

Civitas - CO

Sample Delivery Group: L1727895
Samples Received: 04/20/2024
Project Number: 23317
Description: Aristocrat Angus 42-10

Report To: Sam Vogt / Jacob Evans
6855 W. 118th Ave
Broomfield, CO 80020

Entire Report Reviewed By:



Chris Ward
Project Manager

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Pace Analytical National

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SAMPLE SUMMARY

42-WH-B01 @ 5' L1727895-01 Solid

Collected by Ben Long
Collected date/time 04/19/24 10:30
Received date/time 04/20/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2271929	1	04/23/24 11:44	04/23/24 11:44	JTM	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2272379	1	04/23/24 23:17	04/24/24 11:24	VSS	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2272373	1	04/23/24 15:27	04/23/24 16:40	KA	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2272368	1	04/23/24 10:18	04/23/24 16:10	KRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2271930	1	04/23/24 07:24	04/23/24 12:55	JTM	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2272375	5	04/23/24 12:33	04/23/24 22:33	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2272058	1	04/20/24 15:56	04/22/24 19:52	JHH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2271292	1	04/20/24 15:56	04/21/24 04:39	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2272916	1	04/24/24 04:57	04/24/24 14:48	KKS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2272034	1	04/23/24 10:12	04/24/24 06:51	MBE	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

SP-CS01 L1727895-02 Solid

Collected by Ben Long
Collected date/time 04/19/24 10:50
Received date/time 04/20/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Calculated Results	WG2271929	1	04/23/24 11:46	04/23/24 11:46	JTM	Mt. Juliet, TN
Wet Chemistry by Method 7199	WG2272379	1	04/23/24 23:17	04/24/24 11:30	VSS	Mt. Juliet, TN
Wet Chemistry by Method 9045D	WG2272373	1	04/23/24 15:27	04/23/24 16:40	KA	Mt. Juliet, TN
Wet Chemistry by Method 9050AMod	WG2272368	1	04/23/24 10:18	04/23/24 16:10	KRB	Mt. Juliet, TN
Metals (ICP) by Method 6010B-NE493 Ch 2	WG2271930	1	04/23/24 07:24	04/23/24 12:59	JTM	Mt. Juliet, TN
Metals (ICPMS) by Method 6020	WG2272375	5	04/23/24 12:33	04/23/24 22:36	LD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method 8015D/GRO	WG2272058	1	04/20/24 15:56	04/22/24 20:14	JHH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2271292	1	04/20/24 15:56	04/21/24 04:59	DWR	Mt. Juliet, TN
Semi-Volatile Organic Compounds (GC) by Method 8015M	WG2272916	1	04/24/24 04:57	04/24/24 16:06	KKS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C-SIM	WG2272034	1	04/23/24 10:12	04/24/24 07:43	MBE	Mt. Juliet, TN

⁷Gl

⁸Al

⁹Sc

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	2.45		1	04/23/2024 11:44	WG2271929

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	04/24/2024 11:24	WG2272379

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	9.58	T8	1	04/23/2024 16:40	WG2272373

Sample Narrative:

L1727895-01 WG2272373: 9.58 at 21.1C

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	599		10.0	1	04/23/2024 16:10	WG2272368

Sample Narrative:

L1727895-01 WG2272368: at 25C

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	0.178	J	0.0167	0.200	1	04/23/2024 12:55	WG2271930

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	0.726	J	0.100	1.00	5	04/23/2024 22:33	WG2272375
Barium	36.9		0.152	2.50	5	04/23/2024 22:33	WG2272375
Cadmium	U		0.0855	1.00	5	04/23/2024 22:33	WG2272375
Copper	2.52	J	0.132	5.00	5	04/23/2024 22:33	WG2272375
Lead	3.22		0.0990	2.00	5	04/23/2024 22:33	WG2272375
Nickel	2.39	J	0.197	2.50	5	04/23/2024 22:33	WG2272375
Selenium	0.283	J	0.180	2.50	5	04/23/2024 22:33	WG2272375
Silver	U		0.0865	0.500	5	04/23/2024 22:33	WG2272375
Zinc	9.70	J	0.740	25.0	5	04/23/2024 22:33	WG2272375

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	0.0404	B J	0.0217	0.100	1	04/22/2024 19:52	WG2272058
(S) a,a,a-Trifluorotoluene(FID)	91.8			77.0-120		04/22/2024 19:52	WG2272058

