

The order of this data package is as follows:

1. Chain-of-Custody/Lab Request
2. Copies of field COCs
3. Validation Report
4. Laboratory analysis

Comments:

[illegible]

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11366

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q4

SAMPLE ID: CAMO-17-141986

WORK ORDER:

| | <u>AS PLANNED</u> | <u>AS COLLECTED</u> | | <u>AS PLANNED</u> | <u>AS COLLECTED</u> |
|---------------------------------|-----------------------|---------------------|----------------------|-----------------------|---------------------|
| Date Collected (MM/DD/YYYY): | 8/4/2017 | OK | FIELD MATRIX: | WG | OK |
| TIME COLLECTED (HH:MM): | 1139 | | MEDIA: | UA | |
| PRS ID: | NA | | SAMPLE TECH CODE: | GSP | |
| LOCATION ID: | R-62 | | FIELD PREP: | F | |
| LOCATION TYPE: | NA | | FIELD QC TYPE: | REG | |
| TOP DEPTH: | | | SAMPLE USAGE: | INV | |
| BOTTOM DEPTH: | | | EXCAVATED: | | YES / NO / (NA) |

| PRIORITY | ORDER | CONTAINER | # | PRESERVATIVE | COLLECTED Y/N | SPECIAL INSTRUCTIONS |
|----------|----------------------------------|-----------------------|---|--------------|---------------|----------------------|
| NA | WSP-All Metals | 1 LITER POLY | 1 | HNO3 ICE | Y | NA |
| | WSP- GENINORG+PerChlorat e | 1 LITER POLY | 1 | ICE | | |
| | WSP- NH3+NO3/NO2 | 500 ML AMBER GLASS | 1 | H2SO4 | | |

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

FIELD PARAMETERS:

Sample Time _____ HH:MM _____ Dissolved Oxygen _____ Flow (in gpm) _____
 Oxidation-Reduction _____ pH _____ Specific _____
 Potential _____ Conductance _____
 Temperature _____ Turbidity _____

KT 8/4/17

COLLECTED BY (PRINT): D. Hughes

| | | | |
|--------------------------------------------------|-------------------------------|----------------------------------------------|-----------------------------|
| RELINQUISHED BY (Printed Name) (Signature) | Date/Time 8/4/2017 1217 | RECEIVED BY (Printed Name) (Signature) | Date/Time 8-4-17 1217 |
| RELINQUISHED BY (Printed Name) (Signature) | Date/Time | RECEIVED BY (Printed Name) (Signature) | Date/Time |

Report Date: 07/24/2017

SAMPLE COLLECTION LOG/FIELD CHAIN OF CUSTODY

EVENT ID: 11366

EVENT NAME: Mortandad/Sandia (Cr Inv) MY2017 Q4

SAMPLE ID: CAMO-17-142002

WORK ORDER:

| | AS PLANNED | AS COLLECTED | | AS PLANNED | AS COLLECTED |
|---------------------------------|---------------|--------------|----------------------|---------------|-----------------|
| Date Collected (MM/DD/YYYY): | 8/4/2017 | OK | FIELD MATRIX: | WG | OK |
| TIME COLLECTED (HH:MM): | 1139 | | MEDIA: | UA | |
| PRS ID: | NA | | SAMPLE TECH CODE: | GSP | |
| LOCATION ID: | R-62 | | FIELD PREP: | UF | |
| LOCATION TYPE: | NA | | FIELD QC TYPE: | REG | |
| TOP DEPTH: | | | SAMPLE USAGE: | INV | |
| BOTTOM DEPTH: | | | EXCAVATED: | | YES / NO / (NA) |

| PRIORITY | ORDER | CONTAINER | # | PRESERVATIVE | COLLECTED Y/N | SPECIAL INSTRUCTIONS |
|----------|-------------|-----------------------------------|---|--------------|---------------|----------------------|
| NA | MSGP-Hg | 1000 500-ML POLY A-J 8/4/17 | 1 | HNO3 | Y | NA |
| | WSP-CN(T) | 250 ML POLY | 1 | NAOH | | |
| | WSP-TKN+TOC | 500 ML AMBER GLASS | 1 | H2SO4 | | |

SAMPLE COMMENTS: None

LOCATION COMMENTS: None

FIELD PARAMETERS:

| | | | | | | |
|----------------------------------|-------|-------|------------------|------|-------------------------|-------|
| Sample Time | 1139 | HH:MM | Dissolved Oxygen | 6.59 | Flow (in gpm) | 1.86 |
| Oxidation-Reduction Potential | 177.8 | | pH | 8.29 | Specific Conductance | 229.3 |
| Temperature | 19.8 | | Turbidity | 0.43 | | |

COLLECTED BY (PRINT): D. Hughes

| | | | |
|-----------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------|-----------------------------|
| RELINQUISHED BY (Printed Name) <i>Domen Hughes</i> (Signature) <i>[Signature]</i> | Date/Time 8/4/2017 1217 | RECEIVED BY <i>MATT ENGLERT</i> (Printed Name) (Signature) <i>[Signature]</i> | Date/Time 8-4-17 1217 |
| RELINQUISHED BY (Printed Name) (Signature) | Date/Time | RECEIVED BY (Printed Name) (Signature) | Date/Time |

Report Date: 07/24/2017

DATA VALIDATION REPORT

Chain Of Custody No. 2017-2359

1. Distribution Of Samples In EDD.

| SDG | Analytical Method | Regular Samples | Field Duplicates | Trip Blanks | Field Blanks | Equipment Blanks |
|--------|-------------------|-----------------|------------------|-------------|--------------|------------------|
| 429979 | EPA:120.1 | 1 | | | | |
| 429979 | EPA:150.1 | 1 | | | | |
| 429979 | EPA:160.1 | 1 | | | | |
| 429979 | EPA:170.0 | 2 | | | | |
| 429979 | EPA:245.2 | 2 | | | | |
| 429979 | EPA:300.0 | 1 | | | | |
| 429979 | EPA:310.1 | 1 | | | | |
| 429979 | EPA:335.4 | 1 | | | | |
| 429979 | EPA:350.1 | 1 | | | | |
| 429979 | EPA:351.2 | 1 | | | | |
| 429979 | EPA:353.2 | 1 | | | | |
| 429979 | EPA:365.4 | 1 | | | | |
| 429979 | SM:A2340B | 1 | | | | |
| 429979 | SW-846:6010C | 1 | | | | |
| 429979 | SW-846:6020 | 1 | | | | |
| 429979 | SW-846:6850 | 1 | | | | |
| 429979 | SW-846:9060 | 1 | | | | |

| SDG | Analytical Method | Analysis Lot ID | Prep Lot ID | Regular Samples | Field Duplicates | Trip Blanks | Field Blanks | Equipment Blanks | Method Blanks | Matrix Spikes | Matrix Spike Dups | Analytical Spikes | Post-Digestion Spikes | Lab Control Samples | Lab Control Sample Dups | Blank Spike | Blank Spike Dups | Lab Duplicates | Storage Blanks | Preparation Blanks | Reagent Blanks |
|--------|-------------------|-----------------|-------------|-----------------|------------------|-------------|--------------|------------------|---------------|---------------|-------------------|-------------------|-----------------------|---------------------|-------------------------|-------------|------------------|----------------|----------------|--------------------|----------------|
| 429979 | EPA:120.1 | 1689860 | 1689860 | 1 | | | | | | | | | | 1 | | | 2 | | | | |
| 429979 | EPA:150.1 | 1691073 | 1691073 | 1 | | | | | | | | | | 1 | | | 1 | | | | |
| 429979 | EPA:160.1 | 1690491 | 1690491 | 1 | | | | | 1 | | | | | 1 | | | 1 | | | | |
| 429979 | EPA:170.0 | NA | NA | 2 | | | | | | | | | | | | | | | | | |
| 429979 | EPA:245.2 | 1695634 | 1695628 | 2 | | | | | 1 | 1 | | | | 1 | | | 1 | | | | |
| 429979 | EPA:300.0 | 1691290 | 1691290 | 1 | | | | | 1 | | | | | 1 | | | 2 | | | | |
| 429979 | EPA:310.1 | 1691070 | 1691070 | 1 | | | | | | 1 | | | | 1 | | | 1 | | | | |

DATA VALIDATION REPORT

| SDG | Analytical Method | Analysis Lot ID | Prep Lot ID | Regular Samples | Field Duplicates | Trip Blanks | Field Blanks | Equipment Blanks | Method Blanks | Matrix Spikes | Matrix Spike Dups | Analytical Spikes | Post-Digestion Spikes | Lab Control Samples | Lab Control Sample Dups | Blank Spike | Blank Spike Dups | Lab Duplicates | Storage Blanks | Preparation Blanks | Reagent Blanks |
|--------|-------------------|-----------------|-------------|-----------------|------------------|-------------|--------------|------------------|---------------|---------------|-------------------|-------------------|-----------------------|---------------------|-------------------------|-------------|------------------|----------------|----------------|--------------------|----------------|
| 429979 | EPA:335.4 | 1688863 | 1688862 | 1 | | | | | 1 | 1 | | | | 1 | | | 1 | | | | |
| 429979 | EPA:350.1 | 1698350 | 1698348 | 1 | | | | | 1 | 1 | | | | 1 | | | 1 | | | | |
| 429979 | EPA:351.2 | 1692771 | 1692769 | 1 | | | | | 1 | 2 | | | | 1 | | | 2 | | | | |
| 429979 | EPA:353.2 | 1698353 | 1698353 | 1 | | | | | 1 | | | | | 1 | | | 1 | | | | |
| 429979 | EPA:365.4 | 1698352 | 1698351 | 1 | | | | | 1 | 1 | | | | 1 | | | 1 | | | | |
| 429979 | SM:A2340B | 1697053 | 1697053 | 1 | | | | | | | | | | | | | | | | | |
| 429979 | SW-846:6010C | 1689727 | 1689726 | 1 | | | | | 1 | 1 | | | | 1 | | | 1 | | | | |
| 429979 | SW-846:6020 | 1689747 | 1689746 | 1 | | | | | 1 | 1 | | | | 1 | | | 1 | | | | |
| 429979 | SW-846:6850 | 1690518 | 1690517 | 1 | | | | | 1 | 1 | 1 | | | 1 | | | | | | | |
| 429979 | SW-846:9060 | 1689290 | 1689290 | 1 | | | | | 1 | | | | | 1 | | | 1 | | | | |

2. Distribution Of Analytes In EDD.

| Analytical Method | Analytical Method Category | Field Sample ID | Lab Sample ID | Sample Purpose | Target Analytes | Surrogates | Spiked Compounds | TICS |
|-------------------|----------------------------|-----------------|---------------|----------------|-----------------|------------|------------------|------|
| EPA:120.1 | GENERAL CHEMISTRY | CAMO-17-141974 | 1203849510 | DUP | 1 | 0 | 0 | 0 |
| EPA:120.1 | GENERAL CHEMISTRY | CAMO-17-141986 | 429979001 | REG | 1 | 0 | 0 | 0 |
| EPA:120.1 | GENERAL CHEMISTRY | CAMO-17-142780 | 1203849509 | DUP | 1 | 0 | 0 | 0 |
| EPA:120.1 | GENERAL CHEMISTRY | LCS | 1203849508 | LCS | 0 | 0 | 1 | 0 |
| EPA:150.1 | GENERAL CHEMISTRY | CAMO-17-141986 | 429979001 | REG | 1 | 0 | 0 | 0 |
| EPA:150.1 | GENERAL CHEMISTRY | LCS | 1203852560 | LCS | 0 | 0 | 1 | 0 |
| EPA:150.1 | GENERAL CHEMISTRY | WST22-17-143234 | 1203852562 | DUP | 1 | 0 | 0 | 0 |
| EPA:160.1 | GENERAL CHEMISTRY | CAMO-17-141986 | 429979001 | REG | 1 | 0 | 0 | 0 |
| EPA:160.1 | GENERAL CHEMISTRY | LCS | 1203850979 | LCS | 0 | 0 | 1 | 0 |
| EPA:160.1 | GENERAL CHEMISTRY | MB | 1203850978 | MB | 1 | 0 | 0 | 0 |
| EPA:160.1 | GENERAL CHEMISTRY | WST22-17-143234 | 1203850980 | DUP | 1 | 0 | 0 | 0 |
| EPA:170.0 | VOC | CAMO-17-141986 | 429979001 | REG | 1 | 0 | 0 | 0 |
| EPA:170.0 | VOC | CAMO-17-142002 | 429979002 | REG | 1 | 0 | 0 | 0 |
| EPA:245.2 | INORGANIC | CAMO-17-141986 | 1203862862 | DUP | 1 | 0 | 0 | 0 |
| EPA:245.2 | INORGANIC | CAMO-17-141986 | 1203862864 | MS | 0 | 0 | 1 | 0 |
| EPA:245.2 | INORGANIC | CAMO-17-141986 | 429979001 | REG | 1 | 0 | 0 | 0 |
| EPA:245.2 | INORGANIC | CAMO-17-142002 | 429979002 | REG | 1 | 0 | 0 | 0 |
| EPA:245.2 | INORGANIC | LCS | 1203862861 | LCS | 0 | 0 | 1 | 0 |

DATA VALIDATION REPORT

| Analytical Method | Analytical Method Category | Field Sample ID | Lab Sample ID | Sample Purpose | Target Analytes | Surrogates | Spiked Compounds | TICS |
|-------------------|----------------------------|---------------------|---------------|----------------|-----------------|------------|------------------|------|
| EPA:245.2 | INORGANIC | MB | 1203862860 | MB | 1 | 0 | 0 | 0 |
| EPA:300.0 | GENERAL CHEMISTRY | CAMO-17-141976 | 1203853102 | DUP | 4 | 0 | 0 | 0 |
| EPA:300.0 | GENERAL CHEMISTRY | CAMO-17-141986 | 429979001 | REG | 4 | 0 | 0 | 0 |
| EPA:300.0 | GENERAL CHEMISTRY | CASA-17-142776 | 1203853103 | DUP | 4 | 0 | 0 | 0 |
| EPA:300.0 | GENERAL CHEMISTRY | LCS | 1203853101 | LCS | 0 | 0 | 4 | 0 |
| EPA:300.0 | GENERAL CHEMISTRY | MB | 1203853100 | MB | 4 | 0 | 0 | 0 |
| EPA:310.1 | GENERAL CHEMISTRY | CAMO-17-141976 | 1203852503 | DUP | 2 | 0 | 0 | 0 |
| EPA:310.1 | GENERAL CHEMISTRY | CAMO-17-141976 | 1203852506 | MS | 0 | 0 | 1 | 0 |
| EPA:310.1 | GENERAL CHEMISTRY | CAMO-17-141986 | 429979001 | REG | 2 | 0 | 0 | 0 |
| EPA:310.1 | GENERAL CHEMISTRY | LCS | 1203852501 | LCS | 0 | 0 | 1 | 0 |
| EPA:335.4 | GENERAL CHEMISTRY | CAMO-17-142002 | 429979002 | REG | 1 | 0 | 0 | 0 |
| EPA:335.4 | GENERAL CHEMISTRY | LCS | 1203847021 | LCS | 0 | 0 | 1 | 0 |
| EPA:335.4 | GENERAL CHEMISTRY | MB | 1203847020 | MB | 1 | 0 | 0 | 0 |
| EPA:335.4 | GENERAL CHEMISTRY | WT_SEP-PO-17-141442 | 1203847022 | DUP | 1 | 0 | 0 | 0 |
| EPA:335.4 | GENERAL CHEMISTRY | WT_SEP-PO-17-141442 | 1203847023 | MS | 0 | 0 | 1 | 0 |
| EPA:350.1 | GENERAL CHEMISTRY | CAMO-17-141986 | 1203869227 | DUP | 1 | 0 | 0 | 0 |
| EPA:350.1 | GENERAL CHEMISTRY | CAMO-17-141986 | 1203869228 | MS | 0 | 0 | 1 | 0 |
| EPA:350.1 | GENERAL CHEMISTRY | CAMO-17-141986 | 429979001 | REG | 1 | 0 | 0 | 0 |
| EPA:350.1 | GENERAL CHEMISTRY | LCS | 1203869226 | LCS | 0 | 0 | 1 | 0 |
| EPA:350.1 | GENERAL CHEMISTRY | MB | 1203869225 | MB | 1 | 0 | 0 | 0 |
| EPA:351.2 | GENERAL CHEMISTRY | CAMO-17-141990 | 1203856517 | DUP | 1 | 0 | 0 | 0 |
| EPA:351.2 | GENERAL CHEMISTRY | CAMO-17-141990 | 1203856519 | MS | 0 | 0 | 1 | 0 |
| EPA:351.2 | GENERAL CHEMISTRY | CAMO-17-141992 | 1203856516 | DUP | 1 | 0 | 0 | 0 |
| EPA:351.2 | GENERAL CHEMISTRY | CAMO-17-141992 | 1203856518 | MS | 0 | 0 | 1 | 0 |
| EPA:351.2 | GENERAL CHEMISTRY | CAMO-17-142002 | 429979002 | REG | 1 | 0 | 0 | 0 |
| EPA:351.2 | GENERAL CHEMISTRY | LCS | 1203856515 | LCS | 0 | 0 | 1 | 0 |
| EPA:351.2 | GENERAL CHEMISTRY | MB | 1203856514 | MB | 1 | 0 | 0 | 0 |
| EPA:353.2 | GENERAL CHEMISTRY | CAMO-17-141986 | 1203869238 | DUP | 1 | 0 | 0 | 0 |
| EPA:353.2 | GENERAL CHEMISTRY | CAMO-17-141986 | 429979001 | REG | 1 | 0 | 0 | 0 |
| EPA:353.2 | GENERAL CHEMISTRY | LCS | 1203869237 | LCS | 0 | 0 | 1 | 0 |
| EPA:353.2 | GENERAL CHEMISTRY | MB | 1203869236 | MB | 1 | 0 | 0 | 0 |
| EPA:365.4 | GENERAL CHEMISTRY | CAMO-17-141986 | 1203869234 | DUP | 1 | 0 | 0 | 0 |
| EPA:365.4 | GENERAL CHEMISTRY | CAMO-17-141986 | 1203869235 | MS | 0 | 0 | 1 | 0 |
| EPA:365.4 | GENERAL CHEMISTRY | CAMO-17-141986 | 429979001 | REG | 1 | 0 | 0 | 0 |
| EPA:365.4 | GENERAL CHEMISTRY | LCS | 1203869233 | LCS | 0 | 0 | 1 | 0 |
| EPA:365.4 | GENERAL CHEMISTRY | MB | 1203869232 | MB | 1 | 0 | 0 | 0 |
| SM:A2340B | INORGANIC | CAMO-17-141986 | 429979001 | REG | 1 | 0 | 0 | 0 |
| SW-846:6010C | INORGANIC | CAMO-17-141986 | 429979001 | REG | 17 | 0 | 0 | 0 |
| SW-846:6010C | INORGANIC | LCS | 1203849198 | LCS | 0 | 0 | 17 | 0 |
| SW-846:6010C | INORGANIC | MB | 1203849197 | MB | 17 | 0 | 0 | 0 |

