



Metals

Case Narrative

COGCC

Burkhart -- 25087038

Work Order Number: 1202226

1. This report consists of 1 water sample.
2. The sample was received cool and intact by ALS on 2/20/12.
3. The sample was to be analyzed for dissolved metals. The sample was filtered and preserved to a pH less than 2 prior to digestion.
4. The sample was prepared and analyzed based on Methods for the Determination of Metals in Environmental Samples – Supplement 1 procedures.

For analysis by Trace ICP, 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.
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 this 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.
- All initial and continuing calibration verifications were within the acceptance criteria for the requested analytes.
- The interference check samples associated with Method 200.7 were within acceptance criteria.

9. Matrix specific quality control procedures.

Per method requirements, matrix QC was performed for this 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. Sample dilutions were not required for the requested analysis.

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

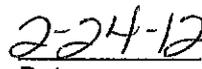
$$\text{SAR} = \text{Na} / (((\text{Ca} + \text{Mg}) / 2)^{1/2})$$

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

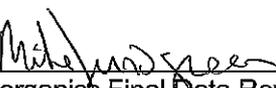
The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.



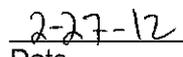
Jill Latelle
Inorganics Primary Data Reviewer



Date



Mike Anderson
Inorganics Final Data Reviewer



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: 1202226

Client Name: COGCC

Client Project Name: Burkhart

Client Project Number: 25087038

Client PO Number:

| Client Sample Number | Lab Sample Number | COC Number | Matrix | Date Collected | Time Collected |
|-----------------------|-------------------|------------|--------|----------------|----------------|
| Burkhart 1/#200340214 | 1202226-1 | | WATER | 20-Feb-12 | 12:00 |



ALS Laboratory Group

225 Commerce Drive, Fort Collins, Colorado 80524
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Chain-of-Custody

Form 202r8

WORKORDER # 1202226

PAGE 1 of 1
DISPOSAL Lab Return to Client

DATE 2/20/12
TURNAROUND STD

SAMPLER SITE ID
EDD FORMAT
PURCHASE ORDER
BILL TO COMPANY
INVOICE ATTN TO
ADDRESS
CITY / STATE / ZIP
PHONE
FAX
E-MAIL

PROJECT NAME *Birkhart, Burkhart, Olson*
PROJECT NO. *25087038*
COMPANY NAME *Terracon Consultants*
SEND REPORT TO *John Axelsson / Amy Wolf*
ADDRESS *10625 W 170th Ave, Littleton, CO 80120*
CITY / STATE / ZIP *Littleton, CO 80120*
PHONE *303-983-3300*
FAX
E-MAIL *Jc.dellaport@terracon.com*

Ashley K Byrne

ANALYSIS / METHODS
*Asst'd Metals
Arsens / Carbons
BTEX
TPH - GLO & DRO
Methane
EC, TDS, PH*

| Lab ID | Field ID | Matrix | Sample Date | Sample Time | # Bottles | Pres. | QC |
|--------|--------------------------------|-----------|----------------|-------------|-----------|----------|----|
| | <i>Birkhart I / #200340417</i> | <i>GW</i> | <i>2/20/12</i> | <i>935</i> | <i>10</i> | <i>✓</i> | |
| ① | <i>Birkhart I / #20034024</i> | <i> </i> | <i> </i> | <i>1200</i> | <i>10</i> | <i>✓</i> | |
| | <i>Olson I / #200340417</i> | <i> </i> | <i> </i> | <i>1500</i> | <i>10</i> | <i>✓</i> | |

| RELINQUISHED BY | SIGNATURE | PRINTED NAME | DATE | TIME |
|-----------------|--------------------|-----------------------|----------------|-------------|
| RECEIVED BY | <i>[Signature]</i> | <i>Ashley K Byrne</i> | <i>2/20/12</i> | <i>1700</i> |
| RELINQUISHED BY | <i>[Signature]</i> | <i>C. Axelsson</i> | <i>2-20-12</i> | <i>1700</i> |
| RECEIVED BY | | | | |
| RELINQUISHED BY | | | | |
| RECEIVED BY | | | | |

| QC PACKAGE (check below) |
|---|
| <input type="checkbox"/> LEVEL II (Standard QC) |
| <input type="checkbox"/> LEVEL III (Std QC + forms) |
| <input type="checkbox"/> LEVEL IV (Std QC + forms + raw data) |

Comments: *Please include sulfate, nitrate/nitrite w/ Total N*

5 of 9

Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035



CONDITION OF SAMPLE UPON RECEIPT FORM

Client: COGCC

Workorder No: 1202226

Project Manager: AW

Initials: CDT Date: 2-20-12

| | | | |
|---|---|--------------------------------------|--------------------------------------|
| 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? | <input checked="" type="radio"/> NONE | 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? | <input checked="" type="radio"/> DROP OFF | 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? | | YES | <input checked="" type="radio"/> 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: _____ < green pea _____ > green pea | N/A | <input checked="" type="radio"/> YES | 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*: #2 <input checked="" type="radio"/> #4 | | RAD ONLY | <input checked="" type="radio"/> YES |
| Cooler #: <u>1</u> | | | |
| Temperature (°C): <u>2.4</u> | | | |
| No. of custody seals on cooler: <u>0</u> | | | |
| External µR/hr reading: <u>NA</u> | | | |
| Background µR/hr reading: <u>NA</u> | | | |
| Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / <input checked="" type="radio"/> NA (If no, see Form 008.) | | | |

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

RECEIVED 6 TOTAL UOA VIALS, SO ASSIGNED 2 FOR EACH ANALYSIS.

2/22/12: cancelled NO2/NO3 by 353.2 due to samples bottles being left out of cooler overnight. Replaced analysis with 300.0 NO2 and 300.0 NO3.

If applicable, was the client contacted? YES / NO / NA Contact: John Axelson ^{aw} _{2/22/12} Date/Time: 2/22/12

Project Manager Signature / Date: C. Wolf 2/21/12

*IR Gun #2: Oakton, SN 29922500201-0066

*IR Gun #4: Oakton, SN 2372220101-0002

Dissolved Metals by 200.7

Method EPA200.7 Revision 4.4

Sample Results

Lab Name: ALS Environmental -- FC

Work Order Number: 1202226

Client Name: COGCC

ClientProject ID: Burkhart 25087038

| | |
|-----------|-----------------------|
| Field ID: | Burkhart 1/#200340214 |
| Lab ID: | 1202226-1 |

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 20-Feb-12

Date Extracted: 23-Feb-12

Date Analyzed: 24-Feb-12

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP120223-1

QCBatchID: IP120223-1-1

Run ID: IT120224-2A3

Cleanup: NONE

Basis: As Received

File Name: 120224A.

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 |
|-----------|-------------------------|-----------------|--------|-----------------|------------------|---------------|
| 7440-38-2 | ARSENIC | 1 | 0.01 | 0.01 | U | |
| 7440-39-3 | BARIUM | 1 | 0.1 | 0.1 | U | |
| 7440-70-2 | CALCIUM | 1 | 68 | 1 | | |
| 7440-47-3 | CHROMIUM | 1 | 0.01 | 0.01 | U | |
| 7439-89-6 | IRON | 1 | 0.34 | 0.1 | | |
| 7439-92-1 | LEAD | 1 | 0.003 | 0.003 | U | |
| 7439-95-4 | MAGNESIUM | 1 | 20 | 1 | | |
| 7439-96-5 | MANGANESE | 1 | 0.053 | 0.01 | | |
| 7440-09-7 | POTASSIUM | 1 | 8.1 | 1 | | |
| 7782-49-2 | SELENIUM | 1 | 0.005 | 0.005 | U | |
| 7440-23-5 | SODIUM | 1 | 66 | 1 | | |
| | SODIUM ADSORPTION RATIO | 1 | 1.8 | 0.17 | | |

Data Package ID: *it1202226-1*

Metals by 200.7

Method EPA200.7 Revision 4.4

Method Blank

Lab Name: ALS Environmental -- FC

Work Order Number: 1202226

Client Name: COGCC

ClientProject ID: Burkhart 25087038

Lab ID: F120222-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 23-Feb-12

Date Analyzed: 24-Feb-12

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP120223-1

QCBatchID: IP120223-1-1

Run ID: IT120224-2A3

Cleanup: NONE

Basis: N/A

File Name: 120224A.

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 |
|-----------|----------------|----|--------|-----------------|------------------|---------------|
| 7440-38-2 | ARSENIC | 1 | 0.01 | 0.01 | U | |
| 7440-39-3 | BARIUM | 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 | |
| 7439-92-1 | LEAD | 1 | 0.003 | 0.003 | U | |
| 7439-95-4 | MAGNESIUM | 1 | 1 | 1 | U | |
| 7439-96-5 | MANGANESE | 1 | 0.01 | 0.01 | U | |
| 7440-09-7 | POTASSIUM | 1 | 1 | 1 | U | |
| 7782-49-2 | SELENIUM | 1 | 0.005 | 0.005 | U | |
| 7440-23-5 | SODIUM | 1 | 1 | 1 | U | |

Data Package ID: *it1202226-1*

Metals by 200.7

Method EPA200.7 Revision 4.4

Laboratory Control Sample

Lab Name: ALS Environmental -- FC
Work Order Number: 1202226
Client Name: COGCC
ClientProject ID: Burkhart 25087038

Lab ID: F120222-1LCS

| | | |
|-----------------------------------|--------------------------------|-----------------------------|
| Sample Matrix: WATER | Prep Batch: IP120223-1 | Sample Aliquot: 50 g |
| % Moisture: N/A | QCBatchID: IP120223-1-1 | Final Volume: 50 g |
| Date Collected: N/A | Run ID: IT120224-2A3 | Result Units: MG/L |
| Date Extracted: 02/23/2012 | Cleanup: NONE | Clean DF: 1 |
| Date Analyzed: 02/24/2012 | Basis: N/A | |
| Prep Method: EPA200.22.8 | File Name: 120224A. | |

| CASNO | Target Analyte | Spike Added | LCS Result | Reporting Limit | Result Qualifier | LCS % Rec. | Control Limits |
|-----------|----------------|-------------|------------|-----------------|------------------|------------|----------------|
| 7440-38-2 | ARSENIC | 2 | 1.98 | 0.01 | | 99 | 85 - 115% |
| 7440-39-3 | BARIUM | 2 | 1.94 | 0.1 | | 97 | 85 - 115% |
| 7440-70-2 | CALCIUM | 40 | 38.3 | 1 | | 96 | 85 - 115% |
| 7440-47-3 | CHROMIUM | 0.2 | 0.19 | 0.01 | | 95 | 85 - 115% |
| 7439-89-6 | IRON | 1 | 0.972 | 0.1 | | 97 | 85 - 115% |
| 7439-92-1 | LEAD | 0.5 | 0.479 | 0.003 | | 96 | 85 - 115% |
| 7439-95-4 | MAGNESIUM | 40 | 37.7 | 1 | | 94 | 85 - 115% |
| 7439-96-5 | MANGANESE | 0.5 | 0.478 | 0.01 | | 96 | 85 - 115% |
| 7440-09-7 | POTASSIUM | 40 | 40.5 | 1 | | 101 | 85 - 115% |
| 7782-49-2 | SELENIUM | 2 | 1.99 | 0.005 | | 99 | 85 - 115% |
| 7440-23-5 | SODIUM | 40 | 38.7 | 1 | | 97 | 85 - 115% |

Data Package ID: *it1202226-1*