



Thursday, February 23, 2017

Ty Woodworth  
Great Western Oil and Gas  
2005 Howard Smith Ave East  
Windsor, CO 80550

Re: ALS Workorder: 1702096  
Project Name: Burr 222HN  
Project Number:

Dear Mr. Woodworth:

Two water samples were received from Great Western Oil and Gas, on 2/7/2017. The samples were scheduled for the following analyses:

Dissolved Gasses

GC/MS Volatiles

Inorganics

Metals

Total Extractable Petroleum Hydrocarbons (Diesel)

Total Volatile Petroleum Hydrocarbons (Gasoline)

The results for these analyses are contained in the enclosed reports.

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.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental  
Shiloh J. Summy  
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Connecticut (CT)	PH-0232
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
L-A-B (DoD ELAP/ISO 170250)	L2257
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



# 1702096

**GC/MS Volatiles:**

The sample was analyzed using GC/MS following the current revision of SOP 525 based on SW-846 Method 8260C.

The vial for the sample contained headspace prior to analysis and had a pH > 2 at the time of analysis.

Due to matrix interferences, the sample was analyzed at a dilution. The reporting limits have been adjusted accordingly.

All remaining acceptance criteria were met.

**Dissolved Gasses:**

The sample was prepared and analyzed according to method RSK-175 procedures and the current revision of SOP 449.

All laboratory control sample criteria were met with the exception of the RPD for methane. Since the recoveries for compound in the laboratory control sample and laboratory control sample duplicate were within control limits, with only the RPD exceeding acceptance criteria, quantitations of target compounds were not compromised. No further action was taken.

All remaining acceptance criteria were met.

**GRO:**

The sample was analyzed following the current revision of SOP 425 generally based on SW-846 Methods 8000C and 8015D. TVPH is a multicomponent mixture and is quantitated by summing the entire carbon range, rather than individual peaks. The carbon range integrated in this test extends from C6 to C10.

The vial for sample 1702096-1 contained headspace prior to analysis. The sample had a pH > 2 at the time of analysis.

All remaining acceptance criteria were met.

**DRO:**

The sample was analyzed following the current revision of SOP 406 generally based on SW-846 Methods 8000C and 8015D. TEPH is a multicomponent mixture and is quantitated by summing the



entire carbon range, rather than individual peaks. The carbon range integrated in this test extends from C10 to C28.

All acceptance criteria were met.

### **Metals:**

The samples were analyzed following Methods for the Determination of Metals in Environmental Samples – Supplement 1 procedures. Analysis by ICPMS followed method 200.8 and the current revision of SOP 827.

Sample 1702096-2 was analyzed for dissolved metals. The sample was filtered through a 0.45 micron filter and preserved with nitric acid to a pH less than 2 prior to analysis. Sample 1702096-1 did not have a pH less than 2 upon receipt. The sample was preserved with nitric acid to a pH less than 2 upon receipt.

All acceptance criteria were met.

### **Inorganics:**

The sample was analyzed following EMSL and Standard Method procedures for the current revisions of the following SOPs and methods:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Alkalinity	SM2320B	1106
Bicarbonate	SM2320B	1106
Carbonate	SM2320B	1106
TDS	SM2540C	1101
Chloride	300.0 Revision 2.1	1113
Sulfate	300.0 Revision 2.1	1113

All acceptance criteria were met.

# ALS -- Fort Collins

## Sample Number(s) Cross-Reference Table

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**OrderNum:** 1702096

**Client Name:** Great Western Oil and Gas

**Client Project Name:** Burr 222HN

**Client Project Number:**

**Client PO Number:**

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Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
Burr 222HN	1702096-1		WATER	07-Feb-17	10:00
Burr 222HN	1702096-2		WATER	07-Feb-17	10:00



# ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524  
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

## Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.  
Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	
1702094	
PAGE	of
DISPOSAL	BY LAB or RETURN

PROJECT NAME	Burr 222H	
PROJECT No.		
COMPANY NAME	Great Western	
SEND REPORT TO	Ty Woodworth	
ADDRESS	2005 Howard Smith Ave East	
CITY / STATE / ZIP	Windsor, CO 80550	
PHONE	970-274-9254	
FAX		
E-MAIL	twoodworth@the-guager.com	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
①	11672 1L Poly	Water	2/7	10:00 am	1	—		X										
	20782		2/7	10 am	1	—		X										
	250 mL poly w/ HPLC		2/7	10	3	X HCL												
	316457, 316454, 316484		2/7	10	3	X HCL												
	316437, 316422, 316507		2/7	10	3	X HCL												
	316452, 316453, 316468		2/7	10	3	X HCL												
	108444, 108432, 108431		2/7	10	3	—												

