



ALS Paragon



Metals Case Narrative

Colorado Oil & Gas Conservation Commission

Complaint 200204502

Work Order Number: 0903157

1. This report consists of 1 water sample.
2. The sample was received cool and intact by ALS Paragon on 03/20/09.
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 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 sample was digested following method 200.2 and SOP 806 Rev. 13.

The sample was 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 CaCl^+ (mass 75) interferences on arsenic.

5. The sample was 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 2nd 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 2nd 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 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.
 - 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.



- The laboratory control sample associated with this digestion batch was within the acceptance limits with the exception of iron. The associated samples were below the reporting limit. A Non-Conformance Report (NCR) has been included to document this occurrence.
- All initial and continuing calibration blanks associated with each analytical batch were below the practical quantitation limits for the requested analytes.
- All initial and continuing calibration verifications associated with each analytical batch were within the acceptance criteria for the requested analytes with the exception of CCV2 for zinc. None of the samples associated with this order number were bracketed by this CCV.
- The interference check samples associated with Method 200.8 were analyzed, and the high standard readbacks were within acceptance criteria.
- The interference check samples and high standard readbacks associated with Method 200.7 were within acceptance criteria.

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 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

3/31/09
Date

[Signature]
Inorganics Final Data Reviewer

3/31/09
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

Paragon OrderNum: 0903157

Client Name: Colorado Oil & Gas Conservation Commission

Client Project Name: Complaint 200204502

Client Project Number:

Client PO Number: OE PHA 090000000004

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
Pulsifer 090319	0903157-1		WATER	19-Mar-09	11:05

Project Name/No.: NER Sampler(s): C. Whitmore Turnaround (circle one) (Standard) or Rush (Due 14) Disposed Date 3/6/ or Return to Client

Report To: Peter Gintantus
Phone: 719-846-3091
Fax:
E-mail: peter.gintantus@state.co.us
Company: Colo. Oil & Gas Conservation Comm.
Address:
Complaints: 2455 PETER WING 200304502
VANALSTYN WIND 200204503

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

[illegible]

* 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
 Animals - DO, Cl, F, NO₂, NO₃, SUG

$$200.7 = \text{Ba, Be, B, Ca, Cr, Cu, Fe, Li, Mn, Mg, Ni, K, Na, S, Zn}$$

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

CONDITION OF SAMPLE UPON RECEIPT FORM

Paragon Analytics

Client: COGCCWorkorder No: 0903157Project Manager: AWInitials: LJO Date: 3/20/09

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 <input checked="" type="radio"/> 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> </u> < green pea <u> </u> > 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*: <input checked="" type="radio"/> #2 <input checked="" type="radio"/> #4 RAD ONLY	<input checked="" type="radio"/> YES	NO
Cooler #: <u>1</u>		
Temperature (°C): <u>2.2</u>		
No. of custody seals on cooler: <u>1</u>		
External µR/hr reading: <u>13</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.

* Sample 1, the 1L amber for SVOC analysis listed no sample time.
 • The 500ml poly for metals analysis needs to be filtered and preserved in house.

If applicable, was the client contacted? YES / NO / ☒ NO Contact: Date/Time: Project Manager Signature / Date: 3/23/09

*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: 0903157

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200204502

Field ID: Pulsifer 090319

Lab ID: 0903157-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 19-Mar-09

Date Extracted: 25-Mar-09

Date Analyzed: 26-Mar-09

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP090325-5

QCBatchID: IP090325-5-1

Run ID: IT090326-2A3

Cleanup: NONE

Basis: As Received

File Name: 090326A.

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	0.3	0.1		
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	39	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	0.018	0.01		
7439-89-6	IRON	1	0.1	0.1	U	
7439-93-2	LITHIUM	1	0.01	0.01		
7439-95-4	MAGNESIUM	1	6.5	1		
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	1.8	1		
7440-23-5	SODIUM	1	48	1		
	SODIUM ADSORPTION RATIO	1	1.9	0.17		
7440-24-6	STRONTIUM	1	1.2	0.01		
7440-66-6	ZINC	1	0.02	0.02	U	

Data Package ID: it0903157-1

Date Printed: Tuesday, March 31, 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: 0903157

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200204502

Field ID:	Pulsifer 090319
Lab ID:	0903157-1

Sample Matrix: WATER

% Moisture: N/A

Date Collected: 19-Mar-09

Date Extracted: 25-Mar-09

Date Analyzed: 26-Mar-09

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP090325-5

QCBatchID: IP090325-5-2

Run ID: IM090326-1A3

Cleanup: NONE

Basis: As Received

File Name: 26MAR09A

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	0.68	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	0.5	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: *im0903157-1*

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Metals by 200.7

Method EPA200.7 Revision 4.4

Method Blank

Lab Name: ALS Paragon

Work Order Number: 0903157

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200204502

Lab ID: F090324-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 25-Mar-09

Date Analyzed: 26-Mar-09

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP090325-5

QCBatchID: IP090325-5-1

Run ID: IT090326-2A3

Cleanup: NONE

Basis: N/A

File Name: 090326A.

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: it0903157-1

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Metals by 200.7

Method EPA200.7 Revision 4.4

Laboratory Control Sample

Lab Name: ALS Paragon

Work Order Number: 0903157

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200204502

Lab ID: F090324-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 03/25/2009

Date Analyzed: 03/26/2009

Prep Method: EPA200.22.8

Prep Batch: IP090325-5

QCBatchID: IP090325-5-1

Run ID: IT090326-2A3

Cleanup: NONE

Basis: N/A

File Name: 090326A.

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	2.03	0.1		101	85 - 115%
7440-41-7	BERYLLIUM	0.05	0.0492	0.002		98	85 - 115%
7440-42-8	BORON	1	1.04	0.1		104	85 - 115%
7440-70-2	CALCIUM	40	42.5	1		106	85 - 115%
7440-47-3	CHROMIUM	0.2	0.206	0.01		103	85 - 115%
7440-48-4	COBALT	0.5	0.51	0.01		102	85 - 115%
7440-50-8	COPPER	0.25	0.256	0.01		102	85 - 115%
7439-89-6	IRON	1	2.01	0.1	N	201	85 - 115%
7439-93-2	LITHIUM	0.5	0.525	0.01		105	85 - 115%
7439-95-4	MAGNESIUM	40	41.5	1		104	85 - 115%
7439-96-5	MANGANESE	0.5	0.493	0.01		99	85 - 115%
7440-02-0	NICKEL	0.5	0.516	0.02		103	85 - 115%
7440-09-7	POTASSIUM	40	43.5	1		109	85 - 115%
7440-23-5	SODIUM	40	41.7	1		104	85 - 115%
7440-24-6	STRONTIUM	0.5	0.493	0.01		99	85 - 115%
7440-66-6	ZINC	0.5	0.494	0.02		99	85 - 115%

Data Package ID: *it0903157-1*

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Metals by 200.8

Method EPA200.8 Revision 5.4

Method Blank

Lab Name: ALS Paragon

Work Order Number: 0903157

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200204502

Lab ID: F090324-1MB

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 25-Mar-09

Date Analyzed: 26-Mar-09

Prep Method: EPA200.2 Rev 2.8

Prep Batch: IP090325-5

QCBatchID: IP090325-5-2

Run ID: IM090326-1A3

Cleanup: NONE

Basis: N/A

File Name: 26MAR09A

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: im0903157-1

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Metals by 200.8

Method EPA200.8 Revision 5.4

Laboratory Control Sample

Lab Name: ALS Paragon

Work Order Number: 0903157

Client Name: Colorado Oil & Gas Conservation Commission

ClientProject ID: Complaint 200204502

Lab ID: FM90324-1LCS

Sample Matrix: WATER

% Moisture: N/A

Date Collected: N/A

Date Extracted: 03/25/2009

Date Analyzed: 03/26/2009

Prep Method: EPA200.22.8

Prep Batch: IP090325-5

QCBatchID: IP090325-5-2

Run ID: IM090326-1A3

Cleanup: NONE

Basis: N/A

File Name: 26MAR09A

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	20.5	0.3		103	85 - 115%
7440-38-2	ARSENIC	40	39.2	2		98	85 - 115%
7440-43-9	CADMIUM	20	20.6	0.3		103	85 - 115%
7439-92-1	LEAD	100	104	0.5		104	85 - 115%
7439-98-7	MOLYBDENUM	20	20.6	1		103	85 - 115%
7782-49-2	SELENIUM	40	42	1		105	85 - 115%
7440-22-4	SILVER	20	21	0.1		105	85 - 115%
7440-28-0	THALLIUM	1	1.03	0.2		103	85 - 115%
7440-61-1	URANIUM	20	21	0.1		105	85 - 115%

Data Package ID: *im0903157-1*

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CONTROLLED

NON-CONFORMANCE REPORT

Non-Conformance

Initiated By: Roy French on 3/27/2009

Event Type: Method Requirements Not Met -- LCS/LCSD

Event Explanation: The LCS for prep batch IP090325-5 had a 200% recovery for Fe. The W.O. affected 0903156, 0903157, 0903158 and 0903159. None of the samples contained Fe.

Action To

Prevent Recurrence: Discussion with analyst.

Corrective Action

Corrective Action: Document in Narrative

Department Manager Approval: Roy French

Approval Date: 3/27/2009

Corrective Action Comments: Double spiking error suspected.

Workorders Affected

Workorder -- Procedure

0903156 -- EPA200.7
0903157 -- EPA200.7
0903158 -- EPA200.7
0903159 -- EPA200.7

Peter Gintautas was contacted on 3/27/2009

Approved By

Amy R. Wolf

Approval Date

3/27/2009

Associated Batches

The samples were originally associated with the following Batch(es):

IT090326-2A3 created on 3/26/2009

All rework was completed in the following Batch(es):

Not Applicable

NCR Approval

Project Manager Approval: ARW on 3/27/2009

Department Manager Approval: Roy French on 3/27/2009

QA Manager Approval: Deb Scheib on 3/29/2009