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*Automated Report*

## Technical Report for

Kerr-McGee Oil & Gas Onshore LP

GWA_Barclay_68535_Well

FID:753245 Reg:Vol. Freq.:Q3

SGS Job Number: DA18737

Sampling Date: 08/19/19

Report to:

Kerr-McGee Oil & Gas Onshore LP
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Total number of pages in report: 52

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

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Laboratory Director

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Certifications: CO (CO00049), NE (NE-OS-06-04), ND (R-027), OK (D9942), UT (NELAP CO00049), LA (LA150028), TX (T104704511), WY (8TMS-L)

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# Sample Summary

Kerr-McGee Oil & Gas Onshore LP

**Job No:** DA18737

GWA_Barclay_68535_Well
Project No: FID:753245 Reg:Vol. Freq.:Q3

| Sample Number | Collected Date | Time | By | Received | Matrix Code | Type | Client Sample ID |
|---|---|---|---|---|---|---|---|
| This report contains results reported as ND = Not detected. The following applies: Organics ND = Not detected above the MDL | | | | | | | |
| DA18737-1 | 08/19/19 | 15:12 | TS | 08/20/19 | AQ | Ground Water | BW_BARCLAY_68535 SWSW_20_3N_66W |
| DA18737-1A | 08/19/19 | 15:12 | TS | 08/20/19 | AQ | Ground Water | BW_BARCLAY_68535 SWSW_20_3N_66W |
| DA18737-1B | 08/19/19 | 15:12 | TS | 08/20/19 | AQ | Ground Water | BW_BARCLAY_68535 SWSW_20_3N_66W |
| DA18737-1F | 08/19/19 | 15:12 | TS | 08/20/19 | AQ | Groundwater Filtered | BW_BARCLAY_68535 SWSW_20_3N_66W |

# CASE NARRATIVE / CONFORMANCE SUMMARY

| | | | |
|---|---|---|---|
| **Client:** | Kerr-McGee Oil & Gas Onshore LP | **Job No** | DA18737 |
| **Site:** | GWA_Barclay_68535_Well | **Report Date** | 9/4/2019 2:27:18 PM |

On 08/20/2019, 1 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at SGS North America Inc. (SGS) at a temperature of 2.3 °C. The samples were intact and properly preserved, unless noted below. An SGS Job Number of DA18737 was assigned to the project. The lab sample ID, client sample ID, and date of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

## MS Volatiles By Method SW846 8260B

**Matrix:** AQ **Batch ID:** V5V2815

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) DA17836-22MS, DA17836-22MSD were used as the QC samples indicated.

## GC Volatiles By Method RSK175 MOD

**Matrix:** AQ **Batch ID:** GFB1094

- All samples were analyzed within the recommended method holding time.
- Sample(s) DA17838-21MS, DA17838-21MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- DA18737-1A: Vial was preserved.

## GC Volatiles By Method SW846 8015B

**Matrix:** AQ **Batch ID:** GGA2273

- All samples were analyzed within the recommended method holding time.
- Sample(s) DA17838-10MS, DA17838-10MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

## GC/LC Semi-volatiles By Method SW846-8015B

**Matrix:** AQ **Batch ID:** OP18194

- All samples were extracted and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) DA17836-27MS, DA17836-27MSD were used as the QC samples indicated.

## Metals Analysis By Method EPA 200.7

**Matrix:** AQ **Batch ID:** MP28769

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) DA18737-1FMS, DA18737-1FMSD were used as the QC samples for the metals analysis.
- MP28769-MB1 for Sodium: All sample results < RL or > 10x mB concentration.

## Metals Analysis By Method EPA 200.8

| Matrix: | AQ | Batch ID: | MP28772 |
|---|---|---|---|

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) DA18732-1MS, DA18732-1MSD were used as the QC samples for the metals analysis.

## General Chemistry By Method EPA 365.1

| Matrix: | AQ | Batch ID: | GP25791 |
|---|---|---|---|

- All samples were prepared and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) DA18725-2DUP, DA18721-3MS were used as the QC samples for the Phosphorus, Total analysis.
- The matrix spike (MS) recovery(s) of Phosphorus, Total are outside control limits. Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

## General Chemistry By Method EPA300.0/SW846 9056A

| Matrix: | AQ | Batch ID: | GP25755 |
|---|---|---|---|

- All samples were prepared and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) DA18736-2MS, DA18736-2MSD were used as the QC samples for the Bromide, Chloride, Fluoride, Nitrogen, Nitrate, Nitrogen, Nitrite, Sulfate, Bromide analysis.
- DA18737-1 for Sulfate, Nitrogen, Nitrate and Nitrogen, Nitrite: Elevated detection limit due to matrix interference.

| Matrix: | AQ | Batch ID: | R48869 |
|---|---|---|---|

- The data for EPA300.0/SW846 9056A meets quality control requirements.
- DA18737-1 for Nitrogen, Nitrate + Nitrite: Calculated as: (Nitrogen, Nitrate) + (Nitrogen, Nitrite)

## General Chemistry By Method HACH IRB-BART

| Matrix: | AQ | Batch ID: | MB1218 |
|---|---|---|---|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

## General Chemistry By Method HACH SLYM-BART

| Matrix: | AQ | Batch ID: | MB1219 |
|---|---|---|---|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

## General Chemistry By Method HACH SRB-BART

| Matrix: | AQ | Batch ID: | MB1220 |
|---|---|---|---|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

## General Chemistry By Method SM 2320B-2011

| Matrix: AQ | Batch ID: GN48045 |
|---|---|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

| Matrix: AQ | Batch ID: GN48046 |
|---|---|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

| Matrix: AQ | Batch ID: GN48047 |
|---|---|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) DA18696-1MS, DA18696-1MSD, DA18737-1DUP were used as the QC samples for the Alkalinity, Total as CaCO3 analysis.

## General Chemistry By Method SM 2510B-2011

| Matrix: AQ | Batch ID: GP25778 |
|---|---|

- Sample(s) DA18737-1DUP were used as the QC samples for the Specific Conductivity analysis.
- The blank spike (BS) recovery(s) of Specific Conductivity are outside control limits.
- GP25778-BS4 for Specific Conductivity: Monthly low level standard check

## General Chemistry By Method SM 2540C-2011

| Matrix: AQ | Batch ID: GN48006 |
|---|---|

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) DA18739-1DUP were used as the QC samples for the Solids, Total Dissolved analysis.

## General Chemistry By Method SM1030E-2011

| Matrix: AQ | Batch ID: GN48068 |
|---|---|

- The data for SM1030E-2011 meets quality control requirements.

## General Chemistry By Method SM4500HB+-2011/9040C

| Matrix: AQ | Batch ID: GN48042 |
|---|---|

- Sample(s) DA18737-1DUP were used as the QC samples for the pH analysis.
- The following samples were run outside of holding time for method SM4500HB+-2011/9040C: DA18737-1 Analysis performed past recommended hold time.

## Field Data By Method FIELD

| Matrix: AQ | Batch ID: R48907 |
|---|---|

- The data for FIELD meets quality control requirements.

SGS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting SGS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by SGS indicated via signature on the report cover.

