



# Metals

## Case Narrative

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### Colorado Oil & Gas Conservation Commission

Complaint 200294386

Work Order Number: 1102061

1. This report consists of 2 water samples.
2. The samples were received cool and intact by ALS on 02/05/11.
3. The samples were to be analyzed for dissolved metals. The samples were filtered through a 0.45 micron filter and preserved with nitric acid to a pH less than two prior to analysis.
4. The samples were 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 and associated QC to improve the sodium and potassium quantitation.

For analysis by Trace ICP and ICP-MS, the samples were digested following method 200.2 and SOP 806 Rev. 14.

5. Analysis by Trace ICP followed method 200.7 and SOP 807 Rev. 12.

Analysis by ICP-MS followed method 200.8 and SOP 827 Rev. 7.

6. All standards and solutions are NIST traceable and were used within their recommended shelf life.
7. The samples were 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 samples were filtered, preserved, and digested at the same time as the samples.
- The preparation (method) blank associated with this digestion batch was below the reporting limit for the requested analytes.
- All laboratory control sample criteria were met.
- All initial and continuing calibration blanks were below the practical quantitation limits 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.
- The interference check samples associated with Method 200.8 were analyzed, and the high standard readbacks were within acceptance criteria.

9. Matrix specific quality control procedures.

Sample 1102061-1 was designated as the quality control sample for each analysis.

Similarity of matrix and therefore relevance of the QC results should not be automatically inferred for any sample other than the native sample selected for QC.

- A matrix spike and matrix spike duplicate were digested and analyzed with each batch. All acceptance criteria for accuracy were met with the following exceptions:

<u>Analyte</u>	<u>Sample ID</u>
Potassium	1102061-1MS & MSD
Barium	1102061-1MS

The native sample results are flagged for matrix spike failure and analytical post spikes were performed. The result of the spike for barium was acceptable indicating that the matrix was not significantly affecting quantitation of this analyte. The result of the spike for potassium was unacceptable indicating that the matrix may be affecting quantitation of this analyte.

- Matrix spike recoveries could not be evaluated for the following analytes:

<u>Analyte</u>	<u>Sample ID</u>
Sodium	1102061-1
Manganese	1102061-1

The concentrations of these analytes in the native sample were greater than four times the concentration of matrix spike added during the digestion. When sample concentration is that much greater than the spike added, spike recoveries may not be accurate. The laboratory control samples indicate that the digestion and analyses were in control.



- A sample duplicate and matrix spike duplicate were digested and analyzed with each batch. All acceptance criteria for precision were met.
- A serial dilution was analyzed with each ICP batch. All acceptance criteria were met.

10. The samples required dilutions to bring sodium into the analytical range of the Trace ICP.

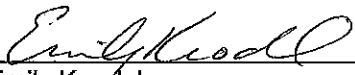
It is a standard practice that samples for ICP-MS are analyzed at a dilution.

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.

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

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.

  
Emily Knodel  
Inorganics Primary Data Reviewer

02-15-11  
Date

  
Inorganics Final Data Reviewer

02-15-11  
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

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**OrderNum:** 1102061

**Client Name:** Colorado Oil & Gas Conservation Commission

**Client Project Name:** Complaint 200294386

**Client Project Number:**

**Client PO Number:** OE PHA 11000000014

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Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
Dahl WW PM	1102061-1		WATER	03-Feb-11	14:56
Trip Blank	1102061-2		WATER	03-Feb-11	6:30
Dahl WW AM	1102061-3		WATER	03-Feb-11	11:59





## CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CUGCCWorkorder No: 1102061Project Manager: AWInitials: CDTDate: 2-5-11