DATA VALIDATION REPORT

| Analytical Method | Analytical Method Category | Field Sample ID | Lab Sample ID | Sample Purpose | Target Analytes | Surrogates | Spiked Compounds | TICS |
|-------------------|----------------------------|-----------------|---------------|----------------|-----------------|------------|------------------|------|
| SW-846:6010C | INORGANIC | RE02-17-141781 | 1203849199 | DUP | 17 | 0 | 0 | 0 |
| SW-846:6010C | INORGANIC | RE02-17-141781 | 1203849200 | MS | 0 | 0 | 17 | 0 |
| SW-846:6020 | INORGANIC | CAMO-17-141986 | 429979001 | REG | 11 | 0 | 0 | 0 |
| SW-846:6020 | INORGANIC | LCS | 1203849248 | LCS | 0 | 0 | 11 | 0 |
| SW-846:6020 | INORGANIC | MB | 1203849247 | MB | 11 | 0 | 0 | 0 |
| SW-846:6020 | INORGANIC | RE02-17-141781 | 1203849249 | DUP | 11 | 0 | 0 | 0 |
| SW-846:6020 | INORGANIC | RE02-17-141781 | 1203849250 | MS | 0 | 0 | 11 | 0 |
| SW-846:6850 | LCMS/MS PERCHLORATE | CAMO-17-141979 | 1203851077 | MS | 0 | 0 | 1 | 0 |
| SW-846:6850 | LCMS/MS PERCHLORATE | CAMO-17-141979 | 1203851078 | MSD | 0 | 0 | 1 | 0 |
| SW-846:6850 | LCMS/MS PERCHLORATE | CAMO-17-141986 | 429979001 | REG | 1 | 0 | 0 | 0 |
| SW-846:6850 | LCMS/MS PERCHLORATE | LCS | 1203851076 | LCS | 0 | 0 | 1 | 0 |
| SW-846:6850 | LCMS/MS PERCHLORATE | MB | 1203851075 | MB | 1 | 0 | 0 | 0 |
| SW-846:9060 | GENERAL CHEMISTRY | CAMO-17-141990 | 1203849665 | DUP | 1 | 0 | 0 | 0 |
| SW-846:9060 | GENERAL CHEMISTRY | CAMO-17-142002 | 429979002 | REG | 1 | 0 | 0 | 0 |
| SW-846:9060 | GENERAL CHEMISTRY | LCS | 1203849663 | LCS | 0 | 0 | 1 | 0 |
| SW-846:9060 | GENERAL CHEMISTRY | MB | 1203849662 | MB | 1 | 0 | 0 | 0 |

3. Are any analytes missing?

No.

4. Were any holding times exceeded?

| Field Sample ID | Lab Sample ID | Analytical Method | Sample Date | Extraction Date | Analysis Date | Extraction Hold Time | Max Extract Hold Time | Reject Above | Exceeds Limit | Analysis Hold Time | Max Analysis Hold Time | Reject Above | Exceeds Limit |
|-----------------|---------------|-------------------|-------------|-----------------|---------------|----------------------|-----------------------|--------------|---------------|--------------------|------------------------|--------------|---------------|
| CAMO-17-141986 | 429979001 | EPA:350.1 | 08-04-2017 | | 09-05-2017 | NA | | | | 32 | 28 | 29 | XX |
| CAMO-17-141986 | 429979001 | EPA:353.2 | 08-04-2017 | | 09-05-2017 | NA | | | | 32 | 28 | 29 | XX |
| CAMO-17-141986 | 429979001 | EPA:365.4 | 08-04-2017 | | 09-05-2017 | NA | | | | 32 | 28 | 29 | XX |

5. Any contaminants in blanks?

DATA VALIDATION REPORT

| Blank FS ID | Blank Lab Sample | Blank Type | Analytical Method | Sample | Parameter Name | Blank Lab Result | Lab Qualifier | Blank Lab Units | Blank Lab Detection Limit |
|-------------|------------------|--------------|-------------------|--------|-------------------------------|------------------|---------------|-----------------|---------------------------|
| MB | 1203850978 | METHOD BLANK | EPA:160.1 | W | Total Dissolved Solids | 5.71 | J | mg/L | 14.3 |
| MB | 1203869225 | METHOD BLANK | EPA:350.1 | W | Ammonia as Nitrogen | 0.0247 | J | mg/L | 0.050 |
| MB | 1203869232 | METHOD BLANK | EPA:365.4 | W | Total Phosphate as Phosphorus | 0.0381 | J | mg/L | 0.050 |

| Field Sample ID | Blank Lab | Blank Type | Analytical Method | Parameter Name | Blank Lab Result | Blank Lab Units | Lab Result | Lab Qualifier | Lab Detection Limit | Detect Flag | Detect to Nondetect Factor | Detect to Estimated Factor | Use Factors |
|-----------------|------------|--------------|-------------------|-------------------------------|------------------|-----------------|------------|---------------|---------------------|-------------|----------------------------|----------------------------|-------------|
| CAMO-17-141986 | 1203869225 | METHOD BLANK | EPA:350.1 | Ammonia as Nitrogen | 0.0247 | mg/L | 0.560 | H | 0.250 | Y | 5 | 100 | Y |
| CAMO-17-141986 | 1203869232 | METHOD BLANK | EPA:365.4 | Total Phosphate as Phosphorus | 0.0381 | mg/L | 0.0332 | HJ | 0.050 | Y | 5 | 100 | Y |

6. Any surrogate recoveries outside the control limits?

No.

7. Any MS/MSD recoveries or RPDs outside the control limits?

| Field Sample ID | MS Lab Sample ID | MSD Lab Sample ID | Analytical Method | Parameter Name | Analysis Lot ID | Analysis Date | Sample Matrix | MS Spike Recovery | MSD Spike Recovery | MS Upper Limit | MS Lower Limit | MS Reject Limit | RPD | RPD Limit |
|---------------------|------------------|-------------------|-------------------|-----------------|-----------------|---------------|---------------|-------------------|--------------------|----------------|----------------|-----------------|-----|-----------|
| WT_SEP-PO-17-141442 | 1203847023 | | EPA:335.4 | Cyanide (Total) | 1688862 | 08-09-2017 | W | 112 | | 110 | 90 | 10 | | |

8. Any LCS/LCSD or BS/BSD recoveries or RPDs outside the control limits?

DATA VALIDATION REPORT

No.

9. Any Field Duplicate RPDs outside the desired limits?

No.

10. Any Lab Duplicate RPDs outside the desired limits?

No.

11. Any required reporting limits exceeded?

No.

12. Additional Validator's Comments.

13. Display Flagged Data.

| Location ID | COC Number | Field Sample ID | Sample Purpose | Analysis Type Code | Analytical Suite | Analytical Method | Parameter Name | Lab Qualifier | Validation Qualifier | Validation Reason Codes | Detect Flag | Lab Result | Lab Units | Report Result | Report Units | Report MDA | Report Uncertainty | Lab Matrix | Sample Date | Percent | Analysis Lot ID | Validation Status Code | Use Flag |
|-------------|------------|-----------------|----------------|--------------------|-------------------|-------------------|-------------------------------|---------------|----------------------|-------------------------|-------------|------------|-----------|---------------|--------------|------------|--------------------|------------|-------------|---------|-----------------|------------------------|----------|
| R-62 | 2017-2359 | CAMO-17-141986 | REG | INIT | GENERAL CHEMISTRY | EPA:350.1 | Ammonia as Nitrogen | H | J+ | I4a | Y | 0.560 | mg/L | 0.560 | mg/L | | | W | 08/04/2017 | | 1698350 | VAL | Y |
| R-62 | 2017-2359 | CAMO-17-141986 | REG | INIT | GENERAL CHEMISTRY | EPA:365.4 | Total Phosphate as Phosphorus | HJ | U | I4 | N | 0.0332 | mg/L | 0.0332 | mg/L | | | W | 08/04/2017 | | 1698352 | VAL | Y |

Reason Code

Description

I4

the sample result is =<5x the concentration of related analyte in the method blank.

I4a

The affected analytes are considered estimated and biased high because this analyte was identified in the method blank but was >5x

J_LAB

The analytical laboratory qualified the detected result as estimated (J) because the result was less the PQL but greater than the MDL

NQ

The analytical laboratory did not qualify the analyte as not detected and/or any other standard qualifire. The analyte is detected in the sample.

U_LAB

The analytical laboratory qualified the analyte as not detected.

14. Usable Result Count.

DATA VALIDATION REPORT

| Field Sample ID | Location ID | Sample Purpose | Analytical Method | No. Unuseable Records | Total Records |
|-----------------|-------------|----------------|-------------------|-----------------------|---------------|
| CAMO-17-141986 | R-62 | REG | EPA:120.1 | 0 | 1 |
| CAMO-17-141986 | R-62 | REG | EPA:150.1 | 0 | 1 |
| CAMO-17-141986 | R-62 | REG | EPA:160.1 | 0 | 1 |
| CAMO-17-141986 | R-62 | REG | EPA:170.0 | 0 | 1 |
| CAMO-17-141986 | R-62 | REG | EPA:245.2 | 0 | 1 |
| CAMO-17-141986 | R-62 | REG | EPA:300.0 | 0 | 4 |
| CAMO-17-141986 | R-62 | REG | EPA:310.1 | 0 | 2 |
| CAMO-17-141986 | R-62 | REG | EPA:350.1 | 0 | 1 |
| CAMO-17-141986 | R-62 | REG | EPA:353.2 | 0 | 1 |
| CAMO-17-141986 | R-62 | REG | EPA:365.4 | 0 | 1 |
| CAMO-17-141986 | R-62 | REG | SM:A2340B | 0 | 1 |
| CAMO-17-141986 | R-62 | REG | SW-846:6010C | 0 | 17 |
| CAMO-17-141986 | R-62 | REG | SW-846:6020 | 0 | 11 |
| CAMO-17-141986 | R-62 | REG | SW-846:6850 | 0 | 1 |
| CAMO-17-142002 | R-62 | REG | EPA:170.0 | 0 | 1 |
| CAMO-17-142002 | R-62 | REG | EPA:245.2 | 0 | 1 |
| CAMO-17-142002 | R-62 | REG | EPA:335.4 | 0 | 1 |
| CAMO-17-142002 | R-62 | REG | EPA:351.2 | 0 | 1 |
| CAMO-17-142002 | R-62 | REG | SW-846:9060 | 0 | 1 |

September 01, 2017

gel.com

Ms. Nita Patel
Los Alamos National Laboratory
TA-00, SM1237, Rm104C
Los Alamos, New Mexico 87545

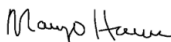
Re: LANL- WQH Water Samples
Work Order: 429979
SDG: 2017-2359

Dear Ms. Patel:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the following analytical results for the sample(s) we received on August 08, 2017, and analyzed for General Chemistry, Metals and Perchlorates by LCMSMS. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4485.

Sincerely,


Margo Herron for
Valerie Davis
Project Manager

Chain of Custody: 2017-2359
Enclosures



ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Work Order #: 429979
SDG: 2017-2359

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Case Narrative

**Case Narrative for
ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)
LANL- WQH Water Samples
Workorder #: 429979
SDG # : 2017-2359**

September 01, 2017

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary

Sample receipt The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on August 08, 2017 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperature was within specification (0 - 6C). Shipping container temperatures were checked, documented, and within specifications. There are no additional comments concerning sample receipt.

Sample Identification The laboratory received the following samples:

| <u>Laboratory ID</u> | <u>Client ID</u> |
|-----------------------------|-------------------------|
| 429979001 | CAMO-17-141986 |
| 429979002 | CAMO-17-142002 |

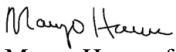
Case Narrative

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

Data Package

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: General Chemistry, Metals and Perchlorates by LCMSMS.

I certify that this data report is in compliance with the terms and conditions of the subcontract and task order, both technically and for completeness, for other than the conditions detailed in the attached case narrative.


