

Metals

Case Narrative

Colorado Oil & Gas Conservation Commission

Complaint 200339399

Work Order Number: 1202195

1. This report consists of 1 water sample.
2. The sample was received cool and intact by ALS on 2/16/12.
3. The sample was to be analyzed for dissolved metals. The sample was filtered through a 0.45 micron filter and preserved with nitric acid to a pH less than two prior to analysis.
4. The sample was prepared and analyzed based on Methods for the Determination of Metals in Environmental Samples – Supplement 1 procedures.

Prior to analysis by Trace ICP, an ionization buffer was added to the samples to improve the sodium and potassium quantitation.

For analysis by Trace ICP and ICP-MS, the sample was digested following method 200.2 and SOP 806 Rev. 15.

5. Analysis by Trace ICP followed method 200.7 and SOP 807 Rev. 13.

Analysis by ICP-MS followed method 200.8 and SOP 827 Rev. 8.

6. All standards and solutions are NIST traceable and were used within their recommended shelf life.
7. The sample was prepared and analyzed within the established hold times.

All in house quality control procedures were followed, as described below.

8. General quality control procedures.



- A filter (method) blank and laboratory control sample were filtered, preserved, and digested at the same time as the sample.
- The preparation (method) blank associated with each digestion batch was below the practical quantitation limit for the requested analytes.
- All laboratory control sample criteria were met.
- All initial and continuing calibration blanks were below the practical quantitation limit for the requested analytes, with the exceptions of CCB3, 4, and 5 for thorium. None of the samples associated with this order number were bracketed by these CCBs.
- All initial and continuing calibration verifications were within the acceptance criteria for the requested analytes, with the exception of CCV3 for thorium. None of the samples associated with this order number were bracketed by this CCV.
- The interference check samples associated with Method 200.7 were within acceptance criteria.
- The interference check samples associated with Method 200.8 were analyzed.

9. Matrix specific quality control procedures.

Per method requirements, matrix QC was performed for each analysis. Since a sample from this order number was not the selected quality control (QC) sample, matrix specific QC results are not included in this report.

10. It is a standard practice that samples for ICP-MS are analyzed at a dilution.

11. Sodium Adsorption Ratio (SAR) was determined by calculation based on a reference from the client. Calcium, magnesium, and sodium concentrations were determined by ICP, Method 200.7.

$$\text{SAR} = \text{Na} / (((\text{Ca} + \text{Mg}) / 2)^{1/2})$$

The analyte results are the me/L concentrations based on conversions from their mg/L concentrations. Please note that the SAR value is unitless.



The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Jill Latelle
Jill Latelle
Inorganics Primary Data Reviewer

2-27-12
Date

[Signature]
Inorganics Final Data Reviewer

2-27-12
Date



Inorganic Data Reporting Qualifiers

The following qualifiers are used by the laboratory when reporting results of inorganic analyses.

- Result qualifier -- If the analyte was analyzed for but not detected a "U" is entered.
- QC qualifier -- Specified entries and their meanings are as follows:
 - E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
 - M - Duplicate injection precision was not met.
 - N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
 - Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
 - * - Duplicate analysis (relative percent difference) not within control limits.

ALS Environmental -- FC

Sample Number(s) Cross-Reference Table

OrderNum: 1202195

Client Name: Colorado Oil & Gas Conservation Commission

Client Project Name: Complaint 200339399

Client Project Number:

Client PO Number: PHA 12-10

| Client Sample Number | Lab Sample Number | COC Number | Matrix | Date Collected | Time Collected |
|----------------------|-------------------|------------|--------|----------------|----------------|
| 705325 Nosaka WW | 1202195-1 | | WATER | 14-Feb-12 | 14:17 |



CONDITION OF SAMPLE UPON RECEIPT FORM

Client: COGCC
Project Manager: ARW

Workorder No: 1202195
Initials: LAS Date: 2/16/12

| | | | |
|---|---------------------------------------|--------------------------------------|---------------------------------------|
| 1. Does this project require any special handling in addition to standard Paragon procedures? | | YES | <input checked="" type="radio"/> NO |
| 2. Are custody seals on shipping containers intact? | NONE | <input checked="" type="radio"/> YES | NO |
| 3. Are Custody seals on sample containers intact? | <input checked="" type="radio"/> NONE | YES | NO |
| 4. Is there a COC (Chain-of-Custody) present or other representative documents? | | <input checked="" type="radio"/> YES | NO |
| 5. Are the COC and bottle labels complete and legible ? | | <input checked="" type="radio"/> YES | NO |
| 6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.) | | <input checked="" type="radio"/> YES | NO |
| 7. Were airbills / shipping documents present and/or removable? | DROP OFF | <input checked="" type="radio"/> YES | NO |
| 8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles) | N/A | <input checked="" type="radio"/> YES | NO |
| 9. Are all aqueous non-preserved samples pH 4-9? | N/A | <input checked="" type="radio"/> YES | NO |
| 10. Is there sufficient sample for the requested analyses? | | <input checked="" type="radio"/> YES | NO |
| 11. Were all samples placed in the proper containers for the requested analyses? | | <input checked="" type="radio"/> YES | NO |
| 12. Are all samples within holding times for the requested analyses? | | <input checked="" type="radio"/> YES | NO |
| 13. Were all sample containers received intact? (not broken or leaking, etc.) | | <input checked="" type="radio"/> YES | NO |
| 14. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: <u>X</u> < green pea ___ > green pea | N/A | YES | <input checked="" type="radio"/> NO * |
| 15. Do perchlorate LCMS-MS samples have headspace? (at least 1/3 of container required) | <input checked="" type="radio"/> N/A | YES | NO |
| 16. Were samples checked for and free from the presence of residual chlorine? (Applicable when PM has indicated samples are from a chlorinated water source; note if field preservation with sodium thiosulfate was not observed.) | <input checked="" type="radio"/> N/A | YES | NO |
| 17. Were the samples shipped on ice? | | <input checked="" type="radio"/> YES | NO |
| 18. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: <input checked="" type="radio"/> #2 #4 RAD ONLY | | <input checked="" type="radio"/> YES | NO |
| Cooler #: <u>1</u> | | | |
| Temperature (°C): <u>1.6</u> | | | |
| No. of custody seals on cooler: <u>1</u> | | | |
| External µR/hr reading: <u>14</u> | | | |
| Background µR/hr reading: <u>11</u> | | | |
| Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <input checked="" type="radio"/> YES / NO / NA (If no, see Form 008.) | | | |

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

*14 1202195-1-6 (705325 Ndsqka) for DISS. Gases arrived with headspace ≤ pea-size.

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: [Signature] 2/16/12

*IR Gun #2: Oakton, SN 29922500201-0066 *IR Gun #4: Oakton, SN 2372220101-0002 Form 201r22.xls (6/1/09)

1202195

From: (719) 846-3091
Peter Gintautas
Colo. Oil & Gas Cons. Comm.
213 Conundrum RD
Trinidad, CO 81082



Origin ID: PUBA

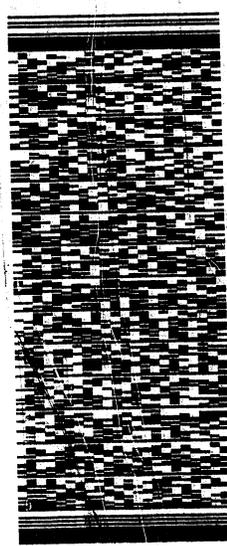


J1210112190225

BILL SENDER

SHIP TO: (970) 490-1511
Amy Wolf
ALS Laboratory Group
225 COMMERCE DR

FORT COLLINS, CO 80524



1.9

Ship Date: 15FEB12
ActWgt 34.0 LB
CAD: 4076443/NET3250

Delivery Address Bar Code



Ref #
Invoice #
PO #
Dept #

14

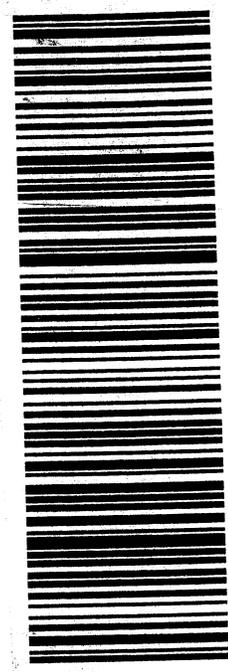
Complaint: 200339399

THU - 16 FEB A2
PRIORITY OVERNIGHT

TRK# 7932 3213 0507
0201

80524
CO-US
DEN

72 FTCA



512G1BF58A278

Dissolved Metals by 200.7

Method EPA200.7 Revision 4.4

Sample Results

Lab Name: ALS Environmental -- FC

Work Order Number: 1202195

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200339399

Field ID: 705325 Nosaka WW

Lab ID: 1202195-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 14-Feb-12

Date Extracted: 21-Feb-12

Date Analyzed: 22-Feb-12

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP120221-1

QCBatchID: IP120221-1-3

Run ID: IT120222-2A6

Cleanup: NONE

Basis: As Received

File Name: 120222A.

Analyst: Mike Lundgr

Sample Aliquot: 50 G

Final Volume: 50 G

Result Units: MG/L

Clean DF: 1

| CASNO | Target Analyte | Dilution Factor | Result | Reporting Limit | Result Qualifier | EPA Qualifier |
|-----------|-------------------------|-----------------|--------|-----------------|------------------|---------------|
| 7440-41-7 | BERYLLIUM | 1 | 0.002 | 0.002 | U | |
| 7440-42-8 | BORON | 1 | 0.1 | 0.1 | U | |
| 7440-70-2 | CALCIUM | 1 | 21 | 1 | | |
| 7440-47-3 | CHROMIUM | 1 | 0.01 | 0.01 | U | |
| 7439-89-6 | IRON | 1 | 0.1 | 0.1 | U | |
| 7439-93-2 | LITHIUM | 1 | 0.023 | 0.01 | | |
| 7439-95-4 | MAGNESIUM | 1 | 1 | 1 | U | |
| 7440-02-0 | NICKEL | 1 | 0.02 | 0.02 | U | |
| 7440-09-7 | POTASSIUM | 1 | 1.3 | 1 | | |
| 7440-21-3 | SILICON | 1 | 3.7 | 0.05 | | |
| 7440-23-5 | SODIUM | 1 | 110 | 1 | | |
| | SODIUM ADSORPTION RATIO | 1 | 6.2 | 0.17 | S | |
| 7440-62-2 | VANADIUM | 1 | 0.01 | 0.01 | U | |

Data Package ID: *it1202195-1*

Dissolved Metals by 200.8

Method EPA200.8 Revision 5.4

Sample Results

Lab Name: ALS Environmental -- FC

Work Order Number: 1202195

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200339399

| | |
|-----------|------------------|
| Field ID: | 705325 Nosaka WW |
| Lab ID: | 1202195-1 |

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 14-Feb-12

Date Extracted: 21-Feb-12

Date Analyzed: 24-Feb-12

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP120221-1

QCBatchID: IP120221-1-2

Run ID: IM120224-10A2

Cleanup: NONE

Basis: As Received

File Name: 024SMPL.

Analyst: Ross Miller

Sample Aliquot: 50 G

Final Volume: 50 G

Result Units: MG/L

Clean DF: 1

| CASNO | Target Analyte | Dilution Factor | Result | Reporting Limit | Result Qualifier | EPA Qualifier |
|-----------|----------------|-----------------|---------|-----------------|------------------|---------------|
| 7429-90-5 | ALUMINUM | 10 | 0.05 | 0.05 | U | |
| 7440-36-0 | ANTIMONY | 10 | 0.00063 | 0.0003 | | |
| 7440-38-2 | ARSENIC | 10 | 0.002 | 0.002 | U | |
| 7440-39-3 | BARIUM | 10 | 0.041 | 0.001 | | |
| 7440-43-9 | CADMIUM | 10 | 0.0003 | 0.0003 | U | |
| 7440-48-4 | COBALT | 10 | 0.001 | 0.001 | U | |
| 7440-50-8 | COPPER | 10 | 0.01 | 0.01 | U | |
| 7439-92-1 | LEAD | 10 | 0.0005 | 0.0005 | U | |
| 7439-96-5 | MANGANESE | 10 | 0.002 | 0.002 | U | |
| 7439-98-7 | MOLYBDENUM | 10 | 0.0019 | 0.001 | | |
| 7782-49-2 | SELENIUM | 10 | 0.001 | 0.001 | U | |
| 7440-22-4 | SILVER | 10 | 0.0001 | 0.0001 | U | |
| 7440-23-5 | SODIUM | 10 | 120 | 1 | | |
| 7440-24-6 | STRONTIUM | 10 | 0.37 | 0.001 | | |
| 7440-28-0 | THALLIUM | 10 | 0.0002 | 0.0002 | U | |
| 7440-29-1 | THORIUM | 10 | 0.0002 | 0.0002 | U | |
| 7440-61-1 | URANIUM | 10 | 0.00011 | 0.0001 | | |
| 7440-66-6 | ZINC | 10 | 0.02 | 0.02 | U | |

Data Package ID: im1202195-1

Metals by 200.7

Method EPA200.7 Revision 4.4

Method Blank

Lab Name: ALS Environmental -- FC

Work Order Number: 1202195

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200339399

Lab ID: F120216-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 21-Feb-12

Date Analyzed: 22-Feb-12

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP120221-1

QCBatchID: IP120221-1-3

Run ID: IT120222-2A6

Cleanup: NONE

Basis: N/A

File Name: 120222A.

Sample Aliquot: 50 g

Final Volume: 50 g

Result Units: MG/L

Clean DF: 1

| CASNO | Target Analyte | DF | Result | Reporting Limit | Result Qualifier | EPA Qualifier |
|-----------|----------------|----|--------|-----------------|------------------|---------------|
| 7440-41-7 | BERYLLIUM | 1 | 0.002 | 0.002 | U | |
| 7440-42-8 | BORON | 1 | 0.1 | 0.1 | U | |
| 7440-70-2 | CALCIUM | 1 | 1 | 1 | U | |
| 7440-47-3 | CHROMIUM | 1 | 0.01 | 0.01 | U | |
| 7439-89-6 | IRON | 1 | 0.1 | 0.1 | U | |
| 7439-93-2 | LITHIUM | 1 | 0.01 | 0.01 | U | |
| 7439-95-4 | MAGNESIUM | 1 | 1 | 1 | U | |
| 7440-02-0 | NICKEL | 1 | 0.02 | 0.02 | U | |
| 7440-09-7 | POTASSIUM | 1 | 1 | 1 | U | |
| 7440-21-3 | SILICON | 1 | 0.05 | 0.05 | U | |
| 7440-23-5 | SODIUM | 1 | 1 | 1 | U | |
| 7440-62-2 | VANADIUM | 1 | 0.01 | 0.01 | U | |

Data Package ID: *it1202195-1*

Metals by 200.7

Method EPA200.7 Revision 4.4

Laboratory Control Sample

Lab Name: ALS Environmental -- FC

Work Order Number: 1202195

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200339399

Lab ID: F120216-1LCS

Sample Matrix: WATER
 % Moisture: N/A
 Date Collected: N/A
 Date Extracted: 02/21/2012
 Date Analyzed: 02/22/2012
 Prep Method: EPA200.22.8

Prep Batch: IP120221-1
 QCBatchID: IP120221-1-3
 Run ID: IT120222-2A6
 Cleanup: NONE
 Basis: N/A
 File Name: 120222A.

Sample Aliquot: 50 g
 Final Volume: 50 g
 Result Units: MG/L
 Clean DF: 1

| CASNO | Target Analyte | Spike Added | LCS Result | Reporting Limit | Result Qualifier | LCS % Rec. | Control Limits |
|-----------|----------------|-------------|------------|-----------------|------------------|------------|----------------|
| 7440-41-7 | BERYLLIUM | 0.05 | 0.0465 | 0.002 | | 93 | 85 - 115% |
| 7440-42-8 | BORON | 1 | 0.977 | 0.1 | | 98 | 85 - 115% |
| 7440-70-2 | CALCIUM | 40 | 39 | 1 | | 98 | 85 - 115% |
| 7440-47-3 | CHROMIUM | 0.2 | 0.19 | 0.01 | | 95 | 85 - 115% |
| 7439-89-6 | IRON | 1 | 1.01 | 0.1 | | 101 | 85 - 115% |
| 7439-93-2 | LITHIUM | 0.5 | 0.47 | 0.01 | | 94 | 85 - 115% |
| 7439-95-4 | MAGNESIUM | 40 | 38.8 | 1 | | 97 | 85 - 115% |
| 7440-02-0 | NICKEL | 0.5 | 0.466 | 0.02 | | 93 | 85 - 115% |
| 7440-09-7 | POTASSIUM | 40 | 40.5 | 1 | | 101 | 85 - 115% |
| 7440-21-3 | SILICON | 2 | 2.07 | 0.05 | | 104 | 85 - 115% |
| 7440-23-5 | SODIUM | 40 | 37.8 | 1 | | 94 | 85 - 115% |
| 7440-62-2 | VANADIUM | 0.5 | 0.485 | 0.01 | | 97 | 85 - 115% |

Data Package ID: *it1202195-1*

Metals by 200.8

Method EPA200.8 Revision 5.4

Method Blank

Lab Name: ALS Environmental -- FC

Work Order Number: 1202195

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200339399

Lab ID: F120216-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 21-Feb-12

Date Analyzed: 24-Feb-12

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP120221-1

QCBatchID: IP120221-1-2

Run ID: IM120224-10A2

Cleanup: NONE

Basis: N/A

File Name: 016SMPL.

Sample Aliquot: 50 g

Final Volume: 50 g

Result Units: MG/L

Clean DF: 1

| CASNO | Target Analyte | DF | Result | Reporting Limit | Result Qualifier | EPA Qualifier |
|-----------|----------------|----|--------|-----------------|------------------|---------------|
| 7429-90-5 | ALUMINUM | 10 | 0.05 | 0.05 | U | |
| 7440-36-0 | ANTIMONY | 10 | 0.0003 | 0.0003 | U | |
| 7440-38-2 | ARSENIC | 10 | 0.002 | 0.002 | U | |
| 7440-39-3 | BARIUM | 10 | 0.001 | 0.001 | U | |
| 7440-43-9 | CADMIUM | 10 | 0.0003 | 0.0003 | U | |
| 7440-48-4 | COBALT | 10 | 0.001 | 0.001 | U | |
| 7440-50-8 | COPPER | 10 | 0.01 | 0.01 | U | |
| 7439-92-1 | LEAD | 10 | 0.0005 | 0.0005 | U | |
| 7439-96-5 | MANGANESE | 10 | 0.002 | 0.002 | U | |
| 7439-98-7 | MOLYBDENUM | 10 | 0.001 | 0.001 | U | |
| 7782-49-2 | SELENIUM | 10 | 0.001 | 0.001 | U | |
| 7440-22-4 | SILVER | 10 | 0.0001 | 0.0001 | U | |
| 7440-23-5 | SODIUM | 10 | 1 | 1 | U | |
| 7440-24-6 | STRONTIUM | 10 | 0.001 | 0.001 | U | |
| 7440-28-0 | THALLIUM | 10 | 0.0002 | 0.0002 | U | |
| 7440-29-1 | THORIUM | 10 | 0.0002 | 0.0002 | U | |
| 7440-61-1 | URANIUM | 10 | 0.0001 | 0.0001 | U | |
| 7440-66-6 | ZINC | 10 | 0.02 | 0.02 | U | |

Data Package ID: im1202195-1

Metals by 200.8

Method EPA200.8 Revision 5.4

Laboratory Control Sample

Lab Name: ALS Environmental -- FC

Work Order Number: 1202195

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200339399

Lab ID: FM120216-1LCS

Sample Matrix: WATER
 % Moisture: N/A
 Date Collected: N/A
 Date Extracted: 02/21/2012
 Date Analyzed: 02/24/2012
 Prep Method: EPA200.22.8

Prep Batch: IP120221-1
 QCBatchID: IP120221-1-2
 Run ID: IM120224-10A2
 Cleanup: NONE
 Basis: N/A
 File Name: 018SMPL.

Sample Aliquot: 50 g
 Final Volume: 50 g
 Result Units: MG/L
 Clean DF: 1

| CASNO | Target Analyte | Spike Added | LCS Result | Reporting Limit | Result Qualifier | LCS % Rec. | Control Limits |
|-----------|----------------|-------------|------------|-----------------|------------------|------------|----------------|
| 7429-90-5 | ALUMINUM | 5 | 4.58 | 0.05 | | 92 | 85 - 115% |
| 7440-36-0 | ANTIMONY | 0.03 | 0.0294 | 0.0003 | | 98 | 85 - 115% |
| 7440-38-2 | ARSENIC | 0.1 | 0.0943 | 0.002 | | 94 | 85 - 115% |
| 7440-39-3 | BARIUM | 0.1 | 0.0964 | 0.001 | | 96 | 85 - 115% |
| 7440-43-9 | CADMIUM | 0.03 | 0.0307 | 0.0003 | | 102 | 85 - 115% |
| 7440-48-4 | COBALT | 0.1 | 0.0973 | 0.001 | | 97 | 85 - 115% |
| 7440-50-8 | COPPER | 1 | 1.01 | 0.01 | | 101 | 85 - 115% |
| 7439-92-1 | LEAD | 0.05 | 0.0496 | 0.0005 | | 99 | 85 - 115% |
| 7439-96-5 | MANGANESE | 0.2 | 0.192 | 0.002 | | 96 | 85 - 115% |
| 7439-98-7 | MOLYBDENUM | 0.1 | 0.0915 | 0.001 | | 91 | 85 - 115% |
| 7782-49-2 | SELENIUM | 0.1 | 0.0982 | 0.001 | | 98 | 85 - 115% |
| 7440-22-4 | SILVER | 0.01 | 0.00982 | 0.0001 | | 98 | 85 - 115% |
| 7440-23-5 | SODIUM | 10 | 10.1 | 1 | | 101 | 85 - 115% |
| 7440-24-6 | STRONTIUM | 0.1 | 0.0944 | 0.001 | | 94 | 85 - 115% |
| 7440-28-0 | THALLIUM | 0.002 | 0.00207 | 0.0002 | | 103 | 85 - 115% |
| 7440-29-1 | THORIUM | 0.01 | 0.00924 | 0.0002 | | 92 | 85 - 115% |
| 7440-61-1 | URANIUM | 0.01 | 0.00949 | 0.0001 | | 95 | 85 - 115% |
| 7440-66-6 | ZINC | 2 | 2.02 | 0.02 | | 101 | 85 - 115% |

Data Package ID: *im1202195-1*