1. Does this project require any <b>special handling</b> in addition to standard Paragon procedures?	YES	<input checked="" type="radio"/> NO
2. Are custody <b>seals on shipping containers</b> intact?	NONE	<input checked="" type="radio"/> YES NO
3. Are Custody seals on <b>sample containers</b> intact?	<input checked="" type="radio"/> NONE	<input checked="" type="radio"/> YES NO
4. Is there a <b>COC (Chain-of-Custody)</b> present or other representative documents?		<input checked="" type="radio"/> YES NO
5. Are the <b>COC and bottle labels complete and legible</b> ?		<input checked="" type="radio"/> YES NO
6. Is the <b>COC in agreement</b> with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES NO
7. Were <b>airbills / shipping documents</b> present and/or removable?	DROP OFF	<input checked="" type="radio"/> YES NO
8. Are all <b>aqueous samples requiring preservation preserved correctly? (excluding volatiles)</b>	N/A	<input checked="" type="radio"/> YES NO
9. Are all aqueous <b>non-preserved samples pH 4-9</b> ?	N/A	<input checked="" type="radio"/> YES <input checked="" type="radio"/> NO
10. Is there <b>sufficient sample</b> for the requested analyses?		<input checked="" type="radio"/> YES NO
11. Were all samples placed in the <b>proper containers</b> for the requested analyses?		<input checked="" type="radio"/> YES NO
12. Are all samples within <b>holding times</b> for the requested analyses?		<input checked="" type="radio"/> YES NO
13. Were all sample containers received <b>intact</b> ? (not broken or leaking, etc.)		<input checked="" type="radio"/> YES NO
14. Are all samples requiring <b>no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon)</b> headspace free? <b>Size of bubble:</b> <u>      </u> < green pea <u>      </u> > green pea	N/A	<input checked="" type="radio"/> YES <input checked="" type="radio"/> NO
15. Do perchlorate LCMS-MS samples <b>have</b> headspace? (at least 1/3 of container required)	<input checked="" type="radio"/> N/A	<input checked="" type="radio"/> YES NO
16. Were samples checked for and free from the presence of <b>residual chlorine</b> ? (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	<input checked="" type="radio"/> YES NO
17. Were the samples <b>shipped on ice</b> ?		<input checked="" type="radio"/> YES NO
18. Were cooler temperatures measured at 0.1-6.0°C? <b>IR gun used*:</b> #2 <input checked="" type="radio"/> #4 <input checked="" type="radio"/> RAD ONLY		<input checked="" type="radio"/> YES NO
Cooler #: <u>1</u>		
Temperature (°C): <u>3.8°</u>		
No. of custody seals on cooler: <u>2</u>		
External µR/hr reading: <u>12</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 <input checked="" type="radio"/> NO / NA (If no, see Form 008.)		

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

Headspace: 1102061-2-1 }  
                  - 2-2 }  
                  - 3-1 } GREEN PEA  
                  - 3-2 }

Sample 1102061-3-4 and 1102061-3-5 received @ pH 2.5

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

Project Manager Signature / Date: \_\_\_\_\_

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

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

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# Dissolved Metals by 200.7

Method EPA200.7 Revision 4.4

## Sample Results

Lab Name: ALS Environmental -- FC

Work Order Number: 1102061

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200294386

Field ID:	Dahl WW PM
Lab ID:	1102061-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 03-Feb-11

Date Extracted: 10-Feb-11

Date Analyzed: 11-Feb-11

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP110210-1

QCBatchID: IP110210-1-3

Run ID: IT110211-2A3

Cleanup: NONE

Basis: As Received

File Name: 110211B.

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	37	1		
7440-47-3	CHROMIUM	1	0.01	0.01	U	
7439-89-6	IRON	1	0.13	0.1		
7439-93-2	LITHIUM	1	0.015	0.01		
7439-95-4	MAGNESIUM	1	2.2	1		
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	2.5	1		N
7440-21-3	SILICON	1	5.7	0.05		
7440-23-5	SODIUM	5	170	5		
	SODIUM ADSORPTION RATIO	5	7.5	0.85		
7440-62-2	VANADIUM	1	0.01	0.01	U	

Data Package ID: IT1102061-1

Date Printed: Tuesday, February 15, 2011

ALS Environmental -- FC

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# Dissolved Metals by 200.7

## Method EPA200.7 Revision 4.4

### Sample Results

Lab Name: ALS Environmental -- FC

Work Order Number: 1102061

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200294386

Field ID:	Dahl WW AM
Lab ID:	1102061-3

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 03-Feb-11

Date Extracted: 10-Feb-11

Date Analyzed: 11-Feb-11

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP110210-1

QCBatchID: IP110210-1-3

Run ID: IT110211-2A3

Cleanup: NONE

Basis: As Received

File Name: 110211B.

