ 12'	9/23/2016	12	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS03 @ 12'	9/23/2016	12	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50
SS04 @ 15'	9/23/2016	15	<0.0020	0.084	0.11	6.0	0.30	1,390
BH01 @ 17'	10/18/2016	17	<0.0020	<0.0050	<0.0050	<0.0050	<0.010	<50
BH02 @ 17'	10/18/2016	17	<0.0020	<0.0050	<0.0050	<0.0050	<0.010	<50
BH03 @ 15.5'	10/18/2016	15.5	<0.0020	<0.0050	<0.0050	<0.0050	<0.010	<50
BH04 @ 10'	10/18/2016	10	<0.0020	<0.0050	<0.0050	<0.0050	<0.010	<50
BH05 @ 15'	10/19/2016	15	<0.0020	<0.0050	<0.0050	<0.0050	<0.010	<50
BH06 @ 10'	10/19/2016	10	<0.0020	<0.0050	<0.0050	<0.0050	<0.010	<50
BH07 @ 15'	10/19/2016	15	<0.0020	<0.0050	<0.0050	<0.0050	<0.010	<50
BH08 @ 12'	10/19/2016	12	<0.0020	<0.0050	<0.0050	<0.0050	<0.010	<50

Notes:

- Standards for soil are taken from 2 CCR 404-1, Table 910-1, effective January 30, 2015.
 - 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
BOLD = Analytical result is in exceedance of COGCC soil standards.

TABLE 2
LOUSTALET 41-15 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 ⁽²⁾ (feet)
COGCC Table 910-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	
BH01	10/19/2016	<1.0	<1.0	<1.0	<1.0	16.75
BH02	10/19/2016	<1.0	<1.0	<1.0	<1.0	17.69
BH03	10/19/2016	<1.0	<1.0	<1.0	<1.0	15.07
BH04	10/19/2016	<1.0	<1.0	<1.0	<1.0	13.20
BH05	10/19/2016	<1.0	<1.0	<1.0	<1.0	18.62
BH06	10/19/2016	<1.0	<1.0	<1.0	<1.0	13.03
BH07	10/19/2016	7.3	<1.0	180	1,300	17.48
BH08	10/19/2016	<1.0	<1.0	<1.0	<1.0	14.12

Notes:

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

2. Depth to water measured from top of well casing for monitoring well samples.

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

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

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

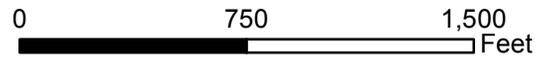
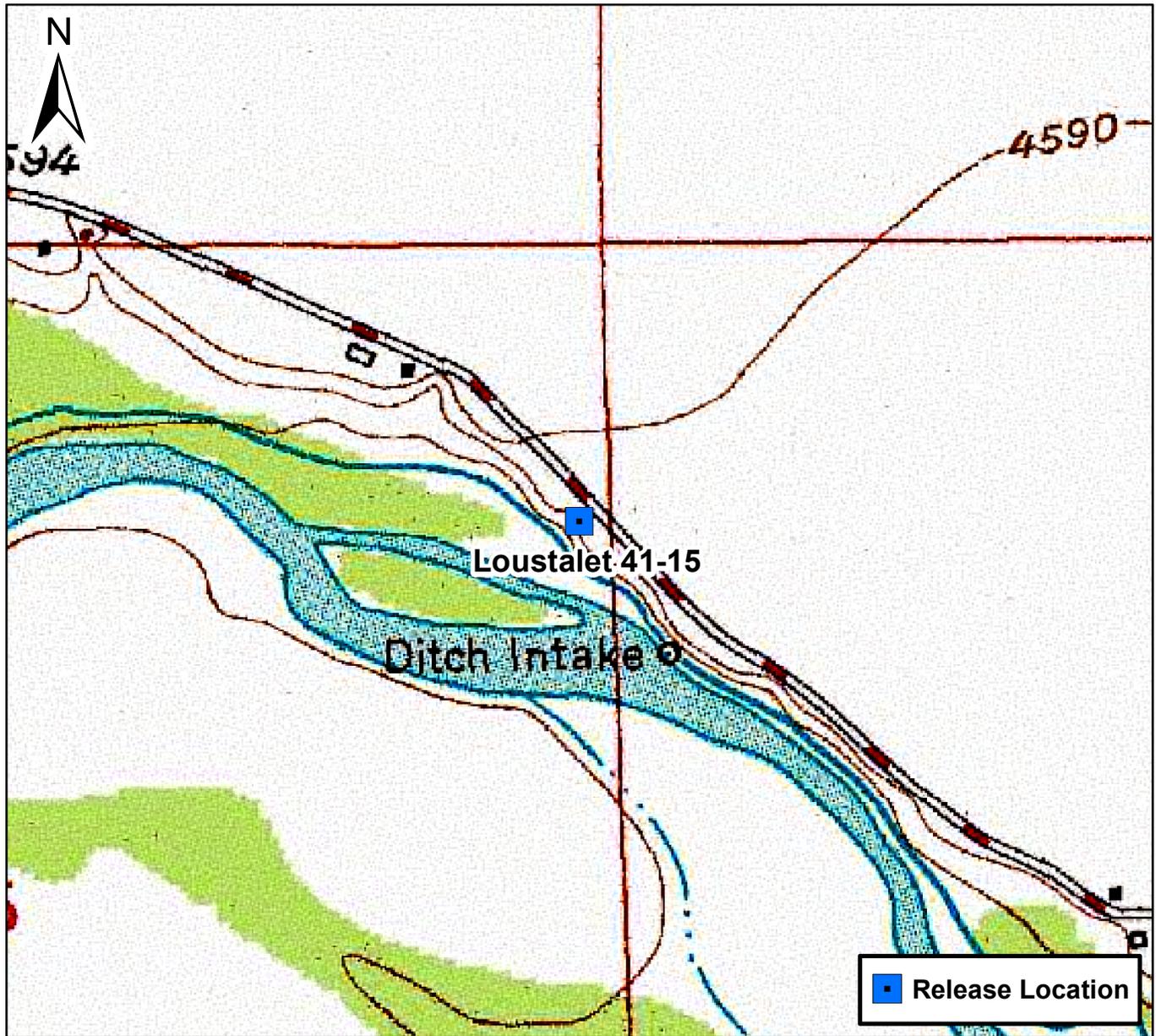


Figure 1

Site Location Map
 Loustalet 41-15
 NENE S15 T5N R64W
 Weld County, Colorado





DRAWN BY: BRN

DATE: 11/4/2016

Facility Diagram
 PDC Energy, Inc. – DJ Basin
 Loustalet 41-15 Tank Battery
 NENE S15 T5N R64W
 Weld County, CO

TASMAN GEOSCIENCES
 6899 Pecos Street, Unit C
 Denver, CO 80221

LEGEND

- Excavation Extent
- X Point of Release
- + Soil Sample Location
- ⊕ Monitoring Well Location (Trimble GPS)
- Groundwater Flow Direction

All locations are approximate unless otherwise noted

FIGURE 2
 SITE INVESTIGATION MAP

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

September 27, 2016

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Loustalet 41-15

Enclosed are the results of analyses for samples received by Summit Scientific on 09/23/16 15:05. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury
President



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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 14:45

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@12'	1609159-01	Soil	09/23/16 14:12	09/23/16 15:05
SS2@12'	1609159-02	Soil	09/23/16 14:15	09/23/16 15:05
SS03@12'	1609159-03	Soil	09/23/16 14:20	09/23/16 15:05
SS04@15'	1609159-04	Soil	09/23/16 14:25	09/23/16 15:05

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 14:45

Summit Scientific

1609159

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

Page 1 of 1

Client: PDC Energy Project Manager: Mark Longhurst
 Address: _____ E-Mail: _____
 City/State/Zip: _____
 Phone: _____ Fax: _____ Project Name: Loustalet 41-15
 Sampler Name: Steve E. Nelson Project Number: _____

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix			Analysis Requested				Special Instructions	
					HCl	HNO3	None	Other (Specify)	Groundwater	Soil	Air-Canister #	Other (Specify)	GTTEY	8260	TPH-DRG		High/Low
1	N01@12'	9/23/16	1402	1									X	X	X	X	
2	S01@12'		1415	1			X						X	X	X	X	
3	W01@12'		1420	1			X		X				X	X	X	X	
4	S01@15'		1425	1			X		X				X	X	X	X	
5																	
6																	
7																	
8																	
9																	
10																	

