



Tuesday, June 21, 2022

Max Trehus
Great Western Operating Company, LLC
4093 Specialty Place, Unit B
Longmont, CO 80504

Re: ALS Workorder: 2206024
Project Name: Ivey LL 02-036HC BH
Project Number:

Dear Mr. Trehus:

Two water samples were received from Great Western Operating Company, LLC, on 6/2/2022. 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. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

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

Sincerely,

For
ALS Environmental
Katie M. OBrien
Project Manager

	<h1>Accreditations</h1>	Effective June 7, 2022
	ALS Environmental – Fort Collins	

Accreditations: 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
Arizona	AZ0828
California (CA)	2926
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
Oklahoma	1301
Louisiana	197538
Maryland (MD)	285
PJLA (DoD ELAP/ISO 170250)	95377
PJLA (DOE-AP/ISO 17025)	95377
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO010992018-1
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	TN02976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280
Virginia	460305

40 CFR Part 136: All analyses for Clean Water Act samples are analyzed using the 40 CFR Part 136 specified method and include all the QC requirements.



2206024

GC/MS Volatiles:

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

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

Surrogate	Sample	Direction
O-terphenyl	-1	High

The high surrogate recovery is due to matrix interferences. No further action was taken.

All remaining acceptance criteria were met.



Metals:

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 the current revision of SOP 834.

Sample 2206024-2 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.

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Sample Number(s) Cross-Reference Table

OrderNum: 2206024

Client Name: PDC Energy

Client Project Name: Ivey LL 02-036HC BH

Client Project Number:

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
02-036HC A	2206024-1		WATER	01-Jun-22	13:50
02-036HC B	2206024-2		WATER	01-Jun-22	13:50

PROJECT NAME Ivey LC 02-036HC DH	SAMPLER Max Trehus	DATE	PAGE	of					
PROJECT No.	SITE ID	TURNAROUND	DISPOSAL	By Lab or Return to Client					
COMPANY NAME PDC	EDD FORMAT								
SEND REPORT TO Max Trehus	PURCHASE ORDER								
ADDRESS Jennifer Hakkarinen	BILL TO COMPANY								
CITY/STATE/ZIP	INVOICE ATTN TO								
PHONE	ADDRESS								
FAX	CITY/STATE/ZIP								
E-MAIL	PHONE								
	FAX								
	E-MAIL								
Lab ID	Field ID	Matrix	Sample Date	Sample Time	# Bottles	Pres.	QC		
1	02-036HC A	W	6/1/22	13:50	3	-	X		
1	02-036HC A				3	1	X		
1	02-036HC A				3	1	X		
1	02-036HC A				3	1	X		
2	02-036HC B				1	-		X	
1	02-036HC A				1	-		X	

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

For metals or anions, please detail analytes below.

Comments:
 Facility FD. 44A012
 490

RELINQUISHED BY	SIGNATURE	PRINTED NAME	DATE	TIME
RECEIVED BY	<i>Max Trehus</i>	Max Trehus	6/2/22	12:35
RELINQUISHED BY	<i>Chaire Thomas</i>	Chaire Thomas	6/2/22	12/15
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035



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CONDITION OF SAMPLE UPON RECEIPT FORM

Client: PDC Energy Workorder No: 2206024
 Project Manager: KMO Initials: CXT Date: 06/02/2022

		N/A	YES	NO
1.	Are airbills / shipping documents present and/or removable?	X		
	Tracking number:			
2.	Are custody seals on shipping containers intact?	X		
3.	Are custody seals on sample containers intact?	X		
4.	Is there a COC (chain-of-custody) present?		X	
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		X	
6.	Are short-hold samples present?			X
7.	Are all samples within holding times for the requested analyses?		X	
8.	Were all sample containers received intact? (not broken or leaking)		X	
9.	Is there sufficient sample for the requested analyses?		X	
10.	Are samples in proper containers for requested analyses? (form 250, <i>Sample Handling Guidelines</i>)		X	
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)		X	
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)		X	
13.	Were the samples shipped on ice?		X	
14.	Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #6	RAD ONLY X	
Cooler #: <u>1</u> Temperature (°C): <u>4.4</u> # of custody seals on cooler: <u>0</u> External µR/hr reading: <u>NA</u> Background µR/hr reading: <u>11</u> Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? <u>NA</u> (If no, see Form 008.)				

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

Were unpreserved bottles pH checked? NA All client bottle ID's vs ALS lab ID's double-checked by CT

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

Project Manager Signature / Date: Margaret G. O'Brien 6/03/22

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SAMPLE SUMMARY REPORT

Client: PDC Energy
 Project: Ivey LL 02-036HC BH
 Sample ID: 02-036HC A
 Legal Location:
 Collection Date: 6/1/2022 13:50

Date: 21-Jun-22
 Work Order: 2206024
 Lab ID: 2206024-1
 Matrix: WATER
 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Alkalinity as Calcium Carbonate			SM2320B		Prep Date: 6/8/2022	PrepBy: KRL
BICARBONATE AS CaCO3	520		20	MG/L	1	6/9/2022
CARBONATE AS CaCO3	63		20	MG/L	1	6/9/2022
TOTAL ALKALINITY AS CaCO3	590		20	MG/L	1	6/9/2022
Diesel Range Organics			SW8015M		Prep Date: 6/6/2022	PrepBy: JRS
Diesel Range Organics	280		11	MG/L	10	6/7/2022 11:53
Surr: O-TERPHENYL	129	*	69-120	%REC	10	6/7/2022 11:53
Dissolved Gasses			RSK175		Prep Date: 6/15/2022	PrepBy: JRS
METHANE	12000		100	UG/L	50	6/16/2022 11:12
ETHANE	56000		200	UG/L	50	6/16/2022 11:12
PROPANE	7900		300	UG/L	50	6/16/2022 11:12
Gasoline Range Organics			SW8015		Prep Date: 6/8/2022	PrepBy: JRS
GASOLINE RANGE ORGANICS	45		5	MG/L	50	6/8/2022 18:12
Surr: 2,3,4-TRIFLUOROTOLUENE	100		80-120	%REC	50	6/8/2022 18:12
GC/MS Volatiles			SW8260_25		Prep Date: 6/13/2022	PrepBy: TWK
BENZENE	3100		50	UG/L	50	6/13/2022 18:49
TOLUENE	1900		50	UG/L	50	6/13/2022 18:49
ETHYLBENZENE	410		50	UG/L	50	6/13/2022 18:49
M+P-XYLENE	1100		50	UG/L	50	6/13/2022 18:49
O-XYLENE	490		50	UG/L	50	6/13/2022 18:49
TOTAL XYLENES	1600		1	UG/L	1	6/13/2022 18:49
Surr: 4-BROMOFLUOROBENZENE	101		80-120	%REC	100	6/14/2022 00:00
Surr: 4-BROMOFLUOROBENZENE	102		80-120	%REC	50	6/13/2022 18:49
Surr: DIBROMOFLUOROMETHANE	103		80-120	%REC	50	6/13/2022 18:49
Surr: DIBROMOFLUOROMETHANE	101		80-120	%REC	100	6/14/2022 00:00
Surr: TOLUENE-D8	97		80-120	%REC	50	6/13/2022 18:49
Surr: TOLUENE-D8	101		80-120	%REC	100	6/14/2022 00:00
Ion Chromatography			EPA300.0		Prep Date: 6/8/2022	PrepBy: AOW
CHLORIDE	680		10	MG/L	50	6/8/2022 11:55
SULFATE	ND		50	MG/L	50	6/8/2022 11:55
Total Recoverable Metals by 200.7			EPA200.7		Prep Date: 6/8/2022	PrepBy: ETC
CALCIUM	42		10	MG/L	1	6/9/2022 14:49
POTASSIUM	22		10	MG/L	1	6/9/2022 14:49
MAGNESIUM	ND		10	MG/L	1	6/9/2022 14:49
SODIUM	820		10	MG/L	1	6/9/2022 14:49
Total Dissolved Solids			SM2540C		Prep Date: 6/8/2022	PrepBy: AOW
TOTAL DISSOLVED SOLIDS	3900		80	MG/L	1	6/10/2022

Client: PDC Energy
Project: Ivey LL 02-036HC BH
Sample ID: 02-036HC B
Legal Location:
Collection Date: 6/1/2022 13:50

Date: 21-Jun-22
Work Order: 2206024
Lab ID: 2206024-2
Matrix: WATER
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Dissolved Metals by 200.7			EPA200.7		Prep Date: 6/8/2022	PrepBy: ETC
CALCIUM	41		10	MG/L	1	6/9/2022 14:50
POTASSIUM	24		10	MG/L	1	6/9/2022 14:50
MAGNESIUM	ND		10	MG/L	1	6/9/2022 14:50
SODIUM	830		10	MG/L	1	6/9/2022 14:50

Client: PDC Energy
Project: Ivey LL 02-036HC BH
Sample ID: 02-036HC B
Legal Location:
Collection Date: 6/1/2022 13:50

Date: 21-Jun-22
Work Order: 2206024
Lab ID: 2206024-2
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

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Date: 6/21/2022 8:15:5

Client: PDC Energy
 Work Order: 2206024
 Project: Ivey LL 02-036HC BH

QC BATCH REPORT

Batch ID: **HC220606-82-1** Instrument ID: **FUELS-1** Method: **SW8015M**

LCS Sample ID: **HC220606-82** Units: **MG/L** Analysis Date: **6/6/2022 17:45**
 Client ID: Run ID: **HC220607-81A** Prep Date: **6/6/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Diesel Range Organics	8.73	1.07	8.33		105	53-120				20	
Surr: O-TERPHENYL	1.64		1.67		98	69-120					

LCSD Sample ID: **HC220606-82** Units: **MG/L** Analysis Date: **6/6/2022 18:06**
 Client ID: Run ID: **HC220607-81A** Prep Date: **6/6/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Diesel Range Organics	9.17	1.07	8.33		110	53-120		8.73	5	20	
Surr: O-TERPHENYL	1.63		1.67		98	69-120			1		

MB Sample ID: **HC220606-82** Units: **MG/L** Analysis Date: **6/6/2022 17:23**
 Client ID: Run ID: **HC220607-81A** Prep Date: **6/6/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Diesel Range Organics	ND	1.1									
Surr: O-TERPHENYL	1.61				97	69-120					

The following samples were analyzed in this batch:

Client: PDC Energy
 Work Order: 2206024
 Project: Ivey LL 02-036HC BH

QC BATCH REPORT

Batch ID: **HC220608-61-1** Instrument ID: **FUELS-1** Method: **SW8015**

LCS		Sample ID: HC220608-61			Units: MG/L		Analysis Date: 6/8/2022 15:36				
Client ID:		Run ID: HC220608-61A			Prep Date: 6/8/2022		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	0.445	0.1	0.5		89	80-120				20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.0968		0.1		97	80-120					

LCSD		Sample ID: HC220608-61			Units: MG/L		Analysis Date: 6/8/2022 15:51				
Client ID:		Run ID: HC220608-61A			Prep Date: 6/8/2022		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	0.465	0.1	0.5		93	80-120		0.445	4	20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.0964		0.1		96	80-120			0		

MB		Sample ID: HC220608-61			Units: MG/L		Analysis Date: 6/8/2022 16:07					
Client ID:		Run ID: HC220608-61A			Prep Date: 6/8/2022		DF: 1					
Analyte	Result	ReportLimit										Qual
GASOLINE RANGE ORGANICS	ND	0.1										
Surr: 2,3,4-TRIFLUOROTOLUENE	0.097		97	80-120								

The following samples were analyzed in this batch:

Client: PDC Energy
 Work Order: 2206024
 Project: Ivey LL 02-036HC BH

QC BATCH REPORT

Batch ID: **HC220615-61-1** Instrument ID: **MEE-1** Method: **RSK175**

LCS Sample ID: **HC220615-61** Units: **UG/L** Analysis Date: **6/15/2022 16:25**
 Client ID: Run ID: **HC220615-91A** Prep Date: **6/15/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
METHANE	155	2	142		109	76-125				25	
ETHANE	291	4	267		109	70-120				25	
PROPANE	426	6	391		109	72-120				25	

LCSD Sample ID: **HC220615-61** Units: **UG/L** Analysis Date: **6/15/2022 17:04**
 Client ID: Run ID: **HC220615-91A** Prep Date: **6/15/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
METHANE	155	2	142		109	76-125		155	0	25	
ETHANE	292	4	267		109	70-120		291	0	25	
PROPANE	423	6	391		108	72-120		426	1	25	

MB Sample ID: **HC220615-61** Units: **UG/L** Analysis Date: **6/15/2022 16:29**
 Client ID: Run ID: **HC220615-91A** Prep Date: **6/15/2022** DF: **1**

Analyte	Result	ReportLimit	Qual
METHANE	ND	2	
ETHANE	ND	4	
PROPANE	ND	6	

The following samples were analyzed in this batch:

Client: PDC Energy
 Work Order: 2206024
 Project: Ivey LL 02-036HC BH

QC BATCH REPORT

Batch ID: **IP220608-7-2** Instrument ID: **ICP5900** Method: **EPA200.7**

LCS Sample ID: **IP220608-7** Units: **MG/L** Analysis Date: **6/9/2022 14:38**
 Client ID: Run ID: **IT220609-1A3** Prep Date: **6/8/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CALCIUM	38.8	1	40		97	85-115				20	
MAGNESIUM	38.5	1	40		96	85-115				20	
POTASSIUM	39.5	1	40		99	85-115				20	
SODIUM	39	1	40		98	85-115				20	

LCSD Sample ID: **IP220608-7** Units: **MG/L** Analysis Date: **6/9/2022 14:39**
 Client ID: Run ID: **IT220609-1A3** Prep Date: **6/8/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CALCIUM	39.1	1	40		98	85-115		38.8	1	20	
MAGNESIUM	38.6	1	40		97	85-115		38.5	0	20	
POTASSIUM	39.7	1	40		99	85-115		39.5	0	20	
SODIUM	39.4	1	40		98	85-115		39	1	20	

MB Sample ID: **IP220608-7** Units: **MG/L** Analysis Date: **6/9/2022 14:34**
 Client ID: Run ID: **IT220609-1A3** Prep Date: **6/8/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CALCIUM	ND	1									
MAGNESIUM	ND	1									
POTASSIUM	ND	1									
SODIUM	ND	1									

The following samples were analyzed in this batch:

Client: PDC Energy
 Work Order: 2206024
 Project: Ivey LL 02-036HC BH

QC BATCH REPORT

Batch ID: **IP220608-7-3** Instrument ID: **ICP5900** Method: **EPA200.7**

LCS Sample ID: **IP220608-7** Units: **MG/L** Analysis Date: **6/9/2022 14:38**
 Client ID: Run ID: **IT220609-1A3** Prep Date: **6/8/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CALCIUM	38.8	1	40		97	85-115				20	
MAGNESIUM	38.5	1	40		96	85-115				20	
POTASSIUM	39.5	1	40		99	85-115				20	
SODIUM	39	1	40		98	85-115				20	

LCSD Sample ID: **IP220608-7** Units: **MG/L** Analysis Date: **6/9/2022 14:39**
 Client ID: Run ID: **IT220609-1A3** Prep Date: **6/8/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CALCIUM	39.1	1	40		98	85-115		38.8	1	20	
MAGNESIUM	38.6	1	40		97	85-115		38.5	0	20	
POTASSIUM	39.7	1	40		99	85-115		39.5	0	20	
SODIUM	39.4	1	40		98	85-115		39	1	20	

MB Sample ID: **FP220606-7** Units: **MG/L** Analysis Date: **6/9/2022 14:35**
 Client ID: Run ID: **IT220609-1A3** Prep Date: **6/8/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CALCIUM	ND	1									
MAGNESIUM	ND	1									
POTASSIUM	ND	1									
SODIUM	ND	1									

The following samples were analyzed in this batch:

Client: PDC Energy
 Work Order: 2206024
 Project: Ivey LL 02-036HC BH

QC BATCH REPORT

Batch ID: VL220613-3-2 Instrument ID: HPV3 Method: SW8260_25

LCS		Sample ID: VL220613-3			Units: %REC		Analysis Date: 6/13/2022 16:55				
Client ID:		Run ID: VL220613-3A			Prep Date: 6/13/2022		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	25.5		25		102	80-120					
Surr: DIBROMOFLUOROMETHANE	25.3		25		101	80-120					
Surr: TOLUENE-D8	25.2		25		101	80-120					
BENZENE	10.1	1	10		101	80-120				20	
TOLUENE	10.2	1	10		102	80-120				20	
ETHYLBENZENE	10.1	1	10		101	80-120				20	
M+P-XYLENE	20.7	1	20		104	80-120				20	
O-XYLENE	10	1	10		100	80-120				20	

LCSD		Sample ID: VL220613-3			Units: %REC		Analysis Date: 6/13/2022 17:18				
Client ID:		Run ID: VL220613-3A			Prep Date: 6/13/2022		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	25		25		100	80-120			2		
Surr: DIBROMOFLUOROMETHANE	25.8		25		103	80-120			2		
Surr: TOLUENE-D8	25.3		25		101	80-120			0		
BENZENE	9.91	1	10		99	80-120		10.1	2	20	
TOLUENE	9.93	1	10		99	80-120		10.2	2	20	
ETHYLBENZENE	9.86	1	10		99	80-120		10.1	3	20	
M+P-XYLENE	20.1	1	20		101	80-120		20.7	3	20	
O-XYLENE	9.99	1	10		100	80-120		10	0	20	

MB		Sample ID: VL220613-3			Units: %REC		Analysis Date: 6/13/2022 18:07				
Client ID:		Run ID: VL220613-3A			Prep Date: 6/13/2022		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	24.9				99	80-120					
Surr: DIBROMOFLUOROMETHANE	24.9				100	80-120					
Surr: TOLUENE-D8	25.2				101	80-120					
BENZENE	ND	1									
TOLUENE	ND	1									
ETHYLBENZENE	ND	1									
M+P-XYLENE	ND	1									
O-XYLENE	ND	1									
TOTAL XYLENES	ND	1									

Client: PDC Energy
Work Order: 2206024
Project: Ivey LL 02-036HC BH

QC BATCH REPORT

Batch ID: **VL220613-3-2** Instrument ID: **HPV3** Method: **SW8260_25**

MB Sample ID: **VL220613-3M** Units: **%REC** Analysis Date: **6/13/2022 20:26**
Client ID: Run ID: **VL220613-3A** Prep Date: **6/13/2022** DF: **50**

Analyte	Result	ReportLimit		Qual
Surr: 4-BROMOFLUOROBENZENE	1280		102	80-120
Surr: DIBROMOFLUOROMETHANE	1220		98	80-120
Surr: TOLUENE-D8	1200		96	80-120
BENZENE	ND	50		
TOLUENE	ND	50		
ETHYLBENZENE	ND	50		
M+P-XYLENE	ND	50		
O-XYLENE	ND	50		
TOTAL XYLENES	ND	1		

The following samples were analyzed in this batch:

2206024-1

Client: PDC Energy
 Work Order: 2206024
 Project: Ivey LL 02-036HC BH

QC BATCH REPORT

Batch ID: **AK220609-1-1** Instrument ID: **NONE** Method: **SM2320B**

LCS		Sample ID: AK220609-1			Units: MG/L		Analysis Date: 6/9/2022				
Client ID:		Run ID: AK220609-1A1			Prep Date: 6/8/2022		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
TOTAL ALKALINITY AS CaCO3	102	5	100		102	85-115				15	

MB		Sample ID: AK220609-1			Units: MG/L		Analysis Date: 6/9/2022				
Client ID:		Run ID: AK220609-1A1			Prep Date: 6/8/2022		DF: 1				
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: PDC Energy
 Work Order: 2206024
 Project: Ivey LL 02-036HC BH

QC BATCH REPORT

Batch ID: **IC220608-1-1** Instrument ID: **IC3** Method: **EPA300.0**

LCS		Sample ID: IC220608-1			Units: MG/L		Analysis Date: 6/8/2022 11:05				
Client ID:		Run ID: IC220608-1A1			Prep Date: 6/8/2022		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CHLORIDE	9.71	0.2	10		97	90-110				15	
SULFATE	47.9	1	50		96	90-110				15	

LCSD		Sample ID: IC220608-1			Units: MG/L		Analysis Date: 6/8/2022 12:19				
Client ID:		Run ID: IC220608-1A1			Prep Date: 6/8/2022		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CHLORIDE	10.6	0.2	10		106	90-110		9.71	9	15	
SULFATE	52.6	1	50		105	90-110		47.9	9	15	

MB		Sample ID: IC220608-1			Units: MG/L		Analysis Date: 6/8/2022 11:13					
Client ID:		Run ID: IC220608-1A1			Prep Date: 6/8/2022		DF: 1					
Analyte	Result	ReportLimit										Qual
CHLORIDE	ND	0.2										
SULFATE	ND	1										

The following samples were analyzed in this batch:

Client: PDC Energy
Work Order: 2206024
Project: Ivey LL 02-036HC BH

QC BATCH REPORT

Batch ID: **TD220608-1-1** Instrument ID: **Balance** Method: **SM2540C**

LCS	Sample ID: TD220608-1						Units: MG/L	Analysis Date: 6/10/2022			
Client ID:		Run ID: TD220610-1A1			Prep Date: 6/8/2022			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
TOTAL DISSOLVED SOLIDS	416	20	400		104	85-115				14	

LCSD	Sample ID: TD220608-1						Units: MG/L	Analysis Date: 6/10/2022			
Client ID:		Run ID: TD220610-1A1			Prep Date: 6/8/2022			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
TOTAL DISSOLVED SOLIDS	423	20	400		106	85-115		416	2	14	

MB	Sample ID: TD220608-1						Units: MG/L	Analysis Date: 6/10/2022				
Client ID:		Run ID: TD220610-1A1			Prep Date: 6/8/2022			DF: 1				
Analyte	Result	ReportLimit										Qual
TOTAL DISSOLVED SOLIDS	ND	20										

The following samples were analyzed in this batch: