

January 24, 2018

Karen Shanahan Olson
Senior EHS Manager
PDC Energy, Inc.
1775 Sherman Street, Suite 3000
Denver, CO 80203

**RE: Produced Water Vessel Closure Report
Guttersen 33, 34, 43, 44-8; 8D Tank Battery
Facility ID #: 310357
SESE S8 T3N R63W
Blanket Remediation #: 9440**

Dear Mrs. Olson,

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

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

Site Assessment Activities

On January 16, 2018, confirmation sampling activities were conducted following the removal of the partially buried produced water vessel. Soil encountered in the excavation was field screened for volatile organic compound (VOC) concentrations in soil using a photoionization detector (PID). One soil sample (SS01) was collected below the former vessel location at approximately 5 feet below ground surface (bgs). The sample was submitted to Summit Scientific Laboratories in Golden, Colorado for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by United States Environmental Protection Agency (USEPA) Method 8260B, TPH – diesel range organics (DRO) by USEPA Method 8015, pH, and electrical conductivity (EC).

Analytical results indicated that organic compound concentrations and physical parameters were in compliance with COGCC Table 910-1 soil standards.

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

Conclusions

Based on the soil analytical data described herein, petroleum hydrocarbon impacts in exceedance of regulatory standards were not encountered during the removal of the produced water vessel. Consequently, no further site investigation is recommended at this time. The facility was decommissioned following site assessment activities.

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

Sincerely,

Tasman Geosciences, Inc.



Christine Hamlin
Program Manager

Enclosures:

Figure 1 – Excavation Site Map

Table 1 – Soil Analytical Results Summary Table

Attachment A – Laboratory Analytical Report



| | |
|--------------|------------------|
| DATE: | January 24, 2018 |
| DESIGNED BY: | C. Hamlin |
| DRAWN BY: | T. Blessing |



TASMAN
GEOSCIENCES

Tasman Geosciences, Inc.
6899 Pecos Street – Unit C
Denver, CO 80221

PDC Energy, Inc. – DJ Basin
Guttersen 33, 34, 43, 44-8; 8D Tank Battery
SESE, Section 8, Township 3 North, Range 63 West
Weld County, Colorado

**EXCAVATION
SITE MAP**

**FIGURE
1**

TABLE 1
GUTTERSEN 33, 34, 43, 44-8; 8D 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) | pH (units) | EC (mmhos/cm) |
|--|--------------|---------------------|--------------------|--------------------|-------------------------|-----------------------------|------------------------|-------------------------------|---------------|------------------|
| COGCC standards for soil (mg/kg) ⁽¹⁾ | | | 0.17 | 85 | 100 | 175 | 23 | 500 | 6-9 | <4 |
| SS01 @ 5' | 1/16/2018 | 5 | <0.0020 | <0.0050 | <0.0050 | <0.010 | <0.010 | <50 | 7.35 | 0.187 |

Notes:

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

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

COGCC = Colorado Oil and Gas Conservation Commission

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

GRO = Total volatile petroleum hydrocarbons - gasoline range organics

DRO = Total extractable petroleum hydrocarbons - diesel range organics

mg/kg = Milligrams per kilogram

bgs = Below ground surface

EC = Electrical conductivity

mmhos/cm = millimhos per centimeter

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

ATTACHMENT A

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

January 23, 2018

Mark Longhurst

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: Guttersen 33,34,43,44-8;8D

Enclosed are the results of analyses for samples received by Summit Scientific on 01/16/18 16:45. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'P. Shrewsbury', written in a cursive style.

Paul Shrewsbury For Ben Shrewsbury
Laboratory Manager



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

Project: Guttersen 33,34,43,44-8;8D
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/18 13:30

ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|-----------|---------------|--------|----------------|----------------|
| SS01@5' | 1801168-01 | Soil | 01/16/18 12:23 | 01/16/18 16:45 |

Summit Scientific

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

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

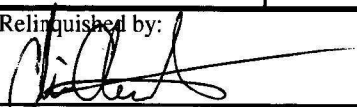
1801168


303-277-9310 ♦ 303-374-5933 Fax

Page \ of \

Project Manager: Mark Longhurst
E-Mail: _____
Project Name: Guttersen 33,34,43,44-8;8D
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) | GBTEXN (9260) | DROCTPH | EL | pH | | | | | | | | | | |
| SS01@5' | 1/16/18 | 12:23 | 1 | | | X | | | X | | | X | X | X | X | | | | | | | | | | Hold |
| SS02@3' | 1/16/18 | 12:20 | 1 | | | X | | | X | | | | | | | | | | | | | | | | |
| SS03@3' | 1/16/18 | 12:17 | 1 | | | X | | | X | | | | | | | | | | | | | | | | |
| SS04@3' | 1/16/18 | 12:12 | 1 | | | X | | | X | | | | | | | | | | | | | | | | |
| SS05@3' | 1/16/18 | 12:15 | 1 | | | X | | | X | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