Relinquished by: <u>[Signature]</u> Date/Time: <u>9/23/16 1505</u>	Received by: <u>[Signature]</u> Date/Time: <u>9-23-16 15:05</u>	Turn Around Time (Check) <input checked="" type="checkbox"/> 72 hours	Notes:
Relinquished by: <u>[Signature]</u> Date/Time: <u>9-23-16 18:08</u>	Received by: <u>[Signature]</u> Date/Time: <u>9-23-16 1800</u>	24 hours <input type="checkbox"/> Standard <input type="checkbox"/>	
Relinquished by: _____ Date/Time: _____	Received by: _____ Date/Time: _____	48 hours <input type="checkbox"/> Sample Integrity: _____	
		Temperature Upon Receipt: <u>4.4</u>	
		Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	

www.s2scientific.com



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

Project: Loustalet 41-15

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/27/16 14:45

Sample Receipt Checklist

S2 Work Order: 1609159

Client: PDC Client Project ID: Loustalet 41-15

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

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

Cooler ID					
Temp (°C)	<u>4.4°C</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact ⁽¹⁾ ?		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Record the pH in Comments.			<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				

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

Mindy Mach
 Custodian Printed Name

[Signature]
 Signature or Initials of Custodian

9/26/16 12:08
 Date/Time

[Signature]



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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 14:45

SS01@12'
1609159-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **09/23/16 14:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	1400	50	mg/kg	1	1609194	09/26/16	09/26/16	8015M	

Date Sampled: **09/23/16 14:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		111 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/23/16 14:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	1.3	0.10	mg/kg	10	1609196	09/26/16	09/26/16	EPA 8260B	
Benzene	ND	0.0020	"	1	"	"	"	"	
Toluene	0.30	0.050	"	10	"	"	"	"	
Ethylbenzene	0.75	0.050	"	"	"	"	"	"	
Xylenes (total)	17	0.10	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	1200	5.0	"	"	"	"	"	"	

Date Sampled: **09/23/16 14:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		102 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		83.3 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		187 %	21-167		"	"	"	"	S-02

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 14:45

SS2@12'
1609159-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **09/23/16 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609194	09/26/16	09/26/16	8015M	

Date Sampled: **09/23/16 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		88.2 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/23/16 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609196	09/26/16	09/26/16	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: **09/23/16 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 14:45

SS03@12'
1609159-03 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **09/23/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609194	09/26/16	09/26/16	8015M	

Date Sampled: **09/23/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		90.5 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/23/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609196	09/26/16	09/26/16	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: **09/23/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 14:45

SS04@15'
1609159-04 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **09/23/16 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	850	50	mg/kg	1	1609194	09/26/16	09/26/16	8015M	

Date Sampled: **09/23/16 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		138 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **09/23/16 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	0.30	0.10	mg/kg	10	1609196	09/26/16	09/26/16	EPA 8260B	
Benzene	ND	0.0020	"	1	"	"	"	"	
Toluene	0.084	0.050	"	10	"	"	"	"	
Ethylbenzene	0.11	0.050	"	"	"	"	"	"	
Xylenes (total)	6.0	0.10	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	540	5.0	"	"	"	"	"	"	

Date Sampled: **09/23/16 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		101 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		82.4 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		138 %	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: Loustalet 41-15

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 09/27/16 14:45

Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

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

Batch 1609194 - EPA 3550A

Blank (1609194-BLK1)

Prepared & Analyzed: 09/26/16

C10-C28 (DRO)	ND	50	mg/kg								
<i>Surrogate: o-Terphenyl</i>	<i>11.1</i>		"	<i>12.5</i>		<i>88.8</i>	<i>30-150</i>				

LCS (1609194-BS1)

Prepared & Analyzed: 09/26/16

C10-C28 (DRO)	406	50	mg/kg	499		81.3	73-134				
<i>Surrogate: o-Terphenyl</i>	<i>12.5</i>		"	<i>12.5</i>		<i>100</i>	<i>30-150</i>				

Matrix Spike (1609194-MS1)

