



Legend

- Soil Sample Location
- Spill Area

0 50 100
Ft

1 inch = 50 ft

Project No: 021-205	Raven A4 Spill Site Diagram Scout Energy Partners SWNE, Section 31, T2N R102W, 6th PM Rio Blanco County, Colorado		330 Grand Avenue, Unit C Grand Junction, CO 81501 970-549-1015	Figure
Map By: NDB				
Date: 8/7/2023			100 Chevron Road Rangely, CO 81648 970-501-5157	1

Table 1
Raven A4 Frac Tank Spill
Soil Data Summary

SAMPLE SUMMARY					
Location Description	Raven A4				
Sample Type	Soil				

LABORATORY DATA SUMMARY					
Sample ID	RAVA4-SS1	RAVA4-BG1	COGCC TABLE 915-1 CONCENTRATION LEVELS		
Depth	0-1'	0-1'			
Sample Date	7/28/2022	7/28/2023			
Analytical Parameters			Residential Soil Screening Level	Protection of Groundwater Screening Level	UNITS
TPH					
TPH (C6-C10)	0.0805 J	NT	500		mg/kg
TPH (C10-C28)	57.4	NT			
TPH (C28-C36)	135	NT			
Volatile Organic Compounds					
1,2,4-Trimethylbenzene	<0.005	NT	30	0.0081	mg/kg
1,3,5-Trimethylbenzene	<0.005	NT	27	0.0087	mg/kg
Benzene	<0.001	NT	1.2	0.0026	mg/kg
Toluene	<0.005	NT	490	0.69	mg/kg
Ethylbenzene	<0.0025	NT	5.8	0.78	mg/kg
Total Xylene	<0.0065	NT	58	9.9	mg/kg
Metals					
Arsenic	7.00	6.57	0.68	0.29	mg/kg
Barium	420	155	15,000	82	mg/kg
Cadmium	0.407 J	0.502	71	0.38	mg/kg
Chromium, Hexavalent	<1.00	<1.00	0.3	0.00067	mg/kg
Copper	17.1	20.0	3,100	46	mg/kg
Lead	19.1	19.3	400	14	mg/kg
Nickel	16.5	22.8	1,500	26	mg/kg
Selenium	<2.00	<2.00	390	0.26	mg/kg
Silver	<1.00	<1.00	390	0.8	mg/kg
Zinc	77.3	91.4	23,000	370	mg/kg
Soil Suitability for Reclamation					
Sodium Adsorption Ratio (SAR)	22.5	14.5	<6	<6	ratio
Electrical Conductivity (EC)	13.9	3.980	<4	<4	mmhos/cm
pH	7.57	7.83	6 - 8.3	6 - 8.3	su
Boron, Hot Water Soluble	2.42	1.01	2	2	mg/l
Polynuclear Aromatic Hydrocarbons					
1-Methylnaphthalene	<0.02	NT	18	0.006	mg/kg
2-Methylnaphthalene	<0.02	NT	24	0.019	mg/kg
Acenaphthene	<0.006	NT	360	0.55	mg/kg
Anthracene	<0.006	NT	1,800	5.8	mg/kg
Benzo(a)anthracene	<0.006	NT	1.1	0.011	mg/kg
Benzo(a)pyrene	<0.006	NT	0.11	0.24	mg/kg
Benzo(b)fluoranthene	0.00265 J	NT	1.1	0.3	mg/kg
Benzo(k)fluoranthene	<0.006	NT	11	2.9	mg/kg
Chrysene	<0.006	NT	110	9	mg/kg
Dibenzo(a,h)anthracene	<0.006	NT	0.11	0.096	mg/kg
Fluoranthene	0.0032 J	NT	240	8.9	mg/kg
Fluorene	<0.006	NT	240	0.54	mg/kg
Indeno(1,2,3-cd)pyrene	<0.006	NT	1.1	0.98	mg/kg
Napthalene	<0.02	NT	2	0.0038	mg/kg
Pyrene	0.00387 J	NT	180	1.3	mg/kg

mg/kg - milligrams per kilogram
mg/L - milligrams per liter
B - analyte detected in the associated Method Blank above the Reporting Limit
J - indicates an estimated value
H - analyzed outside of holding time
mmhos/cm - millimhos per centimeter
mv - millivolts
su - standard units
NA - not applicable
NT - parameter was not tested

Over COGCC Table 915-1 concentration levels but under BACKGROUND level.

Over COGCC Table 915-1 concentration levels and not within BACKGROUND level.

Over COGCC Table 915-1 concentration levels

Scout Energy - Rangely, CO

Sample Delivery Group: L1519998
Samples Received: 07/29/2022
Project Number:
Description: RAVEN A4 Spill

Report To: Chris Patterson
100 Chevron Road
Rangely, CO 81648

Entire Report Reviewed By:



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.

Pace Analytical National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

Cp: Cover Page	1
Tc: Table of Contents	2
Ss: Sample Summary	3
Cn: Case Narrative	4
Sr: Sample Results	5
RAVA4-SS1 L1519998-01	5
RAVA4-BG1 L1519998-02	7
Qc: Quality Control Summary	8
Wet Chemistry by Method 7199	8
Wet Chemistry by Method 9045D	10
Wet Chemistry by Method 9050AMod	11
Metals (ICP) by Method 6010B	12
Metals (ICP) by Method 6010B-NE493 Ch 2	13
Metals (ICPMS) by Method 6020	14
Volatile Organic Compounds (GC) by Method 8015D/GRO	15
Volatile Organic Compounds (GC/MS) by Method 8260B	16
Semi-Volatile Organic Compounds (GC) by Method 8015M	17
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	18
Gl: Glossary of Terms	20
Al: Accreditations & Locations	21
Sc: Sample Chain of Custody	22

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

SAMPLE SUMMARY

RAVA4-SS1 L1519998-01 Solid

Collected by
Tim Dobransky

Collected date/time
07/28/22 08:20

Received date/time
07/29/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1907340	1	08/09/22 11:55	08/09/22 11:55	CCE	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1911969	1	08/23/22 09:38	08/25/22 18:46	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1904878	1	08/03/22 09:56	08/03/22 12:00	SDE	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1910886	1	08/15/22 09:00	08/15/22 17:00	BMD	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1904594	1	08/02/22 18:06	08/04/22 03:59	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1903923	1	08/01/22 14:46	08/03/22 19:56	KMG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1904598	5	08/02/22 18:10	08/03/22 12:29	SJM	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG1904150	1	07/31/22 15:16	08/03/22 07:23	MGF	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG1903586	1	07/31/22 15:16	07/31/22 22:25	ADM	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG1904368	1	08/03/22 08:51	08/04/22 00:58	JAS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG1904118	1	08/02/22 06:43	08/02/22 14:00	AMG	Mt. Juliet, TN

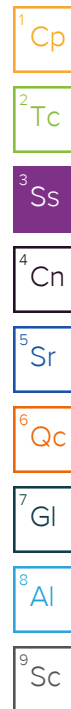
RAVA4-BG1 L1519998-02 Solid

Collected by
Tim Dobransky

Collected date/time
07/28/22 08:35

Received date/time
07/29/22 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG1907340	1	08/09/22 11:58	08/09/22 11:58	CCE	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG1911969	1	08/23/22 09:38	08/25/22 18:52	ARD	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG1904878	1	08/03/22 09:56	08/03/22 12:00	SDE	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG1910886	1	08/15/22 09:00	08/15/22 17:00	BMD	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG1904594	1	08/02/22 18:06	08/04/22 04:02	CCE	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG1903923	1	08/01/22 14:46	08/03/22 20:00	KMG	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG1904598	5	08/02/22 18:10	08/03/22 12:33	SJM	Mt. Juliet, TN

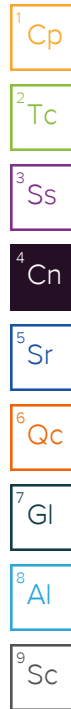


CASE NARRATIVE

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



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	22.5		1	08/09/2022 11:55	WG1907340

Wet Chemistry by Method 7199

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Hexavalent Chromium	U		0.255	1.00	1	08/25/2022 18:46	WG1911969

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.57	T8	1	08/03/2022 12:00	WG1904878

Sample Narrative:

L1519998-01 WG1904878: 7.57 at 24C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	13900		10.0	1	08/15/2022 17:00	WG1910886

Sample Narrative:

L1519998-01 WG1910886: at 25C

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Barium	420		0.0852	0.500	1	08/04/2022 03:59	WG1904594
Cadmium	0.407	J	0.0471	0.500	1	08/04/2022 03:59	WG1904594
Copper	17.1		0.400	2.00	1	08/04/2022 03:59	WG1904594
Lead	19.1		0.208	0.500	1	08/04/2022 03:59	WG1904594
Nickel	16.5		0.132	2.00	1	08/04/2022 03:59	WG1904594
Selenium	U		0.764	2.00	1	08/04/2022 03:59	WG1904594
Silver	U		0.127	1.00	1	08/04/2022 03:59	WG1904594
Zinc	77.3		0.832	5.00	1	08/04/2022 03:59	WG1904594

Metals (ICP) by Method 6010B-NE493 Ch 2

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	2.42		0.0167	0.200	1	08/03/2022 19:56	WG1903923

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	7.00		0.100	1.00	5	08/03/2022 12:29	WG1904598

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

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
TPH (GC/FID) Low Fraction	0.0805	J	0.0217	0.100	1	08/03/2022 07:23	WG1904150
(S) <i>a,a,a</i> -Trifluorotoluene(FID)	97.9			77.0-120		08/03/2022 07:23	WG1904150

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

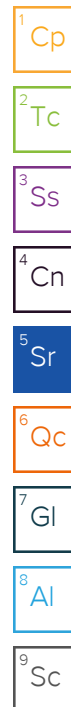
Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Benzene	U		0.000467	0.00100	1	07/31/2022 22:25	WG1903586
Ethylbenzene	U		0.000737	0.00250	1	07/31/2022 22:25	WG1903586
Toluene	U		0.00130	0.00500	1	07/31/2022 22:25	WG1903586
1,2,4-Trimethylbenzene	U		0.00158	0.00500	1	07/31/2022 22:25	WG1903586
1,3,5-Trimethylbenzene	U		0.00200	0.00500	1	07/31/2022 22:25	WG1903586
Xylenes, Total	U		0.000880	0.00650	1	07/31/2022 22:25	WG1903586
(S) Toluene-d8	99.9			75.0-131		07/31/2022 22:25	WG1903586
(S) 4-Bromofluorobenzene	97.0			67.0-138		07/31/2022 22:25	WG1903586
(S) 1,2-Dichloroethane-d4	95.4			70.0-130		07/31/2022 22:25	WG1903586

Semi-Volatile Organic Compounds (GC) by Method 8015M

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
C10-C28 Diesel Range	57.4		1.61	4.00	1	08/04/2022 00:58	WG1904368
C28-C36 Motor Oil Range	135		0.274	4.00	1	08/04/2022 00:58	WG1904368
(S) o-Terphenyl	41.8			18.0-148		08/04/2022 00:58	WG1904368

Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Anthracene	U		0.00230	0.00600	1	08/02/2022 14:00	WG1904118
Acenaphthene	U		0.00209	0.00600	1	08/02/2022 14:00	WG1904118
Benzo(a)anthracene	U		0.00173	0.00600	1	08/02/2022 14:00	WG1904118
Benzo(a)pyrene	U		0.00179	0.00600	1	08/02/2022 14:00	WG1904118
Benzo(b)fluoranthene	0.00265	U	0.00153	0.00600	1	08/02/2022 14:00	WG1904118
Benzo(k)fluoranthene	U		0.00215	0.00600	1	08/02/2022 14:00	WG1904118
Chrysene	U		0.00232	0.00600	1	08/02/2022 14:00	WG1904118
Dibenz(a,h)anthracene	U		0.00172	0.00600	1	08/02/2022 14:00	WG1904118
Fluoranthene	0.00320	U	0.00227	0.00600	1	08/02/2022 14:00	WG1904118
Fluorene	U		0.00205	0.00600	1	08/02/2022 14:00	WG1904118
Indeno(1,2,3-cd)pyrene	U		0.00181	0.00600	1	08/02/2022 14:00	WG1904118
Naphthalene	U		0.00408	0.0200	1	08/02/2022 14:00	WG1904118
Pyrene	0.00387	U	0.00200	0.00600	1	08/02/2022 14:00	WG1904118
1-Methylnaphthalene	U		0.00449	0.0200	1	08/02/2022 14:00	WG1904118
2-Methylnaphthalene	U		0.00427	0.0200	1	08/02/2022 14:00	WG1904118
(S) p-Terphenyl-d14	63.8			23.0-120		08/02/2022 14:00	WG1904118
(S) Nitrobenzene-d5	71.4			14.0-149		08/02/2022 14:00	WG1904118
(S) 2-Fluorobiphenyl	65.8			34.0-125		08/02/2022 14:00	WG1904118



Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	14.5		1	08/09/2022 11:58	WG1907340

Wet Chemistry by Method 7199

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Hexavalent Chromium	U		0.255	1.00	1	08/25/2022 18:52	WG1911969

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.83	T8	1	08/03/2022 12:00	WG1904878

Sample Narrative:

L1519998-02 WG1904878: 7.83 at 24C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	3980		10.0	1	08/15/2022 17:00	WG1910886

Sample Narrative:

L1519998-02 WG1910886: at 25C

Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Barium	155		0.0852	0.500	1	08/04/2022 04:02	WG1904594
Cadmium	0.502		0.0471	0.500	1	08/04/2022 04:02	WG1904594
Copper	20.0		0.400	2.00	1	08/04/2022 04:02	WG1904594
Lead	19.3		0.208	0.500	1	08/04/2022 04:02	WG1904594
Nickel	22.8		0.132	2.00	1	08/04/2022 04:02	WG1904594
Selenium	U		0.764	2.00	1	08/04/2022 04:02	WG1904594
Silver	U		0.127	1.00	1	08/04/2022 04:02	WG1904594
Zinc	91.4		0.832	5.00	1	08/04/2022 04:02	WG1904594

Metals (ICP) by Method 6010B-NE493 Ch 2

Analyte	Result mg/l	Qualifier	MDL mg/l	RDL mg/l	Dilution	Analysis date / time	Batch
Hot Water Sol. Boron	1.01		0.0167	0.200	1	08/03/2022 20:00	WG1903923

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	6.57		0.100	1.00	5	08/03/2022 12:33	WG1904598



Method Blank (MB)

(MB) R3830796-1 08/25/22 15:49

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Hexavalent Chromium	U		0.255	1.00

L1519987-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1519987-02 08/25/22 16:53 • (DUP) R3830796-7 08/25/22 16:58

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Hexavalent Chromium	U	U	1	0.000		20

L1519994-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1519994-01 08/25/22 18:26 • (DUP) R3830796-8 08/25/22 18:31

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Hexavalent Chromium	U	U	1	0.000		20

Laboratory Control Sample (LCS)

(LCS) R3830796-2 08/25/22 15:56

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Hexavalent Chromium	10.0	9.85	98.5	80.0-120	

L1519712-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1519712-01 08/25/22 16:01 • (MS) R3830796-3 08/25/22 16:07 • (MSD) R3830796-4 08/25/22 16:12

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Hexavalent Chromium	20.0	U	U	U	0.000	0.000	1	75.0-125	J6	J6	0.000	20

Sample Narrative:

OS: Sample is a reducer.

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1519712-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1519712-01 08/25/22 16:01 • (MS) R3830796-6 08/25/22 16:22

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Hexavalent Chromium	638	U	133	20.8	50	75.0-125	<u>J6</u>

Sample Narrative:

OS: Sample is a reducer.

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1520009-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1520009-05 08/03/22 12:00 • (DUP) R3822204-2 08/03/22 12:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	7.77	7.74	1	0.387		1

Sample Narrative:

OS: 7.77 at 23.9C
DUP: 7.74 at 24C

L1520326-05 Original Sample (OS) • Duplicate (DUP)

(OS) L1520326-05 08/03/22 12:00 • (DUP) R3822204-3 08/03/22 12:00

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	pH	su		%		%
pH	7.44	7.41	1	0.404		1

Sample Narrative:

OS: 7.44 at 23.9C
DUP: 7.41 at 24C

Laboratory Control Sample (LCS)

(LCS) R3822204-1 08/03/22 12:00

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	9.99	99.9	99.0-101	

Sample Narrative:

LCS: 9.99 at 23.5C

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3826510-2 08/15/22 17:00

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

Sample Narrative:
BLANK: at 25C

L1519990-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1519990-01 08/15/22 17:00 • (DUP) R3826510-4 08/15/22 17:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	2770	2640	1	4.95		20

Sample Narrative:
OS: at 25C
DUP: at 25C

L1519994-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1519994-03 08/15/22 17:00 • (DUP) R3826510-5 08/15/22 17:00

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	12100	13300	1	9.84		20

Sample Narrative:
OS: at 25C
DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R3826510-3 08/15/22 17:00

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	286	281	98.1	85.0-115	

Sample Narrative:
LCS: at 25C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3822427-1 08/04/22 02:51

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Barium	U		0.0852	0.500
Cadmium	U		0.0471	0.500
Copper	U		0.400	2.00
Lead	U		0.208	0.500
Nickel	U		0.132	2.00
Selenium	U		0.764	2.00
Silver	U		0.127	1.00
Zinc	U		0.832	5.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

Laboratory Control Sample (LCS)

(LCS) R3822427-2 08/04/22 02:54

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Barium	100	100	100	80.0-120	
Cadmium	100	95.7	95.7	80.0-120	
Copper	100	98.5	98.5	80.0-120	
Lead	100	95.5	95.5	80.0-120	
Nickel	100	96.0	96.0	80.0-120	
Selenium	100	97.4	97.4	80.0-120	
Silver	20.0	18.5	92.6	80.0-120	
Zinc	100	95.8	95.8	80.0-120	

⁷Gl

⁸Al

⁹Sc

L1519987-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1519987-01 08/04/22 02:56 • (MS) R3822427-5 08/04/22 03:04 • (MSD) R3822427-6 08/04/22 03:07

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 %
Barium	100	119	236	228	118	109	1	75.0-125			3.72	20
Cadmium	100	0.145	94.6	94.8	94.5	94.7	1	75.0-125			0.237	20
Copper	100	14.4	113	113	98.6	98.3	1	75.0-125			0.185	20
Lead	100	15.9	107	106	90.8	89.7	1	75.0-125			0.957	20
Nickel	100	16.5	109	108	92.7	91.0	1	75.0-125			1.49	20
Selenium	100	1.05	96.8	96.4	95.8	95.4	1	75.0-125			0.419	20
Silver	20.0	U	18.4	18.5	91.9	92.3	1	75.0-125			0.381	20
Zinc	100	73.4	164	158	91.0	84.9	1	75.0-125			3.78	20

Method Blank (MB)

(MB) R3822405-1 08/03/22 19:07

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Hot Water Sol. Boron	U		0.0167	0.200

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

(LCS) R3822405-2 08/03/22 19:10 • (LCSD) R3822405-3 08/03/22 19:12

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 %
Hot Water Sol. Boron	1.00	1.15	1.06	115	106	80.0-120			8.67	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3822164-1 08/03/22 10:55

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Arsenic	U		0.100	1.00

Laboratory Control Sample (LCS)

(LCS) R3822164-2 08/03/22 10:58

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Arsenic	100	94.0	94.0	80.0-120	

L1519987-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1519987-01 08/03/22 11:01 • (MS) R3822164-4 08/03/22 11:11 • (MSD) R3822164-5 08/03/22 11:15

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Arsenic	100	6.39	94.4	95.9	88.0	89.6	5	75.0-125			1.64	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R3822103-2 08/02/22 22:26

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	U		0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	101			77.0-120

Laboratory Control Sample (LCS)

(LCS) R3822103-1 08/02/22 20:34

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.50	4.61	83.8	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			106	77.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3821955-3 07/31/22 19:27

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Benzene	U		0.000467	0.00100
Toluene	U		0.00130	0.00500
Ethylbenzene	U		0.000737	0.00250
Xylenes, Total	U		0.000880	0.00650
1,2,4-Trimethylbenzene	U		0.00158	0.00500
1,3,5-Trimethylbenzene	U		0.00200	0.00500
(S) Toluene-d8	99.6			75.0-131
(S) 4-Bromofluorobenzene	96.4			67.0-138
(S) 1,2-Dichloroethane-d4	95.3			70.0-130

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

(LCS) R3821955-1 07/31/22 18:07 • (LCSD) R3821955-2 07/31/22 18:27

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.125	0.127	0.120	102	96.0	70.0-123			5.67	20
Toluene	0.125	0.123	0.121	98.4	96.8	75.0-121			1.64	20
Ethylbenzene	0.125	0.127	0.122	102	97.6	74.0-126			4.02	20
Xylenes, Total	0.375	0.379	0.368	101	98.1	72.0-127			2.95	20
1,2,4-Trimethylbenzene	0.125	0.136	0.132	109	106	70.0-126			2.99	20
1,3,5-Trimethylbenzene	0.125	0.129	0.130	103	104	73.0-127			0.772	20
(S) Toluene-d8				101	101	75.0-131				
(S) 4-Bromofluorobenzene				101	98.3	67.0-138				
(S) 1,2-Dichloroethane-d4				102	96.2	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3822640-1 08/03/22 18:58

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-C36 Motor Oil Range	U		0.274	4.00
(S) o-Terphenyl	38.1			18.0-148

Laboratory Control Sample (LCS)

(LCS) R3822640-2 08/03/22 19:12

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	28.4	56.8	50.0-150	
(S) o-Terphenyl			73.4	18.0-148	

L1519994-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1519994-01 08/03/22 22:34 • (MS) R3822640-3 08/03/22 22:47 • (MSD) R3822640-4 08/03/22 23:00

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	48.5	75.8	97.8	119	45.4	88.2	1	50.0-150	J6		19.6	20
(S) o-Terphenyl					44.4	48.2		18.0-148				

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

Method Blank (MB)

(MB) R3822209-2 08/02/22 11:03

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Acenaphthene	U		0.00209	0.00600
Anthracene	U		0.00230	0.00600
Benzo(a)anthracene	U		0.00173	0.00600
Benzo(b)fluoranthene	U		0.00153	0.00600
Benzo(k)fluoranthene	U		0.00215	0.00600
Benzo(a)pyrene	U		0.00179	0.00600
Chrysene	U		0.00232	0.00600
Dibenz(a,h)anthracene	U		0.00172	0.00600
Fluoranthene	U		0.00227	0.00600
Fluorene	U		0.00205	0.00600
Indeno(1,2,3-cd)pyrene	U		0.00181	0.00600
1-Methylnaphthalene	U		0.00449	0.0200
2-Methylnaphthalene	U		0.00427	0.0200
Naphthalene	U		0.00408	0.0200
Pyrene	U		0.00200	0.00600
(S) p-Terphenyl-d14	86.0			23.0-120
(S) Nitrobenzene-d5	70.7			14.0-149
(S) 2-Fluorobiphenyl	71.9			34.0-125

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R3822209-1 08/02/22 10:45

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0664	83.0	50.0-120	
Anthracene	0.0800	0.0638	79.8	50.0-126	
Benzo(a)anthracene	0.0800	0.0654	81.8	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0685	85.6	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0671	83.9	49.0-125	
Benzo(a)pyrene	0.0800	0.0593	74.1	42.0-120	
Chrysene	0.0800	0.0678	84.8	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0664	83.0	47.0-125	
Fluoranthene	0.0800	0.0658	82.3	49.0-129	
Fluorene	0.0800	0.0666	83.3	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0683	85.4	46.0-125	
1-Methylnaphthalene	0.0800	0.0643	80.4	51.0-121	
2-Methylnaphthalene	0.0800	0.0655	81.9	50.0-120	
Naphthalene	0.0800	0.0653	81.6	50.0-120	
Pyrene	0.0800	0.0740	92.5	43.0-123	

Laboratory Control Sample (LCS)

(LCS) R3822209-1 08/02/22 10:45

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
(S) p-Terphenyl-d14			90.5	23.0-120	
(S) Nitrobenzene-d5			79.6	14.0-149	
(S) 2-Fluorobiphenyl			78.4	34.0-125	

L1519987-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1519987-05 08/02/22 15:47 • (MS) R3822209-3 08/02/22 16:05 • (MSD) R3822209-4 08/02/22 16:23

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MSD Result mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>	<u>MSD Qualifier</u>	RPD %	RPD Limits %
Acenaphthene	0.0768	0.00318	0.0616	0.0530	76.1	65.6	1	14.0-127			15.0	27
Anthracene	0.0768	0.00435	0.0611	0.0509	73.9	61.3	1	10.0-145			18.2	30
Benzo(a)anthracene	0.0768	0.0124	0.0628	0.0539	65.6	54.6	1	10.0-139			15.3	30
Benzo(b)fluoranthene	0.0768	0.0143	0.0653	0.0535	66.4	51.6	1	10.0-140			19.9	36
Benzo(k)fluoranthene	0.0768	0.00575	0.0603	0.0526	71.0	61.6	1	10.0-137			13.6	31
Benzo(a)pyrene	0.0768	0.0122	0.0674	0.0566	71.9	58.4	1	10.0-141			17.4	31
Chrysene	0.0768	0.0120	0.0665	0.0574	71.0	59.7	1	10.0-145			14.7	30
Dibenz(a,h)anthracene	0.0768	0.00224	0.0572	0.0515	71.6	64.8	1	10.0-132			10.5	31
Fluoranthene	0.0768	0.0322	0.0702	0.0546	49.5	29.5	1	10.0-153			25.0	33
Fluorene	0.0768	0.00250	0.0612	0.0537	76.4	67.4	1	11.0-130			13.1	29
Indeno(1,2,3-cd)pyrene	0.0768	0.00869	0.0628	0.0550	70.5	60.9	1	10.0-137			13.2	32
1-Methylnaphthalene	0.0768	U	0.0590	0.0523	76.8	68.8	1	10.0-142			12.0	28
2-Methylnaphthalene	0.0768	U	0.0600	0.0535	78.1	70.4	1	10.0-137			11.5	28
Naphthalene	0.0768	U	0.0597	0.0525	77.7	69.1	1	10.0-135			12.8	27
Pyrene	0.0768	0.0299	0.0706	0.0579	53.0	36.8	1	10.0-148			19.8	35
(S) p-Terphenyl-d14					77.0	73.2		23.0-120				
(S) Nitrobenzene-d5					74.0	73.2		14.0-149				
(S) 2-Fluorobiphenyl					69.8	69.1		34.0-125				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

GLOSSARY OF TERMS

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.

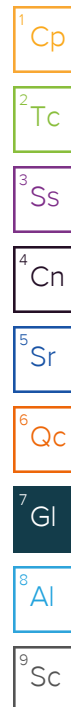
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

Abbreviations and Definitions

MDL	Method Detection Limit.
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.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
T8	Sample(s) received past/too close to holding time expiration.



ACCREDITATIONS & LOCATIONS

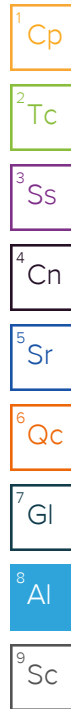
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico ¹	TN00003
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}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
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

* 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 Analytical.



[illegible]