# Summary of Hits

**Job Number:** DA18737
**Account:** Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well
**Collected:** 08/19/19

| Lab Sample ID / Analyte | Client Sample ID | Result/ Qual | RL | MDL | Units | Method |
|---|---|---|---|---|---|---|
| **DA18737-1** | **BW_BARCLAY_68535 SWSW_20_3N_66W** | | | | | |
| Alkalinity, Bicarbonate as CaCO3 | | 443 | 5.0 | | mg/l | SM 2320B-2011 |
| Alkalinity, Carbonate | | 20.1 | 5.0 | | mg/l | SM 2320B-2011 |
| Alkalinity, Total as CaCO3 | | 463 | 5.0 | | mg/l | SM 2320B-2011 |
| Bromide | | 0.59 | 0.10 | | mg/l | EPA300.0/SW846 9056A |
| Cation Anion Balance | | 5.2 | | | % | SM1030E-2011 |
| Chloride | | 61.6 | 5.0 | | mg/l | EPA300.0/SW846 9056A |
| Fluoride | | 1.9 | 0.20 | | mg/l | EPA300.0/SW846 9056A |
| Phosphorus, Total | | 0.045 | 0.010 | | mg/l | EPA 365.1 |
| Solids, Total Dissolved | | 621 | 10 | | mg/l | SM 2540C-2011 |
| Specific Conductivity | | 836 | 1.0 | | umhos/cm | SM 2510B-2011 |
| pH [a] | | 8.69 | | | su | SM4500HB + -2011/9040C |
| pH (Field) | | 8.69 | | | su | FIELD |
| Temperature (Field) | | 17.9 | | | Deg. C | FIELD |
| Turbidity | | 0.98 | | | NTU | FIELD |
| Specific Conductivity (Field) | | 917.2 | 0.50 | | umhos/cm | FIELD |
| **DA18737-1A** | **BW_BARCLAY_68535 SWSW_20_3N_66W** | | | | | |
| Methane [b] | | 4.84 | 0.0080 | 0.0040 | mg/l | RSK175 MOD |
| Ethane [b] | | 0.110 | 0.016 | 0.0080 | mg/l | RSK175 MOD |
| Propane [b] | | 0.0424 | 0.022 | 0.011 | mg/l | RSK175 MOD |
| **DA18737-1B** | **BW_BARCLAY_68535 SWSW_20_3N_66W** | | | | | |
| Iron-Related Bacteria | | 35000 | 25 | | CFU/ml | HACH IRB-BART |
| Slime Forming Bacteria | | < 500 | 500 | | CFU/ml | HACH SLYM-BART |
| Sulfate Reducing Bacteria | | 325 | 200 | | CFU/ml | HACH SRB-BART |
| **DA18737-1F** | **BW_BARCLAY_68535 SWSW_20_3N_66W** | | | | | |
| Barium | | 0.0367 | 0.0040 | | mg/l | EPA 200.8 |
| Boron | | 0.185 | 0.050 | | mg/l | EPA 200.7 |
| Calcium | | 2.13 | 0.40 | | mg/l | EPA 200.7 |
| Iron | | 0.0101 | 0.010 | | mg/l | EPA 200.7 |
| Magnesium | | 0.410 | 0.20 | | mg/l | EPA 200.7 |
| Manganese | | 0.0057 | 0.0050 | | mg/l | EPA 200.7 |
| Potassium | | 1.31 | 1.0 | | mg/l | EPA 200.7 |
| Sodium | | 224 | 0.40 | | mg/l | EPA 200.7 |
| Strontium | | 0.0678 | 0.0050 | | mg/l | EPA 200.7 |

(a) Analysis performed past recommended hold time.
(b) Vial was preserved.

## Sample Results

Report of Analysis

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | BW_BARCLAY_68535 SWSW_20_3N_66W | | |
| **Lab Sample ID:** | DA18737-1 | **Date Sampled:** | 08/19/19 |
| **Matrix:** | AQ - Ground Water | **Date Received:** | 08/20/19 |
| **Method:** | SW846 8260B | **Percent Solids:** | n/a |
| **Project:** | GWA_Barclay_68535_Well | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | 5V54112.D | 1 | 08/22/19 16:28 | MB | n/a | n/a | V5V2815 |
| Run #2 | | | | | | | |

| | Purge Volume |
|---|---|
| Run #1 | 5.0 ml |
| Run #2 | |

**Purgeable Aromatics**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.50 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 1.0 | 1.0 | ug/l | |
| | m,p-Xylene | ND | 1.0 | 0.70 | ug/l | |
| 95-47-6 | o-Xylene | ND | 1.0 | 0.50 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 109% | | 70-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 99% | | 70-130% |
| 2037-26-5 | Toluene-D8 | 98% | | 70-130% |
| 460-00-4 | 4-Bromofluorobenzene | 104% | | 70-130% |

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | BW_BARCLAY_68535 SWSW_20_3N_66W | | |
| **Lab Sample ID:** | DA18737-1 | **Date Sampled:** | 08/19/19 |
| **Matrix:** | AQ - Ground Water | **Date Received:** | 08/20/19 |
| **Method:** | SW846 8015B | **Percent Solids:** | n/a |
| **Project:** | GWA_Barclay_68535_Well | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | GA49813.D | 1 | 08/24/19 09:46 | BB | n/a | n/a | GGA2273 |
| Run #2 | | | | | | | |

| | Purge Volume |
|---|---|
| Run #1 | 5.0 ml |
| Run #2 | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| | TPH-GRO (C6-C10) | ND | 0.050 | 0.050 | mg/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 120-82-1 | 1,2,4-Trichlorobenzene | 97% | | 60-140% |

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | BW_BARCLAY_68535 SWSW_20_3N_66W | | |
| **Lab Sample ID:** | DA18737-1 | **Date Sampled:** | 08/19/19 |
| **Matrix:** | AQ - Ground Water | **Date Received:** | 08/20/19 |
| **Method:** | SW846-8015B SW846 3510C | **Percent Solids:** | n/a |
| **Project:** | GWA_Barclay_68535_Well | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | FC64428.D | 1 | 08/24/19 21:43 | RB | 08/22/19 | OP18194 | GFC2655 |
| Run #2 | | | | | | | |

| | Initial Volume | Final Volume |
|---|---|---|
| Run #1 | 1000 ml | 1.0 ml |
| Run #2 | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| | TPH-DRO (C10-C28) | ND | 0.20 | 0.19 | mg/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 84-15-1 | o-Terphenyl | 84% | | 11-142% |

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





**Client Sample ID:** BW_BARCLAY_68535 SWSW_20_3N_66W
**Lab Sample ID:** DA18737-1
**Matrix:** AQ - Ground Water
**Project:** GWA_Barclay_68535_Well

**Date Sampled:** 08/19/19
**Date Received:** 08/20/19
**Percent Solids:** n/a

**General Chemistry**

| Analyte | Result | RL | Units | DF | Analyzed | By | Method |
|---|---|---|---|---|---|---|---|
| Alkalinity, Bicarbonate as CaC | 443 | 5.0 | mg/l | 1 | 08/26/19 | PV | SM 2320B-2011 |
| Alkalinity, Carbonate | 20.1 | 5.0 | mg/l | 1 | 08/26/19 | PV | SM 2320B-2011 |
| Alkalinity, Total as CaCO3 | 463 | 5.0 | mg/l | 1 | 08/26/19 | PV | SM 2320B-2011 |
| Bromide | 0.59 | 0.10 | mg/l | 2 | 08/21/19 11:47 | JB | EPA300.0/SW846 9056A |
| Cation Anion Balance | 5.2 | | % | 1 | 08/27/19 | KM | SM1030E-2011 |
| Chloride | 61.6 | 5.0 | mg/l | 10 | 08/21/19 18:37 | JB | EPA300.0/SW846 9056A |
| Fluoride | 1.9 | 0.20 | mg/l | 2 | 08/21/19 11:47 | JB | EPA300.0/SW846 9056A |
| Nitrogen, Nitrate [a] | < 0.020 | 0.020 | mg/l | 2 | 08/21/19 11:47 | JB | EPA300.0/SW846 9056A |
| Nitrogen, Nitrate + Nitrite [b] | < 0.028 | 0.028 | mg/l | 1 | 08/21/19 11:47 | JB | EPA300.0/SW846 9056A |
| Nitrogen, Nitrite [a] | < 0.0080 | 0.0080 | mg/l | 2 | 08/21/19 11:47 | JB | EPA300.0/SW846 9056A |
| Phosphorus, Total | 0.045 | 0.010 | mg/l | 1 | 08/27/19 18:00 | AM | EPA 365.1 |
| Solids, Total Dissolved | 621 | 10 | mg/l | 1 | 08/21/19 | AK | SM 2540C-2011 |
| Specific Conductivity | 836 | 1.0 | umhos/cm | 1 | 08/26/19 10:50 | PV | SM 2510B-2011 |
| Sulfate [a] | < 1.0 | 1.0 | mg/l | 2 | 08/21/19 11:47 | JB | EPA300.0/SW846 9056A |
| pH [c] | 8.69 | | su | 1 | 08/26/19 | PV | SM4500HB+-2011/9040C |

**Field Parameters**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Oxygen, Dissolved (Field) | 0 | | mg/l | 1 | 08/27/19 | SUB | FIELD |
| Redox Potential Vs H2 | -116.1 | | mv | 1 | 08/27/19 | SUB | FIELD |
| Specific Conductivity (Field) | 917.2 | 0.50 | umhos/cm | 1 | 08/27/19 | SUB | FIELD |
| Temperature (Field) | 17.9 | | Deg. C | 1 | 08/27/19 | SUB | FIELD |
| Turbidity | 0.98 | | NTU | 1 | 08/27/19 | SUB | FIELD |
| pH (Field) | 8.69 | | su | 1 | 08/27/19 | SUB | FIELD |

(a) Elevated detection limit due to matrix interference.
(b) Calculated as: (Nitrogen, Nitrate) + (Nitrogen, Nitrite)
(c) Analysis performed past recommended hold time.

RL = Reporting Limit

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | BW_BARCLAY_68535 SWSW_20_3N_66W | | |
| **Lab Sample ID:** | DA18737-1A | **Date Sampled:** | 08/19/19 |
| **Matrix:** | AQ - Ground Water | **Date Received:** | 08/20/19 |
| **Method:** | RSK175 MOD | **Percent Solids:** | n/a |
| **Project:** | GWA_Barclay_68535_Well | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 [a] | FB23934.D | 10 | 08/27/19 15:44 | BB | n/a | n/a | GFB1094 |
| Run #2 | | | | | | | |

| | Initial Volume | Headspace Volume | Volume Injected | Temperature |
|---|---|---|---|---|
| Run #1 | 39.0 ml | 4.0 ml | 500 ul | 20.1 Deg. C |
| Run #2 | | | | |

**Methane, Ethane and Propane**

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 74-82-8 | Methane | 4.84 | 0.0080 | 0.0040 | mg/l | |
| 74-84-0 | Ethane | 0.110 | 0.016 | 0.0080 | mg/l | |
| 74-98-6 | Propane | 0.0424 | 0.022 | 0.011 | mg/l | |

(a) Vial was preserved.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | BW_BARCLAY_68535 SWSW_20_3N_66W | | |
| **Lab Sample ID:** | DA18737-1B | **Date Sampled:** | 08/19/19 |
| **Matrix:** | AQ - Ground Water | **Date Received:** | 08/20/19 |
| | | **Percent Solids:** | n/a |
| **Project:** | GWA_Barclay_68535_Well | | |

**General Chemistry**

| Analyte | Result | RL | Units | DF | Analyzed | By | Method |
|---|---|---|---|---|---|---|---|
| Iron-Related Bacteria | 35000 | 25 | CFU/ml | 1 | 08/27/19 16:00 | SK | HACH IRB-BART |
| Slime Forming Bacteria | < 500 | 500 | CFU/ml | 1 | 08/27/19 16:00 | SK | HACH SLYM-BART |
| Sulfate Reducing Bacteria | 325 | 200 | CFU/ml | 1 | 08/27/19 16:00 | SK | HACH SRB-BART |

RL = Reporting Limit

# Report of Analysis





| | | | |
|---|---|---|---|
| **Client Sample ID:** | BW_BARCLAY_68535 SWSW_20_3N_66W | | |
| **Lab Sample ID:** | DA18737-1F | **Date Sampled:** | 08/19/19 |
| **Matrix:** | AQ - Groundwater Filtered | **Date Received:** | 08/20/19 |
| | | **Percent Solids:** | n/a |
| **Project:** | GWA_Barclay_68535_Well | | |

**Dissolved Metals Analysis**

| Analyte | Result | RL | Units | DF | Prep | Analyzed | By | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Barium | 0.0367 | 0.0040 | mg/l | 2 | 08/21/19 | 08/23/19 | CG | EPA 200.8 [1] | EPA 200.8 [4] |
| Boron | 0.185 | 0.050 | mg/l | 1 | 08/21/19 | 08/23/19 | JM | EPA 200.7 [2] | EPA 200.7 [3] |
| Calcium | 2.13 | 0.40 | mg/l | 1 | 08/21/19 | 08/23/19 | JM | EPA 200.7 [2] | EPA 200.7 [3] |
| Iron | 0.0101 | 0.010 | mg/l | 1 | 08/21/19 | 08/23/19 | JM | EPA 200.7 [2] | EPA 200.7 [3] |
| Magnesium | 0.410 | 0.20 | mg/l | 1 | 08/21/19 | 08/23/19 | JM | EPA 200.7 [2] | EPA 200.7 [3] |
| Manganese | 0.0057 | 0.0050 | mg/l | 1 | 08/21/19 | 08/23/19 | JM | EPA 200.7 [2] | EPA 200.7 [3] |
| Potassium | 1.31 | 1.0 | mg/l | 1 | 08/21/19 | 08/23/19 | JM | EPA 200.7 [2] | EPA 200.7 [3] |
| Selenium | < 0.00080 | 0.00080 | mg/l | 2 | 08/21/19 | 08/23/19 | CG | EPA 200.8 [1] | EPA 200.8 [4] |
| Sodium | 224 | 0.40 | mg/l | 1 | 08/21/19 | 08/23/19 | JM | EPA 200.7 [2] | EPA 200.7 [3] |
| Strontium | 0.0678 | 0.0050 | mg/l | 1 | 08/21/19 | 08/23/19 | JM | EPA 200.7 [2] | EPA 200.7 [3] |

(1) Instrument QC Batch: MA11712
(2) Instrument QC Batch: MA11714
(3) Prep QC Batch: MP28769
(4) Prep QC Batch: MP28772

RL = Reporting Limit

## Misc. Forms

### Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

# CHAIN OF CUSTODY



4036 Youngfield Street, Wheat Ridge, CO 80033
TEL: 303-425-6021 FAX: 303-425-6854
www.accutest.com

Bottle Order Control #:
FED-EX Tracking #:
SGS Quote #:
SGS Job #: da 18737

**Client / Reporting Information**

Company: (Report to) **Absaroka Solutions**
Street: 112 High Street
City, State: Buffalo, WY 82834
Project Contact: Tanya Cude
Phone: 352-318-4034
Email:
Sampler(s) Name(s): Tyler Scherden

**Project Information**

Project Name: GWA_Barclay_68535_Well
Frequency: Q3
Regulation: Voluntary
Facility ID: 753245
EQuIS Facility Code: 0089019-AN-GWABWQ
Client Purchase Order #: WO #88561343
Project Manager: Joel Mason