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	0.0075	0.002		
7440-42-8	BORON	1	0.1	0.1		
7440-70-2	CALCIUM	1	300	1		
7440-47-3	CHROMIUM	1	0.055	0.01		
7439-89-6	IRON	1	140	0.1		
7439-93-2	LITHIUM	1	0.11	0.01		
7439-95-4	MAGNESIUM	1	17	1		
7440-02-0	NICKEL	1	0.071	0.02		
7440-09-7	POTASSIUM	1	6.7	1		
7440-21-3	SILICON	1	23	0.05		
7440-23-5	SODIUM	5	220	5		
	SODIUM ADSORPTION RATIO	5	3.4	0.85		
7440-62-2	VANADIUM	1	0.045	0.01		

Data Package ID: IT1102061-1

Date Printed: Tuesday, February 15, 2011

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# Dissolved Metals by 200.8

## Method EPA200.8 Revision 5.4

### Sample Results

Lab Name: ALS Environmental -- FC

Work Order Number: 1102061

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200294386

Field ID:	Dahl WW PM
Lab ID:	1102061-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 03-Feb-11

Date Extracted: 10-Feb-11

Date Analyzed: 14-Feb-11

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP110210-1

QCBatchID: IP110210-1-2

Run ID: IM110214-10A2

Cleanup: NONE

Basis: As Received

File Name: 019SMPL\_

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	0.074	0.05		
7440-36-0	ANTIMONY	10	0.00062	0.0003		
7440-38-2	ARSENIC	10	0.002	0.002	U	
7440-39-3	BARIUM	10	0.25	0.001		N
7440-43-9	CADMIUM	10	0.00033	0.0003		
7440-48-4	COBALT	10	0.008	0.001		
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	1.3	0.002		
7439-98-7	MOLYBDENUM	10	0.0026	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	200	1		
7440-24-6	STRONTIUM	10	0.72	0.001		
7440-28-0	THALLIUM	10	0.0002	0.0002	U	
7440-61-1	URANIUM	10	0.00045	0.0001		
7440-66-6	ZINC	10	0.079	0.02		

Data Package ID: IM1102061-1

Date Printed: Tuesday, February 15, 2011

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# Dissolved Metals by 200.8

## Method EPA200.8 Revision 5.4

### Sample Results

Lab Name: ALS Environmental -- FC

Work Order Number: 1102061

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200294386

Field ID:	Dahl WW AM
Lab ID:	1102061-3

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 03-Feb-11

Date Extracted: 10-Feb-11

Date Analyzed: 14-Feb-11

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP110210-1

QCBatchID: IP110210-1-2

Run ID: IM110214-10A2

Cleanup: NONE

Basis: As Received

File Name: 024SMPL\_

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	16	0.05		
7440-36-0	ANTIMONY	10	0.0033	0.0003		
7440-38-2	ARSENIC	10	0.0042	0.002		
7440-39-3	BARIUM	10	1.3	0.001		
7440-43-9	CADMIUM	10	0.0059	0.0003		
7440-48-4	COBALT	10	0.14	0.001		
7440-50-8	COPPER	10	0.46	0.01		
7439-92-1	LEAD	10	0.19	0.0005		
7439-96-5	MANGANESE	10	15	0.002		
7439-98-7	MOLYBDENUM	10	0.003	0.001		
7782-49-2	SELENIUM	10	0.0041	0.001		
7440-22-4	SILVER	10	0.00014	0.0001		
7440-23-5	SODIUM	10	250	1		
7440-24-6	STRONTIUM	10	4.4	0.001		
7440-28-0	THALLIUM	10	0.0002	0.0002	U	
7440-61-1	URANIUM	10	0.0032	0.0001		
7440-66-6	ZINC	10	2.6	0.02		