Relinquished by: 
Date/Time: 1/16/18 16:45

Received by:  1-16-18 16:45

Turn Around Time (Check)

Same Day

24 Hours

48 Hours

72 Hours

Standard

☐

☐

☐

☒

Relinquished by:
Date/Time:

Received by:
Date/Time:

Sample Integrity:

Temperature Upon Receipt: 5.0

Intact:

Yes

No

☒

☐

Notes:

1801168

Sample Receipt Checklist

S2 Work Order: _____

Client: PDC Client Project ID: Gutterson 33,34,43-8;8DShipped Via: P.V.
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Airbill #: _____

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

| | | | | | |
|-----------|-----|--|--|--|--|
| Cooler ID | | | | | |
| Temp (°C) | 5.0 | | | | |

Thermometer ID: 61857155-K

| | 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 provided that there is evidence that cooling has begun. | X | | | |
| Were all samples received intact ⁽¹⁾ ? | X | | | |
| Was adequate sample volume provided ⁽¹⁾ ? | X | | | |
| If custody seals are present, are they intact ⁽¹⁾ ? | | | X | |
| Are short holding time analytes or samples with HTs due within 48 hours present? | | | X | |
| Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ? | X | | | |
| Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ? | X | | | |
| Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ? | X | | | |
| Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ? | X | | | |
| For volatiles in water – is there headspace present? If yes, contact client and note in narrative. | | | X | |
| Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ? | | | | |
| Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect | | | X | |
| If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? | | | X | |
| Record the pH in Comments. | | | | |
| If dissolved metals are requested, were samples field filtered? | | | X | |
| Additional Comments (if any): | | | | |
| | | | | |
| ⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative. | | | | |

Muri P.
Custodian Printed NameMA 1-16-18
Signature or Initials of Custodian17:00
Date/Time



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

Project: Gutttersen 33,34,43,44-8;8D
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/18 13:30

SS01@5'
1801168-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **01/16/18 12:23**

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---------------|--------|-----------------|-------|----------|---------|----------|----------|--------|-------|
| C10-C28 (DRO) | ND | 50 | mg/kg | 1 | 1801187 | 01/17/18 | 01/17/18 | 8015M | |

Date Sampled: **01/16/18 12:23**

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|------------------------|--------|-----------------|--------|----------|-------|----------|----------|--------|-------|
| Surrogate: o-Terphenyl | | 56.9 % | 30-150 | | " | " | " | " | |

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/16/18 12:23**

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|-----------------------------|--------|-----------------|-------|----------|---------|----------|----------|-----------|-------|
| Naphthalene | ND | 0.010 | mg/kg | 1 | 1801188 | 01/17/18 | 01/18/18 | 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: **01/16/18 12:23**

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|----------------------------------|--------|-----------------|--------|----------|-------|----------|----------|--------|-------|
| Surrogate: 1,2-Dichloroethane-d4 | | 90.1 % | 23-173 | | " | " | " | " | |
| Surrogate: Toluene-d8 | | 99.1 % | 20-170 | | " | " | " | " | |
| Surrogate: 4-Bromofluorobenzene | | 97.7 % | 21-167 | | " | " | " | " | |

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **01/16/18 12:23**

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---------|--------|-----------------|----------|----------|---------|----------|----------|----------|-------|
| pH | 7.35 | 0.100 | pH Units | 1 | 1801241 | 01/22/18 | 01/22/18 | EPA 9045 | |

Summit Scientific

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

Project: Guttersen 33,34,43,44-8;8D
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/18 13:30

SS01@5'
1801168-01 (Soil)

Summit Scientific

Physical Parameters by APHA/ASTM/EPA Methods

Specific Conductance by EPA120.1

Date Sampled: **01/16/18 12:23**

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---------------------------|--------------|--------------------|----------|----------|---------|----------|----------|-----------|-------|
| Specific Conductance (EC) | 0.187 | 0.0100 | mmhos/cm | 1 | 1801242 | 01/23/18 | 01/23/18 | EPA 120.1 | |

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

Project: Gutttersen 33,34,43,44-8;8D
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/18 13:30

Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

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

Batch 1801187 - EPA 3550A

| | | | | | | | | | | |
|--|------|----|-------|-------------------------------|------|-------------------------------|--------|------|----|--|
| Blank (1801187-BLK1) | | | | Prepared & Analyzed: 01/17/18 | | | | | | |
| C10-C28 (DRO) | ND | 50 | mg/kg | | | | | | | |
| Surrogate: o-Terphenyl | 10.5 | | " | 12.5 | | 83.9 | 30-150 | | | |
| LCS (1801187-BS1) | | | | Prepared & Analyzed: 01/17/18 | | | | | | |
| C10-C28 (DRO) | 542 | 50 | mg/kg | 499 | | 109 | 73-134 | | | |
| Surrogate: o-Terphenyl | 11.5 | | " | 12.5 | | 91.8 | 30-150 | | | |
| Matrix Spike (1801187-MS1) | | | | Source: 1801168-01 | | Prepared & Analyzed: 01/17/18 | | | | |
| C10-C28 (DRO) | 514 | 50 | mg/kg | 499 | 7.97 | 101 | 50-148 | | | |
| Surrogate: o-Terphenyl | 7.95 | | " | 12.5 | | 63.6 | 30-150 | | | |
| Matrix Spike Dup (1801187-MSD1) | | | | Source: 1801168-01 | | Prepared & Analyzed: 01/17/18 | | | | |
| C10-C28 (DRO) | 612 | 50 | mg/kg | 499 | 7.97 | 121 | 50-148 | 17.4 | 20 | |
| Surrogate: o-Terphenyl | 12.6 | | " | 12.5 | | 101 | 30-150 | | | |

Summit Scientific

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

Project: Gutttersen 33,34,43,44-8;8D
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/18 13:30

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

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

Batch 1801188 - EPA 5030 Soil MS

Blank (1801188-BLK1)

Prepared: 01/17/18 Analyzed: 01/18/18

| | | | | | | | | | | |
|---|---------------|--------|----------|---------------|--|-------------|---------------|--|--|--|
| 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>0.0349</i> | | <i>"</i> | <i>0.0400</i> | | <i>87.2</i> | <i>23-173</i> | | | |
| <i>Surrogate: Toluene-d8</i> | <i>0.0392</i> | | <i>"</i> | <i>0.0400</i> | | <i>97.9</i> | <i>20-170</i> | | | |
| <i>Surrogate: 4-Bromofluorobenzene</i> | <i>0.0401</i> | | <i>"</i> | <i>0.0400</i> | | <i>100</i> | <i>21-167</i> | | | |

LCS (1801188-BS1)

Prepared: 01/17/18 Analyzed: 01/18/18

| | | | | | | | | | | |
|---|---------------|--------|----------|---------------|--|-------------|---------------|--|--|--|
| Naphthalene | ND | 0.010 | mg/kg | | | | 66-138 | | | |
| Benzene | 0.109 | 0.0020 | " | 0.100 | | 109 | 58-130 | | | |
| Toluene | 0.111 | 0.0050 | " | 0.100 | | 111 | 61-134 | | | |
| Ethylbenzene | 0.126 | 0.0050 | " | 0.0992 | | 127 | 74-139 | | | |
| m,p-Xylene | 0.239 | 0.010 | " | 0.200 | | 120 | 73-137 | | | |
| o-Xylene | 0.118 | 0.0050 | " | 0.0980 | | 120 | 73-141 | | | |
| Xylenes (total) | 0.357 | 0.010 | " | | | | 0-200 | | | |
| Gasoline Range Hydrocarbons | 3.16 | 0.50 | " | | | | 30-150 | | | |
| <i>Surrogate: 1,2-Dichloroethane-d4</i> | <i>0.0366</i> | | <i>"</i> | <i>0.0400</i> | | <i>91.5</i> | <i>23-173</i> | | | |
| <i>Surrogate: Toluene-d8</i> | <i>0.0391</i> | | <i>"</i> | <i>0.0400</i> | | <i>97.7</i> | <i>20-170</i> | | | |
| <i>Surrogate: 4-Bromofluorobenzene</i> | <i>0.0390</i> | | <i>"</i> | <i>0.0400</i> | | <i>97.4</i> | <i>21-167</i> | | | |

Matrix Spike (1801188-MS1)

Source: 1801168-01

Prepared: 01/17/18 Analyzed: 01/18/18

| | | | | | | | | | | |
|---|---------------|--------|----------|---------------|----|-------------|---------------|--|--|--|
| Naphthalene | ND | 0.010 | mg/kg | | ND | | 10-158 | | | |
| Benzene | 0.111 | 0.0020 | " | 0.100 | ND | 111 | 30-131 | | | |
| Toluene | 0.113 | 0.0050 | " | 0.100 | ND | 113 | 30-134 | | | |
| Ethylbenzene | 0.126 | 0.0050 | " | 0.0992 | ND | 127 | 22-153 | | | |
| m,p-Xylene | 0.240 | 0.010 | " | 0.200 | ND | 120 | 10-159 | | | |
| o-Xylene | 0.118 | 0.0050 | " | 0.0980 | ND | 120 | 31-151 | | | |
| Xylenes (total) | 0.358 | 0.010 | " | | ND | | 30-160 | | | |
| Gasoline Range Hydrocarbons | 3.30 | 0.50 | " | | ND | | 30-160 | | | |
| <i>Surrogate: 1,2-Dichloroethane-d4</i> | <i>0.0377</i> | | <i>"</i> | <i>0.0400</i> | | <i>94.2</i> | <i>23-173</i> | | | |
| <i>Surrogate: Toluene-d8</i> | <i>0.0398</i> | | <i>"</i> | <i>0.0400</i> | | <i>99.4</i> | <i>20-170</i> | | | |
| <i>Surrogate: 4-Bromofluorobenzene</i> | <i>0.0385</i> | | <i>"</i> | <i>0.0400</i> | | <i>96.2</i> | <i>21-167</i> | | | |

Summit Scientific

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

Project: Gutttersen 33,34,43,44-8;8D
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/18 13:30

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

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

Batch 1801188 - EPA 5030 Soil MS

| Matrix Spike Dup (1801188-MSD1) | | Source: 1801168-01 | | | Prepared: 01/17/18 | | Analyzed: 01/18/18 | | | |
|----------------------------------|--------|--------------------|-------|--------|--------------------|------|--------------------|-------|----|--|
| Naphthalene | ND | 0.010 | mg/kg | | ND | | 10-158 | | 42 | |
| Benzene | 0.112 | 0.0020 | " | 0.100 | ND | 112 | 30-131 | 0.431 | 34 | |
| Toluene | 0.114 | 0.0050 | " | 0.100 | ND | 114 | 30-134 | 1.06 | 30 | |
| Ethylbenzene | 0.130 | 0.0050 | " | 0.0992 | ND | 131 | 22-153 | 3.03 | 24 | |
| m,p-Xylene | 0.246 | 0.010 | " | 0.200 | ND | 123 | 10-159 | 2.49 | 68 | |
| o-Xylene | 0.121 | 0.0050 | " | 0.0980 | ND | 124 | 31-151 | 2.79 | 38 | |
| Xylenes (total) | 0.368 | 0.010 | " | | ND | | 30-160 | 2.59 | 30 | |
| Gasoline Range Hydrocarbons | 3.32 | 0.50 | " | | ND | | 30-160 | 0.478 | 30 | |
| Surrogate: 1,2-Dichloroethane-d4 | 0.0364 | | " | 0.0400 | | 91.0 | 23-173 | | | |
| Surrogate: Toluene-d8 | 0.0393 | | " | 0.0400 | | 98.3 | 20-170 | | | |
| Surrogate: 4-Bromofluorobenzene | 0.0389 | | " | 0.0400 | | 97.2 | 21-167 | | | |

Summit Scientific

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



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

Project: Guttersen 33,34,43,44-8;8D
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/18 13:30

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

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

Batch 1801241 - General Preparation

LCS (1801241-BS1)

Prepared & Analyzed: 01/22/18

| | | | | | | |
|----|------|-------|----------|------|-----|--------|
| pH | 9.32 | 0.100 | pH Units | 9.16 | 102 | 95-105 |
|----|------|-------|----------|------|-----|--------|

Duplicate (1801241-DUP1)

Source: 1801168-01

Prepared & Analyzed: 01/22/18

| | | | | | | |
|----|------|-------|----------|------|-------|----|
| pH | 7.32 | 0.100 | pH Units | 7.35 | 0.409 | 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: Gutttersen 33,34,43,44-8;8D
Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/18 13:30

Specific Conductance by EPA120.1 - Quality Control
Summit Scientific

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

Batch 1801242 - General Preparation

Blank (1801242-BLK1)

Prepared & Analyzed: 01/23/18

Specific Conductance (EC) ND 0.0100 mmhos/cm

LCS (1801242-BS1)

Prepared & Analyzed: 01/23/18

Specific Conductance (EC) 0.754 0.0100 mmhos/cm 0.750 100 90-110

Duplicate (1801242-DUP1)

Source: 1801168-01

Prepared & Analyzed: 01/23/18

Specific Conductance (EC) 0.188 0.0100 mmhos/cm 0.187 0.133 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: Guttersen 33,34,43,44-8;8D

Project Number: [none]
Project Manager: Mark Longhurst

Reported:
01/23/18 13:30

Notes and Definitions

| | |
|-----|--|
| DET | Analyte DETECTED |
| ND | Analyte NOT DETECTED at or above the reporting limit |
| NR | Not Reported |
| dry | Sample results reported on a dry weight basis |
| RPD | Relative Percent Difference |