

**Investigation Summary Report  
Former National Fireworks Site  
Release Tracking Number 4-000090  
Hanover and Hanson, Massachusetts / TAD #102021**

April 8, 2022

## **1.0 Introduction**

TRC Environmental Corporation (TRC) was contracted to perform environmental sampling activities at the Former National Fireworks Site on behalf of the Massachusetts Department of Environmental Protection (MassDEP) in order to address data gaps and uncertainties associated with sediment collection and analysis.

- **Data Gaps.** There has been limited sampling of sediment conducted from the Factory Pond Dam to, and downstream of, the Luddam's Ford Dam. As such, data gaps are present in the extent of mercury contamination downstream and additional sediment sampling for mercury analyses was warranted.
- **Uncertainties.** MassDEP previously engaged TRC to review the sediment sampling and analysis results submitted by the Fireworks Site Joint Defense Group. Uncertainties associated with sediment collection and analysis were noted by TRC in a December 20, 2018 Memorandum (the "TRC Memo") and included: unknown species of mercury present at the site, sample size of sediment samples collected, sample air-drying time and freeze-drying vs air drying of sediment samples.

The primary objectives of the environmental sampling activities in the Indian Head River Corridor located in Hanover and Hanson, Massachusetts from the Factory Pond Dam to, and downstream of, the Luddam's Ford Dam were as follows:

- Determine if mercury exists in sediment at concentrations that potentially present unacceptable human health and ecological risks;
- Determine the nature and extent of mercury contamination in sediment; and,
- Collect representative sediment samples and evaluate the speciation of mercury in sediment to understand the nature of the contamination at the Site.

## **2.0 Sediment Sampling and Analysis**

On August 24 and 25, 2021, TRC personnel conducted sediment sampling at the Former National Fireworks Site in accordance with the Sampling and Analysis Plan (SAP), To Evaluate Mercury in Sediment in the Indian Head River Corridor from Factory Pond to, and Downstream of, Luddam's Ford Dam, Hanover & Hanson, Massachusetts, dated September 2020.

Facilitated by the use of kayaks, as needed, TRC personnel collected sediment samples at 10 downstream locations (locations SAP-1 through SAP-10) and two upstream locations (SAP-11 and SAP-12) using a Ponar grab sampler. A field duplicate sample was collected at location SAP-11. One equipment blank was collected on each day of sampling. The samples were submitted under chain-of-custody to Alpha Analytical of Mansfield and Westborough, Massachusetts for total mercury, cyanide, and percent solids analysis, and Eurofins Frontier

Global Services of Tacoma, Washington for percent solids and mercury speciation including total mercury, methyl mercury, elemental mercury [mercury (0)], and inorganic mercury (by calculation).

As planned for in the SAP, TRC personnel were not able to accurately measure the thickness in most of the areas, due to the current pushing the kayaks, the amount of trees and roots present and/or the depth of water in most areas. The rope and Ponar grab sampler were used to gauge the embankment to allow for the collection of sediment samples from as close to the middle of the bank as possible.

Table 1 includes the sample descriptions for each sediment sample location. The sediment sample locations are shown on Figure 1. Copies of the field notes are included in Appendix A, site/field photographs are included in Appendix B, photographs of the samples from the laboratory after air drying but before extraction and analysis are included in Appendix C, and the laboratory analytical reports are included in Appendix D.

### **3.0 Results and Conclusions**

As discussed below, all sediment samples were prepared and analyzed in replicate for total mercury. Sample results are presented in Table 1. For discussion purposes, the highest concentrations of total mercury from the replicate analyses are utilized to determine if mercury exists in sediment at concentrations that potentially present unacceptable human health and ecological risks. Concentrations of total mercury were detected at concentrations ranging from 0.280 milligrams per kilogram (mg/kg) at upgradient sample location SAP-11 to 16.2 mg/kg at sample location SAP-06. Total mercury was not detected at sample locations SAP-3 and SAP-12. Total mercury concentrations exceeded the Remediation Goal of 4 mg/kg at five locations, SAP-1, SAP-2, SAP-6, SAP-7, and SAP-10.

### **4.0 Data Evaluation**

#### **4.1 Preparation and Analytical Approach**

Sediment samples were collected for total mercury, total cyanide, and mercury speciation analyses.

#### **4.2 Sample Preparation**

To improve the representativeness of the sediment sample results for total mercury, the air-drying procedure implemented by Alpha Analytical to increase the percent solids content of the samples digested and analyzed was as follows:

- After homogenization of the sample within the laboratory, approximately 60 grams of sample were weighed into a weigh boat. No decanting of the sample was performed prior to homogenization.
- An aliquot of sample was removed for an initial percent solids measurement prior to the drying procedure.
- The air-drying procedure was performed under a fume hood. The air velocity under the fume hood was recorded and was consistent for the air-drying time.

- Samples were allowed to air-dry for approximately 48 hours at room temperature from August 28 through August 30, 2021.
- Samples were homogenized after air-drying.
- An aliquot of sample was removed for a post air drying percent solids measurement.

Two aliquots of 0.6 grams each were measured for total mercury digestion. Due to a limitation in the laboratory's equipment, the sample size could not be increased above 0.6 grams. The first aliquot (REP1) was removed on August 30, 2021, after the air drying and homogenization steps were completed. The air-dried, homogenized sample was stored in a glass jar in the refrigerator. The second aliquot (REP2) was removed 10 days later on September 9, 2021.

It should be noted that Alpha Analytical stated that the samples were heterogeneous even after air-drying. Efforts were made to not include rocks/twigs or other artifacts when removing an aliquot for digestion.

### **4.3 Sample Analysis**

Analyses for total mercury and total cyanide were performed by Alpha Analytical using the following methods:

- Total mercury: SW-846 7471B
- Total cyanide: SW-846 9014

The mercury and cyanide analyses were also performed in accordance with WSC-CAM-IIIB, Table III B-1 of Quality Control Requirements and Performance Standards for the Analysis of Mercury by Cold Vapor Atomic Absorption (CVAA) Spectrometry in Support of Response Actions under the MCP and WSC-CAMVIA, Table VI A-1 of Quality Control Requirements and Performance Standards for the Analysis of Total Cyanide and Physiologically Available Cyanide in Support of Response Actions under the MCP.

Analyses for mercury speciation were performed by Eurofins Frontier Global Sciences of Tacoma, Washington using the following methods:

- Total mercury: flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631B.
- Methyl mercury: cold vapor gas chromatography atomic fluorescence spectrometry (CV-GC-AFS) using EPA 1630.
- Free elemental mercury: CV-AFS using EPA 1630, modified.
- Inorganic mercury: by calculation

### **4.4 Evaluation of Data Usability**

In general, the data are usable for the achievement of project objectives. Several quality control (QC) issues were noted; however, the usability of the data was not adversely affected.

- The replicate measurements of the total mercury analyses performed by Alpha Analytical exhibited variability. In general, the results from the first analysis were more

consistent with the total mercury results obtained from the Eurofins laboratory and therefore used for decision-making purposes. As noted above, Alpha Analytical stated that the samples were heterogeneous even after air-drying and efforts were made to not include rocks/twigs or other artifacts when removing an aliquot for digestion. However, with the relatively low sample weight used for mercury (0.6 grams), there is the potential for variability on a heterogeneous sample.

- The cooler temperature (15.2°C) associated with samples SAP-5, SAP-6, SAP-7, SAP-9, and SAP-10 was above the acceptance criteria ( $\leq 6^\circ\text{C}$ ) due to a one-day delay in transit. As the mercury speciation results are used in a more qualitative manner, this slight temperature exceedance did not have a significant effect on the usability of the data.
- The detected results for elemental mercury in samples SAP-2 and SAP-3 may be false positives due to method blank contamination; these results are less than 5x the method blank concentration.
- Potential low bias exists for the methyl mercury results in all samples due to low recoveries in the laboratory control sample (LCS) and LCS Duplicate. However, the recoveries of methyl mercury in the matrix spike/matrix spike duplicates (MS/MSDs) performed on samples SAP-8 and SAP-10 were within the acceptance criteria, indicating the low bias from the LCS samples may not extend to the field samples.
- Although the total mercury MS/MSD analyses performed as part of the mercury speciation analyses exhibited recoveries above the criteria for sample SAP-10 and below the criteria for sample SAP-8, these recoveries may have been affected by the elevated concentrations of total mercury in these samples compared to the amount spiked.

#### **4.5 Preliminary Evaluation of the Speciation of Mercury in Sediment**

The mercury speciation results were evaluated in order to understand the nature of the contamination at the Site. As stated previously, analyses of the sediment samples were performed for total mercury, elemental (total volatile) mercury, inorganic mercury (Hg [II]), methyl mercury, and total cyanide.

Total cyanide analyses were performed since mercury cyanate, mercury isocyanate, and mercury(II)cyanide can be breakdown products of mercury fulminate. Total cyanide was not detected in any of the sediment samples. The absence of cyanide in the presence of mercury does not indicate that the source of the mercury is not due to mercury fulminate since cyanide can degrade fairly quickly in an aquatic environment.

As shown in Table 1, the elemental, inorganic, and methyl mercury results indicated that the type of mercury present at the site was mainly due to inorganic mercury. In all samples, the inorganic mercury represented 96.2 to 100% of the total mercury present at the site. One sample (SAP-05) showed a small percentage of methyl mercury (3.3%) but higher than the other sample locations; there is a potential that this location may exhibit anerobic, sulfate-reducing concentrations contributing to the higher methyl mercury result. Sample SAP-08 showed a small percentage of elemental mercury; however, the inorganic mercury in this sample was equivalent to the total mercury, indicating that this elemental mercury result may be anomalous. In summary, these results no longer indicate a gap in the type of mercury present at

the site in comparison to the total mercury results; further fractionation analyses to determine the potential types of mercury present are therefore not required.

#### **4.6 Initial Observations on the Nature and Extent of Contamination**

The depositional environment and matrix properties of the sediment influence the concentrations of contaminants observed in the collected samples. More dynamic flow environments will tend to have deposits of coarse-grain sediment and fewer fine-grained material, while slower-moving parts of the creek will tend to be areas of deposition of more fine-grained and organic materials. Finer-grained and organic material in sediment will have a greater sorption capacity for both inorganic and organic constituents. In general, the differences in sediment type appear to align with the differences observed in the sample concentrations from the site.

For example, samples SAP-3 and SAP-8 were comparatively sandy and coarser-grained in character when compared to samples SAP-5, SAP-6, and SAP-7, which consisted of finer-grained material. The concentrations of mercury at SAP-3 and SAP-8 were substantially lower than the mercury concentrations in finer grained samples (SAP-6, and -7 for example). This is consistent with the research literature which states mercury tends to bind via sorption to organic materials and via electrostatic forces to smaller particles such as clays (1, 2, and 3). Other researchers have shown that mercury concentrations associated with releases to soil tend to increase as particle size decreases (4). This has been attributed to the higher mercury sorption capacity of clay minerals, iron and aluminum oxy-hydroxides, and humus surfaces, leading to a higher concentration of mercury in the finer clay sizes (5).

In addition, samples collected closer to the source of contamination near Factory Pond Dam (SAP-01, SAP-02) have relatively elevated concentrations of mercury (8.6 and 5.3 mg/kg, respectively) in contrast to the upstream samples (SAP-11, SAP-12) that had a low detection (0.28 mg/kg) and a non-detect mercury result, respectively. Samples SAP-01 and SAP-02 are closer to, or in, the floodplain and show the impact of overbank deposition that would have occurred during flood events.

The physical environment also appears to be a factor, with areas of slower moving water with less scouring induced by river flow exhibiting elevated concentrations of mercury. Samples SAP-06 and SAP-07 were collected from coves (and behind a dam in the case of SAP-07) with slower apparent water movement, less scour, and corresponding higher proportion of fines and elevated mercury concentrations (16.2 and 9.9 mg/kg, respectively).

Regarding cyanide, the absence of cyanide detections in the sediment samples appears to be attributable to higher solubility (relative to metals such as mercury), biodegradation and volatilization (6).

For example, the United States Environmental Protection Agency (EPA) reports that volatilization is a significant and probably dominant fate process for hydrogen cyanide in surface water. The most common alkali metal cyanides (e.g., sodium and potassium cyanide) may also be lost from surface water primarily through volatilization (7). Variations in the volatilization rate are expected because this process is affected by several parameters including temperature, pH, wind speed, and cyanide concentration (8).

EPA also reports that adsorption is probably insignificant even for metal cyanides when compared to volatilization and biodegradation (7, 8).

EPA notes that biodegradation is an important transformation process for cyanide in natural surface waters, and is dependent on such factors as cyanide concentrations, pH, temperature, availability of nutrients, and acclimation of microbes, though additional data are needed to assess the relative significance of this process in determining the fate of aquatic cyanides (8).

## 5.0 References

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5. R. Fernandez-Martinez, J. Loreda, A. Ordonez, and M. I. Rucandio, *Distribution and mobility of mercury in soils from an old mining area in Mieres, Asturias (Spain)*, Science of the Total Environment, vol. 346, no. 1–3, pp. 200–212, 2005. (In: Arbestain, et al., *Assessment of Mercury-Polluted Soils Adjacent to the Old Mercury-Fulminate Production Plant*. Applied and Environmental Soil Science, Volume 2009, Article 387419)
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7. *U.S. Environmental Protection Agency. Fed Register 57:26248* (In: *Toxicological Profile for Cyanide*, Agency for Toxic Substances and Disease Registry (ATSDR), July 2006)
8. *Water-related environmental fate of 129 priority pollutants*. Vol. 1. Washington, DC: U.S. Environmental Protection Agency, Office of Water Planning and Standards, Office of Water and Waste Management. EPA440479029a. PB80204373. (In: *Toxicological Profile for Cyanide*, Agency for Toxic Substances and Disease Registry (ATSDR), July 2006)

## Tables

Table 1  
Summary of Analytical Results for Sediment Samples -- August 2021  
FMR National Fireworks Site  
Hanover and Hanson, Massachusetts

Sample Location: Sample Name: Sample Depth: Sample Date:				SAP-01			SAP-02			SAP-03		
				SAP-1	SAP-1 REP1	SAP-1 REP2	SAP-2	SAP-2 REP1	SAP-2 REP2	SAP-3	SAP-3 REP1	SAP-3 REP2
				0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in
				8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021	8/25/2021
Location:  Sample Description:				Termination of trail cut on Christoper Lane Circle			Termination of trail cut at end of Sleigh Lane			End of trail where 2 streams meet downstream of Cross Street bridge		
				Silty with organic material Color - black			Silty with organic material Color - black/dark brown			Sandy Color - brown		
Analysis	Analyte	Units	Remediation Goal									
Alpha Analytical Laboratory Results												
Alpha Lab Sample ID:				L2145648-10	L2145656-19	L2145656-20	L2145648-09	L2145656-17	L2145656-18	L2145648-08	L2145656-15	L2145656-16
Total Mercury	Mercury	mg/kg	4	NA	8.64	1.14	NA	5.30	0.987	NA	0.073	0.072
General Chemistry	Cyanide	mg/kg	NS	11	NA	NA	7.3	NA	NA	6.8	NA	NA
	Solids, total	%	NS	9.07	76.5	76.5	13.0	77.6	77.6	13.4	99.4	99.4
Eurofins Laboratory Results												
Eurofins Lab Sample ID:				1H00149-05			1H00149-04			1H00149-03		
Mercury Speciation	Inorganic Mercury	mg/kg	4	9.58			3.35			0.0513		
	Mercury	mg/kg	4	9.59			3.35			0.0515		
	Methyl Mercury (as Mercury)	mg/kg	4	0.00938			0.00377			0.00017		
	Mercury (0)	mg/kg	4	0.00493	U		0.00726			0.0136		
	% of Inorganic Mercury	%		99.896			100.0			99.612		
	% of Methyl Mercury	%		0.098			0.113			0.330		
	% of Elemental Mercury	%		0			0.217	*		26.41	*	
General Chemistry	Solids, total	%	NS	9.1			12.2			86.5		

Notes:  
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).  
\* - Detections of elemental mercury may be false positives due to method blank contamination.  
NA - Sample not analyzed for the listed analyte.  
NA^ - Not applicable; total mercury was not detected.  
NS - No MassDEP standards exist for this analyte.  
U - Analyte was not detected at specified quantitation limit.  
Values in **bold** indicate the analyte was detected.  
Values shown in bold and shaded type exceed the listed Remediation Goal.



**Table 1**  
**Summary of Analytical Results for Sediment Samples -- August 2021**  
**FMR National Fireworks Site**  
**Hanover and Hanson, Massachusetts**

Sample Location: Sample Name: Sample Depth: Sample Date:				SAP-04			SAP-05			SAP-06		
				SAP-4	SAP-4 REP1	SAP-4 REP2	SAP-5	SAP-5 REP1	SAP-5 REP2	SAP-6	SAP-6 REP1	SAP-6 REP2
				0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in
				8/25/2021	8/25/2021	8/25/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021	8/24/2021
Location:				End of rocky run path which begins at Cross Street			Adjacent to Waterman Tack Factory building at bottom of slope			North of Indian Head River Reservoir, north bank near a small cove		
				Silty with organic material Color - black/brown			Silty with rocks and gravel Color - brown			Silty with organic material Color - black/brown		
Analysis	Analyte	Units	Remediation Goal									
<b>Alpha Analytical Laboratory Results</b>												
Alpha Lab Sample ID:				L2145648-07	L2145656-13	L2145656-14	L2145648-05	L2145656-09	L2145656-10	L2145648-03	L2145656-05	L2145656-06
<b>Total Mercury</b>	Mercury	mg/kg	4	NA	<b>2.36</b>	<b>0.802</b>	NA	<b>2.33</b>	<b>0.869</b>	NA	<b>16.2</b>	<b>7.18</b>
<b>General Chemistry</b>	Cyanide	mg/kg	NS	3.2	U	NA	1.8	U	NA	2.5	NA	NA
	Solids, total	%	NS	<b>29.2</b>	<b>71.3</b>	<b>71.3</b>	<b>50.5</b>	<b>73.5</b>	<b>73.5</b>	<b>37.0</b>	<b>75.4</b>	<b>75.4</b>
<b>Eurofins Laboratory Results</b>												
Eurofins Lab Sample ID:				1H00149-02			1H00148-05			1H00148-04		
<b>Mercury Speciation</b>	Inorganic Mercury	mg/kg	4	<b>1.42</b>			<b>1.53</b>			<b>6.36</b>		
	Mercury	mg/kg	4	<b>1.42</b>			<b>1.59</b>			<b>6.37</b>		
	Methyl Mercury (as Mercury)	mg/kg	4	<b>0.00139</b>			<b>0.0526</b>			<b>0.0147</b>		
	Mercury (0)	mg/kg	4	0.00497	U		0.00486	U		0.00451	U	
	% of Inorganic Mercury	%		<b>100.0</b>			<b>96.226</b>			<b>99.843</b>		
	% of Methyl Mercury	%		<b>0.098</b>			<b>3.308</b>			<b>0.231</b>		
	% of Elemental Mercury	%		<b>0</b>			<b>0</b>			<b>0</b>		
<b>General Chemistry</b>	Solids, total	%	NS	<b>25.3</b>			<b>17.4</b>			<b>31.8</b>		

**Notes:**  
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).  
\* - Detections of elemental mercury may be false positives due to method blank contamination.  
NA - Sample not analyzed for the listed analyte.  
NA^ - Not applicable; total mercury was not detected.  
NS - No MassDEP standards exist for this analyte.  
U - Analyte was not detected at specified quantitation limit.  
Values in **bold** indicate the analyte was detected.

**Values shown in bold and shaded type exceed the listed Remediation Goal.**

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FMR National Fireworks Site  
Hanover and Hanson, Massachusetts

Sample Location: Sample Name: Sample Depth: Sample Date:				SAP-07			SAP-08			SAP-09		
				SAP-7	SAP-7 REP1	SAP-7 REP2	SAP-8	SAP-8 REP1	SAP-8 REP2	SAP-9	SAP-9 REP1	SAP-9 REP2
				0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in	0-3 in
				8/24/2021	8/24/2021	8/24/2021	8/25/2021	8/25/2021	8/25/2021	8/24/2021	8/24/2021	8/24/2021
Location:  Sample Description:				Small cove to left of boat launch upstream of the dam			End of walking path on south shore of Indian Head River			Across the river from Hanover public boat launch		
				Silty with organic material Color - black/brown			Sandy Color - light brown			Silty with organic material Color - black/brown		
Analysis	Analyte	Units	Remediation Goal									
Alpha Analytical Laboratory Results												
Alpha Lab Sample ID:				L2145648-04	L2145656-07	L2145656-08	L2145648-06	L2145656-11	L2145656-12	L2145648-02	L2145656-03	L2145656-04
Total Mercury	Mercury	mg/kg	4	NA	9.91	2.12	NA	2.36	1.85	NA	3.00	1.01
General Chemistry	Cyanide	mg/kg	NS	1.2	NA	NA	1.6	NA	NA	2.5	NA	NA
	Solids, total	%	NS	13.3	62.6	62.6	59.3	80.6	80.6	39.3	75.2	75.2
Eurofins Laboratory Results												
Eurofins Lab Sample ID:				1H00148-03			1H00149-01			1H00148-02		
Mercury Speciation	Inorganic Mercury	mg/kg	4	5.73			1.49			1.84		
	Mercury	mg/kg	4	5.74			1.49			1.84		
	Methyl Mercury (as Mercury)	mg/kg	4	0.0122			0.000075	U		0.00308		
	Mercury (0)	mg/kg	4	0.005	U		0.0803			0.00451	U	
	% of Inorganic Mercury	%		99.826			100.0			100.0		
	% of Methyl Mercury	%		0.213			0			0.167		
	% of Elemental Mercury	%		0			5.39			0		
General Chemistry	Solids, total	%	NS	14.6			53.1			33.4		

Notes:  
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).  
\* - Detections of elemental mercury may be false positives due to method blank contamination.  
NA - Sample not analyzed for the listed analyte.  
NA^ - Not applicable; total mercury was not detected.  
NS - No MassDEP standards exist for this analyte.  
U - Analyte was not detected at specified quantitation limit.  
Values in **bold** indicate the analyte was detected.  
Values shown in bold and shaded type exceed the listed Remediation Goal.

Table 1  
Summary of Analytical Results for Sediment Samples -- August 2021  
FMR National Fireworks Site  
Hanover and Hanson, Massachusetts

Sample Location: Sample Name: Sample Depth: Sample Date:				SAP-10					SAP-11													
				SAP-10		SAP-10 REP1		SAP-10 REP2	SAP-11		DUP		SAP-11 REP1		DUP REP1		SAP-11 REP2		DUP REP2			
				0-3 in		0-3 in		0-3 in	0-3 in		0-3 in		0-3 in		0-3 in		0-3 in		0-3 in			
				8/24/2021		8/24/2021		8/24/2021	8/25/2021		8/25/2021		8/25/2021		8/25/2021		8/25/2021		8/25/2021			
Location:   Sample Description:				Near where North River and Herring Brook connect, on north bank of North River					On south property line in Forge Pond close to main parking lot near gate													
				Silty with organic material Color - black/dark brown					Mucky organic material Color - black													
Analysis	Analyte	Units	Remediation Goal								Field Dup				Field Dup				Field Dup			
Alpha Analytical Laboratory Results				Alpha Lab Sample ID:																		
				L2145648-01		L2145656-01		L2145656-02	L2145648-11		L2145648-12		L2145656-21		L2145656-23		L2145656-22		L2145656-24			
Total Mercury	Mercury	mg/kg	4	NA		5.28		0.890			NA		NA		0.280		0.113		0.075	U	0.069	U
General Chemistry	Cyanide	mg/kg	NS	6.9	U	NA		NA		1.8	U	1.8	U	NA		NA		NA		NA		
	Solids, total	%	NS	14.1		70.7		70.7		53.1		52.1		92.7		98.1		92.7		98.1		
Eurofins Laboratory Results																						
				Eurofins Lab Sample ID:					1H00148-01				1H00149-06		1H00149-08							
Mercury Speciation	Inorganic Mercury	mg/kg	4	1.56							0.127		0.127									
	Mercury	mg/kg	4	1.57							0.127		0.128									
	Methyl Mercury (as Mercury)	mg/kg	4	0.00974							0.000801		0.000676									
	Mercury (0)	mg/kg	4	0.0049	U						0.00486	U	0.00498	U								
	% of Inorganic Mercury	%		99.363							100.0		99.219									
	% of Methyl Mercury	%		0.620							0.631		0.528									
	% of Elemental Mercury	%		0							0		0									
General Chemistry	Solids, total	%	NS	13.7							48.8		47.7									

Notes:  
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).  
\* - Detections of elemental mercury may be false positives due to method blank contamination.  
NA - Sample not analyzed for the listed analyte.  
NA^ - Not applicable; total mercury was not detected.  
NS - No MassDEP standards exist for this analyte.  
U - Analyte was not detected at specified quantitation limit.  
Values in **bold** indicate the analyte was detected.

Values shown in bold and shaded type exceed the listed Remediation Goal.

**Table 1**  
**Summary of Analytical Results for Sediment Samples -- August 2021**  
**FMR National Fireworks Site**  
**Hanover and Hanson, Massachusetts**

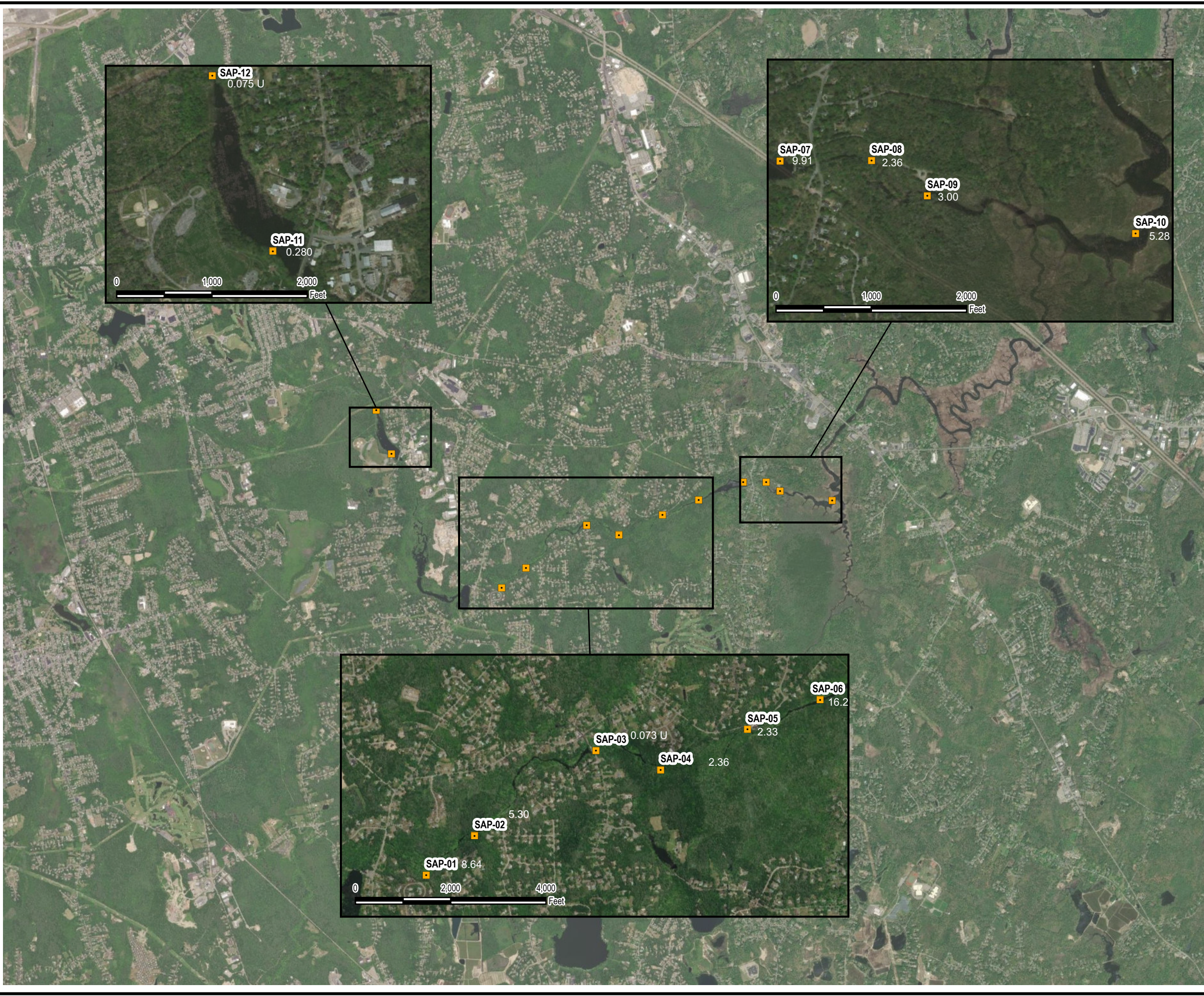
Sample Location: Sample Name: Sample Depth: Sample Date:				SAP-12					
				SAP-12		SAP-12 REP1		SAP-12 REP2	
				0-3 in		0-3 in		0-3 in	
				8/25/2021		8/25/2021		8/25/2021	
Location:  Sample Description:				Upstream of Forge Pond, at end of trail to right of main walking path					
				Sandy Color - light brown					
Analysis	Analyte	Units	Remediation Goal						
Alpha Analytical Laboratory Results				Alpha Lab Sample ID:					
				L2145648-13		L2145656-25		L2145656-26	
Total Mercury	Mercury	mg/kg	4	NA		0.075	U	0.064	U
General Chemistry	Cyanide	mg/kg	NS	1.2	U	NA		NA	
	Solids, total	%	NS	79.0		99.4		99.4	
Eurofins Laboratory Results				Eurofins Lab Sample ID:					
				1H00149-07					
Mercury Speciation	Inorganic Mercury	mg/kg	4	0.000485					
	Mercury	mg/kg	4	0.00116	U				
	Methyl Mercury (as Mercury)	mg/kg	4	0.000048					
	Mercury (0)	mg/kg	4	0.00494	U				
	% of Inorganic Mercury	%		NA^					
	% of Methyl Mercury	%		NA^					
% of Elemental Mercury	%		NA^						
General Chemistry	Solids, total	%	NS	83.9					

**Notes:**  
mg/kg - milligrams per kilogram (dry weight) or parts per million (ppm).  
\* - Detections of elemental mercury may be false positives due to method blank contamination.  
NA - Sample not analyzed for the listed analyte.  
NA^ - Not applicable; total mercury was not detected.  
NS - No MassDEP standards exist for this analyte.  
U - Analyte was not detected at specified quantitation limit.  
Values in **bold** indicate the analyte was detected.

Values shown in bold and shaded type exceed the listed Remediation Goal.

## Figures





**LEGEND**  
■ SEDIMENT SAMPLE LOCATION  
TOTAL MERCURY CONCENTRATION (mg/kg)  
Note: Highest concentration from the replicate.

1:48,000  
1:48,000

PROJECT:		
FMR NATIONAL FIREWORKS SITE HANOVER AND HANSON, MASSACHUSETTS		
TITLE:		
SEDIMENT SAMPLING LOCATIONS		
DRAWN BY:	S. MAJOR/M. NARDONE	PROJ. NO.: 246949_003_2021_11_22
CHECKED BY:	D. PETERSON	FIGURE 1
APPROVED BY:	D. PETERSON	
DATE:	NOV. 2021	
		Wannalancit Mills 650 Suffolk Street Lowell, MA 01854 978-970-5600
FILE NO.:		246949_003_2021_11_22.APRX



## **Appendix A. Field Notes**

Location Liddam Pond Park <sup>Idenver</sup> Date 8-24-21  
 Project / Client Mass DEP

0730 C-Reersall on site  
 - so they take care  
 with Justin + DEP  
 - using kayak's  
 to get to locations  
 Below Pond ladders  
 dam.

- mobilize down to  
 Sep. 10 (see below)

- river is too  
 deep to reach  
 with measuring.  
 - move closer to  
 Bank

- steep bank, sample  
 from middle  
 Material is silty  
 with organics,  
 leaves, sticks, bumps  
 Black/dark Brown  
 in color.

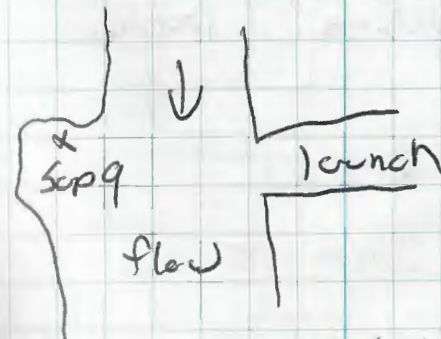
take sample at  
 830 6-3"

0830

x  
 +7 river flow

Location Freeworks Date 8-24-21 <sup>37</sup>  
 Project / Client Mass DEP

0840 mobilize to sap  
 9, located across  
 from Boat launch



0900 Sample taken at

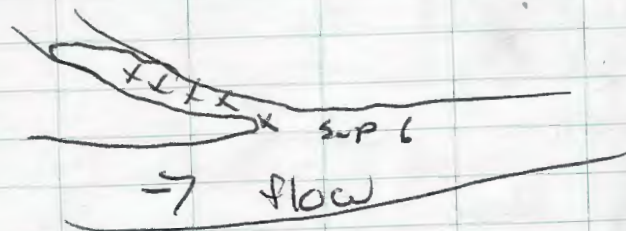
Black / Brown silt  
 with organics, tall  
 grass in area with  
 roots from shrubs.

- mobilize kayaks to  
 Sep 8 up river.  
 Current too strong  
 + Downed trees in  
 the way, mobilize  
 to launch to load  
 kayaks to go to  
 600 7 location



Location Freeworks Date 8-24-21  
 Project / Client Mass Dep

1000 - mobile to Sep  
 6 location, up  
 stream from sand  
 luddons park



- difficult to get  
 kayaks still while  
 using Ponor sampler

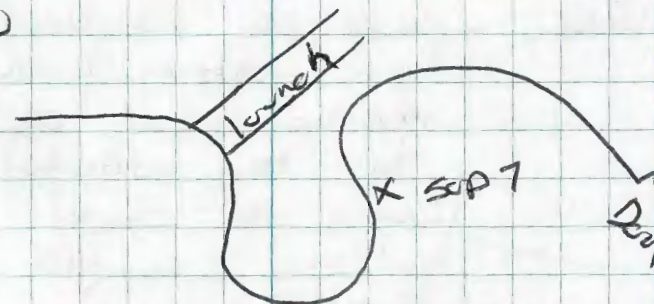
1030 - Sep 6 taken mott  
 closer to blue,  
 swampy / tall grass  
 / lily pads in core

- Black / Brown  
 silty organics,  
 leaves, sticks much

- mobile to Sep 7  
 - original location  
 too difficult to  
 reach, more to  
 back side of park

Location Freeworks Date 8-24-21 39  
 Project / Client Mass Dep

1100



- Sep 7, rocky bottom  
 difficult to get sample

- when need further  
 out, silty organic  
 sticks, leaves, much

Debris from Dep on  
 site

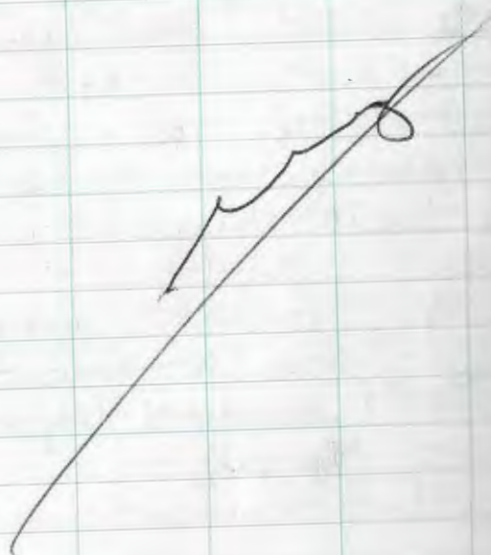
mobile to Sep 5  
 along water st,  
 no kayaks.

difficult access  
 with trees to land  
 Sep 5 owners grabbed  
 sample

Location Freewicks Date 8-24-21  
Project / Client Muss Dep

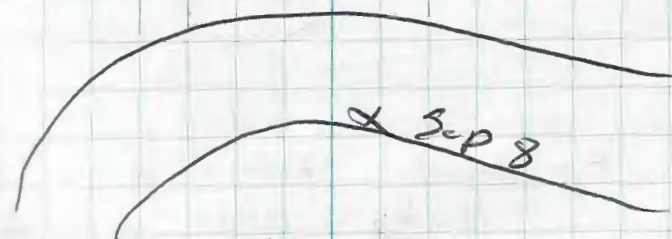
1200 Sep 5 collected  
from shore area,  
minimal vol able  
to be collected,  
rocks + gravel kept  
getting caught in  
Ponar.

1300 - dredge orange bottles  
sample for  
deb. + kerry off  
site



Location Freewicks Date 8-25-21  
Project / Client Muss Dep

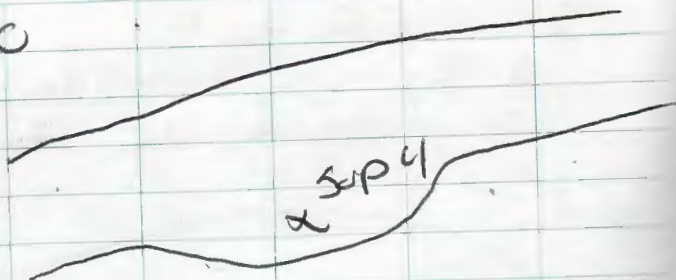
0730 G. Reussell on  
site, safety tent set  
- mobile to Sep 8



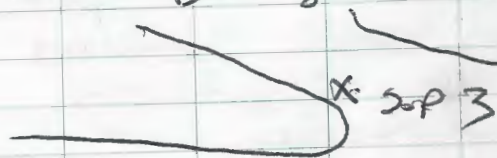
waders.  
- Dark vent 2' into  
stream, sampled 1'  
away from edge  
- Sand Brown  
M-C Sine Piles  
collected sample  
- just on + kerry  
on site, mobile  
to Sep 4  
- rocky Run path  
used waders  
to get into  
deposition area



0920

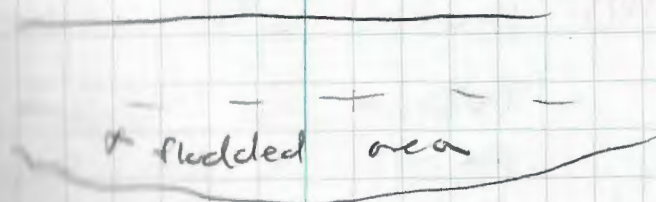


- bank had some rocks near access area, road 2' away, stacks silt & organics, leaves, muck in pond.
- return to vehicles
- Justin sampling gurg, Greg & Kerry move to sup -3 down stream of Cross St Bridge



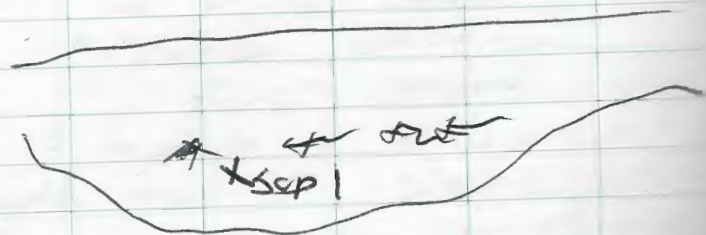
0950 Sep 3 collected at end of Pent rocky bottom. Ben FM Sand, Decent plan in area, trees along Bank.

- move back to vehicles to put sample in jar.
- move to Sep 2 at the end of Sleigh Dr.
- Dep set path. to river.



could not get to riverbed area, sample taken in flooded area along river. silt & organic leaves.

1045 mobile to Christopher  
Ln,  
- very dense,  
trees + roots,  
thick Onagras  
kept getting stuck



1100 tall grass, flooded  
bank, Blk onagras  
muck, sticks leaves

mobile to Forge pond  
bank, locate Sep-11  
not much flow. in  
pond, waded out  
until not possible  
to reach sediment  
to be able to  
sample.

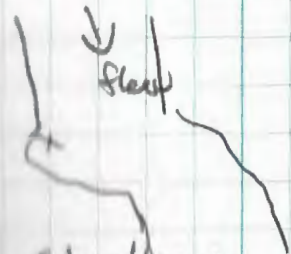
\* Sep 11

sample taken about  
6' from bank,  
rocks, on bank, could  
not get sample, Baker  
tree, Blk Mucky  
leaves sticks, silt.

1145

Dep collected at  
Sep-11

- mobile to Sep-12



- shallow, similar depth  
across whole river.  
sandy rocky bottom  
sample collected  
1145 F-M SAND.

## **Appendix B. Photo Log**

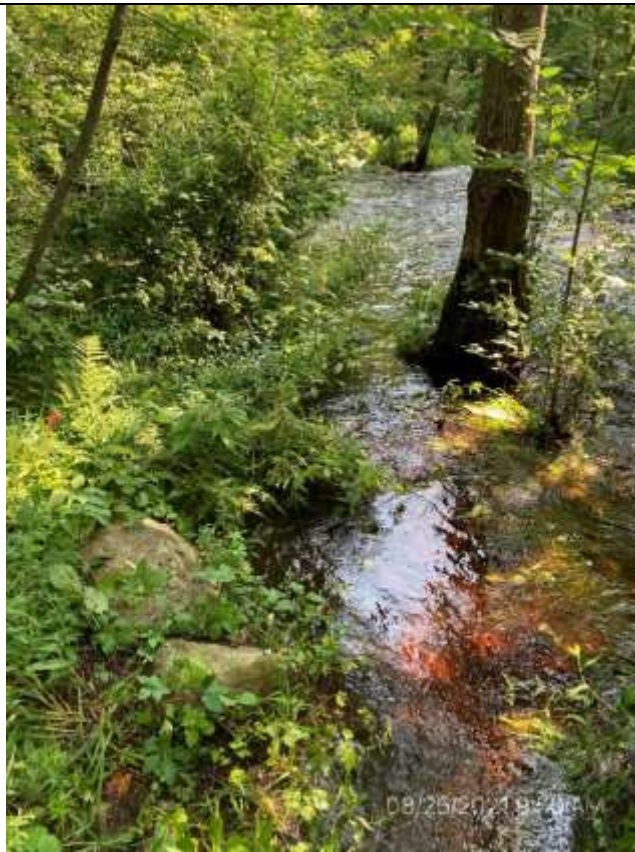




SAP-01- Located at the termination of the trail cut on Christopher Lane Circle.



SAP-02- Located at the termination of the trail cut at the end of Sleigh Lane.



SAP-03- located at the end of the trail where two streams meet downstream of the Cross St. bridge.



SAP-04- Located at end of the rocky run path which begins at Cross St.





SAP-05- located adjacent to the Waterman Tack Factory building at the bottom of the slope.



SAP-06- located north of the Indian Head River Reservoir, north bank near a small cove.





SAP-06- small cove north of SAP-06



SAP-06- Using the Ponar sampler to grab the sediment sample.



SAP-07- in small cove to left of the boat launch upstream of the dam.



SAP-08-Located at the end of the walking path on the south shore of the Indian Head River.





SAP-09- Located across the river from the Hanover public boat launch.



SAP-09- Located across the river from the Hanover public boat launch, collecting sample with ponar.



SAP-09-Location in January, during the initial sample location recon.



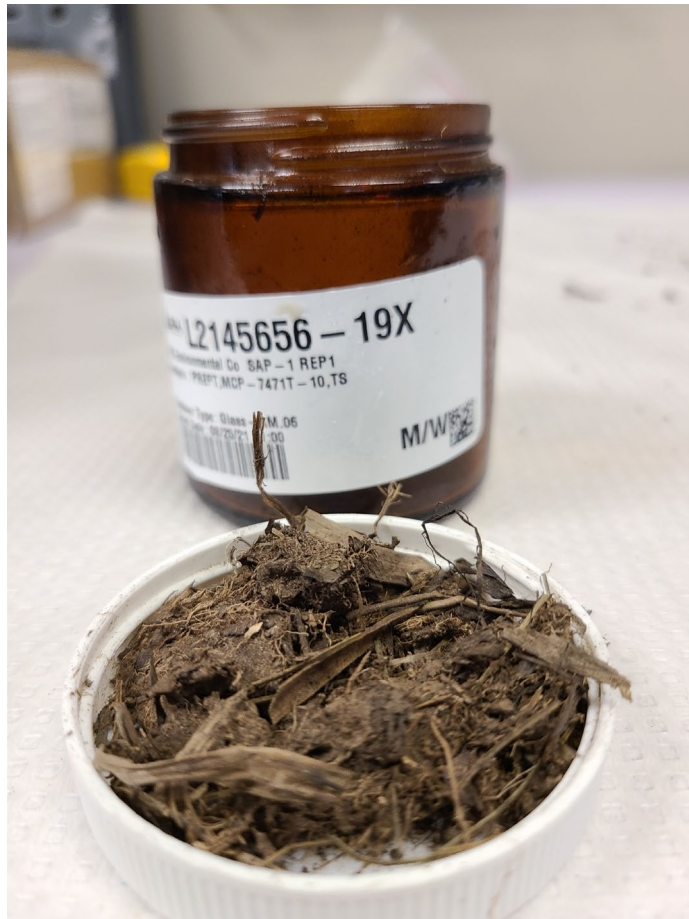
SAP-10- located near where the North River and Herring Brook connect, on the north bank of the North River.





SAP-11- located on the south property line in Forge Pond close to the main parking lot near the gate.

## **Appendix C. Sample Photos**



### SAP-1

REP 1: **8.64 mg/kg**  
 REP 2: 1.14 mg/kg  
 Eurofins: **9.59 mg/kg**  
 Pre-%S: 9.07%  
 Post-%S: 76.5%



### SAP-2

REP 1: **5.30 mg/kg**  
 REP 2: 0.987 mg/kg  
 Eurofins: 3.35 mg/kg  
 Pre-%S: 13.0%  
 Post-%S: 77.6%

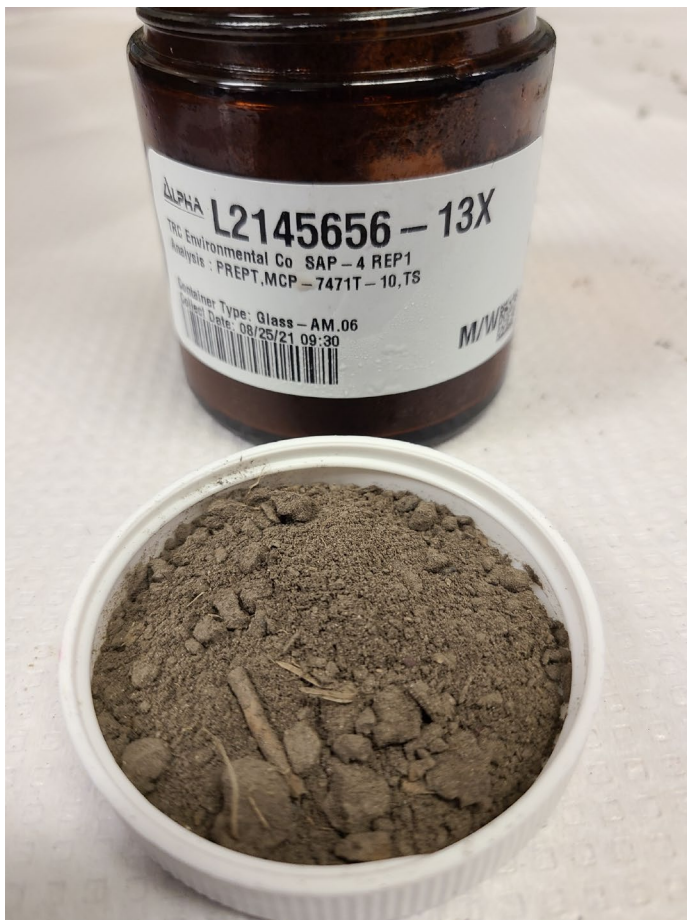


### SAP-3

REP 1: 0.073 U mg/kg  
 REP 2: 0.072 U mg/kg  
 Eurofins: 0.0515 mg/kg  
 Pre-%S: 13.4%  
 Post-%S: 99.4%

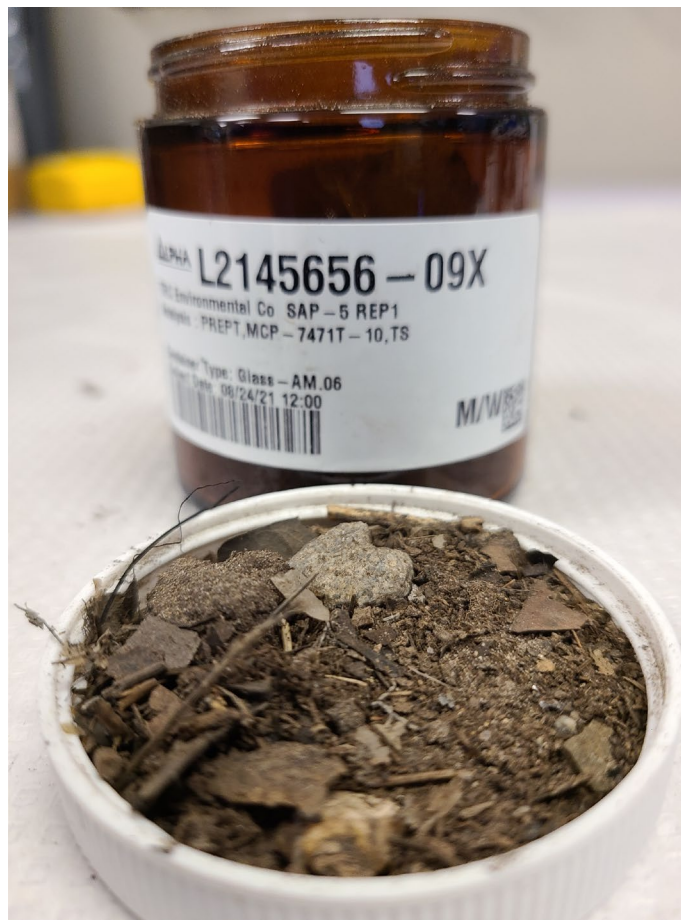
**Total  
Hg  
Results**





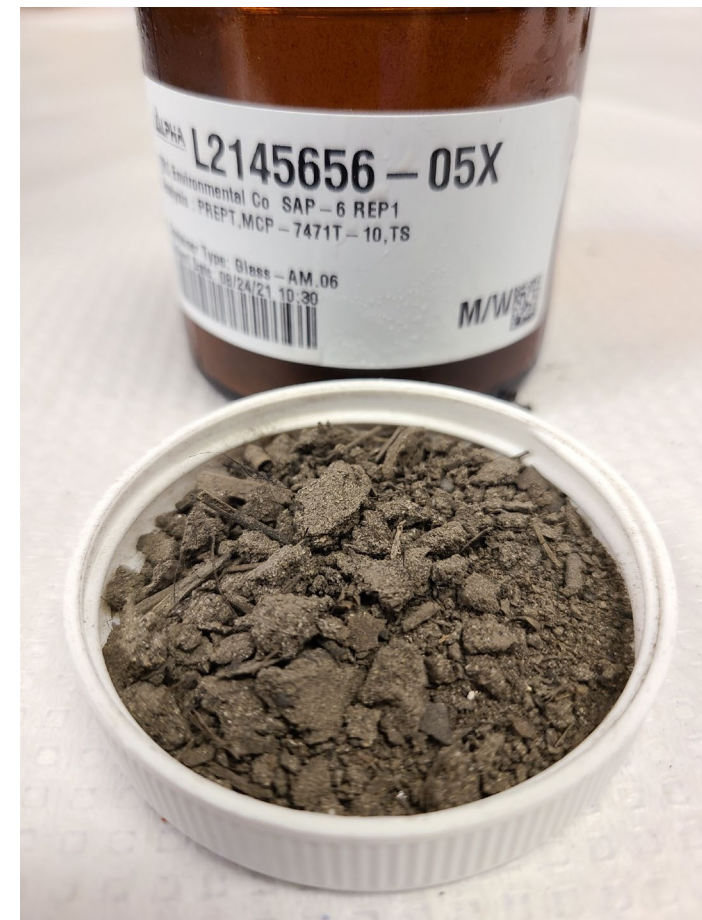
#### **SAP-4**

REP 1: 2.36 mg/kg  
 REP 2: 0.802 mg/kg  
 Eurofins: 1.42 mg/kg  
 Pre-%S: 29.2%  
 Post-%S: 71.3%



#### **SAP-5**

REP 1: 2.33 mg/kg  
 REP 2: 0.869 mg/kg  
 Eurofins: 1.59 mg/kg  
 Pre-%S: 50.5%  
 Post-%S: 73.5%

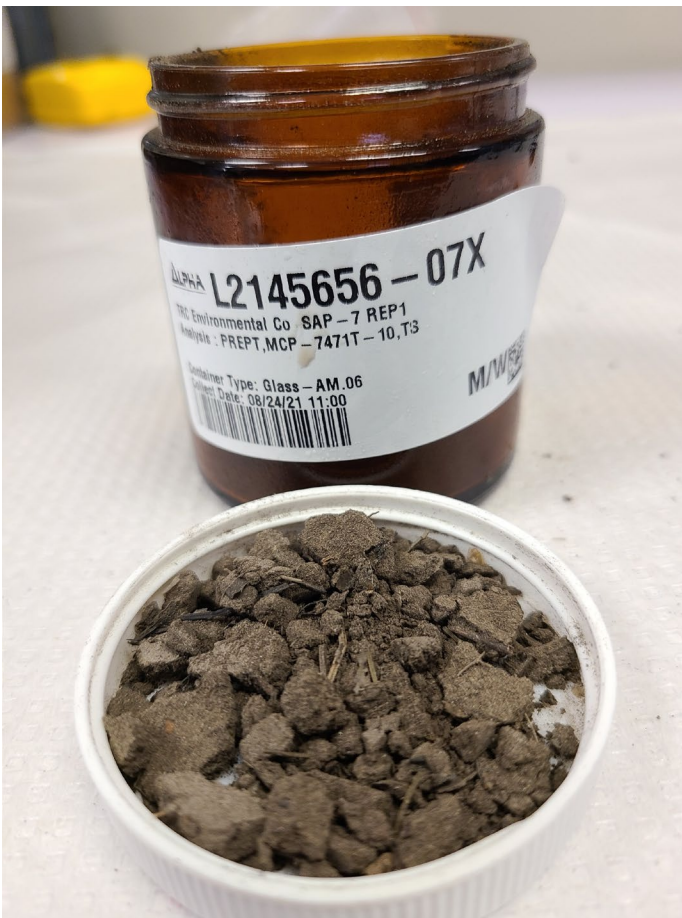


#### **SAP-6**

REP 1: **16.2 mg/kg**  
 REP 2: **7.18 mg/kg**  
 Eurofins: **6.37 mg/kg**  
 Pre-%S: 37.0%  
 Post-%S: 75.4%

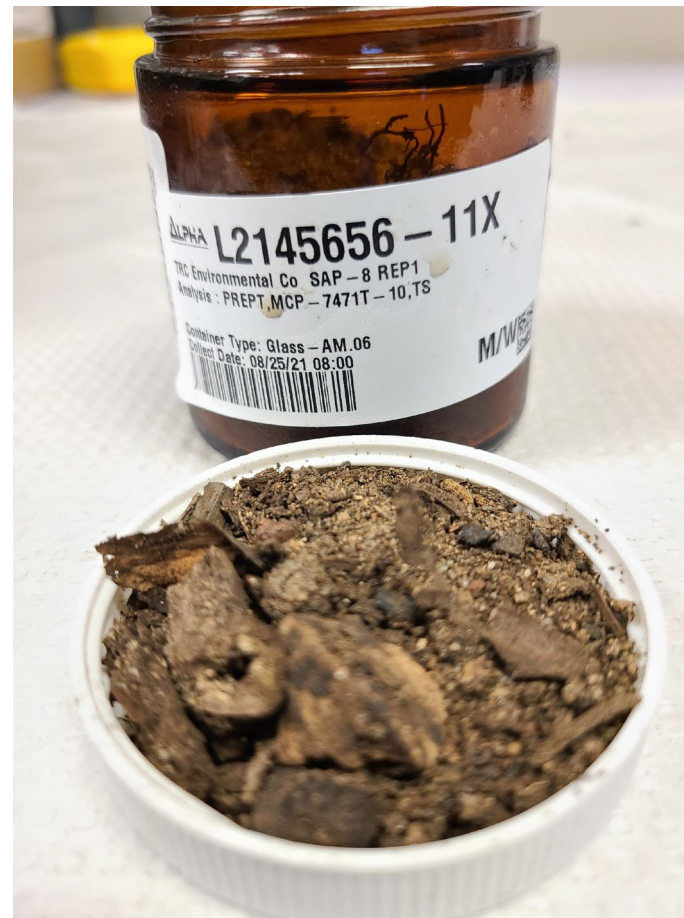
**Total  
Hg  
Results**





### SAP-7

REP 1: **9.91 mg/kg**  
 REP 2: 2.12 mg/kg  
 Eurofins: **5.74 mg/kg**  
 Pre-%S: 13.3%  
 Post-%S: 62.6%



### SAP-8

REP 1: 2.36 mg/kg  
 REP 2: 1.85 mg/kg  
 Eurofins: 1.49 mg/kg  
 Pre-%S: 59.3%  
 Post-%S: 80.6%



### SAP-9

REP 1: 3.00 mg/kg  
 REP 2: 1.01 mg/kg  
 Eurofins: 1.84 mg/kg  
 Pre-%S: 39.3%  
 Post-%S: 75.2%

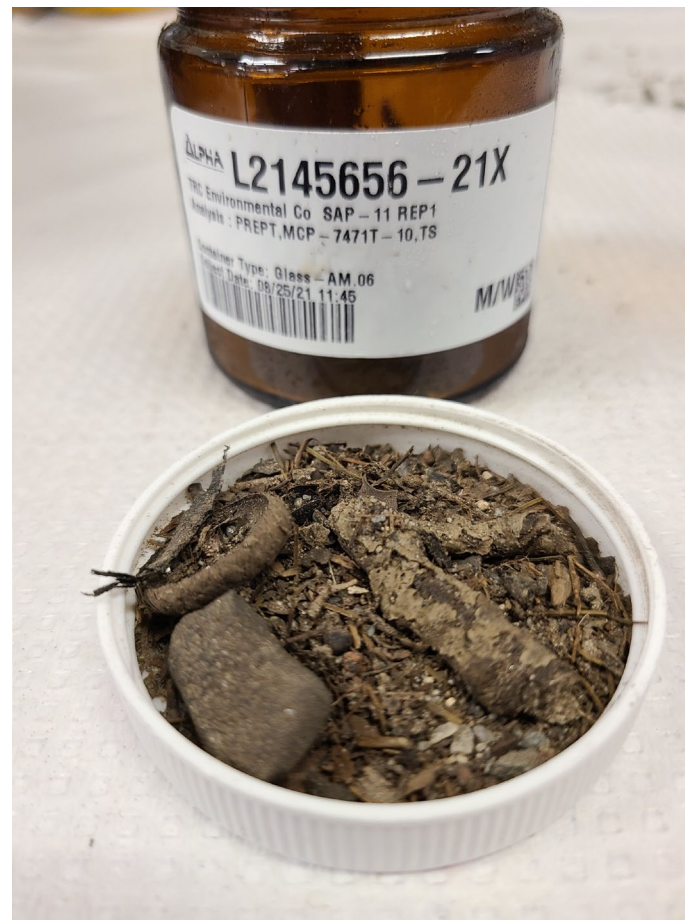
**Total  
Hg  
Results**





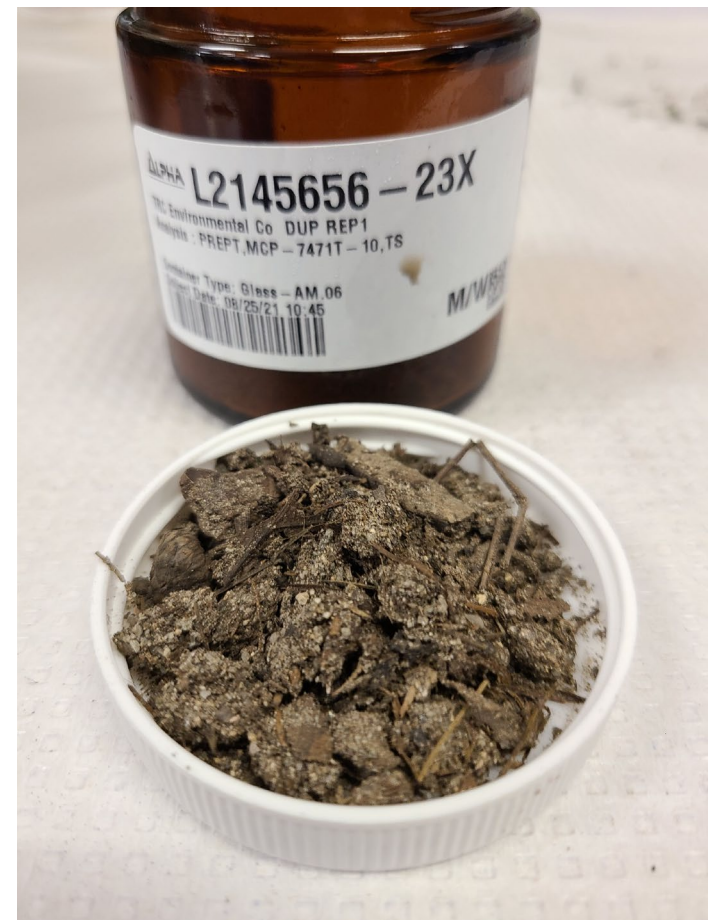
### SAP-10

REP 1: **5.28 mg/kg**  
 REP 2: 0.890 mg/kg  
 Eurofins: 1.57 mg/kg  
 Pre-%S: 14.1%  
 Post-%S: 70.7%



### SAP-11

REP 1: 0.280 mg/kg  
 REP 2: 0.075 U mg/kg  
 Eurofins: 0.127 mg/kg  
 Pre-%S: 53.1%  
 Post-%S: 92.7%



### DUP (SAP-11)

REP 1: 0.113 mg/kg  
 REP 2: 0.069 U mg/kg  
 Eurofins: 0.128 mg/kg  
 Pre-%S: 52.1%  
 Post-%S: 98.1%

**Total  
Hg  
Results**



## Total Hg Results

### **SAP-12**

REP 1: 0.075 U mg/kg

REP 2: 0.064 U mg/kg

Eurofins: 0.00116 U mg/kg

Pre-%S: 79.0%

Post-%S: 99.4%

## **Appendix D. Lab Reports**

04 October 2021

Dave Sullivan  
TRC Solutions  
650 Suffolk Street  
Lowell, MA 01854

RE: Mercury Speciation 2021

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Patrick Strickland".

Patrick Garcia-Strickland  
Business Unit Manager

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

**Reported:**  
04-Oct-21 12:00

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SAP-10	1H00148-01	Soil/Sediment	24-Aug-21 08:30	26-Aug-21 09:30
SAP-9	1H00148-02	Soil/Sediment	24-Aug-21 09:00	26-Aug-21 09:30
SAP-7	1H00148-03	Soil/Sediment	24-Aug-21 11:00	26-Aug-21 09:30
SAP-6	1H00148-04	Soil/Sediment	24-Aug-21 10:30	26-Aug-21 09:30
SAP-5	1H00148-05	Soil/Sediment	24-Aug-21 12:00	26-Aug-21 09:30

Eurofins Frontier Global Sciences, LLC



*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Patrick Garcia-Strickland, Business Unit Manager

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

#### SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 26-Aug-21 09:30. The samples were received intact, on-ice within a sealed cooler at

<u>Cooler</u>	<u>Temp C°</u>
Default Cooler	15.2

#### SAMPLE PREPARATION AND ANALYSIS

Total solids analysis was performed in accordance with method SM2540B. Total solids are prepared at the same time as the preparation for the analyte(s) of interest in order to provide the most accurate dry mass correction which may be outside of the method recommended holding time of 7 days from sample collection.

Total mercury preparation and analysis was performed by flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631B.

Samples were prepared and analyzed for methyl mercury by cold vapor gas chromatography atomic fluorescence spectrometry (CV-GC-AFS) in accordance with EPA 1630 (EFGS SOP2808).

#### ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the

Eurofins Frontier Global Sciences, LLC

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Patrick Garcia-Strickland, Business Unit Manager

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan**Reported:**  
04-Oct-21 12:00

exception of any items flagged and described in the notes and definitions section of the report.

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries. All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

Eurofins Frontier Global Sciences, LLC



Patrick Garcia-Strickland, Business Unit Manager

*The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





Frontier Global Sciences

## Sample Receipt Checklist

Client: TRC

Matrix: Soil/Seed

Date & Time Received: 8/26/21 1130

Date Labeled: 8/26/21 Labeled By: h

# of Coolers Received: 1

Samples Arrived By: X Shipping Service \_\_\_\_\_ Courier \_\_\_\_\_ Hand \_\_\_\_\_

Label Verified By: LR 8/26/21

Coolant: ☐ None/Ambient ☒ Loose Ice ☐ Gel Ice ☐ Dry Ice Coolant Required: Y/N Temp Blank Used: Y/N for Cooler(s): \_\_\_\_\_

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified Y/N

Samples from Wisconsin have special requirements. Shipment received includes samples from Wisconsin: Y/N

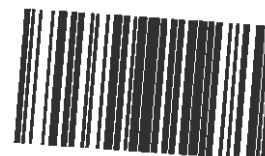
Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>Y</u>	
Custody seals signed:	<u>Y</u>	

TID: <u>181139780</u>	CF: <u>0.7</u> °C	Date/time: <u>8/26/21 1130</u>	By: <u>h</u>
Cooler 1: <u>14.5</u> °C	w/ CF: <u>15.2</u> °C	Cooler 4: _____ °C	w/ CF: _____ °C
Cooler 2: _____ °C	w/ CF: _____ °C	Cooler 5: _____ °C	w/ CF: _____ °C
Cooler 3: _____ °C	w/ CF: _____ °C	Cooler 6: _____ °C	w/ CF: _____ °C

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Reservation type:	<u>NA</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
External COC required:	<u>NA</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>NA</u>	

1H00148



Sample arrived out of temp (15.2°C)  
looks as though cooler was delayed in transit  
PM notified - LR 8/26/21



## Chain of Custody Record & Laboratory Analysis Request

**5755 8th St E  
Tacoma, WA 98424  
Phone: 253 922-2310**

Page 1 of 1

**!US34\_PM@Eurofinsus.com**  
**<http://www.Eurofinsus.com/Frontier/>**

Client: <b>TRC</b>		Contact: <b>Scme</b>		EFGS PM:	
Address: <b>650 Suffolk St Lowell MA</b>		Phone:		Date: <b>8-24-21</b>	
Project Name: <b>Fireworks</b>		E-mail:		TAT: Standard or RUSH (For TAT < 15 days, contact PM.) Surcharges apply for RUSH TAT	
Report To: <b>Dave Sullivan</b>		Contract/PO: <b>246449.1400</b>		Saturday delivery? (If yes, please CONTACT PM)	
Address: <b>650 Suffolk Street Lowell, MA</b>		Invoice To:		EDD Format -	
Phone: <b>978/970 5600</b>		Phone:		Report Format - Level II or IV	
E-mail: <b>DSullivan@rccompanies.com</b>		E-mail:			

No.	Engraved Bottle ID	Sample ID	# of Bottles	Matrix	Date & Time	SD	N	Y	X	Comments
1		SAP-10	1	SS	8/24/21 1030	SD	N	Y	X	
2		SAP-9	1	SS	8/24/21 1030	SD	N	Y	X	
3		SAP-8	1	SS	8/24/21 1030	SD	N	Y	X	
4		SAP-7	1	SS	8/24/21 1100	SD	N	Y	X	
5		SAP-6	1	SS	8/24/21 1030	SD	N	Y	X	
6		SAP-5	1	SS	8/24/21 1200	SD	N	Y	X	
7										
8										
9										
10										
11										
12										

For Laboratory Use Only		Water Control		Relinquished By:		Received By:	
COC Seal:	Comments:	Water Control		Name: <b>Gregory Davis</b>		Name: <b>Warren Ash</b>	
Cooler Temp:		Water Control		Organization: <b>TRC</b>		Organization: <b>EFGS</b>	
Cardinal:		Water Control		Date & Time: <b>8-24/21 1540</b>		Date & Time: <b>8/26/21 9130</b>	
WTR:		Water Control		Tracking number: <b>2829 2550 5575</b>			
Sample Disposal:				By signing, you agree with EFGS' terms and conditions, and that you authorize EFGS to perform analyses.			
<input type="checkbox"/> Return (shipping fees will apply) <input checked="" type="checkbox"/> Standard Disposal - 30 Days after report <input type="checkbox"/> Retain for _____ weeks after report (storage fees will apply)				Date: _____			



Frontier Global Sciences

5755 8th Street East  
Tacoma, WA 98424  
Phone: (253) 922-2310

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

**SAP-10**  
**1H00148-01**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	1560	7.47	68.0	ng/g dry	200	[CALC]	28-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	1570	-	68.0	ng/g dry	200	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	13.7	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	9.74	-	2.71	ng/g dry	10	F109424	28-Sep-21	1130011	29-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	ND	-	4.90	ng/g	100	F109404	24-Sep-21	1129016	28-Sep-21	EPA 1631 Mod	QB-02

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Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
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**SAP-9**  
**1H00148-02**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	1840	7.72	70.2	ng/g dry	500	[CALC]	28-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	1840	-	70.2	ng/g dry	500	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	33.4	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	3.08	-	1.01	ng/g dry	10	F109424	28-Sep-21	1I30011	29-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	ND	-	4.51	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	QB-02



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Reported:  
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**SAP-7**  
**1H00148-03**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	5730	17.0	155	ng/g dry	500	[CALC]	28-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	5740	-	155	ng/g dry	500	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	14.6	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	12.2	-	2.49	ng/g dry	10	F109424	28-Sep-21	1I30011	29-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	ND	-	5.00	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	QB-02

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Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
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**SAP-6**  
**1H00148-04**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	6360	39.3	357	ng/g dry	2500	[CALC]	28-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	6370	-	357	ng/g dry	2500	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	31.8	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	14.7	-	1.10	ng/g dry	10	F109424	28-Sep-21	1I30011	29-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	ND	-	4.51	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	QB-02



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**SAP-5**  
**1H00148-05**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	1530	5.90	53.7	ng/g dry	200	[CALC]	28-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	1590	-	53.7	ng/g dry	200	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	17.4	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	52.6	-	2.41	ng/g dry	10	F109424	28-Sep-21	1I30011	29-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	ND	-	4.86	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	QB-02

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1129016 - F109404</b>											
<b>Cal Standard (1129016-CAL1)</b>						Prepared & Analyzed: 28-Sep-21					
Mercury (0)	0.46	-		ng/L	0.50000		92.5				
<b>Cal Standard (1129016-CAL2)</b>						Prepared & Analyzed: 28-Sep-21					
Mercury (0)	0.95	-		ng/L	1.0000		94.9				
<b>Cal Standard (1129016-CAL3)</b>						Prepared & Analyzed: 28-Sep-21					
Mercury (0)	5.17	-		ng/L	5.0000		103				
<b>Cal Standard (1129016-CAL4)</b>						Prepared & Analyzed: 28-Sep-21					
Mercury (0)	21.79	-		ng/L	20.000		109				
<b>Cal Standard (1129016-CAL5)</b>						Prepared & Analyzed: 28-Sep-21					
Mercury (0)	40.08	-		ng/L	40.000		100				
<b>Calibration Blank (1129016-CCB1)</b>						Prepared & Analyzed: 28-Sep-21					
Mercury (0)	0.004	-		ng/L							
<b>Calibration Blank (1129016-CCB2)</b>						Prepared & Analyzed: 28-Sep-21					
Mercury (0)	-0.0006	-		ng/L							
<b>Calibration Blank (1129016-CCB3)</b>						Prepared & Analyzed: 28-Sep-21					
Mercury (0)	0.01	-		ng/L							
<b>Calibration Blank (1129016-CCB4)</b>						Prepared & Analyzed: 28-Sep-21					
Mercury (0)	-0.17	-		ng/L							
<b>Calibration Blank (1129016-CCB6)</b>						Prepared & Analyzed: 28-Sep-21					
Mercury (0)	-0.08	-		ng/L							

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Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1129016 - F109404</b>											
<b>Calibration Blank (1129016-CCB7)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	0.04	-		ng/L							
<b>Calibration Blank (1129016-CCB8)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	-0.03	-		ng/L							
<b>Calibration Blank (1129016-CCB9)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	-0.04	-		ng/L							
<b>Calibration Blank (1129016-CCBA)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	0.14	-		ng/L							
<b>Calibration Check (1129016-CCV1)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	5.60	-		ng/L	5.0200		112	77-123			
<b>Calibration Check (1129016-CCV2)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	4.62	-		ng/L	5.0200		92.1	77-123			
<b>Calibration Check (1129016-CCV3)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	4.41	-		ng/L	5.0200		87.9	77-123			
<b>Calibration Check (1129016-CCV4)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	3.51	-		ng/L	5.0200		70.0	77-123			
<b>Calibration Check (1129016-CCV6)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	3.94	-		ng/L	5.0200		78.6	77-123			
<b>Calibration Check (1129016-CCV7)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	4.12	-		ng/L	5.0200		82.1	77-123			

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Project: Mercury Speciation 2021  
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Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch 1129016 - F109404

##### Calibration Check (1129016-CCV8)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	4.01	-		ng/L	5.0200		79.9	77-123
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##### Calibration Check (1129016-CCV9)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	3.92	-		ng/L	5.0200		78.1	77-123
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##### Calibration Check (1129016-CCVA)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	3.91	-		ng/L	5.0200		77.9	77-123
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##### Instrument Blank (1129016-IBL1)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	ND	-	0.02	ng/L				
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##### Instrument Blank (1129016-IBL2)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	ND	-	0.02	ng/L				
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##### Instrument Blank (1129016-IBL3)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	ND	-	0.02	ng/L				
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##### Initial Cal Blank (1129016-ICB1)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	0.05	-		ng/L				
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##### Initial Cal Check (1129016-ICV1)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	5.74	-		ng/L	5.0200		114	79-121
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#### Batch 1130011 - F109424

##### Cal Standard (1130011-CAL1)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.043	-		ng/L	0.050000		86.0	
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04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch 1130011 - F109424

<b>Cal Standard (1130011-CAL2)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	0.172	-		ng/L	0.20000		85.8				
<b>Cal Standard (1130011-CAL3)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	1.076	-		ng/L	1.0000		108				
<b>Cal Standard (1130011-CAL4)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	2.177	-		ng/L	2.0000		109				
<b>Cal Standard (1130011-CAL5)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	4.470	-		ng/L	4.0000		112				
<b>Calibration Blank (1130011-CCB1)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	-0.006	-		ng/L							U
<b>Calibration Blank (1130011-CCB2)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	0.015	-		ng/L							
<b>Calibration Blank (1130011-CCB3)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	-0.012	-		ng/L							U
<b>Calibration Blank (1130011-CCB4)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	-0.008	-		ng/L							U
<b>Calibration Blank (1130011-CCB5)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	-0.007	-		ng/L							U
<b>Calibration Blank (1130011-CCB6)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	-0.009	-		ng/L							U

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch 1130011 - F109424

##### Calibration Check (1130011-CCV1)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.463	-		ng/L	0.50368		92.0	60-140		
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##### Calibration Check (1130011-CCV2)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.503	-		ng/L	0.50368		99.9	60-140		
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##### Calibration Check (1130011-CCV3)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.445	-		ng/L	0.50368		88.3	60-140		
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##### Calibration Check (1130011-CCV4)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.396	-		ng/L	0.50368		78.5	60-140		
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##### Calibration Check (1130011-CCV5)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.464	-		ng/L	0.50368		92.1	60-140		
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##### Calibration Check (1130011-CCV6)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.446	-		ng/L	0.50368		88.6	60-140		
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##### Instrument Blank (1130011-IBL1)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	ND	-	0.058	ng/L						U
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##### Initial Cal Blank (1130011-ICB1)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.0008	-		ng/L						
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##### Initial Cal Check (1130011-ICV1)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.565	-		ng/L	0.50368		112	65-135		
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#### Batch 1130013 - F109404

##### Cal Standard (1130013-CAL1)

Prepared & Analyzed: 29-Sep-21

Mercury (0)	0.50	-		ng/L	0.50000		100			
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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1130013 - F109404</b>											
<b>Cal Standard (1130013-CAL2)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	1.00	-		ng/L	1.0000		99.6				
<b>Cal Standard (1130013-CAL3)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	5.00	-		ng/L	5.0000		100				
<b>Cal Standard (1130013-CAL4)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	19.71	-		ng/L	20.000		98.6				
<b>Cal Standard (1130013-CAL5)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	40.72	-		ng/L	40.000		102				
<b>Calibration Blank (1130013-CCB1)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	0.08	-		ng/L							
<b>Calibration Blank (1130013-CCB2)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	0.03	-		ng/L							
<b>Calibration Blank (1130013-CCB3)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	0.10	-		ng/L							
<b>Calibration Blank (1130013-CCB4)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	0.13	-		ng/L							
<b>Calibration Blank (1130013-CCB5)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	0.10	-		ng/L							
<b>Calibration Blank (1130013-CCB6)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	-0.05	-		ng/L							

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### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1I30013 - F109404</b>											
<b>Calibration Blank (1I30013-CCB7)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	-0.004	-		ng/L							
<b>Calibration Check (1I30013-CCV1)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.81	-		ng/L	5.0200		95.7	77-123			
<b>Calibration Check (1I30013-CCV2)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.90	-		ng/L	5.0200		97.6	77-123			
<b>Calibration Check (1I30013-CCV3)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.61	-		ng/L	5.0200		91.9	77-123			
<b>Calibration Check (1I30013-CCV4)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.68	-		ng/L	5.0200		93.3	77-123			
<b>Calibration Check (1I30013-CCV5)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.44	-		ng/L	5.0200		88.5	77-123			
<b>Calibration Check (1I30013-CCV6)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.33	-		ng/L	5.0200		86.3	77-123			
<b>Calibration Check (1I30013-CCV7)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.46	-		ng/L	5.0200		88.8	77-123			
<b>Instrument Blank (1I30013-IBL1)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	ND	-	0.02	ng/L							
<b>Instrument Blank (1I30013-IBL2)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	ND	-	0.02	ng/L							

Eurofins Frontier Global Sciences, LLC

Patrick Garcia-Strickland, Business Unit Manager

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Frontier Global Sciences

5755 8th Street East  
Tacoma, WA 98424  
Phone: (253) 922-2310

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch 1I30013 - F109404

##### Instrument Blank (1I30013-IBL3)

Prepared & Analyzed: 29-Sep-21

Mercury (0)	ND	-	0.02	ng/L
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##### Initial Cal Blank (1I30013-ICB1)

Prepared & Analyzed: 29-Sep-21

Mercury (0)	0.09	-		ng/L
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##### Initial Cal Check (1I30013-ICV1)

Prepared & Analyzed: 29-Sep-21

Mercury (0)	4.91	-		ng/L	5.0200	97.8	79-121
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#### Batch 1J01003 - F109410

##### Cal Standard (1J01003-CAL1)

Prepared & Analyzed: 30-Sep-21

Mercury	0.52	-		ng/L	0.50000	104
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##### Cal Standard (1J01003-CAL2)

Prepared & Analyzed: 30-Sep-21

Mercury	0.99	-		ng/L	1.0000	98.9
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##### Cal Standard (1J01003-CAL3)

Prepared & Analyzed: 30-Sep-21

Mercury	4.96	-		ng/L	5.0000	99.2
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##### Cal Standard (1J01003-CAL4)

Prepared & Analyzed: 30-Sep-21

Mercury	19.70	-		ng/L	20.000	98.5
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##### Cal Standard (1J01003-CAL5)

Prepared & Analyzed: 30-Sep-21

Mercury	39.70	-		ng/L	40.000	99.2
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##### Calibration Blank (1J01003-CCB1)

Prepared & Analyzed: 30-Sep-21

Mercury	0.04	-		ng/L
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Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1J01003 - F109410</b>											
<b>Calibration Blank (1J01003-CCB2)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	0.02	-		ng/L							
<b>Calibration Blank (1J01003-CCB3)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	0.07	-		ng/L							
<b>Calibration Blank (1J01003-CCB4)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	0.007	-		ng/L							
<b>Calibration Blank (1J01003-CCB5)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	0.04	-		ng/L							
<b>Calibration Blank (1J01003-CCB6)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	-0.10	-		ng/L							U
<b>Calibration Blank (1J01003-CCB7)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	-0.06	-		ng/L							U
<b>Calibration Blank (1J01003-CCB8)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	-0.10	-		ng/L							U
<b>Calibration Check (1J01003-CCV1)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.66	-		ng/L	5.0200		92.9	77-123			
<b>Calibration Check (1J01003-CCV2)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.66	-		ng/L	5.0200		92.9	77-123			
<b>Calibration Check (1J01003-CCV3)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.54	-		ng/L	5.0200		90.4	77-123			

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650 Suffolk Street  
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Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1J01003 - F109410</b>											
<b>Calibration Check (1J01003-CCV4)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.61	-		ng/L	5.0200		91.8	77-123			
<b>Calibration Check (1J01003-CCV5)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.54	-		ng/L	5.0200		90.5	77-123			
<b>Calibration Check (1J01003-CCV6)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.66	-		ng/L	5.0200		92.8	77-123			
<b>Calibration Check (1J01003-CCV7)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.54	-		ng/L	5.0200		90.3	77-123			
<b>Calibration Check (1J01003-CCV8)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.54	-		ng/L	5.0200		90.5	77-123			
<b>Instrument Blank (1J01003-IBL1)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	ND	-	0.05	ng/L							U
<b>Instrument Blank (1J01003-IBL2)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	ND	-	0.05	ng/L							U
<b>Instrument Blank (1J01003-IBL3)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	ND	-	0.05	ng/L							U
<b>Initial Cal Blank (1J01003-ICB1)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	0.02	-		ng/L							
<b>Initial Cal Check (1J01003-ICV1)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.76	-		ng/L	5.0200		94.8	79-121			

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TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1J01005 - F109427</b>											
<b>Cal Standard (1J01005-CAL1)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	0.046	-		ng/L	0.050000		92.0				
<b>Cal Standard (1J01005-CAL2)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	0.175	-		ng/L	0.20000		87.5				
<b>Cal Standard (1J01005-CAL3)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	0.955	-		ng/L	1.0000		95.5				
<b>Cal Standard (1J01005-CAL4)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	2.404	-		ng/L	2.0000		120				
<b>Cal Standard (1J01005-CAL5)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	4.003	-		ng/L	4.0000		100				
<b>Cal Standard (1J01005-CAL6)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	8.371	-		ng/L	0.050000		16700				
<b>Calibration Blank (1J01005-CCB1)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	-0.011	-		ng/L							U
<b>Calibration Blank (1J01005-CCB2)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	-0.017	-		ng/L							U
<b>Calibration Check (1J01005-CCV1)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	0.535	-		ng/L	0.50368		106	60-140			
<b>Calibration Check (1J01005-CCV2)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	0.488	-		ng/L	0.50368		97.0	60-140			

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TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch 1J01005 - F109427

##### Instrument Blank (1J01005-IBL1)

Prepared & Analyzed: 30-Sep-21

Methyl Mercury (as Mercury)	ND	-	0.050	ng/L							U
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##### Initial Cal Blank (1J01005-ICB2)

Prepared & Analyzed: 30-Sep-21

Methyl Mercury (as Mercury)	-0.005	-		ng/L							U
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##### Initial Cal Check (1J01005-ICV2)

Prepared & Analyzed: 30-Sep-21

Methyl Mercury (as Mercury)	0.512	-		ng/L	0.50368		102	65-135			
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#### Batch F109404 - Miscellaneous Preparation AFS

##### Blank (F109404-BLK1)

Prepared: 24-Sep-21 Analyzed: 28-Sep-21

Mercury (0)	ND	-	5.00	ng/g							
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##### Blank (F109404-BLK2)

Prepared: 24-Sep-21 Analyzed: 28-Sep-21

Mercury (0)	15.70	-	5.00	ng/g							QB-10
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##### Blank (F109404-BLK3)

Prepared: 24-Sep-21 Analyzed: 28-Sep-21

Mercury (0)	ND	-	5.00	ng/g							
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##### Duplicate (F109404-DUP3)

Source: 1H00148-01RE2

Prepared: 24-Sep-21 Analyzed: 28-Sep-21

Mercury (0)	0.74	-	4.96	ng/g		ND				24	
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##### Duplicate (F109404-DUP4)

Source: 1H00149-01RE1

Prepared: 24-Sep-21 Analyzed: 29-Sep-21

Mercury (0)	70.01	-	4.95	ng/g		80.32			13.7	24	
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#### Batch F109410 - EFGS SOP2807 Cold Aqua Regia Digestion for Hg

##### Blank (F109410-BLK1)

Prepared: 20-Sep-21 Analyzed: 30-Sep-21

Mercury	6.50	-	1.00	ng/g wet							
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Eurofins Frontier Global Sciences, LLC



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Patrick Garcia-Strickland, Business Unit Manager

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F109410 - EFGS SOP2807 Cold Aqua Regia Digestion for Hg

<b>Blank (F109410-BLK2)</b>					Prepared: 20-Sep-21 Analyzed: 30-Sep-21						
Mercury	ND	-	1.00	ng/g wet							U
<b>Blank (F109410-BLK3)</b>					Prepared: 20-Sep-21 Analyzed: 30-Sep-21						
Mercury	ND	-	1.00	ng/g wet							U
<b>LCS (F109410-BS1)</b>					Prepared: 20-Sep-21 Analyzed: 30-Sep-21						
Mercury	382.4	-	20.0	ng/g wet	401.60		95.2	75-125			
<b>LCS Dup (F109410-BSD1)</b>					Prepared: 20-Sep-21 Analyzed: 30-Sep-21						
Mercury	387.1	-	20.0	ng/g wet	401.60		96.4	75-125	1.22	24	
<b>Matrix Spike (F109410-MS1)</b>					<b>Source: 1H00148-01</b>		Prepared: 20-Sep-21 Analyzed: 30-Sep-21				
Mercury	7790	-	131	ng/g dry	2624.8	1573	237	71-125			QM-07
<b>Matrix Spike (F109410-MS2)</b>					<b>Source: 1H00149-01</b>		Prepared: 20-Sep-21 Analyzed: 30-Sep-21				
Mercury	1875	-	44.7	ng/g dry	717.83	1498	52.4	71-125			QM-07
<b>Matrix Spike Dup (F109410-MSD1)</b>					<b>Source: 1H00148-01</b>		Prepared: 20-Sep-21 Analyzed: 30-Sep-21				
Mercury	4160	-	139	ng/g dry	2800.3	1573	92.4	71-125	87.8	24	QR-08
<b>Matrix Spike Dup (F109410-MSD2)</b>					<b>Source: 1H00149-01</b>		Prepared: 20-Sep-21 Analyzed: 30-Sep-21				
Mercury	1887	-	43.6	ng/g dry	700.81	1498	55.4	71-125	5.51	24	QM-07

#### Batch F109424 - EFGS SOP5134 MeCl2 Extraction for Methyl Hg

<b>Blank (F109424-BLK1)</b>					Prepared: 28-Sep-21 Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	ND	-	0.050	ng/g wet							U

Eurofins Frontier Global Sciences, LLC



Patrick Garcia-Strickland, Business Unit Manager

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650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F109424 - EFGS SOP5134 MeCl2 Extraction for Methyl Hg

<b>Blank (F109424-BLK2)</b>					Prepared: 28-Sep-21 Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	ND	-	0.050	ng/g wet							U
<b>Blank (F109424-BLK3)</b>					Prepared: 28-Sep-21 Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	ND	-	0.050	ng/g wet							U
<b>LCS (F109424-BS1)</b>					Prepared: 28-Sep-21 Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	1.167	-	0.500	ng/g wet	5.0000		23.3	50-150			Z-01
<b>LCS Dup (F109424-BSD1)</b>					Prepared: 28-Sep-21 Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	2.099	-	0.500	ng/g wet	5.0000		42.0	50-150	57.1	35	Z-01
<b>Matrix Spike (F109424-MS1)</b>					<b>Source: 1H00148-01</b>		Prepared: 28-Sep-21 Analyzed: 29-Sep-21				
Methyl Mercury (as Mercury)	29.29	-	2.46	ng/g dry	24.626	9.743	79.4	50-150			
<b>Matrix Spike (F109424-MS2)</b>					<b>Source: 1H00149-01</b>		Prepared: 28-Sep-21 Analyzed: 29-Sep-21				
Methyl Mercury (as Mercury)	7.554	-	0.591	ng/g dry	5.9147	ND	128	50-150			
<b>Matrix Spike Dup (F109424-MSD1)</b>					<b>Source: 1H00148-01</b>		Prepared: 28-Sep-21 Analyzed: 29-Sep-21				
Methyl Mercury (as Mercury)	36.33	-	2.90	ng/g dry	28.984	9.743	91.7	50-150	14.4	35	
<b>Matrix Spike Dup (F109424-MSD2)</b>					<b>Source: 1H00149-01</b>		Prepared: 28-Sep-21 Analyzed: 29-Sep-21				
Methyl Mercury (as Mercury)	6.544	-	0.598	ng/g dry	5.9801	ND	109	50-150	15.4	35	



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Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F109432 - EFGS SOP5133 Solids Analysis

##### Duplicate (F109432-DUP1)

Source: 1100084-01

Prepared: 01-Oct-21 Analyzed: 04-Oct-21

% Solids	83.8	-	0.1	% by Weight	83.4				0.478	10	O-04, O-09
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##### Duplicate (F109432-DUP2)

Source: 1100095-01

Prepared: 01-Oct-21 Analyzed: 04-Oct-21

% Solids	83.9	-	0.1	% by Weight	83.2				0.838	10	O-04, O-09
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Patrick Garcia-Strickland, Business Unit Manager



TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Notes and Definitions

- Z-01 LCS recovery not within control limits. Batch acceptable due to all MS samples within control limits.
- U Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
- QR-08 The RPD value for the MS/MSD was outside of acceptance limits. Batch QC acceptable based on matrix duplicate and/or LCS/LCSD RPD values within control limits.
- QM-07 The spike recovery was outside control limits for the MS and/or MSD. The batch was accepted based on LCS and LCSD recoveries within control limits and, when analysis permits, acceptable AS/ASD.
- QB-10 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. Only report sample results greater than 10 times the contamination value (QB-01), or samples less than the MRL (QB-02).
- QB-02 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the sample concentrations are less than the MRL.
- O-09 Total Solids are prepared at the same time as the preparation for the analyte(s) of interest in order to provide the most accurate dry mass correction.
- O-04 This sample was analyzed outside of the recommended holding time.
- E-01 Sample was preceded by a sample exceeding the calibration curve and was reanalyzed for confirmation.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the method detection limit if reported to the MDL or above the reporting limit if reported to the MRL.
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

04 October 2021

Dave Sullivan  
TRC Solutions  
650 Suffolk Street  
Lowell, MA 01854

RE: Mercury Speciation 2021

Enclosed are the analytical results for samples received by Eurofins Frontier Global Sciences. All quality control measurements are within established control limits and there were no analytical difficulties encountered with the exception of those listed in the case narrative section of this report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Patrick Garcia-Strickland  
Business Unit Manager

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854


Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

**Reported:**  
04-Oct-21 12:00

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SAP-8	1H00149-01	Soil/Sediment	25-Aug-21 08:00	26-Aug-21 09:30
SAP-4	1H00149-02	Soil/Sediment	25-Aug-21 09:30	26-Aug-21 09:30
SAP-3	1H00149-03	Soil/Sediment	25-Aug-21 09:50	26-Aug-21 09:30
SAP-2	1H00149-04	Soil/Sediment	25-Aug-21 10:30	26-Aug-21 09:30
SAP-1	1H00149-05	Soil/Sediment	25-Aug-21 11:00	26-Aug-21 09:30
SAP-11	1H00149-06	Soil/Sediment	25-Aug-21 11:45	26-Aug-21 09:30
SAP-12	1H00149-07	Soil/Sediment	25-Aug-21 12:45	26-Aug-21 09:30
DUP	1H00149-08	Soil/Sediment	25-Aug-21 10:45	26-Aug-21 09:30

Eurofins Frontier Global Sciences, LLC



Patrick Garcia-Strickland, Business Unit Manager

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TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

#### SAMPLE RECEIPT

Samples were received at Eurofins Frontier Global Sciences (EFGS) on 26-Aug-21 09:30. The samples were received intact, on-ice within a sealed cooler at

<u>Cooler</u>	<u>Temp C°</u>
Default Cooler	1.4

#### SAMPLE PREPARATION AND ANALYSIS

Total solids analysis was performed in accordance with method SM2540B. Total solids are prepared at the same time as the preparation for the analyte(s) of interest in order to provide the most accurate dry mass correction which may be outside of the method recommended holding time of 7 days from sample collection.

Total mercury preparation and analysis was performed by flow injection atomic fluorescence spectrometry (FI-AFS) in accordance with EPA 1631B.

Samples were prepared and analyzed for methyl mercury by cold vapor gas chromatography atomic fluorescence spectrometry (CV-GC-AFS) in accordance with EPA 1630 (EFGS SOP2808).

#### ANALYTICAL AND QUALITY CONTROL ISSUES

Method blanks were prepared for every preparation to assess possible blank contribution from the sample preparation procedure. The method blanks were carried through the entire analytical procedure. All blanks fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

Liquid spikes, certified reference material (CRM) or a quality control samples (QCS) were prepared for every preparation as a measure of accuracy. All liquid spikes, CRMs and/or QCS samples fell within the established acceptance criteria with the exception of any items narrated above or flagged and described in the notes and definitions section of the report.

As an additional measure of the accuracy of the methods used and to check for matrix interference, matrix spikes (MS) and matrix spike

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Patrick Garcia-Strickland, Business Unit Manager



TRC Solutions  
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Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

**Reported:**  
04-Oct-21 12:00

duplicates (MSD) were digested and analyzed. All of the matrix spike recoveries fell within the established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

A reasonable measure of the precision of the analytical methods is the relative percent difference (RPD) between a matrix spike recovery and a matrix spike duplicate recovery and between laboratory control sample recovery and laboratory control sample duplicate recoveries. All of the relative percent differences fell within established acceptance criteria with the exception of any items flagged and described in the notes and definitions section of the report.

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## Sample Receipt Checklist

Client: TRC

Date & Time Received: 8/26/21 0:30

Date Labeled: 8/28/21 Labeled By: 2

Matrix: Su. l. / sed

Received By: 2

Label Verified By: VLK 8/26/21

# of Coolers Received: 1

Samples Arrived By: X

Shipping Service

Courier

Hand

Other (Specify: \_\_\_\_\_)

Coolant: ☐ None/Ambient

☒ Loose Ice

☐ Gel Ice

☐ Dry Ice

Coolant Required: Y / N

Temp Blank Used: Y for Cooler(s): \_\_\_\_\_

Notify Project Manager if packages/coolers are received without coolant or with thawed coolant and at a temperature in excess of 6°C. PM notified: Y / N

Samples from Wisconsin have special requirements. Shipment received includes samples from Wisconsin: Y / N

Cooler Information:	Y/N/NA	Comments
The coolers do not appear to be tampered with:	<u>Y</u>	
Custody Seals are present and intact:	<u>Y</u>	
Custody seals signed:	<u>Y</u>	

TID: <u>1KH34780</u>	CF: <u>0.7</u> °C	Date/time: <u>8/26/21 00:30</u>	By: <u>VL</u>
Cooler 1: <u>0.7</u> °C	w/ CF: <u>6.7</u> °C	Cooler 4: _____ °C	w/ CF: _____ °C
Cooler 2: _____ °C	w/ CF: _____ °C	Cooler 5: _____ °C	w/ CF: _____ °C
Cooler 3: _____ °C	w/ CF: _____ °C	Cooler 6: _____ °C	w/ CF: _____ °C

Chain of Custody:	Y/N/NA	Comments
Sample ID/Description:	<u>Y</u>	
Date and time of collection:	<u>Y</u>	
Sampled by:	<u>Y</u>	
Reservation type:	<u>NO</u>	
Requested analyses:	<u>Y</u>	
Required signatures:	<u>Y</u>	
Internal COC required:	<u>NO</u>	

Sample Condition/Integrity:	Y/N/NA	Comments
Sample containers intact/present:	<u>Y</u>	
Sample labels are present and legible:	<u>Y</u>	
Sample ID on container/bag matches COC:	<u>Y</u>	
Correct sample containers used:	<u>Y</u>	
Samples received within holding times:	<u>Y</u>	
Sample volume sufficient for requested analyses:	<u>Y</u>	
Correct preservative used for requested analyses:	<u>Y</u>	

1H00149





Frontier Global Sciences

Chain of Custody Record & Laboratory Analysis Request  
Air, Water, Sediments, Plant and Animal Tissue,  
Hydrocarbon & Other Samples

5755 8th St E  
Tacoma, WA 98424  
Phone: 253 922-2310

Page 1 of 1

IUS34\_PM@Eurofinsus.com  
http://www.Eurofinsus.com/Frontier/

Client: <u>TRC</u>		Contact: <u>Liz Denley</u>		<div>Analyses Requested:</div> <table border="1"><tr><td>Sampled by</td><td>Field # (or N/A)</td><td>To: (Agency or Client)</td><td>Field Sampled (Date/Time)</td><td>HC Speciation</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>		Sampled by	Field # (or N/A)	To: (Agency or Client)	Field Sampled (Date/Time)	HC Speciation																				
Sampled by	Field # (or N/A)	To: (Agency or Client)	Field Sampled (Date/Time)			HC Speciation																								
Address: <u>650 Suffolk Street</u> <u>Lowell, MA 01854</u>		Phone: <u>978-308 2551</u>																												
Project Name: <u>Fireworks</u>		Contract/PO: <u>246949.1400</u>																												
Report To: <u>Dave Sullivan</u>		Invoice To: <u>TRC</u>																												
Address:		Address: <u>E.Denley@TRCcompaines.com</u>																												
Phone: <u>(978) 970-5600</u>		Phone:																												
E-mail: <u>DSullivan@trcompaines.com</u>		E-mail:																												
No.	Engraved Bottle ID	Sample ID	# of	Matrix	Date & Time																									
1		<u>SAP-8</u>	<u>1</u>	<u>SS</u>	<u>8/25 800 GP</u>																									
2		<u>SAP-4</u>	<u>1</u>	<u>SS</u>	<u>0930</u>																									
3		<u>SAP-3</u>	<u>1</u>	<u>SS</u>	<u>0950</u>																									
4		<u>SAP-2</u>	<u>1</u>	<u>SS</u>	<u>1030</u>																									
5		<u>SAP-1</u>	<u>1</u>	<u>SS</u>	<u>1100</u>																									
6		<u>SAP-11</u>	<u>1</u>	<u>SS</u>	<u>1145</u>																									
7		<u>SAP-12</u>	<u>1</u>	<u>SS</u>	<u>1245</u>																									
8		<u>Dup</u>	<u>1</u>	<u>SS</u>	<u>8/25/21 1045</u>																									
9																														
10																														
11																														
12																														
For Laboratory Use Only			Matrix Codes:			Relinquished By: <u>Gray Pearson</u> <u>1630</u>		Received By: <u>Dave Miller</u>																						
GOC Seal			Comments:			Name: <u>Gray Pearson</u>		Name: <u>Dave Miller</u>																						
Cooler Temp:						Organization: <u>TRC</u>		Organization: <u>EFGS</u>																						
Carrier:						Date & Time: <u>8-25-21 1630</u>		Date & Time: <u>8/26/21 9:30</u>																						
Vials:						Tracking number: <u>2529 7258 0342</u>																								
If of Coolers:						By signing, you declare that you agree with EFGS' terms and conditions, and that you authorize EFGS to perform the specified analyses.																								
Sample Disposal:						Customer Approval:																								
<input type="checkbox"/> Return (shipping fees will apply)						Date:																								
<input type="checkbox"/> Standard Disposal - 30 Days after report																														
<input type="checkbox"/> Retain for ____ weeks after report (storage fees will apply)																														


TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

**SAP-8**  
**1H00149-01**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	1490	5.05	45.9	ng/g dry	500	[CALC]	30-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	1490	-	45.9	ng/g dry	500	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	53.1	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	ND	-	0.075	ng/g dry	1.1111	F109424	30-Sep-21	1J01005	30-Sep-21	EPA 1630 Mod	U
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	80.3	-	4.92	ng/g	100	F109404	24-Sep-21	1I30013	29-Sep-21	EPA 1631 Mod	





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Project Manager: Dave Sullivan

Reported:  
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**SAP-4**  
**1H00149-02**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	1420	10.2	92.8	ng/g dry	500	[CALC]	30-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	1420	-	92.8	ng/g dry	500	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	25.3	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	1.39	-	0.129	ng/g dry	1.1111	F109424	30-Sep-21	1J01005	30-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	ND	-	4.97	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	QB-02

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Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

**SAP-3**  
**1H00149-03**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	51.3	3.16	28.7	ng/g dry	500	[CALC]	30-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	51.5	-	28.7	ng/g dry	500	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	86.5	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	0.170	-	0.048	ng/g dry	1.1111	F109424	30-Sep-21	1J01005	30-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	13.6	-	4.79	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	

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Project Number: Fireworks  
Project Manager: Dave Sullivan

**Reported:**  
04-Oct-21 12:00

**SAP-2**  
**1H00149-04**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	3350	20.2	184	ng/g dry	500	[CALC]	28-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	3350	-	184	ng/g dry	500	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	12.2	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	3.77	-	3.41	ng/g dry	10	F109424	28-Sep-21	1I30011	29-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	7.26	-	4.82	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	



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Project Number: Fireworks  
Project Manager: Dave Sullivan

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**SAP-1**  
**1H00149-05**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	9580	29.9	272	ng/g dry	500	[CALC]	28-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	9590	-	272	ng/g dry	500	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	9.1	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	9.38	-	3.70	ng/g dry	10	F109424	28-Sep-21	1I30011	29-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	ND	-	4.93	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	QB-02





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Project Number: Fireworks  
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**SAP-11**  
**1H00149-06**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	127	5.56	50.6	ng/g dry	500	[CALC]	30-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	127	-	50.6	ng/g dry	500	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	48.8	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	0.801	-	0.084	ng/g dry	1.1111	F109424	30-Sep-21	1J01005	30-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	ND	-	4.86	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	QB-02





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Tacoma, WA 98424  
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Project: Mercury Speciation 2021  
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Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

**SAP-12**  
**1H00149-07**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
<b>Sample Preparation: [CALC]</b>											
Inorganic Mercury	0.485	0.128	1.16	ng/g dry	20	[CALC]	30-Sep-21		30-Sep-21	EPA 1631 Mod/1630	J
<b>Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg</b>											
Mercury	ND	-	1.16	ng/g dry	20	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	U
<b>Sample Preparation: EFGS SOP5133 Solids Analysis</b>											
% Solids	83.9	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
<b>Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg</b>											
Methyl Mercury (as Mercury)	0.048	-	0.047	ng/g dry	1.1111	F109424	30-Sep-21	1J01005	30-Sep-21	EPA 1630 Mod	
<b>Sample Preparation: Miscellaneous Preparation AFS</b>											
Mercury (0)	ND	-	4.94	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	QB-02

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Patrick Garcia-Strickland, Business Unit Manager

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Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

DUP

1H00149-08

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Batch	Prepared	Sequence	Analyzed	Method	Notes
Sample Preparation: [CALC]											
Inorganic Mercury	127	5.30	48.2	ng/g dry	500	[CALC]	28-Sep-21		30-Sep-21	EPA 1631 Mod/1630	
Sample Preparation: EFGS SOP2807 Cold Aqua Regia Digestion for Hg											
Mercury	128	-	48.2	ng/g dry	500	F109410	20-Sep-21	1J01003	30-Sep-21	EPA 1631B	
Sample Preparation: EFGS SOP5133 Solids Analysis											
% Solids	47.7	-	0.1	% by Weight	1	F109432	01-Oct-21		04-Oct-21	SM 2540B	O-04, O-09
Sample Preparation: EFGS SOP5134 MeCl2 Extraction for Methyl Hg											
Methyl Mercury (as Mercury)	0.676	-	0.651	ng/g dry	10	F109424	28-Sep-21	1I30011	29-Sep-21	EPA 1630 Mod	
Sample Preparation: Miscellaneous Preparation AFS											
Mercury (0)	ND	-	4.98	ng/g	100	F109404	24-Sep-21	1I29016	28-Sep-21	EPA 1631 Mod	QB-02

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TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1129016 - F109404</b>											
<b>Cal Standard (1129016-CAL1)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	0.46	-		ng/L	0.50000		92.5				
<b>Cal Standard (1129016-CAL2)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	0.95	-		ng/L	1.0000		94.9				
<b>Cal Standard (1129016-CAL3)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	5.17	-		ng/L	5.0000		103				
<b>Cal Standard (1129016-CAL4)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	21.79	-		ng/L	20.000		109				
<b>Cal Standard (1129016-CAL5)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	40.08	-		ng/L	40.000		100				
<b>Calibration Blank (1129016-CCB1)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	0.004	-		ng/L							
<b>Calibration Blank (1129016-CCB2)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	-0.0006	-		ng/L							
<b>Calibration Blank (1129016-CCB3)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	0.01	-		ng/L							
<b>Calibration Blank (1129016-CCB4)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	-0.17	-		ng/L							
<b>Calibration Blank (1129016-CCB6)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	-0.08	-		ng/L							

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Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1129016 - F109404</b>											
<b>Calibration Blank (1129016-CCB7)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	0.04	-		ng/L							
<b>Calibration Blank (1129016-CCB8)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	-0.03	-		ng/L							
<b>Calibration Blank (1129016-CCB9)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	-0.04	-		ng/L							
<b>Calibration Blank (1129016-CCBA)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	0.14	-		ng/L							
<b>Calibration Check (1129016-CCV1)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	5.60	-		ng/L	5.0200		112	77-123			
<b>Calibration Check (1129016-CCV2)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	4.62	-		ng/L	5.0200		92.1	77-123			
<b>Calibration Check (1129016-CCV3)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	4.41	-		ng/L	5.0200		87.9	77-123			
<b>Calibration Check (1129016-CCV4)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	3.51	-		ng/L	5.0200		70.0	77-123			
<b>Calibration Check (1129016-CCV6)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	3.94	-		ng/L	5.0200		78.6	77-123			
<b>Calibration Check (1129016-CCV7)</b>					Prepared & Analyzed: 28-Sep-21						
Mercury (0)	4.12	-		ng/L	5.0200		82.1	77-123			

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Patrick Garcia-Strickland, Business Unit Manager

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TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch 1129016 - F109404

##### Calibration Check (1129016-CCV8)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	4.01	-		ng/L	5.0200		79.9	77-123
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##### Calibration Check (1129016-CCV9)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	3.92	-		ng/L	5.0200		78.1	77-123
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##### Calibration Check (1129016-CCVA)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	3.91	-		ng/L	5.0200		77.9	77-123
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##### Instrument Blank (1129016-IBL1)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	ND	-	0.02	ng/L				
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##### Instrument Blank (1129016-IBL2)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	ND	-	0.02	ng/L				
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##### Instrument Blank (1129016-IBL3)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	ND	-	0.02	ng/L				
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##### Initial Cal Blank (1129016-ICB1)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	0.05	-		ng/L				
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##### Initial Cal Check (1129016-ICV1)

Prepared & Analyzed: 28-Sep-21

Mercury (0)	5.74	-		ng/L	5.0200		114	79-121
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#### Batch 1130011 - F109424

##### Cal Standard (1130011-CAL1)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.043	-		ng/L	0.050000		86.0	
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Patrick Garcia-Strickland, Business Unit Manager

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854


Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1130011 - F109424</b>											
<b>Cal Standard (1130011-CAL2)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	0.172	-		ng/L	0.20000		85.8				
<b>Cal Standard (1130011-CAL3)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	1.076	-		ng/L	1.0000		108				
<b>Cal Standard (1130011-CAL4)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	2.177	-		ng/L	2.0000		109				
<b>Cal Standard (1130011-CAL5)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	4.470	-		ng/L	4.0000		112				
<b>Calibration Blank (1130011-CCB1)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	-0.006	-		ng/L							U
<b>Calibration Blank (1130011-CCB2)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	0.015	-		ng/L							
<b>Calibration Blank (1130011-CCB3)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	-0.012	-		ng/L							U
<b>Calibration Blank (1130011-CCB4)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	-0.008	-		ng/L							U
<b>Calibration Blank (1130011-CCB5)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	-0.007	-		ng/L							U
<b>Calibration Blank (1130011-CCB6)</b>					Prepared & Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	-0.009	-		ng/L							U

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Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch 1130011 - F109424

##### Calibration Check (1130011-CCV1)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.463	-		ng/L	0.50368		92.0	60-140			
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##### Calibration Check (1130011-CCV2)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.503	-		ng/L	0.50368		99.9	60-140			
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##### Calibration Check (1130011-CCV3)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.445	-		ng/L	0.50368		88.3	60-140			
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##### Calibration Check (1130011-CCV4)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.396	-		ng/L	0.50368		78.5	60-140			
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##### Calibration Check (1130011-CCV5)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.464	-		ng/L	0.50368		92.1	60-140			
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##### Calibration Check (1130011-CCV6)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.446	-		ng/L	0.50368		88.6	60-140			
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##### Instrument Blank (1130011-IBL1)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	ND	-	0.058	ng/L							U
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##### Initial Cal Blank (1130011-ICB1)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.0008	-		ng/L							
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##### Initial Cal Check (1130011-ICV1)

Prepared & Analyzed: 29-Sep-21

Methyl Mercury (as Mercury)	0.565	-		ng/L	0.50368		112	65-135			
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#### Batch 1130013 - F109404

##### Cal Standard (1130013-CAL1)

Prepared & Analyzed: 29-Sep-21

Mercury (0)	0.50	-		ng/L	0.50000		100				
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Patrick Garcia-Strickland, Business Unit Manager

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1130013 - F109404</b>											
<b>Cal Standard (1130013-CAL2)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	1.00	-		ng/L	1.0000		99.6				
<b>Cal Standard (1130013-CAL3)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	5.00	-		ng/L	5.0000		100				
<b>Cal Standard (1130013-CAL4)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	19.71	-		ng/L	20.000		98.6				
<b>Cal Standard (1130013-CAL5)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	40.72	-		ng/L	40.000		102				
<b>Calibration Blank (1130013-CCB1)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	0.08	-		ng/L							
<b>Calibration Blank (1130013-CCB2)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	0.03	-		ng/L							
<b>Calibration Blank (1130013-CCB3)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	0.10	-		ng/L							
<b>Calibration Blank (1130013-CCB4)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	0.13	-		ng/L							
<b>Calibration Blank (1130013-CCB5)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	0.10	-		ng/L							
<b>Calibration Blank (1130013-CCB6)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	-0.05	-		ng/L							

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Patrick Garcia-Strickland, Business Unit Manager



Frontier Global Sciences

5755 8th Street East  
Tacoma, WA 98424  
Phone: (253) 922-2310

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1I30013 - F109404</b>											
<b>Calibration Blank (1I30013-CCB7)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	-0.004	-		ng/L							
<b>Calibration Check (1I30013-CCV1)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.81	-		ng/L	5.0200		95.7	77-123			
<b>Calibration Check (1I30013-CCV2)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.90	-		ng/L	5.0200		97.6	77-123			
<b>Calibration Check (1I30013-CCV3)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.61	-		ng/L	5.0200		91.9	77-123			
<b>Calibration Check (1I30013-CCV4)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.68	-		ng/L	5.0200		93.3	77-123			
<b>Calibration Check (1I30013-CCV5)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.44	-		ng/L	5.0200		88.5	77-123			
<b>Calibration Check (1I30013-CCV6)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.33	-		ng/L	5.0200		86.3	77-123			
<b>Calibration Check (1I30013-CCV7)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	4.46	-		ng/L	5.0200		88.8	77-123			
<b>Instrument Blank (1I30013-IBL1)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	ND	-	0.02	ng/L							
<b>Instrument Blank (1I30013-IBL2)</b>					Prepared & Analyzed: 29-Sep-21						
Mercury (0)	ND	-	0.02	ng/L							

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TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave SullivanReported:  
04-Oct-21 12:00

## Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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## Batch 1I30013 - F109404

## Instrument Blank (1I30013-IBL3)

Prepared &amp; Analyzed: 29-Sep-21

Mercury (0) ND - 0.02 ng/L

## Initial Cal Blank (1I30013-ICB1)

Prepared &amp; Analyzed: 29-Sep-21

Mercury (0) 0.09 - ng/L

## Initial Cal Check (1I30013-ICV1)

Prepared &amp; Analyzed: 29-Sep-21

Mercury (0) 4.91 - ng/L 5.0200 97.8 79-121

## Batch 1J01003 - F109410

## Cal Standard (1J01003-CAL1)

Prepared &amp; Analyzed: 30-Sep-21

Mercury 0.52 - ng/L 0.50000 104

## Cal Standard (1J01003-CAL2)

Prepared &amp; Analyzed: 30-Sep-21

Mercury 0.99 - ng/L 1.0000 98.9

## Cal Standard (1J01003-CAL3)

Prepared &amp; Analyzed: 30-Sep-21

Mercury 4.96 - ng/L 5.0000 99.2

## Cal Standard (1J01003-CAL4)

Prepared &amp; Analyzed: 30-Sep-21

Mercury 19.70 - ng/L 20.000 98.5

## Cal Standard (1J01003-CAL5)

Prepared &amp; Analyzed: 30-Sep-21

Mercury 39.70 - ng/L 40.000 99.2

## Calibration Blank (1J01003-CCB1)

Prepared &amp; Analyzed: 30-Sep-21

Mercury 0.04 - ng/L

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Frontier Global Sciences

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Tacoma, WA 98424  
Phone: (253) 922-2310

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1J01003 - F109410</b>											
<b>Calibration Blank (1J01003-CCB2)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	0.02	-		ng/L							
<b>Calibration Blank (1J01003-CCB3)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	0.07	-		ng/L							
<b>Calibration Blank (1J01003-CCB4)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	0.007	-		ng/L							
<b>Calibration Blank (1J01003-CCB5)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	0.04	-		ng/L							
<b>Calibration Blank (1J01003-CCB6)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	-0.10	-		ng/L							U
<b>Calibration Blank (1J01003-CCB7)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	-0.06	-		ng/L							U
<b>Calibration Blank (1J01003-CCB8)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	-0.10	-		ng/L							U
<b>Calibration Check (1J01003-CCV1)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.66	-		ng/L	5.0200		92.9	77-123			
<b>Calibration Check (1J01003-CCV2)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.66	-		ng/L	5.0200		92.9	77-123			
<b>Calibration Check (1J01003-CCV3)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.54	-		ng/L	5.0200		90.4	77-123			

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650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1J01003 - F109410</b>											
<b>Calibration Check (1J01003-CCV4)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.61	-		ng/L	5.0200		91.8	77-123			
<b>Calibration Check (1J01003-CCV5)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.54	-		ng/L	5.0200		90.5	77-123			
<b>Calibration Check (1J01003-CCV6)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.66	-		ng/L	5.0200		92.8	77-123			
<b>Calibration Check (1J01003-CCV7)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.54	-		ng/L	5.0200		90.3	77-123			
<b>Calibration Check (1J01003-CCV8)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.54	-		ng/L	5.0200		90.5	77-123			
<b>Instrument Blank (1J01003-IBL1)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	ND	-	0.05	ng/L							U
<b>Instrument Blank (1J01003-IBL2)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	ND	-	0.05	ng/L							U
<b>Instrument Blank (1J01003-IBL3)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	ND	-	0.05	ng/L							U
<b>Initial Cal Blank (1J01003-ICB1)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	0.02	-		ng/L							
<b>Initial Cal Check (1J01003-ICV1)</b>					Prepared & Analyzed: 30-Sep-21						
Mercury	4.76	-		ng/L	5.0200		94.8	79-121			

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Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1J01005 - F109427</b>											
<b>Cal Standard (1J01005-CAL1)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	0.046	-		ng/L	0.050000		92.0				
<b>Cal Standard (1J01005-CAL2)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	0.175	-		ng/L	0.20000		87.5				
<b>Cal Standard (1J01005-CAL3)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	0.955	-		ng/L	1.0000		95.5				
<b>Cal Standard (1J01005-CAL4)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	2.404	-		ng/L	2.0000		120				
<b>Cal Standard (1J01005-CAL5)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	4.003	-		ng/L	4.0000		100				
<b>Cal Standard (1J01005-CAL6)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	8.371	-		ng/L	0.050000		16700				
<b>Calibration Blank (1J01005-CCB1)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	-0.011	-		ng/L							U
<b>Calibration Blank (1J01005-CCB2)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	-0.017	-		ng/L							U
<b>Calibration Check (1J01005-CCV1)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	0.535	-		ng/L	0.50368		106	60-140			
<b>Calibration Check (1J01005-CCV2)</b>					Prepared & Analyzed: 30-Sep-21						
Methyl Mercury (as Mercury)	0.488	-		ng/L	0.50368		97.0	60-140			

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650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch 1J01005 - F109427

##### Instrument Blank (1J01005-IBL1)

Prepared & Analyzed: 30-Sep-21

Methyl Mercury (as Mercury)	ND	-	0.050	ng/L							U
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##### Initial Cal Blank (1J01005-ICB2)

Prepared & Analyzed: 30-Sep-21

Methyl Mercury (as Mercury)	-0.005	-		ng/L							U
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##### Initial Cal Check (1J01005-ICV2)

Prepared & Analyzed: 30-Sep-21

Methyl Mercury (as Mercury)	0.512	-		ng/L	0.50368		102	65-135			
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#### Batch F109404 - Miscellaneous Preparation AFS

##### Blank (F109404-BLK1)

Prepared: 24-Sep-21 Analyzed: 28-Sep-21

Mercury (0)	ND	-	5.00	ng/g							
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##### Blank (F109404-BLK2)

Prepared: 24-Sep-21 Analyzed: 28-Sep-21

Mercury (0)	15.70	-	5.00	ng/g							QB-10
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##### Blank (F109404-BLK3)

Prepared: 24-Sep-21 Analyzed: 28-Sep-21

Mercury (0)	ND	-	5.00	ng/g							
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##### Duplicate (F109404-DUP3)

Source: 1H00148-01RE2

Prepared: 24-Sep-21 Analyzed: 28-Sep-21

Mercury (0)	0.74	-	4.96	ng/g		ND				24	
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##### Duplicate (F109404-DUP4)

Source: 1H00149-01RE1

Prepared: 24-Sep-21 Analyzed: 29-Sep-21

Mercury (0)	70.01	-	4.95	ng/g		80.32			13.7	24	
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#### Batch F109410 - EFGS SOP2807 Cold Aqua Regia Digestion for Hg

##### Blank (F109410-BLK1)

Prepared: 20-Sep-21 Analyzed: 30-Sep-21

Mercury	6.50	-	1.00	ng/g wet							
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TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F109410 - EFGS SOP2807 Cold Aqua Regia Digestion for Hg

<b>Blank (F109410-BLK2)</b>					Prepared: 20-Sep-21 Analyzed: 30-Sep-21						
Mercury	ND	-	1.00	ng/g wet							U
<b>Blank (F109410-BLK3)</b>					Prepared: 20-Sep-21 Analyzed: 30-Sep-21						
Mercury	ND	-	1.00	ng/g wet							U
<b>LCS (F109410-BS1)</b>					Prepared: 20-Sep-21 Analyzed: 30-Sep-21						
Mercury	382.4	-	20.0	ng/g wet	401.60		95.2	75-125			
<b>LCS Dup (F109410-BSD1)</b>					Prepared: 20-Sep-21 Analyzed: 30-Sep-21						
Mercury	387.1	-	20.0	ng/g wet	401.60		96.4	75-125	1.22	24	
<b>Matrix Spike (F109410-MS1)</b>					<b>Source: 1H00148-01</b>		Prepared: 20-Sep-21 Analyzed: 30-Sep-21				
Mercury	7790	-	131	ng/g dry	2624.8	1573	237	71-125			QM-07
<b>Matrix Spike (F109410-MS2)</b>					<b>Source: 1H00149-01</b>		Prepared: 20-Sep-21 Analyzed: 30-Sep-21				
Mercury	1875	-	44.7	ng/g dry	717.83	1498	52.4	71-125			QM-07
<b>Matrix Spike Dup (F109410-MSD1)</b>					<b>Source: 1H00148-01</b>		Prepared: 20-Sep-21 Analyzed: 30-Sep-21				
Mercury	4160	-	139	ng/g dry	2800.3	1573	92.4	71-125	87.8	24	QR-08
<b>Matrix Spike Dup (F109410-MSD2)</b>					<b>Source: 1H00149-01</b>		Prepared: 20-Sep-21 Analyzed: 30-Sep-21				
Mercury	1887	-	43.6	ng/g dry	700.81	1498	55.4	71-125	5.51	24	QM-07

#### Batch F109424 - EFGS SOP5134 MeCl2 Extraction for Methyl Hg

<b>Blank (F109424-BLK1)</b>					Prepared: 28-Sep-21 Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	ND	-	0.050	ng/g wet							U

Eurofins Frontier Global Sciences, LLC



Patrick Garcia-Strickland, Business Unit Manager

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F109424 - EFGS SOP5134 MeCl2 Extraction for Methyl Hg

<b>Blank (F109424-BLK2)</b>					Prepared: 28-Sep-21 Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	ND	-	0.050	ng/g wet							U
<b>Blank (F109424-BLK3)</b>					Prepared: 28-Sep-21 Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	ND	-	0.050	ng/g wet							U
<b>LCS (F109424-BS1)</b>					Prepared: 28-Sep-21 Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	1.167	-	0.500	ng/g wet	5.0000		23.3	50-150			Z-01
<b>LCS Dup (F109424-BSD1)</b>					Prepared: 28-Sep-21 Analyzed: 29-Sep-21						
Methyl Mercury (as Mercury)	2.099	-	0.500	ng/g wet	5.0000		42.0	50-150	57.1	35	Z-01
<b>Matrix Spike (F109424-MS1)</b>					<b>Source: 1H00148-01</b>		Prepared: 28-Sep-21 Analyzed: 29-Sep-21				
Methyl Mercury (as Mercury)	29.29	-	2.46	ng/g dry	24.626	9.743	79.4	50-150			
<b>Matrix Spike (F109424-MS2)</b>					<b>Source: 1H00149-01</b>		Prepared: 28-Sep-21 Analyzed: 29-Sep-21				
Methyl Mercury (as Mercury)	7.554	-	0.591	ng/g dry	5.9147	ND	128	50-150			
<b>Matrix Spike Dup (F109424-MSD1)</b>					<b>Source: 1H00148-01</b>		Prepared: 28-Sep-21 Analyzed: 29-Sep-21				
Methyl Mercury (as Mercury)	36.33	-	2.90	ng/g dry	28.984	9.743	91.7	50-150	14.4	35	
<b>Matrix Spike Dup (F109424-MSD2)</b>					<b>Source: 1H00149-01</b>		Prepared: 28-Sep-21 Analyzed: 29-Sep-21				
Methyl Mercury (as Mercury)	6.544	-	0.598	ng/g dry	5.9801	ND	109	50-150	15.4	35	

Eurofins Frontier Global Sciences, LLC



Patrick Garcia-Strickland, Business Unit Manager

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Frontier Global Sciences

5755 8th Street East  
Tacoma, WA 98424  
Phone: (253) 922-2310

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Quality Control Data

Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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#### Batch F109432 - EFGS SOP5133 Solids Analysis

##### Duplicate (F109432-DUP1)

Source: 1100084-01

Prepared: 01-Oct-21 Analyzed: 04-Oct-21

% Solids	83.8	-	0.1	% by Weight	83.4				0.478	10	O-04, O-09
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##### Duplicate (F109432-DUP2)

Source: 1100095-01

Prepared: 01-Oct-21 Analyzed: 04-Oct-21

% Solids	83.9	-	0.1	% by Weight	83.2				0.838	10	O-04, O-09
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Eurofins Frontier Global Sciences, LLC

The results in this report only apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Patrick Garcia-Strickland, Business Unit Manager

TRC Solutions  
650 Suffolk Street  
Lowell MA, 01854

Project: Mercury Speciation 2021  
Project Number: Fireworks  
Project Manager: Dave Sullivan

Reported:  
04-Oct-21 12:00

### Notes and Definitions

- Z-01 LCS recovery not within control limits. Batch acceptable due to all MS samples within control limits.
- U Analyte was not detected and is reported as less than the LOD or as defined by the client. The LOD has been adjusted for any dilution or concentration of the sample.
- QR-08 The RPD value for the MS/MSD was outside of acceptance limits. Batch QC acceptable based on matrix duplicate and/or LCS/LCSD RPD values within control limits.
- QM-07 The spike recovery was outside control limits for the MS and/or MSD. The batch was accepted based on LCS and LCSD recoveries within control limits and, when analysis permits, acceptable AS/ASD.
- QB-10 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. Only report sample results greater than 10 times the contamination value (QB-01), or samples less than the MRL (QB-02).
- QB-02 The method blank and/or initial/continuing calibration blank contains analyte at a concentration above the MRL. However, the sample concentrations are less than the MRL.
- O-09 Total Solids are prepared at the same time as the preparation for the analyte(s) of interest in order to provide the most accurate dry mass correction.
- O-04 This sample was analyzed outside of the recommended holding time.
- J The result is an estimated concentration.
- E-01 Sample was preceded by a sample exceeding the calibration curve and was reanalyzed for confirmation.
- E The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the method detection limit if reported to the MDL or above the reporting limit if reported to the MRL.
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference



## ANALYTICAL REPORT

Lab Number:	L2145648
Client:	TRC Environmental Consultants Wannalancit Mills 650 Suffolk Street Lowell, MA 01854
ATTN:	Liz Denly
Phone:	(978) 656-3577
Project Name:	FIREWORKS
Project Number:	246949.1400.0000
Report Date:	10/01/21

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2145648-01	SAP-10	SOIL	HANOVER/HANSON, MA	08/24/21 08:30	08/25/21
L2145648-02	SAP-9	SOIL	HANOVER/HANSON, MA	08/24/21 09:00	08/25/21
L2145648-03	SAP-6	SOIL	HANOVER/HANSON, MA	08/24/21 10:30	08/25/21
L2145648-04	SAP-7	SOIL	HANOVER/HANSON, MA	08/24/21 11:00	08/25/21
L2145648-05	SAP-5	SOIL	HANOVER/HANSON, MA	08/24/21 12:00	08/25/21
L2145648-06	SAP-8	SOIL	HANOVER/HANSON, MA	08/25/21 08:00	08/25/21
L2145648-07	SAP-4	SOIL	HANOVER/HANSON, MA	08/25/21 09:30	08/25/21
L2145648-08	SAP-3	SOIL	HANOVER/HANSON, MA	08/25/21 09:50	08/25/21
L2145648-09	SAP-2	SOIL	HANOVER/HANSON, MA	08/25/21 10:30	08/25/21
L2145648-10	SAP-1	SOIL	HANOVER/HANSON, MA	08/25/21 11:00	08/25/21
L2145648-11	SAP-11	SOIL	HANOVER/HANSON, MA	08/25/21 11:45	08/25/21
L2145648-12	DUP	SOIL	HANOVER/HANSON, MA	08/25/21 10:45	08/25/21
L2145648-13	SAP-12	SOIL	HANOVER/HANSON, MA	08/25/21 12:45	08/25/21
L2145648-14	EQUIPMENT BLANK	WATER	HANOVER/HANSON, MA	08/24/21 14:00	08/25/21
L2145648-15	EQUIPMENT BLANK	WATER	HANOVER/HANSON, MA	08/25/21 13:20	08/25/21

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

### MADEP MCP Response Action Analytical Report Certification

**This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.**

<b>An affirmative response to questions A through F is required for "Presumptive Certainty" status</b>		
A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	YES
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	YES
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	YES
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?"	YES
E a.	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	N/A
E b.	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	N/A
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	YES
<b>A response to questions G, H and I is required for "Presumptive Certainty" status</b>		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	YES
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	NO
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	YES
<b>For any questions answered "No", please refer to the case narrative section on the following page(s).</b>		

**Please note that sample matrix information is located in the Sample Results section of this report.**



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

**HOLD POLICY** - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

---

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**Case Narrative (continued)**

Report Revision

October 01, 2021: The Total Solids value has been corrected on L2145648-04.

Report Submission

The results of the Total Mercury analysis will be issued under a separate cover.

MCP Related Narratives

Cyanide, Total

LCS/LCSD SRM Lot#: ERA D107-541

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Kelly Stenstrom

Title: Technical Director/Representative

Date: 10/01/21

## QC OUTLIER SUMMARY REPORT

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

Method	Client ID (Native ID)	Lab ID	Parameter	QC Type	Recovery/RPD (%)	QC Limits (%)	Associated Samples	Data Quality Assessment
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There are no QC Outliers associated with this report.



# **INORGANICS & MISCELLANEOUS**

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**SAMPLE RESULTS**

**Lab ID:** L2145648-01  
**Client ID:** SAP-10  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 08:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>MCP General Chemistry - Westborough Lab</b>										
Cyanide, Total	ND		mg/kg	6.9	--	1	08/31/21 21:00	09/01/21 11:27	97,9014	CR
<b>General Chemistry - Westborough Lab</b>										
Solids, Total	14.1		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**SAMPLE RESULTS**

**Lab ID:** L2145648-02  
**Client ID:** SAP-9  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 09:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>MCP General Chemistry - Westborough Lab</b>										
Cyanide, Total	ND		mg/kg	2.5	--	1	08/31/21 21:00	09/01/21 11:28	97,9014	CR
<b>General Chemistry - Westborough Lab</b>										
Solids, Total	39.3		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

### SAMPLE RESULTS

**Lab ID:** L2145648-03  
**Client ID:** SAP-6  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 10:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP General Chemistry - Westborough Lab										
Cyanide, Total	ND		mg/kg	2.5	--	1	08/31/21 21:00	09/01/21 11:29	97,9014	CR
General Chemistry - Westborough Lab										
Solids, Total	37.0		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

### SAMPLE RESULTS

**Lab ID:** L2145648-04  
**Client ID:** SAP-7  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 11:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP General Chemistry - Westborough Lab										
Cyanide, Total	ND		mg/kg	7.4	--	1	08/31/21 21:00	09/01/21 11:30	97,9014	CR
General Chemistry - Westborough Lab										
Solids, Total	13.3		%	0.100	NA	1	-	09/28/21 22:15	121,2540G	TR





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**SAMPLE RESULTS**

**Lab ID:** L2145648-05  
**Client ID:** SAP-5  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 12:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>MCP General Chemistry - Westborough Lab</b>										
Cyanide, Total	ND		mg/kg	1.8	--	1	08/31/21 21:00	09/01/21 11:31	97,9014	CR
<b>General Chemistry - Westborough Lab</b>										
Solids, Total	50.5		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**SAMPLE RESULTS**

**Lab ID:** L2145648-06  
**Client ID:** SAP-8  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 08:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>MCP General Chemistry - Westborough Lab</b>										
Cyanide, Total	ND		mg/kg	1.6	--	1	08/31/21 21:00	09/01/21 11:32	97,9014	CR
<b>General Chemistry - Westborough Lab</b>										
Solids, Total	59.3		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**SAMPLE RESULTS**

**Lab ID:** L2145648-07  
**Client ID:** SAP-4  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 09:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>MCP General Chemistry - Westborough Lab</b>										
Cyanide, Total	ND		mg/kg	3.2	--	1	08/31/21 21:00	09/01/21 11:35	97,9014	CR
<b>General Chemistry - Westborough Lab</b>										
Solids, Total	29.2		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**SAMPLE RESULTS**

**Lab ID:** L2145648-08  
**Client ID:** SAP-3  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 09:50  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>MCP General Chemistry - Westborough Lab</b>										
Cyanide, Total	ND		mg/kg	6.8	--	1	08/31/21 21:00	09/01/21 11:36	97,9014	CR
<b>General Chemistry - Westborough Lab</b>										
Solids, Total	13.4		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**SAMPLE RESULTS**

**Lab ID:** L2145648-09  
**Client ID:** SAP-2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 10:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>MCP General Chemistry - Westborough Lab</b>										
Cyanide, Total	ND		mg/kg	7.3	--	1	08/31/21 21:00	09/01/21 11:37	97,9014	CR
<b>General Chemistry - Westborough Lab</b>										
Solids, Total	13.0		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**SAMPLE RESULTS**

**Lab ID:** L2145648-10  
**Client ID:** SAP-1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 11:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
<b>MCP General Chemistry - Westborough Lab</b>										
Cyanide, Total	ND		mg/kg	11	--	1	08/31/21 21:00	09/01/21 11:38	97,9014	CR
<b>General Chemistry - Westborough Lab</b>										
Solids, Total	9.07		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

### SAMPLE RESULTS

**Lab ID:** L2145648-11  
**Client ID:** SAP-11  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 11:45  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP General Chemistry - Westborough Lab										
Cyanide, Total	ND		mg/kg	1.8	--	1	08/31/21 21:00	09/01/21 11:39	97,9014	CR
General Chemistry - Westborough Lab										
Solids, Total	53.1		%	0.100	NA	1	-	08/26/21 12:56	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**SAMPLE RESULTS**

**Lab ID:** L2145648-12  
**Client ID:** DUP  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 10:45  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP General Chemistry - Westborough Lab										
Cyanide, Total	ND		mg/kg	1.8	--	1	08/31/21 21:00	09/01/21 11:40	97,9014	CR
General Chemistry - Westborough Lab										
Solids, Total	52.1		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**SAMPLE RESULTS**

**Lab ID:** L2145648-13  
**Client ID:** SAP-12  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 12:45  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP General Chemistry - Westborough Lab										
Cyanide, Total	ND		mg/kg	1.2	--	1	08/31/21 21:00	09/01/21 11:41	97,9014	CR
General Chemistry - Westborough Lab										
Solids, Total	79.0		%	0.100	NA	1	-	08/26/21 12:22	121,2540G	RI



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

**Method Blank Analysis**  
**Batch Quality Control**

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP General Chemistry - Westborough Lab for sample(s): 01-13 Batch: WG1541380-1										
Cyanide, Total	ND		mg/kg	0.92	--	1	08/31/21 21:00	09/01/21 11:23	97,9014	CR

## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP General Chemistry - Westborough Lab Associated sample(s): 01-13 Batch: WG1541380-2 WG1541380-3								
Cyanide, Total	74		85		38-161	17		35

# **Lab Duplicate Analysis** *Batch Quality Control*

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145648  
**Report Date:** 10/01/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03,05-10,12-13 QC Batch ID: WG1539505-1 QC Sample: L2145648-01 Client ID: SAP-10						
Solids, Total	14.1	12.6	%	11		20
General Chemistry - Westborough Lab Associated sample(s): 11 QC Batch ID: WG1539543-1 QC Sample: L2145648-11 Client ID: SAP-11						
Solids, Total	53.1	49.6	%	7		20
General Chemistry - Westborough Lab Associated sample(s): 04 QC Batch ID: WG1552022-1 QC Sample: L2145648-04 Client ID: SAP-7						
Solids, Total	13.3	13.2	%	1		20



**Project Name:** FIREWORKS**Lab Number:** L2145648**Project Number:** 246949.1400.0000**Report Date:** 10/01/21**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

**Cooler Information**

<b>Cooler</b>	<b>Custody Seal</b>
A	Absent

**Container Information**

<b>Container ID</b>	<b>Container Type</b>	<b>Cooler</b>	<b>Initial pH</b>	<b>Final pH</b>	<b>Temp deg C</b>	<b>Pres</b>	<b>Seal</b>	<b>Frozen Date/Time</b>	<b>Analysis(*)</b>
L2145648-01A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-01B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-02A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-02B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-03A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-03B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-04A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-04B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-05A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-05B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-06A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-06B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-06C	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7)
L2145648-06D	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7)
L2145648-06E	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7)
L2145648-06F	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7)
L2145648-07A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-07B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-08A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-08B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-09A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-09B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-10A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

Serial\_No:10012113:57  
**Lab Number:** L2145648  
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**Container Information**

<b>Container ID</b>	<b>Container Type</b>	<b>Cooler</b>	<b>Initial pH</b>	<b>Final pH</b>	<b>Temp deg C</b>	<b>Pres</b>	<b>Seal</b>	<b>Frozen Date/Time</b>	<b>Analysis(*)</b>
L2145648-10B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-11A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-11B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-12A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-12B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-13A	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-13B	Glass 250ml/8oz unpreserved	A	NA		5.2	Y	Absent		TS(7),MCP-TCN9014-10(14)
L2145648-14A	Plastic 120ml HNO3 preserved	A	<2	<2	5.2	Y	Absent		HOLD-HG-TOTAL(28)
L2145648-15A	Plastic 120ml HNO3 preserved	A	<2	<2	5.2	Y	Absent		HOLD-HG-TOTAL(28)

**Project Name:** FIREWORKS  
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**Lab Number:** L2145648  
**Report Date:** 10/01/21

## GLOSSARY

### Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)  Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report



**Project Name:** FIREWORKS  
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### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Difference:** With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**PAH Total:** With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

**PFAS Total:** With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

### Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

**Report Format:** Data Usability Report



**Project Name:** FIREWORKS  
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**Data Qualifiers**

the identification is based on a mass spectral library search.

- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

**Project Name:** FIREWORKS  
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## REFERENCES

- 97 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA, IIB, IIIA, IIIB, IIIC, IIID, VA, VB, VC, VIA, VIB, VIIIA and VIIIB, July 2010.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.





**Alpha Analytical, Inc.**Facility: **Company-wide**Department: **Quality Assurance**Title: **Certificate/Approval Program Summary**ID No.: **17873**

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**Certification Information**

The following analytes are not included in our Primary NELAP Scope of Accreditation:

**Westborough Facility****EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene**EPA 625/625.1:** alpha-Terpineol**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.**Mansfield Facility****SM 2540D:** TSS**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Biological Tissue Matrix:** EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

**Westborough Facility:****Drinking Water****EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,****EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B****EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.****Non-Potable Water****SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,****SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.**EPA 624.1:** Volatile Halocarbons & Aromatics,**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.****Mansfield Facility:****Drinking Water****EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.****EPA 522, EPA 537.1.****Non-Potable Water****EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.**EPA 245.1 Hg.****SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



## CHAIN OF CUSTODY

PAGE 1 OF 2

 8 Walkup Drive  
 Westboro, MA 01581  
 Tel: 508-698-9220

 320 Forbes Blvd  
 Mansfield, MA 02048  
 Tel: 508-822-9300

## Project Information

Project Name: FireworksProject Location: Henover/Henry MAProject #: 246949Project Manager: Dave Sullivan

ALPHA Quote #:

## Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due:

Date Rec'd in Lab: 8/25/21ALPHA Job #: 2445648

## Report Information - Data Deliverables

☒ ADEX ☒ EMAIL

## Billing Information

☐ Same as Client info PO #:

## Client Information

Client: TRC
 Address: 650 Suffolk St  
Lowell MA
Phone: (978) 970-5600Email: DSullivan@trccompanies.com

Additional Project Information:

## Regulatory Requirements &amp; Project Information Requirements

☒ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods  
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)  
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)  
☐ Yes ☐ No NPDES RGP  
☐ Other State /Fed Program Criteria

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler Initials	VOC:	SVOC:	METAL	METAL	EPH: L	VPH: L	PCB	TPH: L	TOC	TSS	pH	Temp	Sample Comments	LES
		Date	Time																
45648-01	SAP-10	8/24/21	0830	S	GP									X	X				4
-02	SAP-9		0900	S	GP									X	X				4
-03	SAP-6		1030	S	GP									X	X				4
-04	SAP-7		1100	S	GP									X	X				4
-05	SAP-5		1200	S	GP									X	X				4
-06	SAP-8	8/28/21	0800	S	GP									X	X	X			4
-07	SAP-4		0930	S	GP									X	X				4
-08	SAP-3		0950	S	GP									X	X				4
-09	SAP-2		1030	S	GP									X	X				4
-10	SAP-1		1100	S	GP									X	X				4
Container Type		Preservative		Container Type		Preservative												4	
P= Plastic A= Amber glass V= Vial		A= None B= HCl C= HNO <sub>3</sub>																4	

 Container Type  
 P= Plastic  
 A= Amber glass  
 V= Vial  
 G= Glass  
 B= Bacteria cup  
 C= Cube  
 O= Other  
 E= Encore  
 D= BOD Bottle

 Preservative  
 A= None  
 B= HCl  
 C= HNO<sub>3</sub>  
 D= H<sub>2</sub>SO<sub>4</sub>  
 E= NaOH  
 F= MeOH  
 G= NaHSO<sub>4</sub>  
 H= Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>  
 I= Ascorbic Acid  
 J= NH<sub>4</sub>Cl  
 K= Zn Acetate  
 O= Other

Container Type

Preservative

Relinquished By:

Date/Time

Received By:

Date/Time

 All samples submitted are subject to  
 Alpha's Terms and Conditions.  
 See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)



PAGE 2 OF 2

320 Forbes Blvd  
Mansfield, MA 02048  
Tel: 508-822-9300

Additional Project Information:

## Date Due:

ANALYSIS		SAMPLE INFO	
VOC: <input type="checkbox"/> 8260 <input type="checkbox"/> 624 <input type="checkbox"/> 524.2		Filtration	
SVOC: <input type="checkbox"/> ABN <input type="checkbox"/> PAH		<input type="checkbox"/> Field	
METALS: <input type="checkbox"/> MCP 13 <input type="checkbox"/> MCP 14 <input type="checkbox"/> RCP 15		<input type="checkbox"/> Lab to do	
METALS: <input type="checkbox"/> RCRA45 <input type="checkbox"/> RCRA8 <input type="checkbox"/> PP13		Preservation	
EPH: <input type="checkbox"/> Ranges & Targets <input type="checkbox"/> Ranges Only		<input type="checkbox"/> Lab to do	
VPH: <input type="checkbox"/> Ranges & Targets <input type="checkbox"/> Ranges Only			
<input type="checkbox"/> PCB <input type="checkbox"/> PEST			
TPH: <input type="checkbox"/> Quant Only <input type="checkbox"/> Fingerprint			
Total Mercury + TCN			
		Sample Comments	

FORM NO: 01-01 (rev. 12-Mar-2012)



## ANALYTICAL REPORT

Lab Number:	L2145656
Client:	TRC Environmental Consultants Wannalancit Mills 650 Suffolk Street Lowell, MA 01854
ATTN:	Liz Denly
Phone:	(978) 656-3577
Project Name:	FIREWORKS
Project Number:	246949.1400.0000
Report Date:	09/10/21

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

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Eight Walkup Drive, Westborough, MA 01581-1019  
508-898-9220 (Fax) 508-898-9193 800-624-9220 - [www.alphalab.com](http://www.alphalab.com)



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2145656-01	SAP-10 REP1	SOIL	HANOVER/HANSON, MA	08/24/21 08:30	08/25/21
L2145656-02	SAP-10 REP2	SOIL	HANOVER/HANSON, MA	08/24/21 08:30	08/25/21
L2145656-03	SAP-9 REP1	SOIL	HANOVER/HANSON, MA	08/24/21 09:00	08/25/21
L2145656-04	SAP-9 REP2	SOIL	HANOVER/HANSON, MA	08/24/21 09:00	08/25/21
L2145656-05	SAP-6 REP1	SOIL	HANOVER/HANSON, MA	08/24/21 10:30	08/25/21
L2145656-06	SAP-6 REP2	SOIL	HANOVER/HANSON, MA	08/24/21 10:30	08/25/21
L2145656-07	SAP-7 REP1	SOIL	HANOVER/HANSON, MA	08/24/21 11:00	08/25/21
L2145656-08	SAP-7 REP2	SOIL	HANOVER/HANSON, MA	08/24/21 11:00	08/25/21
L2145656-09	SAP-5 REP1	SOIL	HANOVER/HANSON, MA	08/24/21 12:00	08/25/21
L2145656-10	SAP-5 REP2	SOIL	HANOVER/HANSON, MA	08/24/21 12:00	08/25/21
L2145656-11	SAP-8 REP1	SOIL	HANOVER/HANSON, MA	08/25/21 08:00	08/25/21
L2145656-12	SAP-8 REP2	SOIL	HANOVER/HANSON, MA	08/25/21 08:00	08/25/21
L2145656-13	SAP-4 REP1	SOIL	HANOVER/HANSON, MA	08/25/21 09:30	08/25/21
L2145656-14	SAP-4 REP2	SOIL	HANOVER/HANSON, MA	08/25/21 09:30	08/25/21
L2145656-15	SAP-3 REP1	SOIL	HANOVER/HANSON, MA	08/25/21 09:50	08/25/21
L2145656-16	SAP-3 REP2	SOIL	HANOVER/HANSON, MA	08/25/21 09:50	08/25/21
L2145656-17	SAP-2 REP1	SOIL	HANOVER/HANSON, MA	08/25/21 10:30	08/25/21
L2145656-18	SAP-2 REP2	SOIL	HANOVER/HANSON, MA	08/25/21 10:30	08/25/21
L2145656-19	SAP-1 REP1	SOIL	HANOVER/HANSON, MA	08/25/21 11:00	08/25/21
L2145656-20	SAP-1 REP2	SOIL	HANOVER/HANSON, MA	08/25/21 11:00	08/25/21
L2145656-21	SAP-11 REP1	SOIL	HANOVER/HANSON, MA	08/25/21 11:45	08/25/21
L2145656-22	SAP-11 REP2	SOIL	HANOVER/HANSON, MA	08/25/21 11:45	08/25/21
L2145656-23	DUP REP1	SOIL	HANOVER/HANSON, MA	08/25/21 10:45	08/25/21
L2145656-24	DUP REP2	SOIL	HANOVER/HANSON, MA	08/25/21 10:45	08/25/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2145656-25	SAP-12 REP1	SOIL	HANOVER/HANSON, MA	08/25/21 12:45	08/25/21
L2145656-26	SAP-12 REP2	SOIL	HANOVER/HANSON, MA	08/25/21 12:45	08/25/21
L2145656-27	EQUIPMENT BLANK	WATER	HANOVER/HANSON, MA	08/24/21 14:00	08/25/21
L2145656-28	EQUIPMENT BLANK	WATER	HANOVER/HANSON, MA	08/25/21 08:30	08/25/21
L2145656-29	HG SRM	SOIL	HANOVER/HANSON, MA		08/25/21



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

### MADEP MCP Response Action Analytical Report Certification

**This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.**

<b>An affirmative response to questions A through F is required for "Presumptive Certainty" status</b>		
A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	YES
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	YES
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	YES
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?"	YES
E a.	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	N/A
E b.	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	N/A
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	YES
<b>A response to questions G, H and I is required for "Presumptive Certainty" status</b>		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	YES
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	NO
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	YES
<b>For any questions answered "No", please refer to the case narrative section on the following page(s).</b>		

**Please note that sample matrix information is located in the Sample Results section of this report.**



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

### Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

**HOLD POLICY** - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

---

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

### Case Narrative (continued)

#### MCP Related Narratives

##### Sample Receipt

The analysis of Total Cyanide was reported under a separate cover.

##### Total Mercury

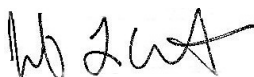
L2145656-01, -05, -06, -07, -17, -19, and -29: The sample has an elevated detection limit for Hg due to the dilution required to quantitate the result within the calibration range.

In reference to question H:

The WG1540843-4/-5 MS/MSD recoveries, performed on L2145656-11, is outside the acceptance criteria for mercury (0%/0%). Re-analysis of the MS yielded an unacceptable recovery of <30%, but the sample detection is above the RL. The LCS recovery is acceptable; therefore, no further action was taken.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:



Jennifer L. Clements

Title: Technical Director/Representative

Date: 09/10/21

## QC OUTLIER SUMMARY REPORT

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

Method	Client ID (Native ID)	Lab ID	Parameter	QC Type	Recovery/RPD (%)	QC Limits (%)	Associated Samples	Data Quality Assessment
MCP Total Metals - Mansfield Lab								
7471B	Batch QC (L2145656-11)	WG1540843-4	Mercury, Total	MS	0	75-125	01,03,05,07, 09,11	potential low bias
7471B	Batch QC (L2145656-11)	WG1540843-5	Mercury, Total	MSD	0	75-125	01,03,05,07, 09,11	potential low bias

## METALS

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-01  
 Client ID: SAP-10 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 08:30  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	5.28		mg/kg	0.569	--	5	08/30/21 18:53	09/08/21 10:40	EPA 7471B	97,7471B	OU





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-02  
 Client ID: SAP-10 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 08:30  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	0.890		mg/kg	0.094	--	1	09/09/21 11:08	09/09/21 12:47	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-03  
 Client ID: SAP-9 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 09:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	3.00		mg/kg	0.107	--	1	08/30/21 18:53	09/08/21 10:21	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-04  
 Client ID: SAP-9 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 09:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	1.01		mg/kg	0.088	--	1	09/09/21 11:08	09/09/21 12:50	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-05  
 Client ID: SAP-6 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 10:30  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	16.2		mg/kg	1.73	--	20	08/30/21 18:53	09/08/21 10:47	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-06  
 Client ID: SAP-6 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 10:30  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	7.18		mg/kg	0.910	--	10	09/09/21 11:08	09/09/21 13:47	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-07  
 Client ID: SAP-7 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 11:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 63%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	9.91		mg/kg	0.626	--	5	08/30/21 18:53	09/08/21 10:50	EPA 7471B	97,7471B	OU





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-08  
 Client ID: SAP-7 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 11:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 63%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	2.12		mg/kg	0.110	--	1	09/09/21 11:08	09/09/21 13:04	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-09  
 Client ID: SAP-5 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 12:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 74%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	2.33		mg/kg	0.099	--	1	08/30/21 18:53	09/08/21 10:37	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-10  
 Client ID: SAP-5 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 12:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 74%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	0.869		mg/kg	0.091	--	1	09/09/21 11:08	09/09/21 13:07	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-11  
 Client ID: SAP-8 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 08:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	2.36		mg/kg	0.102	--	1	08/30/21 18:53	09/08/21 09:51	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-12  
 Client ID: SAP-8 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 08:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 81%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	1.85		mg/kg	0.089	--	1	09/09/21 11:08	09/09/21 13:10	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-13  
 Client ID: SAP-4 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 09:30  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	2.36		mg/kg	0.115	--	1	08/30/21 18:53	09/05/21 14:24	EPA 7471B	97,7471B	OU





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-14  
 Client ID: SAP-4 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 09:30  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 71%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	0.802		mg/kg	0.103	--	1	09/09/21 11:08	09/09/21 13:14	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-15  
 Client ID: SAP-3 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 09:50  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 99%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	ND		mg/kg	0.073	--	1	08/30/21 18:53	09/05/21 14:37	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-16  
 Client ID: SAP-3 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 09:50  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 99%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	ND		mg/kg	0.072	--	1	09/09/21 11:08	09/09/21 13:17	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-17  
 Client ID: SAP-2 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 10:30  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	5.30		mg/kg	1.01	--	10	08/30/21 18:53	09/05/21 16:03	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-18  
 Client ID: SAP-2 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 10:30  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 78%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	0.987		mg/kg	0.090	--	1	09/09/21 11:08	09/09/21 13:20	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-19  
 Client ID: SAP-1 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 11:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	8.64		mg/kg	0.942	--	10	08/30/21 18:53	09/05/21 16:00	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-20  
 Client ID: SAP-1 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 11:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 77%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	1.14		mg/kg	0.090	--	1	09/09/21 11:08	09/09/21 13:24	EPA 7471B	97,7471B	OU





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-21  
 Client ID: SAP-11 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 11:45  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	0.280		mg/kg	0.084	--	1	08/30/21 18:53	09/05/21 14:50	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-22  
 Client ID: SAP-11 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 11:45  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 93%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	ND		mg/kg	0.075	--	1	09/09/21 11:08	09/09/21 13:27	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-23  
 Client ID: DUP REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 10:45  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 98%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	0.113		mg/kg	0.076	--	1	08/30/21 18:53	09/05/21 14:53	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-24  
 Client ID: DUP REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 10:45  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 98%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	ND		mg/kg	0.069	--	1	09/09/21 11:08	09/09/21 13:30	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-25  
 Client ID: SAP-12 REP1  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 12:45  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 99%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	ND		mg/kg	0.075	--	1	08/30/21 18:53	09/05/21 14:56	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-26  
 Client ID: SAP-12 REP2  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 12:45  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: 99%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	ND		mg/kg	0.064	--	1	09/09/21 11:08	09/09/21 13:40	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-27  
 Client ID: EQUIPMENT BLANK  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/24/21 14:00  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	ND		mg/l	0.0002	--	1	09/03/21 06:44	09/03/21 09:56	EPA 7470A	97,7470A	NB





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-28  
 Client ID: EQUIPMENT BLANK  
 Sample Location: HANOVER/HANSON, MA

Date Collected: 08/25/21 08:30  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	ND		mg/l	0.0002	--	1	09/03/21 06:44	09/03/21 10:00	EPA 7470A	97,7470A	NB



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

Lab ID: L2145656-29  
 Client ID: HG SRM  
 Sample Location: HANOVER/HANSON, MA

Date Collected:  
 Date Received: 08/25/21  
 Field Prep: Not Specified

Sample Depth:  
 Matrix: Soil  
 Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab											
Mercury, Total	21.7		mg/kg	0.787	--	10	09/09/21 11:08	09/09/21 13:43	EPA 7471B	97,7471B	OU



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

## Method Blank Analysis Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab for sample(s): 01,03,05,07,09,11 Batch: WG1540843-1										
Mercury, Total	ND		mg/kg	0.083	--	1	08/30/21 18:53	09/08/21 09:41	97,7471B	OU

### Prep Information

Digestion Method: EPA 7471B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab for sample(s): 13,15,17,19,21,23,25 Batch: WG1540844-1										
Mercury, Total	ND		mg/kg	0.083	--	1	08/30/21 18:53	09/05/21 14:14	97,7471B	OU

### Prep Information

Digestion Method: EPA 7471B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab for sample(s): 27-28 Batch: WG1542246-1										
Mercury, Total	ND		mg/l	0.0002	--	1	09/03/21 06:44	09/03/21 09:46	97,7470A	NB

### Prep Information

Digestion Method: EPA 7470A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Total Metals - Mansfield Lab for sample(s): 02,04,06,08,10,12,14,16,18,20,22,24,26,29 Batch: WG1543945-1										
Mercury, Total	ND		mg/kg	0.083	--	1	09/09/21 11:08	09/09/21 12:37	97,7471B	OU

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

## Method Blank Analysis Batch Quality Control

### Prep Information

---

Digestion Method: EPA 7471B

# **Lab Control Sample Analysis** Batch Quality Control

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Total Metals - Mansfield Lab Associated sample(s): 01,03,05,07,09,11 Batch: WG1540843-2 WG1540843-3 SRM Lot Number: D109-540								
Mercury, Total	104		96		60-140	8		30
MCP Total Metals - Mansfield Lab Associated sample(s): 13,15,17,19,21,23,25 Batch: WG1540844-2 WG1540844-3 SRM Lot Number: D109-540								
Mercury, Total	96		90		60-140	6		30
MCP Total Metals - Mansfield Lab Associated sample(s): 27-28 Batch: WG1542246-2 WG1542246-3								
Mercury, Total	100		102		80-120	2		20
MCP Total Metals - Mansfield Lab Associated sample(s): 02,04,06,08,10,12,14,16,18,20,22,24,26,29 Batch: WG1543945-2 WG1543945-3 SRM Lot Number: D109-540								
Mercury, Total	110		99		60-140	11		30

# Matrix Spike Analysis

## Batch Quality Control

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
MCP Total Metals - Mansfield Lab Associated sample(s): 01,03,05,07,09,11 QC Batch ID: WG1540843-4 WG1540843-5 QC Sample: L2145656-11 Client ID: SAP-8 REP1												
Mercury, Total	2.36	0.198	2.33	0	Q	2.32	0	Q	75-125	0		35

# **Lab Duplicate Analysis** *Batch Quality Control*

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
MCP Total Metals - Mansfield Lab Associated sample(s): 01,03,05,07,09,11 QC Batch ID: WG1540843-7 QC Sample: L2145656-01 Client ID: SAP-10 REP1						
Mercury, Total	5.28	5.63	mg/kg	6		35
MCP Total Metals - Mansfield Lab Associated sample(s): 13,15,17,19,21,23,25 QC Batch ID: WG1540844-4 QC Sample: L2145656-13 Client ID: SAP-4 REP1						
Mercury, Total	2.36	2.32	mg/kg	2		35



# **INORGANICS & MISCELLANEOUS**

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-01  
**Client ID:** SAP-10 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 08:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	70.7		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-02  
**Client ID:** SAP-10 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 08:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	70.7		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-03  
**Client ID:** SAP-9 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 09:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	75.2		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-04  
**Client ID:** SAP-9 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 09:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	75.2		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-05  
**Client ID:** SAP-6 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 10:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	75.4		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-06  
**Client ID:** SAP-6 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 10:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	75.4		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-07  
**Client ID:** SAP-7 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 11:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	62.6		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-08  
**Client ID:** SAP-7 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 11:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	62.6		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-09  
**Client ID:** SAP-5 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 12:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	73.5		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-10  
**Client ID:** SAP-5 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/24/21 12:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	73.5		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-11  
**Client ID:** SAP-8 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 08:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	80.6		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-12  
**Client ID:** SAP-8 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 08:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	80.6		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-13  
**Client ID:** SAP-4 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 09:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	71.3		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-14  
**Client ID:** SAP-4 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 09:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	71.3		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-15  
**Client ID:** SAP-3 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 09:50  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	99.4		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-16  
**Client ID:** SAP-3 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 09:50  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	99.4		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-17  
**Client ID:** SAP-2 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 10:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	77.6		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-18  
**Client ID:** SAP-2 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 10:30  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	77.6		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-19  
**Client ID:** SAP-1 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 11:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	76.5		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-20  
**Client ID:** SAP-1 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 11:00  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	76.5		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-21  
**Client ID:** SAP-11 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 11:45  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	92.7		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-22  
**Client ID:** SAP-11 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 11:45  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	92.7		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV





**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-23  
**Client ID:** DUP REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 10:45  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	98.1		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-24  
**Client ID:** DUP REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 10:45  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	98.1		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-25  
**Client ID:** SAP-12 REP1  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 12:45  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	99.4		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

**SAMPLE RESULTS**

**Lab ID:** L2145656-26  
**Client ID:** SAP-12 REP2  
**Sample Location:** HANOVER/HANSON, MA

**Date Collected:** 08/25/21 12:45  
**Date Received:** 08/25/21  
**Field Prep:** Not Specified

**Sample Depth:**  
**Matrix:** Soil

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Solids, Total	99.4		%	0.100	--	1	-	08/30/21 15:47	121,2540G	AV



# Lab Duplicate Analysis

*Batch Quality Control*

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01,03,05,07,09,11,13,15,17,19,21,23,25 QC Batch ID: WG1540825-1 QC Sample: L2145656-21 Client ID: SAP-11 REP1						
Solids, Total	92.7	94.3	%	2		10
General Chemistry - Mansfield Lab Associated sample(s): 02,04,06,08,10,12,14,16,18,20,22,24,26 QC Batch ID: WG1543946-1 QC Sample: L2145656-22 Client ID: SAP-11 REP2						
Solids, Total	92.7	94.3	%	2		10

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656**Report Date:** 09/10/21**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

**Cooler Information**

**Cooler**                      **Custody Seal**  
A                                  Absent

**Container Information**

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2145656-01A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-01B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-01X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-TS(7),MCP-7471T-10(28)
L2145656-02X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-03A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-03B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-03X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		MCP-7471T-10(28),A2-TS(7)
L2145656-04X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-05A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-05B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-05X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-TS(7),MCP-7471T-10(28)
L2145656-06X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-07A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-07B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-07X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		MCP-7471T-10(28),A2-TS(7)
L2145656-08X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-09A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-09B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-09X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-TS(7),MCP-7471T-10(28)
L2145656-10X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-11A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-11A1	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-11A2	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()

**Project Name:** FIREWORKS**Lab Number:** L2145656**Project Number:** 246949.1400.0000**Report Date:** 09/10/21**Container Information**

<b>Container ID</b>	<b>Container Type</b>	<b>Cooler</b>	<b>Initial pH</b>	<b>Final pH</b>	<b>Temp deg C</b>	<b>Pres</b>	<b>Seal</b>	<b>Frozen Date/Time</b>	<b>Analysis(*)</b>
L2145656-11B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-11B1	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-11B2	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-11X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-TS(7),MCP-7471T-10(28)
L2145656-12X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-13A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-13B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-13X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		MCP-7471T-10(28),A2-TS(7)
L2145656-14X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-15A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-15B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-15X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		MCP-7471T-10(28),A2-TS(7)
L2145656-16X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-17A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-17B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-17X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-TS(7),MCP-7471T-10(28)
L2145656-18X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-19A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-19B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-19X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-TS(7),MCP-7471T-10(28)
L2145656-20X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-21A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-21B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-21X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-TS(7),MCP-7471T-10(28)
L2145656-22X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-23A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-23B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-23X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-TS(7),MCP-7471T-10(28)

**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Serial\_No:**09102118:17  
**Lab Number:** L2145656  
**Report Date:** 09/10/21

**Container Information**

<b>Container ID</b>	<b>Container Type</b>	<b>Cooler</b>	<b>Initial pH</b>	<b>Final pH</b>	<b>Temp deg C</b>	<b>Pres</b>	<b>Seal</b>	<b>Frozen Date/Time</b>	<b>Analysis(*)</b>
L2145656-24X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-25A	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-25B	Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-AIRDRY()
L2145656-25X	Metals Only-Glass 60mL/2oz unpreserved	A	NA		5.2	Y	Absent		A2-TS(7),MCP-7471T-10(28)
L2145656-26X	Plastic 2oz unpreserved for TS	A	NA		5.2	Y	Absent		A2-TS(7)
L2145656-27A	Plastic 120ml HNO3 preserved	A	<2	<2	5.2	Y	Absent		MCP-7470T-10(28)
L2145656-28A	Plastic 250ml HNO3 preserved	A	<2	<2	5.2	Y	Absent		MCP-7470T-10(28)



**Project Name:** FIREWORKS  
**Project Number:** 246949.1400.0000

**Lab Number:** L2145656  
**Report Date:** 09/10/21

## GLOSSARY

### Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
	Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

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### Footnotes

- 1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

### Terms

**Analytical Method:** Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Difference:** With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

**Final pH:** As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

**Frozen Date/Time:** With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

**Initial pH:** As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

**PAH Total:** With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

**PFAS Total:** With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA, this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

**Total:** With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

### Data Qualifiers

- A** - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.
- B** - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

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**Data Qualifiers**

the identification is based on a mass spectral library search.

- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.

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## REFERENCES

- 97 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA, IIB, IIIA, IIIB, IIIC, IIID, VA, VB, VC, VIA, VIB, VIIIA and VIIIB, July 2010.
- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

## LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.



## Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

### Westborough Facility

**EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene

**EPA 625/625.1:** alpha-Terpineol

**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

**SM 2540D:** TSS

**EPA 8082A:** NPW: PCB: 1, 5, 31, 87, 101, 110, 141, 151, 153, 180, 183, 187.

**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Biological Tissue Matrix:** EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

### Westborough Facility:

#### Drinking Water

**EPA 300.0:** Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2:** Nitrate-N, Nitrite-N; **SM4500NO3-F:** Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE,**

**EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**

**EPA 332:** Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.

**Microbiology:** **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, SM9222D.**

#### Non-Potable Water

**SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH:** Ammonia-N and Kjeldahl-N, **EPA 350.1:**

Ammonia-N, **LACHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

**SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.

**EPA 624.1:** Volatile Halocarbons & Aromatics,

**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

### Mansfield Facility:

#### Drinking Water

**EPA 200.7:** Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1 Hg.**

**EPA 522, EPA 537.1.**

#### Non-Potable Water

**EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

**EPA 245.1 Hg.**


**SM2340B**

For a complete listing of analytes and methods, please contact your Alpha Project Manager.



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 <b>CHAIN OF CUSTODY</b>		PAGE <u>2</u> OF <u>2</u>		Date Rec'd In Lab: <u>8/25/21</u>		ALPHA Job #: <u>L2145648</u>																															
		<b>Project Information</b> Project Name: <u>Fireworks</u> Project Location: <u>Hanover/Hanson, MA</u> Project #: <u>246949</u> Project Manager: <u>Dave Sullivan</u> ALPHA Quote #: _____		<b>Report Information - Data Deliverables</b> <input checked="" type="checkbox"/> FAX <input checked="" type="checkbox"/> EMAIL		<b>Billing Information</b> <input type="checkbox"/> Same as Client info PO #: _____																															
<b>Client Information</b> Client: <u>TRC</u> Address: <u>650 Suffolk Street</u> <u>Cowell, MA 01854</u> Phone: <u>(978) 970-5600</u> Email: <u>DSullivan@trccompanies.com</u>		<b>Turn-Around Time</b> <input type="checkbox"/> Standard <input type="checkbox"/> RUSH (only confirmed if pre-approved) Date Due: _____		<b>Regulatory Requirements &amp; Project Information Requirements</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No MA MCP Analytical Methods <input type="checkbox"/> Yes <input type="checkbox"/> No CT RCP Analytical Methods <input type="checkbox"/> Yes <input type="checkbox"/> No Matrix Spike Required on this SDG? (Required for MCP Inorganics) <input type="checkbox"/> Yes <input type="checkbox"/> No GW1 Standards (Info Required for Metals & EPH with Targets) <input type="checkbox"/> Yes <input type="checkbox"/> No NPDES RGP <input type="checkbox"/> Other State /Fed Program _____ Criteria _____																																	
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<b>Container Type</b> P= Plastic A= Amber glass V= Vial G= Glass B= Bacteria cup C= Cube O= Other E= Encore D= BOD Bottle		<b>Preservative</b> A= None B= HCl C= HNO3 D= H2SO4 E= NaOH F= MeOH G= NaHSO4 H= Na2S2O3 I= Ascorbic Acid J= NH4Cl K= Zn Acetate O= Other		<b>Container Type</b> Preservative																																	
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