Margo Herron for
Valerie Davis
Project Manager

List of current GEL Certifications as of 01 September 2017

| State | Certification |
|--------------------------|------------------------------|
| Alaska | UST-0110 |
| Arkansas | 88-0651 |
| CLIA | 42D0904046 |
| California | 2940 |
| Colorado | SC00012 |
| Connecticut | PH-0169 |
| Delaware | SC00012 |
| DoD ELAP/ ISO17025 A2LA | 2567.01 |
| Florida NELAP | E87156 |
| Foreign Soils Permit | P330-15-00283, P330-15-00253 |
| Georgia | SC00012 |
| Georgia SDWA | 967 |
| Hawaii | SC00012 |
| Idaho Chemistry | SC00012 |
| Idaho Radiochemistry | SC00012 |
| Illinois NELAP | 200029 |
| Indiana | C-SC-01 |
| Kansas NELAP | E-10332 |
| Kentucky SDWA | 90129 |
| Kentucky Wastewater | 90129 |
| Louisiana NELAP | 03046 (AI33904) |
| Louisiana SDWA | LA170010 |
| Maryland | 270 |
| Massachusetts | M-SC012 |
| Michigan | 9976 |
| Mississippi | SC00012 |
| Nebraska | NE-OS-26-13 |
| Nevada | SC000122018-1 |
| New Hampshire NELAP | 205415 |
| New Jersey NELAP | SC002 |
| New Mexico | SC00012 |
| New York NELAP | 11501 |
| North Carolina | 233 |
| North Carolina SDWA | 45709 |
| North Dakota | R-158 |
| Oklahoma | 9904 |
| Pennsylvania NELAP | 68-00485 |
| Puerto Rico | SC00012 |
| S.Carolina Radchem | 10120002 |
| South Carolina Chemistry | 10120001 |
| Tennessee | TN 02934 |
| Texas NELAP | T104704235-17-12 |
| Utah NELAP | SC000122017-23 |
| Vermont | VT87156 |
| Virginia NELAP | 460202 |
| Washington | C780 |
| West Virginia | 997404 |

Chain of Custody and Supporting Documentation



Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

| | | | |
|--------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Client: <u>ESHL</u> | | SDG/AR/COC/Work Order: <u>429979</u> | |
| Received By: <u>ZKW</u> | | Date Received: <u>8/8/17</u> | |
| Carrier and Tracking Number | | Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>5908 1782 5071</u> <u>5908 1782 5050</u> <u>5908 1782 5060</u> | |
| Suspected Hazard Information | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | *If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation. | |
| Shipped as a DOT Hazardous? | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | Hazard Class Shipped: _____ UN#: _____ | |
| COC/Samples marked or classified as radioactive? | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <u>CPM</u> mR/Hr Classified as: Rad 1 Rad 2 Rad 3 | |
| Is package, COC, and/or Samples marked HAZ? | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other: _____ | |

| Sample Receipt Criteria | Yes | NA | No | Comments/Qualifiers (Required for Non-Conforming Items) |
|-------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Shipping containers received intact and sealed? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 2 Chain of custody documents included with shipment? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 3 Samples requiring cold preservation within (0 ≤ deg. C)?* | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Preservation Method: Wet Ice <u>ice packs</u> Dry ice None Other: *all temperatures are recorded in Celsius TEMP: <u>3°C</u> |
| 4 Daily check performed and passed on IR temperature gun? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Temperature Device Serial #: <u>IR3-16</u> Secondary Temperature Device Serial # (If Applicable): _____ |
| 5 Sample containers intact and sealed? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Circle Applicable: Seals broken Damaged container Leaking container Other (describe) |
| 6 Samples requiring chemical preservation at proper pH? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Sample ID's and Containers Affected: <u>WST samples preserved w/ HNO₃ read unpreserved</u> If Preservation added, Lot#: _____ |
| 7 Do any samples require Volatile Analysis? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | If Yes, Are Encores or Soil Kits present? Yes _____ No _____ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes _____ No _____ N/A _____ (If unknown, select No) VOA vials free of headspace? Yes _____ No _____ N/A _____ Sample ID's and containers affected: _____ |
| 8 Samples received within holding time? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | ID's and tests affected: _____ |
| 9 Sample ID's on COC match ID's on bottles? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Sample ID's and containers affected: _____ |
| 10 Date & time on COC match date & time on bottles? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Sample ID's affected: _____ |
| 11 Number of containers received match number indicated on COC? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Sample ID's affected: <u>See Below</u> |
| 12 Are sample containers identifiable as GEL provided? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 13 COC form is properly signed in relinquished/received sections? | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |

Comments (Use Continuation Form if needed):

- We rec'd one cont. for -143235 and one for -143233
- We did not receive a cont. for NH₃ + NO₃/NO₂ + PO₄ for sample -141986

PM (or PMA) review: Initials

MAU

Date

8/9/17

Page

1 of 1

GL-CHL-SR-001 Rev 5

ORIGIN ID:SAFA (505) 665-9966
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03

SHIP DATE: 07AUG17
ACTWGT: 46.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

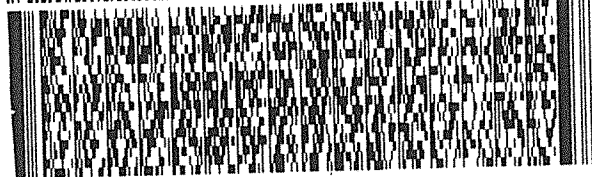
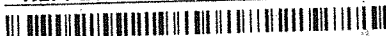
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRAE18DBRA000



FedEx
Express



1 of 3

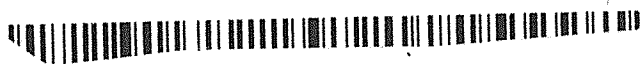
TRK# 5908 1782 5050

0201
MASTER

X7 RBWA

29407
SC-US CHS

TUE - 08 AUG 10:30A
PRIORITY OVERNIGHT



ORIGIN ID:SAFA (505) 665-9966
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03

SHIP DATE: 07AUG17
ACTWGT: 54.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

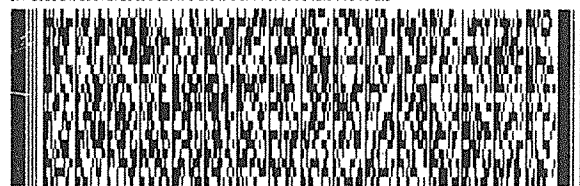
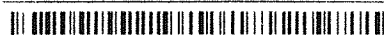
BILL SENDER

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GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRAE18DBRA000



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3 of 3

MPS# 5908 1782 5071

0263
Mstr# 5908 1782 5050

0201

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29407
SC-US CI

TUE - 08 AUG 10:30
PRIORITY OVERNIGHT



ORIGIN ID:SAFA (505) 665-9966
KEITH GREENE
LOS ALAMOS NATL LAB.
TA00 BLDG 1237 DPU 03

SHIP DATE: 07AUG17
ACTWGT: 46.0 LB MAN
CAD: 0014176/CAFE2916

LOS ALAMOS, NM 87545
UNITED STATES US

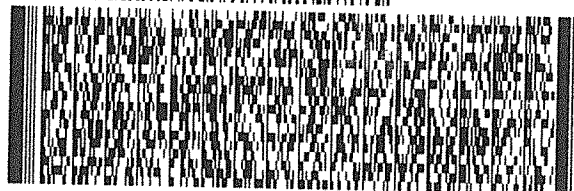
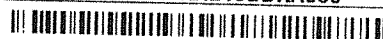
BILL SENDER

TO VALERIE DAVIS
GENERAL ENGINEERING LAB
2040 SAVAGE RD

CHARLESTON SC 29407

(843) 556-8171

REF: 21PD0ASRAE18DBRA000



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Express



2 of 3

MPS# 5908 1782 5060

0263
Mstr# 5908 1782 5050

0201

X7 RBWA

29407
SC-US CH

TUE - 08 AUG 10:30
PRIORITY OVERNIGHT



Data Review Qualifier Flag Definition Sheet

Data Review Qualifier Definitions

| Qualifier | Explanation |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| * | A quality control analyte recovery is outside of specified acceptance criteria |
| ** | Analyte is a surrogate compound |
| < | Result is less than value reported |
| > | Result is greater than value reported |
| ^ | RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL |
| A | The TIC is a suspected aldol-condensation product |
| B | Target analyte was detected in the associated blank |
| B | Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL |
| BD | Results are either below the MDC or tracer recovery is low |
| C | Analyte has been confirmed by GC/MS analysis |
| D | Results are reported from a diluted aliquot of the sample |
| d | 5-day BOD-The 2:1 depletion requirement was not met for this sample |
| E | Organics-Concentration of the target analyte exceeds the instrument calibration range |
| E | Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria |
| H | Analytical holding time was exceeded |
| h | Preparation or preservation holding time was exceeded |
| J | Value is estimated |
| N | Metals-The Matrix spike sample recovery is not within specified control limits |
| N | Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor |
| N/A | Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more |
| ND | Analyte concentration is not detected above the reporting limit |
| UI | Gamma Spectroscopy-Uncertain identification |
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier |
| Y | QC Samples were not spiked with this compound |
| Z | Paint Filter Test-Particulates passed through the filter, however no free liquids were observed. |

P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.
For HPLC, the difference is >70%.

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

Perchlorates by LCMSMS Analysis

Case Narrative

**Perchlorates by LCMSMS
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2359
Work Order #: 429979**

Method/Analysis Information

Procedure: **Definitive Low Level Perchlorate Analysis Utilizing Liquid Chromatography/Mass Spectrometry/Mass Spectrometry (LC/MS/MS) by EPA Method 6850 Modified (6850M)**

Analytical Method: SW-846:6850

Prep Method: SW-846:6850

Analytical Batch Number: 1690518

Prep Batch Number: 1690517

Sample Analysis

| Sample ID | Client ID |
|------------------|--------------------------------------------------------|
| 429979001 | 429979001 (CAMO-17-141986) |
| 1203851079 | Interference Check Sample (ICS) |
| 1203851075 | Method Blank (MB) |
| 1203851076 | Laboratory Control Sample (LCS) |
| 1203851077 | 429324001(CAMO-17-141979) Matrix Spike (MS) |
| 1203851078 | 429324001(CAMO-17-141979) Matrix Spike Duplicate (MSD) |

The samples in this SDG were analyzed on an "as received" basis.

Preparation/Analytical Method Verification

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-OA-E-067 REV# 14.

Calibration Information

Initial Calibration

All initial calibration requirements have been met for this SDG. Due to software constraints, all Initial

Calibration Blanks must be designated as IPB001.

ICV Requirements

All associated initial calibration verification standard(s) (ICV) met the acceptance criteria.

CCB Requirements

All continuing calibration blanks (CCB) bracketing the analyses associated with this batch were within acceptance criteria.

CCV Requirements

All continuing calibration checks (CCV) requirements were met by all bracketing CCV standards.

Low Level Standard (CRI) Requirements

All low level calibration verification (CRI) requirements were met by all bracketing CRI standards.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Interference Check Sample (ICS)

The ICS spike recoveries met the acceptance criteria.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

QC Sample Designation

Client sample 429324001 (CAMO-17-141979) was chosen for matrix spike and matrix spike duplicate analysis.

Matrix Spike (MS) Recovery Statement

The MS recoveries were within the established acceptance limits.

MS/MSD Relative Percent Difference (RPD) Statement

The RPDs between the MS and MSD met the acceptance limits.

Internal Standard Area Acceptance

The internal standard areas were within the required acceptance criteria for all samples and QC.

Retention Time

During the analysis of Perchlorate by LC/MS/MS, retention time shifts are commonly observed. These retention time shifts, which are caused by fouling of the column by the sample matrices, are problematic when the retention time is used as one of the criterion for confirmation. To overcome this problem, a known amount of O(18) labeled Perchlorate was added to each sample as a retention time standard. The presence of Perchlorate was confirmed by the relative retention time (RRT) of the Perchlorate peak and the O(18) standard. A RRT window of 0.98 to 1.02, as required by DOD QSM 5.0, has been used. In addition to the isotopic ratio, the presence of Perchlorate in the samples associated with this data package have been confirmed using the relative retention criteria stated above, not the absolute retention time.

Technical Information

Holding Time Specifications

All samples in this SDG in this analytical batch met the specified holding time. GEL assigns holding times based on the associated methodology, which assigns the date and time from sample collection of sample receipt. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-extraction/Re-analysis

Re-extractions or re-analyses were not required in this SDG.

Miscellaneous Information**Manual Integrations**

Manual integrations were not required for any data file associated with this SDG.

Method Comments

The samples in this SDG were not originally analyzed using EPA Method 314.0.

Additional Comments

The Perchlorate Isotope Ratio on the Form I may differ slightly from the ratio on the corresponding raw data due to rounding rules and/or significant figures or due to software limitations when there are manual integrations, dilutions or other factors. The ratio value of the Form I is the correct value. The retention time marker, Perchlorate-O (18), is added to all samples, instrument blanks, and standards prior to injection. It is used to verify the retention time of Perchlorate and Perchlorate-101 and to insure an accurate injection occurred. Due to various anions affecting the recovery of Perchlorate-O (18) and not Perchlorate and Perchlorate-101, the calibration curves of Perchlorate and Perchlorate-101 are internally corrected for using Perchlorate-O (18).

Perchlorate Isotope Ratio

The Perchlorate isotope ratio met acceptance criteria for all samples and QC samples. Please see the isotope ratio criteria in the Miscellaneous Section.

System Configuration

The laboratory utilizes a Waters LC 2795 liquid chromatography instrument for Perchlorate analysis. It is coupled with a Micromass Quattro Ultima Mass Spectrometer/Mass Spectrometer. It is designated as LCMSMS #2. It is fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis. The laboratory may also utilize an Agilent 1100 liquid chromatography instrument for Perchlorate analysis. It is coupled with an Applied Biosystems 4000 Mass Spectrometer/Mass Spectrometer, designated as LCMSMS #3 or LCMSMS #4. It is also fitted with an electrospray probe that is operated in the negative electrospray ionization mode for Perchlorate analysis.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Chromatographic Columns

The LC-MS/MS Perchlorate analysis was performed on a Quattro Ultima LC/MS/MS.

Chromatographic separation of Perchlorate is accomplished through analysis on the following anion column:

Dionex: IonPac AG-16 2 x 50 mm.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2017-2359 GEL Work Order: 429979

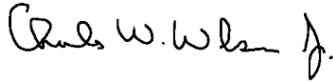
The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a surrogate compound
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- DL Indicates that sample is diluted.
- RA Indicates that sample is re-analyzed without re-extraction.
- RE Indicates that sample is re-extracted.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Charles Wilson

Date: 16 AUG 2017

Title: Analyst II

Sample Data Summary

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLC

Client Sample No.

CAMO-17-141986Lab Code: GELDate Received: 08-AUG-17Instrument: LCMSMSGEL Job No (SDG): 2017-2359Method: SW846 6850 ModifiedGEL Sample ID: 429979001Matrix: WATERDate Filtered: 10-AUG-17Extraction Batch ID: 1690517Injection Volume (uL): 20Extraction Type: Filter/DAISample Volume/Weight: 10.0 mL%Solids: Concentrated Extract Volume: 10.0

| CAS No. | Analyte^ | MDL | RL | Conc* | Units | Q | Dilution Factor | Date Analyzed | GEL File ID |
|------------|---------------------------|-----|----|-------|-------|---|-----------------|-----------------|-------------|
| 14797-73-0 | Perchlorate | .05 | .2 | 0.860 | ug/L | | 1 | 11-AUG-17 18:12 | per0811029a |
| | Perchlorate Isotope Ratio | | | 3.02 | | | 1 | 11-AUG-17 18:12 | per0811029a |
| 14797-73-0 | Perchlorate-101 | .05 | .2 | 0.835 | ug/L | | 1 | 11-AUG-17 18:12 | per0811029a |
| | Perchlorate-O(18) | | | 0.503 | ug/L | | 1 | 11-AUG-17 18:12 | per0811029a |

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

Quality Control Summary

Perchlorate Laboratory Control Sample

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No. (SDG): 2017-2359

Extract Batch Code: 1690517

Date Filtered: 10-AUG-17

Matrix: WATER

Sample ID: 1203851076

| Analyte^ | True | Found | Units | %Rec | Q | Control Limits |
|---------------------------|-------|-------|-------|------|---|----------------|
| Perchlorate | 0.200 | .21 | ug/L | 105 | | 85 - 115 |
| Perchlorate Isotope Ratio | | 3.26 | | | | - |
| Perchlorate-101 | 0.200 | .189 | ug/L | 94 | | 85 - 115 |
| Perchlorate-O(18) | | .48 | ug/L | | | - |

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

Perchlorate Spike/Spike Duplicate Summary

Lab Name: General Engineering Laboratories

Lab Code: GEL

GEL Job No (SDG): 2017-2359

Extract Batch Code: 1690517

Date Extracted: 10-AUG-17

GEL MS/PS ID: 1203851077

Client ID: CAMO-17-141979

GEL MSD/PSD ID: 1203851078

QC Type: MS

| Compound^ | Spike Added | Sample Conc | Units | MS Conc | MS Rec # | MSD Conc | MSD Rec # | RPD # | RPD Limit | Recovery Limit |
|---------------------------|-------------|-------------|-------|---------|----------|----------|-----------|-------|-----------|----------------|
| Perchlorate | 0.200 | 1.13 | ug/L | 1.33 | 100 | 1.34 | 107 | 1 | 30 | 75 - 125 |
| Perchlorate Isotope Ratio | 0 | 2.94 | | 2.94 | | 2.87 | | 2 | | - |
| Perchlorate-101 | 0.200 | 1.12 | ug/L | 1.33 | 101 | 1.37 | 122 | 3 | 30 | 75 - 125 |
| Perchlorate-O(18) | 0 | 0.527 | ug/L | 0.517 | | .503 | | 3 | | - |