Source: 1609159-01

Prepared & Analyzed: 09/26/16

C10-C28 (DRO)	1800	50	mg/kg	499	1400	80.3	50-148				
<i>Surrogate: o-Terphenyl</i>	<i>13.8</i>		"	<i>12.5</i>		<i>111</i>	<i>30-150</i>				

Matrix Spike Dup (1609194-MSD1)

Source: 1609159-01

Prepared & Analyzed: 09/26/16

C10-C28 (DRO)	1630	50	mg/kg	499	1400	46.4	50-148	9.87	20		QM-07
<i>Surrogate: o-Terphenyl</i>	<i>14.2</i>		"	<i>12.5</i>		<i>114</i>	<i>30-150</i>				

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 14:45

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

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

Batch 1609196 - EPA 5030 Soil MS

Blank (1609196-BLK1)

Prepared & Analyzed: 09/26/16

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>0.0414</i>		<i>"</i>	<i>0.0400</i>		<i>104</i>		<i>23-173</i>		
<i>Surrogate: Toluene-d8</i>	<i>0.0396</i>		<i>"</i>	<i>0.0400</i>		<i>99.1</i>		<i>20-170</i>		
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0406</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>		<i>21-167</i>		

LCS (1609196-BS1)

Prepared & Analyzed: 09/26/16

Naphthalene	ND	0.010	mg/kg					66-138		
Benzene	0.108	0.0020	"	0.100		108		58-130		
Toluene	0.0964	0.0050	"	0.100		96.4		61-134		
Ethylbenzene	0.111	0.0050	"	0.0992		112		74-139		
m,p-Xylene	0.212	0.010	"	0.200		106		73-137		
o-Xylene	0.107	0.0050	"	0.0980		110		73-141		
Xylenes (total)	0.320	0.010	"					0-200		
Gasoline Range Hydrocarbons	2.08	0.50	"					30-150		
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0423</i>		<i>"</i>	<i>0.0400</i>		<i>106</i>		<i>23-173</i>		
<i>Surrogate: Toluene-d8</i>	<i>0.0413</i>		<i>"</i>	<i>0.0400</i>		<i>103</i>		<i>20-170</i>		
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0391</i>		<i>"</i>	<i>0.0400</i>		<i>97.6</i>		<i>21-167</i>		

Matrix Spike (1609196-MS1)

Source: 1609159-02

Prepared & Analyzed: 09/26/16

Naphthalene	ND	0.010	mg/kg		ND			10-158		
Benzene	0.104	0.0020	"	0.0982	ND	106		30-131		
Toluene	0.0926	0.0050	"	0.0982	ND	94.3		30-134		
Ethylbenzene	0.107	0.0050	"	0.0974	ND	109		22-153		
m,p-Xylene	0.202	0.010	"	0.196	ND	103		10-159		
o-Xylene	0.104	0.0050	"	0.0963	ND	108		31-151		
Xylenes (total)	0.306	0.010	"		ND			30-160		
Gasoline Range Hydrocarbons	1.99	0.50	"		ND			30-160		
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0418</i>		<i>"</i>	<i>0.0393</i>		<i>106</i>		<i>23-173</i>		
<i>Surrogate: Toluene-d8</i>	<i>0.0406</i>		<i>"</i>	<i>0.0393</i>		<i>103</i>		<i>20-170</i>		
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0384</i>		<i>"</i>	<i>0.0393</i>		<i>97.8</i>		<i>21-167</i>		

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 14:45

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

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

Batch 1609196 - EPA 5030 Soil MS

Matrix Spike Dup (1609196-MSD1)	Source: 1609159-02			Prepared & Analyzed: 09/26/16						
Naphthalene	ND	0.010	mg/kg	ND	ND	101	10-158			42
Benzene	0.0988	0.0020	"	0.0982	ND	101	30-131	5.15		34
Toluene	0.0872	0.0050	"	0.0982	ND	88.8	30-134	6.00		30
Ethylbenzene	0.101	0.0050	"	0.0974	ND	104	22-153	5.28		24
m,p-Xylene	0.194	0.010	"	0.196	ND	98.9	10-159	4.21		68
o-Xylene	0.0986	0.0050	"	0.0963	ND	102	31-151	5.55		38
Xylenes (total)	0.292	0.010	"		ND		30-160	4.67		30
Gasoline Range Hydrocarbons	1.93	0.50	"		ND		30-160	3.19		30
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0408</i>		<i>"</i>	<i>0.0393</i>		<i>104</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0403</i>		<i>"</i>	<i>0.0393</i>		<i>103</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0386</i>		<i>"</i>	<i>0.0393</i>		<i>98.2</i>	<i>21-167</i>			

