

TABLE 1
FORMER HALL 28-1 WELLHEAD
SOIL ANALYTICAL RESULTS SUMMARY TABLE
ORGANIC COMPOUNDS

Sample ID	Date Sampled	Depth	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	1, 2, 4-TMB (mg/kg)	1, 3, 5-TMB (mg/kg)	Naphthalene (mg/kg)	TPH ^(a) (mg/kg)
Residential SSL ^(1,2)			1.2	490	5.8	58	30	27	2	500
Protection of Groundwater SSL ^(1,2,3)			0.0026	0.69	0.78	9.9	0.0081	0.0087	0.0038	500
WH01 @ 6'	10/21/2021	6 ft. bgs.	<0.0020	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0038	<50
FLR01 @ 4'	10/21/2021	4 ft. bgs.	<0.0020	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0038	<50
FL01-01 @ 3'	10/21/2021	3 ft. bgs.	<0.0020	<0.0050	<0.0050	<0.010	<0.0050	<0.0050	<0.0038	<50

Notes:

- Compounds referenced from the COGCC 2 CCR 404-1, Table 915-1, effective January 15, 2021.
 - Soil Screening Levels (SSL) referenced from EPA Regional Screening Levels (EPA RSLs) for Chemical Contaminants at Superfund Sites, effective November 2020.
 - SSLs are applicable if a pathway for communication with groundwater is present.
 - Value calculated by adding TVPH-GRO, TEPH-DRO, and TEPH-ORO concentrations.
- COGCC = Colorado Oil and Gas Conservation Commission
 (<) = Analytical result is less than the indicated laboratory reporting limit.
 TVPH-GRO = Total volatile petroleum hydrocarbons - gasoline range organics
 TEPH-DRO = Total extractable petroleum hydrocarbons - diesel range organics
 TEPH-ORO = Total extractable petroleum hydrocarbons - oil range organics
 mg/kg = Milligrams per kilogram
 TMB = Trimethylbenzene
 ft. = Feet
 in. = Inches
 bgs = Below ground surface

TABLE 2
FORMER HALL 28-1 WELLHEAD
SOIL ANALYTICAL RESULTS SUMMARY TABLE
INORGANIC COMPOUNDS

Sample ID	Date Sampled	Depth	pH (units)	EC (mmhos/cm)	SAR (units)	Boron (mg/L)
Soil Suitability for Reclamation Standard ⁽¹⁾			6-8.3	<4	<6	2
WH01 @ 6'	10/8/2021	6 ft. bgs.	8.21	2.06	8.30	0.339
FLR01 @ 4'	10/21/2021	4 ft. bgs.	8.32	3.65	9.47	0.191
BKG01 @ 4'	10/21/2021	4 ft. bgs.	8.34	NA	9.80	NA
BKG01 @ 6'	10/21/2021	6 ft. bgs.	8.08	NA	8.02	NA

Notes:

1. Compounds referenced from the COGCC 2 CCR 404-1, Table 915-1, effective January 15, 2021.

COGCC = Colorado Oil and Gas Conservation Commission

EC = Electrical conductivity

SAR = Sodium adsorption ratio

mmhos/cm = millimhos per centimeter

mg/L = milligram per liter

ft. = Feet

bgs = Below ground surface

BOLD = Analytical result is in exceedance of applicable standard.

NA = Constituent not analyzed

TABLE 3
FORMER HALL 28-1 WELLHEAD
SOIL ANALYTICAL RESULTS SUMMARY TABLE
ORGANIC COMPOUNDS - PAHs

Sample ID	Date Sampled	Depth	Acenaphthene (mg/kg)	Anthracene (mg/kg)	Benz(a) (mg/kg)	Benzo(a) (mg/kg)	Benzo(b) (mg/kg)	Benzo(k) (mg/kg)	Chrysene (mg/kg)	A,H (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	1,2,3-CD (mg/kg)	Pyrene (mg/kg)	1-M (mg/kg)	2-M (mg/kg)
Residential SSL ^(1,2)			360	1,800	1.1	0.11	1.1	11	110	0.11	240	240	1.1	180	18	24
Protection of Groundwater SSL ^(1,2,3)			0.55	5.8	0.011	0.24	0.3	2.9	9	0.096	8.9	0.54	0.98	1.3	0.006	0.019
WH01 @ 6'	10/21/2021	6 ft. bgs.	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500
FLR01 @ 4'	10/21/2021	4 ft. bgs.	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500	<0.00500

Notes:

1. Compounds referenced from the COGCC 2 CCR 404-1, Table 915-1, effective January 15, 2021.
2. Soil Screening Levels (SSL) referenced from EPA Regional Screening Levels (EPA RSLs) for Chemical Contaminants at Superfund Sites, effective November 2020.
3. SSLs are applicable if a pathway for communication with