Data Package ID: IM1102061-1

# Metals by 200.7

## Method EPA200.7 Revision 4.4

### Method Blank

Lab Name: ALS Environmental -- FC

Work Order Number: 1102061

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200294386

Lab ID: IP110210-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 10-Feb-11

Date Analyzed: 11-Feb-11

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP110210-1

QCBatchID: IP110210-1-3

Run ID: IT110211-2A3

Cleanup: NONE

Basis: N/A

File Name: 110211B.

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: IT1102061-1

Date Printed: Tuesday, February 15, 2011

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# Metals by 200.7

## Method EPA200.7 Revision 4.4

### Laboratory Control Sample

Lab Name: ALS Environmental -- FC

Work Order Number: 1102061

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200294386

Lab ID: IP110210-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 02/10/2011

Date Analyzed: 02/11/2011

Prep Method: EPA200.22.8

Prep Batch: IP110210-1

QCBatchID: IP110210-1-3

Run ID: IT110211-2A3

Cleanup: NONE

Basis: N/A

File Name: 110211B.

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	0.0437	0.002		87	85 - 115%
7440-42-8	BORON	1	0.917	0.1		92	85 - 115%
7440-70-2	CALCIUM	40	38.2	1		96	85 - 115%
7440-47-3	CHROMIUM	0.2	0.181	0.01		91	85 - 115%
7439-89-6	IRON	1	0.929	0.1		93	85 - 115%
7439-93-2	LITHIUM	0.5	0.471	0.01		94	85 - 115%
7439-95-4	MAGNESIUM	40	37.9	1		95	85 - 115%
7440-02-0	NICKEL	0.5	0.457	0.02		91	85 - 115%
7440-09-7	POTASSIUM	40	40.2	1		100	85 - 115%
7440-21-3	SILICON	2	1.87	0.05		94	85 - 115%
7440-23-5	SODIUM	40	38.4	1		96	85 - 115%
7440-62-2	VANADIUM	0.5	0.469	0.01		94	85 - 115%

Data Package ID: IT1102061-1

Date Printed: Tuesday, February 15, 2011

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# Metals by 200.7

## Method EPA200.7 Revision 4.4

### Matrix Spike And Matrix Spike Duplicate

**Lab Name:** ALS Environmental -- FC  
**Work Order Number:** 1102061  
**Client Name:** Colorado Oil & Gas Conservation Commission  
**ClientProject ID:** Complaint 200294386

<b>Field ID:</b> Dahl WW PM <b>LabID:</b> 1102061-1MS	<b>Sample Matrix:</b> WATER <b>% Moisture:</b> N/A <b>Date Collected:</b> 03-Feb-11 <b>Date Extracted:</b> 10-Feb-11 <b>Date Analyzed:</b> 11-Feb-11 <b>Prep Method:</b> EPA200.2 Rev 2.8	<b>Prep Batch:</b> IP110210-1 <b>QCBatchID:</b> IP110210-1-3 <b>Run ID:</b> IT110211-2A3 <b>Cleanup:</b> NONE <b>Basis:</b> As Received	<b>Sample Aliquot:</b> 50 g <b>Final Volume:</b> 50 g <b>Result Units:</b> MG/L <b>File Name:</b> 110211B.
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CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-41-7	BERYLLIUM	0.002	U	0.0408		0.002	0.05	82	70 - 130%
7440-42-8	BORON	0.1	U	0.946		0.1	1	95	70 - 130%
7440-70-2	CALCIUM	37		69.2		1	40	82	70 - 130%
7440-47-3	CHROMIUM	0.01	U	0.176		0.01	0.2	88	70 - 130%
7439-89-6	IRON	0.13		1.09		0.1	1	96	70 - 130%
7439-93-2	LITHIUM	0.015		0.571		0.01	0.5	111	70 - 130%
7439-95-4	MAGNESIUM	2.2		38.2		1	40	90	70 - 130%
7440-02-0	NICKEL	0.02	U	0.437		0.02	0.5	87	70 - 130%
7440-09-7	POTASSIUM	2.5		55.2	N	1	40	132	70 - 130%
7440-21-3	SILICON	5.7		7.63		0.05	2	97	70 - 130%
7440-23-5	SODIUM	170		195		5	40	55	70 - 130%
7440-62-2	VANADIUM	0.01	U	0.455		0.01	0.5	91	70 - 130%

**Data Package ID:** *IT1102061-1*

# Metals by 200.7

## Method EPA200.7 Revision 4.4

### Matrix Spike And Matrix Spike Duplicate

**Lab Name:** ALS Environmental -- FC  
**Work Order Number:** 1102061  
**Client Name:** Colorado Oil & Gas Conservation Commission  
**ClientProject ID:** Complaint 200294386

**Field ID:** Dahl WW PM

**LabID:** 1102061-1MSD

**Sample Matrix:** WATER

**% Moisture:** N/A

**Date Collected:** 03-Feb-11

**Date Extracted:** 10-Feb-11

**Date Analyzed:** 11-Feb-11

**Prep Method:** EPA200.2 Rev 2.8

**Prep Batch:** IP110210-1

**QCBatchID:** IP110210-1-3

**Run ID:** IT110211-2A3

**Cleanup:** NONE

**Basis:** As Received

**Sample Aliquot:** 50 g

**Final Volume:** 50 g

**Result Units:** MG/L

**File Name:** 110211B.

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-41-7	BERYLLIUM	0.0407		0.05	81	0.002	20	0
7440-42-8	BORON	0.925		1	93	0.1	20	2
7440-70-2	CALCIUM	71.9		40	88	1	20	4
7440-47-3	CHROMIUM	0.175		0.2	88	0.01	20	0
7439-89-6	IRON	1.12		1	99	0.1	20	2
7439-93-2	LITHIUM	0.561		0.5	109	0.01	20	2
7439-95-4	MAGNESIUM	38		40	89	1	20	1
7440-02-0	NICKEL	0.434		0.5	87	0.02	20	0
7440-09-7	POTASSIUM	54.7	N	40	131	1	20	1
7440-21-3	SILICON	7.43		2	87	0.05	20	3
7440-23-5	SODIUM	204		40	78	5	20	5
7440-62-2	VANADIUM	0.452		0.5	90	0.01	20	1

**Data Package ID:** IT1102061-1

**Date Printed:** Tuesday, February 15, 2011

**ALS Environmental -- FC**

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# Metals by 200.7

## Method EPA200.7

### Analytical Spike Sample Recovery

Lab Name: ALS Environmental -- FC

Work Order Number: 1102061

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200294386

Field ID: Dahl WW PM

LabID: 1102061-1A

Run ID: IT110211-2A3

Date Analyzed: 11-Feb-11

Result Units: mg/l

Target Analyte	Sample Result	Samp Qual	PS Result	PS Qual	Spike Added	PS % Rec.	Control Limits
POTASSIUM	2.48		53.3	N	40	127	75 - 125%

Data Package ID: *IT1102061-1*

Date Printed: Tuesday, February 15, 2011

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# Metals by 200.8

## Method EPA200.8 Revision 5.4

### Method Blank

Lab Name: ALS Environmental -- FC

Work Order Number: 1102061

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200294386

Lab ID: IP110210-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 10-Feb-11

Date Analyzed: 14-Feb-11

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP110210-1

QCBatchID: IP110210-1-2

Run ID: IM110214-10A2

Cleanup: NONE

Basis: N/A

File Name: 025SMPL\_

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	
7440-61-1	URANIUM	10	0.0001	0.0001	U	
7440-66-6	ZINC	10	0.02	0.02	U	