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
09/27/16 14:45

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.
- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

November 08, 2016

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Loustalet 41-15

Enclosed are the results of analyses for samples received by Summit Scientific on 10/20/16 10:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury
President



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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01@17'	1610165-01	Soil	10/18/16 09:36	10/20/16 10:15
BH02@17'	1610165-02	Soil	10/18/16 11:09	10/20/16 10:15
BH03@15.5'	1610165-03	Soil	10/18/16 12:49	10/20/16 10:15
BH04@10'	1610165-04	Soil	10/18/16 13:52	10/20/16 10:15
BH05@15'	1610165-05	Soil	10/19/16 10:29	10/20/16 10:15
BH06@10'	1610165-06	Soil	10/19/16 11:44	10/20/16 10:15
BH07@15'	1610165-07	Soil	10/19/16 14:20	10/20/16 10:15
BH08@12'	1610165-08	Soil	10/19/16 16:05	10/20/16 10:15
BH01	1610165-09	Water	10/19/16 14:49	10/20/16 10:15
BH02	1610165-10	Water	10/19/16 15:11	10/20/16 10:15
BH03	1610165-11	Water	10/19/16 14:16	10/20/16 10:15
BH04	1610165-12	Water	10/19/16 11:07	10/20/16 10:15
BH05	1610165-13	Water	10/19/16 13:01	10/20/16 10:15
BH06	1610165-14	Water	10/19/16 14:40	10/20/16 10:15
BH07	1610165-15	Water	10/19/16 15:44	10/20/16 10:15
BH08	1610165-16	Water	10/19/16 17:16	10/20/16 10:15

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

Summit Scientific

1610165.1

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

Page 1 of 2

Client: PDC Energy
Address: _____
City/State/Zip: _____
Phone: _____ Fax: _____
Sampler Name: Brock Nelson

Project Manager: Mark Longhurst
E-Mail: _____
Project Name: Loustalet 41-15
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)		CO ₂ TEX 8760
BH01 @ 17'	10/6/16	936	1			✓							
BH02 @ 17'		1109	1			✓							
BH03 @ 15.5'		1249	1			✓							
BH04 @ 10'		1352	1			✓							
BH05 @ 15'	10/17/16	1024	1			✓							
BH06 @ 10'		1144	1			✓							
BH07 @ 15'		1426	1			✓							
BH08 @ 12'		1605	1			✓							
BH04		1449	3	X			X					X	
BH02		1511	3	X			✓					X	

Relinquished by: [Signature] Date/Time: 10/20/16 10:15

Relinquished by: [Signature] Date/Time: 10/20/16 10:50

Relinquished by: _____ Date/Time: _____

Received by: [Signature] Date/Time: 10/20/16 10:15

Received by: [Signature] Date/Time: 10/20/16 10:50

Received in Lab by: _____ Date/Time: _____

Turn Around Time (Check)

Same Day 72 Hours

24 Hours Standard

48 Hours

Sample Integrity: 5.1°C

Temperature Upon Receipt: _____

Intact: Yes No

Notes:

results by end of day Friday 10/21/16

on ice

www.s2scientific.com

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: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

Summit Scientific

1610165

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

Page 2 of 2

Client: PDC Energy
Address: _____
City/State/Zip: _____
Phone: _____ Fax: _____
Sampler Name: Scott Kuber