COGCC = Colorado Oil and Gas Conservation Commission

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

PAHs = Polycyclic aromatic hydrocarbons

Benzo(a) = Benzoanthracene

Benzo(a) = Benzopyrene

Benzo(b) = Benzo(a)fluoranthene

Benzo(k) = Benzo(a)fluoranthene

A,H = Dibenzoanthracene

1,2,3-CD = Indenopyrene

M = Methylnaphthalene

mg/kg = Milligrams per kilogram

ft. = Feet

bgs = Below ground surface

TABLE 4
FORMER HALL 28-1 WELLHEAD
FIELD DATA SUMMARY TABLE

Sample ID	Date Sampled	Depth	GPS Data ⁽¹⁾ Latitude / Longitude		PDOP Value	VOC Concentration ⁽²⁾ (ppm)
WH01 @ 6'	10/21/2021	6 ft. bgs.	40.372954	-104.548724	1.1	0.6
FLR01 @ 4'	10/21/2021	4 ft. bgs.	40.372945	-104.548702	1.0	0.2
WHS01-N @ 0-6"	10/21/2021	0-6 in. bgs.	40.372998	-104.548731	1.0	0.2
WHS01-W @ 0-6"	10/21/2021	0-6 in. bgs.	40.372943	-104.548797	1.0	0.2
WHS01-S @ 0-6"	10/21/2021	0-6 in. bgs.	40.372889	-104.548740	1.0	0.1
WHS01-E @ 0-6"	10/21/2021	0-6 in. bgs.	40.372954	-104.548661	1.0	0.0
FL01-01 @ 3'	10/21/2021	3 ft. bgs.	40.372886	-104.547801	1.1	0.0
FL01-02 @ 3'	10/21/2021	3 ft. bgs.	40.372856	-104.547127	1.0	0.1
FL01-03 @ 3'	10/21/2021	3 ft. bgs.	40.372826	-104.546530	1.0	0.0
FL01-04 @ 3'	10/21/2021	3 ft. bgs.	40.372777	-104.545775	1.0	0.0

Notes:

1. Global Positioning System (GPS) data is provided in decimal degrees using World Geodetic System (WGS) 84 UTM Zone 13 North.

2. Volatile organic compound (VOC) concentrations are measured in the field using a photoionization detector (PID).

PDOP = Position Dilution of Precision

ppm = Parts per million

ft. = Feet

in. = Inches

bgs = Below ground surface

TABLE 5
FORMER HALL 28-1 WELLHEAD
GROUNDWATER ANALYTICAL RESULTS SUMMARY TABLE
ORGANIC COMPOUNDS

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	1,2,4-TMB (µg/L)	1,3,5-TMB (µg/L)	Depth to Water ⁽²⁾ (ft.)
COGCC Table 915-1 Groundwater Standard (µg/L) ⁽¹⁾		5	560	700	1,400	140	67	67	-
GW01	10/21/2021	1.5	4.4	<1.0	2.6	<1.0	<1.0	<1.0	6
GW02	10/21/2021	<1.0	<1.0	<1.0	<2.0	<1.0	<1.0	<1.0	3

Notes:

1. Groundwater standards referenced from 2 CCR 404-1, Table 915-1, January 15, 2021.
2. Depth to water measurements were measured from ground surface for excavation samples. Monitoring well measurements were collected from top of casing and adjusted using survey data to reflect depth of water from ground surface.

TMB = Trimethylbenzene

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

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

ft. = Feet

AMSL = Above Mean Sea Level

NA = Not applicable

Attachment A

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403


303.277.9310

November 17, 2021

Mark Longhurst
PDC Energy
1775 Sherman St. STE. 3000
Denver, CO 80203
RE: Hall 28-1 Wellhead
Work Order #2110375

Enclosed are the results of analyses for samples received by Summit Scientific on 10/21/21 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 "Muri Premer", is shown on a light purple rectangular background.

Muri Premer For Paul Shrewsbury
President



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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FLR01@4'	2110375-01	Soil	10/21/21 14:20	10/21/21 17:00
WH01@6'	2110375-02	Soil	10/21/21 14:24	10/21/21 17:00
BKG01@4'	2110375-03	Soil	10/21/21 14:38	10/21/21 17:00
BKG01@6'	2110375-04	Soil	10/21/21 14:42	10/21/21 17:00
FL01-01@3'	2110375-05	Soil	10/21/21 15:08	10/21/21 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.

Summit Scientific

S₂

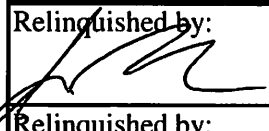
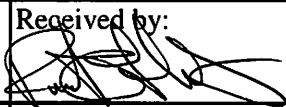
2110375

4653 Table Mountain Drive ♦ Golden, Colorado 80403
303-277-9310

Page 1 of 1

Client: PDC / Tasman Project Manager: Mark Longhurst
Address: 6855 W 119th Ave E-Mail: mark.longhurst@PDCE.com
City/State/Zip: Broomfield/ CO/ 80020
Phone: 303-487-1228 Project Name: Hall 28-1 wellhead
Sampler Name: J. Marcus Project Number: 1/9

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested								Special Instructions
					HCl	HNO ₃	None	Other	Water	Soil	Air-Canister #	Other	BTEXN - 8260B	TPH - (C6 - C36)	1,2,4 & 1,3,5-TMB	Boron - HWS	pH, EC, SAR	PAH-915	ON HOLD		
1	FLR01@4'	10/21/21	1420	3			X			X				X	X	X	X	X	X		
2	WHT01@6'		1424	3			X			X				X	X	X	X	X	X		
3	BKG01@4'		1438	1			X			X										X	
4	BKG01@6'		1442	1			X			X										X	
5	FL01-01@3'		1508	2			X			X				X	X	X					
6																					
7																					
8																					
9																					
10																					

Relinquished by: 	Date/Time: 10/21/21 1700	Received by: Tasman's Lock Box	Date/Time: 10/21/21 1700	Turn Around Time (Check) Same Day — 72 hours — 24 hours — Standard <input checked="" type="checkbox"/> 48 hours — Sample Integrity: Temperature Upon Receipt: 2.7 Samples Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	Notes:
Relinquished by: Tasman's Lock Box	Date/Time:	Received by: 	Date/Time: 10/21/21 1700		
Relinquished by:	Date/Time:	Received by:	Date/Time:		

