



Thursday, May 26, 2022

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

Re: ALS Workorder: 2205279  
Project Name: Raindance FD 20-399HCBH  
Project Number:

Dear Mr. Trehus:

Two water samples were received from Great Western Operating Company, LLC, on 5/13/2022. 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,

*Margaret G. O'Brien*

For

ALS Environmental  
Katie M. OBrien  
Project Manager

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
Maryland (MD)	285
Missouri (MO)	175
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.



## 2205279

### 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 likely due to the high 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 Trace ICP followed method 200.7 and the current revision of SOP 834.

Sample 2205279-2 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:** 2205279

**Client Name:** PDC Energy

**Client Project Name:** Raindance FD 20-399HCBH

**Client Project Number:**

**Client PO Number:**

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Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
20-399HC A	2205279-1		WATER	12-May-22	17:30
20-399HC B	2205279-2		WATER	12-May-22	17:30



## Chain-of-Custody

Form 202r8

2205279

**WORKORDER #**

(ALS)		PROJECT NAME		PROJECT No.		COMPANY NAME		SEND REPORT TO		ADDRESS		CITY / STATE / ZIP		PHONE		FAX		E-MAIL		SAMPLER		Max Trehus		DATE		PAGE		By Lab or		Return to Client		
		PROJECT NAME		PROJECT No.		COMPANY NAME		SEND REPORT TO		ADDRESS		CITY / STATE / ZIP		PHONE		FAX		E-MAIL		SAMPLER		Max Trehus		TURNAROUND		DISPOSAL						
		Raindance FD 20-399 HC B A				PTDC														SITE ID		Max Trehus										
																				EDD FORMAT												
																				PURCHASE ORDER												
																				BILL TO COMPANY												
																				INVOICE ATTN TO												
																				ADDRESS												
																				CITY / STATE / ZIP												
																				PHONE												
																				FAX												
																				E-MAIL												
																				Matrix		Sample Date		Sample Time		# Bottles		Pres.		QC		
																				W		5/12/12		17:30		3		-		X		
																				1		1		1		3		-		X		
																				1		1		1		3		-		X		
																				1		1		1		3		-		X		
																				1		1		1		3		-		X		
																				1		1		1		3		-		X		
																				1		1		1		3		-		X		
																				1		1		1		3		-		X		
																				1		1		1		3		-		X		
																				1		1		1		3		-		X		
																				1		1		1		3		-		X		
																				1		1		1								

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.**

Facility ID: 451715 5.9°	Comments:		QC PACKAGE (check below)	
			LEVEL II (Standard QC)	
			LEVEL III (Std QC + forms)	
			LEVEL IV (Std QC + forms + raw data)	
Preservative Key: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaHSO4 7-Other 8-4 degrees C 9-5035				



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

Client: PDC Workorder No: 2205279  
 Project Manager: \_\_\_\_\_ Initials: CXT Date: 5/13/2022

	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*: <u>#5</u>			
COOLER DATA			
Cooler #: <u>1</u>			
Temperature (°C): <u>5.9</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>			

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

Sample 1 bottle 14 received at pH 12; added .75ml of concentrated hno3 lot #267725; final pH 12

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: Taylor Ma 5/16/22

## ALS -- Fort Collins

## SAMPLE SUMMARY REPORT

Client: PDC Energy  
 Project: Raindance FD 20-399HCBH  
 Sample ID: 20-399HC A  
 Legal Location:  
 Collection Date: 5/12/2022 17:30

Date: 26-May-22  
 Work Order: 2205279  
 Lab ID: 2205279-1  
 Matrix: WATER  
 Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Alkalinity as Calcium Carbonate</b>		<b>SM2320B</b>			Prep Date: 5/18/2022	PrepBy:KRL
BICARBONATE AS CaCO3	ND		20	MG/L	1	5/19/2022
CARBONATE AS CaCO3	1200		20	MG/L	1	5/19/2022
TOTAL ALKALINITY AS CaCO3	10000		20	MG/L	1	5/19/2022
<b>Diesel Range Organics</b>		<b>SW8015M</b>			Prep Date: 5/20/2022	PrepBy:JRS
Diesel Range Organics	40		1	MG/L	1	5/23/2022 19:31
Surr: O-TERPHENYL	106		69-120	%REC	1	5/23/2022 19:31
<b>Dissolved Gasses</b>		<b>RSK175</b>			Prep Date: 5/20/2022	PrepBy:JRS
METHANE	490		1	UG/L	1	5/23/2022 13:48
ETHANE	300		2	UG/L	1	5/23/2022 13:48
PROPANE	200		1	UG/L	1	5/23/2022 13:48
<b>Gasoline Range Organics</b>		<b>SW8015</b>			Prep Date: 5/20/2022	PrepBy:JRS
GASOLINE RANGE ORGANICS	3.2		0.1	MG/L	1	5/23/2022 16:29
Surr: 2,3,4-TRIFLUOROTOLUENE	105		80-120	%REC	1	5/23/2022 16:29
<b>GC/MS Volatiles</b>		<b>SW8260_25</b>			Prep Date: 5/19/2022	PrepBy:TWK
BENZENE	53		10	UG/L	10	5/19/2022 17:33
TOLUENE	140		10	UG/L	10	5/19/2022 17:33
ETHYLBENZENE	60		10	UG/L	10	5/19/2022 17:33
M+P-XYLENE	180		10	UG/L	10	5/19/2022 17:33
O-XYLENE	110		10	UG/L	10	5/19/2022 17:33
TOTAL XYLENES	280		1	UG/L	1	5/19/2022 17:33
Surr: 4-BROMOFLUOROBENZENE	99		80-120	%REC	10	5/19/2022 17:33
Surr: DIBROMOFLUOROMETHANE	35	*	80-120	%REC	10	5/19/2022 17:33
Surr: TOLUENE-D8	98		80-120	%REC	10	5/19/2022 17:33
<b>Ion Chromatography</b>		<b>EPA300.0</b>			Prep Date: 5/17/2022	PrepBy:AOW
CHLORIDE	650		100	MG/L	500	5/17/2022 13:49
SULFATE	760		500	MG/L	500	5/17/2022 13:49
<b>Total Recoverable Metals by 200.7</b>		<b>EPA200.7</b>			Prep Date: 5/18/2022	PrepBy:ETC
CALCIUM	110		10	MG/L	10	5/23/2022 13:58
POTASSIUM	5400		100	MG/L	100	5/23/2022 15:19
MAGNESIUM	ND		10	MG/L	10	5/23/2022 13:58
SODIUM	1900		10	MG/L	10	5/23/2022 13:58
<b>Total Dissolved Solids</b>		<b>SM2540C</b>			Prep Date: 5/17/2022	PrepBy:KRL
TOTAL DISSOLVED SOLIDS	9300		1000	MG/L	1	5/19/2022



Client: PDC Energy

Date: 26-May-22

Project: Raindance FD 20-399HCBH

Work Order: 2205279

Sample ID: 20-399HC B

Lab ID: 2205279-2

Legal Location:

Matrix: WATER

Collection Date: 5/12/2022 17:30

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
<b>Dissolved Metals by 200.7</b>			<b>EPA200.7</b>		Prep Date: <b>5/18/2022</b>	PrepBy: <b>ETC</b>
<b>CALCIUM</b>	<b>100</b>		<b>10</b>	<b>MG/L</b>	10	5/23/2022 13:59
<b>POTASSIUM</b>	<b>4900</b>		<b>100</b>	<b>MG/L</b>	100	5/23/2022 15:20
<b>MAGNESIUM</b>	<b>ND</b>		<b>10</b>	<b>MG/L</b>	10	5/23/2022 13:59
<b>SODIUM</b>	<b>1900</b>		<b>10</b>	<b>MG/L</b>	10	5/23/2022 13:59

**Client:** PDC Energy  
**Project:** Raindance FD 20-399HCBH  
**Sample ID:** 20-399HC B  
**Legal Location:**  
**Collection Date:** 5/12/2022 17:30

**Date:** 26-May-22  
**Work Order:** 2205279  
**Lab ID:** 2205279-2  
**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

Client: PDC Energy

Work Order: 2205279

Project: Raindance FD 20-399HCBH

Date: 5/26/2022 2:31:1

## QC BATCH REPORT

Batch ID: HC220520-61-1 Instrument ID: FUELS-1 Method: SW8015

LCS Sample ID: HC220520-61 Units: MG/L Analysis Date: 5/23/2022 14:38

Client ID: Run ID: HC220526-61A Prep Date: 5/20/2022 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	0.458	0.1	0.5		92	80-120				20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.0983		0.1		98	80-120					

LCSD Sample ID: HC220520-61 Units: MG/L Analysis Date: 5/23/2022 17:47

Client ID: Run ID: HC220526-61A Prep Date: 5/20/2022 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	0.464	0.1	0.5		93	80-120		0.458	1	20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.107		0.1		107	80-120			8		

MB Sample ID: HC220520-61 Units: MG/L Analysis Date: 5/23/2022 14:54

Client ID: Run ID: HC220526-61A Prep Date: 5/20/2022 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	ND	0.1									
Surr: 2,3,4-TRIFLUOROTOLUENE	0.106				106	80-120					

The following samples were analyzed in this batch:

2205279-1

**Client:** PDC Energy  
**Work Order:** 2205279  
**Project:** Raindance FD 20-399HCBH

## QC BATCH REPORT

Batch ID: **HC220520-81-1** Instrument ID: **FUELS-1** Method: **SW8015M**

LCS	Sample ID: <b>HC220520-81</b>				Units: <b>MG/L</b>		Analysis Date: <b>5/23/2022 16:39</b>				
Client ID:	Run ID: <b>HC220523-81A</b>				Prep Date: <b>5/20/2022</b>			DF: <b>1</b>			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Diesel Range Organics	9.07	1.07	8.33		109	53-120				20	
Surr: O-TERPHENYL	1.65		1.67		99	69-120					

LCSD		Sample ID: <b>HC220520-81</b>				Units: <b>MG/L</b>		Analysis Date: <b>5/23/2022 17:01</b>			
Client ID:		Run ID: <b>HC220523-81A</b>				Prep Date: <b>5/20/2022</b>			DF: <b>1</b>		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
Diesel Range Organics	9	1.07	8.33		108	53-120		9.07	1	20	
Surr: O-TERPHENYL	1.63		1.67		98	69-120			1		

MB		Sample ID: <b>HC220520-81</b>		Units: <b>MG/L</b>		Analysis Date: <b>5/23/2022 15:57</b>	
Client ID:		Run ID: <b>HC220523-81A</b>		Prep Date: <b>5/20/2022</b>		DF: <b>1</b>	
Analyte		Result	ReportLimit	Qual			
Diesel Range Organics		ND	1.1				
Surr: O-TERPHENYL		1.63		98	69-120		

The following samples were analyzed in this batch:

2205279-1

**Client:** PDC Energy  
**Work Order:** 2205279  
**Project:** Raindance FD 20-399HCBH

## QC BATCH REPORT

Batch ID: **HC220520-91-1** Instrument ID: **MEE-1** Method: **RSK175**

<b>LCS</b>		Sample ID: <b>HC220520-91</b>				Units: <b>UG/L</b>		Analysis Date: <b>5/23/2022 12:21</b>				
Client ID:		Run ID: <b>HC220520-91A</b>				Prep Date: <b>5/20/2022</b>				DF: <b>1</b>		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual	
METHANE	154	1	142		108	76-125				25		
ETHANE	296	2	267		111	70-120				25		
PROPANE	440	1	391		112	72-120				25		

<b>LCSD</b>		Sample ID: <b>HC220520-91</b>				Units: <b>UG/L</b>		Analysis Date: <b>5/23/2022 13:38</b>				
Client ID:		Run ID: <b>HC220520-91A</b>				Prep Date: <b>5/20/2022</b>				DF: <b>1</b>		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual	
METHANE	160	1	142		112	76-125		154	4	25		
ETHANE	303	2	267		114	70-120		296	2	25		
PROPANE	448	1	391		114	72-120		440	2	25		

MB		Sample ID: <b>HC220520-91</b>		Units: <b>UG/L</b>		Analysis Date: <b>5/23/2022 12:26</b>	
Client ID:		Run ID: <b>HC220520-91A</b>		Prep Date: <b>5/20/2022</b>		DF: <b>1</b>	
Analyte		Result	ReportLimit	Qual			
METHANE		ND	1				
ETHANE		ND	2				
PROPANE		ND	1				

The following samples were analyzed in this batch:

2205279-1

Client: PDC Energy  
Work Order: 2205279  
Project: Raindance FD 20-399HCBH

## QC BATCH REPORT

Batch ID: **IP220518-2-3** Instrument ID: **ICP5900** Method: **EPA200.7**

**LCS** Sample ID: **IP220518-2** Units: **MG/L** Analysis Date: **5/23/2022 13:49**

Client ID: Run ID: **IT220523-1A3** Prep Date: **5/18/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CALCIUM	39.2	1	40		98	85-115				20	
MAGNESIUM	38.2	1	40		95	85-115				20	
POTASSIUM	39.7	1	40		99	85-115				20	
SODIUM	40.3	1	40		101	85-115				20	

**LCSD** Sample ID: **IP220518-2** Units: **MG/L** Analysis Date: **5/23/2022 13:50**

Client ID: Run ID: **IT220523-1A3** Prep Date: **5/18/2022** 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		39.2	0	20	
MAGNESIUM	38.2	1	40		95	85-115		38.2	0	20	
POTASSIUM	39.9	1	40		100	85-115		39.7	0	20	
SODIUM	40.6	1	40		101	85-115		40.3	1	20	

**MB** Sample ID: **IP220518-2** Units: **MG/L** Analysis Date: **5/23/2022 15:11**

Client ID: Run ID: **IT220523-1A3** Prep Date: **5/18/2022** DF: **1**

Analyte	Result	ReportLimit	Qual
CALCIUM	ND	1	
MAGNESIUM	ND	1	
POTASSIUM	ND	1	
SODIUM	ND	1	

The following samples were analyzed in this batch:

2205279-1

**Client:** PDC Energy  
**Work Order:** 2205279  
**Project:** Raindance FD 20-399HCBH

## QC BATCH REPORT

Batch ID: **IP220518-2-4** Instrument ID: **ICP5900** Method: **EPA200.7**

**LCS** Sample ID: **IP220518-2** Units: **MG/L** Analysis Date: **5/23/2022 13:49**

Client ID: Run ID: **IT220523-1A3** Prep Date: **5/18/2022** DF: **1**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CALCIUM	39.2	1	40		98	85-115				20	
MAGNESIUM	38.2	1	40		95	85-115				20	
POTASSIUM	39.7	1	40		99	85-115				20	
SODIUM	40.3	1	40		101	85-115				20	

**LCSD** Sample ID: **IP220518-2** Units: **MG/L** Analysis Date: **5/23/2022 13:50**

Client ID: Run ID: **IT220523-1A3** Prep Date: **5/18/2022** 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		39.2	0	20	
MAGNESIUM	38.2	1	40		95	85-115		38.2	0	20	
POTASSIUM	39.9	1	40		100	85-115		39.7	0	20	
SODIUM	40.6	1	40		101	85-115		40.3	1	20	

**MB** Sample ID: **FP220516-2** Units: **MG/L** Analysis Date: **5/23/2022 15:12**

Client ID: Run ID: **IT220523-1A3** Prep Date: **5/18/2022** DF: **1**

Analyte	Result	ReportLimit	Qual
CALCIUM	ND	1	
MAGNESIUM	ND	1	
POTASSIUM	ND	1	
SODIUM	ND	1	

The following samples were analyzed in this batch:

2205279-2

Client: PDC Energy  
Work Order: 2205279  
Project: Raindance FD 20-399HCBH

## QC BATCH REPORT

Batch ID: VL220519-33-2 Instrument ID: HPV3 Method: SW8260\_25

LCS		Sample ID: VL220519-3			Units: %REC		Analysis Date: 5/19/2022 10:55				
Client ID:		Run ID: VL220519-33A			Prep Date: 5/19/2022			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	24.7		25		99	80-120					
Surr: DIBROMOFLUOROMETHANE	25.1		25		101	80-120					
Surr: TOLUENE-D8	24.3		25		97	80-120					
BENZENE	10.2	1	10		102	80-120				20	
TOLUENE	10.1	1	10		101	80-120				20	
ETHYLBENZENE	9.91	1	10		99	80-120				20	
M+P-XYLENE	19	1	20		95	80-120				20	
O-XYLENE	10	1	10		100	80-120				20	

LCSD		Sample ID: VL220519-3			Units: %REC		Analysis Date: 5/19/2022 11:18				
Client ID:		Run ID: VL220519-33A				Prep Date: 5/19/2022			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	24.7		25		99	80-120			0		
Surr: DIBROMOFLUOROMETHANE	25.5		25		102	80-120			1		
Surr: TOLUENE-D8	24.9		25		100	80-120			2		
BENZENE	10.5	1	10		105	80-120		10.2	3	20	
TOLUENE	10.7	1	10		107	80-120		10.1	6	20	
ETHYLBENZENE	10.5	1	10		105	80-120		9.91	6	20	
M+P-XYLENE	20.1	1	20		100	80-120		19	6	20	
O-XYLENE	10.4	1	10		104	80-120		10	4	20	

MB		Sample ID: VL220519-3		Units: %REC		Analysis Date: 5/19/2022 11:43	
Client ID:		Run ID: VL220519-33A		Prep Date: 5/19/2022		DF: 1	
Analyte		Result	ReportLimit				Qual
Surr: 4-BROMOFLUOROBENZENE		25.1		100	80-120		
Surr: DIBROMOFLUOROMETHANE		25.3		101	80-120		
Surr: TOLUENE-D8		24.4		98	80-120		
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:

2205279-1



**Client:** PDC Energy  
**Work Order:** 2205279  
**Project:** Raindance FD 20-399HCBH

## QC BATCH REPORT

Batch ID: **AK220519-1-2** Instrument ID: **NONE** Method: **SM2320B**

LCS		Sample ID: AK220519-1				Units: MG/L		Analysis Date: 5/19/2022			
Client ID:		Run ID: AK220519-1A1				Prep Date: 5/18/2022			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	99.1	5	100		99	85-115				15	

MB		Sample ID: AK220519-1		Units: MG/L		Analysis Date: 5/19/2022	
Client ID:		Run ID: AK220519-1A1		Prep Date: 5/18/2022		DF: 1	
Analyte		Result	ReportLimit	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:

2205279-1

**Client:** PDC Energy  
**Work Order:** 2205279  
**Project:** Raindance FD 20-399HCBH

## QC BATCH REPORT

Batch ID: **IC220517-1-1** Instrument ID: **IC3** Method: **EPA300.0**

LCS	Sample ID: IC220517-1				Units: MG/L		Analysis Date: 5/17/2022 12:41				
Client ID:	Run ID: IC220517-1A1				Prep Date: 5/17/2022			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CHLORIDE	10.2	0.2	10		102	90-110				15	
SULFATE	51.6	1	50		103	90-110				15	

LCSD		Sample ID: IC220517-1				Units: MG/L		Analysis Date: 5/17/2022 13:55			
Client ID:		Run ID: IC220517-1A1				Prep Date: 5/17/2022		DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref Value	RPD	RPD Limit	Qual
CHLORIDE	9.81	0.2	10		98	90-110		10.2	4	15	
SULFATE	48.9	1	50		98	90-110		51.6	5	15	

MB		Sample ID: IC220517-1		Units: MG/L		Analysis Date: 5/17/2022 12:49	
Client ID:		Run ID: IC220517-1A1		Prep Date: 5/17/2022		DF: 1	
Analyte		Result	ReportLimit	Qual			
CHLORIDE		ND	0.2				
SULFATE		ND	1				

The following samples were analyzed in this batch:

2205279-1

**Client:** PDC Energy  
**Work Order:** 2205279  
**Project:** Raindance FD 20-399HCBH

## QC BATCH REPORT

Batch ID: **TD220517-2-1** Instrument ID: **Balance** Method: **SM2540C**

LCS	Sample ID: TD220517-2				Units: MG/L		Analysis Date: 5/19/2022				
Client ID:		Run ID: TD220519-1A1				Prep Date: 5/17/2022			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	402	20	400		100	85-115				14	

LCSD		Sample ID: TD220517-2			Units: MG/L		Analysis Date: 5/19/2022				
Client ID:		Run ID: TD220519-1A1			Prep Date: 5/17/2022			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	390	20	400		97	85-115		402	3	14	

MB		Sample ID: TD220517-2			Units: MG/L		Analysis Date: 5/19/2022		
Client ID:		Run ID: TD220519-1A1			Prep Date: 5/17/2022			DF: 1	
Analyte		Result	ReportLimit						
TOTAL DISSOLVED SOLIDS		ND	20						

The following samples were analyzed in this batch:

2205279-1