



# ALS Paragon



## Metals Case Narrative

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### **Colorado Oil & Gas Conservation Commission**

**Complaint 200205808**

**Work Order Number: 0903060**

1. This report consists of 2 water samples.
2. The samples were received cool and intact by ALS Paragon on 03/10/09.
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 for analysis 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 sample 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. 13.

The samples were prepared for ICP-MS analysis of arsenic and selenium by passing the digested sample and associated QC through a cation exchange column. The cation exchange column removes cations from the matrix and eliminates the  $\text{CaCl}^+$  (mass 75) interferences on arsenic.

5. The samples were analyzed following Methods for the Determination of Metals in Environmental Samples – Supplement 1 procedures.

Analysis by Trace ICP followed method 200.7 and SOP 807 Rev. 11.

The relationship between intensity and concentration for each element is established using at least four standards, one of which is a blank solution.

During sample analysis concentrations are computed by the software and the results are printed in mg/L. The instrument software does not provide a printout which gives both intensity and concentration. The validity of the calibration equation is tested by analyzing the following



solutions: a blank, a low level check solution with concentrations near the reporting limit, an Initial Calibration Verification (ICV) standard from a 2<sup>nd</sup> source standard solution with concentrations near the middle of the analytical range, a Continuing Calibration Verification (CCV) standard with concentrations at two times those in the ICV, and a readback of the highest calibration standard.

These solutions provide verification that the calibration equations are functioning properly throughout the analytical range of the instrument. During sample analysis dilutions are made for analytes found at concentrations above the highest calibration standard. No results are taken from extrapolations beyond the highest standard.

Analysis by ICP-MS followed method 200.8 and SOP 827 Rev. 6.

The relationship between intensity and concentration for each element is established using at least four standards, one of which is a blank solution. A calibration equation relating instrument response to concentration is developed by the instrument software. The equation is a higher order polynomial. This type of equation is used to improve quantitation accuracy at lower concentrations where the relationship between concentration and instrument response is non-linear.

During sample analysis concentrations are computed by the software and the results are printed in ug/L. The validity of the calibration equation is tested by analyzing the following solutions: a blank, a low level check solution with concentrations near the reporting limit, an Initial Calibration Verification (ICV) standard from a 2<sup>nd</sup> source standard solution with concentrations near the middle of the analytical range, a Continuing Calibration Verification (CCV) standard with concentrations near the middle of the analytical range but different than those in the ICV, and a readback of the highest calibration standard.

These solutions provide verification that the calibration equations are functioning properly throughout the analytical range of the instrument. During sample analysis dilutions are made for analytes found at concentrations above the highest calibration standard. No results are taken from extrapolations beyond the highest standard.

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.
  - n A filter (method) blank and laboratory control sample were filtered, preserved, and digested at the same time as the samples. There were not more than 20 samples associated with the filtered blank and laboratory control sample.
  - n The filter (method) blank associated with this digestion batch was below the practical quantitation limit for each requested analyte.



- n The laboratory control sample associated with this digestion batch was within the acceptance limits. This indicates complete digestion according to the method.
- n All initial and continuing calibration blanks associated with each analytical batch were below the practical quantitation limits for the requested analytes.
- n All initial and continuing calibration verifications associated with each analytical batch were within the acceptance criteria for the requested analytes. This indicates a valid calibration and stable instrument conditions.
- n The interference check samples associated with Method 200.8 were analyzed, and the high standard readbacks were within acceptance criteria.
- n The interference check samples and high standard readbacks associated with Method 200.7 were within acceptance criteria.

9. Matrix specific quality control procedures.

Sample 0903060-1 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.

- n 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	0903060-1MS & MSD

The native sample result is flagged for matrix spike failure and an analytical post spike was performed. Results of the spike were unacceptable indicating that the matrix may be affecting quantitation of this analyte.

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

<u>Analyte</u>	<u>Sample ID</u>
Calcium	0903060-1
Sodium	0903060-1

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 sample indicates that the digestion and analysis were in control.

- n 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 with the following exception:

<u>Analyte</u>	<u>Sample ID</u>
Sodium	0903060-1L

The native sample result is flagged for serial dilution failure.

10. Sample 0903060-1 required a dilution to bring sodium into the analytical range of the Trace ICP.

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

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.