S₂

Sample Receipt Checklist

S2 Work Order# _____

2110375

Client: RBC TasmanClient Project ID: Hall 28-1 wellheadShipped Via: ☐ H.D./P.U./FedEx/UPS/USPS/Other _____

Airbill #: _____

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

(Describe)

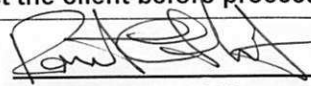
Temp (°C)

2.7

Thermometer ID: G86A9201901378

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C ⁽¹⁾ ? NOTE: If samples are delivered the same day of sampling, this requirement is met if there is evidence that cooling has begun.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	on ICE
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are samples with holding times due within 48 hours sample due within 48 hours present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Same day
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCl, H ₂ SO ₄ , NaOH, HNO ₃ , etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Additional Comments (if any):

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

 Custodian Printed Name or Initials

10.21.21
 Date/Time



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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

FLR01@4'
2110375-01 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	BEJ0526	10/26/21	10/27/21	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.0038	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	BEJ0527	10/26/21	10/27/21	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		119 %	30-150		"	"	"	"	

PAH by EPA Method 8270D SIM

Summit Scientific

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1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

FLR01@4'
2110375-01 (Soil)

Summit Scientific

PAH by EPA Method 8270D SIM

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BEJ0509	10/26/21	10/27/21	EPA 8270D SIM	
Anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.00500	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Chrysene	ND	0.00500	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.00500	"	"	"	"	"	"	
Fluoranthene	ND	0.00500	"	"	"	"	"	"	
Fluorene	ND	0.00500	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.00500	"	"	"	"	"	"	
Pyrene	ND	0.00500	"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10		90.4 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10		71.1 %	40-150		"	"	"	"	

Total Metals by EPA 6020B Hot Water Soluble Extraction

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	0.191	0.0100	mg/L	1	BEJ0516	10/26/21	10/27/21	EPA 6020B	

Soluble Nutrients by EPA 6020/USDA60 6(2) - Saturated Paste Extraction

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

FLR01@4'
2110375-01 (Soil)

Summit Scientific

Soluble Nutrients by EPA 6020/USDA60 6(2) - Saturated Paste Extraction

Calcium	133	0.0583	mg/L dry	1	BEJ0538	10/27/21	10/28/21	EPA 6020B
Magnesium	102	0.0583	"	"	"	"	"	"
Sodium	597	0.0583	"	"	"	"	"	"

Calculated Analysis

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	9.47	0.00100	units	1	BEJ0605	10/29/21	10/29/21	Calculation	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	85.7		%	1	BEJ0428	10/22/21	10/22/21	Calculation	

Specific Conductance by EPA Method 120.1, Saturated Paste Extraction

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	3.65	0.0100	mmhos/cm	1	BEJ0586	10/28/21	10/28/21	EPA 120.1	

Physical Parameters by APHA/ASTM/EPA Methods, Saturated Paste Extraction

Date Sampled: **10/21/21 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.32		pH Units	1	BEJ0584	10/28/21	10/28/21	EPA 9045D	

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

WH01@6'
2110375-02 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	BEJ0526	10/26/21	10/27/21	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.0038	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		101 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	BEJ0527	10/26/21	10/27/21	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		97.5 %	30-150		"	"	"	"	

PAH by EPA Method 8270D SIM

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

WH01@6'
2110375-02 (Soil)

Summit Scientific

PAH by EPA Method 8270D SIM

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BEJ0509	10/26/21	10/27/21	EPA 8270D SIM	
Anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.00500	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Chrysene	ND	0.00500	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.00500	"	"	"	"	"	"	
Fluoranthene	ND	0.00500	"	"	"	"	"	"	
Fluorene	ND	0.00500	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.00500	"	"	"	"	"	"	
Pyrene	ND	0.00500	"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10		92.7 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10		73.1 %	40-150		"	"	"	"	

Total Metals by EPA 6020B Hot Water Soluble Extraction

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Boron	0.339	0.0100	mg/L	1	BEJ0516	10/26/21	10/27/21	EPA 6020B	

Soluble Nutrients by EPA 6020/USDA60 6(2) - Saturated Paste Extraction

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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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: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

WH01@6'
2110375-02 (Soil)

Summit Scientific

Soluble Nutrients by EPA 6020/USDA60 6(2) - Saturated Paste Extraction

Calcium	53.7	0.0582	mg/L dry	1	BEJ0538	10/27/21	10/28/21	EPA 6020B
Magnesium	47.8	0.0582	"	"	"	"	"	"
Sodium	347	0.0582	"	"	"	"	"	"

Calculated Analysis

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	8.30	0.00100	units	1	BEJ0605	10/29/21	10/29/21	Calculation	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	85.9		%	1	BEJ0428	10/22/21	10/22/21	Calculation	

Specific Conductance by EPA Method 120.1, Saturated Paste Extraction

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	2.06	0.0100	mmhos/cm	1	BEJ0586	10/28/21	10/28/21	EPA 120.1	

Physical Parameters by APHA/ASTM/EPA Methods, Saturated Paste Extraction

Date Sampled: **10/21/21 14:24**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	8.21		pH Units	1	BEJ0584	10/28/21	10/28/21	EPA 9045D	

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

BKG01@4'
2110375-03 (Soil)