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

Quality Control Data

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1690517Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

MBDate Received: 10-AUG-17GEL Job No (SDG): 2017-2359GEL Sample ID: 1203851075Date Filtered: 10-AUG-17Injection Volume (uL): 20%Solids:

| CAS No. | Analyte^ | MDL | RL | Conc* | Units | Q | Dilution Factor | Date Analyzed | GEL File ID |
|------------|---------------------------|-----|----|-------|-------|---|-----------------|-----------------|-------------|
| 14797-73-0 | Perchlorate | .05 | .2 | 0.050 | ug/L | U | 1 | 11-AUG-17 14:37 | per0811013a |
| | Perchlorate Isotope Ratio | | | | | | 1 | 11-AUG-17 14:37 | per0811013a |
| 14797-73-0 | Perchlorate-101 | .05 | .2 | 0.050 | ug/L | U | 1 | 11-AUG-17 14:37 | per0811013a |
| | Perchlorate-O(18) | | | 0.492 | ug/L | | 1 | 11-AUG-17 14:37 | per0811013a |

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: EPA 6850 ModifiedMatrix: WATERExtraction Batch ID: 1690517Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

LCSDate Received: 10-AUG-17GEL Job No (SDG): 2017-2359GEL Sample ID: 1203851076Date Filtered: 10-AUG-17Injection Volume (uL): 20%Solids:

| CAS No. | Analyte^ | MDL | RL | Conc* | Units | Q | Dilution Factor | Date Analyzed | GEL File ID |
|------------|---------------------------|-----|----|-------|-------|---|-----------------|-----------------|-------------|
| 14797-73-0 | Perchlorate | .05 | .2 | 0.210 | ug/L | | 1 | 11-AUG-17 14:50 | per0811014a |
| | Perchlorate Isotope Ratio | | | 3.26 | | | 1 | 11-AUG-17 14:50 | per0811014a |
| 14797-73-0 | Perchlorate-101 | .05 | .2 | 0.189 | ug/L | J | 1 | 11-AUG-17 14:50 | per0811014a |
| | Perchlorate-O(18) | | | 0.480 | ug/L | | 1 | 11-AUG-17 14:50 | per0811014a |

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1690517Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

ICS

Date Received:

GEL Job No (SDG): 2017-2359GEL Sample ID: 1203851079Date Filtered: 10-AUG-17Injection Volume (uL): 20

%Solids:

| CAS No. | Analyte^ | MDL | RL | Conc* | Units | Q | Dilution Factor | Date Analyzed | GEL File ID |
|------------|---------------------------|-----|----|-------|-------|---|-----------------|-----------------|-------------|
| 14797-73-0 | Perchlorate | .05 | .2 | 0.237 | ug/L | | 1 | 11-AUG-17 15:04 | per0811015a |
| | Perchlorate Isotope Ratio | | | 3.16 | | | 1 | 11-AUG-17 15:04 | per0811015a |
| 14797-73-0 | Perchlorate-101 | .05 | .2 | 0.219 | ug/L | | 1 | 11-AUG-17 15:04 | per0811015a |
| | Perchlorate-O(18) | | | 0.484 | ug/L | | 1 | 11-AUG-17 15:04 | per0811015a |

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1690517Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-141979MSDate Received: 01-AUG-17GEL Job No (SDG): 2017-2359GEL Sample ID: 1203851077Date Filtered: 10-AUG-17Injection Volume (uL): 20%Solids:

| CAS No. | Analyte^ | MDL | RL | Conc* | Units | Q | Dilution Factor | Date Analyzed | GEL File ID |
|------------|---------------------------|-----|----|-------|-------|---|-----------------|-----------------|-------------|
| 14797-73-0 | Perchlorate | .05 | .2 | 1.33 | ug/L | | 1 | 11-AUG-17 15:31 | per0811017a |
| | Perchlorate Isotope Ratio | | | 2.94 | | | 1 | 11-AUG-17 15:31 | per0811017a |
| 14797-73-0 | Perchlorate-101 | .05 | .2 | 1.33 | ug/L | | 1 | 11-AUG-17 15:31 | per0811017a |
| | Perchlorate-O(18) | | | 0.517 | ug/L | | 1 | 11-AUG-17 15:31 | per0811017a |

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

Perchlorate Analysis Data Sheet

Lab Name: GEL Laboratories LLCLab Code: GELInstrument: LCMSMSMethod: SW846 6850 ModifiedMatrix: WATERExtraction Batch ID: 1690517Extraction Type: Filter/DAISample Volume/Weight: 10.0 mLConcentrated Extract Volume: 10.0

Client Sample No.

CAMO-17-141979MSDDate Received: 01-AUG-17GEL Job No (SDG): 2017-2359GEL Sample ID: 1203851078Date Filtered: 10-AUG-17Injection Volume (uL): 20%Solids:

| CAS No. | Analyte^ | MDL | RL | Conc* | Units | Q | Dilution Factor | Date Analyzed | GEL File ID |
|------------|---------------------------|-----|----|-------|-------|---|-----------------|-----------------|-------------|
| 14797-73-0 | Perchlorate | .05 | .2 | 1.34 | ug/L | | 1 | 11-AUG-17 15:44 | per0811018a |
| | Perchlorate Isotope Ratio | | | 2.87 | | | 1 | 11-AUG-17 15:44 | per0811018a |
| 14797-73-0 | Perchlorate-101 | .05 | .2 | 1.37 | ug/L | | 1 | 11-AUG-17 15:44 | per0811018a |
| | Perchlorate-O(18) | | | 0.503 | ug/L | | 1 | 11-AUG-17 15:44 | per0811018a |

^ When the analyte name is Perchlorate Isotope Ratio the concentration is a unitless value calculated from the ratio of Perchlorate peak area to Perchlorate-101 peak area. The Perchlorate-101 and isotopic ratio results are provided for qualitative purposes only. The results are used to verify the presence and quantitation of Perchlorate.

*Concentration =

$$\text{Instrument Value} \times \frac{\text{Concentrated Extract Volume}}{\text{Aliquot}} \times \frac{1}{\% \text{Solids}}$$

Metals Analysis

Case Narrative

Metals
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2359
Work Order #: 429979

| Sample ID | Client ID |
|------------------|---------------------------------------------------|
| 429979001 | CAMO-17-141986 |
| 429979002 | CAMO-17-142002 |
| 1203849197 | Method Blank (MB) ICP |
| 1203849198 | Laboratory Control Sample (LCS) |
| 1203849201 | 429939001(RE02-17-141781L) Serial Dilution (SD) |
| 1203849199 | 429939001(RE02-17-141781D) Sample Duplicate (DUP) |
| 1203849200 | 429939001(RE02-17-141781S) Matrix Spike (MS) |
| 1203849247 | Method Blank (MB) ICP-MS |
| 1203849248 | Laboratory Control Sample (LCS) |
| 1203849251 | 429939001(RE02-17-141781L) Serial Dilution (SD) |
| 1203849249 | 429939001(RE02-17-141781D) Sample Duplicate (DUP) |
| 1203849250 | 429939001(RE02-17-141781S) Matrix Spike (MS) |
| 1203862860 | Method Blank (MB) CVAA |
| 1203862861 | Laboratory Control Sample (LCS) |
| 1203862866 | 429979001(CAMO-17-141986L) Serial Dilution (SD) |
| 1203862862 | 429979001(CAMO-17-141986D) Sample Duplicate (DUP) |
| 1203862864 | 429979001(CAMO-17-141986S) Matrix Spike (MS) |

Sample Analysis

Samples 429979001 and 002 in this SDG were analyzed for metals and mercury on an "as received" basis.

Method/Analysis Information

| | |
|---------------------------------------|------------------------------------------------------------------------------------------------------------|
| Analytical Batch: | 1689727, 1689747, 1695634 and 1697053 |
| Prep Batch : | 1689726, 1689746 and 1695628 |
| Standard Operating Procedures: | GL-MA-E-013 REV# 29, GL-MA-E-006 REV# 13, GL-MA-E-014 REV# 31, GL-MA-E-010 REV# 35 and GL-GC-E-107 REV# 10 |
| Analytical Method: | SW846 3005A/6010C, SW846 3005A/6020A, EPA 245.2 1974 and SM:A2340B |
| Prep Method : | SW846 3005A and EPA 245.1/245.2 Prep |

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

System Configuration

The Hardness as CaCO₃ is calculated from Calcium and Magnesium results.

The Metals analysis-ICP was performed on a PE 7300 Optima radial/axial-viewing inductively coupled plasma atomic emission spectrometer. The instrument is equipped with an ESI SC-FAST introduction, cyclonic spray chamber, and yttrium or scandium internal standard.

The Metals analysis-Mercury was performed on a Perkin-Elmer Flow Injection Mercury System (FIMS-100) automated mercury analyzer. The instrument consists of a cold vapor atomic absorption spectrometer set to detect mercury at a wavelength of 253.7 nm.

The Metals analysis - ICPMS was performed on a PerkinElmer NexION 300X ICPMS. The instrument is equipped with a ESI PFA-ST nebulizer, quadrupole mass spectrometer, dual mode electron multiplier detector, and Kinetic Energy Discrimination (KED) technology. Internal standards of scandium, germanium, indium, tantalum, and/or lutetium were utilized to cover the mass spectrum.

Calibration Information

Instrument Calibration

All initial calibration requirements have been met for this sample delivery group (SDG).

CRDL/PQL Requirements

The CRDL/PQL standard recoveries met the referenced advisory control limits.

ICSA/ICSAB Statement

All interference check samples (ICSA and ICSAB) associated with this SDG met the established acceptance criteria. For the ICP-MS analysis, the ICSA solution contains analyte concentrations which are verified trace impurities indigenous to the purchased standard.

Continuing Calibration Blanks (CCB) Requirements

All continuing calibration blanks (CCB) bracketing the sample in this SDG did not meet the acceptance criteria. The samples bracketed by this CCB, however, contained silica at a concentration at least ten times greater than the concentration in the CCB. This indicates that any contribution to the concentration of silica in the samples from potential laboratory contamination would be minimal. 429979001 (CAMO-17-141986)-ICP.

Continuing Calibration Verification (CCV) Requirements

All continuing calibration verifications (CCV) bracketing this SDG met the acceptance criteria.

Quality Control (QC) Information

Method Blank (MB) Statement

The MBs analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recoveries met the acceptance limits.

Quality Control (QC) Sample Statement

The following samples were selected as the quality control (QC) samples for this SDG: 429939001 (RE02-17-141781)-ICP and ICP-MS and 429979001 (CAMO-17-141986)-CVAA.

Matrix Spike (MS/MSD) Recovery Statement

The percent recoveries (%R) obtained from the MS/MSD analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike met the recommended quality control acceptance criteria for percent recoveries for all applicable analytes.

Duplicate Relative Percent Difference (RPD) Statement

The RPD obtained from the designated sample duplicate (DUP) is evaluated based on acceptance criteria of 20% when the sample is >5X the contract required reporting limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control of +/-RL is used to evaluate the DUP results. The relative percent differences (RPD) between the sample and its duplicate (DUP) were within acceptable limits for all applicable analytes.

Serial Dilution % Difference Statement

All applicable analytes in the serial dilution (SDILT) demonstrated acceptable correlation to its associated sample and met the established acceptance percent difference criteria.

Technical Information**Holding Time Specifications**

GEL assigns holding times based on the associated methodology. Holding time is measured by comparison of the date and time of sample collection to the date and time of sample preparation and analysis. Those holding times expressed in hours are calculated in the AlphaLIMS system. Those holding times expressed as days expire at midnight on the day of expiration. All samples in this SDG met the specified holding time.

Preparation/Analytical Method Verification

All procedures were performed as stated in the SOP.

Sample Dilutions

Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. Sample was diluted to ensure that the silica concentration was within the linear calibration range of the instrument. 429979001 (CAMO-17-141986)-ICP.

| | |
|---------|--------|
| Analyte | 429979 |
| | 001 |
| Silica | 10X |

Preparation Information

The samples in this SDG were not diluted and were prepared according to the cited SOP.

Miscellaneous Information**Electronic Packaging Comment**

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. An electronic signature page inserted after the case narrative will include the data validator's signature and title. The signature page also includes the data qualifiers used in the fractional package. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Additional Comments

Total Hardness by Calculation is determined using the results of Total Calcium (Ca) and Total Magnesium (Mg) determined by ICP or ICP-MS.

$$\text{Hardness} = 2.497 (\text{Ca}) + 4.118 (\text{Mg})$$

Please refer to the Total Ca and Total Mg data to validate results appearing on the Hardness Summary sheet.

Both results are in the Inorganic/metals section of the package. There is no Batch QC for calculated results, and thus no QC Summary for the Hardness by Calculation Batch. The MDLs and PQLs are calculated using the higher of the two calculated values of Ca or Mg.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2017-2359 GEL Work Order: 429979

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature:



Name: Nik-Cole Elmore

Date: 01 SEP 2017

Title: Data Validator

Sample Data Summary

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2359**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 429979001**BASIS:** As Received**DATE COLLECTED** 04-AUG-17**CLIENT ID:** CAMO-17-141986**LEVEL:** Low**DATE RECEIVED** 08-AUG-17**MATRIX:** W**%SOLIDS:** 0

| CAS | Analyte | Result | Units | Qual | MDL | PQL | CRDL | DF | M* | Analyst | Run Date | Analytical Run | Analytical Batch |
|-----------|---------|--------|-------|------|-------|-----|------|----|----|---------|----------------|----------------|------------------|
| 7439-97-6 | Mercury | 0.067 | ug/L | U | 0.067 | 0.2 | 0.2 | 1 | AV | MTM1 | 08/28/17 10:48 | 082817W1-6 | 1695634 |

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2359

CONTRACT: ESHL00114

METHOD TYPE: SW846

SAMPLE ID: 429979001

BASIS: As Received

DATE COLLECTED 04-AUG-17

CLIENT ID: CAMO-17-141986

LEVEL: Low

DATE RECEIVED 08-AUG-17

MATRIX: W

%SOLIDS: 0

| CAS | Analyte | Result | Units | Qual | MDL | PQL | CRDL | DF | M* | Analyst | Run Date | Analytical Run | Analytical Batch |
|-----------|------------|--------|-------|------|-------|------|------|----|----|---------|----------------|----------------|------------------|
| 7429-90-5 | Aluminum | 68 | ug/L | U | 68 | 200 | 200 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7440-36-0 | Antimony | 1 | ug/L | U | 1 | 3 | 3 | 1 | MS | PRB | 08/17/17 12:06 | 170817-4 | 1689747 |
| 7440-38-2 | Arsenic | 2 | ug/L | U | 2 | 5 | 5 | 1 | MS | PRB | 08/16/17 22:16 | 170816-5 | 1689747 |
| 7440-39-3 | Barium | 33.1 | ug/L | | 1 | 5 | 5 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7440-41-7 | Beryllium | 1 | ug/L | U | 1 | 5 | 5 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7440-42-8 | Boron | 15 | ug/L | U | 15 | 50 | 50 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7440-43-9 | Cadmium | 0.30 | ug/L | U | 0.3 | 1 | 1 | 1 | MS | PRB | 08/16/17 22:16 | 170816-5 | 1689747 |
| 7440-70-2 | Calcium | 23100 | ug/L | | 50 | 200 | 200 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7440-47-3 | Chromium | 232 | ug/L | | 3 | 10 | 10 | 1 | MS | PRB | 08/16/17 22:16 | 170816-5 | 1689747 |
| 7440-48-4 | Cobalt | 1 | ug/L | U | 1 | 5 | 5 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7440-50-8 | Copper | 3 | ug/L | U | 3 | 10 | 10 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7439-89-6 | Iron | 30 | ug/L | U | 30 | 100 | 100 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7439-92-1 | Lead | 0.50 | ug/L | U | 0.5 | 2 | 2 | 1 | MS | PRB | 08/16/17 02:04 | 170815-3 | 1689747 |
| 7439-95-4 | Magnesium | 6150 | ug/L | | 110 | 300 | 300 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7439-96-5 | Manganese | 2 | ug/L | U | 2 | 10 | 10 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7439-98-7 | Molybdenum | 0.674 | ug/L | | 0.2 | 0.5 | 0.5 | 1 | MS | PRB | 08/16/17 22:16 | 170816-5 | 1689747 |
| 7440-02-0 | Nickel | 3.71 | ug/L | | 0.6 | 2 | 2 | 1 | MS | PRB | 08/16/17 22:16 | 170816-5 | 1689747 |
| 7440-09-7 | Potassium | 1240 | ug/L | | 50 | 150 | 150 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7782-49-2 | Selenium | 2 | ug/L | U | 2 | 5 | 5 | 1 | MS | PRB | 08/16/17 22:16 | 170816-5 | 1689747 |
| 7631-86-9 | Silica | 59500 | ug/L | | 530 | 2130 | 2130 | 10 | P | JWJ | 08/16/17 16:39 | 081617-2 | 1689727 |
| 7440-22-4 | Silver | 0.30 | ug/L | U | 0.3 | 1 | 1 | 1 | MS | PRB | 08/16/17 22:16 | 170816-5 | 1689747 |
| 7440-23-5 | Sodium | 11500 | ug/L | | 100 | 300 | 300 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7440-24-6 | Strontium | 97.6 | ug/L | | 1 | 5 | 5 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7440-28-0 | Thallium | 0.60 | ug/L | U | 0.6 | 2 | 2 | 1 | MS | PRB | 08/16/17 02:04 | 170815-3 | 1689747 |
| 7440-31-5 | Tin | 2.5 | ug/L | U | 2.5 | 10 | 10 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7440-61-1 | Uranium | 0.837 | ug/L | | 0.067 | 0.2 | 0.2 | 1 | MS | PRB | 08/16/17 02:04 | 170815-3 | 1689747 |
| 7440-62-2 | Vanadium | 2.82 | ug/L | J | 1 | 5 | 5 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |
| 7440-66-6 | Zinc | 3.3 | ug/L | U | 3.3 | 10 | 10 | 1 | P | JWJ | 08/10/17 15:13 | 081017-1 | 1689727 |

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2359**CONTRACT:** ESHL00114**METHOD TYPE:****SAMPLE ID:** 429979001**BASIS:** As Received**DATE COLLECTED** 04-AUG-17**CLIENT ID:** CAMO-17-141986**LEVEL:** Low**DATE RECEIVED** 08-AUG-17**MATRIX:** W**%SOLIDS:** 0

| CAS | Analyte | Result | Units | Qual | MDL | PQL | CRDL | DF | M* | Analyst | Run Date | Analytical Run | Analytical Batch |
|-----|-------------------|--------|-------|------|-------|------|------|----|----|---------|----------------|----------------|------------------|
| | Hardness as CaCO3 | 83 | mg/L | | 0.453 | 1.24 | 1.24 | 1 | | TXT1 | 08/30/17 11:17 | | 1697053 |

Prep Information:

| Analytical Batch | Prep Batch | Prep Method | Initial wt./vol. | Units | Final wt./vol. | Units | Date | Analyst |
|------------------|------------|----------------------|------------------|-------|----------------|-------|----------|---------|
| 1689727 | 1689726 | SW846 3005A | 50 | mL | 50 | mL | 08/08/17 | JXM8 |
| 1689747 | 1689746 | SW846 3005A | 50 | mL | 50 | mL | 08/08/17 | JXM8 |
| 1695634 | 1695628 | EPA 245.1/245.2 Prep | 20 | mL | 20 | mL | 08/25/17 | AXS5 |

Analytical Methods:*P** SW846 3005A/6010C**MS** SW846 3005A/6020A**AV** EPA 245.2 1974

METALS
-1-
INORGANICS ANALYSIS DATA PACKAGE

SDG No: 2017-2359**CONTRACT:** ESHL00114**METHOD TYPE:** EPA**SAMPLE ID:** 429979002**BASIS:** As Received**DATE COLLECTED** 04-AUG-17**CLIENT ID:** CAMO-17-142002**LEVEL:** Low**DATE RECEIVED** 08-AUG-17**MATRIX:** W**%SOLIDS:** 0

| CAS | Analyte | Result | Units | Qual | MDL | PQL | CRDL | DF | M* | Analyst | Run Date | Analytical Run | Analytical Batch |
|-----------|---------|--------|-------|------|-------|-----|------|----|----|---------|----------------|----------------|------------------|
| 7439-97-6 | Mercury | 0.067 | ug/L | U | 0.067 | 0.2 | 0.2 | 1 | AV | MTM1 | 08/28/17 11:00 | 082817W1-6 | 1695634 |

Prep Information:

| Analytical Batch | Prep Batch | Prep Method | Initial wt./vol. | Units | Final wt./vol. | Units | Date | Analyst |
|------------------|------------|----------------------|------------------|-------|----------------|-------|----------|---------|
| 1695634 | 1695628 | EPA 245.1/245.2 Prep | 20 | mL | 20 | mL | 08/25/17 | AXS5 |

***Analytical Methods:**

AV EPA 245.2 1974

Quality Control Summary

METALS
-3b-
PREPARATION BLANK SUMMARY

SDG NO. 2017-2359

Contract: ESHL00114

Matrix: W

| <u>Sample ID</u> | <u>Analyte</u> | <u>Result</u> | <u>Units</u> | <u>Acceptance Window</u> | <u>Conc Qual</u> | <u>M*</u> | <u>MDL</u> | <u>RDL</u> |
|------------------|----------------|---------------|--------------|--------------------------|------------------|-----------|------------|------------|
| 1203849197 | Manganese | 2 | ug/L | +/-10 | U | P | 2 | 10 |
| | Potassium | 50 | ug/L | +/-150 | U | P | 50 | 150 |
| | Silica | 53 | ug/L | +/-213 | U | P | 53 | 213 |
| | Sodium | 100 | ug/L | +/-300 | U | P | 100 | 300 |
| | Strontium | 1 | ug/L | +/-5 | U | P | 1 | 5 |
| | Aluminum | 68 | ug/L | +/-200 | U | P | 68 | 200 |
| | Beryllium | 1 | ug/L | +/-5 | U | P | 1 | 5 |
| | Calcium | 50 | ug/L | +/-200 | U | P | 50 | 200 |
| | Copper | 3 | ug/L | +/-10 | U | P | 3 | 10 |
| | Iron | 30 | ug/L | +/-100 | U | P | 30 | 100 |
| | Cobalt | 1 | ug/L | +/-5 | U | P | 1 | 5 |
| | Boron | 15 | ug/L | +/-50 | U | P | 15 | 50 |
| | Barium | 1 | ug/L | +/-5 | U | P | 1 | 5 |
| | Magnesium | 110 | ug/L | +/-300 | U | P | 110 | 300 |
| | Tin | 2.5 | ug/L | +/-10 | U | P | 2.5 | 10 |
| | Vanadium | 1 | ug/L | +/-5 | U | P | 1 | 5 |
| | Zinc | 3.3 | ug/L | +/-10 | U | P | 3.3 | 10 |
| 1203849247 | Antimony | 1 | ug/L | +/-3 | U | MS | 1 | 3 |
| | Arsenic | 2 | ug/L | +/-5 | U | MS | 2 | 5 |
| | Cadmium | 0.3 | ug/L | +/-1 | U | MS | 0.3 | 1 |
| | Chromium | 3 | ug/L | +/-10 | U | MS | 3 | 10 |
| | Lead | 0.5 | ug/L | +/-2 | U | MS | 0.5 | 2 |
| | Molybdenum | 0.2 | ug/L | +/-0.5 | U | MS | 0.2 | 0.5 |
| | Nickel | 0.6 | ug/L | +/-2 | U | MS | 0.6 | 2 |
| | Selenium | 2 | ug/L | +/-5 | U | MS | 2 | 5 |
| | Silver | 0.3 | ug/L | +/-1 | U | MS | 0.3 | 1 |
| | Thallium | 0.6 | ug/L | +/-2 | U | MS | 0.6 | 2 |
| | Uranium | 0.067 | ug/L | +/-0.2 | U | MS | 0.067 | 0.2 |
| 1203862860 | Mercury | 0.067 | ug/L | +/-0.2 | U | AV | 0.067 | 0.2 |

*Analytical Methods:

P SW846 3005A/6010C
MS SW846 3005A/6020A
AV EPA 245.1/245.2

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-2359 Client ID: RE02-17-141781S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 429939001 Spike ID: 1203849200

| <u>Analyte</u> | <u>Units</u> | <u>Acceptance Limit</u> | <u>Spiked Result</u> | <u>C</u> | <u>Sample Result</u> | <u>C</u> | <u>Spike Added</u> | <u>% Recovery</u> | <u>Qual</u> | <u>M*</u> |
|----------------|--------------|-----------------------------|--------------------------|----------|--------------------------|----------|------------------------|-----------------------|-------------|-----------|
| Aluminum | ug/L | 75-125 | 5160 | | 68 | U | 5000 | 103 | | P |
| Barium | ug/L | 75-125 | 486 | | 1.57 | J | 500 | 96.9 | | P |
| Beryllium | ug/L | 75-125 | 475 | | 1 | U | 500 | 95.1 | | P |
| Boron | ug/L | 75-125 | 478 | | 15 | U | 500 | 95.1 | | P |
| Calcium | ug/L | 75-125 | 5220 | | 106 | J | 5000 | 102 | | P |
| Cobalt | ug/L | 75-125 | 490 | | 1 | U | 500 | 97.9 | | P |
| Copper | ug/L | 75-125 | 484 | | 3 | U | 500 | 96.8 | | P |
| Iron | ug/L | 75-125 | 5090 | | 30 | U | 5000 | 101 | | P |
| Magnesium | ug/L | 75-125 | 5220 | | 110 | U | 5000 | 104 | | P |
| Manganese | ug/L | 75-125 | 489 | | 4.51 | J | 500 | 96.8 | | P |
| Potassium | ug/L | 75-125 | 4980 | | 50 | U | 5000 | 99.1 | | P |
| Silica | ug/L | 75-125 | 9810 | | 74.3 | J | 10700 | 91 | | P |
| Sodium | ug/L | 75-125 | 5560 | | 354 | | 5000 | 104 | | P |
| Strontium | ug/L | 75-125 | 490 | | 1 | U | 500 | 98 | | P |
| Tin | ug/L | 75-125 | 473 | | 2.5 | U | 500 | 94.6 | | P |
| Vanadium | ug/L | 75-125 | 481 | | 1 | U | 500 | 96.1 | | P |
| Zinc | ug/L | 75-125 | 469 | | 3.3 | U | 500 | 93.4 | | P |

*Analytical Methods:

P SW846 3005A/6010C

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-2359 Client ID: RE02-17-141781S

Contract: ESHL00114 Level: Low

Matrix: WATER % Solids:

Sample ID: 429939001 Spike ID: 1203849250

| <u>Analyte</u> | <u>Units</u> | <u>Acceptance Limit</u> | <u>Spiked Result</u> | <u>C</u> | <u>Sample Result</u> | <u>C</u> | <u>Spike Added</u> | <u>% Recovery</u> | <u>Qual</u> | <u>M*</u> |
|----------------|--------------|-----------------------------|--------------------------|----------|--------------------------|----------|------------------------|-----------------------|-------------|-----------|
| Antimony | ug/L | 75-125 | 48.5 | | 1 | U | 50 | 96.9 | | MS |
| Arsenic | ug/L | 75-125 | 50.4 | | 2 | U | 50 | 98 | | MS |
| Cadmium | ug/L | 75-125 | 51.5 | | 0.3 | U | 50 | 103 | | MS |
| Chromium | ug/L | 75-125 | 51.1 | | 3 | U | 50 | 100 | | MS |
| Lead | ug/L | 75-125 | 53.6 | | 0.5 | U | 50 | 107 | | MS |
| Molybdenum | ug/L | 75-125 | 51.8 | | 0.2 | U | 50 | 104 | | MS |
| Nickel | ug/L | 75-125 | 50.1 | | 0.6 | U | 50 | 99.5 | | MS |
| Selenium | ug/L | 75-125 | 46.6 | | 2 | U | 50 | 93.2 | | MS |
| Silver | ug/L | 75-125 | 53.2 | | 0.3 | U | 50 | 106 | | MS |
| Thallium | ug/L | 75-125 | 46.8 | | 0.6 | U | 50 | 93.3 | | MS |
| Uranium | ug/L | 75-125 | 53.4 | | 0.067 | U | 50 | 107 | | MS |

*Analytical Methods:

MS SW846 3005A/6020A

METALS

-5a-

Matrix Spike Summary

SDG NO. 2017-2359 **Client ID:** CAMO-17-141986S**Contract:** ESHL00114 **Level:** Low**Matrix:** WATER **% Solids:****Sample ID:** 429979001 **Spike ID:** 1203862864

| <u>Analyte</u> | <u>Units</u> | <u>Acceptance Limit</u> | <u>Spiked Result</u> | <u>C</u> | <u>Sample Result</u> | <u>C</u> | <u>Spike Added</u> | <u>% Recovery</u> | <u>Qual</u> | <u>M*</u> |
|----------------|--------------|-----------------------------|--------------------------|----------|--------------------------|----------|------------------------|-----------------------|-------------|-----------|
| Mercury | ug/L | 75-125 | 2.13 | | 0.067 | U | 2 | 106 | | AV |

*Analytical Methods:

AV EPA 245.1/245.2

Metals
-6-
Duplicate Sample Summary

SDG No.: 2017-2359

Lab Code: GEL

Contract: ESHL00114

Client ID: RE02-17-141781D

Matrix: WATER

Level: Low

Sample ID: 429939001

Duplicate ID: 1203849199

Percent Solids for Dup: N/A

| Analyte | Units | Acceptance Limit | Sample Result | C | Duplicate Result | C | RPD | Qual | M* |
|-----------|-------|------------------|---------------|---|------------------|---|------|------|----|
| Aluminum | ug/L | | 68 U | | 68 U | | | | P |
| Barium | ug/L | +/-5 | 1.57 J | | 1.61 J | | 2.56 | | P |
| Beryllium | ug/L | | 1 U | | 1 U | | | | P |
| Boron | ug/L | | 15 U | | 15 U | | | | P |
| Calcium | ug/L | +/-200 | 106 J | | 102 J | | 4.33 | | P |
| Cobalt | ug/L | | 1 U | | 1 U | | | | P |
| Copper | ug/L | | 3 U | | 3 U | | | | P |
| Iron | ug/L | | 30 U | | 30 U | | | | P |
| Magnesium | ug/L | | 110 U | | 110 U | | | | P |
| Manganese | ug/L | +/-10 | 4.51 J | | 4.67 J | | 3.62 | | P |
| Potassium | ug/L | | 50 U | | 50 U | | | | P |
| Silica | ug/L | +/-213 | 74.3 J | | 73 J | | 1.75 | | P |
| Sodium | ug/L | +/-300 | 354 | | 355 | | .234 | | P |
| Strontium | ug/L | | 1 U | | 1 U | | | | P |
| Tin | ug/L | | 2.5 U | | 2.5 U | | | | P |
| Vanadium | ug/L | | 1 U | | 1 U | | | | P |
| Zinc | ug/L | | 3.3 U | | 3.3 U | | | | P |

*Analytical Methods:

P SW846 3005A/6010C

Metals
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Duplicate Sample Summary

SDG No.: 2017–2359

Lab Code: GEL

Contract: ESHL00114

Client ID: RE02–17–141781D

Matrix: WATER

Level: Low

Sample ID: 429939001

Duplicate ID: 1203849249

Percent Solids for Dup: N/A

| Analyte | Units | Acceptance Limit | Sample Result | C | Duplicate Result | C | RPD | Qual | M* |
|------------|-------|---------------------|------------------|---|---------------------|---|-----|------|----|
| Antimony | ug/L | | 1 U | | 1 U | | | | MS |
| Arsenic | ug/L | | 2 U | | 2 U | | | | MS |
| Cadmium | ug/L | | 0.3 U | | 0.3 U | | | | MS |
| Chromium | ug/L | | 3 U | | 3 U | | | | MS |
| Lead | ug/L | | 0.5 U | | 0.5 U | | | | MS |
| Molybdenum | ug/L | | 0.2 U | | 0.2 U | | | | MS |
| Nickel | ug/L | | 0.6 U | | 0.6 U | | | | MS |
| Selenium | ug/L | | 2 U | | 2 U | | | | MS |
| Silver | ug/L | | 0.3 U | | 0.3 U | | | | MS |
| Thallium | ug/L | | 0.6 U | | 0.6 U | | | | MS |
| Uranium | ug/L | | 0.067 U | | 0.067 U | | | | MS |

*Analytical Methods:

MS SW846 3005A/6020A

Metals
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Duplicate Sample Summary

SDG No.: 2017–2359**Lab Code:** GEL**Contract:** ESHL00114**Client ID:** CAMO–17–141986D**Matrix:** WATER**Level:** Low**Sample ID:** 429979001**Duplicate ID:** 1203862862**Percent Solids for Dup:** N/A

| Analyte | Units | Acceptance Limit | Sample Result | C | Duplicate Result | C | RPD | Qual | M* |
|---------|-------|---------------------|------------------|---|---------------------|---|-----|------|----|
| Mercury | ug/L | | 0.067 | U | 0.067 | U | | | AV |

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2359

Contract: ESHL00114

Aqueous LCS Source:OS2I

Solid LCS Source:

| <u>Sample ID</u> | <u>Analyte</u> | <u>Units</u> | <u>True Value</u> | <u>Result</u> | <u>C</u> | <u>% Recovery</u> | <u>Acceptance Limit</u> | <u>M*</u> |
|------------------|----------------|--------------|-------------------|---------------|----------|-------------------|-------------------------|-----------|
| 1203849198 | | | | | | | | |
| | Aluminum | ug/L | 5000 | 4840 | | 96.8 | 80-120 | P |
| | Barium | ug/L | 500 | 472 | | 94.5 | 80-120 | P |
| | Beryllium | ug/L | 500 | 465 | | 93 | 80-120 | P |
| | Boron | ug/L | 500 | 460 | | 92 | 80-120 | P |
| | Calcium | ug/L | 5000 | 5010 | | 100 | 80-120 | P |
| | Cobalt | ug/L | 500 | 480 | | 96.1 | 80-120 | P |
| | Copper | ug/L | 500 | 471 | | 94.2 | 80-120 | P |
| | Iron | ug/L | 5000 | 4940 | | 98.7 | 80-120 | P |
| | Magnesium | ug/L | 5000 | 5080 | | 102 | 80-120 | P |
| | Manganese | ug/L | 500 | 473 | | 94.6 | 80-120 | P |
| | Potassium | ug/L | 5000 | 4910 | | 98.1 | 80-120 | P |
| | Silica | ug/L | 10700 | 9520 | | 88.9 | 80-120 | P |
| | Sodium | ug/L | 5000 | 5050 | | 101 | 80-120 | P |
| | Strontium | ug/L | 500 | 475 | | 94.9 | 80-120 | P |
| | Tin | ug/L | 500 | 466 | | 93.2 | 80-120 | P |
| | Vanadium | ug/L | 500 | 466 | | 93.1 | 80-120 | P |
| | Zinc | ug/L | 500 | 452 | | 90.5 | 80-120 | P |

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2359

Contract: ESHL00114

Aqueous LCS Source:O2Si

Solid LCS Source:

| <u>Sample ID</u> | <u>Analyte</u> | <u>Units</u> | <u>True Value</u> | <u>Result</u> | <u>C</u> | <u>% Recovery</u> | <u>Acceptance Limit</u> | <u>M*</u> |
|------------------|----------------|--------------|-------------------|---------------|----------|-------------------|-------------------------|-----------|
| 1203849248 | | | | | | | | |
| | Antimony | ug/L | 50 | 47.9 | | 95.9 | 80-120 | MS |
| | Arsenic | ug/L | 50 | 51.9 | | 104 | 80-120 | MS |
| | Cadmium | ug/L | 50 | 51.9 | | 104 | 80-120 | MS |
| | Chromium | ug/L | 50 | 50.3 | | 101 | 80-120 | MS |
| | Lead | ug/L | 50 | 54.6 | | 109 | 80-120 | MS |
| | Molybdenum | ug/L | 50 | 51 | | 102 | 80-120 | MS |
| | Nickel | ug/L | 50 | 50 | | 99.9 | 80-120 | MS |
| | Selenium | ug/L | 50 | 47.3 | | 94.6 | 80-120 | MS |
| | Silver | ug/L | 50 | 52.5 | | 105 | 80-120 | MS |
| | Thallium | ug/L | 50 | 48.8 | | 97.7 | 80-120 | MS |
| | Uranium | ug/L | 50 | 53.7 | | 107 | 80-120 | MS |

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Laboratory Control Sample Summary

SDG NO. 2017-2359

Contract: ESHL00114

Aqueous LCS Source: GEL

Solid LCS Source:

| <u>Sample ID</u> | <u>Analyte</u> | <u>Units</u> | <u>True Value</u> | <u>Result</u> | <u>C</u> | <u>% Recovery</u> | <u>Acceptance Limit</u> | <u>M*</u> |
|------------------|----------------|--------------|-------------------|---------------|----------|-------------------|-------------------------|-----------|
| 1203862861 | Mercury | ug/L | 2 | 2.12 | | 106 | 85-115 | AV |

*Analytical Methods:

AV EPA 245.1/245.2

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2359

Client ID: RE02-17-141781L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 429939001

Serial Dilution ID: 1203849201

| <u>Analyte</u> | <u>Initial Value ug/L</u> | <u>C</u> | <u>Serial Value ug/L</u> | <u>C</u> | <u>% Difference</u> | <u>Qual</u> | <u>Acceptance Limit</u> | <u>M*</u> |
|----------------|-----------------------------------|----------|----------------------------------|----------|-------------------------|-------------|-----------------------------|-----------|
| Aluminum | 68 | U | 340 | U | | | | P |
| Barium | 1.57 | J | 5 | U | 8.956 | | | P |
| Beryllium | 1 | U | 5 | U | | | | P |
| Boron | 15 | U | 75 | U | | | | P |
| Calcium | 106 | J | 250 | U | 26.555 | | | P |
| Cobalt | 1 | U | 5 | U | | | | P |
| Copper | 3 | U | 15 | U | | | | P |
| Iron | 30 | U | 150 | U | | | | P |
| Magnesium | 110 | U | 550 | U | | | | P |
| Manganese | 4.51 | J | 10 | U | 2.373 | | | P |
| Potassium | 50 | U | 250 | U | | | | P |
| Silica | 74.3 | J | 265 | U | 7.056 | | | P |
| Sodium | 354 | | 500 | U | 2.449 | | | P |
| Strontium | 1 | U | 5 | U | | | | P |
| Tin | 2.5 | U | 12.5 | U | | | | P |
| Vanadium | 1 | U | 5 | U | | | | P |
| Zinc | 3.3 | U | 16.5 | U | | | | P |

*Analytical Methods:

P SW846 3005A/6010C

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2359

Client ID: RE02-17-141781L

Contract: ESHL00114

Matrix: LIQUID

Level: Low

Sample ID: 429939001

Serial Dilution ID: 1203849251

| <u>Analyte</u> | <u>Initial Value ug/L</u> | <u>C</u> | <u>Serial Value ug/L</u> | <u>C</u> | <u>% Difference</u> | <u>Qual</u> | <u>Acceptance Limit</u> | <u>M*</u> |
|----------------|-----------------------------------|----------|----------------------------------|----------|-------------------------|-------------|-----------------------------|-----------|
| Antimony | 1 | U | 5 | U | | | | MS |
| Arsenic | 2 | U | 10 | U | | | | MS |
| Cadmium | .3 | U | 1.5 | U | | | | MS |
| Chromium | 3 | U | 15 | U | | | | MS |
| Lead | .5 | U | 2.5 | U | | | | MS |
| Molybdenum | .2 | U | 1 | U | | | | MS |
| Nickel | .6 | U | 3 | U | | | | MS |
| Selenium | 2 | U | 10 | U | | | | MS |
| Silver | .3 | U | 1.5 | U | | | | MS |
| Thallium | .6 | U | 3 | U | | | | MS |
| Uranium | .067 | U | .335 | U | | | | MS |

*Analytical Methods:

MS SW846 3005A/6020A

METALS

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Serial Dilution Sample Summary

SDG NO. 2017-2359 **Client ID:** CAMO-17-141986L**Contract:** ESHL00114**Matrix:** LIQUID **Level:** Low**Sample ID:** 429979001 **Serial Dilution ID:** 1203862866

| <u>Analyte</u> | <u>Initial Value ug/L</u> | <u>C</u> | <u>Serial Value ug/L</u> | <u>C</u> | <u>% Difference</u> | <u>Qual</u> | <u>Acceptance Limit</u> | <u>M*</u> |
|----------------|-----------------------------------|----------|----------------------------------|----------|-------------------------|-------------|-----------------------------|-----------|
| Mercury | .067 | U | .335 | U | | | | AV |

*Analytical Methods:

AV EPA 245.1/245.2

General Chem Analysis

Case Narrative

**General Chemistry
Technical Case Narrative
ARS International, LLC (ARSL)
SDG #: 2017-2359
Work Order #: 429979**

Method/Analysis Information

Product: Carbon and Total Organic

Analytical Batch: 1689290

Method: SW 9060 Total Organic Carbon

Sample Analysis

The following samples were analyzed using the analytical protocol as established in SW-846:9060:

| Sample ID | Client ID |
|------------------|--------------------------------------------------|
| 429979002 | CAMO-17-142002 |
| 1203849662 | Method Blank (MB) |
| 1203849663 | Laboratory Control Sample (LCS) |
| 1203849665 | 429873002(CAMO-17-141990) Sample Duplicate (DUP) |
| 1203849667 | 429873002(CAMO-17-141990) Post Spike (PS) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-093 REV# 15.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Carbon analysis was performed on a O-I Analytical 1030W Carbon Analyzer.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within

acceptance limits.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 429873002 (CAMO-17-141990) was selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will

always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

| | | | |
|--------------------------|--------------------------|----------------|-----------|
| Product: | Cyanide and Total | | |
| Analytical Batch: | 1688863 | Method: | WSP-CN(T) |
| Prep Batch : | 1688862 | Method: | EPA 335.4 |

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 335.4 1993:

| Sample ID | Client ID |
|------------------|------------------------------------------|
| 429979002 | CAMO-17-142002 |
| 1203847020 | Method Blank (MB) |
| 1203847021 | Laboratory Control Sample (LCS) |
| 1203847022 | 429712004(NonSDG) Sample Duplicate (DUP) |
| 1203847023 | 429712004(NonSDG) Matrix Spike (MS) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-095 REV# 20.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Flow Injection analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 429712004 (NonSDG) was selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The percent recoveries (%R) obtained from the spike analyses are evaluated when the sample concentration is less than four times (4X) the spike concentration added. The matrix spike recovered outside of the established acceptance limits due to matrix interference and/or non-homogeneity.

| Analyte | Sample | Value |
|----------------|----------------------------------|-----------------|
| Cyanide, Total | 1203847023 (Non SDG 429712004MS) | 112* (90%-110%) |

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages

electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Ion Chromatography

Analytical Batch: 1691290

Method: WSP-ANIONS

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:300.0:

| Sample ID | Client ID |
|------------------|--------------------------------------------------|
| 429979001 | CAMO-17-141986 |
| 1203853100 | Method Blank (MB) |
| 1203853101 | Laboratory Control Sample (LCS) |
| 1203853102 | 429717001(CAMO-17-141976) Sample Duplicate (DUP) |
| 1203853103 | 430398002(CASA-17-142776) Sample Duplicate (DUP) |
| 1203853104 | 429717001(CAMO-17-141976) Post Spike (PS) |
| 1203853105 | 430398002(CASA-17-142776) Post Spike (PS) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-086 REV# 25.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Ion Chromatography analysis was performed on a Dionex ICS-3000 Ion Chromatograph.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 429717001 (CAMO-17-141976) and 430398002 (CASA-17-142776) were selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recoveries for this sample set were within the required acceptance limits where applicable.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The following samples 1203853102 (CAMO-17-141976DUP), 1203853104 (CAMO-17-141976PS) and 429979001 (CAMO-17-141986) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

| | |
|----------|---------------|
| Analyte | 429979 |
| | 001 |
| Chloride | 2X |
| Sulfate | 2X |

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Manual Integrations

Samples 1203853102 (CAMO-17-141976DUP), 1203853103 (CASA-17-142776DUP), 1203853104 (CAMO-17-141976PS), 1203853105 (CASA-17-142776PS) and 429979001 (CAMO-17-141986) were manually

integrated to correctly position the baseline as set in the calibration standards.

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

| | | | |
|--------------------------|-------------------------|----------------|----------------|
| Product: | Ammonia Nitrogen | | |
| Analytical Batch: | 1698350 | Method: | NH3 |
| Prep Batch : | 1698348 | Method: | EPA 350.1 Prep |

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:350.1:

| Sample ID | Client ID |
|------------------|--------------------------------------------------|
| 429979001 | CAMO-17-141986 |
| 1203869225 | Method Blank (MB) |
| 1203869226 | Laboratory Control Sample (LCS) |
| 1203869227 | 429979001(CAMO-17-141986) Sample Duplicate (DUP) |
| 1203869228 | 429979001(CAMO-17-141986) Matrix Spike (MS) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-106 REV# 9.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 429979001 (CAMO-17-141986) was selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

Duplicate Relative Percent Difference (RPD) Statement

The Relative Percent Difference (RPD) between the sample and duplicate falls outside of the established acceptance limits because of the heterogeneous matrix of the sample:

| Analyte | Sample | Value |
|-------------------|--------------------------------|-----------------------------------|
| Nitrogen, Ammonia | 1203869227 (CAMO-17-141986DUP) | abs(.0447 - .112)* (+/- .05 mg/L) |

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

Samples (See Below) were not available for analysis until after the holding time had expired. The data is qualified.

| Sample | Analyte | Value |
|-----------------------------------|----------------------|-------------------------------------------------------------------------------------|
| 1203869227 (CAMO-17-141986DUP) | Nitrogen, Ammonia | Received 08-AUG-17, within holding, analyzed 05-SEP-17, out of holding 01-SEP-17 |
| | Nitrogen, Ammonia | Received 08-AUG-17, within holding, prepped 05-SEP-17, out of holding 01-SEP-17 |
| 1203869228 (CAMO-17-141986MS) | Nitrogen, Ammonia | Received 08-AUG-17, within holding, analyzed 05-SEP-17, out of holding 01-SEP-17 |
| | Nitrogen, Ammonia | Received 08-AUG-17, within holding, prepped 05-SEP-17, out of holding 01-SEP-17 |
| 429979001 (CAMO-17-141986) | Nitrogen, Ammonia | Received 08-AUG-17, within holding, analyzed 05-SEP-17, out of holding 01-SEP-17 |
| | Nitrogen, Ammonia | Received 08-AUG-17, within holding, prepped 05-SEP-17, out of holding 01-SEP-17 |

Sample Preservation/Integrity

All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions

Samples were diluted at the prep step due to limited sample quantity. 1203869227 (CAMO-17-141986DUP), 1203869228 (CAMO-17-141986MS) and 429979001 (CAMO-17-141986). Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range. **Sample Re-analysis**

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

| | | | |
|--------------------------|--------------------------------|----------------|----------------|
| Product: | Total Kjeldahl Nitrogen | | |
| Analytical Batch: | 1692771 | Method: | TKN |
| Prep Batch : | 1692769 | Method: | EPA 351.2 Prep |

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:351.2:

| Sample ID | Client ID |
|------------------|--------------------------------------------------|
| 429979002 | CAMO-17-142002 |
| 1203856514 | Method Blank (MB) |
| 1203856515 | Laboratory Control Sample (LCS) |
| 1203856516 | 429717002(CAMO-17-141992) Sample Duplicate (DUP) |
| 1203856517 | 429873002(CAMO-17-141990) Sample Duplicate (DUP) |
| 1203856518 | 429717002(CAMO-17-141992) Matrix Spike (MS) |
| 1203856519 | 429873002(CAMO-17-141990) Matrix Spike (MS) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-104 REV# 14.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 429717002 (CAMO-17-141992) and 429873002 (CAMO-17-141990) were selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recoveries for this sample set were within the required acceptance limits where applicable.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Preservation/Integrity

All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Nitrate Nitrite by Cadmium Reduction

Analytical Batch: 1698353

Method: NO3NO2

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:353.2:

| Sample ID | Client ID |
|------------------|--------------------------------------------------|
| 429979001 | CAMO-17-141986 |
| 1203869236 | Method Blank (MB) |
| 1203869237 | Laboratory Control Sample (LCS) |
| 1203869238 | 429979001(CAMO-17-141986) Sample Duplicate (DUP) |
| 1203869239 | 429979001(CAMO-17-141986) Post Spike (PS) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-128 REV# 9.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8500 Series.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Calibration Verification Information

All associated calibration verification standard(s) (ICV or CCV) met the acceptance criteria.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information**Method Blank (MB) Statement**

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 429979001 (CAMO-17-141986) was selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

Samples (See Below) were not available for analysis until after the holding time had expired. The data is qualified.

| Sample | Analyte | Value |
|-----------------------------------|------------------------------|-------------------------------------------------------------------------------------|
| 1203869238 (CAMO-17-141986DUP) | Nitrogen, Nitrate/Nitrite | Received 08-AUG-17, within holding, analyzed 05-SEP-17, out of holding 01-SEP-17 |
| 1203869239 (CAMO-17-141986PS) | Nitrogen, Nitrate/Nitrite | Received 08-AUG-17, within holding, analyzed 05-SEP-17, out of holding 01-SEP-17 |
| 429979001 (CAMO-17-141986) | Nitrogen, Nitrate/Nitrite | Received 08-AUG-17, within holding, analyzed 05-SEP-17, out of holding 01-SEP-17 |

Sample Preservation/Integrity

All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions

The following samples 1203869238 (CAMO-17-141986DUP), 1203869239 (CAMO-17-141986PS) and 429979001 (CAMO-17-141986) were diluted because target analyte concentrations exceeded the calibration range. Dilutions may be required for many reasons, including to minimize matrix interferences or to bring over range target analyte concentrations into the linear calibration range.

| | |
|---------------------------|---------------|
| Analyte | 429979 |
| | 001 |
| Nitrogen, Nitrate/Nitrite | 5X |

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

| | | | |
|--------------------------|-------------------------|----------------|----------------|
| Product: | Total Phosphorus | | |
| Analytical Batch: | 1698352 | Method: | PO4 |
| Prep Batch : | 1698351 | Method: | EPA 365.4 Prep |

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 365.4 1974:

| | |
|------------------|--------------------------------------------------|
| Sample ID | Client ID |
| 429979001 | CAMO-17-141986 |
| 1203869232 | Method Blank (MB) |
| 1203869233 | Laboratory Control Sample (LCS) |
| 1203869234 | 429979001(CAMO-17-141986) Sample Duplicate (DUP) |
| 1203869235 | 429979001(CAMO-17-141986) Matrix Spike (MS) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-103 REV# 10.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Nutrient analysis was performed on a Lachat QuickChem FIA+ 8000 Series.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Continuing Calibration Blanks

All continuing calibration blanks (CCBs) associated with reported data from this batch were within acceptance limits.

Calibration Verification Information (CCV)

All continuing calibration verification standards (CCVs) associated with reported data from this batch were within acceptance limits.

Y Intercept Rule

The absolute value of the intercept is less than 3 times the MDL.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 429979001 (CAMO-17-141986) was selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

Samples (See Below) were not available for analysis until after the holding time had expired. The data is qualified.

| Sample | Analyte | Value |
|-----------------------------------|---------------------------|-------------------------------------------------------------------------------------|
| 1203869234 (CAMO-17-141986DUP) | Phosphorus, Total as P | Received 08-AUG-17, within holding, analyzed 05-SEP-17, out of holding 01-SEP-17 |
| | Phosphorus, Total as P | Received 08-AUG-17, within holding, prepped 05-SEP-17, out of holding 01-SEP-17 |
| 1203869235 (CAMO-17-141986MS) | Phosphorus, Total as P | Received 08-AUG-17, within holding, analyzed 05-SEP-17, out of holding 01-SEP-17 |
| | Phosphorus, Total as P | Received 08-AUG-17, within holding, prepped 05-SEP-17, out of holding 01-SEP-17 |
| 429979001 (CAMO-17-141986) | Phosphorus, Total as P | Received 08-AUG-17, within holding, analyzed 05-SEP-17, out of holding 01-SEP-17 |
| | Phosphorus, Total as P | Received 08-AUG-17, within holding, prepped 05-SEP-17, out of holding 01-SEP-17 |

Sample Preservation/Integrity

All the samples from this sample group met the preservation and integrity requirements of the method.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

Sample1203869233 (LCS) was re-analyzed due to instrument failure. The results from the reanalysis are reported.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Solids and Total Dissolved

Analytical Batch: 1690491

Method: TDS

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:160.1:

| Sample ID | Client ID |
|------------------|---------------------------------------------------|
| 429979001 | CAMO-17-141986 |
| 1203850978 | Method Blank (MB) |
| 1203850979 | Laboratory Control Sample (LCS) |
| 1203850980 | 429981001(WST22-17-143234) Sample Duplicate (DUP) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-001 REV# 15.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Solids analysis was performed on a Sartorius Balance BAL216. Solids lab

Initial Calibration

All initial calibration requirements have been met for this SDG.

Quality Control (QC) Information

Method Blank (MB) Statement

The MB analyzed with this SDG met the acceptance criteria.

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Consecutive Weight Checks

All consecutive weight checks were met.

Quality Control (QC) Designation

Sample 429981001 (WST22-17-143234) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Specific Conductivity

Analytical Batch: 1689860

Method: EPA120.1 Specific Conductivity

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:120.1:

| Sample ID | Client ID |
|------------------|--------------------------------------------------|
| 429979001 | CAMO-17-141986 |
| 1203849508 | Laboratory Control Sample (LCS) |
| 1203849509 | 429324004(CAMO-17-142780) Sample Duplicate (DUP) |
| 1203849510 | 429873001(CAMO-17-141974) Sample Duplicate (DUP) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-009 REV# 14.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Titration and Ion analysis was performed on a Orion 160 Conductivity Meter.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Samples 429324004 (CAMO-17-142780) and 429873001 (CAMO-17-141974) were selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: pH

Analytical Batch: 1691073 **Method:** PH

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA 150.1 1982:

| Sample ID | Client ID |
|------------------|---------------------------------------------------|
| 429979001 | CAMO-17-141986 |
| 1203852560 | Laboratory Control Sample (LCS) |
| 1203852562 | 429981001(WST22-17-143234) Sample Duplicate (DUP) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-008 REV# 22.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Titration and Ion analysis was performed on a Thermo Orion Star A111. Immediates

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 429981001 (WST22-17-143234) was selected for QC analysis.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

Samples (See Below) were received by the laboratory outside of the method specified holding time. The data is qualified.

| Sample | Analyte | Value |
|---------------------------------|---------|----------------------------------------------|
| 1203852562 (WST22-17-143234DUP) | pH | Received 08-AUG-17, out of holding 03-AUG-17 |
| 429979001 (CAMO-17-141986) | pH | Received 08-AUG-17, out of holding 04-AUG-17 |

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information**Additional Comments**

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Method/Analysis Information

Product: Alkalinity

Analytical Batch: 1691070 **Method:** EPA 310.1 Total Alkalinity

Sample Analysis

The following samples were analyzed using the analytical protocol as established in EPA:310.1:

| Sample ID | Client ID |
|------------------|--------------------------------------------------|
| 429979001 | CAMO-17-141986 |
| 1203852501 | Laboratory Control Sample (LCS) |
| 1203852503 | 429717001(CAMO-17-141976) Sample Duplicate (DUP) |
| 1203852506 | 429717001(CAMO-17-141976) Matrix Spike (MS) |

The samples in this SDG were analyzed on an "as received" basis.

SOP Reference

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-GC-E-033 REV# 13.

Preparation/Analytical Method Verification

The SOP stated above has been prepared based on technical research and testing conducted by GEL Laboratories, LLC. and with guidance from the regulatory documents listed in this "Method/Analysis Information" section.

Calibration Information

The Titration and Ion analysis was performed on a Electronic bottle-top buret.

Initial Calibration

All initial calibration requirements have been met for this SDG.

Initial Standardization

The titrant was properly standardized

Quality Control (QC) Information

Laboratory Control Sample Duplicate (LCSD)

An LCSD was not used in place of matrix QC.

Laboratory Control Sample (LCS) Recovery

The LCS spike recovery met the acceptance limits.

Quality Control (QC) Designation

Sample 429717001 (CAMO-17-141976) was selected for QC analysis.

Matrix Spike (MS)/Post Spike (PS) Recovery Statement

The MS/PS recovery for this sample set was within the required acceptance limits where applicable.

Duplicate Relative Percent Difference (RPD) Statement

The RPD between the sample and its duplicate met the acceptance limits.

Technical Information

GEL assigns holding times based on the date and time of sample collection. Those holding times expressed in hours are calculated in the AlphaLims system by hours. Those holding times expressed as days expire at midnight on the day of expiration.

Holding Times

All samples in this SDG met the specified holding time.

Sample Dilutions

The samples in this SDG did not require dilutions.

Sample Re-analysis

The samples in this SDG did not require re-analysis.

Miscellaneous Information

Additional Comments

Additional comments were not required for this SDG.

Electronic Packaging Comment

This data package was generated using an electronic data processing program referred to as virtual packaging. In an effort to increase quality and efficiency, the laboratory has developed systems to generate all data packages electronically. The following change from traditional packages should be noted:

Analyst/peer reviewer initials and dates are not present on the electronic data files. Presently, all initials and dates are present on the original raw data. These hard copies are temporarily stored in the laboratory. The data validator will always sign and date the case narrative. Data that are not generated electronically, such as hand written pages, will be scanned and inserted into the electronic package.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

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Qualifier Definition Report for

ARSL004 ARS International, LLC (ARS-LANS-MTOA6-25093-GEL)

Client SDG: 2017-2359 GEL Work Order: 429979

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- H Analytical holding time was exceeded
- J Value is estimated
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- h Preparation or preservation holding time was exceeded

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Kristen Mizzell

Date: 05 SEP 2017

Title: Analyst I

Sample Data Summary

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 5, 2017

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client SDG: 2017-2359

Client Sample ID: CAMO-17-141986
Sample ID: 429979001
Matrix: W
Collect Date: 04-AUG-17 11:39
Receive Date: 08-AUG-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

| Parameter | Qualifier | Result | DL | RL | Units | PF | DF | Analyst | Date | Time | Batch | Method |
|----------------------------------------------|-----------|--------|-------|-------|----------|------|----|---------|----------|------|---------|--------|
| Ion Chromatography | | | | | | | | | | | | |
| WSP-ANIONS "As Received" | | | | | | | | | | | | |
| Bromide | J | 0.117 | 0.067 | 0.200 | mg/L | | 1 | MXL2 | 08/14/17 | 1859 | 1691290 | 1 |
| Fluoride | | 0.106 | 0.033 | 0.100 | mg/L | | 1 | | | | | |
| Chloride | | 12.2 | 0.134 | 0.400 | mg/L | | 2 | MXL2 | 08/15/17 | 1428 | 1691290 | 2 |
| Sulfate | | 22.1 | 0.266 | 0.800 | mg/L | | 2 | | | | | |
| Nutrient Analysis | | | | | | | | | | | | |
| NH3 "As Received" | | | | | | | | | | | | |
| Nitrogen, Ammonia | Hh | 0.560 | 0.085 | 0.250 | mg/L | 5.00 | 1 | KLP1 | 09/05/17 | 1147 | 1698350 | 3 |
| NO3NO2 "As Received" | | | | | | | | | | | | |
| Nitrogen, Nitrate/Nitrite | H | 1.52 | 0.085 | 0.250 | mg/L | | 5 | AXH3 | 09/05/17 | 1000 | 1698353 | 4 |
| PO4 "As Received" | | | | | | | | | | | | |
| Phosphorus, Total as P | HJh | 0.0332 | 0.020 | 0.050 | mg/L | 1.00 | 1 | KLP1 | 09/05/17 | 1540 | 1698352 | 5 |
| Solids Analysis | | | | | | | | | | | | |
| TDS "As Received" | | | | | | | | | | | | |
| Total Dissolved Solids | | 191 | 3.40 | 14.3 | mg/L | | | KLP1 | 08/10/17 | 1652 | 1690491 | 6 |
| Titration and Ion Analysis | | | | | | | | | | | | |
| EPA 310.1 Total Alkalinity "As Received" | | | | | | | | | | | | |
| Alkalinity, Total as CaCO3 | | 66.8 | 1.45 | 4.00 | mg/L | | | RXB5 | 08/16/17 | 1239 | 1691070 | 7 |
| Carbonate alkalinity (CaCO3) | J | 3.63 | 1.45 | 4.00 | mg/L | | | | | | | |
| EPA120.1 Specific Conductivity "As Received" | | | | | | | | | | | | |
| Conductivity | | 255 | 1.00 | 1.00 | umhos/cm | | 1 | RXB5 | 08/15/17 | 1411 | 1689860 | 8 |
| PH "As Received" | | | | | | | | | | | | |
| pH at Temp 18.6C | H | 8.52 | 0.010 | 0.100 | SU | | 1 | RXB5 | 08/16/17 | 1241 | 1691073 | 9 |

The following Prep Methods were performed:

| Method | Description | Analyst | Date | Time | Prep Batch |
|----------------|------------------------------------------|---------|----------|------|------------|
| EPA 350.1 Prep | EPA 350.1 Ammonia Nitrogen Prep | AXH3 | 09/05/17 | 0950 | 1698348 |
| EPA 365.4 Prep | EPA 365.4 Phosphorus, Total in liquid PR | KLP1 | 09/05/17 | 1230 | 1698351 |

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 5, 2017

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client SDG: 2017-2359

Client Sample ID: CAMO-17-141986
Sample ID: 429979001

Project: ESHL00114
Client ID: ARSL004

| Parameter | Qualifier | Result | DL | RL | Units | PF | DF | Analyst | Date | Time | Batch | Method |
|--------------------------------------------------|----------------|--------|----|----|-------|------------------|----|---------|------|------|-------|--------|
| The following Analytical Methods were performed: | | | | | | | | | | | | |
| Method | Description | | | | | Analyst Comments | | | | | | |
| 1 | EPA:300.0 | | | | | | | | | | | |
| 2 | EPA:300.0 | | | | | | | | | | | |
| 3 | EPA:350.1 | | | | | | | | | | | |
| 4 | EPA:353.2 | | | | | | | | | | | |
| 5 | EPA 365.4 1974 | | | | | | | | | | | |
| 6 | EPA:160.1 | | | | | | | | | | | |
| 7 | EPA:310.1 | | | | | | | | | | | |
| 8 | EPA:120.1 | | | | | | | | | | | |
| 9 | EPA 150.1 1982 | | | | | | | | | | | |

Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 5, 2017

Company : Los Alamos National Laboratory
Address : TA-00, SM1237, Rm104C

Los Alamos, New Mexico 87545
Contact: Ms. Nita Patel
Project: LANL- WQH Water Samples

Client SDG: 2017-2359

Client Sample ID: CAMO-17-142002
Sample ID: 429979002
Matrix: W
Collect Date: 04-AUG-17 11:39
Receive Date: 08-AUG-17
Collector: Client

Project: ESHL00114
Client ID: ARSL004

| Parameter | Qualifier | Result | DL | RL | Units | PF | DF | Analyst | Date | Time | Batch | Method |
|--------------------------------------------|-----------|--------|-------|-------|-------|------|----|---------|----------|------|---------|--------|
| Carbon Analysis | | | | | | | | | | | | |
| SW 9060 Total Organic Carbon "As Received" | | | | | | | | | | | | |
| Total Organic Carbon Average | U | ND | 0.330 | 1.00 | mg/L | | 1 | TSM | 08/11/17 | 1555 | 1689290 | 1 |
| Flow Injection Analysis | | | | | | | | | | | | |
| WSP-CN(T) "As Received" | | | | | | | | | | | | |
| Cyanide, Total | J | 1.73 | 1.67 | 5.00 | ug/L | 1.00 | 1 | AXH3 | 08/09/17 | 0825 | 1688863 | 2 |
| Nutrient Analysis | | | | | | | | | | | | |
| TKN "As Received" | | | | | | | | | | | | |
| Nitrogen, Total Kjeldahl | | 0.170 | 0.033 | 0.100 | mg/L | 1.00 | 1 | KLP1 | 08/25/17 | 0906 | 1692771 | 3 |

The following Prep Methods were performed:

| Method | Description | Analyst | Date | Time | Prep Batch |
|----------------|----------------------------------------|---------|----------|------|------------|
| EPA 335.4 | EPA 335.4 Total Cyanide | AXH3 | 08/09/17 | 0737 | 1688862 |
| EPA 351.2 Prep | EPA 351.2 Total Kjeldahl Nitrogen Prep | KLP1 | 08/23/17 | 1700 | 1692769 |

The following Analytical Methods were performed:

| Method | Description | Analyst Comments |
|--------|----------------|------------------|
| 1 | SW-846:9060 | |
| 2 | EPA 335.4 1993 | |
| 3 | EPA:351.2 | |

Notes:

Column headers are defined as follows:

| | |
|---------------------------------------|--------------------------------|
| DF: Dilution Factor | Lc/LC: Critical Level |
| DL: Detection Limit | PF: Prep Factor |
| MDA: Minimum Detectable Activity | RL: Reporting Limit |
| MDC: Minimum Detectable Concentration | SQL: Sample Quantitation Limit |

Quality Control Summary

GEL LABORATORIES LLC

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QC Summary

Report Date: September 5, 2017

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Los Alamos National Laboratory
TA-00, SM1237, Rm104C
Los Alamos, New Mexico

Contact: Ms. Nita Patel

Workorder: 429979

| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|--------------------------------|-----------|--------|-------|----|-------|------|-------|-------|------------|------------|----------------|
| Carbon Analysis | | | | | | | | | | | |
| Batch | 1689290 | | | | | | | | | | |
| QC1203849665 | 429873002 | DUP | | | | | | | | | |
| Total Organic Carbon Average | | J | 0.383 | J | 0.346 | mg/L | 10.2 | ^ | (+/-1.00) | TSM | 08/11/17 10:50 |
| QC1203849663 | LCS | | | | | | | | | | |
| Total Organic Carbon Average | 10.0 | | | | 9.47 | mg/L | | | 94.7 | (80%-120%) | 08/11/17 00:52 |
| QC1203849662 | MB | | | | | | | | | | |
| Total Organic Carbon Average | | | | U | ND | mg/L | | | | | 08/11/17 00:41 |
| QC1203849667 | 429873002 | PS | | | | | | | | | |
| Total Organic Carbon Average | 10.0 | J | 0.383 | | 8.52 | mg/L | | | 81.4 | (75%-125%) | 08/11/17 11:37 |
| Flow Injection Analysis | | | | | | | | | | | |
| Batch | 1688863 | | | | | | | | | | |
| QC1203847022 | 429712004 | DUP | | | | | | | | | |
| Cyanide, Total | | U | ND | U | ND | ug/L | N/A | | | AXH3 | 08/09/17 07:58 |
| QC1203847021 | LCS | | | | | | | | | | |
| Cyanide, Total | 50.0 | | | | 54.3 | ug/L | | | 109 | (90%-110%) | 08/09/17 07:56 |
| QC1203847020 | MB | | | | | | | | | | |
| Cyanide, Total | | | | U | ND | ug/L | | | | | 08/09/17 07:51 |
| QC1203847023 | 429712004 | MS | | | | | | | | | |
| Cyanide, Total | 100 | U | ND | | 113 | ug/L | | | 112* | (90%-110%) | 08/09/17 07:59 |
| Ion Chromatography | | | | | | | | | | | |
| Batch | 1691290 | | | | | | | | | | |
| QC1203853102 | 429717001 | DUP | | | | | | | | | |
| Bromide | | | 0.274 | | 0.275 | mg/L | 0.328 | ^ | (+/-0.200) | MXL2 | 08/11/17 23:03 |

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QC Summary

Workorder: 429979

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|---------------------------|-----------|--------|--------|-------|--------|--------|------|------------|------------|----------|----------------|
| Ion Chromatography | | | | | | | | | | | |
| Batch | 1691290 | | | | | | | | | | |
| Chloride | | 38.9 | | 39.0 | mg/L | 0.0462 | | (0%-20%) | MXL2 | 08/14/17 | 18:01 |
| Fluoride | | 0.193 | | 0.198 | mg/L | 2.45 | ^ | (+/-0.100) | | 08/11/17 | 23:03 |
| Sulfate | | 55.9 | | 56.1 | mg/L | 0.23 | | (0%-20%) | | 08/14/17 | 18:01 |
| QC1203853103 | 430398002 | DUP | | | | | | | | | |
| Bromide | | J | 0.0965 | J | 0.0985 | mg/L | 2.05 | ^ | (+/-0.200) | | 08/12/17 10:49 |
| Chloride | | 8.37 | | 8.39 | mg/L | 0.165 | | (0%-20%) | | | |
| Fluoride | | 0.281 | | 0.287 | mg/L | 1.87 | ^ | (+/-0.100) | | | |
| Sulfate | | 17.1 | | 17.0 | mg/L | 0.428 | | (0%-20%) | | | |
| QC1203853101 | LCS | | | | | | | | | | |
| Bromide | | 1.25 | | 1.23 | mg/L | | | 98.3 | (80%-120%) | | 08/11/17 22:04 |
| Chloride | | 5.00 | | 4.63 | mg/L | | | 92.5 | (80%-120%) | | |
| Fluoride | | 2.50 | | 2.41 | mg/L | | | 96.2 | (80%-120%) | | |
| Sulfate | | 10.0 | | 9.47 | mg/L | | | 94.7 | (80%-120%) | | |
| QC1203853100 | MB | | | | | | | | | | |
| Bromide | | | U | ND | mg/L | | | | | | 08/11/17 21:35 |
| Chloride | | | U | ND | mg/L | | | | | | |
| Fluoride | | | U | ND | mg/L | | | | | | |
| Sulfate | | | U | ND | mg/L | | | | | | |

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QC Summary

Workorder: 429979

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|----------------------------|---------|----------|------|------|-------|------|------|------------|-------|----------|-------|
| Ion Chromatography | | | | | | | | | | | |
| Batch | 1691290 | | | | | | | | | | |
| QC1203853104 429717001 PS | | | | | | | | | | | |
| Bromide | 1.25 | 0.274 | | 1.51 | mg/L | | 98.5 | (75%-125%) | MXL2 | 08/11/17 | 23:32 |
| Chloride | 5.00 | 7.79 | | 13.3 | mg/L | | 110 | (75%-125%) | | 08/14/17 | 18:30 |
| Fluoride | 2.50 | 0.193 | | 2.58 | mg/L | | 95.5 | (75%-125%) | | 08/11/17 | 23:32 |
| Sulfate | 10.0 | 11.2 | | 21.7 | mg/L | | 106 | (75%-125%) | | 08/14/17 | 18:30 |
| QC1203853105 430398002 PS | | | | | | | | | | | |
| Bromide | 1.25 | J 0.0965 | | 1.31 | mg/L | | 96.8 | (75%-125%) | | 08/12/17 | 11:18 |
| Chloride | 5.00 | 8.37 | | 14.0 | mg/L | | 113 | (75%-125%) | | | |
| Fluoride | 2.50 | 0.281 | | 2.66 | mg/L | | 95.3 | (75%-125%) | | | |
| Sulfate | 10.0 | 17.1 | | 28.0 | mg/L | | 109 | (75%-125%) | | | |
| Nutrient Analysis | | | | | | | | | | | |
| Batch | 1692771 | | | | | | | | | | |
| QC1203856516 429717002 DUP | | | | | | | | | | | |
| Nitrogen, Total Kjeldahl | | U | ND U | ND | mg/L | N/A | | | KLP1 | 08/25/17 | 08:58 |
| QC1203856517 429873002 DUP | | | | | | | | | | | |
| Nitrogen, Total Kjeldahl | | U | ND U | ND | mg/L | N/A | | | | 08/25/17 | 09:01 |
| QC1203856515 LCS | | | | | | | | | | | |
| Nitrogen, Total Kjeldahl | 1.00 | | | 1.08 | mg/L | | 108 | (90%-110%) | | 08/25/17 | 08:52 |
| QC1203856514 MB | | | | | | | | | | | |
| Nitrogen, Total Kjeldahl | | | U | ND | mg/L | | | | | 08/25/17 | 08:51 |

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QC Summary

Workorder: 429979

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|--------------------------|-----------|--------|--------|--------|--------|------|--------|------------|-------|----------|-------|
| Nutrient Analysis | | | | | | | | | | | |
| Batch | 1692771 | | | | | | | | | | |
| QC1203856518 | 429717002 | MS | | | | | | | | | |
| Nitrogen, Total Kjeldahl | 1.00 | U | ND | 1.00 | mg/L | | 97.8 | (90%-110%) | KLP1 | 08/25/17 | 08:59 |
| QC1203856519 | 429873002 | MS | | | | | | | | | |
| Nitrogen, Total Kjeldahl | 1.00 | U | ND | 1.05 | mg/L | | 105 | (90%-110%) | | 08/25/17 | 09:02 |
| Batch | 1698350 | | | | | | | | | | |
| QC1203869227 | 429979001 | DUP | | | | | | | | | |
| Nitrogen, Ammonia | | Hh | 0.560 | HJh | 0.224 | mg/L | 85.9*^ | (+/-0.250) | KLP1 | 09/05/17 | 11:47 |
| QC1203869226 | LCS | | | | | | | | | | |
| Nitrogen, Ammonia | 1.00 | | | 0.976 | mg/L | | 97.6 | (90%-110%) | | 09/05/17 | 11:46 |
| QC1203869225 | MB | | | | | | | | | | |
| Nitrogen, Ammonia | | | J | 0.0247 | mg/L | | | | | 09/05/17 | 11:45 |
| QC1203869228 | 429979001 | MS | | | | | | | | | |
| Nitrogen, Ammonia | 5.00 | Hh | 0.560 | Hh | 5.15 | mg/L | 91.8 | (90%-110%) | | 09/05/17 | 11:48 |
| Batch | 1698352 | | | | | | | | | | |
| QC1203869234 | 429979001 | DUP | | | | | | | | | |
| Phosphorus, Total as P | | HJh | 0.0332 | HJh | 0.0353 | mg/L | 6.13 ^ | (+/-0.050) | KLP1 | 09/05/17 | 15:41 |
| QC1203869233 | LCS | | | | | | | | | | |
| Phosphorus, Total as P | 1.00 | | | 0.904 | mg/L | | 90.4 | (80%-124%) | | 09/05/17 | 15:43 |
| QC1203869232 | MB | | | | | | | | | | |
| Phosphorus, Total as P | | | J | 0.0381 | mg/L | | | | | 09/05/17 | 15:39 |
| QC1203869235 | 429979001 | MS | | | | | | | | | |
| Phosphorus, Total as P | 1.00 | HJh | 0.0332 | Hh | 0.856 | mg/L | 82.3 | (63%-139%) | | 09/05/17 | 15:42 |

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QC Summary

Workorder: 429979

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|-----------------------------------|-----------|--------|-------|------|-------|----------|-------|------------|-------|----------|-------|
| Nutrient Analysis | | | | | | | | | | | |
| Batch | 1698353 | | | | | | | | | | |
| QC1203869238 | 429979001 | DUP | | | | | | | | | |
| Nitrogen, Nitrate/Nitrite | | H | 1.52 | H | 1.53 | mg/L | 0.985 | (0%-20%) | AXH3 | 09/05/17 | 10:01 |
| QC1203869237 | LCS | | | | | | | | | | |
| Nitrogen, Nitrate/Nitrite | 1.00 | | | | 1.08 | mg/L | 108 | (90%-110%) | | 09/05/17 | 09:59 |
| QC1203869236 | MB | | | | | | | | | | |
| Nitrogen, Nitrate/Nitrite | | | U | ND | mg/L | | | | | 09/05/17 | 09:57 |
| QC1203869239 | 429979001 | PS | | | | | | | | | |
| Nitrogen, Nitrate/Nitrite | 1.00 | H | 0.303 | H | 1.37 | mg/L | 107 | (90%-110%) | | 09/05/17 | 10:02 |
| Solids Analysis | | | | | | | | | | | |
| Batch | 1690491 | | | | | | | | | | |
| QC1203850980 | 429981001 | DUP | | | | | | | | | |
| Total Dissolved Solids | | | 176 | | 174 | mg/L | 0.816 | (0%-5%) | KLP1 | 08/10/17 | 16:52 |
| QC1203850979 | LCS | | | | | | | | | | |
| Total Dissolved Solids | 300 | | | | 297 | mg/L | 99 | (95%-105%) | | 08/10/17 | 16:52 |
| QC1203850978 | MB | | | | | | | | | | |
| Total Dissolved Solids | | | J | 5.71 | mg/L | | | | | 08/10/17 | 16:52 |
| Titration and Ion Analysis | | | | | | | | | | | |
| Batch | 1689860 | | | | | | | | | | |
| QC1203849509 | 429324004 | DUP | | | | | | | | | |
| Conductivity | | | 198 | | 201 | umhos/cm | 1.4 | (0%-10%) | RXB5 | 08/15/17 | 14:01 |
| QC1203849510 | 429873001 | DUP | | | | | | | | | |
| Conductivity | | | 151 | | 150 | umhos/cm | 0.797 | (0%-10%) | | 08/15/17 | 14:07 |
| QC1203849508 | LCS | | | | | | | | | | |
| Conductivity | 1410 | | | | 1430 | umhos/cm | 101 | (95%-105%) | | 08/15/17 | 13:59 |

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2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 429979

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|-----------------------------------|-----------|--------|------|------|-------|-------|------|------------|-------|----------|-------|
| Titration and Ion Analysis | | | | | | | | | | | |
| Batch | 1691070 | | | | | | | | | | |
| QC1203852503 | 429717001 | DUP | | | | | | | | | |
| Alkalinity, Total as CaCO3 | | 78.3 | | 78.7 | mg/L | 0.514 | | (0%-20%) | RXB5 | 08/16/17 | 12:05 |
| Carbonate alkalinity (CaCO3) | U | ND | U | ND | mg/L | N/A | | | | | |
| QC1203852501 | LCS | | | | | | | | | | |
| Alkalinity, Total as CaCO3 | 100 | | | 109 | mg/L | | 109 | (90%-110%) | | 08/16/17 | 11:19 |
| QC1203852506 | 429717001 | MS | | | | | | | | | |
| Alkalinity, Total as CaCO3 | 100 | 78.3 | | 183 | mg/L | | 104 | (80%-120%) | | 08/16/17 | 12:06 |
| Batch | 1691073 | | | | | | | | | | |
| QC1203852562 | 429981001 | DUP | | | | | | | | | |
| pH | H | 8.15 | H | 8.17 | SU | 0.245 | | (0%-5%) | RXB5 | 08/16/17 | 12:45 |
| QC1203852560 | LCS | | | | | | | | | | |
| pH | 7.00 | | | 7.01 | SU | | 100 | (99%-101%) | | 08/16/17 | 12:01 |

Notes:

- < Result is less than value reported
- > Result is greater than value reported
- B The target analyte was detected in the associated blank.
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- H Analytical holding time was exceeded
- J Value is estimated
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

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QC Summary

Workorder: 429979

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| Parmname | NOM | Sample | Qual | QC | Units | RPD% | REC% | Range | Anlst | Date | Time |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|----|-------|------|------|-------|-------|------|------|
| X | Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier | | | | | | | | | | |
| Z | Paint Filter Test--Particulates passed through the filter, however no free liquids were observed. | | | | | | | | | | |
| ^ | RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry. | | | | | | | | | | |
| d | 5-day BOD--The 2:1 depletion requirement was not met for this sample | | | | | | | | | | |
| e | 5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes | | | | | | | | | | |
| h | Preparation or preservation holding time was exceeded | | | | | | | | | | |

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.