



10450 Stancliff Rd. Suite 210
Houston, TX 77099
T: +1 281 530 5656
F: +1 281 530 5887

February 27, 2023

Jenifer Hakkarinen
PDC Energy
4000 Burlington Ave.
Evans, CO 80620

Work Order: **HS23020543**

Laboratory Results for: **Fern 11U-434**

Dear Jenifer Hakkarinen,

ALS Environmental received 1 sample(s) on Feb 11, 2023 for the analysis presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Generated By: JUMOKE.LAWAL
Tyler Monroe

Client: PDC Energy
Project: Fern 11U-434
Work Order: HS23020543

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS23020543-01	Fern 11U-434	Water		08-Feb-2023 13:20	11-Feb-2023 10:25	<input type="checkbox"/>

Client: PDC Energy
Project: Fern 11U-434
Work Order: HS23020543

CASE NARRATIVE

GC Semivolatiles by Method RSK-175**Batch ID: R428839**

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

GC Semivolatiles by Method SW8015M**Batch ID: 189719****Sample ID: Fern 11U-434 (HS23020543-01)**

- Surrogate recoveries were outside of the control limits due to matrix interference.

Sample ID: HS23020553-04MS

- MS and MSD are for an unrelated sample

GC Volatiles by Method SW8015**Batch ID: R427921****Sample ID: Fern 11U-434 (HS23020543-01)**

- Surrogate failed outside of control limits high due to sample matrix interference. This was confirmed by sample reanalysis.

GCMS Volatiles by Method SW8260**Batch ID: R428388****Sample ID: Fern 11U-434 (HS23020543-01)**

- Lowest practical dilution due to foamy matrix and/or high concentration of non-target analyte(s).

Metals by Method E200.8**Batch ID: 190020****Sample ID: Fern 11U-434 (HS23020543-01)**

- Sample ran at 5x due to high concentration of Sodium.

Sample ID: HS23020873-01MS

- MS and MSD are for an unrelated sample

Sample ID: HS23021156-03MS

- MS and MSD are for an unrelated sample

WetChemistry by Method E300**Batch ID: R428630****Sample ID: Fern 11U-434 (HS23020543-01)**

- The reporting limit is elevated due to dilution for high concentrations of non-target analytes. (Sulfate)

Sample ID: HS23020652-04MS

- MS and MSD are for an unrelated sample

Client: PDC Energy
Project: Fern 11U-434
Work Order: HS23020543

CASE NARRATIVE

WetChemistry by Method SM2320B

Batch ID: R428629

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.

WetChemistry by Method M2540C

Batch ID: R428051

- The test results meet requirements of the current NELAP standards, state requirements or programs where applicable.
-

Client: PDC Energy
 Project: Fern 11U-434
 Sample ID: Fern 11U-434
 Collection Date: 08-Feb-2023 13:20

ANALYTICAL REPORT

WorkOrder: HS23020543
 Lab ID: HS23020543-01
 Matrix: Water

ANALYSES	RESULT	QUAL	MDL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C			Method: SW8260			Analyst: AKP	
Benzene	180	J	100	500	ug/L	500	20-Feb-2023 18:34
Ethylbenzene	U		150	500	ug/L	500	20-Feb-2023 18:34
m,p-Xylene	U		250	1000	ug/L	500	20-Feb-2023 18:34
o-Xylene	U		150	500	ug/L	500	20-Feb-2023 18:34
Toluene	340	J	100	500	ug/L	500	20-Feb-2023 18:34
Xylenes, Total	U		150	500	ug/L	500	20-Feb-2023 18:34
<i>Surr: 1,2-Dichloroethane-d4</i>	<i>87.9</i>			<i>70-126</i>	<i>%REC</i>	<i>500</i>	<i>20-Feb-2023 18:34</i>
<i>Surr: 4-Bromofluorobenzene</i>	<i>86.9</i>			<i>77-113</i>	<i>%REC</i>	<i>500</i>	<i>20-Feb-2023 18:34</i>
<i>Surr: Dibromofluoromethane</i>	<i>97.6</i>			<i>77-123</i>	<i>%REC</i>	<i>500</i>	<i>20-Feb-2023 18:34</i>
<i>Surr: Toluene-d8</i>	<i>98.5</i>			<i>82-127</i>	<i>%REC</i>	<i>500</i>	<i>20-Feb-2023 18:34</i>
GASOLINE RANGE ORGANICS BY SW8015C			Method: SW8015			Analyst: PJM	
Gasoline Range Organics	U		5.00	25.0	mg/L	500	13-Feb-2023 16:35
<i>Surr: 4-Bromofluorobenzene</i>	<i>385</i>	<i>S</i>		<i>70-123</i>	<i>%REC</i>	<i>500</i>	<i>13-Feb-2023 16:35</i>
DISSOLVED GASES BY RSK-175			Method: RSK-175			Analyst: SAM	
Ethane	749		2.88	20.0	ug/L	20	21-Feb-2023 10:51
Methane	2,370		10.7	50.0	ug/L	100	21-Feb-2023 11:53
Propane	335		20.0	20.0	ug/L	20	21-Feb-2023 10:51
TPH DRO/ORO BY SW8015C			Method: SW8015M			Prep: SW3511 / 15-Feb-2023	Analyst: SAM
TPH (Diesel Range)	3.6		0.020	0.050	mg/L	1	16-Feb-2023 09:06
<i>Surr: 2-Fluorobiphenyl</i>	<i>183</i>	<i>S</i>		<i>60-135</i>	<i>%REC</i>	<i>1</i>	<i>16-Feb-2023 09:06</i>
TOTAL METALS BY E200.8, REV 5.4, 1994			Method: E200.8			Prep: E200.8 / 23-Feb-2023	Analyst: MSC
Calcium	2.31	J	0.0900	2.50	mg/L	5	23-Feb-2023 16:53
Magnesium	0.155	J	0.0390	2.50	mg/L	5	23-Feb-2023 16:53
Potassium	38.0		0.165	2.50	mg/L	5	23-Feb-2023 16:53
Sodium	2,220		2.10	20.0	mg/L	100	24-Feb-2023 14:23
ANIONS BY E300.0, REV 2.1, 1993			Method: E300			Analyst: TH	
Chloride	2,270		10.0	25.0	mg/L	50	22-Feb-2023 12:04
Sulfate	0.980	J	0.400	1.00	mg/L	2	22-Feb-2023 13:43
TOTAL DISSOLVED SOLIDS BY SM2540C -2011			Method: M2540C			Analyst: DC	
Total Dissolved Solids (Residue, Filterable)	9,300		5.00	10.0	mg/L	1	14-Feb-2023 10:30
ALKALINITY BY SM 2320B-2011			Method: SM2320B			Analyst: JAC	
Alkalinity, Bicarbonate (As CaCO ₃)	1,750		50.0	50.0	mg/L	10	22-Feb-2023 16:01
Alkalinity, Carbonate (As CaCO ₃)	1,770		50.0	50.0	mg/L	10	22-Feb-2023 16:01
Alkalinity, Total (As CaCO ₃)	3,530		50.0	50.0	mg/L	10	22-Feb-2023 16:01

Note: See Qualifiers Page for a list of qualifiers and their explanation.

Weight / Prep Log

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

Batch ID: 189719	Start Date: 15 Feb 2023 11:43	End Date: 15 Feb 2023 14:30
Method: SW3511		Prep Code: 3511_DRO

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS23020543-01		32.93 (mL)	2 (mL)	0.06073	40 mL Amber

Batch ID: 190020	Start Date: 23 Feb 2023 09:30	End Date: 23 Feb 2023 18:00
Method: TOTAL METALS PREP BY E200.8, REV 5.4, 1994		Prep Code: 200.8PR

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS23020543-01		10 (mL)	10 (mL)	1	250 mL plastic, HNO3 to pH <2

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 189719 (0)		Test Name : TPH DRO/ORO BY SW8015C			Matrix: Water	
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20		15 Feb 2023 11:43	16 Feb 2023 09:06	1
Batch ID: 190020 (0)		Test Name : TOTAL METALS BY E200.8, REV 5.4, 1994			Matrix: Water	
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20		23 Feb 2023 09:30	24 Feb 2023 14:23	100
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20		23 Feb 2023 09:30	23 Feb 2023 16:53	5
Batch ID: R427921 (0)		Test Name : GASOLINE RANGE ORGANICS BY SW8015C			Matrix: Water	
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20			13 Feb 2023 16:35	500
Batch ID: R428051 (0)		Test Name : TOTAL DISSOLVED SOLIDS BY SM2540C-2011			Matrix: Water	
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20			14 Feb 2023 10:30	1
Batch ID: R428388 (0)		Test Name : LOW LEVEL VOLATILES BY SW8260C			Matrix: Water	
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20			20 Feb 2023 18:34	500
Batch ID: R428629 (0)		Test Name : ALKALINITY BY SM 2320B-2011			Matrix: Water	
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20			22 Feb 2023 16:01	10
Batch ID: R428630 (0)		Test Name : ANIONS BY E300.0, REV 2.1, 1993			Matrix: Water	
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20			22 Feb 2023 13:43	2
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20			22 Feb 2023 12:04	50
Batch ID: R428839 (0)		Test Name : DISSOLVED GASES BY RSK-175			Matrix: Water	
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20			21 Feb 2023 11:53	100
HS23020543-01	Fern 11U-434	08 Feb 2023 13:20			21 Feb 2023 10:51	20

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: 189719 (0)		Instrument: FID-16		Method: TPH DRO/ORO BY SW8015C					
MBLK	Sample ID: MBLK-189719	Units: mg/L		Analysis Date: 15-Feb-2023 18:45					
Client ID:	Run ID: FID-16_428197		SeqNo: 7132204		PrepDate: 15-Feb-2023		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

TPH (Diesel Range) U 0.050

Surr: 2-Fluorobiphenyl 0.04254 0.0050 0.06 0 70.9 60 - 135

LCS	Sample ID: LCS-189719	Units: mg/L		Analysis Date: 15-Feb-2023 19:15					
Client ID:	Run ID: FID-16_428197		SeqNo: 7132205		PrepDate: 15-Feb-2023		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

TPH (Diesel Range) 0.6505 0.050 0.6 0 108 70 - 130

Surr: 2-Fluorobiphenyl 0.06185 0.0050 0.06 0 103 60 - 135

MS	Sample ID: HS23020553-04MS	Units: mg/L		Analysis Date: 15-Feb-2023 21:12					
Client ID:	Run ID: FID-16_428197		SeqNo: 7132207		PrepDate: 15-Feb-2023		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

TPH (Diesel Range) 0.8892 0.051 0.6089 0 146 70 - 130 S

Surr: 2-Fluorobiphenyl 0.06678 0.0051 0.06089 0 110 60 - 135

MSD	Sample ID: HS23020553-04MSD	Units: mg/L		Analysis Date: 15-Feb-2023 21:42					
Client ID:	Run ID: FID-16_428197		SeqNo: 7132208		PrepDate: 15-Feb-2023		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual

TPH (Diesel Range) 0.6931 0.052 0.6254 0 111 70 - 130 0.8892 24.8 20 R

Surr: 2-Fluorobiphenyl 0.04674 0.0052 0.06254 0 74.7 60 - 135 0.06678 35.3 20 R

The following samples were analyzed in this batch: HS23020543-01

Client: PDC Energy
 Project: Fern 11U-434
 WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: R428839 (0)		Instrument: FID-4		Method: DISSOLVED GASES BY RSK-175					
MBLK	Sample ID: MBLK-230221	Units: ug/L		Analysis Date: 21-Feb-2023 06:55					
Client ID:	Run ID: FID-4_428839	SeqNo: 7146390		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	U	1.00							
Methane	U	0.500							
Propane	U	1.00							

LCS	Sample ID: LCS-230221	Units: ug/L		Analysis Date: 21-Feb-2023 07:34					
Client ID:	Run ID: FID-4_428839	SeqNo: 7146391		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	20.99	1.00	18.04	0	116	75 - 125			
Methane	9.122	0.500	9.647	0	94.6	75 - 125			
Propane	31.33	1.00	26.46	0	118	75 - 125			

LCSD	Sample ID: LCSD-230221	Units: ug/L		Analysis Date: 21-Feb-2023 08:05					
Client ID:	Run ID: FID-4_428839	SeqNo: 7146392		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Ethane	21.46	1.00	18.04	0	119	75 - 125	20.99	2.21	30
Methane	9.58	0.500	9.647	0	99.3	75 - 125	9.122	4.89	30
Propane	32.75	1.00	26.46	0	124	75 - 125	31.33	4.43	30

The following samples were analyzed in this batch: HS23020543-01

Client: PDC Energy
 Project: Fern 11U-434
 WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: R427921 (0)		Instrument: FID-20		Method: GASOLINE RANGE ORGANICS BY SW8015C						
MBLK	Sample ID: MBLK-230213	Units: mg/L		Analysis Date: 13-Feb-2023 11:33						
Client ID:	Run ID: FID-20_427921		SeqNo: 7121953		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Gasoline Range Organics	U	0.0500								
Surr: 4-Bromofluorobenzene	0.08172	0.00500	0.1	0	81.7	70 - 121				
LCS	Sample ID: LCS-230213	Units: mg/L		Analysis Date: 13-Feb-2023 11:05						
Client ID:	Run ID: FID-20_427921		SeqNo: 7121951		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Gasoline Range Organics	0.9912	0.0500	1	0	99.1	76 - 124				
Surr: 4-Bromofluorobenzene	0.08259	0.00500	0.1	0	82.6	52 - 138				
LCSD	Sample ID: LCSD-230213	Units: mg/L		Analysis Date: 13-Feb-2023 11:19						
Client ID:	Run ID: FID-20_427921		SeqNo: 7121952		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Gasoline Range Organics	0.9457	0.0500	1	0	94.6	76 - 124	0.9912	4.71	20	
Surr: 4-Bromofluorobenzene	0.08136	0.00500	0.1	0	81.4	52 - 138	0.08259	1.5	20	
The following samples were analyzed in this batch: HS23020543-01										

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: 190020 (0)		Instrument: ICPMS06		Method: TOTAL METALS BY E200.8, REV 5.4, 1994					
MBLK	Sample ID: MBLK-190020	Units: ug/L		Analysis Date: 23-Feb-2023 17:41					
Client ID:	Run ID: ICPMS06_428628	SeqNo: 7144459		PrepDate: 23-Feb-2023		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Calcium	U	500							
Magnesium	12.02	500							J
Potassium	U	500							
Sodium	U	200							

LCS	Sample ID: LCS-190020	Units: ug/L		Analysis Date: 23-Feb-2023 16:40					
Client ID:	Run ID: ICPMS06_428628	SeqNo: 7144484		PrepDate: 23-Feb-2023		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Calcium	5432	500	5000	0	109	85 - 115			
Magnesium	5571	500	5000	0	111	85 - 115			
Potassium	5435	500	5000	0	109	85 - 115			
Sodium	5692	200	5000	0	114	85 - 115			

MS	Sample ID: HS23021156-03MS	Units: ug/L		Analysis Date: 24-Feb-2023 15:08					
Client ID:	Run ID: ICPMS06_428763	SeqNo: 7145223		PrepDate: 23-Feb-2023		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Calcium	37030	500	5000	31820	104	70 - 130			O
Magnesium	8211	500	5000	2674	111	70 - 130			
Potassium	617400	500	5000	623100	-115	70 - 130			SEO
Sodium	1311000	200	5000	1311000	-4.13	70 - 130			SEO

MS	Sample ID: HS23020873-01MS	Units: ug/L		Analysis Date: 23-Feb-2023 17:51					
Client ID:	Run ID: ICPMS06_428628	SeqNo: 7144464		PrepDate: 23-Feb-2023		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Calcium	89090	500	5000	87670	28.4	70 - 130			SO
Magnesium	17120	500	5000	12210	98.0	70 - 130			
Potassium	35720	500	5000	31090	92.5	70 - 130			O
Sodium	386500	200	5000	398700	-243	70 - 130			SEO

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: 190020 (0)		Instrument: ICPMS06		Method: TOTAL METALS BY E200.8, REV 5.4, 1994						
MSD		Sample ID: HS23021156-03MSD		Units: ug/L		Analysis Date: 24-Feb-2023 15:10				
Client ID:		Run ID: ICPMS06_428763		SeqNo: 7145224		PrepDate: 23-Feb-2023		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	39530	500	5000	31820	154	70 - 130	37030	6.52	20	SO
Magnesium	8729	500	5000	2674	121	70 - 130	8211	6.13	20	
Potassium	666100	500	5000	623100	860	70 - 130	617400	7.6	20	SEO
Sodium	1405000	200	5000	1311000	1880	70 - 130	1311000	6.93	20	SEO
MSD		Sample ID: HS23020873-01MSD		Units: ug/L		Analysis Date: 24-Feb-2023 14:27				
Client ID:		Run ID: ICPMS06_428763		SeqNo: 7144959		PrepDate: 23-Feb-2023		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	89080	500	5000	87670	28.2	70 - 130	89090	0.0106	20	SO
Magnesium	16860	500	5000	12210	93.0	70 - 130	17120	1.49	20	
Potassium	35120	500	5000	31090	80.4	70 - 130	35720	1.71	20	O
Sodium	387500	200	5000	398700	-224	70 - 130	386500	0.248	20	SEO
The following samples were analyzed in this batch: HS23020543-01										

Client: PDC Energy
 Project: Fern 11U-434
 WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: R428388 (0)		Instrument: VOA7		Method: LOW LEVEL VOLATILES BY SW8260C					
MBLK	Sample ID: VBLKW-230220	Units: ug/L		Analysis Date: 20-Feb-2023 10:52					
Client ID:	Run ID: VOA7_428388	SeqNo: 7136000		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	U	1.0							
Ethylbenzene	U	1.0							
m,p-Xylene	U	2.0							
o-Xylene	U	1.0							
Toluene	U	1.0							
Xylenes, Total	U	1.0							
Surr: 1,2-Dichloroethane-d4	44.85	1.0	50	0	89.7	70 - 123			
Surr: 4-Bromofluorobenzene	45.31	1.0	50	0	90.6	77 - 113			
Surr: Dibromofluoromethane	45.96	1.0	50	0	91.9	73 - 126			
Surr: Toluene-d8	49.43	1.0	50	0	98.9	81 - 120			

LCS	Sample ID: VLCSW-230220	Units: ug/L		Analysis Date: 20-Feb-2023 10:09					
Client ID:	Run ID: VOA7_428388	SeqNo: 7135999		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	18.07	1.0	20	0	90.4	74 - 120			
Ethylbenzene	18.56	1.0	20	0	92.8	77 - 117			
m,p-Xylene	36.62	2.0	40	0	91.6	77 - 122			
o-Xylene	18.49	1.0	20	0	92.5	75 - 119			
Toluene	17.68	1.0	20	0	88.4	77 - 118			
Xylenes, Total	55.12	1.0	60	0	91.9	75 - 122			
Surr: 1,2-Dichloroethane-d4	45.08	1.0	50	0	90.2	70 - 123			
Surr: 4-Bromofluorobenzene	47.45	1.0	50	0	94.9	77 - 113			
Surr: Dibromofluoromethane	48.73	1.0	50	0	97.5	73 - 126			
Surr: Toluene-d8	49.89	1.0	50	0	99.8	81 - 120			

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: R428388 (0)		Instrument: VOA7		Method: LOW LEVEL VOLATILES BY SW8260C					
MS		Sample ID: HS23020760-02MS		Units: ug/L		Analysis Date: 20-Feb-2023 12:18			
Client ID:		Run ID: VOA7_428388		SeqNo: 7136004		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	17.82	1.0	20	0	89.1	70 - 127			
Ethylbenzene	19.05	1.0	20	0	95.3	70 - 124			
m,p-Xylene	37.21	2.0	40	0	93.0	70 - 130			
o-Xylene	18.07	1.0	20	0	90.3	70 - 124			
Toluene	18.07	1.0	20	0	90.4	70 - 123			
Xylenes, Total	55.28	1.0	60	0	92.1	70 - 130			
Surr: 1,2-Dichloroethane-d4	45.13	1.0	50	0	90.3	70 - 126			
Surr: 4-Bromofluorobenzene	47.36	1.0	50	0	94.7	77 - 113			
Surr: Dibromofluoromethane	48.05	1.0	50	0	96.1	77 - 123			
Surr: Toluene-d8	49.18	1.0	50	0	98.4	82 - 127			

MSD		Sample ID: HS23020760-02MSD		Units: ug/L		Analysis Date: 20-Feb-2023 12:39			
Client ID:		Run ID: VOA7_428388		SeqNo: 7136005		PrepDate:		DF: 1	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Benzene	17.39	1.0	20	0	86.9	70 - 127	17.82	2.47	20
Ethylbenzene	18.72	1.0	20	0	93.6	70 - 124	19.05	1.78	20
m,p-Xylene	36.43	2.0	40	0	91.1	70 - 130	37.21	2.13	20
o-Xylene	17.61	1.0	20	0	88.0	70 - 124	18.07	2.59	20
Toluene	17.6	1.0	20	0	88.0	70 - 123	18.07	2.63	20
Xylenes, Total	54.03	1.0	60	0	90.1	70 - 130	55.28	2.28	20
Surr: 1,2-Dichloroethane-d4	44.74	1.0	50	0	89.5	70 - 126	45.13	0.858	20
Surr: 4-Bromofluorobenzene	48.14	1.0	50	0	96.3	77 - 113	47.36	1.63	20
Surr: Dibromofluoromethane	47.08	1.0	50	0	94.2	77 - 123	48.05	2.03	20
Surr: Toluene-d8	48.94	1.0	50	0	97.9	82 - 127	49.18	0.483	20

The following samples were analyzed in this batch: HS23020543-01

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: R428051 (0)		Instrument: Balance1		Method: TOTAL DISSOLVED SOLIDS BY SM2540C-2011						
MBLK	Sample ID: WBLK-02142023	Units: mg/L		Analysis Date: 14-Feb-2023 10:30						
Client ID:	Run ID: Balance1_428051	SeqNo: 7125022		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Filterable)		U	10.0							
LCS	Sample ID: LCS-02142023	Units: mg/L		Analysis Date: 14-Feb-2023 10:30						
Client ID:	Run ID: Balance1_428051	SeqNo: 7125021		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Filterable)		1074	10.0	1000	0	107	85 - 115			
DUP	Sample ID: HS23020513-06DUP	Units: mg/L		Analysis Date: 14-Feb-2023 10:30						
Client ID:	Run ID: Balance1_428051	SeqNo: 7125017		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Filterable)		624	10.0				624	0	20	
DUP	Sample ID: HS23020513-02DUP	Units: mg/L		Analysis Date: 14-Feb-2023 10:30						
Client ID:	Run ID: Balance1_428051	SeqNo: 7125012		PrepDate:		DF: 1				
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Total Dissolved Solids (Residue, Filterable)		486	10.0				486	0	20	
The following samples were analyzed in this batch:		HS23020543-01								

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: R428629 (0)		Instrument: Skalar 03		Method: ALKALINITY BY SM 2320B-2011					
MBLK	Sample ID: MBLK-R428629	Units: mg/L		Analysis Date: 22-Feb-2023 16:01					
Client ID:	Run ID: Skalar 03_428629	SeqNo: 7141640		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Alkalinity, Bicarbonate (As CaCO3)	U	5.00							
Alkalinity, Carbonate (As CaCO3)	U	5.00							
Alkalinity, Total (As CaCO3)	U	5.00							

LCS	Sample ID: LCS-R428629	Units: mg/L		Analysis Date: 22-Feb-2023 16:01					
Client ID:	Run ID: Skalar 03_428629	SeqNo: 7142635		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Alkalinity, Carbonate (As CaCO3)	970.4	5.00	1000	0	97.0	85 - 115			
Alkalinity, Total (As CaCO3)	1020	5.00	1000	0	102	85 - 115			

LCSD	Sample ID: LCSD-R428629	Units: mg/L		Analysis Date: 22-Feb-2023 16:01					
Client ID:	Run ID: Skalar 03_428629	SeqNo: 7142634		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Alkalinity, Carbonate (As CaCO3)	932.2	5.00	1000	0	93.2	85 - 115	970.4	4.02	20
Alkalinity, Total (As CaCO3)	1004	5.00	1000	0	100	85 - 115	1020	1.57	20

DUP	Sample ID: HS23020497-01DUP	Units: mg/L		Analysis Date: 22-Feb-2023 16:01					
Client ID:	Run ID: Skalar 03_428629	SeqNo: 7141641		PrepDate:		DF: 1			
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Alkalinity, Bicarbonate (As CaCO3)	850.3	5.00					912.6	7.07	20
Alkalinity, Carbonate (As CaCO3)	U	5.00					0	0	20
Alkalinity, Total (As CaCO3)	850.3	5.00					912.6	7.07	20

The following samples were analyzed in this batch: HS23020543-01

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: R428630 (0)		Instrument: ICS-Integrion		Method: ANIONS BY E300.0, REV 2.1, 1993					
MBLK	Sample ID: MBLK	Units: mg/L		Analysis Date: 22-Feb-2023 11:12					
Client ID:	Run ID: ICS-Integrion_428630		SeqNo: 7141583		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	U	0.500							
Sulfate	U	0.500							

LCS	Sample ID: LCS	Units: mg/L		Analysis Date: 22-Feb-2023 11:30					
Client ID:	Run ID: ICS-Integrion_428630		SeqNo: 7141584		PrepDate:		DF: 1		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	20.06	0.500	20	0	100	90 - 110			
Sulfate	20.39	0.500	20	0	102	90 - 110			

MS	Sample ID: HS23020652-04MS	Units: mg/L		Analysis Date: 22-Feb-2023 14:18					
Client ID:	Run ID: ICS-Integrion_428630		SeqNo: 7141601		PrepDate:		DF: 10		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	571.8	5.00	100	489.7	82.2	80 - 120			O
Sulfate	893.3	5.00	100	859.3	34.0	80 - 120			SO

MS	Sample ID: HS23020585-01MS	Units: mg/L		Analysis Date: 22-Feb-2023 15:45					
Client ID:	Run ID: ICS-Integrion_428630		SeqNo: 7141608		PrepDate:		DF: 10		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	275.1	5.00	100	169.8	105	80 - 120			
Sulfate	173.8	5.00	100	71.96	102	80 - 120			

MSD	Sample ID: HS23020652-04MSD	Units: mg/L		Analysis Date: 22-Feb-2023 14:24					
Client ID:	Run ID: ICS-Integrion_428630		SeqNo: 7141602		PrepDate:		DF: 10		
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	574.5	5.00	100	489.7	84.9	80 - 120	571.8	0.471	20 O
Sulfate	898	5.00	100	859.3	38.7	80 - 120	893.3	0.518	20 SO

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

QC BATCH REPORT

Batch ID: R428630 (0)		Instrument: ICS-Integrion		Method: ANIONS BY E300.0, REV 2.1, 1993					
MSD		Sample ID: HS23020585-01MSD		Units: mg/L		Analysis Date: 22-Feb-2023 15:51			
Client ID:		Run ID: ICS-Integrion_428630		SeqNo: 7141609		PrepDate:		DF: 10	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit Qual
Chloride	273.6	5.00	100	169.8	104	80 - 120	275.1	0.569	20
Sulfate	172.8	5.00	100	71.96	101	80 - 120	173.8	0.572	20

The following samples were analyzed in this batch: HS23020543-01

Client: PDC Energy
Project: Fern 11U-434
WorkOrder: HS23020543

**QUALIFIERS,
ACRONYMS, UNITS**

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL/SDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Unit Reported	Description
mg/L	Milligrams per Liter

CERTIFICATIONS,ACCREDITATIONS & LICENSES

Agency	Number	Expire Date
Arkansas	22-041-0	27-Mar-2023
California	2919 2022-2023	30-Apr-2023
Dept of Defense	L21-682	31-Dec-2023
Florida	E87611-36	30-Jun-2023
Illinois	2000322022-9	09-May-2023
Kansas	E-10352; 2022-2023	31-Jul-2023
Kentucky	123043, 2022-2023	30-Apr-2023
Louisiana	03087, 2022-2023	30-Jun-2023
Maryland	343, 2022-2023	30-Jun-2023
North Carolina	624-2023	31-Dec-2023
North Dakota	R-193 2022-2023	30-Apr-2023
Oklahoma	2022-141	31-Aug-2023
Texas	T104704231-22-29	30-Apr-2023
Utah	TX026932022-13	31-Jul-2023

Sample Receipt Checklist

Work Order ID: HS23020543

Date/Time Received: 11-Feb-2023 10:25

Client Name: PDC Energy 80620

Received by: Corey Grandits

Completed By: /S/ Corey Grandits

11-Feb-2023 11:31

Reviewed by: /S/ Tyler Monroe

15-Feb-2023 12:13

eSignature

Date/Time

eSignature

Date/Time

Matrices: WCarrier name: FedEx

Shipping container/cooler in good condition?

Yes ☒No ☐Not Present ☐

Custody seals intact on shipping container/cooler?

Yes ☐No ☐Not Present ☒

Custody seals intact on sample bottles?

Yes ☐No ☐Not Present ☒

VOA/TX1005/TX1006 Solids in hermetically sealed vials?

Yes ☐No ☐Not Present ☒

Chain of custody present?

Yes ☒No ☐

1 Page(s)

Chain of custody signed when relinquished and received?

Yes ☒No ☐

Samplers name present on COC?

Yes ☒No ☐

Chain of custody agrees with sample labels?

Yes ☒No ☐

Samples in proper container/bottle?

Yes ☒No ☐

Sample containers intact?

Yes ☒No ☐

Sufficient sample volume for indicated test?

Yes ☒No ☐

All samples received within holding time?

Yes ☒No ☐

Container/Temp Blank temperature in compliance?

Yes ☒No ☐

Temperature(s)/Thermometer(s):

1.7UC/1.2C

IR31

Cooler(s)/Kit(s):

Lg Blue

Date/Time sample(s) sent to storage:

2/11/23

Water - VOA vials have zero headspace?

Yes ☒No ☐No VOA vials submitted ☐

Water - pH acceptable upon receipt?

Yes ☒No ☐N/A ☐

pH adjusted?

Yes ☐No ☒N/A ☐

pH adjusted by:

Login Notes:

Client Contacted:

Date Contacted:

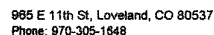
Person Contacted:

Contacted By:

Regarding:

Comments:

Corrective Action:



WORKORDER #	
-------------	--

[illegible]

*Time Zone (Circle): EST CST 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: Cations/Anions: Calcium, Chloride, Magnesium, Potassium, Sodium, Sulfate Samples analyzed per COGCC Bradenhead Sampling Program <div style="text-align: center;"> 1R31 LH ALVE 1.7° </div>	QC PACKAGE (check below)	
		LEVEL II (Standard QC)
		LEVEL III (Std QC + forms)
		LEVEL IV (Std QC + forms + raw data)
Preservative Key: 1-HCl 3-HNO3 3-702504 4-NaOH 5-NaOH504 7-Other 8-4 degrees C 9-3036		

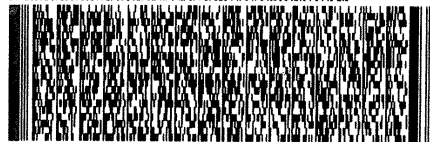
	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	<i>[Signature]</i>	Jeff Braden	2-10-23	0910
RECEIVED BY	<i>[Signature]</i>	Amy Kephan	2-10-23	0900
RELINQUISHED BY	<i>[Signature]</i>	Amy Kephan	2-10-23	1530
RECEIVED BY	<i>[Signature]</i>	ca	2-11-23	1025
RELINQUISHED BY	<i>[Signature]</i>			
RECEIVED BY	<i>[Signature]</i>			

FEB 11 2023

SHIP DATE: 10FEB23
ACTWGT: 56.75 LB
CAD: 0487862/CAFE3618
DIMS: 24x14x12 IN
BILL THIRD PARTY

TO **SAMPLE RECEIVING
ALS
10450 STANCLIFF RD
SUITE 210
HOUSTON TX 77099**

REF: CORONA/PDC



FedEx
Express



TRK# 6182 5243 5522
0201

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO SGRA

77099
TX-US IAH