Summit Scientific

Soluble Nutrients by EPA 6020/USDA60 6(2) - Saturated Paste Extraction

Date Sampled: **10/21/21 14:38**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Calcium	137	0.0583	mg/L dry	1	BEK0262	11/11/21	11/12/21	EPA 6020B	
Magnesium	134	0.0583	"	"	"	"	"	"	
Sodium	673	0.0583	"	"	"	"	"	"	

Calculated Analysis

Date Sampled: **10/21/21 14:38**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Sodium Adsorption Ratio	9.80	0.00100	units	1	BEK0313	11/15/21	11/15/21	Calculation	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **10/21/21 14:38**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
% Solids	85.8		%	1	BEK0265	11/11/21	11/12/21	Calculation	

Physical Parameters by APHA/ASTM/EPA Methods, Saturated Paste Extraction

Date Sampled: **10/21/21 14:38**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
pH	8.34		pH Units	1	BEK0345	11/04/21	11/04/21	EPA 9045D	

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

BKG01@6'
2110375-04 (Soil)

Summit Scientific

Soluble Nutrients by EPA 6020/USDA60 6(2) - Saturated Paste Extraction

Date Sampled: **10/21/21 14:42**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Calcium	118	0.0619	mg/L dry	1	BEK0082	11/03/21	11/08/21	EPA 6020B	
Magnesium	97.5	0.0619	"	"	"	"	"	"	
Sodium	486	0.0619	"	"	"	"	"	"	

Calculated Analysis

Date Sampled: **10/21/21 14:42**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Sodium Adsorption Ratio	8.02	0.00100	units	1	BEK0213	11/09/21	11/09/21	Calculation	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **10/21/21 14:42**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
% Solids	80.8		%	1	BEK0071	11/03/21	11/03/21	Calculation	

Physical Parameters by APHA/ASTM/EPA Methods, Saturated Paste Extraction

Date Sampled: **10/21/21 14:42**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
pH	8.08		pH Units	1	BEK0116	11/04/21	11/04/21	EPA 9045D	

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

FL01-01@3'
2110375-05 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/21/21 15:08**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	BEJ0526	10/26/21	10/27/21	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.0038	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **10/21/21 15:08**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		100 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **10/21/21 15:08**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	BEJ0527	10/26/21	10/27/21	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **10/21/21 15:08**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		99.8 %	30-150		"	"	"	"	

Physical Parameters by APHA/ASTM/EPA Methods

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: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

FL01-01@3'
2110375-05 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **10/21/21 15:08**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
% Solids	86.0			%	1	BEK0071	11/03/21	11/03/21	Calculation	

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

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 BEJ0526 - EPA 5030 Soil MS

Blank (BEJ0526-BLK1)

Prepared & Analyzed: 10/26/21

Benzene	ND	0.0020	mg/kg							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
1,2,4-Trimethylbenzene	ND	0.0050	"							
1,3,5-Trimethylbenzene	ND	0.0050	"							
Naphthalene	ND	0.0038	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	0.0402		"	0.0400		101	23-173			
Surrogate: Toluene-d8	0.0404		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0404		"	0.0400		101	21-167			

LCS (BEJ0526-BS1)

Prepared: 10/26/21 Analyzed: 10/27/21

Benzene	0.140	0.0020	mg/kg	0.125		112	70-130			
Toluene	0.134	0.0050	"	0.125		108	70-130			
Ethylbenzene	0.139	0.0050	"	0.125		112	70-130			
m,p-Xylene	0.265	0.010	"	0.250		106	70-130			
o-Xylene	0.114	0.0050	"	0.125		91.1	70-130			
1,2,4-Trimethylbenzene	0.121	0.0050	"	0.125		97.2	70-130			
1,3,5-Trimethylbenzene	0.120	0.0050	"	0.125		96.2	70-130			
Naphthalene	0.0934	0.0038	"	0.125		74.7	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0387		"	0.0400		96.7	23-173			
Surrogate: Toluene-d8	0.0404		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0403		"	0.0400		101	21-167			

Matrix Spike (BEJ0526-MS1)

Source: 2110355-01

Prepared: 10/26/21 Analyzed: 10/27/21

Benzene	0.136	0.0020	mg/kg	0.125	ND	109	70-130			
Toluene	0.130	0.0050	"	0.125	ND	104	70-130			
Ethylbenzene	0.133	0.0050	"	0.125	ND	106	70-130			
m,p-Xylene	0.250	0.010	"	0.250	ND	100	70-130			
o-Xylene	0.111	0.0050	"	0.125	ND	88.6	70-130			
1,2,4-Trimethylbenzene	0.116	0.0050	"	0.125	ND	92.7	70-130			
1,3,5-Trimethylbenzene	0.114	0.0050	"	0.125	ND	91.0	70-130			
Naphthalene	0.0993	0.0038	"	0.125	0.00900	72.2	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0402		"	0.0400		100	23-173			
Surrogate: Toluene-d8	0.0404		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0406		"	0.0400		101	21-167			

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

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 BEJ0526 - EPA 5030 Soil MS

Matrix Spike Dup (BEJ0526-MSD1)		Source: 2110355-01			Prepared: 10/26/21 Analyzed: 10/27/21					
Benzene	0.141	0.0020	mg/kg	0.125	ND	113	70-130	3.64	30	
Toluene	0.135	0.0050	"	0.125	ND	108	70-130	4.01	30	
Ethylbenzene	0.137	0.0050	"	0.125	ND	109	70-130	2.92	30	
m,p-Xylene	0.258	0.010	"	0.250	ND	103	70-130	3.12	30	
o-Xylene	0.114	0.0050	"	0.125	ND	90.8	70-130	2.52	30	
1,2,4-Trimethylbenzene	0.121	0.0050	"	0.125	ND	96.6	70-130	4.16	30	
1,3,5-Trimethylbenzene	0.118	0.0050	"	0.125	ND	94.8	70-130	4.03	30	
Naphthalene	0.109	0.0038	"	0.125	0.00900	80.2	70-130	9.61	30	
Surrogate: 1,2-Dichloroethane-d4		0.0400	"	0.0400		100	23-173			
Surrogate: Toluene-d8		0.0409	"	0.0400		102	20-170			
Surrogate: 4-Bromofluorobenzene		0.0399	"	0.0400		99.8	21-167			

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

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

Batch BEJ0527 - EPA 3550A

Blank (BEJ0527-BLK1)

Prepared: 10/26/21 Analyzed: 10/27/21

C10-C28 (DRO)	ND	50	mg/kg
C28-C36 (ORO)	ND	50	"

LCS (BEJ0527-BS1)

Prepared: 10/26/21 Analyzed: 10/27/21

C10-C28 (DRO)	579	50	mg/kg	500	116	70-130
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Matrix Spike (BEJ0527-MS1)

Source: 2110355-01

Prepared: 10/26/21 Analyzed: 10/27/21

C10-C28 (DRO)	512	50	mg/kg	500	26.3	97.1	70-130
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Matrix Spike Dup (BEJ0527-MSD1)

Source: 2110355-01

Prepared: 10/26/21 Analyzed: 10/27/21

C10-C28 (DRO)	421	50	mg/kg	500	26.3	79.0	70-130	19.5	20
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Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

PAH by EPA Method 8270D SIM - Quality Control

Summit Scientific

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

Batch BEJ0509 - EPA 5030 Soil MS

Blank (BEJ0509-BLK1)

Prepared & Analyzed: 10/26/21

Acenaphthene	ND	0.00500	mg/kg							
Anthracene	ND	0.00500	"							
Benzo (a) anthracene	ND	0.00500	"							
Benzo (a) pyrene	ND	0.00500	"							
Benzo (b) fluoranthene	ND	0.00500	"							
Benzo (k) fluoranthene	ND	0.00500	"							
Chrysene	ND	0.00500	"							
Dibenz (a,h) anthracene	ND	0.00500	"							
Fluoranthene	ND	0.00500	"							
Fluorene	ND	0.00500	"							
Indeno (1,2,3-cd) pyrene	ND	0.00500	"							
Pyrene	ND	0.00500	"							
1-Methylnaphthalene	ND	0.00500	"							
2-Methylnaphthalene	ND	0.00500	"							
Surrogate: 2-Methylnaphthalene-d10	0.0357		"	0.0333		107	40-150			
Surrogate: Fluoranthene-d10	0.0262		"	0.0333		78.5	40-150			

LCS (BEJ0509-BS1)

Prepared & Analyzed: 10/26/21

Acenaphthene	0.0339	0.00500	mg/kg	0.0333		102	31-137			
Anthracene	0.0334	0.00500	"	0.0333		100	30-120			
Benzo (a) anthracene	0.0319	0.00500	"	0.0333		95.7	30-120			
Benzo (a) pyrene	0.0323	0.00500	"	0.0333		96.9	30-120			
Benzo (b) fluoranthene	0.0347	0.00500	"	0.0333		104	30-120			
Benzo (k) fluoranthene	0.0350	0.00500	"	0.0333		105	30-120			
Chrysene	0.0314	0.00500	"	0.0333		94.1	30-120			
Dibenz (a,h) anthracene	0.0326	0.00500	"	0.0333		97.7	30-120			
Fluoranthene	0.0355	0.00500	"	0.0333		106	30-120			
Fluorene	0.0318	0.00500	"	0.0333		95.5	30-120			
Indeno (1,2,3-cd) pyrene	0.0277	0.00500	"	0.0333		83.1	30-120			
Pyrene	0.0334	0.00500	"	0.0333		100	35-142			
1-Methylnaphthalene	0.0375	0.00500	"	0.0333		113	35-142			
2-Methylnaphthalene	0.0355	0.00500	"	0.0333		107	35-142			
Surrogate: 2-Methylnaphthalene-d10	0.0384		"	0.0333		115	40-150			
Surrogate: Fluoranthene-d10	0.0320		"	0.0333		96.0	40-150			

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

PAH by EPA Method 8270D SIM - Quality Control

Summit Scientific

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

Batch BEJ0509 - EPA 5030 Soil MS

Matrix Spike (BEJ0509-MS1)

Source: 2110277-01

Prepared & Analyzed: 10/26/21

Acenaphthene	0.0266	0.00500	mg/kg	0.0333	ND	79.8	31-137				
Anthracene	0.0251	0.00500	"	0.0333	ND	75.4	30-120				
Benzo (a) anthracene	0.0244	0.00500	"	0.0333	ND	73.3	30-120				
Benzo (a) pyrene	0.0245	0.00500	"	0.0333	ND	73.5	30-120				
Benzo (b) fluoranthene	0.0254	0.00500	"	0.0333	ND	76.1	30-120				
Benzo (k) fluoranthene	0.0262	0.00500	"	0.0333	ND	78.7	30-120				
Chrysene	0.0246	0.00500	"	0.0333	ND	73.7	30-120				
Dibenz (a,h) anthracene	0.0226	0.00500	"	0.0333	ND	67.7	30-120				
Fluoranthene	0.0268	0.00500	"	0.0333	ND	80.3	30-120				
Fluorene	0.0269	0.00500	"	0.0333	ND	80.6	30-120				
Indeno (1,2,3-cd) pyrene	0.0204	0.00500	"	0.0333	ND	61.3	30-120				
Pyrene	0.0265	0.00500	"	0.0333	ND	79.4	35-142				
1-Methylnaphthalene	0.0282	0.00500	"	0.0333	ND	84.5	15-130				
2-Methylnaphthalene	0.0273	0.00500	"	0.0333	ND	81.8	15-130				
Surrogate: 2-Methylnaphthalene-d10	0.0307		"	0.0333		92.2	40-150				
Surrogate: Fluoranthene-d10	0.0253		"	0.0333		75.8	40-150				

Matrix Spike Dup (BEJ0509-MSD1)

Source: 2110277-01

Prepared & Analyzed: 10/26/21

Acenaphthene	0.0218	0.00500	mg/kg	0.0333	ND	65.4	31-137	19.9	30		
Anthracene	0.0212	0.00500	"	0.0333	ND	63.5	30-120	17.1	30		
Benzo (a) anthracene	0.0215	0.00500	"	0.0333	ND	64.5	30-120	12.7	30		
Benzo (a) pyrene	0.0217	0.00500	"	0.0333	ND	65.1	30-120	12.2	30		
Benzo (b) fluoranthene	0.0226	0.00500	"	0.0333	ND	67.7	30-120	11.6	30		
Benzo (k) fluoranthene	0.0233	0.00500	"	0.0333	ND	69.8	30-120	12.0	30		
Chrysene	0.0213	0.00500	"	0.0333	ND	64.0	30-120	14.1	30		
Dibenz (a,h) anthracene	0.0201	0.00500	"	0.0333	ND	60.3	30-120	11.7	30		
Fluoranthene	0.0224	0.00500	"	0.0333	ND	67.3	30-120	17.6	30		
Fluorene	0.0220	0.00500	"	0.0333	ND	66.0	30-120	19.9	30		
Indeno (1,2,3-cd) pyrene	0.0174	0.00500	"	0.0333	ND	52.2	30-120	15.9	30		
Pyrene	0.0227	0.00500	"	0.0333	ND	68.2	35-142	15.2	30		
1-Methylnaphthalene	0.0250	0.00500	"	0.0333	ND	75.0	15-130	11.8	50		
2-Methylnaphthalene	0.0244	0.00500	"	0.0333	ND	73.1	15-130	11.3	50		
Surrogate: 2-Methylnaphthalene-d10	0.0257		"	0.0333		77.0	40-150				
Surrogate: Fluoranthene-d10	0.0220		"	0.0333		66.0	40-150				

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

Total Metals by EPA 6020B Hot Water Soluble Extraction - Quality Control
Summit Scientific

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

Batch BEJ0516 - EPA 3050B

Blank (BEJ0516-BLK1)

Prepared: 10/26/21 Analyzed: 10/27/21

Boron ND 0.0100 mg/L

LCS (BEJ0516-BS1)

Prepared: 10/26/21 Analyzed: 10/27/21

Boron 4.59 0.0100 mg/L 5.00 91.8 80-120

Duplicate (BEJ0516-DUP1)

Source: 2110338-01

Prepared: 10/26/21 Analyzed: 10/27/21

Boron 0.144 0.0100 mg/L 0.170 16.3 20

Matrix Spike (BEJ0516-MS1)

Source: 2110338-01

Prepared: 10/26/21 Analyzed: 10/27/21

Boron 4.97 0.0100 mg/L 5.00 0.170 96.0 75-125

Matrix Spike Dup (BEJ0516-MSD1)

Source: 2110338-01

Prepared: 10/26/21 Analyzed: 10/27/21

Boron 4.91 0.0100 mg/L 5.00 0.170 94.9 75-125 1.16 25

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

Soluble Nutrients by EPA 6020/USDA60 6(2) - Saturated Paste Extraction - Quality Control
Summit Scientific

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

Batch BEJ0538 - General Preparation

Blank (BEJ0538-BLK1)

Prepared: 10/27/21 Analyzed: 10/28/21

Calcium	ND	0.0500	mg/L wet
Magnesium	ND	0.0500	"
Sodium	ND	0.0500	"

LCS (BEJ0538-BS1)

Prepared: 10/27/21 Analyzed: 10/28/21

Calcium	5.39	0.0500	mg/L wet	5.00	108	70-130
Magnesium	5.01	0.0500	"	5.00	100	70-130
Sodium	5.09	0.0500	"	5.00	102	70-130

Batch BEK0082 - General Preparation

Blank (BEK0082-BLK1)

Prepared: 11/03/21 Analyzed: 11/08/21

Calcium	ND	0.0500	mg/L wet
Magnesium	ND	0.0500	"
Sodium	ND	0.0500	"

LCS (BEK0082-BS1)

Prepared: 11/03/21 Analyzed: 11/08/21

Calcium	6.13	0.0500	mg/L wet	5.00	123	70-130
Magnesium	5.67	0.0500	"	5.00	113	70-130
Sodium	5.65	0.0500	"	5.00	113	70-130

Batch BEK0262 - General Preparation

Blank (BEK0262-BLK1)

Prepared: 11/11/21 Analyzed: 11/12/21

Calcium	ND	0.0500	mg/L wet
Magnesium	ND	0.0500	"
Sodium	ND	0.0500	"

Summit Scientific

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

Project: Hall 28-1 Wellhead

Project Number: [none]

Project Manager: Mark Longhurst

Reported:

11/17/21 10:51

Soluble Nutrients by EPA 6020/USDA60 6(2) - Saturated Paste Extraction - Quality Control

Summit Scientific

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

Batch BEK0262 - General Preparation

LCS (BEK0262-BS1)

Prepared: 11/11/21 Analyzed: 11/12/21

Calcium	5.66	0.0500	mg/L wet	5.00	113	70-130
Magnesium	5.37	0.0500	"	5.00	107	70-130
Sodium	5.31	0.0500	"	5.00	106	70-130

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

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 BEJ0428 - General Preparation

Duplicate (BEJ0428-DUP1) **Source: 2110359-01** Prepared & Analyzed: 10/22/21

% Solids	91.1		%		92.2			1.23	20
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Batch BEK0071 - General Preparation

Duplicate (BEK0071-DUP1) **Source: 2110375-04** Prepared & Analyzed: 11/03/21

% Solids	80.7		%		80.8			0.188	20
----------	------	--	---	--	------	--	--	-------	----

Batch BEK0265 - General Preparation

Duplicate (BEK0265-DUP1) **Source: 2110375-03** Prepared: 11/11/21 Analyzed: 11/12/21

% Solids	85.6		%		85.8			0.149	20
----------	------	--	---	--	------	--	--	-------	----

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

Specific Conductance by EPA Method 120.1, Saturated Paste Extraction - Quality Control
Summit Scientific

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

Batch BEJ0586 - General Preparation

Blank (BEJ0586-BLK1)

Prepared & Analyzed: 10/28/21

Specific Conductance (EC) ND 0.0100 mmhos/cm

Duplicate (BEJ0586-DUP1)

Source: 2110321-01

Prepared & Analyzed: 10/28/21

Specific Conductance (EC) 0.726 0.0100 mmhos/cm 0.722 0.594 20

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

Physical Parameters by APHA/ASTM/EPA Methods, Saturated Paste Extraction - Quality Control
Summit Scientific

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

Batch BEJ0584 - General Preparation

LCS (BEJ0584-BS1)				Prepared & Analyzed: 10/28/21						
pH	9.20		pH Units	9.18		100	95-105			
Duplicate (BEJ0584-DUP1)				Source: 2110321-01		Prepared & Analyzed: 10/28/21				
pH	8.06		pH Units		8.02			0.498	20	

Batch BEK0116 - General Preparation

LCS (BEK0116-BS1)				Prepared & Analyzed: 11/04/21						
pH	9.19		pH Units	9.18		100	95-105			
Duplicate (BEK0116-DUP1)				Source: 2110375-04		Prepared & Analyzed: 11/04/21				
pH	8.09		pH Units		8.08			0.124	20	

Batch BEK0345 - General Preparation

LCS (BEK0345-BS1)				Prepared & Analyzed: 11/16/21						
pH	9.07		pH Units	9.18		98.8	95-105			
Duplicate (BEK0345-DUP1)				Source: 2110375-03		Prepared & Analyzed: 11/16/21				
pH	8.48		pH Units		8.34			1.66	20	

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: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
11/17/21 10:51

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

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

October 22, 2021

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Hall 28-1 Wellhead

Work Order #2110364

Enclosed are the results of analyses for samples received by Summit Scientific on 10/21/21 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: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/21 06:31

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
GW01	2110364-01	Water	10/21/21 14:09	10/21/21 17:00
GW02	2110364-02	Water	10/21/21 15:30	10/21/21 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.

Summit Scientific

S₂

2110364

4653 Table Mountain Drive ♦ Golden, Colorado 80403

303-277-9310

Page 1 of 1

Client: PDC / Tasman

Project Manager: Mark Longhurst

Address: 6855 W 119th Ave

E-Mail: mark.longhurst@PDCE.com

City/State/Zip: Broomfield/ CO/ 80020

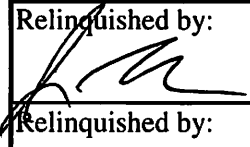

Phone: 303-487-1228

Project Name: Hall 28-1 Wellhead

Sampler Name: J. Marcus

Project Number: N/A

					Preservative				Matrix				Analysis Requested						Special Instructions				
ID	Sample Description	Date Sampled	Time Sampled	# of containers	HCl	HNO ₃	None	Other	Water	Soil	Air-Canister #	Other	BTEXN - 8260B	TPH - (C6 - C36)	1,2,4 & 1,3,5-TMB	Boron - HWS	pH, EC, SAR					pH, EC, SAR by saturated paste	
1	GW01	10/21/21	1409	3			X		X				X		X								
2	GW02	↓	1530	3			X		X				X		X								
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

Relinquished by: 	Date/Time: 10/21/21 1700	Received by: Tasman's Lock Box	Date/Time: 10/21/21 1700	Turn Around Time (Check) Same Day <input checked="" type="checkbox"/> 72 hours ___ 24 hours ___ Standard ___ 48 hours ___	Notes:
Relinquished by: Tasman's Lock Box	Date/Time:	Received by: 	Date/Time: 10/21/21 1700	Sample Integrity: 2.7	
Relinquished by:	Date/Time:	Received by:	Date/Time:	Temperature Upon Receipt: 2.7 Samples Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	

