Nicholson GeoSolutions, LLC
3433 East Lake Drive
Centennial, CO 80121

July 31, 2020

Mr. Don Wilbourn
Berry Petroleum Company
235 Callahan Avenue
Parachute, Colorado 81635

Subject: Long Ridge J15 Groundwater Investigation

Dear Don:

Nicholson GeoSolutions LLC was retained by Berry Petroleum Company (Berry) to continue investigation at the site of a produced water and condensate leak near the J15 well pad on Long Ridge, Garfield County, Colorado. An unknown amount of condensate and produced water were reported to be lost from a pipeline that runs along the Long Ridge access road south of the J15 well pad. Upon discovery of the leak, an excavation contractor was immediately mobilized to the site to begin excavation of impacted soils and rock. Soil sampling of the excavation walls and floor was conducted on two occasions as previously reported.

To evaluate possible impacts to groundwater, a boring was drilled at the south side of the soil impact zone and completed as a monitoring well. Figure 1 shows the location of the monitoring well and previously collected soil samples. The boring was drilled using a Failing Speedstar drill rig by Artesian Services, Inc. Continuous coring was conducted for the first 32 feet of drilling. The core was screened for volatile compounds using a PID and the lithology encountered was logged. Appendix A contains the boring logs. The core consisted of fractured sandstone of the Uinta Formation and was observed to be moist on the outside but dry within the matrix of the sandstone. Two soil samples were collected from fractured zones at depths of 6-7 feet and 26-27 feet. Table 1 provides the laboratory data for these two samples. The laboratory analytical report is contained in Appendix B. Gasoline-range TPH was present in the lower sample at 422 mg/kg. Benzene, ethylbenzene, and xylenes were also present in this sample.

Table 1 Drill Core Soil Sample Results – July 21, 2020

Parameter	Table 910-1 Standards	J15-1-1 (6-7 ft)	J15-1-2 (26-27 ft)
TVPH – gasoline range (mg/kg)	500	<0.1	422
TEPH – diesel/motor oil range (mg/kg)		<8.0	NA
benzene (mg/kg)	0.17	0.000889	0.13
Toluene (mg/kg)	85	<0.005	<1.0
ethylbenzene (mg/kg)	100	<0.0005	1.28
Xylenes (mg/kg)	175	<0.0015	11.0

Following coring, the boring was extended to a depth of 60 feet. Water was initially present in the borehole at a depth of about 59 feet below ground surface (bgs). After waiting overnight, water had risen in the borehole to a depth of approximately 47 feet bgs. A grab water sample was collected from the open borehole and analyzed for Total Volatile Petroleum Hydrocarbons (TVPH – gasoline range), BTEX (benzene, toluene, ethylbenzene, and xylenes), chloride, sodium, alkalinity, ammonia, and VOCs. Table 2 provides analytical results for the initial water sample. The laboratory analytical report is contained in Appendix B.

Gasoline-range TPH was reported at 104 mg/l, benzene was reported at 1.64 mg/l and toluene was reported at 6.28 mg/l for the initial water sample. In addition, ethylbenzene, xylenes, and several VOCs (sec-butylbenzene, tert-butylbenzene, isopropylbenzene, p-isopropylbenzene, 2-butanone, naphthalene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,2,3-trimethylbenzene, and 1,3,5-trimethylbenzene) were also reported above detection limits. These compounds are all commonly present in natural gas condensate liquids. Elevated levels of TDS (4,830 mg/l), chloride (1,940 mg/l), and dissolved sodium (761 mg/l) were also reported and are indicative of produced water.

Table 2 Initial Water Sample Results

Parameter	Colorado Aquatic Life Standards[3]	EPA Drinking Water Standards	J15-W-1 (July 21, 2020)
Field Parameters			
sp. conductance (µS/cm)			6,380
pH (standard units)	6.5-9.0	6.5-8.5[2]	7.27
temperature (°C)			11.9
General Water Quality Parameters			
total alkalinity (mg/L)			548
TDS (mg/l)		500[2]	**4,830**
Organic Constituents			
total petroleum hydrocarbons – gasoline range (mg/l)			104
benzene (mg/l)	5.3	0.005[1]	**1.64**
toluene (mg/l)	17.5	1.0[1]	**6.28**
ethylbenzene (mg/l)	32	0.7[1]	0.349
xylenes (mg/l)	C[4]	10[1]	6.25
Major Cations and Anions			
dissolved sodium (mg/l)			761
chloride (mg/l)		250[2]	**1,940**
ammonia (mg/l)	0.02[5]		<0.25

[1]Federal Drinking Water Maximum Contaminant Level (MCL)
[2]Federal Drinking Water Secondary Standard
[3]Chronic aquatic life standard (Colorado Water Quality Standards, 5 CCR 1002-31).
[4]Carcinogenic compounds as classified by the EPA
[5]Chronic. Acute ammonia standard calculated based on 0.43/FT/FPH/2, where FT = acute temperature adjustment and FPH = acute pH adjustment.

Based on the initial water sampling results, it appears that the water encountered in the borehole is mainly produced water and condensate with little or no natural groundwater present. Following sampling, the borehole was completed as a 4" monitoring well using Schedule 40 PVC casing and 20 feet of well screen set from approximately 40-60 feet bgs.

Sincerely,

David K. Nicholson, P.G.
Nicholson GeoSolutions LLC

Figure 1

July
2020

GeoSolutions
Nicholson

Legend

- Confirmation Sample
- Pipeline
- Spill Perimeter
- MonitoringWell

0 30 60 Feet

1" = 60'

Berry Petroleum Company

Long Ridge J-15 Pipeline Spill Response Garfield County, Colorado

APPENDIX A
Boring Logs

FIELD LOG

Boring No: J15-MW-1

GeoSolutions NICHOLSON

	Berry Petroleum	Location:	
		Drilling Equipment:	Failing Speedstar
Site ID:	LR J15	Driller:	Artesian Services Inc.
Date/Time Started:	7/20/20 1000	Date/Time Completed:	
Total Depth (ft):		Init. Water Level (ft):	59.0'
Sampling Method:	Core 1st 90'; cuttings	Geologist:	DK Nicholson

Depth (ft)	Sample Interval / Recovery	Well Construction	Description	Moisture	Consistency	PID Headspace (ppm)	Lab Sample
0							0
			sandstone, dry, tan (Vista Fm)				
9	4.7/9.0		soil, tan-brown, rocky, slightly moist, no odors or staining / sandstone, tan, dry \ sample J15-1-16.7'			2.5	
10							
	9.0/9.10		sandstone, hard w/ fractures, tan-brown, moist on outside of core but not in matrix, no odors or staining			2.4	
18			same as above			0.3	
	5.0/6.0						
24							

FIELD LOG

GeoSolutions NICHOLSON

Boring No: J15-MW-1

Site ID:	Location:
Date/Time Started:	Drilling Equipment:
Total Depth (ft):	Driller:
Sampling Method:	Date/Time Completed:
	Init. Water Level (ft): 59.0'
	Geologist: DK Nicholson

Depth (ft)	Sample Interval	Well Construction	Description	Moisture	Consistency	PID Headspace (ppm)	Lab Sample
0							0
30	6.0 / 8.0		same as above shale, vari-colored, dense, slightly moist, ~~st~~ moderate petroleum odor - checked for water - none. sample J15-1-2			58.4	
35			Sandstone, gray, solid w/ a few fractures; moist to wet; no odors or staining.				
40	13.0 / 13.0					1.7	
45							
50			(cuttings)				

FIELD LOG

GeoSolutions NICHOLSON

Boring No: J15-MW-1

Site ID:	Location:
Date/Time Started:	Drilling Equipment:
Total Depth (ft):	Driller:
Sampling Method:	Date/Time Completed:
	Init. Water Level (ft):
	Geologist: DK Nicholson

Depth (ft)	Sample Interval	Well Construction	Description	Moisture	Consistency	PID Headspace (ppm)	Lab Sample
0							0
55			- water encountered after Waiting 10 minutes. About one foot. Strong condensate odor. - Wait overnight.				
60			- ▽ - End 7/20			111.0	
65			TD = 60.0'				
70							
75							

APPENDIX B
Laboratory Reports

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

July 30, 2020

Berry Petroleum - Denver, CO

Sample Delivery Group:	L1242917
Samples Received:	07/23/2020
Project Number:	
Description:	J15

Report To: Dave Nicholson
3433 E. Lake Dr
Centennial, CO 80121

Entire Report Reviewed By:

Mark W. Beasley
Project Manager

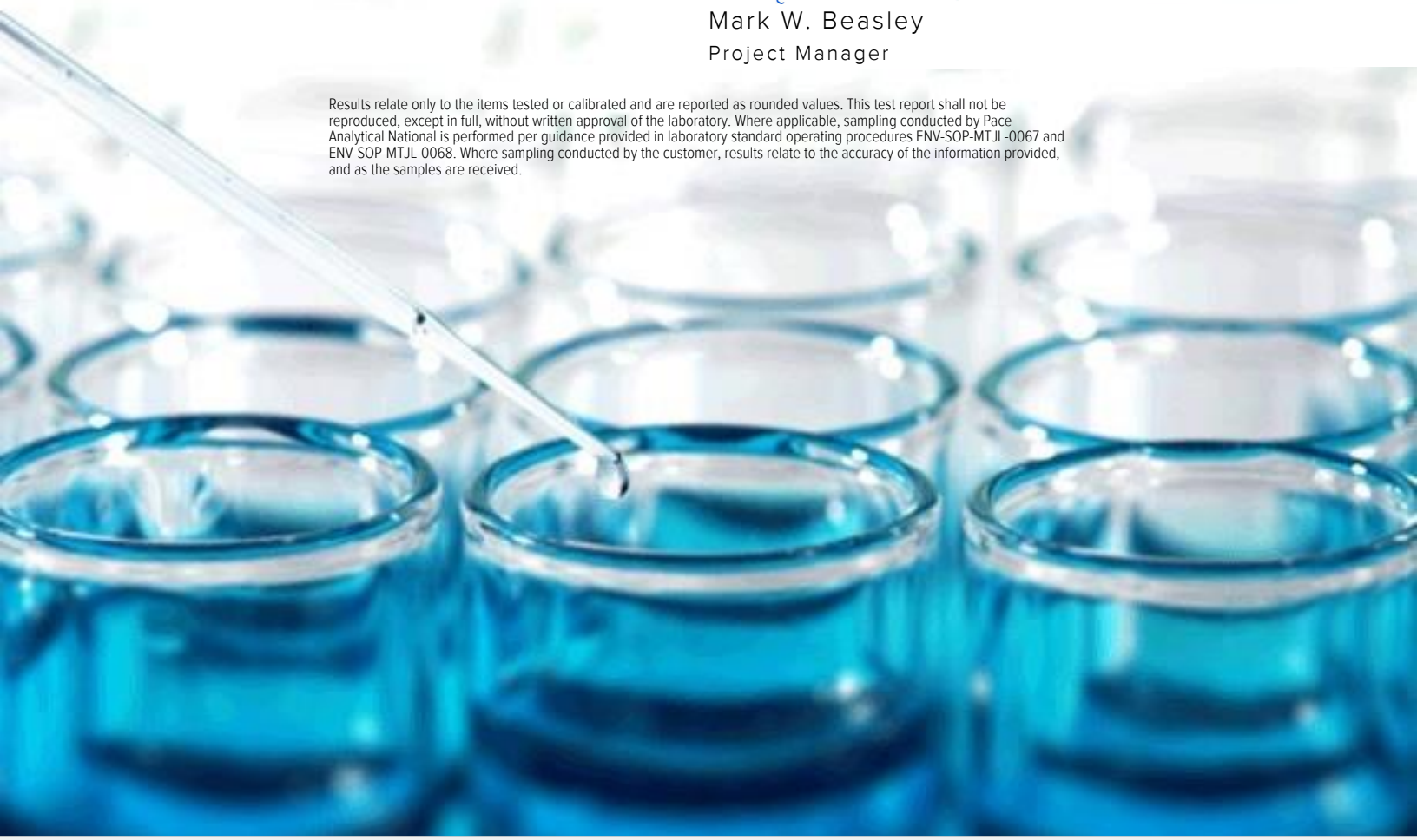


TABLE OF CONTENTS

JI5-1-1 L1242917-01 Solid

Collected by: D. Nicholson
Collected date/time: 07/21/20 10:50
Received date/time: 07/23/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8015/8021	WG1516505	1	07/24/20 22:11	07/29/20 14:52	TPR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015	WG1516461	1	07/28/20 20:23	07/29/20 15:06	CLG	Mt. Juliet, TN

JI5-1-2 L1242917-02 Solid

Collected by: D. Nicholson
Collected date/time: 07/21/20 13:30
Received date/time: 07/23/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC) by Method 8015/8021	WG1515483	200	07/24/20 22:11	07/26/20 21:31	TPR	Mt. Juliet, TN

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.

Mark W. Beasley
Project Manager

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.000889		0.000500	1	07/29/2020 14:52	WG1516505
Toluene	ND		0.00500	1	07/29/2020 14:52	WG1516505
Ethylbenzene	ND		0.000500	1	07/29/2020 14:52	WG1516505
Total Xylene	ND		0.00150	1	07/29/2020 14:52	WG1516505
TPH (GC/FID) Low Fraction	ND		0.100	1	07/29/2020 14:52	WG1516505
(S) a,a,a-Trifluorotoluene(FID)	*100*		*77.0-120*		*07/29/2020 14:52*	WG1516505
(S) a,a,a-Trifluorotoluene(PID)	*98.3*		*72.0-128*		*07/29/2020 14:52*	WG1516505

Semi-Volatile Organic Compounds (GC) by Method 8015

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	ND		4.00	1	07/29/2020 15:06	WG1516461
C28-C40 Oil Range	ND		4.00	1	07/29/2020 15:06	WG1516461
(S) o-Terphenyl	*71.8*		*18.0-148*		*07/29/2020 15:06*	WG1516461

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	0.130		0.100	200	07/26/2020 21:31	WG1515483
Toluene	ND		1.00	200	07/26/2020 21:31	WG1515483
Ethylbenzene	1.28		0.100	200	07/26/2020 21:31	WG1515483
Total Xylene	11.0		0.300	200	07/26/2020 21:31	WG1515483
TPH (GC/FID) Low Fraction	422		20.0	200	07/26/2020 21:31	WG1515483
(S) a,a,a-Trifluorotoluene(FID)	*96.0*		*62.0-128*		*07/26/2020 21:31*	WG1515483
(S) a,a,a-Trifluorotoluene(PID)	*100*		*55.0-122*		*07/26/2020 21:31*	WG1515483

Method Blank (MB)

(MB) R3553981-3 07/26/20 13:04

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	U		0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	*98.5*			*77.0-120*
(S) a,a,a-Trifluorotoluene(PID)	*99.6*			*72.0-128*

Laboratory Control Sample (LCS)

(LCS) R3553981-1 07/26/20 11:57

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.0500	0.0405	81.0	76.0-121	
Toluene	0.0500	0.0421	84.2	80.0-120	
Ethylbenzene	0.0500	0.0439	87.8	80.0-124	
Total Xylene	0.150	0.132	88.0	37.0-160	
(S) a,a,a-Trifluorotoluene(FID)			*97.9*	*77.0-120*	
(S) a,a,a-Trifluorotoluene(PID)			*101*	*72.0-128*	

Laboratory Control Sample (LCS)

(LCS) R3553981-2 07/26/20 12:19

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.55	101	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			*101*	*77.0-120*	
(S) a,a,a-Trifluorotoluene(PID)			*107*	*72.0-128*	

L1242917-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1242917-02 07/26/20 21:31 • (MS) R3553981-4 07/26/20 21:53 • (MSD) R3553981-5 07/26/20 22:15

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	10.0	0.130	9.98	10.4	98.5	103	200	10.0-155			4.12	32
Toluene	10.0	ND	9.65	10.1	96.5	101	200	10.0-160			4.56	34
Ethylbenzene	10.0	1.28	11.4	11.9	101	106	200	10.0-160			4.29	32
Total Xylene	30.0	11.0	40.0	41.2	96.7	101	200	10.0-160			2.96	32
(S) a,a,a-Trifluorotoluene(FID)					*96.2*	*97.0*		*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)					*100*	*99.8*		*72.0-128*				

L1242917-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1242917-02 07/26/20 21:31 • (MS) R3553981-6 07/26/20 22:37 • (MSD) R3553981-7 07/26/20 22:59

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
TPH (GC/FID) Low Fraction	1100	422	1270	1380	77.1	87.1	200	10.0-151			8.30	28
(S) a,a,a-Trifluorotoluene(FID)					*101*	*99.2*		*77.0-120*				
(S) a,a,a-Trifluorotoluene(PID)					*106*	*106*		*72.0-128*				

Method Blank (MB)

(MB) R3554628-3 07/29/20 11:47

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000120	0.000500
Toluene	U		0.000150	0.00500
Ethylbenzene	U		0.000110	0.000500
Total Xylene	U		0.000460	0.00150
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	*104*			*77.0-120*
(S) a,a,a-Trifluorotoluene(PID)	*101*			*72.0-128*

Laboratory Control Sample (LCS)

(LCS) R3554628-1 07/29/20 10:45

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.0500	0.0467	93.4	76.0-121	
Toluene	0.0500	0.0514	103	80.0-120	
Ethylbenzene	0.0500	0.0528	106	80.0-124	
Total Xylene	0.150	0.156	104	37.0-160	
(S) a,a,a-Trifluorotoluene(FID)			*105*	*77.0-120*	
(S) a,a,a-Trifluorotoluene(PID)			*99.7*	*72.0-128*	

Laboratory Control Sample (LCS)

(LCS) R3554628-2 07/29/20 11:06

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.42	98.5	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			*96.6*	*77.0-120*	
(S) a,a,a-Trifluorotoluene(PID)			*103*	*72.0-128*	

Method Blank (MB)

(MB) R3554876-1 07/29/20 11:57

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
C10-C28 Diesel Range	U		1.61	4.00
C28-C40 Oil Range	U		0.274	4.00
(S) o-Terphenyl	*71.8*			*18.0-148*

Laboratory Control Sample (LCS)

(LCS) R3554876-2 07/29/20 12:10

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	30.1	60.2	50.0-150	
(S) o-Terphenyl			*65.5*	*18.0-148*	

L1242909-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1242909-01 07/29/20 13:18 • (MS) R3554876-3 07/29/20 13:31 • (MSD) R3554876-4 07/29/20 13:45

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
C10-C28 Diesel Range	49.0	263	211	356	0.000	188	1	50.0-150	V	E J3 V	51.1	20
(S) o-Terphenyl					*64.8*	*76.1*		*18.0-148*				

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
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J3	The associated batch QC was outside the established quality control range for precision.
V	The sample concentration is too high to evaluate accurate spike recoveries.

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	LAO00356
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

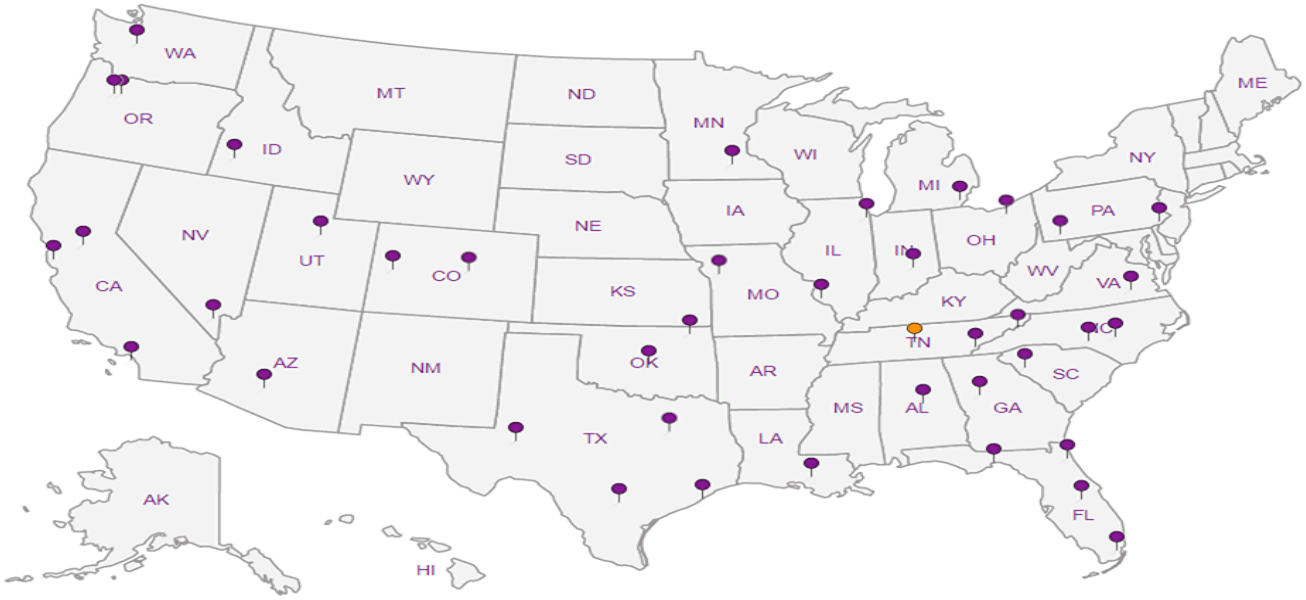
Third Party Federal Accreditations

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.



Berry Petroleum - Denver, CO

1999 Broadway, Suite 3700
Denver, CO 93309

Billing Information:
Dan Wilbourn
Accounts Payable
235 Callahan Ave
Parachute, CO 81635

Report to: Dave Nicholson

Email To: dknicholson@g.com

Project Description: J15

City/State Collected:

Phone: ~~303-999-4400~~
Fax: ~~303-999-4401~~

Client Project #

Lab Project #

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):
DK Nicholson
Immediately Packed on Ice N ___ (Y)

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Pres Chk	TVPH/BTEX	TEPH (diesel + motor)									Remarks	Sample # (lab only)
J15-1-1		SS		7/21	1050	2		X	X										-01
J15-1-2		SS		11	1330	1		X											-02

Analysis / Container / Preservative

Chain of Custody Page 1 of 1

ESC LABORATORIES
a subsidiary of Pace Analytical

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

L # 124217

F207

Acctnum: BERPETDCO

Template:

Prelogin:

TSR: 134 - Mark W. Beasley

PB:

Shipped Via:

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

Remarks:

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier __ _____

Tracking #

Sample Receipt Checklist
COC Seal Present/Intact: NP 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

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
DK Nicholson	7/22/20	1200	FedEx
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes / No
HCL / MeoH
TBR

Temp: wA °C .8+0=.8 Bottles Received: 3

If preservation required by Login: Date/Time

Date: 07/23/20 Time: 0900

Hold:

Condition: NCF / OK

Pace Analytical®
National Center for Testing & Innovation

ANALYTICAL REPORT

July 30, 2020

Berry Petroleum - Denver, CO

Sample Delivery Group: L1242939

Samples Received: 07/23/2020

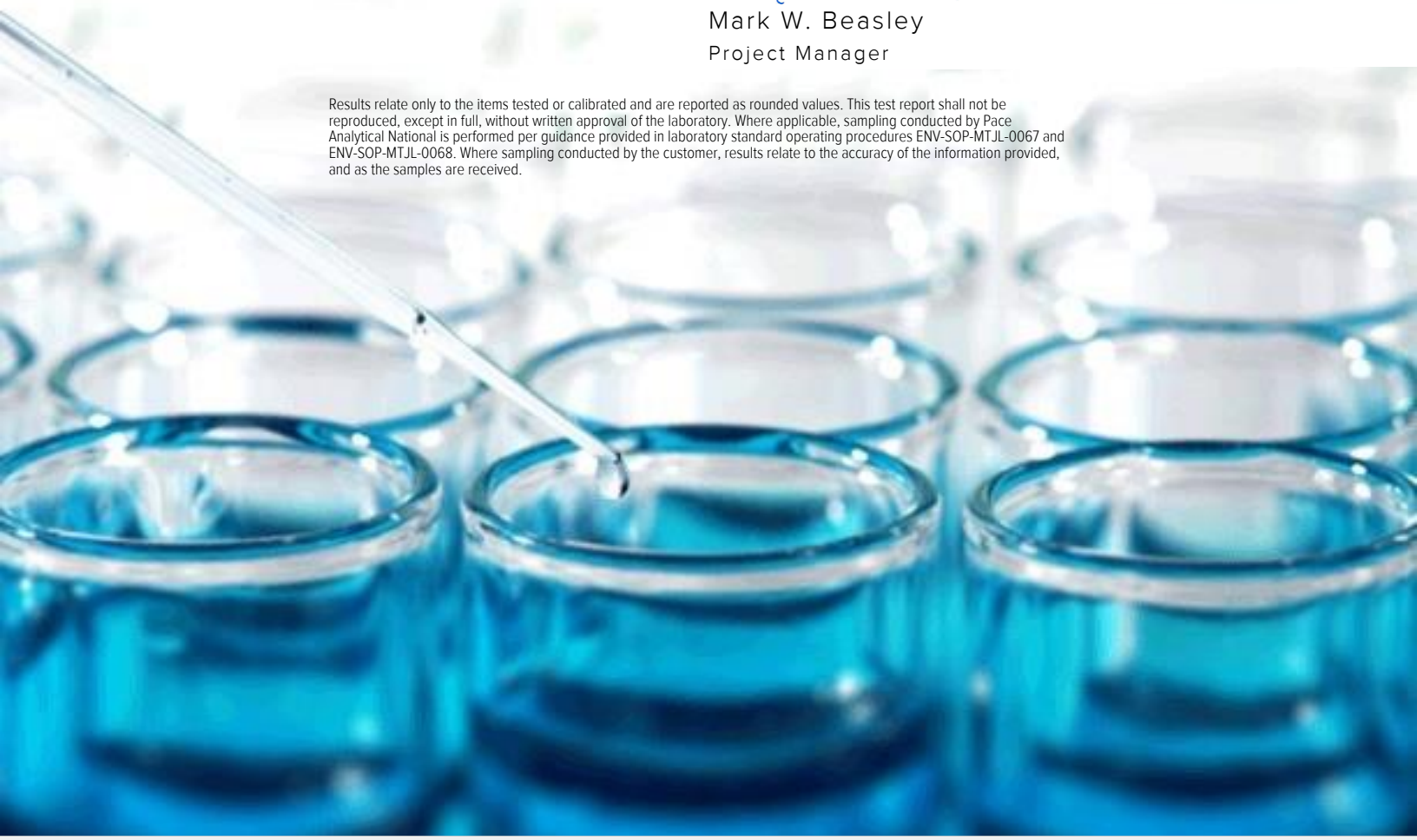
Project Number:

Description:

Report To: Dave Nicholson
3433 E. Lake Dr
Centennial, CO 80121

Entire Report Reviewed By:

Mark W. Beasley
Project Manager



J15-W-1 L1242939-01 GW

Collected by	Collected date/time	Received date/time
	07/21/20 10:00	07/23/20 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1514968	1	07/24/20 20:28	07/24/20 23:40	TH	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1515700	1	07/29/20 23:03	07/29/20 23:03	MCG	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1515643	1	07/29/20 09:25	07/29/20 09:25	DGR	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1514895	100	07/26/20 22:23	07/26/20 22:23	MCG	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1514956	1	07/26/20 09:29	07/26/20 15:08	CCE	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1516523	20	07/30/20 00:32	07/30/20 00:32	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1514822	1	07/25/20 08:48	07/25/20 08:48	JHH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1515897	250	07/27/20 22:12	07/27/20 22:12	DWR	Mt. Juliet, TN

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.

Mark W. Beasley
Project Manager

Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Dissolved Solids	4830		100	1	07/24/2020 23:40	WG1514968

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Alkalinity	548		20.0	1	07/29/2020 23:03	WG1515700

Sample Narrative:

L1242939-01 WG1515700: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Ammonia Nitrogen	ND		0.250	1	07/29/2020 09:25	WG1515643

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Chloride	1940		100	100	07/26/2020 22:23	WG1514895

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Sodium,Dissolved	761		3.00	1	07/26/2020 15:08	WG1514956

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
TPH (GC/FID) Low Fraction	104		2.00	20	07/30/2020 00:32	WG1516523
(S) a,a,a-Trifluorotoluene(FID)	*96.2*		*78.0-120*		*07/30/2020 00:32*	WG1516523

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

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
Acetone	ND		12.5	250	07/27/2020 22:12	WG1515897
Acrolein	ND		0.0500	1	07/25/2020 08:48	WG1514822
Acrylonitrile	ND		0.0100	1	07/25/2020 08:48	WG1514822
Benzene	1.64		0.250	250	07/27/2020 22:12	WG1515897
Bromobenzene	ND		0.00100	1	07/25/2020 08:48	WG1514822
Bromodichloromethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
Bromoform	ND		0.00100	1	07/25/2020 08:48	WG1514822
Bromomethane	ND		0.00500	1	07/25/2020 08:48	WG1514822
n-Butylbenzene	ND		0.00100	1	07/25/2020 08:48	WG1514822
sec-Butylbenzene	0.00536		0.00100	1	07/25/2020 08:48	WG1514822
tert-Butylbenzene	0.00397		0.00100	1	07/25/2020 08:48	WG1514822
Carbon tetrachloride	ND		0.00100	1	07/25/2020 08:48	WG1514822
Chlorobenzene	ND		0.00100	1	07/25/2020 08:48	WG1514822
Chlorodibromomethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
Chloroethane	ND		0.00500	1	07/25/2020 08:48	WG1514822
2-Chloroethyl vinyl ether	ND		0.0500	1	07/25/2020 08:48	WG1514822
Chloroform	ND		0.00500	1	07/25/2020 08:48	WG1514822
Chloromethane	ND		0.00250	1	07/25/2020 08:48	WG1514822
2-Chlorotoluene	ND		0.00100	1	07/25/2020 08:48	WG1514822

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

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
4-Chlorotoluene	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,2-Dibromo-3-Chloropropane	ND		0.00500	1	07/25/2020 08:48	WG1514822
1,2-Dibromoethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
Dibromomethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,2-Dichlorobenzene	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,3-Dichlorobenzene	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,4-Dichlorobenzene	ND		0.00100	1	07/25/2020 08:48	WG1514822
Dichlorodifluoromethane	ND		0.00500	1	07/25/2020 08:48	WG1514822
1,1-Dichloroethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,2-Dichloroethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,1-Dichloroethene	ND		0.00100	1	07/25/2020 08:48	WG1514822
cis-1,2-Dichloroethene	ND		0.00100	1	07/25/2020 08:48	WG1514822
trans-1,2-Dichloroethene	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,2-Dichloropropane	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,1-Dichloropropene	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,3-Dichloropropane	ND		0.00100	1	07/25/2020 08:48	WG1514822
cis-1,3-Dichloropropene	ND		0.00100	1	07/25/2020 08:48	WG1514822
trans-1,3-Dichloropropene	ND		0.00100	1	07/25/2020 08:48	WG1514822
2,2-Dichloropropane	ND		0.00100	1	07/25/2020 08:48	WG1514822
Di-isopropyl ether	ND		0.00100	1	07/25/2020 08:48	WG1514822
Ethylbenzene	0.349		0.250	250	07/27/2020 22:12	WG1515897
Hexachloro-1,3-butadiene	ND		0.00100	1	07/25/2020 08:48	WG1514822
Isopropylbenzene	0.0268		0.00100	1	07/25/2020 08:48	WG1514822
p-Isopropyltoluene	0.0165		0.00100	1	07/25/2020 08:48	WG1514822
2-Butanone (MEK)	0.0926		0.0100	1	07/25/2020 08:48	WG1514822
Methylene Chloride	ND		0.00500	1	07/25/2020 08:48	WG1514822
4-Methyl-2-pentanone (MIBK)	ND		0.0100	1	07/25/2020 08:48	WG1514822
Methyl tert-butyl ether	ND		0.00100	1	07/25/2020 08:48	WG1514822
Naphthalene	0.106		0.00500	1	07/25/2020 08:48	WG1514822
n-Propylbenzene	0.0151		0.00100	1	07/25/2020 08:48	WG1514822
Styrene	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,1,1,2-Tetrachloroethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,1,2,2-Tetrachloroethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,1,2-Trichlorotrifluoroethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
Tetrachloroethene	ND		0.00100	1	07/25/2020 08:48	WG1514822
Toluene	6.28		0.250	250	07/27/2020 22:12	WG1515897
1,2,3-Trichlorobenzene	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,2,4-Trichlorobenzene	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,1,1-Trichloroethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
1,1,2-Trichloroethane	ND		0.00100	1	07/25/2020 08:48	WG1514822
Trichloroethene	ND		0.00100	1	07/25/2020 08:48	WG1514822
Trichlorofluoromethane	ND		0.00500	1	07/25/2020 08:48	WG1514822
1,2,3-Trichloropropane	ND		0.00250	1	07/25/2020 08:48	WG1514822
1,2,4-Trimethylbenzene	0.712		0.250	250	07/27/2020 22:12	WG1515897
1,2,3-Trimethylbenzene	0.193		0.00100	1	07/25/2020 08:48	WG1514822
1,3,5-Trimethylbenzene	0.774		0.250	250	07/27/2020 22:12	WG1515897
Vinyl chloride	ND		0.00100	1	07/25/2020 08:48	WG1514822
Xylenes, Total	6.25		0.750	250	07/27/2020 22:12	WG1515897
Ethanol	ND	J4	0.100	1	07/25/2020 08:48	WG1514822
2-Propanol	ND		1.25	250	07/27/2020 22:12	WG1515897
(S) Toluene-d8	*103*		*80.0-120*		*07/25/2020 08:48*	WG1514822
(S) Toluene-d8	*99.5*		*80.0-120*		*07/27/2020 22:12*	WG1515897
(S) 4-Bromofluorobenzene	*97.9*		*77.0-126*		*07/25/2020 08:48*	WG1514822
(S) 4-Bromofluorobenzene	*91.2*		*77.0-126*		*07/27/2020 22:12*	WG1515897
(S) 1,2-Dichloroethane-d4	*93.6*		*70.0-130*		*07/25/2020 08:48*	WG1514822
(S) 1,2-Dichloroethane-d4	*101*		*70.0-130*		*07/27/2020 22:12*	WG1515897

Method Blank (MB)

(MB) R3553361-1 07/24/20 23:40

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Dissolved Solids	U		2.82	10.0

L1237007-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1237007-02 07/24/20 23:40 • (DUP) R3553361-3 07/24/20 23:40

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Dissolved Solids	30000	25400	1	16.6	J3	5

Laboratory Control Sample (LCS)

(LCS) R3553361-2 07/24/20 23:40

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Dissolved Solids	8800	8790	99.9	85.0-115	

Method Blank (MB)

(MB) R3554613-1 07/29/20 20:07

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Alkalinity	U		8.45	20.0

Sample Narrative:

BLANK: Endpoint pH 4.5

L1242375-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1242375-01 07/29/20 21:19 • (DUP) R3554613-2 07/29/20 21:28

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	119	119	1	0.134		20

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

L1243923-09 Original Sample (OS) • Duplicate (DUP)

(OS) L1243923-09 07/29/20 23:47 • (DUP) R3554613-4 07/29/20 23:54

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Alkalinity	132	130	1	1.72		20

Sample Narrative:

OS: Endpoint pH 4.5

DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS)

(LCS) R3554613-3 07/29/20 22:04

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Alkalinity	100	99.5	99.5	85.0-115	

Sample Narrative:

LCS: Endpoint pH 4.5

Method Blank (MB)

(MB) R3554315-1 07/29/20 08:32

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Ammonia Nitrogen	U		0.117	0.250

L1242085-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1242085-01 07/29/20 08:37 • (DUP) R3554315-3 07/29/20 08:39

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	ND	ND	1	0.000		10

L1242419-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1242419-01 07/29/20 09:19 • (DUP) R3554315-6 07/29/20 09:20

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Ammonia Nitrogen	4.09	4.07	1	0.417		10

Laboratory Control Sample (LCS)

(LCS) R3554315-2 07/29/20 08:34

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ammonia Nitrogen	7.50	7.37	98.2	90.0-110	

L1242269-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1242269-02 07/29/20 08:40 • (MS) R3554315-4 07/29/20 08:42 • (MSD) R3554315-5 07/29/20 08:44

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 %
Ammonia Nitrogen	5.00	ND	4.93	4.94	98.7	98.7	1	90.0-110			0.0405	10

L1242895-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1242895-01 07/29/20 09:22 • (MS) R3554315-7 07/29/20 09:24

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Ammonia Nitrogen	5.00	ND	4.93	98.5	1	90.0-110	

Method Blank (MB)

(MB) R3553414-1 07/26/20 13:06

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Chloride	U		0.379	1.00

L1242685-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1242685-01 07/26/20 14:05 • (DUP) R3553414-3 07/26/20 14:24

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	1440	1450	50	0.703		15

L1242891-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1242891-01 07/26/20 19:55 • (DUP) R3553414-6 07/26/20 20:51

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	11.7	11.5	1	1.56		15

Laboratory Control Sample (LCS)

(LCS) R3553414-2 07/26/20 13:24

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	40.0	39.7	99.3	80.0-120	

L1242733-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1242733-01 07/26/20 16:14 • (MS) R3553414-4 07/26/20 17:10 • (MSD) R3553414-5 07/26/20 17:28

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 %
Chloride	50.0	1.11	52.4	52.2	103	102	1	80.0-120			0.489	15

L1242891-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1242891-02 07/26/20 21:09 • (MS) R3553414-7 07/26/20 21:28

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Chloride	50.0	11.6	62.2	101	1	80.0-120	

Method Blank (MB)

(MB) R3553374-1 07/26/20 13:53

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Sodium,Dissolved	U		1.40	3.00

Laboratory Control Sample (LCS)

(LCS) R3553374-2 07/26/20 13:55

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Sodium,Dissolved	10.0	10.4	104	80.0-120	

Method Blank (MB)

(MB) R3554362-3 07/29/20 11:17

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
TPH (GC/FID) Low Fraction	U		0.0314	0.100
(S) a,a,a-Trifluorotoluene(FID)	*95.9*			*78.0-120*

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

(LCS) R3554362-1 07/29/20 09:55 • (LCSD) R3554362-2 07/29/20 10:33

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) Low Fraction	5.50	5.26	5.24	95.6	95.3	72.0-127			0.381	20
(S) a,a,a-Trifluorotoluene(FID)				*102*	*102*	*78.0-120*				

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

Method Blank (MB)

(MB) R3553337-3 07/25/20 01:20

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acrolein	U		0.00254	0.0500
Acrylonitrile	U		0.000671	0.0100
Bromobenzene	U		0.000118	0.00100
Bromodichloromethane	U		0.000136	0.00100
Bromoform	U		0.000129	0.00100
Bromomethane	U		0.000605	0.00500
n-Butylbenzene	U		0.000157	0.00100
sec-Butylbenzene	U		0.000125	0.00100
tert-Butylbenzene	U		0.000127	0.00100
Carbon tetrachloride	U		0.000128	0.00100
Chlorobenzene	U		0.000116	0.00100
Chlorodibromomethane	U		0.000140	0.00100
Chloroethane	U		0.000192	0.00500
2-Chloroethyl vinyl ether	U		0.000575	0.0500
Chloroform	U		0.000111	0.00500
Chloromethane	U		0.000960	0.00250
2-Chlorotoluene	U		0.000106	0.00100
4-Chlorotoluene	U		0.000114	0.00100
1,2-Dibromo-3-Chloropropane	U		0.000276	0.00500
1,2-Dibromoethane	U		0.000126	0.00100
Dibromomethane	U		0.000122	0.00100
1,2-Dichlorobenzene	U		0.000107	0.00100
1,3-Dichlorobenzene	U		0.000110	0.00100
1,4-Dichlorobenzene	U		0.000120	0.00100
Dichlorodifluoromethane	U		0.000374	0.00500
1,1-Dichloroethane	U		0.000100	0.00100
1,2-Dichloroethane	U		0.0000819	0.00100
1,1-Dichloroethene	U		0.000188	0.00100
cis-1,2-Dichloroethene	U		0.000126	0.00100
trans-1,2-Dichloroethene	U		0.000149	0.00100
1,2-Dichloropropane	U		0.000149	0.00100
1,1-Dichloropropene	U		0.000142	0.00100
1,3-Dichloropropane	U		0.000110	0.00100
cis-1,3-Dichloropropene	U		0.000111	0.00100
trans-1,3-Dichloropropene	U		0.000118	0.00100
2,2-Dichloropropane	U		0.000161	0.00100
Di-isopropyl ether	U		0.000105	0.00100
Ethanol	U		0.0420	0.100
Hexachloro-1,3-butadiene	U		0.000337	0.00100
Isopropylbenzene	U		0.000105	0.00100

Method Blank (MB)

(MB) R3553337-3 07/25/20 01:20

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
p-Isopropyltoluene	U		0.000120	0.00100
2-Butanone (MEK)	U		0.00119	0.0100
Methylene Chloride	U		0.000430	0.00500
4-Methyl-2-pentanone (MIBK)	U		0.000478	0.0100
Methyl tert-butyl ether	U		0.000101	0.00100
Naphthalene	U		0.00100	0.00500
n-Propylbenzene	U		0.0000993	0.00100
Styrene	U		0.000118	0.00100
1,1,1,2-Tetrachloroethane	U		0.000147	0.00100
1,1,2,2-Tetrachloroethane	U		0.000133	0.00100
Tetrachloroethene	U		0.000300	0.00100
1,1,2-Trichlorotrifluoroethane	U		0.000180	0.00100
1,2,3-Trichlorobenzene	U		0.000230	0.00100
1,2,4-Trichlorobenzene	U		0.000481	0.00100
1,1,1-Trichloroethane	U		0.000149	0.00100
1,1,2-Trichloroethane	U		0.000158	0.00100
Trichloroethene	U		0.000190	0.00100
Trichlorofluoromethane	U		0.000160	0.00500
1,2,3-Trichloropropane	U		0.000237	0.00250
1,2,3-Trimethylbenzene	U		0.000104	0.00100
Vinyl chloride	U		0.000234	0.00100
(S) Toluene-d8	*105*			*80.0-120*
(S) 4-Bromofluorobenzene	*102*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*95.9*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R3553337-1 07/25/20 00:16

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acrolein	0.0250	0.0374	150	10.0-160	
Acrylonitrile	0.0250	0.0250	100	55.0-149	
Bromobenzene	0.00500	0.00443	88.6	73.0-121	
Bromodichloromethane	0.00500	0.00493	98.6	75.0-120	
Bromoform	0.00500	0.00475	95.0	68.0-132	
Bromomethane	0.00500	0.00364	72.8	10.0-160	
n-Butylbenzene	0.00500	0.00434	86.8	73.0-125	
sec-Butylbenzene	0.00500	0.00448	89.6	75.0-125	
tert-Butylbenzene	0.00500	0.00467	93.4	76.0-124	

Laboratory Control Sample (LCS)

(LCS) R3553337-1 07/25/20 00:16

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Carbon tetrachloride	0.00500	0.00448	89.6	68.0-126	
Chlorobenzene	0.00500	0.00498	99.6	80.0-121	
Chlorodibromomethane	0.00500	0.00511	102	77.0-125	
Chloroethane	0.00500	0.00432	86.4	47.0-150	
2-Chloroethyl vinyl ether	0.0250	0.0218	87.2	51.0-160	
Chloroform	0.00500	0.00449	89.8	73.0-120	
Chloromethane	0.00500	0.00463	92.6	41.0-142	
2-Chlorotoluene	0.00500	0.00442	88.4	76.0-123	
4-Chlorotoluene	0.00500	0.00465	93.0	75.0-122	
1,2-Dibromo-3-Chloropropane	0.00500	0.00501	100	58.0-134	
1,2-Dibromoethane	0.00500	0.00514	103	80.0-122	
Dibromomethane	0.00500	0.00472	94.4	80.0-120	
1,2-Dichlorobenzene	0.00500	0.00486	97.2	79.0-121	
1,3-Dichlorobenzene	0.00500	0.00488	97.6	79.0-120	
1,4-Dichlorobenzene	0.00500	0.00485	97.0	79.0-120	
Dichlorodifluoromethane	0.00500	0.00569	114	51.0-149	
1,1-Dichloroethane	0.00500	0.00466	93.2	70.0-126	
1,2-Dichloroethane	0.00500	0.00476	95.2	70.0-128	
1,1-Dichloroethene	0.00500	0.00457	91.4	71.0-124	
cis-1,2-Dichloroethene	0.00500	0.00468	93.6	73.0-120	
trans-1,2-Dichloroethene	0.00500	0.00458	91.6	73.0-120	
1,2-Dichloropropane	0.00500	0.00450	90.0	77.0-125	
1,1-Dichloropropene	0.00500	0.00477	95.4	74.0-126	
1,3-Dichloropropane	0.00500	0.00509	102	80.0-120	
cis-1,3-Dichloropropene	0.00500	0.00478	95.6	80.0-123	
trans-1,3-Dichloropropene	0.00500	0.00501	100	78.0-124	
2,2-Dichloropropane	0.00500	0.00424	84.8	58.0-130	
Di-isopropyl ether	0.00500	0.00467	93.4	58.0-138	
Hexachloro-1,3-butadiene	0.00500	0.00590	118	54.0-138	
Isopropylbenzene	0.00500	0.00511	102	76.0-127	
p-Isopropyltoluene	0.00500	0.00477	95.4	76.0-125	
2-Butanone (MEK)	0.0250	0.0261	104	44.0-160	
Methylene Chloride	0.00500	0.00457	91.4	67.0-120	
4-Methyl-2-pentanone (MIBK)	0.0250	0.0238	95.2	68.0-142	
Methyl tert-butyl ether	0.00500	0.00480	96.0	68.0-125	
Naphthalene	0.00500	0.00416	83.2	54.0-135	
n-Propylbenzene	0.00500	0.00434	86.8	77.0-124	
Styrene	0.00500	0.00526	105	73.0-130	
1,1,1,2-Tetrachloroethane	0.00500	0.00538	108	75.0-125	
1,1,2,2-Tetrachloroethane	0.00500	0.00455	91.0	65.0-130	

Laboratory Control Sample (LCS)

(LCS) R3553337-1 07/25/20 00:16

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Tetrachloroethene	0.00500	0.00529	106	72.0-132	
1,1,2-Trichlorotrifluoroethane	0.00500	0.00378	75.6	69.0-132	
1,2,3-Trichlorobenzene	0.00500	0.00401	80.2	50.0-138	
1,2,4-Trichlorobenzene	0.00500	0.00508	102	57.0-137	
1,1,1-Trichloroethane	0.00500	0.00451	90.2	73.0-124	
1,1,2-Trichloroethane	0.00500	0.00519	104	80.0-120	
Trichloroethene	0.00500	0.00481	96.2	78.0-124	
Trichlorofluoromethane	0.00500	0.00388	77.6	59.0-147	
1,2,3-Trichloropropane	0.00500	0.00486	97.2	73.0-130	
1,2,3-Trimethylbenzene	0.00500	0.00466	93.2	77.0-120	
Vinyl chloride	0.00500	0.00441	88.2	67.0-131	
ethanol	0.250	0.569	228	10.0-160	J4
(S) Toluene-d8			*104*	*80.0-120*	
(S) 4-Bromofluorobenzene			*102*	*77.0-126*	
(S) 1,2-Dichloroethane-d4			*97.1*	*70.0-130*	

Method Blank (MB)

(MB) R3553804-4 07/27/20 19:56

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Acetone	U		0.0113	0.0500
Benzene	U		0.0000941	0.00100
Ethylbenzene	U		0.000137	0.00100
2-Propanol	U		0.00165	0.00500
Toluene	U		0.000278	0.00100
1,2,4-Trimethylbenzene	U		0.000322	0.00100
1,3,5-Trimethylbenzene	U		0.000104	0.00100
Xylenes, Total	U		0.000174	0.00300
(S) Toluene-d8	*100*			*80.0-120*
(S) 4-Bromofluorobenzene	*91.2*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*104*			*70.0-130*

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

(LCS) R3553804-1 07/27/20 18:38 • (LCSD) R3553804-2 07/27/20 18:57

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 %
Acetone	0.0250	0.0278	0.0256	111	102	19.0-160			8.24	27
Benzene	0.00500	0.00581	0.00530	116	106	70.0-123			9.18	20
Ethylbenzene	0.00500	0.00506	0.00494	101	98.8	79.0-123			2.40	20
Toluene	0.00500	0.00517	0.00491	103	98.2	79.0-120			5.16	20
1,2,4-Trimethylbenzene	0.00500	0.00488	0.00488	97.6	97.6	76.0-121			0.000	20
1,3,5-Trimethylbenzene	0.00500	0.00588	0.00559	118	112	76.0-122			5.06	20
Xylenes, Total	0.0150	0.0141	0.0132	94.0	88.0	79.0-123			6.59	20
(S) Toluene-d8				*96.9*	*95.7*	*80.0-120*				
(S) 4-Bromofluorobenzene				*87.0*	*85.5*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*96.7*	*93.9*	*70.0-130*				

Laboratory Control Sample (LCS)

(LCS) R3553804-3 07/27/20 19:17

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Propanol	0.0500	0.0537	107	10.0-160	
(S) Toluene-d8			*98.9*	*80.0-120*	
(S) 4-Bromofluorobenzene			*95.4*	*77.0-126*	
(S) 1,2-Dichloroethane-d4			*97.6*	*70.0-130*	

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
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.

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	LAO00356
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

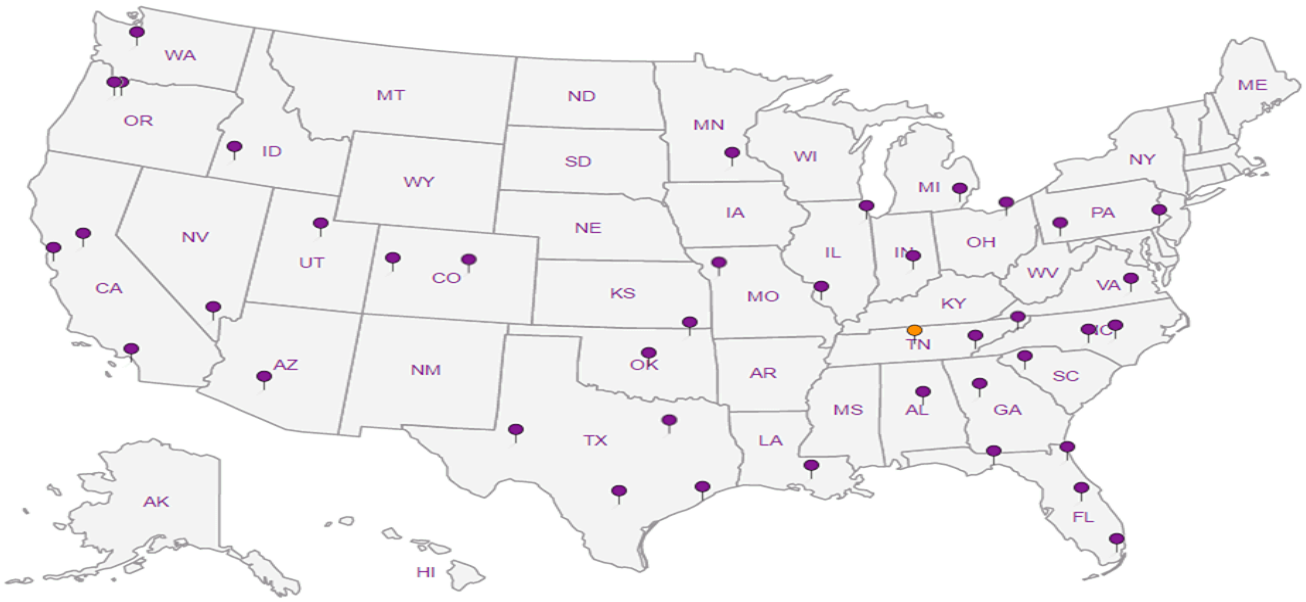
Third Party Federal Accreditations

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.



Berry Petroleum - Denver, CO

3433 E. Lake Dr
Centennial, CO 80121

Billing Information:
Don Wilbourn
235 Callahan Ave
Parachute, CO 81635

Report to: **Dave Nicholson**

Email To: **dknicholson@q.com**

Project Description:

City/State Collected:

Please Circle: PT MT CT ET

Phone: **303-601-2023**
Fax: ~~303-999-4401~~

Client Project #

Lab Project # **BERPETDCO-NICHOLSON**

Collected by (print):

Site/Facility ID #

P.O. #

Collected by (signature):

Immediately Packed on Ice N ___ Y ___

Rush? (Lab MUST Be Notified)
___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Analysis / Container / Preservative

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	~~**Cl,NO2,NO3,SO4~~ 125mlHDPE-NoPres Chloride	ALK, TDS 250mlHDPE-NoPres	~~GRO~~ 40mlAmb-HCl	~~DRO~~ 40mlAmb-HCl-BT	Dissolved Sodium 250mlHDPE-NoPres	~~NH3,NO2NO3 250mlHDPE-H2SO4~~	~~BSK 125 40mlAmb HCl~~	Ammonia L2	VOCs 8260			Remarks	Sample # (lab only)
J15-W-1		GW		7/21	1000	9	X	X	X		X			X	X				-01
		GW																	

Chain of Custody Page 1 of 1

Pace Analytical® National Center for Testing & Innovation

12065 Lebanon Rd
Mount Juliet, TN 37122
Phone: 615-758-5858
Phone: 800-767-5859
Fax: 615-758-5859

SDG # L1242939

F209

Acctnum: **BERPETDCO**
Template: **T122368**
Prelogin: **P729746**
PM: **134 - Mark W. Beasley**
PB: 9-11-19 GM
Shipped Via: **FedEX Ground**

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

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via:
__ UPS __ FedEx __ Courier _____

Tracking # 120357803470

Sample Receipt Checklist
COC Seal Present/Intact: NP 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: Y N

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
DK Nicholson	7/22/20	1200	FedEx
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)

Trip Blank Received: Yes (No) HCl / MeoH TBR

Temp: 0.8 °C Bottles Received: 9

Date: 07 23 20 Time: 0400

If preservation required by Login: Date/Time

Hold:

Condition: NCF (OK)