**Billing Information (if different from Report to)**

Company: Anadarko Petroleum Corporation (APC)
Street Address: 1099 18th Street, Suite 1800
City, State ZIP: Denver, CO 80202-1918
Attention: Erik Mickelson User ID: fvv451

**Requested Analysis (see TEST CODE sheet)**

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB-Field Blank; EB-Equipment Blank; RB- Rinse Blank; TB-Trip Blank

| Field ID / Point of Collection | Collection Date | Collection Time | Sampled by | Matrix | # of bottles | Number of preserved Bottles: NONE | HCl | NaOH | HNO3 | H2SO4 | DI Water | MEOH | ENCORE | Na2S2O4 | Other | PH, SCON, TDS | XCARBICALK | BRO, CHL, F, NO2, XNO3O, NO32, SO4 | TPO4 | Dissolved Metals - Lab Filtered* | VRSK175DGMEP | V8260BTX | B8015DRO | V8015GRO | IRBAC, SFBAC, SO4RBAC | CABAL | LAB USE ONLY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BW_Barclay_68535 | 8/19/2019 | 1512 | TS | GW | 17 | 9 | 6 | | | 1 | | | | | 1 | X | X | X | X | X | X | X | X | X | X | X | 01 |
| SWSW_20_3N_66W | | | | | | | | | | | | | | | | | | | | | | | | | | | SR 8/20/19 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature, field | 17.9 | °C | | | | | | | | | | | | | | | | | | | | | | | | | |
| pH, field | 8.69 | s.u. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Specific Conductivity, field | 917.2 | uS/cm | | | | | | | | | | | | | | | | | | | | | | | | | |
| Oxidation Reduction Potential, field | -116.1 | mV | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissolved Oxygen, field | 0.00 | mg/L | | | | | | | | | | | | | | | | | | | | | | | | | |
| Turbidity, field | 0.98 | NTU | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Turnaround Time (Business days)**

- [X] Std. 10 Business Days
- [ ] 5 Day RUSH
- [ ] 3 Day Emergency
- [ ] 2 Day Emergency
- [ ] 1 Day Emergency

Emergency & Rush T/A data available VIA LabLink. RUSH TAT approval needed.

**Special Reporting Instructions**

- [ ] Report in PPB
- [ ] Report in PPM
- [ ] Report MDLs

**Data Deliverable Information**

- [ ] Commercial "A" (Level 1, Results Only)
- [ ] Commercial "B" (Level 2, Results + QC Summary)
- [ ] COMMBN (Results/QC/Narrative)
- [ ] COMMBN+ [Results/QC/Narrative (+ chromatograms)]
- [ ] REDT2
- [ ] FULT1
- [X] EDD Format: COGCC Compatible

**Comments / Special Instructions**

*Dissolved Metals (200.7/200.8): BaMS, B, Ca, Fe,Mg, Mn, K, SeMS, Na, Sr

Please also send reports to Joel.Mason@Absarokasolutions.com and Max.Moran@Absarokasolutions.com

**Sample Custody must be documented below each time samples change possession, including courier delivery.**

| Relinquished by Sampler: | Date/Time: | Received By: | Relinquished By: | Date/Time: | Received By: |
|---|---|---|---|---|---|
| 1 | 8/19/19 1600 | 1 | 8/20/19 1400 | | 2 |
| 3 | | 3 | 4 | | 4 |

Custody Seal #: Intact [X] Not Intact [ ] Absent [ ]
Preserved where applicable [ ]
Cooler Temp. °C: 0 3
Therm. ID: TO80
On Ice [X]

Form MSQA 064-01, RV 6/19/17

## SGS Accutest Sample Receipt Summary

**Job Number:** DA18737 **Client:** ABSAROKA SOLUTIONS **Project:** GWA_BARCLAY_68535_WELL

**Date / Time Received:** 8/20/2019 2:00:00 PM **Delivery Method:** **Airbill #'s:** co

**Cooler Temps (Initial/Adjusted):** 0

| Cooler Security | Y | or | N | | Y | or | N |
|---|---|---|---|---|---|---|---|
| 1. Custody Seals Present: | ☑ | | ☐ | 3. COC Present: | ☑ | | ☐ |
| 2. Custody Seals Intact: | ☑ | | ☐ | 4. Smpl Dates/Time OK | ☑ | | ☐ |

| Cooler Temperature | Y | or | N |
|---|---|---|---|
| 1. Temp criteria achieved: | ☑ | | ☐ |
| 2. Cooler temp verification: | ; | | |
| 3. Cooler media: | Ice (Bag) | | |
| 4. No. Coolers: | 1 | | |

| Quality Control Preservation | Y | or | N | N/A |
|---|---|---|---|---|
| 1. Trip Blank present / cooler: | ☑ | | ☐ | ☐ |
| 2. Trip Blank listed on COC: | ☑ | | ☐ | ☐ |
| 3. Samples preserved properly: | ☑ | | ☐ | |
| 4. VOCs headspace free: | ☑ | | ☐ | ☐ |

| Sample Integrity - Documentation | Y | or | N |
|---|---|---|---|
| 1. Sample labels present on bottles: | ☑ | | ☐ |
| 2. Container labeling complete: | ☑ | | ☐ |
| 3. Sample container label / COC agree: | ☑ | | ☐ |

| Sample Integrity - Condition | Y | or | N |
|---|---|---|---|
| 1. Sample recvd within HT: | ☑ | | ☐ |
| 2. All containers accounted for: | ☑ | | ☐ |
| 3. Condition of sample: | Intact | | |

| Sample Integrity - Instructions | Y | or | N | N/A |
|---|---|---|---|---|
| 1. Analysis requested is clear: | ☑ | | ☐ | |
| 2. Bottles received for unspecified tests | ☐ | | ☑ | |
| 3. Sufficient volume recvd for analysis: | ☑ | | ☐ | |
| 4. Compositing instructions clear: | ☐ | | ☐ | ☑ |
| 5. Filtering instructions clear: | ☐ | | ☐ | ☑ |

Comments



**DA18737: Chain of Custody**
**Page 2 of 2**

## MS Volatiles

6

### QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

# Method Blank Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| V5V2815-MB | 5V54098.D | 1 | 08/22/19 | MB | n/a | n/a | V5V2815 |

**The QC reported here applies to the following samples:** **Method:** SW846 8260B

DA18737-1

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| | m,p-Xylene | ND | 1.0 | 0.70 | ug/l | |
| 95-47-6 | o-Xylene | ND | 1.0 | 0.50 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 1.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 107% | 70-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 101% | 70-130% |
| 2037-26-5 | Toluene-D8 | 99% | 70-130% |
| 460-00-4 | 4-Bromofluorobenzene | 102% | 70-130% |

# Blank Spike Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| V5V2815-BS | 5V54096.D | 1 | 08/22/19 | MB | n/a | n/a | V5V2815 |

**The QC reported here applies to the following samples:** **Method:** SW846 8260B

DA18737-1

| CAS No. | Compound | Spike ug/l | BSP ug/l | BSP % | Limits |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 50 | 48.9 | 98 | 70-130 |
| 100-41-4 | Ethylbenzene | 50 | 47.9 | 96 | 69-130 |
| 108-88-3 | Toluene | 50 | 47.2 | 94 | 70-130 |
| | m,p-Xylene | 100 | 97.4 | 97 | 70-130 |
| 95-47-6 | o-Xylene | 50 | 48.9 | 98 | 70-130 |
| 1330-20-7 | Xylene (total) | 150 | 146 | 97 | 70-130 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 107% | 70-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 100% | 70-130% |
| 2037-26-5 | Toluene-D8 | 98% | 70-130% |
| 460-00-4 | 4-Bromofluorobenzene | 101% | 70-130% |

* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| DA17836-22MS | 5V54099.D | 1 | 08/22/19 | MB | n/a | n/a | V5V2815 |
| DA17836-22MSD | 5V54100.D | 1 | 08/22/19 | MB | n/a | n/a | V5V2815 |
| DA17836-22 | 5V54101.D | 1 | 08/22/19 | MB | n/a | n/a | V5V2815 |

**The QC reported here applies to the following samples:** **Method:** SW846 8260B

DA18737-1

| CAS No. | Compound | DA17836-22 ug/l | Q | Spike ug/l | MS ug/l | MS % | Spike ug/l | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | | 50 | 48.1 | 96 | 50 | 47.6 | 95 | 1 | 67-130/30 |
| 100-41-4 | Ethylbenzene | ND | | 50 | 48.0 | 96 | 50 | 47.4 | 95 | 1 | 69-130/30 |
| 108-88-3 | Toluene | ND | | 50 | 46.4 | 93 | 50 | 46.7 | 93 | 1 | 70-130/30 |
| | m,p-Xylene | ND | | 100 | 96.7 | 97 | 100 | 95.7 | 96 | 1 | 70-130/30 |
| 95-47-6 | o-Xylene | ND | | 50 | 48.4 | 97 | 50 | 47.9 | 96 | 1 | 70-130/30 |
| 1330-20-7 | Xylene (total) | ND | | 150 | 145 | 97 | 150 | 144 | 96 | 1 | 67-130/30 |

| CAS No. | Surrogate Recoveries | MS | MSD | DA17836-22 | Limits |
|---|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 106% | 109% | 107% | 70-130% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 101% | 100% | 98% | 70-130% |
| 2037-26-5 | Toluene-D8 | 99% | 99% | 98% | 70-130% |
| 460-00-4 | 4-Bromofluorobenzene | 102% | 102% | 99% | 70-130% |

* = Outside of Control Limits.

## GC Volatiles

### QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

# Method Blank Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| GGA2273-MB | GA49793.D | 1 | 08/23/19 | BB | n/a | n/a | GGA2273 |

**The QC reported here applies to the following samples:** **Method:** SW846 8015B

DA18737-1

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| | TPH-GRO (C6-C10) | ND | 0.050 | 0.050 | mg/l | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 120-82-1 | 1,2,4-Trichlorobenzene | 99% | 60-140% |

# Method Blank Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| GFB1094-MB | FB23924.D | 1 | 08/27/19 | BB | n/a | n/a | GFB1094 |

**The QC reported here applies to the following samples:** **Method:** RSK175 MOD

DA18737-1A

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 74-82-8 | Methane | ND | 0.00080 | 0.00040 | mg/l | |
| 74-84-0 | Ethane | ND | 0.0016 | 0.00080 | mg/l | |
| 74-98-6 | Propane | ND | 0.0022 | 0.0011 | mg/l | |

# Blank Spike Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| GGA2273-BS | GA49794.D | 1 | 08/23/19 | BB | n/a | n/a | GGA2273 |

**The QC reported here applies to the following samples:** **Method:** SW846 8015B

DA18737-1

| CAS No. | Compound | Spike mg/l | BSP mg/l | BSP % | Limits |
|---|---|---|---|---|---|
| | TPH-GRO (C6-C10) | 2.2 | 2.36 | 107 | 51-130 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 120-82-1 | 1,2,4-Trichlorobenzene | 103% | 60-140% |

* = Outside of Control Limits.

# Blank Spike Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| GFB1094-BS | FB23925.D | 10 | 08/27/19 | BB | n/a | n/a | GFB1094 |

**The QC reported here applies to the following samples:** **Method:** RSK175 MOD

DA18737-1A

| CAS No. | Compound | Spike mg/l | BSP mg/l | BSP % | Limits |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 0.512 | 0.502 | 98 | 70-133 |
| 74-84-0 | Ethane | 0.923 | 1.03 | 112 | 70-137 |
| 74-98-6 | Propane | 1.38 | 1.54 | 112 | 70-137 |

* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| DA17838-10MS | GA49796.D | 1 | 08/24/19 | BB | n/a | n/a | GGA2273 |
| DA17838-10MSD | GA49797.D | 1 | 08/24/19 | BB | n/a | n/a | GGA2273 |
| DA17838-10 | GA49798.D | 1 | 08/24/19 | BB | n/a | n/a | GGA2273 |

**The QC reported here applies to the following samples:** **Method:** SW846 8015B

DA18737-1



| CAS No. | Compound | DA17838-10 mg/l | Q | Spike mg/l | MS mg/l | MS % | Spike mg/l | MSD mg/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | TPH-GRO (C6-C10) | ND | | 2.2 | 2.23 | 101 | 2.2 | 2.24 | 102 | 0 | 40-132/30 |

| CAS No. | Surrogate Recoveries | MS | MSD | DA17838-10 | Limits |
|---|---|---|---|---|---|
| 120-82-1 | 1,2,4-Trichlorobenzene | 101% | 102% | 99% | 60-140% |

* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| DA17838-21MS | FB23926.D | 10 | 08/27/19 | BB | n/a | n/a | GFB1094 |
| DA17838-21MSD | FB23927.D | 10 | 08/27/19 | BB | n/a | n/a | GFB1094 |
| DA17838-21 | FB23928.D | 1 | 08/27/19 | BB | n/a | n/a | GFB1094 |

**The QC reported here applies to the following samples:** **Method:** RSK175 MOD

DA18737-1A

| CAS No. | Compound | DA17838-21 mg/l | Q | Spike mg/l | MS mg/l | MS % | Spike mg/l | MSD mg/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 74-82-8 | Methane | 0.00066 | J | 0.512 | 0.516 | 101 | 0.512 | 0.504 | 98 | 2 | 15-196/30 |
| 74-84-0 | Ethane | ND | | 0.923 | 1.07 | 116 | 0.923 | 1.05 | 114 | 2 | 53-144/30 |
| 74-98-6 | Propane | ND | | 1.38 | 1.61 | 117 | 1.38 | 1.57 | 114 | 3 | 54-144/30 |

* = Outside of Control Limits.

## GC/LC Semi-volatiles

### QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

# Method Blank Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP18194-MB | FC64413.D | 1 | 08/24/19 | RB | 08/22/19 | OP18194 | GFC2655 |

**The QC reported here applies to the following samples:** **Method:** SW846-8015B

DA18737-1

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| | TPH-DRO (C10-C28) | ND | 0.20 | 0.19 | mg/l | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 84-15-1 | o-Terphenyl | 58% | 11-142% |

# Blank Spike Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP18194-BS | FC64414.D | 1 | 08/24/19 | RB | 08/22/19 | OP18194 | GFC2655 |

**The QC reported here applies to the following samples:** **Method:** SW846-8015B

DA18737-1

| CAS No. | Compound | Spike mg/l | BSP mg/l | BSP % | Limits |
|---|---|---|---|---|---|
| | TPH-DRO (C10-C28) | 5 | 2.98 | 60 | 22-130 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 84-15-1 | o-Terphenyl | 65% | 11-142% |

* = Outside of Control Limits.

# Matrix Spike/Matrix Spike Duplicate Summary



**Job Number:** DA18737
**Account:** ANADACOD Kerr-McGee Oil & Gas Onshore LP
**Project:** GWA_Barclay_68535_Well

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| OP18194-MS | FC64415.D | 1 | 08/24/19 | RB | 08/22/19 | OP18194 | GFC2655 |
| OP18194-MSD | FC64416.D | 1 | 08/24/19 | RB | 08/22/19 | OP18194 | GFC2655 |
| DA17836-27 | FC64417.D | 1 | 08/24/19 | RB | 08/22/19 | OP18194 | GFC2655 |

**The QC reported here applies to the following samples:** **Method:** SW846-8015B

DA18737-1

| CAS No. | Compound | DA17836-27 mg/l | Q | Spike mg/l | MS mg/l | MS % | Spike mg/l | MSD mg/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | TPH-DRO (C10-C28) | ND | | 5 | 3.08 | 62 | 5 | 2.60 | 52 | 17 | 22-130/30 |

| CAS No. | Surrogate Recoveries | MS | MSD | DA17836-27 | Limits |
|---|---|---|---|---|---|
| 84-15-1 | o-Terphenyl | 65% | 51% | 53% | 11-142% |

* = Outside of Control Limits.

## Metals Analysis

### QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28769
Matrix Type: AQUEOUS

Methods: EPA 200.7
Units: ug/l

Prep Date: 08/21/19

| Metal | RL | IDL | MDL | MB raw | final |
|---|---|---|---|---|---|
| Aluminum | 100 | 11 | 30 | | |
| Antimony | 30 | 2.1 | 10 | | |
| Arsenic | 25 | 3.8 | 7 | | |
| Barium | 10 | .2 | 2 | | |
| Beryllium | 10 | .9 | 1.3 | | |
| Boron | 50 | .8 | 7.4 | 0.60 | <50 |
| Cadmium | 10 | .2 | 1.6 | | |
| Calcium | 400 | 2.4 | 53 | 10.4 | <400 |
| Chromium | 10 | .3 | 1.7 | | |
| Cobalt | 5.0 | .5 | 2.3 | | |
| Copper | 10 | .8 | 2.3 | | |
| Iron | 10 | 1.5 | 3.1 | 2.0 | <10 |
| Lead | 50 | 2.1 | 6.3 | | |
| Lithium | 5.0 | .4 | 4 | | |
| Magnesium | 200 | 6.8 | 31 | 6.2 | <200 |
| Manganese | 5.0 | .5 | 1.1 | -0.40 | <5.0 |
| Molybdenum | 10 | .4 | 4.3 | | |
| Nickel | 30 | .5 | 6.1 | | |
| Phosphorus | 100 | 15 | 24 | | |
| Potassium | 1000 | 99 | 250 | 63.4 | <1000 |
| Selenium | 50 | 7.1 | 21 | | |
| Silicon | 50 | 4.7 | 45 | | |
| Silver | 30 | .3 | 4 | | |
| Sodium | 400 | 7.3 | 51 | 509 | * (a) |
| Strontium | 5.0 | .01 | .6 | 0.0 | <5.0 |
| Thallium | 10 | 1.8 | 7.5 | | |
| Tin | 60 | 12 | 51 | | |
| Titanium | 10 | .1 | 1.9 | | |
| Uranium | 50 | 2.9 | 8.5 | | |
| Vanadium | 10 | .4 | .7 | | |
| Zinc | 30 | .4 | 3.8 | | |

Associated samples MP28769: DA18737-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28769 Methods: EPA 200.7
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 08/21/19

| Metal | RL | IDL | MDL | MB raw | final |
|---|---|---|---|---|---|

(anr) Analyte not requested
(a) All sample results < RL or > 10x mB concentration.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28769 Methods: EPA 200.7
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 08/21/19

| Metal | DA18737-1F Original | MS | Spikelot ICPALL2 | % Rec | QC Limits |
|---|---|---|---|---|---|
| Aluminum | | | | | |
| Antimony | | | | | |
| Arsenic | anr | | | | |
| Barium | anr | | | | |
| Beryllium | | | | | |
| Boron | 185 | 1270 | 1000 | 108.5 | 70-130 |
| Cadmium | anr | | | | |
| Calcium | 2130 | 26600 | 25000 | 97.9 | 70-130 |
| Chromium | anr | | | | |
| Cobalt | | | | | |
| Copper | anr | | | | |
| Iron | 10.1 | 5080 | 5000 | 101.4 | 70-130 |
| Lead | anr | | | | |
| Lithium | | | | | |
| Magnesium | 410 | 24600 | 25000 | 96.8 | 70-130 |
| Manganese | 5.7 | 510 | 500 | 100.9 | 70-130 |
| Molybdenum | anr | | | | |
| Nickel | anr | | | | |
| Phosphorus | | | | | |
| Potassium | 1310 | 27200 | 25000 | 103.6 | 70-130 |
| Selenium | anr | | | | |
| Silicon | | | | | |
| Silver | anr | | | | |
| Sodium | 224000 | 247000 | 25000 | 92.0 | 70-130 |
| Strontium | 67.8 | 561 | 500 | 98.6 | 70-130 |
| Thallium | | | | | |
| Tin | | | | | |
| Titanium | | | | | |
| Uranium | | | | | |
| Vanadium | | | | | |
| Zinc | anr | | | | |

Associated samples MP28769: DA18737-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28769 Methods: EPA 200.7
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 08/21/19

| Metal | DA18737-1F Original MS | Spikelot ICPALL2 | % Rec | QC Limits |
|---|---|---|---|---|

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28769 Methods: EPA 200.7
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 08/21/19

| Metal | DA18737-1F Original | MSD | Spikelot ICPALL2 | % Rec | MSD RPD | QC Limit |
|---|---|---|---|---|---|---|
| Aluminum | | | | | | |
| Antimony | | | | | | |
| Arsenic | anr | | | | | |
| Barium | anr | | | | | |
| Beryllium | | | | | | |
| Boron | 185 | 1260 | 1000 | 107.5 | 0.8 | 20 |
| Cadmium | anr | | | | | |
| Calcium | 2130 | 26300 | 25000 | 96.7 | 1.1 | 20 |
| Chromium | anr | | | | | |
| Cobalt | | | | | | |
| Copper | anr | | | | | |
| Iron | 10.1 | 5030 | 5000 | 100.4 | 1.0 | 20 |
| Lead | anr | | | | | |
| Lithium | | | | | | |
| Magnesium | 410 | 24400 | 25000 | 96.0 | 0.8 | 20 |
| Manganese | 5.7 | 505 | 500 | 99.9 | 1.0 | 20 |
| Molybdenum | anr | | | | | |
| Nickel | anr | | | | | |
| Phosphorus | | | | | | |
| Potassium | 1310 | 27100 | 25000 | 103.2 | 0.4 | 20 |
| Selenium | anr | | | | | |
| Silicon | | | | | | |
| Silver | anr | | | | | |
| Sodium | 224000 | 244000 | 25000 | 80.0 | 1.2 | 20 |
| Strontium | 67.8 | 554 | 500 | 97.2 | 1.3 | 20 |
| Thallium | | | | | | |
| Tin | | | | | | |
| Titanium | | | | | | |
| Uranium | | | | | | |
| Vanadium | | | | | | |
| Zinc | anr | | | | | |

Associated samples MP28769: DA18737-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28769 Methods: EPA 200.7
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 08/21/19

| Metal | DA18737-1F Original MSD | Spikelot ICPALL2 % Rec | MSD RPD | QC Limit |
|---|---|---|---|---|

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28769
Matrix Type: AQUEOUS

Methods: EPA 200.7
Units: ug/l

Prep Date: 08/21/19

| Metal | BSP Result | Spikelot ICPALL2 | % Rec | QC Limits |
|---|---|---|---|---|
| Aluminum | | | | |
| Antimony | | | | |
| Arsenic | anr | | | |
| Barium | anr | | | |
| Beryllium | | | | |
| Boron | 1060 | 1000 | 106.0 | 85-115 |
| Cadmium | anr | | | |
| Calcium | 24500 | 25000 | 98.0 | 85-115 |
| Chromium | anr | | | |
| Cobalt | | | | |
| Copper | anr | | | |
| Iron | 5170 | 5000 | 103.4 | 85-115 |
| Lead | anr | | | |
| Lithium | | | | |
| Magnesium | 24700 | 25000 | 98.8 | 85-115 |
| Manganese | 509 | 500 | 101.8 | 85-115 |
| Molybdenum | anr | | | |
| Nickel | anr | | | |
| Phosphorus | | | | |
| Potassium | 25400 | 25000 | 101.6 | 85-115 |
| Selenium | anr | | | |
| Silicon | | | | |
| Silver | anr | | | |
| Sodium | 24700 | 25000 | 98.8 | 85-115 |
| Strontium | 502 | 500 | 100.4 | 85-115 |
| Thallium | | | | |
| Tin | | | | |
| Titanium | | | | |
| Uranium | | | | |
| Vanadium | | | | |
| Zinc | anr | | | |

Associated samples MP28769: DA18737-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28769
Matrix Type: AQUEOUS

Methods: EPA 200.7
Units: ug/l

Prep Date: 08/21/19

| Metal | BSP Result | Spikelot ICPALL2 | % Rec | QC Limits |
|---|---|---|---|---|

(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28772
Matrix Type: AQUEOUS

Methods: EPA 200.8
Units: ug/l

Prep Date: 08/21/19

| Metal | RL | IDL | MDL | MB raw | final |
|---|---|---|---|---|---|
| Aluminum | 50 | 1.1 | 2 | | |
| Antimony | 0.40 | .0022 | .011 | | |
| Arsenic | 0.20 | .017 | .044 | | |
| Barium | 2.0 | .016 | .079 | 0.028 | <2.0 |
| Beryllium | 0.20 | .016 | .069 | | |
| Boron | 40 | .49 | 2.1 | | |
| Cadmium | 0.10 | .036 | .042 | | |
| Calcium | 400 | 5.6 | 12 | | |
| Chromium | 2.0 | .053 | .053 | | |
| Cobalt | 0.20 | .0049 | .015 | | |
| Copper | 2.0 | .06 | .13 | | |
| Iron | 10 | 3.5 | 4.6 | | |
| Lead | 0.50 | .0079 | .008 | | |
| Magnesium | 100 | 1.3 | 1.3 | | |
| Manganese | 1.0 | .12 | .13 | | |
| Molybdenum | 1.0 | .049 | .029 | | |
| Nickel | 2.0 | .0088 | .027 | | |
| Phosphorus | 60 | 2.6 | 4.3 | | |
| Potassium | 200 | 2.9 | 2.9 | | |
| Selenium | 0.40 | .06 | .21 | -0.031 | <0.40 |
| Silver | 0.10 | .0019 | .008 | | |
| Sodium | 500 | 4.9 | 4.9 | | |
| Strontium | 20 | .01 | .015 | | |
| Thallium | 0.20 | .0024 | .005 | | |
| Tin | 10 | .063 | 1.3 | | |
| Titanium | 2.0 | .059 | .092 | | |
| Uranium | 0.20 | .0017 | .002 | | |
| Vanadium | 1.0 | .037 | .2 | | |
| Zinc | 10 | .21 | .96 | | |

Associated samples MP28772: DA18737-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28772
Matrix Type: AQUEOUS

Methods: EPA 200.8
Units: ug/l

Prep Date: 08/21/19

| Metal | DA18732-1 Original | MS | Spikelot ICPALL2 | % Rec | QC Limits |
|---|---|---|---|---|---|
| Aluminum | | | | | |
| Antimony | | | | | |
| Arsenic | anr | | | | |
| Barium | 51.0 | 445 | 400 | 98.5 | 70-130 |
| Beryllium | | | | | |
| Boron | | | | | |
| Cadmium | anr | | | | |
| Calcium | | | | | |
| Chromium | anr | | | | |
| Cobalt | | | | | |
| Copper | anr | | | | |
| Iron | | | | | |
| Lead | anr | | | | |
| Magnesium | | | | | |
| Manganese | | | | | |
| Molybdenum | anr | | | | |
| Nickel | anr | | | | |
| Phosphorus | | | | | |
| Potassium | | | | | |
| Selenium | 6.0 | 186 | 200 | 90.0 | 70-130 |
| Silver | anr | | | | |
| Sodium | | | | | |
| Strontium | | | | | |
| Thallium | | | | | |
| Tin | | | | | |
| Titanium | | | | | |
| Uranium | | | | | |
| Vanadium | | | | | |
| Zinc | anr | | | | |

Associated samples MP28772: DA18737-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28772 Methods: EPA 200.8
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 08/21/19

| Metal | DA18732-1 Original | MSD | Spikelot ICPALL2 | % Rec | MSD RPD | QC Limit |
|---|---|---|---|---|---|---|
| Aluminum | | | | | | |
| Antimony | | | | | | |
| Arsenic | anr | | | | | |
| Barium | 51.0 | 470 | 400 | 104.8 | 5.5 | 20 |
| Beryllium | | | | | | |
| Boron | | | | | | |
| Cadmium | anr | | | | | |
| Calcium | | | | | | |
| Chromium | anr | | | | | |
| Cobalt | | | | | | |
| Copper | anr | | | | | |
| Iron | | | | | | |
| Lead | anr | | | | | |
| Magnesium | | | | | | |
| Manganese | | | | | | |
| Molybdenum | anr | | | | | |
| Nickel | anr | | | | | |
| Phosphorus | | | | | | |
| Potassium | | | | | | |
| Selenium | 6.0 | 194 | 200 | 94.0 | 4.2 | 20 |
| Silver | anr | | | | | |
| Sodium | | | | | | |
| Strontium | | | | | | |
| Thallium | | | | | | |
| Tin | | | | | | |
| Titanium | | | | | | |
| Uranium | | | | | | |
| Vanadium | | | | | | |
| Zinc | anr | | | | | |

Associated samples MP28772: DA18737-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

QC Batch ID: MP28772
Matrix Type: AQUEOUS

Methods: EPA 200.8
Units: ug/l

Prep Date: 08/21/19

| Metal | BSP Result | Spikelot ICPALL2 | % Rec | QC Limits |
|---|---|---|---|---|
| Aluminum | | | | |
| Antimony | | | | |
| Arsenic | anr | | | |
| Barium | 421 | 400 | 105.3 | 85-115 |
| Beryllium | | | | |
| Boron | | | | |
| Cadmium | anr | | | |
| Calcium | | | | |
| Chromium | anr | | | |
| Cobalt | | | | |
| Copper | anr | | | |
| Iron | | | | |
| Lead | anr | | | |
| Magnesium | | | | |
| Manganese | | | | |
| Molybdenum | anr | | | |
| Nickel | anr | | | |
| Phosphorus | | | | |
| Potassium | | | | |
| Selenium | 189 | 200 | 94.5 | 85-115 |
| Silver | anr | | | |
| Sodium | | | | |
| Strontium | | | | |
| Thallium | | | | |
| Tin | | | | |
| Titanium | | | | |
| Uranium | | | | |
| Vanadium | | | | |
| Zinc | anr | | | |

Associated samples MP28772: DA18737-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