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

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 Paragon certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Megan Johnson  
Megan Johnson  
Inorganics Primary Data Reviewer

3/17/09  
Date

Ron E. Miller  
Inorganics Final Data Reviewer

3/17/09  
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.
  - S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

# ALS Paragon

## Sample Number(s) Cross-Reference Table

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**Paragon OrderNum:** 0903060

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

**Client Project Name:** Complaint 200205808

**Client Project Number:**

**Client PO Number:** OE PHA 090000000004

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Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
Angely WW 1	0903060-1		WATER	09-Mar-09	9:56
Angely WW 2	0903060-2		WATER	09-Mar-09	10:30
Trip Blank	0903060-3		WATER	09-Mar-09	

Report To: Peter Gintautas  
Phone: 714-846-3091  
Fax:  
E-mail: peter.gintautas@state.co.us  
Company: Colo. Div. of Gas Cars, Comm.  
Address:

Complaint 2002-04738

Circle method (right); provide additional information as needed (comments).

Sample ID	Date	Time *	Lab ID	Matrix	Preservative (Indicate type... HCl, etc.)	No. of Containers
Angely WW 1	9/11/19	09:56	W		none	5
					HCL	3
					H <sub>2</sub> SO <sub>4</sub>	1
					NaOH	1
					NaOH	1
Angely WW 2	9/11/19	10:30	W		none	2

SW	Parameter	Unit	Result	Pass/Fail	Remarks
SW8260B	VOCs	mg/L	0.05	Pass	
SW8260B	BTEX (only)	mg/L	0.05	Pass	
SW8270C	SVOCs	mg/L	0.05	Pass	
SW8082	OC-Pesticides	mg/L	0.05	Pass	
SW8082	PCBs	mg/L	0.05	Pass	
SW8151A	Herbicides	mg/L	0.05	Pass	
SW8330	Explosives	mg/L	0.05	Pass	
SW8260B 8270C 8081A 8151A	TCLP Organics SW1311	mg/L	0.05	Pass	
SW6010B 7470	TCLP Metals SW1311 Hg	mg/L	0.05	Pass	
SW6010B 7470 7471 E200.7	Total Metals by ICP Hg	mg/L	0.05	Pass	
SW6020A E200.8	Dissolved Metals by ICP Hg	mg/L	0.05	Pass	
SW6020A E200.8	Total Metals by ICP/MS	mg/L	0.05	Pass	
SW6020A E200.8	Dissolved Metals by ICP/MS	mg/L	0.05	Pass	
SW7196A	Hexachlorobenzene	mg/L	0.05	Pass	
SW7196A	Polychlorinated Biphenyls (PCBs)	mg/L	0.05	Pass	
SW9056 E300.0	Inorganic Anions	mg/L	0.05	Pass	
Total E160.3 TDS E160.1 TSS E160.2	Solids:	mg/L	0.05	Pass	
SW940B SW940C	pH		0.05	Pass	
SW8015B GRO DRO	TPH	mg/L	0.05	Pass	
SW9310 E900.0	Gross Alpha / Beta	dpm/100ml	0.05	Pass	
Pu / U / Am / Th / Cm /	Actinides by Paragon SOP	dpm/100ml	0.05	Pass	
E906.0	Tritium	dpm/100ml	0.05	Pass	
SW9315 E903.0	Total Alpha-Emitting Radium	dpm/100ml	0.05	Pass	
E903.1	Radium 226	dpm/100ml	0.05	Pass	
SW9320 E904.0	Radium 228	dpm/100ml	0.05	Pass	
D5811-00	Strontium 90 (Total RadioSr)	dpm/100ml	0.05	Pass	
E901.1	Gamma Isotopes	dpm/100ml	0.05	Pass	
SM7510Rn	Radon 222	dpm/100ml	0.05	Pass	
SW8260B	VOCs	mg/L	0.05	Pass	
SW8260B	BTEX (only)	mg/L	0.05	Pass	
SW8270C	SVOCs	mg/L	0.05	Pass	
SW8082	OC-Pesticides	mg/L	0.05	Pass	
SW8082	PCBs	mg/L	0.05	Pass	
SW8151A	Herbicides	mg/L	0.05	Pass	
SW8330	Explosives	mg/L	0.05	Pass	
SW8260B 8270C 8081A 8151A	TCLP Organics SW1311	mg/L	0.05	Pass	
SW6010B 7470	TCLP Metals SW1311 Hg	mg/L	0.05	Pass	
SW6010B 7470 7471 E200.7	Total Metals by ICP Hg	mg/L	0.05	Pass	
SW6020A E200.8	Dissolved Metals by ICP Hg	mg/L	0.05	Pass	
SW6020A E200.8	Total Metals by ICP/MS	mg/L	0.05	Pass	
SW6020A E200.8	Dissolved Metals by ICP/MS	mg/L	0.05	Pass	
SW7196A	Hexachlorobenzene	mg/L	0.05	Pass	
SW7196A	Polychlorinated Biphenyls (PCBs)	mg/L	0.05	Pass	
SW9056 E300.0	Inorganic Anions	mg/L	0.05	Pass	
Total E160.3 TDS E160.1 TSS E160.2	Solids:	mg/L	0.05	Pass	
SW940B SW940C	pH		0.05	Pass	
SW8015B GRO DRO	TPH	mg/L	0.05	Pass	
SW9310 E900.0	Gross Alpha / Beta	dpm/100ml	0.05	Pass	
Pu / U / Am / Th / Cm /	Actinides by Paragon SOP	dpm/100ml	0.05	Pass	
E906.0	Tritium	dpm/100ml	0.05	Pass	
SW9315 E903.0	Total Alpha-Emitting Radium	dpm/100ml	0.05	Pass	
E903.1	Radium 226	dpm/100ml	0.05	Pass	
SW9320 E904.0	Radium 228	dpm/100ml	0.05	Pass	
D5811-00	Strontium 90 (Total RadioSr)	dpm/100ml	0.05	Pass	
E901.1	Gamma Isotopes	dpm/100ml	0.05	Pass	
SM7510Rn	Radon 222	dpm/100ml	0.05	Pass	