Data Package ID: IM1102061-1

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# Metals by 200.8

## Method EPA200.8 Revision 5.4

### Laboratory Control Sample

Lab Name: ALS Environmental -- FC

Work Order Number: 1102061

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200294386

Lab ID: IM110210-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 02/10/2011

Date Analyzed: 02/14/2011

Prep Method: EPA200.22.8

Prep Batch: IP110210-1

QCBatchID: IP110210-1-2

Run ID: IM110214-10A2

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	4.66	0.05		93	85 - 115%
7440-36-0	ANTIMONY	0.03	0.0303	0.0003		101	85 - 115%
7440-38-2	ARSENIC	0.1	0.0981	0.002		98	85 - 115%
7440-39-3	BARIUM	0.1	0.105	0.001		105	85 - 115%
7440-43-9	CADMIUM	0.03	0.031	0.0003		103	85 - 115%
7440-48-4	COBALT	0.1	0.0959	0.001		96	85 - 115%
7440-50-8	COPPER	1	0.972	0.01		97	85 - 115%
7439-92-1	LEAD	0.05	0.05	0.0005		100	85 - 115%
7439-96-5	MANGANESE	0.2	0.19	0.002		95	85 - 115%
7439-98-7	MOLYBDENUM	0.1	0.0962	0.001		96	85 - 115%
7782-49-2	SELENIUM	0.1	0.0998	0.001		100	85 - 115%
7440-22-4	SILVER	0.01	0.00986	0.0001		99	85 - 115%
7440-23-5	SODIUM	10	10.2	1		102	85 - 115%
7440-24-6	STRONTIUM	0.5	0.485	0.001		97	85 - 115%
7440-28-0	THALLIUM	0.002	0.00202	0.0002		101	85 - 115%
7440-61-1	URANIUM	0.01	0.01	0.0001		100	85 - 115%
7440-66-6	ZINC	2	1.93	0.02		97	85 - 115%

Data Package ID: IM1102061-1

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# Metals by 200.8

## Method EPA200.8 Revision 5.4

### Matrix Spike And Matrix Spike Duplicate

**Lab Name:** ALS Environmental -- FC  
**Work Order Number:** 1102061  
**Client Name:** Colorado Oil & Gas Conservation Commission  
**ClientProject ID:** Complaint 200294386

**Field ID:** Dahl WW PM

**LabID:** 1102061-1MS

**Sample Matrix:** WATER

**% Moisture:** N/A

**Date Collected:** 03-Feb-11

**Date Extracted:** 10-Feb-11

**Date Analyzed:** 14-Feb-11

**Prep Method:** EPA200.2 Rev 2.8

**Prep Batch:** IP110210-1

**QCBatchID:** IP110210-1-2

**Run ID:** IM110214-10A2

**Cleanup:** NONE

**Basis:** As Received

**Sample Aliquot:** 50 g

**Final Volume:** 50 g

**Result Units:** MG/L

**File Name:** 022SMPL\_

CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7429-90-5	ALUMINUM	0.074		4.64		0.05	5	91	70 - 130%
7440-36-0	ANTIMONY	0.00062		0.0306		0.0003	0.03	100	70 - 130%
7440-38-2	ARSENIC	0.002	U	0.0972		0.002	0.1	97	70 - 130%
7440-39-3	BARIUM	0.25		0.315	N	0.001	0.1	64	70 - 130%
7440-43-9	CADMIUM	0.00033		0.0302		0.0003	0.03	100	70 - 130%
7440-48-4	COBALT	0.008		0.102		0.001	0.1	94	70 - 130%
7440-50-8	COPPER	0.01	U	0.973		0.01	1	97	70 - 130%
7439-92-1	LEAD	0.0005	U	0.0502		0.0005	0.05	100	70 - 130%
7439-96-5	MANGANESE	1.3		1.31		0.002	0.2	-9	70 - 130%
7439-98-7	MOLYBDENUM	0.0026		0.0985		0.001	0.1	96	70 - 130%
7782-49-2	SELENIUM	0.001	U	0.0968		0.001	0.1	97	70 - 130%
7440-22-4	SILVER	0.0001	U	0.00937		0.0001	0.01	94	70 - 130%
7440-23-5	SODIUM	200		177		1	10	-206	70 - 130%
7440-24-6	STRONTIUM	0.72		1.08		0.001	0.5	72	70 - 130%
7440-28-0	THALLIUM	0.0002	U	0.00196		0.0002	0.002	98	70 - 130%
7440-61-1	URANIUM	0.00045		0.0107		0.0001	0.01	102	70 - 130%
7440-66-6	ZINC	0.079		1.99		0.02	2	95	70 - 130%