S₂

Sample Receipt Checklist

S2 Work Order#

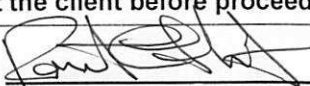
2110364

Client: RBC Tasman Client Project ID: Hall 28-1 wellheadShipped Via: ☐ H.D./P.U./FedEx/UPS/USPS/Other ☒ Airbill #: _____Matrix (check all that apply): ☐ Air ☐ Soil/Solid ☒ Water ☐ Other: _____
(Describe)Temp (°C) 2.7

Thermometer ID: G86A9201901378

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C ⁽¹⁾ ? NOTE: If samples are delivered the same day of sampling, this requirement is met if there is evidence that cooling has begun.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	on ICE
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are samples with holding times due within 48 hours sample due within 48 hours present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sameday
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCl, H ₂ SO ₄ , NaOH, HNO ₃ , etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Additional Comments (if any):				

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


 Custodian Printed Name or Initials

10.21.21
 Date/Time



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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/21 06:31

GW01
2110364-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/21/21 14:09**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	1.5	1.0		ug/l	1	BEJ0410	10/21/21	10/22/21	EPA 8260B	
Toluene	4.4	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	2.6	2.0		"	"	"	"	"	"	
Naphthalene	ND	1.0		"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0		"	"	"	"	"	"	

Date Sampled: **10/21/21 14:09**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		115 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		99.5 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.8 %		21-167		"	"	"	"	

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/21 06:31

GW02
2110364-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **10/21/21 15:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	BEJ0410	10/21/21	10/22/21	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	
Naphthalene	ND	1.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0	"	"	"	"	"	"	

Date Sampled: **10/21/21 15:30**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		117 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		93.9 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/21 06:31

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 BEJ0410 - EPA 5030 Water MS

Blank (BEJ0410-BLK1)

Prepared: 10/21/21 Analyzed: 10/22/21

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Naphthalene	ND	1.0	"							
1,2,4-Trimethylbenzene	ND	1.0	"							
1,3,5-Trimethylbenzene	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	14.9		"	13.3		112	23-173			
Surrogate: Toluene-d8	13.3		"	13.3		100	20-170			
Surrogate: 4-Bromofluorobenzene	13.6		"	13.3		102	21-167			

LCS (BEJ0410-BS1)

Prepared: 10/21/21 Analyzed: 10/22/21

Benzene	36.1	1.0	ug/l	33.3		108	51-132			
Toluene	43.7	1.0	"	33.3		131	51-138			
Ethylbenzene	42.8	1.0	"	33.3		128	58-146			
m,p-Xylene	82.2	2.0	"	66.7		123	57-144			
o-Xylene	42.7	1.0	"	33.3		128	53-146			
Naphthalene	36.2	1.0	"	33.3		109	70-130			
1,2,4-Trimethylbenzene	40.2	1.0	"	33.3		121	70-130			
1,3,5-Trimethylbenzene	39.2	1.0	"	33.3		118	70-130			
Surrogate: 1,2-Dichloroethane-d4	15.4		"	13.3		116	23-173			
Surrogate: Toluene-d8	13.3		"	13.3		100	20-170			
Surrogate: 4-Bromofluorobenzene	12.6		"	13.3		94.5	21-167			

Matrix Spike (BEJ0410-MS1)

Source: 2110271-01

Prepared: 10/21/21 Analyzed: 10/22/21

Benzene	35.9	1.0	ug/l	33.3	ND	108	34-141			
Toluene	38.9	1.0	"	33.3	ND	117	27-151			
Ethylbenzene	42.3	1.0	"	33.3	ND	127	29-160			
m,p-Xylene	81.9	2.0	"	66.7	ND	123	20-166			
o-Xylene	41.8	1.0	"	33.3	ND	125	33-159			
Naphthalene	37.2	1.0	"	33.3	ND	112	70-130			
1,2,4-Trimethylbenzene	40.3	1.0	"	33.3	ND	121	70-130			
1,3,5-Trimethylbenzene	38.4	1.0	"	33.3	ND	115	70-130			
Surrogate: 1,2-Dichloroethane-d4	15.5		"	13.3		116	23-173			
Surrogate: Toluene-d8	13.2		"	13.3		99.3	20-170			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		95.7	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: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/21 06:31

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 BEJ0410 - EPA 5030 Water MS

Matrix Spike Dup (BEJ0410-MSD1)	Source: 2110271-01			Prepared: 10/21/21 Analyzed: 10/22/21						
Benzene	36.4	1.0	ug/l	33.3	ND	109	34-141	1.25	30	
Toluene	39.2	1.0	"	33.3	ND	118	27-151	0.768	30	
Ethylbenzene	42.1	1.0	"	33.3	ND	126	29-160	0.427	30	
m,p-Xylene	81.0	2.0	"	66.7	ND	122	20-166	1.06	30	
o-Xylene	41.3	1.0	"	33.3	ND	124	33-159	1.13	30	
Naphthalene	40.0	1.0	"	33.3	ND	120	70-130	7.24	30	
1,2,4-Trimethylbenzene	39.8	1.0	"	33.3	ND	119	70-130	1.40	30	
1,3,5-Trimethylbenzene	39.1	1.0	"	33.3	ND	117	70-130	1.57	30	
Surrogate: 1,2-Dichloroethane-d4	17.0		"	13.3		128	23-173			
Surrogate: Toluene-d8	13.6		"	13.3		102	20-170			
Surrogate: 4-Bromofluorobenzene	12.7		"	13.3		95.0	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: Hall 28-1 Wellhead
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
10/22/21 06:31

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