\* Time Zone: EST CST MST PST      Matrix Key: O = oil, S = soil, NS = non-soil solid, W = water, L = liquid, E = extract, F = filter



Comments:

Filter + preserve metals upon receipt

Anions = Br, Cl, F,  $NO_2$ ,  $NO_3$ ,  $SO_4$

200.7 = Ba, Be, B, Ca, Cr, Cu, Fe, Li, Mg, Mn, Ni, K, Na, Zn, Sr

200.0 = Sb, As, Cd, Pb, Mo, Se, Ag, Te, U

Relinquished By: 	(1)	Relinquished By:	(2)
Signature _____		Signature _____	
Printed Name <u>J. G. Smith</u>		Printed Name _____	
Date <u>9 May 09</u> Time <u>16:30</u>		Date _____ Time _____	
Company _____		Company _____	
Received By: 	(1)	Received By:	(2)
Signature _____		Signature _____	
Printed Name <u>J. G. Smith</u>		Printed Name _____	
Date <u>3-10-09</u> Time <u>1410</u>		Date _____ Time _____	
Company <u>ACS</u>		Company _____	

## CONDITION OF SAMPLE UPON RECEIPT FORM

Paragon Analytics

Client: COC GWorkorder No: 0903060Project Manager: AWInitials: Pre Date: 3-10-09

1. Does this project require any <b>special handling</b> in addition to standard Paragon procedures?		YES	<u>NO</u>
2. Are custody <b>seals</b> on <b>shipping containers</b> intact?	NONE	<u>YES</u>	NO
3. Are Custody seals on <b>sample containers</b> intact?	NONE	<u>YES</u>	NO
4. Is there a <b>COC (Chain-of-Custody)</b> <b>present</b> or other representative documents?		<u>YES</u>	NO
5. Are the <b>COC and bottle labels complete and legible</b> ?		<u>YES</u>	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.)		<u>YES</u>	NO
7. Were <b>airbills / shipping documents</b> present and/or removable?	DROP OFF	<u>YES</u>	NO
8. Are all aqueous <b>samples requiring preservation preserved correctly?</b> (excluding volatiles)	N/A	<u>YES</u>	NO
9. Are all aqueous <b>non-preserved samples pH 4-9?</b>	N/A	<u>YES</u>	NO
10. Is there <b>sufficient sample</b> for the requested analyses?		<u>YES</u>	NO
11. Were all samples placed in the <b>proper containers</b> for the requested analyses?		<u>YES</u>	NO
12. Are all samples within <b>holding times</b> for the requested analyses?		<u>YES</u>	NO
13. Were all sample containers received <b>intact?</b> (not broken or leaking, etc.)		<u>YES</u>	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	<u>YES</u>	<u>NO</u>
15. Do perchlorate LCMS-MS samples <b>have</b> headspace? (at least 1/3 of container required)	N/A	<u>YES</u>	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.)	N/A	<u>YES</u>	NO
17. Were the samples <b>shipped on ice?</b>		<u>YES</u>	NO
18. Were cooler temperatures measured at 0.1-6.0°C? <b>IR gun used*:</b> <u>#2</u> <u>#4</u>	RAD ONLY	<u>YES</u>	NO
Cooler #: <u>1</u>			
Temperature (°C): <u>2.8</u>			
No. of custody seals on cooler: <u>1</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? 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.

