



Friday, November 15, 2019

Ty Woodworth  
Great Western Operating Company, LLC  
4093 Specialty Place, Unit B  
Longmont, CO 80504

Re: ALS Workorder: 1911030  
Project Name: Postle IC 09-342 HNX  
Project Number:

Dear Mr. Woodworth:

Two water samples were received from Great Western Operating Company, LLC, on 11/1/2019. 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  
Katie M. O'Brien  
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
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
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



## 1911030

### GC/MS Volatiles:

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

All surrogate recoveries were within acceptance criteria with the following exception:

Surrogate	Sample	Direction
Dibromofluoromethane	-1	Low

The low surrogate recovery is due to the PH of the sample. No further action was taken.

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 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.

All 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 1911030-2 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.

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:** 1911030

**Client Name:** Great Western Operating Company, LLC

**Client Project Name:** Postle IC 09-342 HNX

**Client Project Number:**

**Client PO Number:**

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Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
09-342 HNX A through E, and G	1911030-1		WATER	01-Nov-19	11:15
09-342 HNX F	1911030-2		WATER	01-Nov-19	11:15



**ALS Environmental**

225 Commerce Drive, Fort Collins, Colorado 80524  
 TF: (900) 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 #		1911030	
PAGE	of	DISPOSAL	BY LAB or RETURN
PARAMETER/METHOD REQUEST FOR ANALYSIS			
A	Dissolved Gases		
B	BTEX		
C	DRO		
D	GRO		
E	ANIONS, AK, TDS		
F	DS Metals		
G	TR Metals		
H			
I			
J			

TURNAROUND TIME	SAMPLER	SITE ID	EDD FORMAT	PURCHASE ORDER	BILL TO COMPANY	INVOICE ATTN TO	ADDRESS	CITY / STATE / ZIP	PHONE	FAX	E-MAIL	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
		09-342 HNX			GNOC		1 Woodworth St. Max Trebus				maxtrebus@guagco.com	W	11/1	11:15	3	-		X										
		09-342 HNX									maxtrebus@guagco.com	W			3	HCL		X										
		09-342 HNX									maxtrebus@guagco.com	W			3	HCL			X									
		09-342 HNX										W			3	HCL			X									
		09-342 HNX										W			1	-				X								
		09-342 HNX										W			1	-					X							
		09-342 HNX										W			1	HNO3						X						

RELINQUISHED BY	SIGNATURE	PRINTED NAME	DATE	TIME
RECEIVED BY	<i>[Signature]</i>	Cassy Weinger	11/1	15:04
RELINQUISHED BY		Erik Evans	11/1/19	1504
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

Form 2029

REPORT LEVEL / QC REQUIRED

Summary (Standard QC)

LEVEL II (Standard QC)

LEVEL III (Std QC + forms)

LEVEL IV (Std QC + forms + raw)

Facility ID

6 of 18

Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

PRESERVATION KEY 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other



ALS Environmental - Fort Collins  
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: Great Western Oil

Workorder No: 1911030

Project Manager: KMO

Initials: EE

Date: 11/1/19

1. Are airbills / shipping documents present and/or removable?		<input checked="" type="radio"/> DROP OFF	YES	NO		
2. Are custody seals on shipping containers intact?		<input checked="" type="radio"/> NONE	YES	NO *		
3. Are custody seals on sample containers intact?		<input checked="" type="radio"/> NONE	YES	NO *		
4. Is there a COC (chain-of-custody) present?			<input checked="" type="radio"/> YES	NO *		
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			<input checked="" type="radio"/> YES	NO *		
6. Are short-hold samples present?			YES	<input checked="" type="radio"/> NO		
7. Are all samples within holding times for the requested analyses?			<input checked="" type="radio"/> YES	NO *		
8. Were all sample containers received intact? (not broken or leaking)			<input checked="" type="radio"/> YES	NO *		
9. Is there sufficient sample for the requested analyses?			<input checked="" type="radio"/> YES	NO *		
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)			<input checked="" type="radio"/> YES	NO *		
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)		N/A	YES	<input checked="" type="radio"/> NO *		
12. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)		N/A	YES	<input checked="" type="radio"/> NO		
13. Were the samples shipped on ice?			<input checked="" type="radio"/> YES	NO		
14. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*:	#3	#5	RAD ONLY	<input checked="" type="radio"/> YES	NO
Cooler #: <u>1</u>						
Temperature (°C): <u>5.0</u>						
# of custody seals on cooler: <u>0</u>						
External mR/hr reading: <u>N/A</u>						
Background mR/hr reading: <u>12</u>						
Were external mR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / <input checked="" type="radio"/> NA (If no, see Form 008.)						

\* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

11. Sample 1911030-1-14 had an initial pH of ~14 1 mL of HNO<sub>3</sub> added final pH ~13

12. Sample 1911030-1-6 had significant headspace.

Were unpreserved bottles pH checked? YES /  NA

All client bottle ID's vs ALS lab ID's double-checked by: JXB

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

Date/Time: \_\_\_\_\_

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

[Signature] 11/4/19

**Client:** Great Western Operating Company, LLC  
**Project:** Postle IC 09-342 HNX  
**Sample ID:** 09-342 HNX A through E, and G  
**Legal Location:**  
**Collection Date:** 11/1/2019 11:15

**Date:** 15-Nov-19  
**Work Order:** 1911030  
**Lab ID:** 1911030-1  
**Matrix:** WATER  
**Percent Moisture:**

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Alkalinity as Calcium Carbonate</b>						
BICARBONATE AS CaCO3	ND		100	MG/L	1	11/8/2019
CARBONATE AS CaCO3	1100		100	MG/L	1	11/8/2019
TOTAL ALKALINITY AS CaCO3	10000		100	MG/L	1	11/8/2019
<b>Diesel Range Organics</b>						
Diesel Range Organics	4.1	L	0.5	MG/L	1	11/6/2019 19:23
Surr: O-TERPHENYL	84		63-126	%REC	1	11/6/2019 19:23
<b>Dissolved Gasses</b>						
METHANE	370		1	UG/L	1	11/13/2019 12:04
ETHANE	190		2	UG/L	1	11/13/2019 12:04
PROPANE	92		1	UG/L	1	11/13/2019 12:04
<b>Gasoline Range Organics</b>						
GASOLINE RANGE ORGANICS	5	G	0.5	MG/L	5	11/5/2019 17:38
Surr: 2,3,4-TRIFLUOROTOLUENE	101		74-129	%REC	5	11/5/2019 17:38
<b>GC/MS Volatiles</b>						
BENZENE	110		10	UG/L	10	11/6/2019 10:04
TOLUENE	290		10	UG/L	10	11/6/2019 10:04
ETHYLBENZENE	46		10	UG/L	10	11/6/2019 10:04
M+P-XYLENE	160		10	UG/L	10	11/6/2019 10:04
O-XYLENE	88		10	UG/L	10	11/6/2019 10:04
TOTAL XYLENES	240		1	UG/L	1	11/6/2019 10:04
Surr: 4-BROMOFLUOROBENZENE	98		85-115	%REC	10	11/6/2019 10:04
Surr: DIBROMOFLUOROMETHANE	63	*	84-118	%REC	10	11/6/2019 10:04
Surr: TOLUENE-D8	112		85-115	%REC	10	11/6/2019 10:04
<b>Ion Chromatography</b>						
CHLORIDE	2000		40	MG/L	200	11/6/2019 22:12
SULFATE	710		200	MG/L	200	11/6/2019 22:12
<b>Total Recoverable Metals by 200.8</b>						
CALCIUM	170000		1000	UG/L	10	11/7/2019 18:15
POTASSIUM	6200000		10000	UG/L	100	11/13/2019 13:54
MAGNESIUM	200		100	UG/L	10	11/7/2019 18:15
SODIUM	2600000		1000	UG/L	10	11/7/2019 18:15
<b>Total Dissolved Solids</b>						
TOTAL DISSOLVED SOLIDS	11000		1000	MG/L	1	11/5/2019

**Client:** Great Western Operating Company, LLC

**Date:** 15-Nov-19

**Project:** Postle IC 09-342 HNX

**Work Order:** 1911030

**Sample ID:** 09-342 HNX F

**Lab ID:** 1911030-2

**Legal Location:**

**Matrix:** WATER

**Collection Date:** 11/1/2019 11:15

**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: 11/6/2019	PrepBy: JML
CALCIUM	180000		1000	UG/L	10	11/7/2019 18:18
POTASSIUM	6300000		10000	UG/L	100	11/13/2019 13:57
MAGNESIUM	ND		100	UG/L	10	11/7/2019 18:18
SODIUM	2700000		1000	UG/L	10	11/7/2019 18:18

**Client:** Great Western Operating Company, LLC  
**Project:** Postle IC 09-342 HNX  
**Sample ID:** 09-342 HNX F  
**Legal Location:**  
**Collection Date:** 11/1/2019 11:15

**Date:** 15-Nov-19  
**Work Order:** 1911030  
**Lab ID:** 1911030-2  
**Matrix:** WATER  
**Percent Moisture:**

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

**Radiochemistry:**

- "Report Limit" is the MDC
- 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.
- 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: 11/15/2019 4:54

Client: Great Western Operating Company, LLC

QC BATCH REPORT

Work Order: 1911030

Project: Postle IC 09-342 HNX

Batch ID: **HC191105-61-1**

Instrument ID **FUELS-1**

Method: **SW8015**

**LCS** Sample ID: **HC191105-61** Units: **MG/L** Analysis Date: **11/5/2019 08:19**

Client ID: Run ID: **HC191105-6A** Prep Date: **11/5/2019** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	0.522	0.1	0.5		104	79-118				20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.102		0.1		102	74-129					

**LCSD** Sample ID: **HC191105-61** Units: **MG/L** Analysis Date: **11/5/2019 10:17**

Client ID: Run ID: **HC191105-6A** Prep Date: **11/5/2019** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	0.515	0.1	0.5		103	79-118		0.522	1	20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.101		0.1		101	74-129			1		

**MB** Sample ID: **HC191105-61** Units: **MG/L** Analysis Date: **11/5/2019 08:39**

Client ID: Run ID: **HC191105-6A** Prep Date: **11/5/2019** DF: **1**

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	0.0979				98	74-129					

The following samples were analyzed in this batch:

1911030-1

Client: Great Western Operating Company, LLC  
 Work Order: 1911030  
 Project: Postle IC 09-342 HNX

# QC BATCH REPORT

Batch ID: **HC191106-82-1** Instrument ID **FUELS-1** Method: **SW8015M**

LCS		Sample ID: <b>HC191106-82</b>			Units: <b>MG/L</b>		Analysis Date: <b>11/6/2019 17:15</b>				
Client ID:		Run ID: <b>HC191106-8A</b>			Prep Date: <b>11/6/2019</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	7.31	0.533	8.33		88	36-150				20	
Surr: O-TERPHENYL	1.44		1.67		86	63-126					

LCSD		Sample ID: <b>HC191106-82</b>			Units: <b>MG/L</b>		Analysis Date: <b>11/6/2019 17:36</b>				
Client ID:		Run ID: <b>HC191106-8A</b>			Prep Date: <b>11/6/2019</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	7.18	0.533	8.33		86	36-150		7.31	2	20	
Surr: O-TERPHENYL	1.45		1.67		87	63-126			1		

MB		Sample ID: <b>HC191106-82</b>			Units: <b>MG/L</b>		Analysis Date: <b>11/6/2019 16:53</b>					
Client ID:		Run ID: <b>HC191106-8A</b>			Prep Date: <b>11/6/2019</b>		DF: <b>1</b>					
Analyte	Result	ReportLimit										Qual
Diesel Range Organics	ND	0.53										
Surr: O-TERPHENYL	1.44				86	63-126						

The following samples were analyzed in this batch:

Client: Great Western Operating Company, LLC  
 Work Order: 1911030  
 Project: Postle IC 09-342 HNX

# QC BATCH REPORT

Batch ID: **HC191113-91-1** Instrument ID **MEE-1** Method: **RSK175**

**LCS** Sample ID: **HC191113-91** Units: **UG/L** Analysis Date: **11/13/2019 11:51**  
 Client ID: Run ID: **HC191113-9A** Prep Date: **11/13/2019** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
METHANE	140	1	142		98	80-120				25	
ETHANE	250	2	267		94	80-120				25	
PROPANE	357	1	391		91	80-120				25	

**LCSD** Sample ID: **HC191113-91** Units: **UG/L** Analysis Date: **11/13/2019 12:25**  
 Client ID: Run ID: **HC191113-9A** Prep Date: **11/13/2019** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
METHANE	147	1	142		103	80-120		140	5	25	
ETHANE	263	2	267		99	80-120		250	5	25	
PROPANE	372	1	391		95	80-120		357	4	25	

**MB** Sample ID: **HC191113-91** Units: **UG/L** Analysis Date: **11/13/2019 11:53**  
 Client ID: Run ID: **HC191113-9A** Prep Date: **11/13/2019** DF: **1**

Analyte	Result	ReportLimit	Qual
METHANE	ND	1	
ETHANE	ND	2	
PROPANE	ND	1	

The following samples were analyzed in this batch:

Client: Great Western Operating Company, LLC  
 Work Order: 1911030  
 Project: Postle IC 09-342 HNX

# QC BATCH REPORT

Batch ID: **IP191106-1-6** Instrument ID **ICPMS2** Method: **EPA200.8**

**LCS** Sample ID: **IM191106-1** Units: **UG/L** Analysis Date: **11/7/2019 16:40**  
 Client ID: Run ID: **IM191107-10A8** Prep Date: **11/6/2019** DF: **10**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CALCIUM	9690	1000	10000		97	85-115				20	
MAGNESIUM	9820	100	10000		98	85-115				20	
POTASSIUM	5200	1000	5000		104	85-115				20	
SODIUM	9820	1000	10000		98	85-115				20	

**MB** Sample ID: **FP191104-1** Units: **UG/L** Analysis Date: **11/7/2019 16:34**  
 Client ID: Run ID: **IM191107-10A8** Prep Date: **11/6/2019** DF: **10**

Analyte	Result	ReportLimit	Qual
CALCIUM	ND	1000	
MAGNESIUM	ND	100	
POTASSIUM	ND	1000	
SODIUM	ND	1000	

**MB** Sample ID: **IP191106-1** Units: **UG/L** Analysis Date: **11/7/2019 16:37**  
 Client ID: Run ID: **IM191107-10A8** Prep Date: **11/6/2019** DF: **10**

Analyte	Result	ReportLimit	Qual
CALCIUM	ND	1000	
MAGNESIUM	ND	100	
POTASSIUM	ND	1000	
SODIUM	ND	1000	

The following samples were analyzed in this batch:

1911030-1	1911030-2
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Client: Great Western Operating Company, LLC  
 Work Order: 1911030  
 Project: Postle IC 09-342 HNX

# QC BATCH REPORT

Batch ID: VL191106-4-1 Instrument ID: HPV4 Method: SW8260\_25

LCS		Sample ID: VL191106-4			Units: %REC		Analysis Date: 11/6/2019 08:16				
Client ID:		Run ID: VL191106-4A			Prep Date: 11/6/2019		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	24.4		25		98	85-115					
Surr: DIBROMOFLUOROMETHANE	25.5		25		102	84-118					
Surr: TOLUENE-D8	24.9		25		100	85-115					
BENZENE	9.7	1	10		97	83-117				20	
TOLUENE	9.34	1	10		93	82-113				20	
ETHYLBENZENE	9.62	1	10		96	81-113				20	
M+P-XYLENE	18.7	1	20		94	82-115				20	
O-XYLENE	8.61	1	10		86	81-115				20	

LCSD		Sample ID: VL191106-4			Units: %REC		Analysis Date: 11/6/2019 08:37				
Client ID:		Run ID: VL191106-4A			Prep Date: 11/6/2019		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	24.2		25		97	85-115			1		
Surr: DIBROMOFLUOROMETHANE	25.4		25		102	84-118			1		
Surr: TOLUENE-D8	24.3		25		97	85-115			2		
BENZENE	9.62	1	10		96	83-117		9.7	1	20	
TOLUENE	9.32	1	10		93	82-113		9.34	0	20	
ETHYLBENZENE	9.58	1	10		96	81-113		9.62	0	20	
M+P-XYLENE	18.9	1	20		94	82-115		18.7	1	20	
O-XYLENE	8.67	1	10		87	81-115		8.61	1	20	

MB		Sample ID: VL191106-4			Units: %REC		Analysis Date: 11/6/2019 09:43				
Client ID:		Run ID: VL191106-4A			Prep Date: 11/6/2019		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	25.2				101	85-115					
Surr: DIBROMOFLUOROMETHANE	25.7				103	84-118					
Surr: TOLUENE-D8	24.7				99	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:

Client: Great Western Operating Company, LLC  
 Work Order: 1911030  
 Project: Postle IC 09-342 HNX

# QC BATCH REPORT

Batch ID: **AK191108-1-1** Instrument ID **NONE** Method: **SM2320B**

LCS		Sample ID: <b>AK191108-1</b>			Units: <b>MG/L</b>		Analysis Date: <b>11/8/2019</b>				
Client ID:		Run ID: <b>AK191108-1A1</b>			Prep Date: <b>11/8/2019</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	106	5	100		106	85-115				15	

MB		Sample ID: <b>AK191108-1</b>			Units: <b>MG/L</b>		Analysis Date: <b>11/8/2019</b>				
Client ID:		Run ID: <b>AK191108-1A1</b>			Prep Date: <b>11/8/2019</b>		DF: <b>1</b>				
Analyte	Result	ReportLimit									
BICARBONATE AS CaCO3	ND	5									
CARBONATE AS CaCO3	ND	5									
TOTAL ALKALINITY AS CaCO3	ND	5									

The following samples were analyzed in this batch:

Client: Great Western Operating Company, LLC  
 Work Order: 1911030  
 Project: Postle IC 09-342 HNX

# QC BATCH REPORT

Batch ID: **IC191106-3-1** Instrument ID **IC3** Method: **EPA300.0**

LCS		Sample ID: <b>IC191106-3</b>			Units: <b>MG/L</b>		Analysis Date: <b>11/6/2019 21:17</b>				
Client ID:		Run ID: <b>IC191106B-1a1</b>			Prep Date: <b>11/6/2019</b>		DF: <b>1</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CHLORIDE	9.87	0.2	10		99	90-110				15	
SULFATE	49.5	1	50		99	90-110				15	

LCSD		Sample ID: <b>IC191106-3</b>			Units: <b>MG/L</b>		Analysis Date: <b>11/7/2019 00:00</b>				
Client ID:		Run ID: <b>IC191106B-1a1</b>			Prep Date: <b>11/6/2019</b>		DF: <b>1</b>				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CHLORIDE	9.9	0.2	10		99	90-110		9.87	0	15	
SULFATE	49.6	1	50		99	90-110		49.5	0	15	

MB		Sample ID: <b>IC191106-3</b>			Units: <b>MG/L</b>		Analysis Date: <b>11/6/2019 18:52</b>					
Client ID:		Run ID: <b>IC191106B-1a1</b>			Prep Date: <b>11/6/2019</b>		DF: <b>1</b>					
Analyte	Result	ReportLimit										Qual
CHLORIDE	ND	0.2										
SULFATE	ND	1										

The following samples were analyzed in this batch:

**Client:** Great Western Operating Company, LLC  
**Work Order:** 1911030  
**Project:** Postle IC 09-342 HNX

# QC BATCH REPORT

Batch ID: **TD191104-1-1** Instrument ID **Balance** Method: **SM2540C**

LCS		Sample ID: <b>TD191104-1</b>			Units: <b>MG/L</b>		Analysis Date: <b>11/5/2019</b>				
Client ID:		Run ID: <b>TD191104-1A1</b>			Prep Date: <b>11/4/2019</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	374	20	400		94	85-115				14	

MB		Sample ID: <b>TD191104-1</b>			Units: <b>MG/L</b>		Analysis Date: <b>11/5/2019</b>				
Client ID:		Run ID: <b>TD191104-1A1</b>			Prep Date: <b>11/4/2019</b>		DF: <b>1</b>				
Analyte	Result	ReportLimit									Qual
TOTAL DISSOLVED SOLIDS	ND	20									

The following samples were analyzed in this batch:

1911030-1