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

March 20, 2023

Jenifer Hakkarinen
PDC Energy
1775 Sherman Street
Suite 3000
Denver, CO 80203

Work Order: **HS23030250**

Laboratory Results for: **Werning 8-3**

Dear Jenifer Hakkarinen,

ALS Environmental received 1 sample(s) on Mar 04, 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: Werning 8-3
Work Order: HS23030250

SAMPLE SUMMARY

Lab Samp ID	Client Sample ID	Matrix	TagNo	Collection Date	Date Received	Hold
HS23030250-01	Werning 8-3	Water		02-Mar-2023 12:50	04-Mar-2023 09:10	☐

Client: PDC Energy **CASE NARRATIVE**
Project: Werning 8-3
Work Order: HS23030250

GC Semivolatiles by Method RSK-175

Batch ID: R429849

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

GC Semivolatiles by Method SW8015M

Batch ID: 190413

Sample ID: Werning 8-3 (HS23030250-01)

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

GC Volatiles by Method SW8015

Batch ID: R429407

Sample ID: Werning 8-3 (HS23030250-01)

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

GCMS Volatiles by Method SW8260

Batch ID: R429437

Sample ID: Werning 8-3 (HS23030250-01)

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

Metals by Method E200.8

Batch ID: 190945

Sample ID: HS23030536-01MS

• MS and MSD are for an unrelated sample

Sample ID: Werning 8-3 (HS23030250-01)

• Sample ran at a 5X dilution due to high concentration of Sodium.

WetChemistry by Method SM2320B

Batch ID: R430293

Sample ID: Werning 8-3 (HS23030250-01DUP)

• Carbonate and bicarbonate results are not within criteria. However, total alkalinity meets duplicate criteria.

Client: PDC Energy
Project: Werning 8-3
Work Order: HS23030250

CASE NARRATIVE

WetChemistry by Method E300

Batch ID: R429937

Sample ID: HS23030191-06MS

• MS and MSD are for an unrelated sample

Sample ID: HS23030249-01MS

• MS and MSD are for an unrelated sample

Sample ID: Werning 8-3 (HS23030250-01)

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

WetChemistry by Method M2540C

Batch ID: R429534

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

Client: PDC Energy
Project: Werning 8-3
Sample ID: Werning 8-3
Collection Date: 02-Mar-2023 12:50

ANALYTICAL REPORT
WorkOrder:HS23030250
Lab ID:HS23030250-01
Matrix:Water

ANALYSES	RESULT	QUAL	REPORT LIMIT	UNITS	DILUTION FACTOR	DATE ANALYZED
LOW LEVEL VOLATILES BY SW8260C		**Method:SW8260**				Analyst: AKP
Benzene	ND		500	ug/L	500	07-Mar-2023 04:33
Ethylbenzene	ND		500	ug/L	500	07-Mar-2023 04:33
m,p-Xylene	ND		1000	ug/L	500	07-Mar-2023 04:33
o-Xylene	ND		500	ug/L	500	07-Mar-2023 04:33
Toluene	ND		500	ug/L	500	07-Mar-2023 04:33
Xylenes, Total	ND		500	ug/L	500	07-Mar-2023 04:33
Surr: 1,2-Dichloroethane-d4	*83.9*		*70-126*	*%REC*	*500*	*07-Mar-2023 04:33*
Surr: 4-Bromofluorobenzene	*93.5*		*77-113*	*%REC*	*500*	*07-Mar-2023 04:33*
Surr: Dibromofluoromethane	*95.7*		*77-123*	*%REC*	*500*	*07-Mar-2023 04:33*
Surr: Toluene-d8	*98.4*		*82-127*	*%REC*	*500*	*07-Mar-2023 04:33*
GASOLINE RANGE ORGANICS BY SW8015C		**Method:SW8015**				Analyst: PJM
Gasoline Range Organics	**234**		**25.0**	**mg/L**	500	06-Mar-2023 12:47
Surr: 4-Bromofluorobenzene	*667*	*S*	*70-123*	*%REC*	*500*	*06-Mar-2023 12:47*
DISSOLVED GASES BY RSK-175		**Method:RSK-175**				Analyst: SAM
Ethane	**1,130**		**200**	**ug/L**	200	09-Mar-2023 07:28
Methane	**4,860**		**100**	**ug/L**	200	09-Mar-2023 07:28
Propane	**1,260**		**200**	**ug/L**	200	09-Mar-2023 07:28
TPH DRO/ORO BY SW8015C		**Method:SW8015M**		Prep:SW3511 / 06-Mar-2023		Analyst: PPM
TPH (Diesel Range)	**0.82**		**0.051**	**mg/L**	1	08-Mar-2023 10:47
Surr: 2-Fluorobiphenyl	*152*	*S*	*60-135*	*%REC*	*1*	*08-Mar-2023 10:47*
TOTAL METALS BY E200.8, REV 5.4, 1994		**Method:E200.8**		Prep:E200.8 / 17-Mar-2023		Analyst: JC
Calcium	**52.3**		**2.50**	**mg/L**	5	17-Mar-2023 20:05
Magnesium	ND		2.50	mg/L	5	17-Mar-2023 20:05
Potassium	**17.1**		**2.50**	**mg/L**	5	17-Mar-2023 20:05
Sodium	**3,140**		**10.0**	**mg/L**	50	20-Mar-2023 12:33
ANIONS BY E300.0, REV 2.1, 1993		**Method:E300**				Analyst: TH
Chloride	**4,670**		**50.0**	**mg/L**	100	13-Mar-2023 21:15
Sulfate	ND		5.00	mg/L	10	13-Mar-2023 21:09
TOTAL DISSOLVED SOLIDS BY SM2540C -2011		**Method:M2540C**				Analyst: DC
Total Dissolved Solids (Residue, Filterable)	**9,420**		**10.0**	**mg/L**	1	07-Mar-2023 02:00
ALKALINITY BY SM 2320B-2011		**Method:SM2320B**				Analyst: JAC
Alkalinity, Bicarbonate (As CaCO3)	ND		5.00	mg/L	1	16-Mar-2023 19:21
Alkalinity, Carbonate (As CaCO3)	**189**		**5.00**	**mg/L**	1	16-Mar-2023 19:21
Alkalinity, Total (As CaCO3)	**196**		**5.00**	**mg/L**	1	16-Mar-2023 19:21

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

Weight / Prep Log

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

Batch ID: 190413 **Start Date:** 06 Mar 2023 08:54 **End Date:** 07 Mar 2023 14:00
Method: SW3511 **Prep Code:** 3511_DRO

Sample ID	Container	Sample Wt/Vol	Final Volume	Prep Factor	
HS23030250-01		32.63 (mL)	2 (mL)	0.06129	40 mL Amber

Batch ID: 190945 **Start Date:** 17 Mar 2023 09:00 **End Date:** 17 Mar 2023 13:00
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	
HS23030250-01		10 (mL)	10 (mL)	1	250 mL plastic, HNO3 to pH <2

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

DATES REPORT

Sample ID	Client Samp ID	Collection Date	Leachate Date	Prep Date	Analysis Date	DF
Batch ID: 190413 (0)	**Test Name :** TPH DRO/ORO BY SW8015C				**Matrix:** Water	
HS23030250-01	Werning 8-3	02 Mar 2023 12:50		06 Mar 2023 08:54	08 Mar 2023 10:47	1
Batch ID: 190945 (0)	**Test Name :** TOTAL METALS BY E200.8, REV 5.4, 1994				**Matrix:** Water	
HS23030250-01	Werning 8-3	02 Mar 2023 12:50		17 Mar 2023 09:00	20 Mar 2023 12:33	50
HS23030250-01	Werning 8-3	02 Mar 2023 12:50		17 Mar 2023 09:00	17 Mar 2023 20:05	5
Batch ID: R429407 (0)	**Test Name :** GASOLINE RANGE ORGANICS BY SW8015C				**Matrix:** Water	
HS23030250-01	Werning 8-3	02 Mar 2023 12:50			06 Mar 2023 12:47	500
Batch ID: R429437 (0)	**Test Name :** LOW LEVEL VOLATILES BY SW8260C				**Matrix:** Water	
HS23030250-01	Werning 8-3	02 Mar 2023 12:50			07 Mar 2023 04:33	500
Batch ID: R429534 (0)	**Test Name :** TOTAL DISSOLVED SOLIDS BY SM2540C-2011				**Matrix:** Water	
HS23030250-01	Werning 8-3	02 Mar 2023 12:50			07 Mar 2023 02:00	1
Batch ID: R429849 (0)	**Test Name :** DISSOLVED GASES BY RSK-175				**Matrix:** Water	
HS23030250-01	Werning 8-3	02 Mar 2023 12:50			09 Mar 2023 07:28	200
Batch ID: R429937 (0)	**Test Name :** ANIONS BY E300.0, REV 2.1, 1993				**Matrix:** Water	
HS23030250-01	Werning 8-3	02 Mar 2023 12:50			13 Mar 2023 21:15	100
HS23030250-01	Werning 8-3	02 Mar 2023 12:50			13 Mar 2023 21:09	10
Batch ID: R430293 (0)	**Test Name :** ALKALINITY BY SM 2320B-2011				**Matrix:** Water	
HS23030250-01	Werning 8-3	02 Mar 2023 12:50			16 Mar 2023 19:21	1

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: 190413 (0) **Instrument: FID-17** **Method: TPH DRO/ORO BY SW8015C**

MBLK Sample ID: **MBLK-190413** Units: **mg/L** Analysis Date: **07-Mar-2023 12:11**
Client ID: Run ID: **FID-17_429665** SeqNo: **7163807** PrepDate: **06-Mar-2023** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
TPH (Diesel Range)	ND	0.050								
Surr: 2-Fluorobiphenyl	*0.04962*	*0.0050*	*0.06*	*0*	*82.7*	*60 - 135*				

LCS Sample ID: **LCS-190413** Units: **mg/L** Analysis Date: **07-Mar-2023 12:40**
Client ID: Run ID: **FID-17_429665** SeqNo: **7163808** PrepDate: **06-Mar-2023** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
TPH (Diesel Range)	0.5085	0.050	0.6	0	84.8	70 - 130				
Surr: 2-Fluorobiphenyl	*0.07398*	*0.0050*	*0.06*	*0*	*123*	*60 - 135*				

MS Sample ID: **HS23030265-01MS** Units: **mg/L** Analysis Date: **07-Mar-2023 15:37**
Client ID: Run ID: **FID-17_429665** SeqNo: **7163810** PrepDate: **06-Mar-2023** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
TPH (Diesel Range)	0.5308	0.052	0.6203	0	85.6	70 - 130				
Surr: 2-Fluorobiphenyl	*0.07487*	*0.0052*	*0.06203*	*0*	*121*	*60 - 135*				

MSD Sample ID: **HS23030265-01MSD** Units: **mg/L** Analysis Date: **07-Mar-2023 16:06**
Client ID: Run ID: **FID-17_429665** SeqNo: **7163819** PrepDate: **06-Mar-2023** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
TPH (Diesel Range)	0.5247	0.051	0.6105	0	85.9	70 - 130	0.5308	1.16	20	
Surr: 2-Fluorobiphenyl	*0.07377*	*0.0051*	*0.06105*	*0*	*121*	*60 - 135*	*0.07487*	*1.48*	*20*	

The following samples were analyzed in this batch: HS23030250-01

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: R429849 (0) **Instrument: FID-4** **Method: DISSOLVED GASES BY RSK-175**

MBLK Sample ID: **MBLK-230308** Units: **ug/L** Analysis Date: **08-Mar-2023 08:08**
Client ID: Run ID: **FID-4_429849** SeqNo: **7168015** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ethane	ND	1.00								
Methane	ND	0.500								
Propane	ND	1.00								

LCS Sample ID: **LCS-230308** Units: **ug/L** Analysis Date: **08-Mar-2023 08:26**
Client ID: Run ID: **FID-4_429849** SeqNo: **7168016** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ethane	20.18	1.00	18.04	0	112	75 - 125				
Methane	8.359	0.500	9.647	0	86.6	75 - 125				
Propane	30.07	1.00	26.46	0	114	75 - 125				

LCSD Sample ID: **LCSD-230308** Units: **ug/L** Analysis Date: **08-Mar-2023 08:46**
Client ID: Run ID: **FID-4_429849** SeqNo: **7168017** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Ethane	20.79	1.00	18.04	0	115	75 - 125	20.18	2.99	30	
Methane	8.182	0.500	9.647	0	84.8	75 - 125	8.359	2.15	30	
Propane	30.33	1.00	26.46	0	115	75 - 125	30.07	0.887	30	

The following samples were analyzed in this batch: HS23030250-01

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: R429407 (0) **Instrument:** FID-20 **Method:** GASOLINE RANGE ORGANICS BY SW8015C

MBLK Sample ID: **MBLK-230306** Units: **mg/L** Analysis Date: **06-Mar-2023 11:25**
Client ID: Run ID: **FID-20_429407** SeqNo: **7158556** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Gasoline Range Organics	ND	0.0500								
Surr: 4-Bromofluorobenzene	*0.09931*	*0.00500*	*0.1*	*0*	*99.3*	*70 - 121*				

LCS Sample ID: **LCS-230306** Units: **mg/L** Analysis Date: **06-Mar-2023 10:58**
Client ID: Run ID: **FID-20_429407** SeqNo: **7158554** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Gasoline Range Organics	0.9109	0.0500	1	0	91.1	76 - 124				
Surr: 4-Bromofluorobenzene	*0.08751*	*0.00500*	*0.1*	*0*	*87.5*	*52 - 138*				

LCSD Sample ID: **LCSD-230306** Units: **mg/L** Analysis Date: **06-Mar-2023 11:11**
Client ID: Run ID: **FID-20_429407** SeqNo: **7158555** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Gasoline Range Organics	1.079	0.0500	1	0	108	76 - 124	0.9109	16.9	20	
Surr: 4-Bromofluorobenzene	*0.09167*	*0.00500*	*0.1*	*0*	*91.7*	*52 - 138*	*0.08751*	*4.64*	*20*	

The following samples were analyzed in this batch: HS23030250-01

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: 190945 (0) **Instrument: ICPMS06** **Method: TOTAL METALS BY E200.8, REV 5.4, 1994**

MBLK Sample ID: **MBLK-190945** Units: **ug/L** Analysis Date: **17-Mar-2023 19:43**
Client ID: Run ID: **ICPMS06_430360** SeqNo: **7181551** PrepDate: **17-Mar-2023** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	ND	500								
Magnesium	ND	500								
Potassium	ND	500								
Sodium	ND	200								

LCS Sample ID: **LCS-190945** Units: **ug/L** Analysis Date: **17-Mar-2023 19:45**
Client ID: Run ID: **ICPMS06_430360** SeqNo: **7181552** PrepDate: **17-Mar-2023** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	10050	500	10000	0	101	85 - 115				
Magnesium	10140	500	10000	0	101	85 - 115				
Potassium	10260	500	10000	0	103	85 - 115				
Sodium	10070	200	10000	0	101	85 - 115				

MS Sample ID: **HS23030536-03MS** Units: **ug/L** Analysis Date: **17-Mar-2023 19:55**
Client ID: Run ID: **ICPMS06_430360** SeqNo: **7181557** PrepDate: **17-Mar-2023** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	12280	500	5000	7223	101	70 - 130				
Magnesium	9909	500	5000	4769	103	70 - 130				
Potassium	9456	500	5000	4345	102	70 - 130				
Sodium	17850	200	5000	12920	98.5	70 - 130				

MS Sample ID: **HS23030536-01MS** Units: **ug/L** Analysis Date: **17-Mar-2023 19:49**
Client ID: Run ID: **ICPMS06_430360** SeqNo: **7181554** PrepDate: **17-Mar-2023** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	16750	500	10000	5911	108	70 - 130				
Magnesium	12430	500	10000	1933	105	70 - 130				
Potassium	12750	500	10000	2376	104	70 - 130				
Sodium	110700	200	10000	94910	158	70 - 130				SO

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: 190945 (0) **Instrument: ICPMS06** **Method: TOTAL METALS BY E200.8, REV 5.4, 1994**

MSD Sample ID: **HS23030536-03MSD** Units: **ug/L** Analysis Date: **17-Mar-2023 19:57**
Client ID: Run ID: **ICPMS06_430360** SeqNo: **7181558** PrepDate: **17-Mar-2023** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	11750	500	5000	7223	90.5	70 - 130	12280	4.47	20	
Magnesium	9491	500	5000	4769	94.5	70 - 130	9909	4.31	20	
Potassium	8941	500	5000	4345	91.9	70 - 130	9456	5.6	20	
Sodium	16990	200	5000	12920	81.4	70 - 130	17850	4.92	20	

MSD Sample ID: **HS23030536-01MSD** Units: **ug/L** Analysis Date: **17-Mar-2023 19:51**
Client ID: Run ID: **ICPMS06_430360** SeqNo: **7181555** PrepDate: **17-Mar-2023** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Calcium	16890	500	10000	5911	110	70 - 130	16750	0.843	20	
Magnesium	12330	500	10000	1933	104	70 - 130	12430	0.804	20	
Potassium	13090	500	10000	2376	107	70 - 130	12750	2.63	20	
Sodium	112000	200	10000	94910	171	70 - 130	110700	1.2	20	SO

The following samples were analyzed in this batch: HS23030250-01

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: R429437 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MBLK Sample ID: **VBLKW-230306** Units: **ug/L** Analysis Date: **06-Mar-2023 21:46**
Client ID: Run ID: **VOA7_429437** SeqNo: **7159333** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	ND	1.0								
Ethylbenzene	ND	1.0								
m,p-Xylene	ND	2.0								
o-Xylene	ND	1.0								
Toluene	ND	1.0								
Xylenes, Total	ND	1.0								
Surr: 1,2-Dichloroethane-d4	*44.02*	*1.0*	*50*	*0*	*88.0*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*40.56*	*1.0*	*50*	*0*	*81.1*	*77 - 113*				
Surr: Dibromofluoromethane	*48.51*	*1.0*	*50*	*0*	*97.0*	*73 - 126*				
Surr: Toluene-d8	*48.28*	*1.0*	*50*	*0*	*96.6*	*81 - 120*				

LCS Sample ID: **VLCSW-230306** Units: **ug/L** Analysis Date: **06-Mar-2023 21:03**
Client ID: Run ID: **VOA7_429437** SeqNo: **7159332** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	16.65	1.0	20	0	83.2	74 - 120				
Ethylbenzene	17.84	1.0	20	0	89.2	77 - 117				
m,p-Xylene	35.18	2.0	40	0	87.9	77 - 122				
o-Xylene	17.34	1.0	20	0	86.7	75 - 119				
Toluene	16.76	1.0	20	0	83.8	77 - 118				
Xylenes, Total	52.52	1.0	60	0	87.5	75 - 122				
Surr: 1,2-Dichloroethane-d4	*44.72*	*1.0*	*50*	*0*	*89.4*	*70 - 123*				
Surr: 4-Bromofluorobenzene	*48.13*	*1.0*	*50*	*0*	*96.3*	*77 - 113*				
Surr: Dibromofluoromethane	*48.1*	*1.0*	*50*	*0*	*96.2*	*73 - 126*				
Surr: Toluene-d8	*48.19*	*1.0*	*50*	*0*	*96.4*	*81 - 120*				

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: R429437 (0) **Instrument: VOA7** **Method: LOW LEVEL VOLATILES BY SW8260C**

MS Sample ID: **HS23030223-02MS** Units: **ug/L** Analysis Date: **06-Mar-2023 23:33**
Client ID: Run ID: **VOA7_429437** SeqNo: **7159338** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	16.08	1.0	20	0	80.4	70 - 127				
Ethylbenzene	18.33	1.0	20	0	91.6	70 - 124				
m,p-Xylene	33.64	2.0	40	0	84.1	70 - 130				
o-Xylene	16.92	1.0	20	0	84.6	70 - 124				
Toluene	16.15	1.0	20	0	80.7	70 - 123				
Xylenes, Total	50.56	1.0	60	0	84.3	70 - 130				
Surr: 1,2-Dichloroethane-d4	*45.2*	*1.0*	*50*	*0*	*90.4*	*70 - 126*				
Surr: 4-Bromofluorobenzene	*48.11*	*1.0*	*50*	*0*	*96.2*	*77 - 113*				
Surr: Dibromofluoromethane	*48.33*	*1.0*	*50*	*0*	*96.7*	*77 - 123*				
Surr: Toluene-d8	*48.78*	*1.0*	*50*	*0*	*97.6*	*82 - 127*				

MSD Sample ID: **HS23030223-02MSD** Units: **ug/L** Analysis Date: **06-Mar-2023 23:55**
Client ID: Run ID: **VOA7_429437** SeqNo: **7159339** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	15.77	1.0	20	0	78.8	70 - 127	16.08	2	20	
Ethylbenzene	17.92	1.0	20	0	89.6	70 - 124	18.33	2.25	20	
m,p-Xylene	33.32	2.0	40	0	83.3	70 - 130	33.64	0.957	20	
o-Xylene	16.27	1.0	20	0	81.4	70 - 124	16.92	3.89	20	
Toluene	16	1.0	20	0	80.0	70 - 123	16.15	0.914	20	
Xylenes, Total	49.6	1.0	60	0	82.7	70 - 130	50.56	1.93	20	
Surr: 1,2-Dichloroethane-d4	*43.98*	*1.0*	*50*	*0*	*88.0*	*70 - 126*	*45.2*	*2.73*	*20*	
Surr: 4-Bromofluorobenzene	*47.77*	*1.0*	*50*	*0*	*95.5*	*77 - 113*	*48.11*	*0.71*	*20*	
Surr: Dibromofluoromethane	*48.26*	*1.0*	*50*	*0*	*96.5*	*77 - 123*	*48.33*	*0.128*	*20*	
Surr: Toluene-d8	*48.76*	*1.0*	*50*	*0*	*97.5*	*82 - 127*	*48.78*	*0.0343*	*20*	

The following samples were analyzed in this batch: HS23030250-01

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: R429534 (0) **Instrument:** Balance1 **Method:** TOTAL DISSOLVED SOLIDS BY SM2540C-2011

MBLK Sample ID: **WBLK-03072023** Units: **mg/L** Analysis Date: **07-Mar-2023 02:00**
Client ID: Run ID: **Balance1_429534** SeqNo: **7161445** 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)	ND	10.0								

LCS Sample ID: **LCS-030723** Units: **mg/L** Analysis Date: **07-Mar-2023 02:00**
Client ID: Run ID: **Balance1_429534** SeqNo: **7161444** 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)	1054	10.0	1000	0	105	85 - 115				

DUP Sample ID: **HS23030195-10DUP** Units: **mg/L** Analysis Date: **07-Mar-2023 02:00**
Client ID: Run ID: **Balance1_429534** SeqNo: **7161434** 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)	10420	10.0					10420	0	20	

DUP Sample ID: **HS23030194-08DUP** Units: **mg/L** Analysis Date: **07-Mar-2023 02:00**
Client ID: Run ID: **Balance1_429534** SeqNo: **7161429** 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)	2600	10.0					2600	0	20	

The following samples were analyzed in this batch: HS23030250-01

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: R429937 (0) **Instrument: ICS-Integrion** **Method: ANIONS BY E300.0, REV 2.1, 1993**

MBLK Sample ID: **MBLK** Units: **mg/L** Analysis Date: **13-Mar-2023 17:29**
Client ID: Run ID: **ICS-Integrion_429937** SeqNo: **7170201** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	ND	0.500								
Sulfate	ND	0.500								

LCS Sample ID: **LCS** Units: **mg/L** Analysis Date: **13-Mar-2023 17:35**
Client ID: Run ID: **ICS-Integrion_429937** SeqNo: **7170202** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	20.07	0.500	20	0	100	90 - 110				
Sulfate	20.38	0.500	20	0	102	90 - 110				

MS Sample ID: **HS23030249-01MS** Units: **mg/L** Analysis Date: **13-Mar-2023 20:52**
Client ID: Run ID: **ICS-Integrion_429937** SeqNo: **7170231** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	66.59	0.500	10	61.02	55.7	80 - 120				SO
Sulfate	9.807	0.500	10	0.1168	96.9	80 - 120				

MS Sample ID: **HS23030191-06MS** Units: **mg/L** Analysis Date: **13-Mar-2023 18:33**
Client ID: Run ID: **ICS-Integrion_429937** SeqNo: **7170211** PrepDate: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	630.8	5.00	100	558.4	72.5	80 - 120				SO
Sulfate	3188	5.00	100	3205	-17.6	80 - 120				SEO

MSD Sample ID: **HS23030249-01MSD** Units: **mg/L** Analysis Date: **13-Mar-2023 20:58**
Client ID: Run ID: **ICS-Integrion_429937** SeqNo: **7170232** PrepDate: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	66.32	0.500	10	61.02	53.0	80 - 120	66.59	0.412	20	SO
Sulfate	9.793	0.500	10	0.1168	96.8	80 - 120	9.807	0.148	20	

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: R429937 (0) **Instrument: ICS-Integrion** **Method: ANIONS BY E300.0, REV 2.1, 1993**

MSD Sample ID: **HS23030191-06MSD** Units: **mg/L** Analysis Date: **13-Mar-2023 18:38**
Client ID: Run ID: **ICS-Integrion_429937** SeqNo: **7170212** PrepDate: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chloride	631.6	5.00	100	558.4	73.2	80 - 120	630.8	0.125	20	SO
Sulfate	3191	5.00	100	3205	-14.1	80 - 120	3188	0.11	20	SEO

The following samples were analyzed in this batch: HS23030250-01

Client: PDC Energy
Project: Werning 8-3
WorkOrder: HS23030250

QC BATCH REPORT

Batch ID: R430293 (0) **Instrument: Skalar 03** **Method: ALKALINITY BY SM 2320B-2011**

MBLK Sample ID: **MBLK-R430293** Units: **mg/L** Analysis Date: **16-Mar-2023 19:21**
Client ID: Run ID: **Skalar 03_430293** SeqNo: **7179204** 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)	ND	5.00								
Alkalinity, Carbonate (As CaCO3)	ND	5.00								
Alkalinity, Total (As CaCO3)	ND	5.00								

LCS Sample ID: **LCS-R430293** Units: **mg/L** Analysis Date: **16-Mar-2023 19:21**
Client ID: Run ID: **Skalar 03_430293** SeqNo: **7179203** 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)	936.8	5.00	1000	0	93.7	85 - 115				
Alkalinity, Total (As CaCO3)	992.4	5.00	1000	0	99.2	85 - 115				

LCSD Sample ID: **LCSD-R430293** Units: **mg/L** Analysis Date: **16-Mar-2023 19:21**
Client ID: Run ID: **Skalar 03_430293** SeqNo: **7179202** 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)	929.8	5.00	1000	0	93.0	85 - 115	936.8	0.75	20	
Alkalinity, Total (As CaCO3)	979.3	5.00	1000	0	97.9	85 - 115	992.4	1.33	20	

DUP Sample ID: **HS23030250-01DUP** Units: **mg/L** Analysis Date: **16-Mar-2023 19:21**
Client ID: **Werning 8-3** Run ID: **Skalar 03_430293** SeqNo: **7179205** 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)	174.6	5.00					0	200	20	R
Alkalinity, Carbonate (As CaCO3)	51.8	5.00					188.6	114	20	R
Alkalinity, Total (As CaCO3)	226.4	5.00					196.5	14.1	20	

The following samples were analyzed in this batch: HS23030250-01

Client: PDC Energy
Project: Werning 8-3
WorkOrder: **HS23030250**

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 Quantitaion 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: HS23030250 **Date/Time Received:** **04-Mar-2023 09:10**

Client Name: PDC Energy 80203 **Received by:** **Corey Grandits**

Completed By:	/S/ Nilesh D. Ranchod	06-Mar-2023 10:31	**Reviewed by:**	/S/ Tyler Monroe	06-Mar-2023 16:17
	eSignature	Date/Time		eSignature	Date/Time

Matrices: **W** Carrier 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):	1.8C/1.3C, 1.5C/1.0C UC/C	IR31
Cooler(s)/Kit(s):	Blue / 50246	
Date/Time sample(s) sent to storage:	03/04/23 13:00	

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:

ALS Environmental
965 E 11th St, Loveland, CO 80537
Phone: 970-305-1648

Chain-of-Custody

WORKORDER #

PAGE 1 of 1

DISPOSAL: By Lab or Return to Client

PROJECT NAME	Werning 8-3	SAMPLER	Jeff Braden
PROJECT No.	09C2073326	FACILITY ID	123-17441
	PDCE Bradenhead Sampling	EDD FORMAT	COGCC EDD, LTE
COMPANY NAME	PDC Energy	PURCHASE ORDER	N/A
SEND REPORT TO	Jenifer Hakkarinen	BILL TO COMPANY	PDC Energy
ADDRESS	1775 Sherman Street, Suite 3000	INVOICE ATTN TO	Jenifer Hakkarinen
CITY / STATE / ZIP	Denver, Colorado 80203	ADDRESS	1775 Sherman Street, Suite 3000
PHONE	303.860.5815	CITY / STATE / ZIP	Denver, Colorado 80203
E-MAIL	jenifer.hakkarinen@pdce.com jessica.johannsen@pdce.com jbraden@ensolum.com	PHONE	303.860.5815
		E-MAIL	jenifer.hakkarinen@pdce.com

DATE 3/2/2023

TURNAROUND: Standard

Lab ID	Field ID	Matrix	Sample Date	Sample Time	# Bottles	Pres.	QC	Dissolved Methane, Ethane, Propane RSK 175	BTEX & TPH GRO SW8260_25	TPH DRO SW8015M	Alkalinity, Carbonate, Bicarbonate, Total SM2320B	Total Cations - see comments EPA200.7/20.8	Total Anions - see comments EPA 300.0	Total Dissolved Solids SM2540C
	Werning 8-3	W	3/2/2023	~~1220~~ 1250	11	1,3		X	X	X	X	X	X	X

HS23030250
PDC Energy
Werning 8-3

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

For metals or anions, please detail analytes below.

Comments:	Cations/Anions:	QC PACKAGE (check below)
Calcium, Chloride, Magnesium, Potassium, Sodium, Sulfate **Samples analyzed per** **COGCC Bradenhead Sampling Program**		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

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY		Jeff Braden	3/3/23	1155
RECEIVED BY			3/3/23	1155
RELINQUISHED BY			3/3/23	1530
RECEIVED BY			3-4-23	0910
RELINQUISHED BY				
RECEIVED BY				

1-8 c

SDR FedEx Express SD

lay Delivery 151966 10/04 MWI FedEx® Saturday Delivery

Do not lift using this tag.

ORIGIN ID:GXYA (970) 305-1648
AMY KEPHART
ALS
965 E 11TH ST

LOVELAND, CO 80537
UNITED STATES US

SHIP DATE: 03MAR23
ACTWGT: 29.15 LB
CAD: 0487862/CAFE3618
DIMS: 16x13x13 IN

BILL THIRD PARTY

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

REF: PDC

FedEx Express

TRK# 0201 **6182 5243 5967**

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO SGRA BWE

77099
TX-US **IAH**

TRK# 0201 **6182 5243 5956**

SATURDAY 12:00P
PRIORITY OVERNIGHT

XO SGRA 50246

77099
TX-US **IAH**