Project Manager: Mark Longhurst
E-Mail: _____
Project Name: Loustalet 41-15
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)					
BH03	10/16/16	1416	3	X				X								
BH04		1417	3	X				X								
BH05		1418	3	X				X								
BH06		1419	3	X				X								
BH07		1501	3	X				X								
BH08		1716	3	X				X								
Relinquished by: <u>[Signature]</u> Date/Time: <u>10/20/16 10:15</u>				Received by: <u>[Signature]</u> Date/Time: <u>10/20/16 10:15</u>				Turn Around Time (Check)				Notes:				
Relinquished by: <u>[Signature]</u> Date/Time: <u>10/20/16 10:50</u>				Received by: <u>Jacob Pater</u> Date/Time: <u>10/20/16 10:50</u>				Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/>				on ice				
Relinquished by: _____ Date/Time: _____				Received in Lab by: _____ Date/Time: _____				24 Hours <input type="checkbox"/> Standard <input type="checkbox"/>								
Relinquished by: _____ Date/Time: _____				Received in Lab by: _____ Date/Time: _____				48 Hours <input checked="" type="checkbox"/>				Sample Integrity: <u>5.1°C</u>				
Relinquished by: _____ Date/Time: _____				Received in Lab by: _____ Date/Time: _____				Temperature Upon Receipt: <u>5.1°C</u>				Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

Sample Receipt Checklist

S2 Work Order: 1610165
Client: PDC Energy Client Project ID: Loustalet 41-15
Shipped Via: P/U Airbill #: _____
(UPS, FedEx, Hand Delivered, Pick-up, etc)
Matrix (check all that apply): Air Soil/Solid Water Other: _____
(Describe)

Cooler ID					
Temp (°C)	<u>5.1</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
If custody seals are present, are they intact ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?			<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.				
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ?				
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect				
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ?			<input checked="" type="checkbox"/>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			<input checked="" type="checkbox"/>	
Additional Comments (if any):				

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

Nakita
Custodian Printed Name

ML
Signature or Initials of Custodian

10/20/16 10:50
Date/Time



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

Project: Loustalet 41-15
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

BH01@17'
1610165-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/18/16 09:36**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/20/16	8015M	

Date Sampled: **10/18/16 09:36**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		99.7 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/18/16 09:36**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/20/16	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: **10/18/16 09:36**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

BH02@17'
1610165-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/18/16 11:09**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/20/16	8015M	

Date Sampled: **10/18/16 11:09**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		94.2 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/18/16 11:09**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/20/16	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: **10/18/16 11:09**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

BH03@15.5'
1610165-03 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/18/16 12:49**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/20/16	8015M	

Date Sampled: **10/18/16 12:49**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		91.6 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/18/16 12:49**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/20/16	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: **10/18/16 12:49**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	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: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

BH04@10'
1610165-04 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/18/16 13:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/20/16	8015M	

Date Sampled: **10/18/16 13:52**

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

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/18/16 13:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/20/16	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: **10/18/16 13:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

BH05@15'
1610165-05 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/19/16 10:29**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/20/16	8015M	

Date Sampled: **10/19/16 10:29**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		93.3 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 10:29**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/20/16	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: **10/19/16 10:29**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

BH06@10'
1610165-06 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/19/16 11:44**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/20/16	8015M	

Date Sampled: **10/19/16 11:44**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		93.5 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 11:44**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/20/16	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: **10/19/16 11:44**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	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: Loustalet 41-15
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

BH07@15'
1610165-07 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/19/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/20/16	8015M	

Date Sampled: **10/19/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		92.7 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/20/16	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: **10/19/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

BH08@12'
1610165-08 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/19/16 16:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/20/16	8015M	

Date Sampled: **10/19/16 16:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		93.9 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 16:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/20/16	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: **10/19/16 16:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 11/08/16 09:55

BH01
1610165-09 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 14:49**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610225	10/21/16	10/21/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/19/16 14:49**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		79.1 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.0 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.6 %	45-146		"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



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

Project: Loustalet 41-15

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 11/08/16 09:55

BH02
1610165-10 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 15:11**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610225	10/21/16	10/21/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/19/16 15:11**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		78.5 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.2 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		96.9 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 11/08/16 09:55

BH03
1610165-11 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 14:16**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610225	10/21/16	10/21/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/19/16 14:16**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		84.7 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.1 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		94.9 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 11/08/16 09:55

BH04
1610165-12 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 11:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610225	10/21/16	10/21/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/19/16 11:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		80.7 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		95.8 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		95.7 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 11/08/16 09:55

BH05
1610165-13 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 13:01**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610225	10/21/16	10/21/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/19/16 13:01**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		82.8 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.4 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.3 %	45-146		"	"	"	"	

Summit Scientific

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

Project: Loustalet 41-15

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 11/08/16 09:55

BH06
1610165-14 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 14:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610225	10/21/16	10/21/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/19/16 14:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		79.5 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.4 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		95.2 %	45-146		"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



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

Project: Loustalet 41-15
 Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 11/08/16 09:55

BH07
1610165-15 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 15:44**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	7.3	1.0	ug/l	1	1610225	10/21/16	10/21/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	180	1.0	"	"	"	"	"	"	
Xylenes (total)	1300	10	"	10	"	"	"	"	

Date Sampled: **10/19/16 15:44**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		83.6 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		80.9 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		127 %	45-146		"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



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

Project: Loustalet 41-15

Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 11/08/16 09:55

BH08
1610165-16 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/19/16 17:16**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610225	10/21/16	10/21/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/19/16 17:16**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		84.2 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.8 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		103 %	45-146		"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



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

Project: Loustalet 41-15
 Project Number: [none]
 Project Manager: Mark Longhurst

Reported:
 11/08/16 09:55

Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

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

Batch 1610211 - EPA 3550A

Blank (1610211-BLK1)				Prepared & Analyzed: 10/20/16						
C10-C28 (DRO)	ND	50	mg/kg							
<i>Surrogate: o-Terphenyl</i>	12.0		"	12.5		95.8	30-150			
LCS (1610211-BS1)				Prepared & Analyzed: 10/20/16						
C10-C28 (DRO)	453	50	mg/kg	499		90.9	73-134			
<i>Surrogate: o-Terphenyl</i>	12.6		"	12.5		101	30-150			
Matrix Spike (1610211-MS1)				Source: 1610150-01		Prepared & Analyzed: 10/20/16				
C10-C28 (DRO)	504	50	mg/kg	497	46.8	92.0	50-148			
<i>Surrogate: o-Terphenyl</i>	12.2		"	12.5		97.7	30-150			
Matrix Spike Dup (1610211-MSD1)				Source: 1610150-01		Prepared & Analyzed: 10/20/16				
C10-C28 (DRO)	524	50	mg/kg	498	46.8	95.8	50-148	3.89	20	
<i>Surrogate: o-Terphenyl</i>	12.2		"	12.5		97.9	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: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

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

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

Batch 1610214 - EPA 5030 Soil MS

Blank (1610214-BLK1)

Prepared & Analyzed: 10/20/16

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>0.0438</i>		<i>"</i>	<i>0.0400</i>		<i>109</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0388</i>		<i>"</i>	<i>0.0400</i>		<i>97.0</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0418</i>		<i>"</i>	<i>0.0400</i>		<i>105</i>	<i>21-167</i>			

LCS (1610214-BS1)

Prepared & Analyzed: 10/20/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0750	0.0020	"	0.100		75.0	58-130			
Toluene	0.0802	0.0050	"	0.100		80.2	61-134			
Ethylbenzene	0.0660	0.0050	"	0.0992		66.6	50-139			
m,p-Xylene	0.119	0.010	"	0.200		59.5	50-137			
o-Xylene	0.0619	0.0050	"	0.0980		63.2	50-141			
Xylenes (total)	0.181	0.010	"				0-200			
Gasoline Range Hydrocarbons	1.23	0.50	"				30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0363</i>		<i>"</i>	<i>0.0400</i>		<i>90.7</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0514</i>		<i>"</i>	<i>0.0400</i>		<i>129</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0431</i>		<i>"</i>	<i>0.0400</i>		<i>108</i>	<i>21-167</i>			

Matrix Spike (1610214-MS1)

Source: 1610154-01

Prepared & Analyzed: 10/20/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0881	0.0020	"	0.0996	ND	88.5	30-131			
Toluene	0.0915	0.0050	"	0.0996	ND	91.8	30-134			
Ethylbenzene	0.0851	0.0050	"	0.0988	ND	86.1	22-153			
m,p-Xylene	0.152	0.010	"	0.199	ND	76.2	10-159			
o-Xylene	0.0792	0.0050	"	0.0976	ND	81.2	31-151			
Xylenes (total)	0.231	0.010	"		ND		30-160			
Gasoline Range Hydrocarbons	1.62	0.50	"		ND		30-160			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0407</i>		<i>"</i>	<i>0.0398</i>		<i>102</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0455</i>		<i>"</i>	<i>0.0398</i>		<i>114</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0416</i>		<i>"</i>	<i>0.0398</i>		<i>104</i>	<i>21-167</i>			

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

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

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

Batch 1610214 - EPA 5030 Soil MS

Matrix Spike Dup (1610214-MSD1)	Source: 1610154-01			Prepared & Analyzed: 10/20/16						
Naphthalene	ND	0.010	mg/kg	ND	ND	101	10-158		42	
Benzene	0.0996	0.0020	"	0.0990	ND	101	30-131	12.2	34	
Toluene	0.107	0.0050	"	0.0990	ND	108	30-134	15.8	30	
Ethylbenzene	0.108	0.0050	"	0.0982	ND	110	22-153	24.1	24	QM-07
m,p-Xylene	0.195	0.010	"	0.198	ND	98.6	10-159	24.9	68	
o-Xylene	0.103	0.0050	"	0.0970	ND	106	31-151	25.7	38	
Xylenes (total)	0.297	0.010	"		ND		30-160	25.2	30	
Gasoline Range Hydrocarbons	2.16	0.50	"		ND		30-160	28.4	30	
Surrogate: 1,2-Dichloroethane-d4	0.0405		"	0.0396		102	23-173			
Surrogate: Toluene-d8	0.0422		"	0.0396		107	20-170			
Surrogate: 4-Bromofluorobenzene	0.0401		"	0.0396		101	21-167			

Batch 1610225 - EPA 5030 Water MS

Blank (1610225-BLK1)	Prepared & Analyzed: 10/20/16									
Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	11.2		"	13.3		83.9	37-154			
Surrogate: Toluene-d8	12.8		"	13.3		96.4	45-149			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.7	45-146			
LCS (1610225-BS1)	Prepared & Analyzed: 10/20/16									
Benzene	35.9	1.0	ug/l	41.7		86.1	51-132			
Toluene	36.8	1.0	"	41.7		88.3	51-138			
Ethylbenzene	38.5	1.0	"	41.3		93.2	58-146			
m,p-Xylene	74.9	2.0	"	83.2		90.1	57-144			
o-Xylene	37.2	1.0	"	40.8		91.1	53-146			
Surrogate: 1,2-Dichloroethane-d4	12.1		"	13.3		90.8	37-154			
Surrogate: Toluene-d8	13.8		"	13.3		104	45-149			
Surrogate: 4-Bromofluorobenzene	12.4		"	13.3		92.9	45-146			

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

Project: Loustalet 41-15
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

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

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

Batch 1610225 - EPA 5030 Water MS

Matrix Spike (1610225-MS1)	Source: 1610165-10			Prepared & Analyzed: 10/20/16						
Benzene	45.2	1.0	ug/l	41.7	ND	109	34-141			
Toluene	46.3	1.0	"	41.7	ND	111	27-151			
Ethylbenzene	49.5	1.0	"	41.3	ND	120	29-160			
m,p-Xylene	95.3	2.0	"	83.2	ND	115	20-166			
o-Xylene	48.0	1.0	"	40.8	ND	118	33-159			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>11.6</i>		<i>"</i>	<i>13.3</i>		<i>87.2</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.6</i>		<i>"</i>	<i>13.3</i>		<i>102</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.4</i>		<i>"</i>	<i>13.3</i>		<i>93.1</i>	<i>45-146</i>			

Matrix Spike Dup (1610225-MSD1)	Source: 1610165-10			Prepared & Analyzed: 10/20/16						
Benzene	38.3	1.0	ug/l	41.7	ND	91.8	34-141	16.7	32	
Toluene	38.9	1.0	"	41.7	ND	93.3	27-151	17.5	25	
Ethylbenzene	42.5	1.0	"	41.3	ND	103	29-160	15.2	50	
m,p-Xylene	81.6	2.0	"	83.2	ND	98.1	20-166	15.5	36	
o-Xylene	40.5	1.0	"	40.8	ND	99.2	33-159	17.0	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>11.7</i>		<i>"</i>	<i>13.3</i>		<i>87.6</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.4</i>		<i>"</i>	<i>13.3</i>		<i>101</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.4</i>		<i>"</i>	<i>13.3</i>		<i>93.2</i>	<i>45-146</i>			

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

Project: Loustalet 41-15

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/08/16 09:55

Notes and Definitions

- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference