



Nicholson GeoSolutions, LLC

3433 East Lake Drive
Centennial, CO 80121

Groundwater Monitoring Report for the P32-596 Water Management Facility, Spring 2020

Nicholson GeoSolutions LLC conducted groundwater monitoring near the Berry Petroleum Company P32-596 water management facility located on Old Mountain in Garfield County, Colorado on May 23rd, 2020. Three monitoring wells were installed around the facility in 2014 to provide groundwater monitoring capability for the permit. Figure 1 provides the locations of the monitoring wells. The facility is located on the top of Old Mountain adjacent to Deep Gulch. The three wells are gauged semi-annually to check for groundwater in accordance with the facility permit and samples are collected if sufficient water is present.

Total Depth and Water Levels

Total depth and water levels were measured in each monitoring well using an electronic water level indicator. The water level data are provided in Table 1.

Table 1 P-32 Water Facility Total Depths and Water Levels – May 23, 2020

Monitoring Well ID	Total Depth (feet below top of casing)	Water Level (feet below top of casing)	Water Column Thickness (feet)
MW-1	31.71	dry	dry
MW-2	33.67	33.38	0.29
MW-3	32.40	28.94	3.46

Well MW-2 contained 0.29 feet of water, insufficient for sampling or bailing. MW-1 was dry. Approximately 3.46 feet of water was present in well MW-3. This well was sampled without bailing to capture a vadose-zone groundwater sample.

Sampling Procedures

One unpurged groundwater sample was collected from monitoring well MW-3. Measurements of pH, specific conductance (SC), and water temperature (T) were made using an Oakton 300 combination meter during sampling. The sample was collected into new, pre-preserved sample containers provided by the laboratory. The sample bottles were labeled, placed in plastic zip-lock bags, and stored immediately on ice in a cooler. The sample was shipped to the Pace National Environmental Laboratory in Mt. Juliet, Tennessee for analysis. Chain-of-custody procedures were followed during collection and shipping of the sample.

Laboratory analyses consisted of the following: benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8021B; dissolved sodium by EPA Method 6010B; chloride, fluoride, nitrate, nitrite, and sulfate by EPA Method 9056A; nitrate-nitrite by EPA Method 353.2; total

alkalinity by EPA Method 2320B; ammonia by EPA Method 350.1; total dissolved solids (TDS) by EPA Method 2540C; methane, ethane, and ethene by Method RSKSOP-175M; and Total Petroleum Hydrocarbons (diesel and gasoline range) by EPA Method 8015.

Results

Table 2 summarizes the field parameters and laboratory analytical results for the sample collected. The laboratory analytical report is included in Appendix A. All results are below the associated Federal and Colorado aquatic life standards except for ammonia. Ammonia was reported at 1.45 mg/l, above the aquatic standard of 0.02 mg/l. All petroleum constituents were reported as not detected, except for methane at 2.95 mg/l. Trace concentrations of methane are occasionally reported in groundwater in the area and are considered to be naturally occurring.

Table 2 P-32 Water Facility Groundwater Monitoring Results for Spring 2020

Parameter	Standards		Sample ID and Date
	Colorado Aquatic Life Standards ³	EPA Drinking Water Standards	MW-3 (May 23, 2020)
Field Parameters			
sp. conductance (µS/cm)			724
pH (standard units)	6.5-9.0	6.5-8.5 ²	7.37
temperature (°C)			8.6
General Water Quality Parameters			
total alkalinity			337
TDS		500 ²	395
Organic Constituents			
total petroleum hydrocarbons, diesel range			<0.1
total petroleum hydrocarbons, gasoline range			<0.1
benzene	5.3	0.005 ¹	<0.0005
toluene	17.5	1 ¹	<0.001
ethylbenzene	32	0.7 ¹	<0.0005
xylenes	C ⁴	10 ¹	<0.0015
methane			2.95
ethane			<0.013
ethene			<0.013
Anions			
dissolved sodium			61.0
ammonia	0.02 ⁵		1.45
chloride		250 ²	4.48
fluoride		4 ¹ , 2 ²	0.158
nitrate		10 ¹	<0.1
nitrite		1 ¹	R
nitrate-nitrite			0.718
sulfate		250 ²	15.1

All results in mg/l except where indicated µS/cm = microSiemens per centimeter R = value rejected during data validation

¹Federal Drinking Water Maximum Contaminant Level (MCL) ²Federal Drinking Water Secondary Standard ³Chronic aquatic life standard (Colorado Water Quality Standards, 5 CCR 1002-31).

⁴Carcinogenic compounds as classified by the EPA

⁵Chronic. Acute ammonia standard calculated based on 0.43/FT/FPH/2, where FT = acute temperature adjustment and FPH = acute pH adjustment.

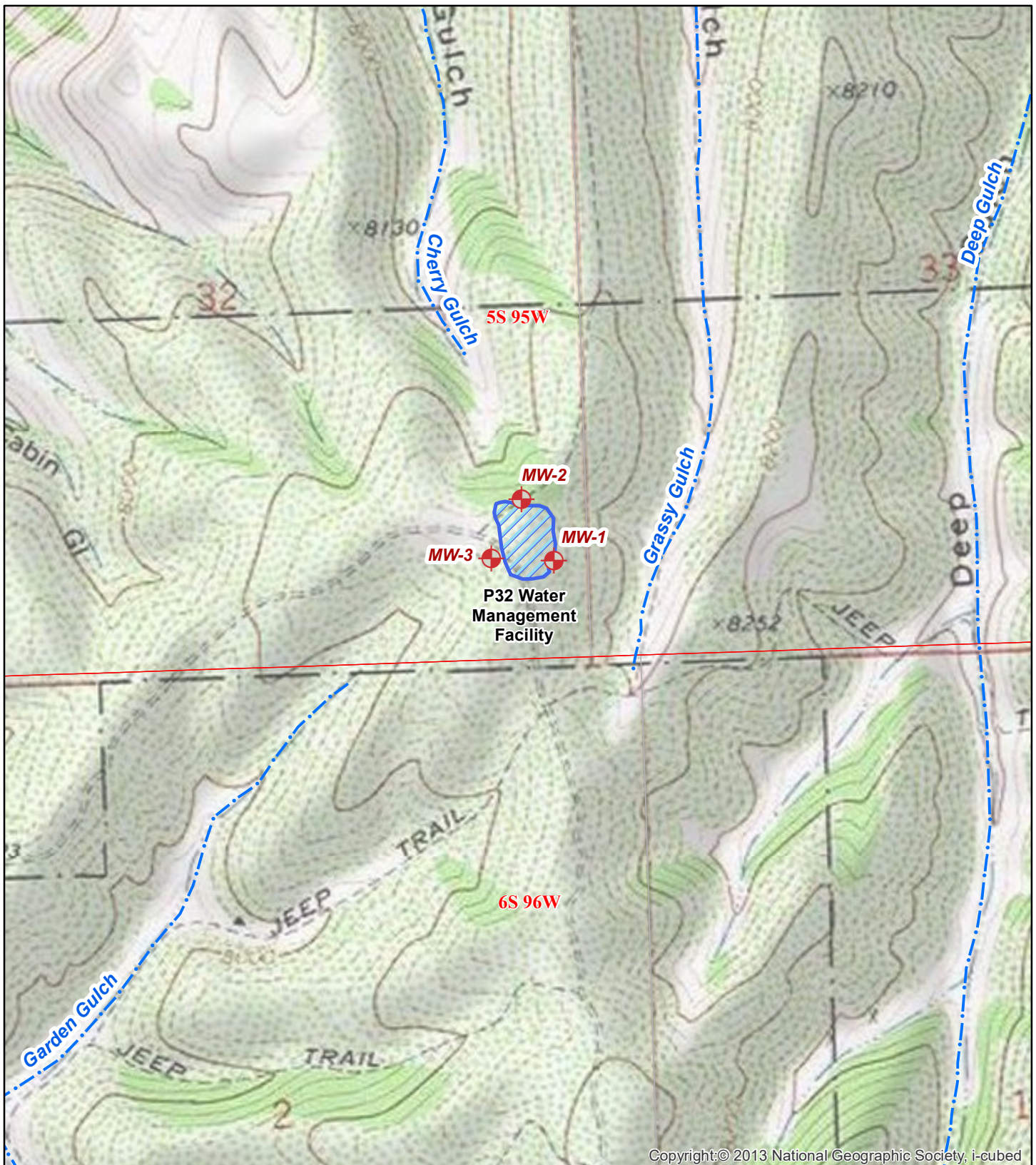
A data review was conducted using the quality assurance report supplied by the laboratory and standard EPA data validation guidelines. All analyses were conducted within the recommended holding times except for nitrite (4 days). Nitrite was rejected “R” based on exceeding the holding time by more than 100%. All method blank results were reported as not detected. All laboratory

control sample (LCS), laboratory duplicate, surrogate, and matrix spike/matrix spike duplicate (MS/MSD) recoveries (for QA samples prepared using the samples from this event only) were within the laboratory control limits.

Nicholson GeoSolutions LLC

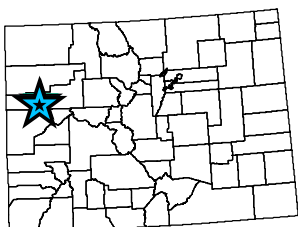
A handwritten signature in blue ink, reading "DK Nicholson". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

David K. Nicholson, P.G.
Principal Geologist






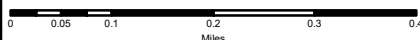
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Project Location



Legend

-  Monitoring Well
-  Surface Water
-  P-32 Water Management Facility



Berry Petroleum Company

Groundwater Monitoring Locations
P-32 Water Manangement Facility
Garfield County, Colorado

June 2017

Nicholson GeoSolutions, LLC

APPENDIX A
Laboratory Report

June 03, 2020

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Berry Petroleum - Denver, CO

Sample Delivery Group: L1222204
Samples Received: 05/27/2020
Project Number:
Description: Berry Garden Gulch Water

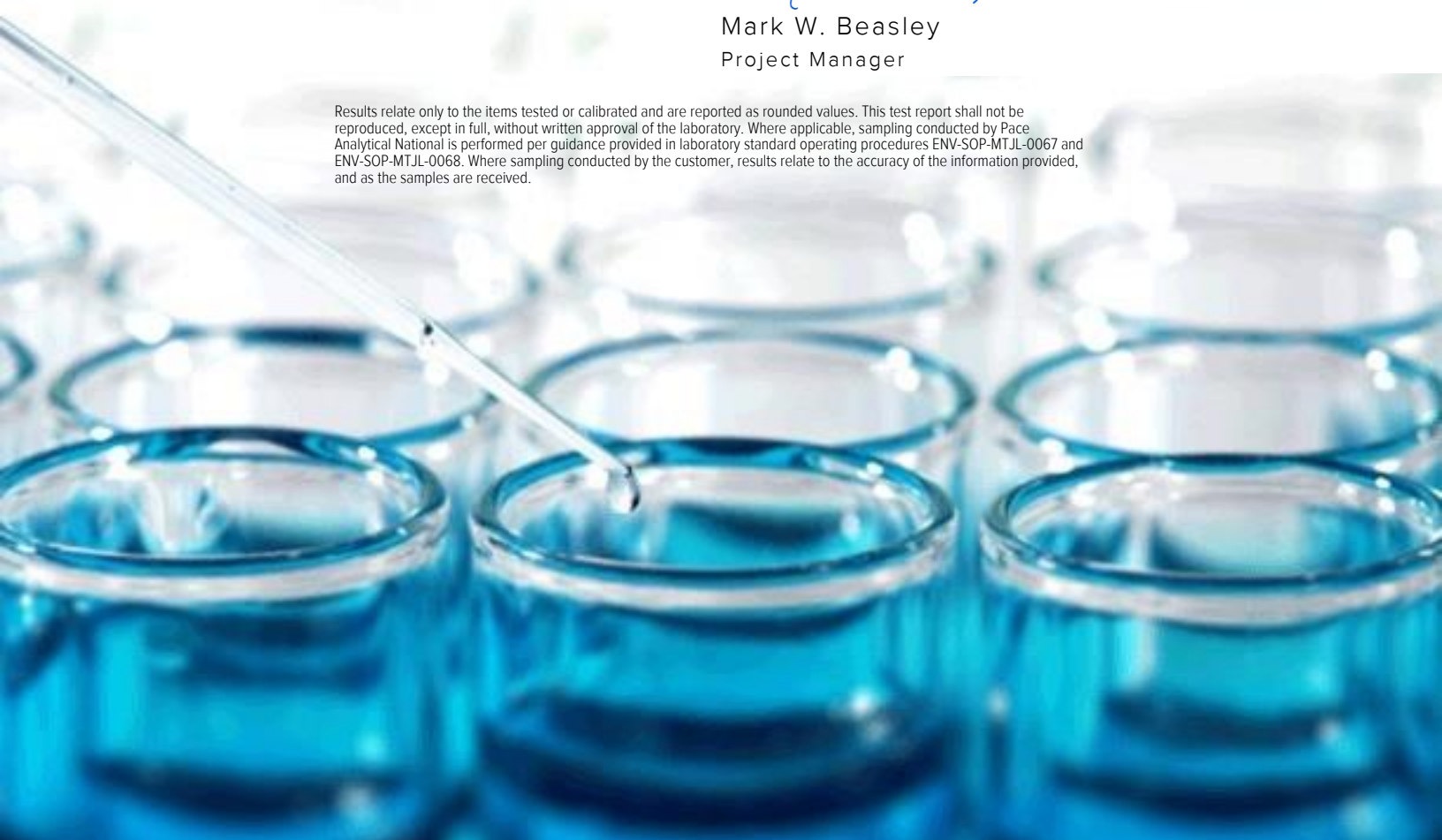
Report To: Dave Nicholson
3433 E. Lake Dr
Centennial, CO 80121

Entire Report Reviewed By:



Mark W. Beasley
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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SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



MW-3 L1222204-01 GW

Collected by
DK Nicholson

Collected date/time
05/23/20 09:10

Received date/time
05/27/20 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Gravimetric Analysis by Method 2540 C-2011	WG1484318	1	05/29/20 15:10	05/29/20 23:38	TH	Mt. Juliet, TN
Wet Chemistry by Method 2320 B-2011	WG1484636	1	06/02/20 12:22	06/02/20 12:22	LEB	Mt. Juliet, TN
Wet Chemistry by Method 350.1	WG1482464	1	06/02/20 10:44	06/02/20 10:44	MCG	Mt. Juliet, TN
Wet Chemistry by Method 353.2	WG1485019	1	06/01/20 18:50	06/01/20 18:50	BAM	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG1482819	1	05/27/20 13:54	05/27/20 13:54	ELN	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1483875	1	05/29/20 00:27	05/29/20 15:06	JPD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015/8021	WG1484805	1	05/31/20 03:08	05/31/20 03:08	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG1485577	1	06/02/20 14:11	06/02/20 14:11	DAH	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 3511/8015	WG1483129	1	05/29/20 15:32	05/31/20 05:01	JN	Mt. Juliet, TN

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

ACCOUNT:

Berry Petroleum - Denver, CO

PROJECT:

SDG:

L1222204

DATE/TIME:

06/03/20 14:47

PAGE:

3 of 20



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

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Gravimetric Analysis by Method 2540 C-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Dissolved Solids	395		10.0	1	05/29/2020 23:38	WG1484318

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Wet Chemistry by Method 2320 B-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Alkalinity	337		20.0	1	06/02/2020 12:22	WG1484636

Sample Narrative:

L1222204-01 WG1484636: Endpoint pH 4.5 HEADSPACE

Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	1.45		0.250	1	06/02/2020 10:44	WG1482464

Wet Chemistry by Method 353.2

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Nitrate-Nitrite	0.718		0.100	1	06/01/2020 18:50	WG1485019

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Chloride	4.48		1.00	1	05/27/2020 13:54	WG1482819
Fluoride	0.158		0.150	1	05/27/2020 13:54	WG1482819
Nitrate as (N)	ND	T8	0.100	1	05/27/2020 13:54	WG1482819
Nitrite as (N)	0.260	T8	0.100	1	05/27/2020 13:54	WG1482819
Sulfate	15.1		5.00	1	05/27/2020 13:54	WG1482819

Metals (ICPMS) by Method 6020

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Sodium,Dissolved	61.0		2.00	1	05/29/2020 15:06	WG1483875

Volatile Organic Compounds (GC) by Method 8015/8021

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Benzene	ND		0.000500	1	05/31/2020 03:08	WG1484805
Toluene	ND		0.00100	1	05/31/2020 03:08	WG1484805
Ethylbenzene	ND		0.000500	1	05/31/2020 03:08	WG1484805
Total Xylene	ND		0.00150	1	05/31/2020 03:08	WG1484805
TPH (GC/FID) Low Fraction	ND		0.100	1	05/31/2020 03:08	WG1484805
(S) a,a,a-Trifluorotoluene(FID)	94.8		78.0-120		05/31/2020 03:08	WG1484805
(S) a,a,a-Trifluorotoluene(PID)	100		79.0-125		05/31/2020 03:08	WG1484805

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	RDL	Dilution	Analysis date / time	Batch
Methane	2.95		0.0100	1	06/02/2020 14:11	WG1485577
Ethane	ND		0.0130	1	06/02/2020 14:11	WG1485577
Ethene	ND		0.0130	1	06/02/2020 14:11	WG1485577



Collected date/time: 05/23/20 09:10

L1222204

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	05/31/2020 05:01	WG1483129
(S) o-Terphenyl	67.4		31.0-160		05/31/2020 05:01	WG1483129

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Method Blank (MB)

(MB) R3533532-1 05/29/20 23:38

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

Laboratory Control Sample (LCS)

(LCS) R3533532-2 05/29/20 23:38

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	<u>LCS Qualifier</u>
Analyte	mg/l	mg/l	%	%	
Dissolved Solids	8800	8730	99.2	85.0-115	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3534189-1 06/02/20 10:26

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

Sample Narrative:

BLANK: Endpoint pH 4.5

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3534189-3 06/02/20 10:55

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
Alkalinity	65.7	65.7	1	0.0169		20

Sample Narrative:

DUP: Endpoint pH 4.5

Laboratory Control Sample (LCS)

(LCS) R3534189-5 06/02/20 11:51

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
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) R3534123-1 06/02/20 10:20

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

Laboratory Control Sample (LCS)

(LCS) R3534123-2 06/02/20 10:22

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Ammonia Nitrogen	7.50	7.51	100	90.0-110	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3533872-1 06/01/20 18:44

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Nitrate-Nitrite	U		0.0500	0.100

Laboratory Control Sample (LCS)

(LCS) R3533872-2 06/01/20 18:45

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Nitrate-Nitrite	4.00	4.17	104	90.0-110	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3532596-1 05/27/20 12:06

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Chloride	U		0.379	1.00
Fluoride	U		0.0640	0.150
Nitrate	U		0.0480	0.100
Nitrite	U		0.0420	0.100
Sulfate	U		0.594	5.00

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3532596-3 05/27/20 14:19

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	4.55		1	0.123		15
Fluoride	ND		1	0.000		15
Nitrate	0.522		1	1.21		15
Nitrite	ND		1	0.000		15
Sulfate	91.3		1	0.259		15

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3532596-7 05/28/20 01:47

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloride	ND		1	0.000		15
Fluoride	ND		1	0.000		15
Nitrate	ND		1	0.000		15
Nitrite	ND		1	0.000		15
Sulfate	ND		1	0.000		15

Laboratory Control Sample (LCS)

(LCS) R3532596-2 05/27/20 12:19

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Chloride	40.0	39.6	99.0	80.0-120	
Fluoride	8.00	7.92	99.0	80.0-120	
Nitrate	8.00	8.07	101	80.0-120	
Nitrite	8.00	8.01	100	80.0-120	

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc



Laboratory Control Sample (LCS)

(LCS) R3532596-2 05/27/20 12:19

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Sulfate	40.0	40.0	100	80.0-120	

Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) • (MS) R3532596-4 05/27/20 14:45 • (MSD) R3532596-5 05/27/20 14:58

Analyte	Spike Amount mg/l	Original Result	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 %
Chloride	50.0		58.7	58.5	101	101	1	80.0-120			0.254	15
Fluoride	5.00		5.07	4.90	99.0	95.6	1	80.0-120			3.39	15
Nitrate	5.00		5.16	5.17	102	102	1	80.0-120			0.240	15
Nitrite	5.00		5.19	5.18	104	104	1	80.0-120			0.168	15

Original Sample (OS) • Matrix Spike (MS)

(OS) • (MS) R3532596-6 05/28/20 00:56

Analyte	Spike Amount mg/l	Original Result	MS Result mg/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Chloride	50.0		82.0	95.9	1	80.0-120	
Fluoride	5.00		5.16	100	1	80.0-120	
Nitrate	5.00		4.99	99.9	1	80.0-120	
Nitrite	5.00		5.08	102	1	80.0-120	
Sulfate	50.0		48.9	97.9	1	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3533178-1 05/29/20 14:38

Analyte	MB Result mg/l	<u>MB Qualifier</u>	MB MDL mg/l	MB RDL mg/l
Sodium,Dissolved	U		0.630	2.00

Laboratory Control Sample (LCS)

(LCS) R3533178-2 05/29/20 14:41

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Sodium,Dissolved	5.00	5.08	102	80.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3534272-3 05/31/20 02:46

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000190	0.000500
Toluene	U		0.000412	0.00100
Ethylbenzene	U		0.000160	0.000500
Total Xylene	U		0.000510	0.00150
TPH (GC/FID) Low Fraction	0.0402	⬇	0.0314	0.100
(S) a,a,a-Trifluorotoluene(FID)	94.3			78.0-120
(S) a,a,a-Trifluorotoluene(PID)	98.9			79.0-125

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS)

(LCS) R3534272-1 05/31/20 01:39

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	0.0500	0.0482	96.4	77.0-122	
Toluene	0.0500	0.0442	88.4	80.0-121	
Ethylbenzene	0.0500	0.0457	91.4	80.0-123	
Total Xylene	0.150	0.139	92.7	47.0-154	
(S) a,a,a-Trifluorotoluene(FID)			93.8	78.0-120	
(S) a,a,a-Trifluorotoluene(PID)			100	79.0-125	

Laboratory Control Sample (LCS)

(LCS) R3534272-2 05/31/20 02:01

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	5.28	96.0	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			100	78.0-120	
(S) a,a,a-Trifluorotoluene(PID)			109	79.0-125	



L1222605-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1222605-01 05/31/20 07:12 • (MS) R3534272-4 05/31/20 10:47 • (MSD) R3534272-5 05/31/20 11:09

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 %
Benzene	0.0500	ND	0.0471	0.0496	94.2	99.2	1	10.0-160			5.17	21
Toluene	0.0500	ND	0.0433	0.0456	86.6	91.2	1	12.0-148			5.17	21
Ethylbenzene	0.0500	ND	0.0444	0.0474	88.8	94.8	1	22.0-149			6.54	21
Total Xylene	0.150	ND	0.138	0.146	92.0	97.3	1	13.0-155			5.63	21
(S) a,a,a-Trifluorotoluene(FID)					95.1	95.3		78.0-120				
(S) a,a,a-Trifluorotoluene(PID)					101	103		79.0-125				

L1222605-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1222605-01 05/31/20 07:12 • (MS) R3534272-6 05/31/20 11:31 • (MSD) R3534272-7 05/31/20 11:54

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 %
TPH (GC/FID) Low Fraction	5.50	ND	5.34	5.27	96.3	95.0	1	10.0-160			1.32	22
(S) a,a,a-Trifluorotoluene(FID)					100	100		78.0-120				
(S) a,a,a-Trifluorotoluene(PID)					109	109		79.0-125				

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc



Method Blank (MB)

(MB) R3534222-2 06/02/20 13:22

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

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3534222-3 06/02/20 14:01

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

Original Sample (OS) • Duplicate (DUP)

(OS) • (DUP) R3534222-4 06/02/20 14:52

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

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

(LCS) R3534222-1 06/02/20 12:14 • (LCSD) R3534222-5 06/02/20 14:55

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	0.0626	0.0631	92.3	93.1	85.0-115			0.796	20
Ethane	0.129	0.121	0.125	93.8	96.9	85.0-115			3.25	20
Ethene	0.127	0.117	0.119	92.1	93.7	85.0-115			1.69	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3533468-1 05/30/20 16:31

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	56.5			31.0-160

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

(LCS) R3533468-2 05/30/20 16:52 • (LCSD) R3533468-3 05/30/20 17:12

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	1.37	1.36	91.3	90.7	50.0-150			0.733	20
(S) o-Terphenyl				103	103	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

J	The identification of the analyte is acceptable; the reported value is an estimate.
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.



Nicholson GeoSolutions, LLC

3433 E. Lake Dr.
Centennial, CO 80121

Billing Information:

Don Wilbourn
Berry Petroleum Company
235 Callahan Ave
Parachute, CO 81635

Pres
Chk

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



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



Report to:
Dave Nicholson

Email To:
dknicholson@q.com

Project Description: **Berry Garden Gulch Water**

City/State
Collected:

Phone: **303-601-2023**
Fax:

Client Project #

Lab Project #
BERPETDCO030615

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	No. of Cntrs
MW-3		GW		5/23	0910	11
		GW				11
		GW				11
		GW				11
		GW				11
		GW				11
		GW				11
		GW				11
		GW				11
		GW				11

BTEX / GRO (3) 40mL Amber - HCl
 TDS, ALK - 250mL HDPE - No Pres
 FI, CI, NO2, NO3, SO4 - 250mL HDPE No Pres
 RSK-175 (2) 40mL Amber - HCl
 Ammonia (1) 250mL HDPE - H2SO4
 TPH-DRO (2) 40mL Amber - HCl
 Dissolved Sodium (1) 250mL HDPE No Pres

Lab filter for Dss. Na

L# 1222 201
H210

Acctnum: **BERPETDCO**

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:

Samples returned via:

☐ UPS ☐ FedEx ☐ Courier

Tracking #

pH Temp

Flow Other

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

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: °C Bottles Received:

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date:

Time:

Hold:

Condition:
NCF / OK