## General Chemistry

### QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

| Analyte | Batch ID | RL | MB Result | Units | Spike Amount | BSP Result | BSP %Recov | QC Limits |
|---|---|---|---|---|---|---|---|---|
| Alkalinity, Bicarbonate as CaC | GN48045 | 5.0 | 3.8 | mg/l | 100 | 100 | 100.3 | 90-110% |
| Alkalinity, Carbonate | GN48046 | 5.0 | 3.8 | mg/l | 100 | 100 | 100.3 | 80-120% |
| Alkalinity, Total as CaCO3 | GN48047 | 5.0 | 3.8 | mg/l | 100 | 100 | 100.3 | 90-110% |
| Bromide | GP25755/GN48011 | 0.050 | 0.0 | mg/l | 0.5 | 0.505 | 101.0 | 90-110% |
| Chloride | GP25755/GN48011 | 0.50 | 0.0 | mg/l | 5 | 5.12 | 102.4 | 90-110% |
| Fluoride | GP25755/GN48011 | 0.10 | 0.0 | mg/l | 1 | 1.01 | 101.0 | 90-110% |
| Iron-Related Bacteria | MB1218 | 25 | <25 | CFU/ml | | | | |
| Nitrogen, Nitrate | GP25755/GN48011 | 0.010 | 0.0 | mg/l | 0.1 | 0.0996 | 99.6 | 90-110% |
| Nitrogen, Nitrite | GP25755/GN48011 | 0.0040 | 0.0 | mg/l | 0.05 | 0.0532 | 106.4 | 90-110% |
| Phosphorus, Total | GP25791/GN48074 | 0.010 | 0.00 | mg/l | 0.2 | 0.202 | 101.0 | 90-110% |
| Phosphorus, Total | GP25791/GN48074 | 0.010 | 0.00 | mg/l | 0.2 | 0.215 | 107.5 | 90-110% |
| Slime Forming Bacteria | MB1219 | 500 | <500 | CFU/ml | | | | |
| Solids, Total Dissolved | GN48006 | 10 | 0.0 | mg/l | 250 | 254 | 101.6 | 90-110% |
| Specific Conductivity | GP25778/GN48043 | | | umhos/cm | 1413 | 1400 | 98.7 | 90-110% |
| Specific Conductivity | GP25778/GN48043 | | | umhos/cm | 1.49 | 1.9 | 126.8(a) | 90-110% |
| Specific Conductivity | GP25778/GN48043 | | | umhos/cm | 99.7 | 95.6 | 95.9 | 90-110% |
| Specific Conductivity | GP25778/GN48043 | | | umhos/cm | 998 | 990 | 99.2 | 90-110% |
| Sulfate | GP25755/GN48011 | 0.50 | 0.0 | mg/l | 5 | 5.10 | 102.0 | 90-110% |
| Sulfate Reducing Bacteria | MB1220 | 200 | <200 | CFU/ml | | | | |
| pH | GN48042 | | | su | 6.00 | 5.99 | 99.8 | 99.1-100.9% |
| pH | GN48042 | | | su | 8.00 | 8.01 | 100.1 | 99.1-100.9% |
| pH | GN48042 | | | su | 8.00 | 8.01 | 100.1 | 99.1-100.9% |
| pH | GN48042 | | | su | 8.00 | 8.02 | 100.2 | 99.1-100.9% |
| pH | GN48042 | | | su | 8.00 | 8.02 | 100.2 | 99.1-100 |
| pH | GN48042 | | | su | 6.00 | 5.99 | 99.8 | 99.1-100 |

Associated Samples:
Batch MB1218: DA18737-1B
Batch MB1219: DA18737-1B
Batch MB1220: DA18737-1B
Batch GN48006: DA18737-1
Batch GN48042: DA18737-1
Batch GN48045: DA18737-1
Batch GN48046: DA18737-1
Batch GN48047: DA18737-1
Batch GP25755: DA18737-1
Batch GP25778: DA18737-1
Batch GP25791: DA18737-1
(*) Outside of QC limits
(a) Monthly low level standard check

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

| Analyte | Batch ID | QC Sample | Units | Original Result | DUP Result | RPD | QC Limits |
|---|---|---|---|---|---|---|---|
| Alkalinity, Total as CaCO3 | GN48047 | DA18737-1 | mg/l | 463 | 447 | 3.5 | 0-20% |
| Phosphorus, Total | GP25791/GN48074 | DA18725-2 | mg/l | 0.081 | 0.0760 | 6.4 | 0-20% |
| Solids, Total Dissolved | GN48006 | DA18739-1 | mg/l | 2620 | 2540 | 3.1 | 0-5% |
| Specific Conductivity | GP25778/GN48043 | DA18737-1 | umhos/cm | 836 | 802 | 4.2 | 0-20% |
| pH | GN48042 | DA18737-1 | su | 8.69 | 8.70 | 0.1 | 0-5% |
| pH | GN48042 | DA18737-1 | su | 8.69 | 8.70 | 0.1 | 0-5% |

Associated Samples:
Batch GN48006: DA18737-1
Batch GN48042: DA18737-1
Batch GN48047: DA18737-1
Batch GP25778: DA18737-1
Batch GP25791: DA18737-1
(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

| Analyte | Batch ID | QC Sample | Units | Original Result | Spike Amount | MS Result | %Rec | QC Limits |
|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total as CaCO3 | GN48047 | DA18696-1 | mg/l | 76.4 | 100 | 175 | 98.7 | 80-120% |
| Bromide | GP25755/GN48011 | DA18736-2 | mg/l | 0.0 | 5 | 5.2 | 104.0 | 80-120% |
| Chloride | GP25755/GN48011 | DA18736-2 | mg/l | 95.0 | 50 | 145 | 100.0 | 80-120% |
| Fluoride | GP25755/GN48011 | DA18736-2 | mg/l | 2.0 | 10 | 12.1 | 101.0 | 80-120% |
| Nitrogen, Nitrate | GP25755/GN48011 | DA18736-2 | mg/l | 3.9 | 1 | 4.8 | 90.0 | 80-120% |
| Nitrogen, Nitrite | GP25755/GN48011 | DA18736-2 | mg/l | 0.12 | 0.5 | 0.63 | 102.0 | 80-120% |
| Phosphorus, Total | GP25791/GN48074 | DA18721-3 | mg/l | 0.69 | 0.2 | 0.836 | 75.0N(a) | 90-110% |
| Sulfate | GP25755/GN48011 | DA18736-2 | mg/l | 97.9 | 50 | 146 | 96.2 | 80-120% |

Associated Samples:
Batch GN48047: DA18737-1
Batch GP25755: DA18737-1
Batch GP25791: DA18737-1
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

MATRIX SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: DA18737
Account: ANADACOD - Kerr-McGee Oil & Gas Onshore LP
Project: GWA_Barclay_68535_Well

| Analyte | Batch ID | QC Sample | Units | Original Result | Spike Amount | MSD Result | RPD | QC Limit |
|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total as CaCO3 | GN48047 | DA18696-1 | mg/l | 76.4 | 100 | 172 | 1.6 | 20% |
| Bromide | GP25755/GN48011 | DA18736-2 | mg/l | 0.0 | 5 | 5.1 | 1.9 | 20% |
| Chloride | GP25755/GN48011 | DA18736-2 | mg/l | 95.0 | 50 | 144 | 0.7 | 20% |
| Fluoride | GP25755/GN48011 | DA18736-2 | mg/l | 2.0 | 10 | 12.1 | 0.0 | 20% |
| Nitrogen, Nitrate | GP25755/GN48011 | DA18736-2 | mg/l | 3.9 | 1 | 4.8 | 0.0 | 20% |
| Nitrogen, Nitrite | GP25755/GN48011 | DA18736-2 | mg/l | 0.12 | 0.5 | 0.62 | 1.6 | 20% |
| Sulfate | GP25755/GN48011 | DA18736-2 | mg/l | 97.9 | 50 | 146 | 0.0 | 20% |

Associated Samples:
Batch GN48047: DA18737-1
Batch GP25755: DA18737-1
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits