

October 14, 2019

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laramie Energy - Grand Junction, CO

Sample Delivery Group: L1146341
Samples Received: 10/04/2019
Project Number:
Description: KOBE FLANGE - DITCH

Report To: Matt Kasten
760 Horizon Dr., Ste. 101
Grand Junction, CO 81506

Entire Report Reviewed By:

Chris Ward

Chris Ward
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.





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⁹ Sc

SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



KOBE FLANGE-DITCH POR L1146341-01 GW

Collected by
Matt Kasten

Collected date/time
10/03/19 09:10

Received date/time
10/04/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method BART	WG1357718	1	10/14/19 09:20	10/14/19 09:20	CFM	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1358086	1	10/06/19 10:52	10/06/19 14:43	TH	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1358690	1	10/07/19 19:31	10/07/19 19:31	GB	Mt. Juliet, TN
Wet Chemistry by Method 365.4	WG1357623	1	10/04/19 16:59	10/07/19 13:23	SDL	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG1357782	1	10/04/19 19:00	10/04/19 19:00	MSP	Mt. Juliet, TN
Wet Chemistry by Method 9050A	WG1357584	1	10/04/19 20:00	10/04/19 20:00	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1357554	1	10/04/19 19:12	10/04/19 19:12	LDC	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1357554	10	10/04/19 19:29	10/04/19 19:29	LDC	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1357636	1	10/04/19 16:14	10/07/19 19:08	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1358557	1	10/07/19 14:00	10/07/19 14:00	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1358910	1	10/08/19 11:25	10/08/19 11:25	DAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1358343	1	10/06/19 15:52	10/06/19 15:52	JCP	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1357735	1	10/04/19 16:57	10/06/19 21:59	JN	Mt. Juliet, TN

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

KOBE FLANGE-DITCH UP L1146341-02 GW

Collected by
Matt Kasten

Collected date/time
10/03/19 09:15

Received date/time
10/04/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method BART	WG1357718	1	10/14/19 09:20	10/14/19 09:20	CFM	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1358086	1	10/06/19 10:52	10/06/19 14:43	TH	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1358690	1	10/07/19 19:39	10/07/19 19:39	GB	Mt. Juliet, TN
Wet Chemistry by Method 365.4	WG1357623	1	10/04/19 16:59	10/07/19 13:24	SDL	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG1357782	1	10/04/19 19:00	10/04/19 19:00	MSP	Mt. Juliet, TN
Wet Chemistry by Method 9050A	WG1357584	1	10/04/19 20:00	10/04/19 20:00	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1357554	1	10/04/19 19:45	10/04/19 19:45	LDC	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1357554	10	10/04/19 20:02	10/04/19 20:02	LDC	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1357636	1	10/04/19 16:14	10/07/19 19:11	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1358557	1	10/07/19 14:24	10/07/19 14:24	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1358910	1	10/08/19 11:21	10/08/19 11:21	DAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1358343	1	10/06/19 15:33	10/06/19 15:33	JCP	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1357735	1	10/04/19 16:57	10/06/19 22:19	JN	Mt. Juliet, TN

KOBE FLANGE-DITCH DOWN L1146341-03 GW

Collected by
Matt Kasten

Collected date/time
10/03/19 10:00

Received date/time
10/04/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Microbiology by Method BART	WG1357718	1	10/14/19 09:20	10/14/19 09:20	CFM	Mt. Juliet, TN
Gravimetric Analysis by Method 2540 C-2011	WG1358086	1	10/06/19 10:52	10/06/19 14:43	TH	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1358690	1	10/07/19 19:46	10/07/19 19:46	GB	Mt. Juliet, TN
Wet Chemistry by Method 365.4	WG1357623	1	10/04/19 16:59	10/07/19 13:26	SDL	Mt. Juliet, TN
Wet Chemistry by Method 9040C	WG1357782	1	10/04/19 19:00	10/04/19 19:00	MSP	Mt. Juliet, TN
Wet Chemistry by Method 9050A	WG1357584	1	10/04/19 20:00	10/04/19 20:00	AKA	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1357554	1	10/04/19 20:51	10/04/19 20:51	LDC	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1357554	10	10/04/19 21:07	10/04/19 21:07	LDC	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1357636	1	10/04/19 16:14	10/07/19 19:13	EL	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1358557	1	10/07/19 14:48	10/07/19 14:48	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1358910	1	10/08/19 11:23	10/08/19 11:23	DAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1358343	1	10/06/19 15:14	10/06/19 15:14	JCP	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1357735	1	10/04/19 16:57	10/06/19 22:39	JN	Mt. Juliet, TN

ACCOUNT:

Laramie Energy - Grand Junction, CO

PROJECT:

SDG:

L1146341

DATE/TIME:

10/14/19 10:23

PAGE:

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KOBE FLANGE-DITCH END L1146341-04 GW

Collected by
Matt KastenCollected date/time
10/03/19 11:00Received date/time
10/04/19 08:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1358557	1	10/07/19 15:11	10/07/19 15:11	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1358343	1	10/06/19 14:55	10/06/19 14:55	JCP	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1357735	1	10/04/19 16:57	10/06/19 22:59	JN	Mt. Juliet, TN

¹Cp²Tc³Ss⁴Cn⁵Sr⁶Qc⁷Gl⁸Al⁹Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Chris Ward
Project Manager

Project Narrative

The following reactions were observed on one or more samples within this SDG.

BC Brown Cloudy
BL Blackened Liquid
BR Brown Ring
FO Foam
BB Blackened Base
BT Blackening around Ball
SR Slime Ring around Ball
PB Pale Blue Glow in UV Light

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Microbiology by Method BART

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Iron Related Bacteria	Present		1	10/14/2019 09:20	WG1357718
Slime Forming Bacteria	Present		1	10/14/2019 09:20	WG1357718
Sulfate Reducing Bacteria	Present		1	10/14/2019 09:20	WG1357718

Sample Narrative:

L1146341-01 WG1357718: Approximate IRB population=9000 cfu/ml. Reactions=FO/BR/BC/BL

L1146341-01 WG1357718: Approximate SLYM population= 2500 cfu/ml. Reactions=PB/SR

L1146341-01 WG1357718: Approximate SRB population= 500,000cfu/ml. Reactions=BB/BT

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	1200		20.0	1	10/06/2019 14:43	WG1358086

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	533		20.0	1	10/07/2019 19:31	WG1358690
Alkalinity,Bicarbonate	533		20.0	1	10/07/2019 19:31	WG1358690
Alkalinity,Carbonate	ND		20.0	1	10/07/2019 19:31	WG1358690

Sample Narrative:

L1146341-01 WG1358690: Endpoint pH 4.5

Wet Chemistry by Method 365.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Phosphorus,Total	ND		0.100	1	10/07/2019 13:23	WG1357623

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.24	T8	1	10/04/2019 19:00	WG1357782

Sample Narrative:

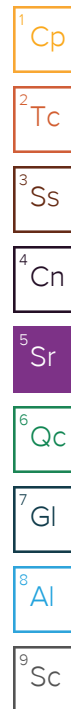
L1146341-01 WG1357782: 8.24 at 17.6C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	1550		10.0	1	10/04/2019 20:00	WG1357584

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	10/04/2019 19:12	WG1357554
Chloride	19.5		1.00	1	10/04/2019 19:12	WG1357554
Fluoride	0.745		0.100	1	10/04/2019 19:12	WG1357554
Nitrate as (N)	ND		0.100	1	10/04/2019 19:12	WG1357554
Nitrite as (N)	ND		0.100	1	10/04/2019 19:12	WG1357554
Sulfate	574		50.0	10	10/04/2019 19:29	WG1357554





Collected date/time: 10/03/19 09:10

L1146341

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Barium	0.0563		0.00500	1	10/07/2019 19:08	WG1357636
Boron	0.291		0.200	1	10/07/2019 19:08	WG1357636
Calcium	108		1.00	1	10/07/2019 19:08	WG1357636
Iron	0.730	<u>B</u>	0.100	1	10/07/2019 19:08	WG1357636
Magnesium	104		1.00	1	10/07/2019 19:08	WG1357636
Manganese	0.0978		0.0100	1	10/07/2019 19:08	WG1357636
Potassium	3.93		1.00	1	10/07/2019 19:08	WG1357636
Selenium	ND		0.0100	1	10/07/2019 19:08	WG1357636
Sodium	200		1.00	1	10/07/2019 19:08	WG1357636
Strontium	1.86		0.0100	1	10/07/2019 19:08	WG1357636

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	10/07/2019 14:00	WG1358557
(S) <i>α,α,α</i> -Trifluorotoluene(FID)	110		78.0-120		10/07/2019 14:00	WG1358557

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	10/08/2019 11:25	WG1358910
Ethane	ND		0.0130	1	10/08/2019 11:25	WG1358910
Ethene	ND		0.0130	1	10/08/2019 11:25	WG1358910

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	10/06/2019 15:52	WG1358343
Toluene	ND		0.00100	1	10/06/2019 15:52	WG1358343
Ethylbenzene	ND		0.00100	1	10/06/2019 15:52	WG1358343
Total Xylenes	ND		0.00300	1	10/06/2019 15:52	WG1358343
(S) <i>Toluene-d8</i>	111		80.0-120		10/06/2019 15:52	WG1358343
(S) <i>4-Bromofluorobenzene</i>	99.2		77.0-126		10/06/2019 15:52	WG1358343
(S) <i>1,2-Dichloroethane-d4</i>	95.0		70.0-130		10/06/2019 15:52	WG1358343

Semi-Volatile Organic Compounds (GC) by Method 3511/8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		0.100	1	10/06/2019 21:59	WG1357735
(S) <i>o</i> -Terphenyl	73.2		31.0-160		10/06/2019 21:59	WG1357735



Microbiology by Method BART

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Iron Related Bacteria	Present		1	10/14/2019 09:20	WG1357718
Slime Forming Bacteria	Present		1	10/14/2019 09:20	WG1357718
Sulfate Reducing Bacteria	Present		1	10/14/2019 09:20	WG1357718

Sample Narrative:

L1146341-02 WG1357718: Approximate IRB population=9000 cfu/ml. Reactions=FO/BR/BC/BL

L1146341-02 WG1357718: Approximate SLYM population= 13,000 cfu/ml. Reactions=PB/SR

L1146341-02 WG1357718: Approximate SRB population= 500,000cfu/ml. Reactions=BB/BT

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	1220		20.0	1	10/06/2019 14:43	WG1358086

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	503		20.0	1	10/07/2019 19:39	WG1358690
Alkalinity,Bicarbonate	503		20.0	1	10/07/2019 19:39	WG1358690
Alkalinity,Carbonate	ND		20.0	1	10/07/2019 19:39	WG1358690

Sample Narrative:

L1146341-02 WG1358690: Endpoint pH 4.5

Wet Chemistry by Method 365.4

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Phosphorus,Total	ND		0.100	1	10/07/2019 13:24	WG1357623

Wet Chemistry by Method 9040C

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
pH	8.22	T8	1	10/04/2019 19:00	WG1357782

Sample Narrative:

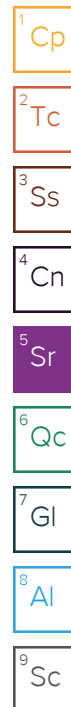
L1146341-02 WG1357782: 8.22 at 17.8C

Wet Chemistry by Method 9050A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Specific Conductance	1840		10.0	1	10/04/2019 20:00	WG1357584

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	10/04/2019 19:45	WG1357554
Chloride	19.5		1.00	1	10/04/2019 19:45	WG1357554
Fluoride	0.752		0.100	1	10/04/2019 19:45	WG1357554
Nitrate as (N)	ND		0.100	1	10/04/2019 19:45	WG1357554
Nitrite as (N)	ND		0.100	1	10/04/2019 19:45	WG1357554
Sulfate	577		50.0	10	10/04/2019 20:02	WG1357554





Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Barium	0.0539		0.00500	1	10/07/2019 19:11	WG1357636
Boron	0.290		0.200	1	10/07/2019 19:11	WG1357636
Calcium	109		1.00	1	10/07/2019 19:11	WG1357636
Iron	0.500	B	0.100	1	10/07/2019 19:11	WG1357636
Magnesium	104		1.00	1	10/07/2019 19:11	WG1357636
Manganese	0.0991		0.0100	1	10/07/2019 19:11	WG1357636
Potassium	3.86		1.00	1	10/07/2019 19:11	WG1357636
Selenium	ND		0.0100	1	10/07/2019 19:11	WG1357636
Sodium	199		1.00	1	10/07/2019 19:11	WG1357636
Strontium	1.86		0.0100	1	10/07/2019 19:11	WG1357636

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	10/07/2019 14:24	WG1358557
(S) <i>α,α,α</i> -Trifluorotoluene(FID)	110		78.0-120		10/07/2019 14:24	WG1358557

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	10/08/2019 11:21	WG1358910
Ethane	ND		0.0130	1	10/08/2019 11:21	WG1358910
Ethene	ND		0.0130	1	10/08/2019 11:21	WG1358910

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	10/06/2019 15:33	WG1358343
Toluene	ND		0.00100	1	10/06/2019 15:33	WG1358343
Ethylbenzene	ND		0.00100	1	10/06/2019 15:33	WG1358343
Total Xylenes	ND		0.00300	1	10/06/2019 15:33	WG1358343
(S) <i>Toluene-d8</i>	110		80.0-120		10/06/2019 15:33	WG1358343
(S) <i>4-Bromofluorobenzene</i>	101		77.0-126		10/06/2019 15:33	WG1358343
(S) <i>1,2-Dichloroethane-d4</i>	95.3		70.0-130		10/06/2019 15:33	WG1358343

Semi-Volatile Organic Compounds (GC) by Method 3511/8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		0.100	1	10/06/2019 22:19	WG1357735
(S) <i>o</i> -Terphenyl	80.0		31.0-160		10/06/2019 22:19	WG1357735



Microbiology by Method BART

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Iron Related Bacteria	Present		1	10/14/2019 09:20	WG1357718
Slime Forming Bacteria	Present		1	10/14/2019 09:20	WG1357718
Sulfate Reducing Bacteria	Present		1	10/14/2019 09:20	WG1357718

Sample Narrative:

L1146341-03 WG1357718: Approximate IRB population=9000 cfu/ml. Reactions=FO/BR/BC/BL

L1146341-03 WG1357718: Approximate SLYM population= 13,000 cfu/ml. Reactions=PB/SR

L1146341-03 WG1357718: Approximate SRB population= 500,000cfu/ml. Reactions=BB/BT

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Dissolved Solids	1250		20.0	1	10/06/2019 14:43	WG1358086

Wet Chemistry by Method 2320 B-2011

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Alkalinity	531		20.0	1	10/07/2019 19:46	WG1358690
Alkalinity,Bicarbonate	531		20.0	1	10/07/2019 19:46	WG1358690
Alkalinity,Carbonate	ND		20.0	1	10/07/2019 19:46	WG1358690

Sample Narrative:

L1146341-03 WG1358690: Endpoint pH 4.5

Wet Chemistry by Method 365.4

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Phosphorus,Total	ND		0.100	1	10/07/2019 13:26	WG1357623

Wet Chemistry by Method 9040C

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	8.27	T8	1	10/04/2019 19:00	WG1357782

Sample Narrative:

L1146341-03 WG1357782: 8.27 at 17.8C

Wet Chemistry by Method 9050A

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	1250		10.0	1	10/04/2019 20:00	WG1357584

Wet Chemistry by Method 9056A

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Bromide	ND		1.00	1	10/04/2019 20:51	WG1357554
Chloride	19.5		1.00	1	10/04/2019 20:51	WG1357554
Fluoride	0.753		0.100	1	10/04/2019 20:51	WG1357554
Nitrate as (N)	ND		0.100	1	10/04/2019 20:51	WG1357554
Nitrite as (N)	ND		0.100	1	10/04/2019 20:51	WG1357554
Sulfate	577		50.0	10	10/04/2019 21:07	WG1357554

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc



Collected date/time: 10/03/19 10:00

L1146341

Metals (ICP) by Method 6010B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Barium	0.0552		0.00500	1	10/07/2019 19:13	WG1357636
Boron	0.291		0.200	1	10/07/2019 19:13	WG1357636
Calcium	109		1.00	1	10/07/2019 19:13	WG1357636
Iron	0.425	<u>B</u>	0.100	1	10/07/2019 19:13	WG1357636
Magnesium	104		1.00	1	10/07/2019 19:13	WG1357636
Manganese	0.0952		0.0100	1	10/07/2019 19:13	WG1357636
Potassium	3.87		1.00	1	10/07/2019 19:13	WG1357636
Selenium	ND		0.0100	1	10/07/2019 19:13	WG1357636
Sodium	200		1.00	1	10/07/2019 19:13	WG1357636
Strontium	1.86		0.0100	1	10/07/2019 19:13	WG1357636

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	10/07/2019 14:48	WG1358557
(S) <i>α,α,α</i> -Trifluorotoluene(FID)	111		78.0-120		10/07/2019 14:48	WG1358557

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Methane	ND		0.0100	1	10/08/2019 11:23	WG1358910
Ethane	ND		0.0130	1	10/08/2019 11:23	WG1358910
Ethene	ND		0.0130	1	10/08/2019 11:23	WG1358910

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	10/06/2019 15:14	WG1358343
Toluene	ND		0.00100	1	10/06/2019 15:14	WG1358343
Ethylbenzene	ND		0.00100	1	10/06/2019 15:14	WG1358343
Total Xylenes	ND		0.00300	1	10/06/2019 15:14	WG1358343
(S) <i>Toluene-d8</i>	109		80.0-120		10/06/2019 15:14	WG1358343
(S) <i>4-Bromofluorobenzene</i>	101		77.0-126		10/06/2019 15:14	WG1358343
(S) <i>1,2-Dichloroethane-d4</i>	96.8		70.0-130		10/06/2019 15:14	WG1358343

Semi-Volatile Organic Compounds (GC) by Method 3511/8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		0.100	1	10/06/2019 22:39	WG1357735
(S) <i>o</i> -Terphenyl	73.7		31.0-160		10/06/2019 22:39	WG1357735



Volatile Organic Compounds (GC) by Method 8015D/GRO

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	ND		0.100	1	10/07/2019 15:11	WG1358557
(S) a,a,a-Trifluorotoluene(FID)	110		78.0-120		10/07/2019 15:11	WG1358557

1 Cp

2 Tc

3 Ss

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
Benzene	ND		0.00100	1	10/06/2019 14:55	WG1358343
Toluene	ND		0.00100	1	10/06/2019 14:55	WG1358343
Ethylbenzene	ND		0.00100	1	10/06/2019 14:55	WG1358343
Total Xylenes	ND		0.00300	1	10/06/2019 14:55	WG1358343
(S) Toluene-d8	106		80.0-120		10/06/2019 14:55	WG1358343
(S) 4-Bromofluorobenzene	103		77.0-126		10/06/2019 14:55	WG1358343
(S) 1,2-Dichloroethane-d4	96.4		70.0-130		10/06/2019 14:55	WG1358343

4 Cn

5 Sr

6 Qc

7 Gl

Semi-Volatile Organic Compounds (GC) by Method 3511/8015

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
TPH (GC/FID) High Fraction	ND		0.100	1	10/06/2019 22:59	WG1357735
(S) o-Terphenyl	79.5		31.0-160		10/06/2019 22:59	WG1357735

8 Al

9 Sc

¹Cp ${}^2\text{Tc}$ 3S_S ${}^4\text{Cn}$ ^5Sr ⁶Qc

GI

 ${}^8\text{Al}$ ^9Sc

Method Blank (MB)

(MB) R3458578-1 10/07/19 16:46

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Alkalinity	3.28	U	2.71	20.0
Alkalinity,Bicarbonate	3.28	U	2.71	20.0
Alkalinity,Carbonate	U		2.71	20.0

Sample Narrative:
BLANK: Endpoint pH 4.5

L1145200-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1145200-04 10/07/19 17:46 • (DUP) R3458578-3 10/07/19 17:53

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Alkalinity	245	246	1	0.531		20
Alkalinity,Bicarbonate	245	246	1	0.531		20
Alkalinity,Carbonate	U	0.000	1	0.000		20

Sample Narrative:
OS: Endpoint pH 4.5
DUP: Endpoint pH 4.5

L1145310-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1145310-03 10/07/19 18:59 • (DUP) R3458578-6 10/07/19 19:07

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	mg/l	mg/l		%		%
Alkalinity	142	142	1	0.0816		20
Alkalinity,Bicarbonate	142	142	1	0.0816		20
Alkalinity,Carbonate	U	0.000	1	0.000		20

Sample Narrative:
OS: Endpoint pH 4.5 headspace
DUP: Endpoint pH 4.5

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Laboratory Control Sample (LCS)

(LCS) R3458578-5 10/07/19 18:01

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Alkalinity	100	103	103	85.0-115	

Sample Narrative:
LCS: Endpoint pH 4.5

- 1Cp
- 2Tc
- 3Ss
- 4Cn
- 5Sr
- 6Qc
- 7Gl
- 8Al
- 9Sc



Method Blank (MB)

(MB) R3458409-1 10/07/19 12:51

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/l		mg/l	mg/l
Phosphorus,Total	U		0.0350	0.100

L1146197-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1146197-04 10/07/19 12:59 • (DUP) R3458409-3 10/07/19 13:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Phosphorus,Total	2.92	2.84	1	2.78		20

L1146214-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146214-02 10/07/19 13:14 • (DUP) R3458409-7 10/07/19 13:15

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Phosphorus,Total	1.80	1.74	1	3.39		20

Laboratory Control Sample (LCS)

(LCS) R3458409-2 10/07/19 12:52

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
Phosphorus,Total	2.00	1.84	92.0	90.0-110	

L1146200-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1146200-02 10/07/19 13:06 • (MS) R3458409-4 10/07/19 13:08 • (MSD) R3458409-5 10/07/19 13:09

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Phosphorus,Total	2.50	3.38	5.70	6.18	92.8	112	1	90.0-110	E	E J5	8.08	20

L1146273-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1146273-02 10/07/19 13:19 • (MS) R3458409-6 10/07/19 13:21

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/l	mg/l	mg/l	%		%	
Phosphorus,Total	2.50	2.71	5.18	98.8	1	90.0-110	E

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



L1146155-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146155-02 10/04/19 19:00 • (DUP) R3457897-2 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.30	8.29	1	0.121		1

Sample Narrative:

OS: 8.3 at 19.3C

DUP: 8.29 at 19.3C



L1146158-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146158-02 10/04/19 19:00 • (DUP) R3457897-3 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.96	6.98	1	0.287		1

Sample Narrative:

OS: 6.96 at 19.3C

DUP: 6.98 at 19.3C

L1146159-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146159-02 10/04/19 19:00 • (DUP) R3457897-4 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.11	7.11	1	0.000		1

Sample Narrative:

OS: 7.11 at 18.9C

DUP: 7.11 at 18.9C

L1146161-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146161-02 10/04/19 19:00 • (DUP) R3457897-5 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	6.45	6.44	1	0.155		1

Sample Narrative:



L1146161-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146161-02 10/04/19 19:00 • (DUP) R3457897-5 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 6.45 at 19.9C						
DUP: 6.44 at 19.9C						

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L1146163-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146163-02 10/04/19 19:00 • (DUP) R3457897-6 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.06	7.09	1	0.424		1

Sample Narrative:

OS: 7.06 at 19.7C

DUP: 7.09 at 19.5C

L1146164-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146164-02 10/04/19 19:00 • (DUP) R3457897-7 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	5.83	5.82	1	0.172		1

Sample Narrative:

OS: 5.83 at 18.9C

DUP: 5.82 at 18.9C

L1146203-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1146203-01 10/04/19 19:00 • (DUP) R3457897-8 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	9.30	9.30	1	0.000		1

Sample Narrative:

OS: 9.3 at 18.9C

DUP: 9.3 at 18.9C



L1146247-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146247-02 10/04/19 19:00 • (DUP) R3457897-9 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.58	8.58	1	0.000		1

Sample Narrative:

OS: 8.58 at 18.2C

DUP: 8.58 at 18.2C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1146302-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1146302-01 10/04/19 19:00 • (DUP) R3457897-10 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.39	7.37	1	0.271		1

Sample Narrative:

OS: 7.39 at 18.3C

DUP: 7.37 at 18.4C

L1146306-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1146306-01 10/04/19 19:00 • (DUP) R3457897-11 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.80	7.86	1	0.766		1

Sample Narrative:

OS: 7.8 at 18.1C

DUP: 7.86 at 18.1C

L1146331-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1146331-01 10/04/19 19:00 • (DUP) R3457897-13 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.34	8.34	1	0.000		1

Sample Narrative:

L1146331-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1146331-01 10/04/19 19:00 • (DUP) R3457897-13 10/04/19 19:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
OS: 8.34 at 18.5C						
DUP: 8.34 at 18.5C						

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1146337-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1146337-01 10/04/19 19:00 • (DUP) R3457897-14 10/04/19 19:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.48	7.49	1	0.134		1

Sample Narrative:

OS: 7.48 at 19C
DUP: 7.49 at 18.9C

L1146337-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146337-02 10/04/19 19:00 • (DUP) R3457897-15 10/04/19 19:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	6.68	6.60	1	1.20	J3	1

Sample Narrative:

OS: 6.68 at 19.1C
DUP: 6.6 at 19C

L1146337-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1146337-03 10/04/19 19:00 • (DUP) R3457897-16 10/04/19 19:00

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	su	su		%		%
pH	7.25	7.22	1	0.415		1

Sample Narrative:

OS: 7.25 at 18.5C
DUP: 7.22 at 18.4C

L1146338-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1146338-01 10/04/19 19:00 • (DUP) R3457897-17 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.62	7.69	1	0.914		1

Sample Narrative:

OS: 7.62 at 18.6C
DUP: 7.69 at 19C

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1146341-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1146341-01 10/04/19 19:00 • (DUP) R3457897-18 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.24	8.24	1	0.000		1

Sample Narrative:

OS: 8.24 at 17.6C
DUP: 8.24 at 17.4C

L1146341-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1146341-02 10/04/19 19:00 • (DUP) R3457897-19 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.22	8.23	1	0.122		1

Sample Narrative:

OS: 8.22 at 17.8C
DUP: 8.23 at 17.8C

L1146341-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1146341-03 10/04/19 19:00 • (DUP) R3457897-20 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.27	8.27	1	0.000		1

Sample Narrative:



L1146341-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1146341-03 10/04/19 19:00 • (DUP) R3457897-20 10/04/19 19:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
OS: 8.27 at 17.8C						
DUP: 8.27 at 17.8C						

Laboratory Control Sample (LCS)

(LCS) R3457897-1 10/04/19 19:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	9.96	99.6	99.0-101	

Sample Narrative:

LCS: 9.96 at 19.7C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3457903-1 10/04/19 20:00

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	umhos/cm		umhos/cm	umhos/cm
Specific Conductance	U		10.0	10.0

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

L1145050-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1145050-02 10/04/19 20:00 • (DUP) R3457903-3 10/04/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	120	120	1	0.000		20

L1145940-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1145940-04 10/04/19 20:00 • (DUP) R3457903-4 10/04/19 20:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	umhos/cm	umhos/cm		%		%
Specific Conductance	369	368	1	0.271		20

Laboratory Control Sample (LCS)

(LCS) R3457903-2 10/04/19 20:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	umhos/cm	umhos/cm	%	%	
Specific Conductance	393	396	101	85.0-115	



Method Blank (MB)

(MB) R3457962-1 10/04/19 13:02

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Bromide	U		0.0790	1.00
Chloride	U		0.0519	1.00
Fluoride	U		0.00990	0.100
Nitrate	U		0.0227	0.100
Nitrite	U		0.0277	0.100
Sulfate	U		0.0774	5.00

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L1146336-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1146336-01 10/04/19 14:50 • (DUP) R3457962-3 10/04/19 15:06

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Bromide	ND	0.000	1	0.000		15
Chloride	30.3	30.2	1	0.281		15
Fluoride	0.102	0.0966	1	5.14	U	15
Nitrate	ND	0.000	1	0.000		15
Nitrite	ND	0.000	1	0.000		15
Sulfate	23.2	23.1	1	0.292		15

Laboratory Control Sample (LCS)

(LCS) R3457962-2 10/04/19 13:18

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Bromide	40.0	39.3	98.2	80.0-120	
Chloride	40.0	39.0	97.6	80.0-120	
Fluoride	8.00	8.02	100	80.0-120	
Nitrate	8.00	7.96	99.6	80.0-120	
Nitrite	8.00	7.86	98.2	80.0-120	
Sulfate	40.0	40.0	100	80.0-120	

L1146336-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1146336-02 10/04/19 15:23 • (MS) R3457962-4 10/04/19 15:39 • (MSD) R3457962-5 10/04/19 15:55

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Bromide	50.0	ND	44.6	45.2	89.3	90.4	1	80.0-120			1.21	15
Chloride	50.0	29.9	77.9	77.7	96.1	95.5	1	80.0-120			0.361	15

L1146336-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1146336-02 10/04/19 15:23 • (MS) R3457962-4 10/04/19 15:39 • (MSD) R3457962-5 10/04/19 15:55

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Fluoride	5.00	ND	5.08	5.02	101	99.7	1	80.0-120			1.16	15
Nitrate	5.00	ND	4.67	4.77	93.4	95.3	1	80.0-120			2.05	15
Nitrite	5.00	ND	4.99	4.98	99.8	99.7	1	80.0-120			0.0682	15
Sulfate	50.0	11.8	61.0	60.3	98.5	97.0	1	80.0-120			1.23	15

L1146350-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1146350-01 10/04/19 21:56 • (MS) R3457962-7 10/04/19 22:13

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Bromide	50.0	U	48.7	97.3	1	80.0-120	
Chloride	50.0	22.0	71.1	98.3	1	80.0-120	
Fluoride	5.00	0.120	5.21	102	1	80.0-120	
Nitrate	5.00	5.45	10.3	97.6	1	80.0-120	E
Nitrite	5.00	U	5.10	102	1	80.0-120	
Sulfate	50.0	17.0	66.5	99.0	1	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3458634-1 10/07/19 17:57

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Barium	U		0.00170	0.00500
Boron	U		0.0126	0.200
Calcium	0.0540	U	0.0463	1.00
Iron	0.0754	U	0.0141	0.100
Magnesium	0.0297	U	0.0111	1.00
Manganese	U		0.00120	0.0100
Potassium	U		0.102	1.00
Selenium	U		0.00740	0.0100
Sodium	0.196	U	0.0985	1.00
Strontium	U		0.00170	0.0100

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3458634-2 10/07/19 18:00 • (LCSD) R3458634-3 10/07/19 18:02

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Barium	1.00	1.02	1.02	102	102	80.0-120			0.522	20
Boron	1.00	0.991	1.01	99.1	101	80.0-120			1.73	20
Calcium	10.0	10.1	10.1	101	101	80.0-120			0.725	20
Iron	10.0	9.94	10.1	99.4	101	80.0-120			1.21	20
Magnesium	10.0	10.2	10.2	102	102	80.0-120			0.741	20
Manganese	1.00	0.981	0.982	98.1	98.2	80.0-120			0.0252	20
Potassium	10.0	9.73	9.83	97.3	98.3	80.0-120			1.02	20
Selenium	1.00	0.973	0.986	97.3	98.6	80.0-120			1.25	20
Sodium	10.0	10.5	10.5	105	105	80.0-120			0.0962	20
Strontium	1.00	1.00	1.00	100	100	80.0-120			0.167	20

L1146191-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1146191-01 10/07/19 18:05 • (MS) R3458634-5 10/07/19 18:10 • (MSD) R3458634-6 10/07/19 18:12

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Barium	1.00	0.316	1.33	1.32	101	101	1	75.0-125			0.489	20
Boron	1.00	ND	0.999	1.01	98.6	99.5	1	75.0-125			0.884	20
Calcium	10.0	8.88	18.5	18.6	95.8	97.3	1	75.0-125			0.810	20
Iron	10.0	1.52	11.6	12.1	101	106	1	75.0-125			4.09	20
Magnesium	10.0	3.74	13.7	13.7	99.3	99.9	1	75.0-125			0.490	20
Manganese	1.00	0.134	1.10	1.09	96.1	95.8	1	75.0-125			0.264	20
Potassium	10.0	3.09	12.6	12.6	95.2	94.6	1	75.0-125			0.419	20



L1146191-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1146191-01 10/07/19 18:05 • (MS) R3458634-5 10/07/19 18:10 • (MSD) R3458634-6 10/07/19 18:12

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Selenium	1.00	ND	0.978	0.964	97.8	96.4	1	75.0-125			1.43	20
Sodium	10.0	15.0	25.0	24.8	100	97.4	1	75.0-125			1.07	20
Strontium	1.00	1.24	2.22	2.23	97.8	98.6	1	75.0-125			0.353	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3458789-4 10/07/19 11:52

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) Low Fraction	0.0444	⬇	0.0314	0.100
(S) a,a,a-Trifluorotoluene(FID)	110			78.0-120

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3458789-2 10/07/19 10:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.10	92.7	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			95.6	78.0-120	



Method Blank (MB)

(MB) R3458753-1 10/08/19 09:54

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Methane	U		0.00291	0.0100
Ethane	U		0.00407	0.0130
Ethene	U		0.00426	0.0130

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

L1146209-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1146209-05 10/08/19 10:17 • (DUP) R3458753-2 10/08/19 10:43

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Methane	0.0603	0.0676	1	11.4		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20

L1146341-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1146341-01 10/08/19 11:25 • (DUP) R3458753-3 10/08/19 11:29

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Methane	ND	0.000	1	0.000		20
Ethane	ND	0.000	1	0.000		20
Ethene	ND	0.000	1	0.000		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3458753-6 10/08/19 11:37 • (LCSD) R3458753-7 10/08/19 11:44

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Methane	0.0678	0.0712	0.0714	105	105	85.0-115			0.381	20
Ethane	0.129	0.129	0.129	99.9	100	85.0-115			0.285	20
Ethene	0.127	0.135	0.136	106	107	85.0-115			0.859	20



L1146209-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1146209-01 10/08/19 09:56 • (MS) R3458753-4 10/08/19 11:32 • (MSD) R3458753-5 10/08/19 11:35

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Methane	0.0678	0.0224	0.0959	0.0979	108	111	1	85.0-115			2.08	20
Ethane	0.129	ND	0.136	0.141	106	109	1	85.0-115			3.11	20
Ethene	0.127	ND	0.140	0.144	110	113	1	85.0-115			2.69	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc



Method Blank (MB)

(MB) R3459020-3 10/06/19 12:59

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
Ethylbenzene	U		0.000384	0.00100
Toluene	U		0.000412	0.00100
Xylenes, Total	U		0.00106	0.00300
(S) Toluene-d8	108			80.0-120
(S) 4-Bromofluorobenzene	101			77.0-126
(S) 1,2-Dichloroethane-d4	96.1			70.0-130

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3459020-1 10/06/19 12:03 • (LCSD) R3459020-2 10/06/19 12:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0250	0.0231	0.0227	92.4	90.8	70.0-123			1.75	20
Ethylbenzene	0.0250	0.0250	0.0246	100	98.4	79.0-123			1.61	20
Toluene	0.0250	0.0246	0.0241	98.4	96.4	79.0-120			2.05	20
Xylenes, Total	0.0750	0.0764	0.0753	102	100	79.0-123			1.45	20
(S) Toluene-d8				105	104	80.0-120				
(S) 4-Bromofluorobenzene				100	101	77.0-126				
(S) 1,2-Dichloroethane-d4				104	103	70.0-130				



Method Blank (MB)

(MB) R3458267-1 10/06/19 17:37

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) High Fraction	U		0.0247	0.100
(S) o-Terphenyl	81.0			31.0-160

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3458267-2 10/06/19 17:57 • (LCSD) R3458267-3 10/06/19 18:17

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) High Fraction	1.50	1.40	1.43	93.3	95.3	50.0-150			2.12	20
(S) o-Terphenyl				85.5	93.0	31.0-160				

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc



Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
T8	Sample(s) received past/too close to holding time expiration.

1	Cp
2	Tc
3	Ss
4	Cn
5	Sr
6	Qc
7	Gl
8	Al
9	Sc



Pace National is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our one location design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be YOUR LAB OF CHOICE.

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace National.

State Accreditations

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN-03-2002-34
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico ¹	n/a
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	90010	South Carolina	84004
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana ¹	LA180010	Texas	T104704245-18-15
Maine	TN0002	Texas ⁵	LAB0152
Maryland	324	Utah	TN00003
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	460132
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA

Third Party Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA – ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

Our Locations

Pace National has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. Pace National performs all testing at our central laboratory.



Entrada Consulting Group

330 Grand Avenue, Unit C
Grand Junction, CO 81501

Billing Information:
OXYGJCO - LARAMIE OIL AND GAS

Pres
Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



Report to:
Robert Stockton *Matt Kasten*

Email To:
mkasten@entradainc.com

Project **KOBE FLANGE - DITCH**
Description:

City/State
Collected: **DE BEQUE**, CO

Phone: 970-901-9007
Fax:

Client Project #

Lab Project #

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)

Quote #

Immediately
Packed on Ice N ☐ Y ☒

Same Day ☐ Five Day ☐
Next Day ☒ 5 Day (Rad Only) ☐
Two Day ☐ 10 Day (Rad Only) ☐
Three Day ☐

Date Results Needed

No.
of
Cntrs

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	
Kobe Flange - Ditch Por	Grab	GW	-	10/3/19	910	14
Kobe Flange - Ditch UP					915	14
Kobe Flange - Ditch Down					1000	14
Kobe Flange - Ditch Box S					1030	
Kobe Flange - Ditch Box E					1040	
Kobe Flange - Ditch END					1100	4

Btex, GRO, DRO

methane, ethane, propane

TDS, N02N03,

Cl, FI, ALKBI, ALKCA, S04

Metals

SPCON, pH,

Total Alkalinity

major anions

major cations

IRB, SRB, SYLM

Acctnum: OXYGJCO

Template:

Prelogin:

TSR:

PB:

Shipped Via:

Remarks Sample # (lab only)

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks:

** SEE ATTCHED LIST FOR FULL ANALYTES

Samples returned via:

UPS ☐ FedEx ☐ Courier ☐

Tracking #

pH Temp

Flow Other

Sample Receipt Checklist

COC Seal Present/Intact: ☒ Y ☐ N
COC Signed/Accurate: ☒ Y ☐ N
Bottles arrive intact: ☒ Y ☐ N
Correct bottles used: ☒ Y ☐ N
Sufficient volume sent: ☒ Y ☐ N

If Applicable

VOA Zero Headspace: ☒ Y ☐ N
Preservation Correct/Checked: ☒ Y ☐ N

RAD SCREEN: <0.5 mR/hr

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Trip Blank Received: Yes ☐ No ☒

HCL / MeOH
TBR

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: 15.5 °C Bottles Received: 4

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date: 10/4/19 Time: 8:30

Hold:

Condition:
NCF ☒ OK

L1146341

609 Sample Suite

Bacteria

- IRB - Iron related bacteria
- SRB – Sulfate reducing bacteria
- SYLM – Slime forming bacteria

TPH

- GRO – gasoline range
- DRO – diesel range

BTEX

- Benzene
- Toluene
- Ethylbenzene
- Xylene

Dissolved gases

- Methane
- Ethane
- Propane

Major Anions

- Bromide
- Chloride
- Fluoride
- Sulfate
- Nitrate
- Nitrite as N
- Phosphorus

Major Cations

- Calcium
- Iron
- Magnesium
- Manganese
- Potassium
- Sodium

Other elements

- Barium
- Boron
- Selenium
- Strontium

Total dissolved solids (TDS)

pH

Specific conductance

Alkalinity (total bicarbonate and carbonate as CaCO₃)

Isotope analysis of methane(carbon and hydrogen – 12C, 13C, 1H and 2 H) if methane (RSK 175)
is > 1 mg/l

L1146341