**Data Package ID:** IM1102061-1

**Date Printed:** Tuesday, February 15, 2011

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# Metals by 200.8

## Method EPA200.8 Revision 5.4

### Matrix Spike And Matrix Spike Duplicate

**Lab Name:** ALS Environmental -- FC  
**Work Order Number:** 1102061  
**Client Name:** Colorado Oil & Gas Conservation Commission  
**ClientProject ID:** Complaint 200294386

<b>Field ID:</b> Dahl WW PM <b>LabID:</b> 1102061-1MSD	<b>Sample Matrix:</b> WATER <b>% Moisture:</b> N/A <b>Date Collected:</b> 03-Feb-11 <b>Date Extracted:</b> 10-Feb-11 <b>Date Analyzed:</b> 14-Feb-11 <b>Prep Method:</b> EPA200.2 Rev 2.8	<b>Prep Batch:</b> IP110210-1 <b>QCBatchID:</b> IP110210-1-2 <b>Run ID:</b> IM110214-10A2 <b>Cleanup:</b> NONE <b>Basis:</b> As Received	<b>Sample Aliquot:</b> 50 g <b>Final Volume:</b> 50 g <b>Result Units:</b> MG/L <b>File Name:</b> 023SMPL_
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CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7429-90-5	ALUMINUM	5.16		5	102	0.05	20	11
7440-36-0	ANTIMONY	0.032		0.03	105	0.0003	20	4
7440-38-2	ARSENIC	0.109		0.1	109	0.002	20	11
7440-39-3	BARIUM	0.363		0.1	112	0.001	20	14
7440-43-9	CADMIUM	0.0331		0.03	109	0.0003	20	9
7440-48-4	COBALT	0.112		0.1	104	0.001	20	9
7440-50-8	COPPER	1.06		1	106	0.01	20	9
7439-92-1	LEAD	0.0525		0.05	105	0.0005	20	5
7439-96-5	MANGANESE	1.56		0.2	117	0.002	20	17
7439-98-7	MOLYBDENUM	0.108		0.1	105	0.001	20	9
7782-49-2	SELENIUM	0.106		0.1	106	0.001	20	9
7440-22-4	SILVER	0.0106		0.01	106	0.0001	20	12
7440-23-5	SODIUM	214		10	159	1	20	19
7440-24-6	STRONTIUM	1.29		0.5	115	0.001	20	18
7440-28-0	THALLIUM	0.00218		0.002	109	0.0002	20	11
7440-61-1	URANIUM	0.0111		0.01	107	0.0001	20	4
7440-66-6	ZINC	2.16		2	104	0.02	20	8

**Data Package ID:** *IM1102061-1*

# Metals by 200.8

## Method EPA200.8

### Analytical Spike Sample Recovery

Lab Name: ALS Environmental -- FC

Work Order Number: 1102061

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200294386

Field ID: Dahl WW PM

LabID: 1102061-1A

Run ID: IM110214-10A2

Date Analyzed: 14-Feb-11

Result Units: mg/l

Target Analyte	Sample Result	Samp Qual	PS Result	PS Qual	Spike Added	PS % Rec.	Control Limits
BARIUM	0.0251		0.0344		0.01	93	75 - 125%

Data Package ID: IM1102061-1

Date Printed: Tuesday, February 15, 2011

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