3 vials for VL = Headspace &lt; green pea #4 #5 #6

3 vials for methan - #7 #8 #9 #7 huge Bubble 809 small bubbles

If applicable, was the client contacted? YES / NO / NA Contact: Peter Gintantas Date/Time: 3/10/09Project Manager Signature / Date: [Signature] 3/10/09

\*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 Paragon

Work Order Number: 0903060

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200205808

Field ID: Angely WW 1

Lab ID: 0903060-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 09-Mar-09

Date Extracted: 12-Mar-09

Date Analyzed: 13-Mar-09

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP090312-3

QCBatchID: IP090312-3-1

Run ID: it090313-2a4

Cleanup: NONE

Basis: As Received

File Name: 090313A.

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
7440-39-3	BARIUM	1	0.1	0.1	U	
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	190	1		
7440-47-3	CHROMIUM	1	0.01	0.01	U	
7440-48-4	COBALT	1	0.01	0.01	U	
7440-50-8	COPPER	1	0.01	0.01	U	
7439-89-6	IRON	1	0.1	0.1	U	
7439-93-2	LITHIUM	1	0.026	0.01		
7439-95-4	MAGNESIUM	1	2.6	1		
7439-96-5	MANGANESE	1	0.19	0.01		
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	2	1		N
7440-23-5	SODIUM	5	280	5		E
	SODIUM ADSORPTION RATIO	1	5.6	0.17		
7440-24-6	STRONTIUM	1	3.9	0.01		
7440-66-6	ZINC	1	0.02	0.02	U	

Data Package ID: it0903060-1

Date Printed: Monday, March 23, 2009

ALS Paragon

LIMS Version: 6.252A

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# Dissolved Metals by 200.7

Method EPA200.7 Revision 4.4

## Sample Results

Lab Name: ALS Paragon

Work Order Number: 0903060

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200205808

Field ID: Angely WW 2

Lab ID: 0903060-2

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 09-Mar-09

Date Extracted: 12-Mar-09

Date Analyzed: 13-Mar-09

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP090312-3

QCBatchID: IP090312-3-1

Run ID: it090313-2a4

Cleanup: NONE

Basis: As Received

File Name: 090313A.

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
7440-39-3	BARIUM	1	0.1	0.1	U	
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	110	1		
7440-47-3	CHROMIUM	1	0.01	0.01	U	
7440-48-4	COBALT	1	0.01	0.01	U	
7440-50-8	COPPER	1	0.014	0.01		
7439-89-6	IRON	1	0.1	0.1	U	
7439-93-2	LITHIUM	1	0.017	0.01		
7439-95-4	MAGNESIUM	1	1.3	1		
7439-96-5	MANGANESE	1	0.16	0.01		
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	1.3	1		
7440-23-5	SODIUM	1	190	1		
	SODIUM ADSORPTION RATIO	1	5	0.17		
7440-24-6	STRONTIUM	1	2	0.01		
7440-66-6	ZINC	1	0.28	0.02		

Data Package ID: it0903060-1

Date Printed: Monday, March 23, 2009

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# Dissolved Metals by 200.8

Method EPA200.8 Revision 5.4

## Sample Results

Lab Name: ALS Paragon

Work Order Number: 0903060

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200205808

Field ID:	Angely WW 1
Lab ID:	0903060-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 09-Mar-09

Date Extracted: 12-Mar-09

Date Analyzed: 13-Mar-09

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP090312-3

QCBatchID: IP090312-3-2

Run ID: IM090313-1A3

Cleanup: NONE

Basis: As Received

File Name: 13MAR09A

Sample Aliquot: 50 g

Final Volume: 50 g

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7440-36-0	ANTIMONY	10	0.3	0.3	U	
7440-38-2	ARSENIC	10	2	2	U	
7440-43-9	CADMIUM	10	0.3	0.3	U	
7439-92-1	LEAD	10	0.5	0.5	U	
7439-98-7	MOLYBDENUM	10	2.2	1		
7782-49-2	SELENIUM	10	1	1	U	
7440-22-4	SILVER	10	0.1	0.1	U	
7440-28-0	THALLIUM	10	0.2	0.2	U	
7440-61-1	URANIUM	10	0.1	0.1	U	

Data Package ID: *im0903060-1*

Date Printed: Monday, March 23, 2009

ALS Paragon

LIMS Version: 6.252A

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# Dissolved Metals by 200.8

Method EPA200.8 Revision 5.4

## Sample Results

Lab Name: ALS Paragon

Work Order Number: 0903060

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200205808

Field ID: Angely WW 2

Lab ID: 0903060-2

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 09-Mar-09

Date Extracted: 12-Mar-09

Date Analyzed: 13-Mar-09

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP090312-3

QCBatchID: IP090312-3-2

Run ID: IM090313-1A3

Cleanup: NONE

Basis: As Received

File Name: 13MAR09A

Sample Aliquot: 50 g

Final Volume: 50 g

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	Dilution Factor	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7440-36-0	ANTIMONY	10	0.91	0.3		
7440-38-2	ARSENIC	10	2	2	U	
7440-43-9	CADMIUM	10	0.3	0.3	U	
7439-92-1	LEAD	10	0.53	0.5		
7439-98-7	MOLYBDENUM	10	3.5	1		
7782-49-2	SELENIUM	10	1	1	U	
7440-22-4	SILVER	10	0.1	0.1	U	
7440-28-0	THALLIUM	10	0.2	0.2	U	
7440-61-1	URANIUM	10	0.1	0.1	U	

Data Package ID: *im0903060-1*

Date Printed: Monday, March 23, 2009

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LIMS Version: 6.252A

# Metals by 200.7

## Method EPA200.7 Revision 4.4

### Method Blank

Lab Name: ALS Paragon

Work Order Number: 0903060

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200205808

Lab ID: F090311-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 12-Mar-09

Date Analyzed: 13-Mar-09

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP090312-3

QCBatchID: IP090312-3-1

Run ID: it090313-2a4

Cleanup: NONE

Basis: N/A

File Name: 090313A.

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
7440-39-3	BARIUM	1	0.1	0.1	U	
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	
7440-48-4	COBALT	1	0.01	0.01	U	
7440-50-8	COPPER	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	
7439-96-5	MANGANESE	1	0.01	0.01	U	
7440-02-0	NICKEL	1	0.02	0.02	U	
7440-09-7	POTASSIUM	1	1	1	U	
7440-23-5	SODIUM	1	1	1	U	
7440-24-6	STRONTIUM	1	0.01	0.01	U	
7440-66-6	ZINC	1	0.02	0.02	U	

Data Package ID: it0903060-1

Date Printed: Monday, March 23, 2009

ALS Paragon

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# Metals by 200.7

## Method EPA200.7 Revision 4.4

### Laboratory Control Sample

Lab Name: ALS Paragon

Work Order Number: 0903060

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200205808

Lab ID: F090311-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 03/12/2009

Date Analyzed: 03/13/2009

Prep Method: EPA200.22.8

Prep Batch: IP090312-3

QCBatchID: IP090312-3-1

Run ID: it090313-2a4

Cleanup: NONE

Basis: N/A

File Name: 090313A.

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
7440-39-3	BARIUM	2	1.96	0.1		98	85 - 115%
7440-41-7	BERYLLIUM	0.05	0.0472	0.002		94	85 - 115%
7440-42-8	BORON	1	1	0.1		100	85 - 115%
7440-70-2	CALCIUM	40	39.7	1		99	85 - 115%
7440-47-3	CHROMIUM	0.2	0.198	0.01		99	85 - 115%
7440-48-4	COBALT	0.5	0.488	0.01		98	85 - 115%
7440-50-8	COPPER	0.25	0.249	0.01		100	85 - 115%
7439-89-6	IRON	1	0.958	0.1		96	85 - 115%
7439-93-2	LITHIUM	0.5	0.513	0.01		103	85 - 115%
7439-95-4	MAGNESIUM	40	40.7	1		102	85 - 115%
7439-96-5	MANGANESE	0.5	0.486	0.01		97	85 - 115%
7440-02-0	NICKEL	0.5	0.493	0.02		99	85 - 115%
7440-09-7	POTASSIUM	40	41.5	1		104	85 - 115%
7440-23-5	SODIUM	40	40.3	1		101	85 - 115%
7440-24-6	STRONTIUM	0.5	0.517	0.01		103	85 - 115%
7440-66-6	ZINC	0.5	0.514	0.02		103	85 - 115%

Data Package ID: *it0903060-1*

Date Printed: Monday, March 23, 2009

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# Metals by 200.7

## Method EPA200.7 Revision 4.4

### Matrix Spike And Matrix Spike Duplicate

**Lab Name:** ALS Paragon  
**Work Order Number:** 0903060  
**Client Name:** Colorado Oil & Gas Conservation Commission  
**ClientProject ID:** Complaint 200205808

<b>Field ID:</b> Angely WW 1 <b>LabID:</b> 0903060-1MS	<b>Sample Matrix:</b> WATER <b>% Moisture:</b> N/A <b>Date Collected:</b> 09-Mar-09 <b>Date Extracted:</b> 12-Mar-09 <b>Date Analyzed:</b> 13-Mar-09 <b>Prep Method:</b> EPA200.2 Rev 2.8	<b>Prep Batch:</b> IP090312-3 <b>QCBatchID:</b> IP090312-3-1 <b>Run ID:</b> it090313-2a4 <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> 090313A.
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CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-39-3	BARIUM	0.1	U	1.85		0.1	2	92	70 - 130%
7440-41-7	BERYLLIUM	0.002	U	0.0456		0.002	0.05	91	70 - 130%
7440-42-8	BORON	0.1	U	1.02		0.1	1	102	70 - 130%
7440-70-2	CALCIUM	190		233		1	40	113	70 - 130%
7440-47-3	CHROMIUM	0.01	U	0.189		0.01	0.2	95	70 - 130%
7440-48-4	COBALT	0.01	U	0.476		0.01	0.5	95	70 - 130%
7440-50-8	COPPER	0.01	U	0.244		0.01	0.25	98	70 - 130%
7439-89-6	IRON	0.1	U	0.913		0.1	1	91	70 - 130%
7439-93-2	LITHIUM	0.026		0.617		0.01	0.5	118	70 - 130%
7439-95-4	MAGNESIUM	2.6		40.9		1	40	96	70 - 130%
7439-96-5	MANGANESE	0.19		0.651		0.01	0.5	93	70 - 130%
7440-02-0	NICKEL	0.02	U	0.476		0.02	0.5	95	70 - 130%
7440-09-7	POTASSIUM	2		59.1	N	1	40	143	70 - 130%
7440-23-5	SODIUM	280		327		5	40	107	70 - 130%
7440-24-6	STRONTIUM	3.9		4.3		0.01	0.5	86	70 - 130%
7440-66-6	ZINC	0.02	U	0.517		0.02	0.5	103	70 - 130%

**Data Package ID:** *it0903060-1*

# Metals by 200.7

## Method EPA200.7 Revision 4.4

### Matrix Spike And Matrix Spike Duplicate

**Lab Name:** ALS Paragon  
**Work Order Number:** 0903060  
**Client Name:** Colorado Oil & Gas Conservation Commission  
**ClientProject ID:** Complaint 200205808