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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	04/21/2024 04:39	WG2271292
Toluene	U		0.00130	0.00500	1	04/21/2024 04:39	WG2271292
Ethylbenzene	U		0.000737	0.00250	1	04/21/2024 04:39	WG2271292
Xylenes, Total	U		0.000880	0.00650	1	04/21/2024 04:39	WG2271292
1,2,4-Trimethylbenzene	U		0.00158	0.00500	1	04/21/2024 04:39	WG2271292
1,3,5-Trimethylbenzene	U		0.00200	0.00500	1	04/21/2024 04:39	WG2271292
(S) Toluene-d8	110			75.0-131		04/21/2024 04:39	WG2271292
(S) 4-Bromofluorobenzene	95.8			67.0-138		04/21/2024 04:39	WG2271292
(S) 1,2-Dichloroethane-d4	93.8			70.0-130		04/21/2024 04:39	WG2271292

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	U		1.61	4.00	1	04/24/2024 14:48	WG2272916
C28-C36 Motor Oil Range	2.51	B J	0.274	4.00	1	04/24/2024 14:48	WG2272916
(S) o-Terphenyl	31.7			18.0-148		04/24/2024 14:48	WG2272916

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
Acenaphthene	U		0.00209	0.00600	1	04/24/2024 06:51	WG2272034
Anthracene	U		0.00230	0.00600	1	04/24/2024 06:51	WG2272034
Benzo(a)anthracene	U		0.00173	0.00600	1	04/24/2024 06:51	WG2272034
Benzo(b)fluoranthene	U		0.00153	0.00600	1	04/24/2024 06:51	WG2272034
Benzo(k)fluoranthene	U		0.00215	0.00600	1	04/24/2024 06:51	WG2272034
Benzo(a)pyrene	U		0.00179	0.00600	1	04/24/2024 06:51	WG2272034
Chrysene	U		0.00232	0.00600	1	04/24/2024 06:51	WG2272034
Dibenz(a,h)anthracene	U		0.00172	0.00600	1	04/24/2024 06:51	WG2272034
Fluoranthene	U		0.00227	0.00600	1	04/24/2024 06:51	WG2272034
Fluorene	U		0.00205	0.00600	1	04/24/2024 06:51	WG2272034
Indeno(1,2,3-cd)pyrene	U		0.00181	0.00600	1	04/24/2024 06:51	WG2272034
1-Methylnaphthalene	U		0.00449	0.0200	1	04/24/2024 06:51	WG2272034
2-Methylnaphthalene	U		0.00427	0.0200	1	04/24/2024 06:51	WG2272034
Naphthalene	U		0.00408	0.0200	1	04/24/2024 06:51	WG2272034
Pyrene	U		0.00200	0.00600	1	04/24/2024 06:51	WG2272034
(S) p-Terphenyl-d14	80.3			23.0-120		04/24/2024 06:51	WG2272034
(S) Nitrobenzene-d5	79.5			14.0-149		04/24/2024 06:51	WG2272034
(S) 2-Fluorobiphenyl	78.7			34.0-125		04/24/2024 06:51	WG2272034

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Calculated Results

Analyte	Result	Qualifier	Dilution	Analysis date / time	Batch
Sodium Adsorption Ratio	0.405		1	04/23/2024 11:46	WG2271929

1
Cp

2
Tc

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	04/24/2024 11:30	WG2272379

3
Ss

4
Cn

Wet Chemistry by Method 9045D

Analyte	Result su	Qualifier	Dilution	Analysis date / time	Batch
pH	7.77	T8	1	04/23/2024 16:40	WG2272373

5
Sr

6
Qc

Sample Narrative:

L1727895-02 WG2272373: 7.77 at 20.8C

7
Gl

Wet Chemistry by Method 9050AMod

Analyte	Result umhos/cm	Qualifier	RDL umhos/cm	Dilution	Analysis date / time	Batch
Specific Conductance	310		10.0	1	04/23/2024 16:10	WG2272368

8
Al

9
Sc

Sample Narrative:

L1727895-02 WG2272368: at 25C

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	0.0828	J	0.0167	0.200	1	04/23/2024 12:59	WG2271930

Metals (ICPMS) by Method 6020

Analyte	Result mg/kg	Qualifier	MDL mg/kg	RDL mg/kg	Dilution	Analysis date / time	Batch
Arsenic	0.943	J	0.100	1.00	5	04/23/2024 22:36	WG2272375
Barium	43.0		0.152	2.50	5	04/23/2024 22:36	WG2272375
Cadmium	U		0.0855	1.00	5	04/23/2024 22:36	WG2272375
Copper	2.90	J	0.132	5.00	5	04/23/2024 22:36	WG2272375
Lead	7.81		0.0990	2.00	5	04/23/2024 22:36	WG2272375
Nickel	2.68		0.197	2.50	5	04/23/2024 22:36	WG2272375
Selenium	0.296	J	0.180	2.50	5	04/23/2024 22:36	WG2272375
Silver	U		0.0865	0.500	5	04/23/2024 22:36	WG2272375
Zinc	16.3	J	0.740	25.0	5	04/23/2024 22:36	WG2272375

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	0.0431	B J	0.0217	0.100	1	04/22/2024 20:14	WG2272058
(S) a,a,a-Trifluorotoluene(FID)	92.3			77.0-120		04/22/2024 20:14	WG2272058

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	04/21/2024 04:59	WG2271292
Toluene	U		0.00130	0.00500	1	04/21/2024 04:59	WG2271292
Ethylbenzene	U		0.000737	0.00250	1	04/21/2024 04:59	WG2271292
Xylenes, Total	U		0.000880	0.00650	1	04/21/2024 04:59	WG2271292
1,2,4-Trimethylbenzene	U		0.00158	0.00500	1	04/21/2024 04:59	WG2271292
1,3,5-Trimethylbenzene	U		0.00200	0.00500	1	04/21/2024 04:59	WG2271292
(S) Toluene-d8	108			75.0-131		04/21/2024 04:59	WG2271292
(S) 4-Bromofluorobenzene	96.9			67.0-138		04/21/2024 04:59	WG2271292
(S) 1,2-Dichloroethane-d4	91.9			70.0-130		04/21/2024 04:59	WG2271292

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	5.08		1.61	4.00	1	04/24/2024 16:06	WG2272916
C28-C36 Motor Oil Range	15.0		0.274	4.00	1	04/24/2024 16:06	WG2272916
(S) o-Terphenyl	48.6			18.0-148		04/24/2024 16:06	WG2272916

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
Acenaphthene	U		0.00209	0.00600	1	04/24/2024 07:43	WG2272034
Anthracene	U		0.00230	0.00600	1	04/24/2024 07:43	WG2272034
Benzo(a)anthracene	U		0.00173	0.00600	1	04/24/2024 07:43	WG2272034
Benzo(b)fluoranthene	U		0.00153	0.00600	1	04/24/2024 07:43	WG2272034
Benzo(k)fluoranthene	U		0.00215	0.00600	1	04/24/2024 07:43	WG2272034
Benzo(a)pyrene	U		0.00179	0.00600	1	04/24/2024 07:43	WG2272034
Chrysene	U		0.00232	0.00600	1	04/24/2024 07:43	WG2272034
Dibenz(a,h)anthracene	U		0.00172	0.00600	1	04/24/2024 07:43	WG2272034
Fluoranthene	U		0.00227	0.00600	1	04/24/2024 07:43	WG2272034
Fluorene	U		0.00205	0.00600	1	04/24/2024 07:43	WG2272034
Indeno(1,2,3-cd)pyrene	U		0.00181	0.00600	1	04/24/2024 07:43	WG2272034
1-Methylnaphthalene	U		0.00449	0.0200	1	04/24/2024 07:43	WG2272034
2-Methylnaphthalene	U		0.00427	0.0200	1	04/24/2024 07:43	WG2272034
Naphthalene	U		0.00408	0.0200	1	04/24/2024 07:43	WG2272034
Pyrene	U		0.00200	0.00600	1	04/24/2024 07:43	WG2272034
(S) p-Terphenyl-d14	90.7			23.0-120		04/24/2024 07:43	WG2272034
(S) Nitrobenzene-d5	92.9			14.0-149		04/24/2024 07:43	WG2272034
(S) 2-Fluorobiphenyl	86.3			34.0-125		04/24/2024 07:43	WG2272034

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4061560-1 04/24/24 08:28

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

L1727889-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1727889-03 04/24/24 08:55 • (DUP) R4061560-3 04/24/24 09:02

	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

L1728011-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1728011-03 04/24/24 11:49 • (DUP) R4061560-12 04/24/24 11:55

	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) R4061560-2 04/24/24 08:37

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/kg	mg/kg	%	%	
Hexavalent Chromium	10.0	10.2	102	80.0-120	

L1727894-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1727894-01 04/24/24 10:10 • (MS) R4061560-4 04/24/24 10:16 • (MSD) R4061560-5 04/24/24 10:22

	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	18.4	18.3	91.8	91.4	1	75.0-125			0.409	20

L1727894-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1727894-02 04/24/24 10:41 • (MS) R4061560-8 04/24/24 10:59 • (MSD) R4061560-9 04/24/24 11:05

	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	19.4	19.0	97.0	95.2	1	75.0-125			1.88	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1727894-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1727894-01 04/24/24 10:10 • (MS) R4061560-6 04/24/24 10:28

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Hexavalent Chromium	651	U	595	91.4	50	75.0-125	

L1727894-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L1727894-02 04/24/24 10:41 • (MS) R4061560-10 04/24/24 11:12

Analyte	Spike Amount mg/kg	Original Result mg/kg	MS Result mg/kg	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Hexavalent Chromium	643	U	653	102	50	75.0-125	



L1727915-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1727915-01 04/23/24 16:40 • (DUP) R4061137-2 04/23/24 16:40

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.04	8.00	1	0.499		1

Sample Narrative:

OS: 8.04 at 20.8C

DUP: 8 at 20.8C

L1728011-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1728011-03 04/23/24 16:40 • (DUP) R4061137-3 04/23/24 16:40

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	su	su		%		%
pH	8.24	8.25	1	0.121		1

Sample Narrative:

OS: 8.24 at 20.3C

DUP: 8.25 at 20.3C

Laboratory Control Sample (LCS)

(LCS) R4061137-1 04/23/24 16:40

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	su	su	%	%	
pH	10.0	10.0	100	99.0-101	

Sample Narrative:

LCS: 10.01 at 19.9C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4061111-1 04/23/24 16:10

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

L1727932-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1727932-04 04/23/24 16:10 • (DUP) R4061111-3 04/23/24 16:10

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	436	437	1	0.229		20

Sample Narrative:

OS: at 25C

DUP: at 25C

L1728011-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1728011-03 04/23/24 16:10 • (DUP) R4061111-4 04/23/24 16:10

Analyte	Original Result umhos/cm	DUP Result umhos/cm	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Specific Conductance	453	447	1	1.33		20

Sample Narrative:

OS: at 25C

DUP: at 25C

Laboratory Control Sample (LCS)

(LCS) R4061111-2 04/23/24 16:10

Analyte	Spike Amount umhos/cm	LCS Result umhos/cm	LCS Rec. %	Rec. Limits %	LCS Qualifier
Specific Conductance	327	328	100	85.0-115	

Sample Narrative:

LCS: at 25C

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4060971-1 04/23/24 12:38

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) R4060971-2 04/23/24 12:42 • (LCSD) R4060971-3 04/23/24 12:45

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	1.11	1.17	111	117	80.0-120			5.21	20

1

Cp

2

Tc

3

Ss

4

Cn

5

Sr

6

Qc

7

Gl

8

Al

9

Sc

Method Blank (MB)

(MB) R4061202-1 04/23/24 21:00

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Arsenic	U		0.100	1.00
Barium	U		0.152	2.50
Cadmium	U		0.0855	1.00
Copper	U		0.133	5.00
Lead	U		0.0990	2.00
Nickel	U		0.197	2.50
Selenium	U		0.180	2.50
Silver	U		0.0865	0.500
Zinc	U		0.740	25.0

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

Laboratory Control Sample (LCS)

(LCS) R4061202-2 04/23/24 21:03

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Arsenic	100	93.1	93.1	80.0-120	
Barium	100	91.3	91.3	80.0-120	
Cadmium	100	93.6	93.6	80.0-120	
Copper	100	91.7	91.7	80.0-120	
Lead	100	85.2	85.2	80.0-120	
Nickel	100	94.5	94.5	80.0-120	
Selenium	100	90.0	90.0	80.0-120	
Silver	20.0	18.6	93.1	80.0-120	
Zinc	100	91.8	91.8	80.0-120	

⁷Gl

⁸Al

⁹Sc

L1727792-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1727792-03 04/23/24 21:07 • (MS) R4061202-5 04/23/24 21:17 • (MSD) R4061202-6 04/23/24 21:20

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 %
Arsenic	100	34.7	136	133	102	98.5	5	75.0-125			2.43	20
Barium	100	38.9	176	167	137	128	5	75.0-125	J5	J5	5.05	20
Cadmium	100	0.0972	93.1	96.9	93.1	96.8	5	75.0-125			3.93	20
Copper	100	30.5	119	111	88.0	80.0	5	75.0-125			7.02	20
Lead	100	4.21	100	93.6	96.1	89.4	5	75.0-125			6.93	20
Nickel	100	5.12	96.5	99.9	91.4	94.8	5	75.0-125			3.41	20
Selenium	100	0.795	76.9	72.1	76.1	71.3	5	75.0-125		J6	6.39	20
Silver	20.0	U	18.5	18.9	92.5	94.6	5	75.0-125			2.29	20
Zinc	100	14.5	106	103	91.9	88.8	5	75.0-125			2.95	20

Method Blank (MB)

(MB) R4061070-1 04/22/24 15:51

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
TPH (GC/FID) Low Fraction	0.0292	⬇	0.0217	0.100
(S) a,a,a-Trifluorotoluene(FID)	96.6			77.0-120

Laboratory Control Sample (LCS)

(LCS) R4061070-2 04/22/24 18:44

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
TPH (GC/FID) Low Fraction	5.00	5.11	102	72.0-127	
(S) a,a,a-Trifluorotoluene(FID)			109	77.0-120	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4060765-3 04/20/24 23:06

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	106			75.0-131
(S) 4-Bromofluorobenzene	95.5			67.0-138
(S) 1,2-Dichloroethane-d4	95.8			70.0-130

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

(LCS) R4060765-1 04/20/24 21:27 • (LCSD) R4060765-2 04/20/24 21:47

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	0.114	0.114	91.2	91.2	70.0-123			0.000	20
Toluene	0.125	0.128	0.120	102	96.0	75.0-121			6.45	20
Ethylbenzene	0.125	0.124	0.119	99.2	95.2	74.0-126			4.12	20
Xylenes, Total	0.375	0.370	0.358	98.7	95.5	72.0-127			3.30	20
1,2,4-Trimethylbenzene	0.125	0.120	0.115	96.0	92.0	70.0-126			4.26	20
1,3,5-Trimethylbenzene	0.125	0.123	0.120	98.4	96.0	73.0-127			2.47	20
(S) Toluene-d8				110	106	75.0-131				
(S) 4-Bromofluorobenzene				95.3	92.1	67.0-138				
(S) 1,2-Dichloroethane-d4				98.4	104	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4061530-1 04/24/24 12:37

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	0.441	⬇	0.274	4.00
(S) o-Terphenyl	55.6			18.0-148

Laboratory Control Sample (LCS)

(LCS) R4061530-2 04/24/24 12:50

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
C10-C28 Diesel Range	50.0	32.4	64.8	50.0-150	
(S) o-Terphenyl			45.9	18.0-148	

L1727894-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1727894-01 04/24/24 15:01 • (MS) R4061530-3 04/24/24 15:14 • (MSD) R4061530-4 04/24/24 15:27

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	49.5	2.97	34.6	38.8	63.9	72.5	1	50.0-150			11.4	20
(S) o-Terphenyl					37.3	41.9		18.0-148				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4061594-2 04/24/24 01:22

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	85.9			23.0-120
(S) Nitrobenzene-d5	84.9			14.0-149
(S) 2-Fluorobiphenyl	84.5			34.0-125

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R4061594-1 04/24/24 01:05

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	0.0800	0.0658	82.3	50.0-120	
Anthracene	0.0800	0.0705	88.1	50.0-126	
Benzo(a)anthracene	0.0800	0.0697	87.1	45.0-120	
Benzo(b)fluoranthene	0.0800	0.0650	81.3	42.0-121	
Benzo(k)fluoranthene	0.0800	0.0621	77.6	49.0-125	
Benzo(a)pyrene	0.0800	0.0559	69.9	42.0-120	
Chrysene	0.0800	0.0705	88.1	49.0-122	
Dibenz(a,h)anthracene	0.0800	0.0659	82.4	47.0-125	
Fluoranthene	0.0800	0.0759	94.9	49.0-129	
Fluorene	0.0800	0.0687	85.9	49.0-120	
Indeno(1,2,3-cd)pyrene	0.0800	0.0653	81.6	46.0-125	
1-Methylnaphthalene	0.0800	0.0720	90.0	51.0-121	
2-Methylnaphthalene	0.0800	0.0692	86.5	50.0-120	
Naphthalene	0.0800	0.0662	82.8	50.0-120	
Pyrene	0.0800	0.0674	84.3	43.0-123	

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

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.

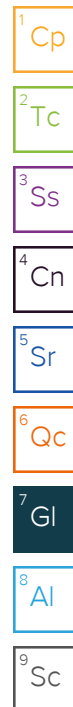
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
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.



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