*Time Zone (Circle):		EST	CST	MST	PST	Matrix:	O = oil	S = soil	NS = non-soil solid	W = water	L = liquid	E = extract	F = filter
NOTES		Form 202-9											
REPORT LEVEL / QC REQUIRED		SIGNATURE											
Summary (Standard QC)		Ty Woodworth											
LEVEL II (Standard QC)		C. Trumbull											
LEVEL III (Std QC + forms)													
LEVEL IV (Std QC + forms + raw)													
RELINQUISHED BY		RECEIVED BY											
RECEIVED BY		RECEIVED BY											
RELINQUISHED BY		RECEIVED BY											
RECEIVED BY		RECEIVED BY											
RELINQUISHED BY		RECEIVED BY											
RECEIVED BY		RECEIVED BY											
PRINTED NAME		DATE											
Ty Woodworth		2/7											
C. Trumbull		2-7-17 14-12											
TIME		2:42 pm											



**ALS Environmental - Fort Collins**  
**CONDITION OF SAMPLE UPON RECEIPT FORM**

Client: Great Western

Workorder No: 1702096

Project Manager: \_\_\_\_\_

Initials: COS Date: 2-7-17

1. Does this project require any special handling in addition to standard ALS procedures?		YES	<u>NO</u>
2. Are custody seals on shipping containers intact?	<u>NONE</u>	YES	NO
3. Are Custody seals on sample containers intact?	<u>NONE</u>	YES	NO
4. Is there a COC (Chain-of-Custody) present or other representative documents?		<u>YES</u>	NO
5. Are the COC and bottle labels complete and legible?		<u>YES</u>	NO
6. Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		<u>YES</u>	NO
7. Were airbills / shipping documents present and/or removable?	<u>DROP OFF</u>	YES	NO
8. Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	YES	<u>NO</u>
9. Are all aqueous non-preserved samples pH 4-9?	N/A	YES	<u>NO</u>
10. Is there sufficient sample for the requested analyses?		<u>YES</u>	NO
11. Were all samples placed in the proper containers for the requested analyses?		<u>YES</u>	NO
12. Are all samples within holding times for the requested analyses?		<u>YES</u>	NO
13. Were all sample containers received intact? (not broken or leaking, etc.)		<u>YES</u>	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	YES	<u>NO</u>
15. Do any water samples contain sediment? Amount Amount of sediment: _____ dusting _____ moderate _____ heavy	N/A	YES	<u>NO</u>
16. Were the samples shipped on ice?		YES	<u>NO</u>
17. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4 RAD ONLY		YES	<u>NO</u>
Cooler #: <u>1</u>			
Temperature (°C): <u>Amb</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 / NA (If no, see Form 008.)			

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

Bottle 1702096-1-14 initial pH 2.2. Added 0.5 ml HNO<sub>3</sub>  
@ 1430, 2-7-17, Final pH < 2. HNO<sub>3</sub> lot no 137345.  
Bottles 1702096-1-13 and 1702096-2-1 pH 11.  
All vials have headspace > green pea, except  
1702096-1-12 which has no headspace.

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

Project Manager Signature / Date: Shirah Lunny

Client: Great Western Oil and Gas

Date: 23-Feb-17

Project: Burr 222HN

Work Order: 1702096

Sample ID: Burr 222HN

Lab ID: 1702096-1

Legal Location:

Matrix: WATER

Collection Date: 2/7/2017 10:00

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Alkalinity as Calcium Carbonate</b>			<b>SM2320B</b>		Prep Date: <b>2/20/2017</b>	PrepBy: <b>AMG</b>
BICARBONATE AS CaCO3	ND		100	MG/L	1	2/20/2017
CARBONATE AS CaCO3	700		100	MG/L	1	2/20/2017
TOTAL ALKALINITY AS CaCO3	1800		100	MG/L	1	2/20/2017
<b>Diesel Range Organics</b>			<b>SW8015M</b>		Prep Date: <b>2/9/2017</b>	PrepBy: <b>JFN</b>
Diesel Range Organics	8.8	ZLD	1.5	MG/L	1	2/10/2017 15:38
Surr: O-TERPHENYL	101		63-126	%REC	1	2/10/2017 15:38
<b>Dissolved Gasses</b>			<b>RSK175</b>		Prep Date: <b>2/14/2017</b>	PrepBy: <b>JFN</b>
METHANE	11000		3	UG/L	3	2/14/2017 09:35
ETHANE	2700		6	UG/L	3	2/14/2017 09:35
PROPANE	850		3	UG/L	3	2/14/2017 09:35
<b>Gasoline Range Organics</b>			<b>SW8015</b>		Prep Date: <b>2/10/2017</b>	PrepBy: <b>JFN</b>
GASOLINE RANGE ORGANICS	1.5	G	1	MG/L	10	2/10/2017 12:45
Surr: 2,3,4-TRIFLUOROTOLUENE	95		74-129	%REC	10	2/10/2017 12:45
<b>GC/MS Volatiles</b>			<b>SW8260_25</b>		Prep Date: <b>2/7/2017</b>	PrepBy: <b>JXK</b>
BENZENE	220		50	UG/L	50	2/7/2017 19:51
TOLUENE	230		50	UG/L	50	2/7/2017 19:51
ETHYLBENZENE	ND		50	UG/L	50	2/7/2017 19:51
M+P-XYLENE	52		50	UG/L	50	2/7/2017 19:51
O-XYLENE	ND		50	UG/L	50	2/7/2017 19:51
TOTAL XYLENES	52		1	UG/L	1	2/7/2017 19:51
Surr: 4-BROMOFLUOROBENZENE	103		85-115	%REC	50	2/7/2017 19:51
Surr: DIBROMOFLUOROMETHANE	102		84-118	%REC	50	2/7/2017 19:51
Surr: TOLUENE-D8	96		85-115	%REC	50	2/7/2017 19:51
<b>Ion Chromatography</b>			<b>EPA300.0</b>		Prep Date: <b>2/15/2017</b>	PrepBy: <b>AMG</b>
CHLORIDE	8200		100	MG/L	500	2/20/2017 11:36
SULFATE	360		25	MG/L	25	2/15/2017 23:26
<b>Total Recoverable Metals by 200.8</b>			<b>EPA200.8</b>		Prep Date: <b>2/9/2017</b>	PrepBy: <b>AJL2</b>
CALCIUM	360000		1000	UG/L	10	2/13/2017 16:01
POTASSIUM	2200000		1000	UG/L	10	2/13/2017 16:01
MAGNESIUM	ND		100	UG/L	10	2/14/2017 19:58
SODIUM	3600000		1000	UG/L	10	2/13/2017 16:01
<b>Total Dissolved Solids</b>			<b>SM2540C</b>		Prep Date: <b>2/8/2017</b>	PrepBy: <b>HMA</b>
TOTAL DISSOLVED SOLIDS	13000		400	MG/L	1	2/9/2017



Client: Great Western Oil and Gas

Date: 23-Feb-17

Project: Burr 222HN

Work Order: 1702096

Sample ID: Burr 222HN

Lab ID: 1702096-2

Legal Location:

Matrix: WATER

Collection Date: 2/7/2017 10:00

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Dissolved Metals by 200.8</b>			<b>EPA200.8</b>		Prep Date: <b>2/9/2017</b>	PrepBy: <b>AJL2</b>
<b>CALCIUM</b>	<b>350000</b>		<b>1000</b>	<b>UG/L</b>	10	2/13/2017 16:04
<b>POTASSIUM</b>	<b>2200000</b>		<b>1000</b>	<b>UG/L</b>	10	2/13/2017 16:04
<b>MAGNESIUM</b>	ND		100	UG/L	10	2/14/2017 20:01
<b>SODIUM</b>	<b>3600000</b>		<b>1000</b>	<b>UG/L</b>	10	2/13/2017 16:04

Client: Great Western Oil and Gas

Date: 23-Feb-17

Project: Burr 222HN

Work Order: 1702096

Sample ID: Burr 222HN

Lab ID: 1702096-2

Legal Location:

Matrix: WATER

Collection Date: 2/7/2017 10:00

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
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**Explanation of Qualifiers****Radiochemistry:**

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

\* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

LT - Result is less than requested MDC but greater than achieved MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

**Inorganics:**

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

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.

**Organics:**

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

\* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:

- gasoline

- JP-8

- diesel

- mineral spirits

- motor oil

- Stoddard solvent

- bunker C

## ALS -- Fort Collins

Date: 2/23/2017 4:32:

Client: Great Western Oil and Gas

## QC BATCH REPORT

Work Order: 1702096

Project: Burr 222HN

Batch ID: HC170209-100-1

Instrument ID: FUELS-1

Method: SW8015M

LCS	Sample ID: <b>HC170209-100</b>				Units: <b>MG/L</b>			Analysis Date: <b>2/10/2017 12:31</b>			
Client ID:	Run ID: <b>HC170210-8A</b>				Prep Date: <b>2/9/2017</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Diesel Range Organics	8.3	0.592	8.22		101	36-150				20	
Surr: O-TERPHENYL	0.784		0.822		95	63-126					

LCSD	Sample ID: <b>HC170209-100</b>				Units: <b>MG/L</b>		Analysis Date: <b>2/10/2017 12:54</b>				
Client ID:	Run ID: <b>HC170210-8A</b>				Prep Date: <b>2/9/2017</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Diesel Range Organics	8.6	0.602	8.36		103	36-150		8.3	4	20	
Surr: O-TERPHENYL	0.821		0.836		98	63-126			5		

MB	Sample ID: HC170209-100					Units: MG/L		Analysis Date: 2/10/2017 10:54				
Client ID:	Run ID: HC170210-8A					Prep Date: 2/9/2017			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual	
Diesel Range Organics	ND	0.61										
Surr: O-TERPHENYL	0.783		0.845		93	63-126						

The following samples were analyzed in this batch:

1702096-1

Client: Great Western Oil and Gas  
 Work Order: 1702096  
 Project: Burr 222HN

## QC BATCH REPORT

Batch ID: **HC170210-61-1** Instrument ID: **FUELS-1** Method: **SW8015**

LCS	Sample ID: <b>HC170210-61</b>				Units: <b>MG/L</b>		Analysis Date: <b>2/10/2017 09:51</b>				
Client ID:	Run ID: <b>HC170210-6A</b>				Prep Date: <b>2/10/2017</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	0.487	0.1	0.5		97	79-118				20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.0984		0.1		98	74-129					

LCSD	Sample ID: <b>HC170210-61</b>				Units: <b>MG/L</b>		Analysis Date: <b>2/10/2017 16:48</b>				
Client ID:	Run ID: <b>HC170210-6A</b>				Prep Date: <b>2/10/2017</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	0.48	0.1	0.5		96	79-118		0.487	2	20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.0912		0.1		91	74-129			8		

MB		Sample ID: <b>HC170210-61</b>				Units: <b>MG/L</b>		Analysis Date: <b>2/10/2017 10:13</b>				
Client ID:		Run ID: <b>HC170210-6A</b>				Prep Date: <b>2/10/2017</b>			DF: <b>1</b>			
Analyte		Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS		ND	0.1									
Surr: 2,3,4-TRIFLUOROTOLUENE		0.091		0.1		91	74-129					

The following samples were analyzed in this batch:

1702096-1

Client: Great Western Oil and Gas  
 Work Order: 1702096  
 Project: Burr 222HN

## QC BATCH REPORT

Batch ID: **HC170214-9-1** Instrument ID: **MEE-1** Method: **RSK175**

LCS	Sample ID: <b>HC170214-9</b>				Units: <b>UG/L</b>		Analysis Date: <b>2/14/2017 09:04</b>				
Client ID:	Run ID: <b>HC170214-9A</b>				Prep Date: <b>2/14/2017</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
METHANE	119	1	142		83	80-120				25	
ETHANE	228	2	267		86	80-120				25	
PROPANE	333	1	391		85	80-120				25	

LCSD	Sample ID: HC170214-9				Units: UG/L		Analysis Date: 2/14/2017 10:06				
Client ID:	Run ID: HC170214-9A				Prep Date: 2/14/2017			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
METHANE	155	1	142		109	80-120		119	27	25	+
ETHANE	292	2	267		110	80-120		228	25	25	
PROPANE	423	1	391		108	80-120		333	24	25	

MB	Sample ID: <b>HC170214-9</b>				Units: <b>UG/L</b>		Analysis Date: <b>2/14/2017 09:09</b>				
Client ID:		Run ID: <b>HC170214-9A</b>				Prep Date: <b>2/14/2017</b>			DF: <b>1</b>		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
METHANE	ND	1									
ETHANE	ND	2									
PROPANE	ND	1									

The following samples were analyzed in this batch:

1702096-1

**Client:** Great Western Oil and Gas  
**Work Order:** 1702096  
**Project:** Burr 222HN

## QC BATCH REPORT

Batch ID: **IP170209-2-2** Instrument ID: **ICPMS2** Method: **EPA200.8**

**LCS** Sample ID: **IM170209-2** Units: **UG/L** Analysis Date: **2/13/2017 15:25**

Client ID: Run ID: **IM170213-10A3** Prep Date: **2/9/2017** DF: **10**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CALCIUM	9310	1000	10000		93	85-115				20	
POTASSIUM	4820	1000	5000		96	85-115				20	
SODIUM	9430	1000	10000		94	85-115				20	

**MB** Sample ID: **FP170209-2** Units: **UG/L** Analysis Date: **2/13/2017 15:16**

Client ID: Run ID: **IM170213-10A3** Prep Date: **2/9/2017** DF: **10**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CALCIUM	ND	1000									
POTASSIUM	ND	1000									
SODIUM	ND	1000									

The following samples were analyzed in this batch:

1702096-1 1702096-2

**Client:** Great Western Oil and Gas  
**Work Order:** 1702096  
**Project:** Burr 222HN

## QC BATCH REPORT

Batch ID: **IP170209-2-2** Instrument ID: **ICPMS2** Method: **EPA200.8**

LCS	Sample ID: IM170209-2				Units: UG/L		Analysis Date: 2/14/2017 19:55				
Client ID:	Run ID: IM170214-11A5				Prep Date: 2/9/2017			DF: 10			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
MAGNESIUM	9830	100	10000		98	85-115				20	

MB		Sample ID: <b>FP170209-2</b>				Units: <b>UG/L</b>		Analysis Date: <b>2/14/2017 19:52</b>			
Client ID:		Run ID: <b>IM170214-11A5</b>				Prep Date: <b>2/9/2017</b>		DF: <b>10</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
MAGNESIUM	ND	100									

The following samples were analyzed in this batch:

1702096-1	1702096-2
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Client: Great Western Oil and Gas  
 Work Order: 1702096  
 Project: Burr 222HN

# QC BATCH REPORT

Batch ID: **VL170207-4-3** Instrument ID: **HPV4** Method: **SW8260\_25**

LCS		Sample ID: <b>VL170207-4</b>				Units: %REC		Analysis Date: <b>2/7/2017 11:22</b>			
Client ID:		Run ID: <b>VL170207-4A</b>				Prep Date: <b>2/7/2017</b>			DF: <b>1</b>		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	25.2		25		101	85-115					
Surr: DIBROMOFLUOROMETHANE	25.9		25		104	84-118					
Surr: TOLUENE-D8	24.4		25		97	85-115					
BENZENE	10.9	1	10		109	83-117				20	
TOLUENE	10.3	1	10		103	82-113				20	
ETHYLBENZENE	9.91	1	10		99	81-113				20	
M+P-XYLENE	20.9	1	20		105	82-115				20	
O-XYLENE	10.1	1	10		101	81-115				20	

LCSD		Sample ID: VL170207-4			Units: %REC		Analysis Date: 2/7/2017 11:45				
Client ID:		Run ID: VL170207-4A			Prep Date: 2/7/2017			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	24.9		25		99	85-115			1		
Surr: DIBROMOFLUOROMETHANE	25.2		25		101	84-118			3		
Surr: TOLUENE-D8	24.3		25		97	85-115			0		
BENZENE	11	1	10		110	83-117		10.9	1	20	
TOLUENE	9.92	1	10		99	82-113		10.3	4	20	
ETHYLBENZENE	9.87	1	10		99	81-113		9.91	0	20	
M+P-XYLENE	20.2	1	20		101	82-115		20.9	4	20	
O-XYLENE	10.1	1	10		101	81-115		10.1	0	20	

MB			Sample ID: VL170207-4			Units: %REC			Analysis Date: 2/7/2017 12:33		
Client ID:			Run ID: VL170207-4A			Prep Date: 2/7/2017			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	24.9		25		100	85-115					
Surr: DIBROMOFLUOROMETHANE	25.8		25		103	84-118					
Surr: TOLUENE-D8	24.2		25		97	85-115					
BENZENE	ND	1									
TOLUENE	ND	1									
ETHYLBENZENE	ND	1									
M+P-XYLENE	ND	1									
O-XYLENE	ND	1									
TOTAL XYLENES	ND	1									

The following samples were analyzed in this batch:

1702096-1



**Client:** Great Western Oil and Gas  
**Work Order:** 1702096  
**Project:** Burr 222HN

## QC BATCH REPORT

Batch ID: **AK170220-1-1** Instrument ID: **NONE** Method: **SM2320B**

<b>LCS</b>		Sample ID: <b>AK170220-1</b>			Units: <b>MG/L</b>			Analysis Date: <b>2/20/2017</b>			
Client ID:		Run ID: <b>AK170220-1a1</b>			Prep Date: <b>2/20/2017</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
TOTAL ALKALINITY AS CaCO3	99.1	5	100		99	85-115				15	

<b>LCSD</b>		Sample ID: <b>AK170220-1</b>			Units: <b>MG/L</b>			Analysis Date: <b>2/20/2017</b>			
Client ID:		Run ID: <b>AK170220-1a1</b>			Prep Date: <b>2/20/2017</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
TOTAL ALKALINITY AS CaCO3	99.5	5	100		99	85-115		99.1	0	15	

<b>MB</b>		Sample ID: <b>AK170220-1</b>			Units: <b>MG/L</b>			Analysis Date: <b>2/20/2017</b>			
Client ID:		Run ID: <b>AK170220-1a1</b>			Prep Date: <b>2/20/2017</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
BICARBONATE AS CaCO3	ND	5									
CARBONATE AS CaCO3	ND	5									
TOTAL ALKALINITY AS CaCO3	ND	5									

The following samples were analyzed in this batch:

1702096-1

**Client:** Great Western Oil and Gas  
**Work Order:** 1702096  
**Project:** Burr 222HN

## QC BATCH REPORT

Batch ID: **IC170215-1-1** Instrument ID: **IC-2** Method: **EPA300.0**

LCS	Sample ID: IC170215-1				Units: MG/L			Analysis Date: 2/15/2017 21:10			
Client ID:	Run ID: IC170215-1A1				Prep Date: 2/15/2017			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CHLORIDE	4.97	0.2	5		99	90-110				15	
SULFATE	19.6	1	20		98	90-110				15	

LCSD	Sample ID: IC170215-1				Units: MG/L		Analysis Date: 2/15/2017 21:55				
Client ID:	Run ID: IC170215-1A1				Prep Date: 2/15/2017			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CHLORIDE	4.87	0.2	5		97	90-110		4.97	2	15	
SULFATE	19.2	1	20		96	90-110		19.6	2	15	

MB		Sample ID: IC170215-1				Units: MG/L		Analysis Date: 2/15/2017 20:55			
Client ID:		Run ID: IC170215-1A1				Prep Date: 2/15/2017			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CHLORIDE	ND	0.2									
SULFATE	ND	1									

The following samples were analyzed in this batch:

1702096-1

**Client:** Great Western Oil and Gas  
**Work Order:** 1702096  
**Project:** Burr 222HN

## QC BATCH REPORT

Batch ID: **TD170208-1-1** Instrument ID: **Balance** Method: **SM2540C**

<b>LCS</b>		Sample ID: <b>TD170208-1</b>			Units: <b>MG/L</b>			Analysis Date: <b>2/9/2017</b>			
Client ID:		Run ID: <b>TD170209-1a1</b>			Prep Date: <b>2/8/2017</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
TOTAL DISSOLVED SOLIDS	395	20	400		99	85-115				5	

<b>MB</b>		Sample ID: <b>TD170208-1</b>			Units: <b>MG/L</b>			Analysis Date: <b>2/9/2017</b>			
Client ID:		Run ID: <b>TD170209-1a1</b>			Prep Date: <b>2/8/2017</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
TOTAL DISSOLVED SOLIDS	ND	20									

The following samples were analyzed in this batch:

1702096-1