<b>Field ID:</b> Angely WW 1 <b>LabID:</b> 0903060-1MSD	<b>Sample Matrix:</b> WATER <b>% Moisture:</b> N/A <b>Date Collected:</b> 09-Mar-09 <b>Date Extracted:</b> 12-Mar-09 <b>Date Analyzed:</b> 13-Mar-09 <b>Prep Method:</b> EPA200.2 Rev 2.8	<b>Prep Batch:</b> IP090312-3 <b>QCBatchID:</b> IP090312-3-1 <b>Run ID:</b> it090313-2a4 <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> 090313A.
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CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-39-3	BARIUM	1.83		2	91	0.1	20	1
7440-41-7	BERYLLIUM	0.0453		0.05	91	0.002	20	1
7440-42-8	BORON	1.01		1	101	0.1	20	1
7440-70-2	CALCIUM	231		40	108	1	20	1
7440-47-3	CHROMIUM	0.189		0.2	94	0.01	20	0
7440-48-4	COBALT	0.474		0.5	95	0.01	20	1
7440-50-8	COPPER	0.241		0.25	96	0.01	20	1
7439-89-6	IRON	0.907		1	91	0.1	20	1
7439-93-2	LITHIUM	0.611		0.5	117	0.01	20	1
7439-95-4	MAGNESIUM	40.6		40	95	1	20	1
7439-96-5	MANGANESE	0.646		0.5	92	0.01	20	1
7440-02-0	NICKEL	0.474		0.5	95	0.02	20	0
7440-09-7	POTASSIUM	58.6	N	40	142	1	20	1
7440-23-5	SODIUM	327		40	109	5	20	0
7440-24-6	STRONTIUM	4.25		0.5	76	0.01	20	1
7440-66-6	ZINC	0.518		0.5	104	0.02	20	0

**Data Package ID:** *it0903060-1*

**Date Printed:** Monday, March 23, 2009

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# Metals by 200.7

## Method EPA200.7

### Analytical Spike Sample Recovery

Lab Name: ALS Paragon

Work Order Number: 0903060

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200205808

Field ID: Angely WW 1

LabID: 0903060-1A

Run ID: it090313-2a4

Date Analyzed: 13-Mar-09

Result Units: mg/l

Target Analyte	Sample Result	Samp Qual	PS Result	PS Qual	Spike Added	PS % Rec.	Control Limits
POTASSIUM	1.99		63.3	N	40	153	75 - 125%

Data Package ID: *it0903060-1*

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# Metals by 200.8

## Method EPA200.8 Revision 5.4

### Method Blank

Lab Name: ALS Paragon

Work Order Number: 0903060

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200205808

Lab ID: F090311-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 12-Mar-09

Date Analyzed: 13-Mar-09

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP090312-3

QCBatchID: IP090312-3-2

Run ID: IM090313-1A3

Cleanup: NONE

Basis: N/A

File Name: 13MAR09A

Sample Aliquot: 50 g

Final Volume: 50 g

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	DF	Result	Reporting Limit	Result Qualifier	EPA Qualifier
7440-36-0	ANTIMONY	10	0.3	0.3	U	
7440-38-2	ARSENIC	10	2	2	U	
7440-43-9	CADMIUM	10	0.3	0.3	U	
7439-92-1	LEAD	10	0.5	0.5	U	
7439-98-7	MOLYBDENUM	10	1	1	U	
7782-49-2	SELENIUM	10	1	1	U	
7440-22-4	SILVER	10	0.1	0.1	U	
7440-28-0	THALLIUM	10	0.2	0.2	U	
7440-61-1	URANIUM	10	0.1	0.1	U	

Data Package ID: *im0903060-1*

Date Printed: Monday, March 23, 2009

ALS Paragon

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# Metals by 200.8

Method EPA200.8 Revision 5.4

## Laboratory Control Sample

Lab Name: ALS Paragon

Work Order Number: 0903060

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200205808

Lab ID: FM90311-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 03/12/2009

Date Analyzed: 03/13/2009

Prep Method: EPA200.22.8

Prep Batch: IP090312-3

QCBatchID: IP090312-3-2

Run ID: IM090313-1A3

Cleanup: NONE

Basis: N/A

File Name: 13MAR09A

Sample Aliquot: 50 g

Final Volume: 50 g

Result Units: UG/L

Clean DF: 1

CASNO	Target Analyte	Spike Added	LCS Result	Reporting Limit	Result Qualifier	LCS % Rec.	Control Limits
7440-36-0	ANTIMONY	20	20.4	0.3		102	85 - 115%
7440-38-2	ARSENIC	40	41	2		103	85 - 115%
7440-43-9	CADMIUM	20	21.2	0.3		106	85 - 115%
7439-92-1	LEAD	100	104	0.5		104	85 - 115%
7439-98-7	MOLYBDENUM	20	20.8	1		104	85 - 115%
7782-49-2	SELENIUM	40	45.5	1		114	85 - 115%
7440-22-4	SILVER	20	20.9	0.1		105	85 - 115%
7440-28-0	THALLIUM	1	0.885	0.2		88	85 - 115%
7440-61-1	URANIUM	20	21	0.1		105	85 - 115%

Data Package ID: *im0903060-1*

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# Metals by 200.8

## Method EPA200.8 Revision 5.4

### Matrix Spike And Matrix Spike Duplicate

**Lab Name:** ALS Paragon  
**Work Order Number:** 0903060  
**Client Name:** Colorado Oil & Gas Conservation Commission  
**ClientProject ID:** Complaint 200205808

<b>Field ID:</b> Angely WW 1 <b>LabID:</b> 0903060-1MS	<b>Sample Matrix:</b> WATER <b>% Moisture:</b> N/A <b>Date Collected:</b> 09-Mar-09 <b>Date Extracted:</b> 12-Mar-09 <b>Date Analyzed:</b> 13-Mar-09 <b>Prep Method:</b> EPA200.2 Rev 2.8	<b>Prep Batch:</b> IP090312-3 <b>QCBatchID:</b> IP090312-3-2 <b>Run ID:</b> IM090313-1A3 <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> UG/L <b>File Name:</b> 13MAR09A
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CASNO	Target Analyte	Sample Result	Samp Qual	MS Result	MS Qual	Reporting Limit	Spike Added	MS % Rec.	Control Limits
7440-36-0	ANTIMONY	0.3	U	20.2		0.3	20	101	70 - 130%
7440-38-2	ARSENIC	2	U	39.8		2	40	100	70 - 130%
7440-43-9	CADMIUM	0.3	U	20.4		0.3	20	102	70 - 130%
7439-92-1	LEAD	0.5	U	103		0.5	100	103	70 - 130%
7439-98-7	MOLYBDENUM	2.2		24.1		1	20	110	70 - 130%
7782-49-2	SELENIUM	1	U	39.6		1	40	99	70 - 130%
7440-22-4	SILVER	0.1	U	20.6		0.1	20	103	70 - 130%
7440-28-0	THALLIUM	0.2	U	0.895		0.2	1	89	70 - 130%
7440-61-1	URANIUM	0.1	U	21.8		0.1	20	109	70 - 130%

**Data Package ID:** *im0903060-1*

**Date Printed:** Monday, March 23, 2009

**ALS Paragon**

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# Metals by 200.8

## Method EPA200.8 Revision 5.4

### Matrix Spike And Matrix Spike Duplicate

**Lab Name:** ALS Paragon  
**Work Order Number:** 0903060  
**Client Name:** Colorado Oil & Gas Conservation Commission  
**ClientProject ID:** Complaint 200205808

**Field ID:** Angely WW 1

**LabID:** 0903060-1MSD

**Sample Matrix:** WATER

**% Moisture:** N/A

**Date Collected:** 09-Mar-09

**Date Extracted:** 12-Mar-09

**Date Analyzed:** 13-Mar-09

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

**Prep Batch:** IP090312-3

**QCBatchID:** IP090312-3-2

**Run ID:** IM090313-1A3

**Cleanup:** NONE

**Basis:** As Received

**Sample Aliquot:** 50 g

**Final Volume:** 50 g

**Result Units:** UG/L

**File Name:** 13MAR09A

CASNO	Target Analyte	MSD Result	MSD Qual	Spike Added	MSD % Rec.	Reporting Limit	RPD Limit	RPD
7440-36-0	ANTIMONY	20		20	100	0.3	20	1
7440-38-2	ARSENIC	39.7		40	99	2	20	0
7440-43-9	CADMIUM	19.8		20	99	0.3	20	3
7439-92-1	LEAD	101		100	101	0.5	20	2
7439-98-7	MOLYBDENUM	23.7		20	107	1	20	2
7782-49-2	SELENIUM	39.9		40	100	1	20	1
7440-22-4	SILVER	20.3		20	102	0.1	20	1
7440-28-0	THALLIUM	1.23		1	123	0.2	20	
7440-61-1	URANIUM	21.4		20	107	0.1	20	2

**Data Package ID:** im0903060-1

**Date Printed:** Monday, March 23, 2009

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