



Report of Annual PFAS Analysis

Black Earth Compost is taking a proactive approach to investigating the issue of PFAS in our world and as it relates to our composts and soils. We have been voluntarily analyzing and reporting our results and have worked with a consultant to put together this document. In it we provide data from our latest round of PFAS testing from our 3 compost sites (see Table 2) and compare it to Massachusetts limits for human safety defined by the state as: children inhaling and playing in the soil (see Table 1). The good news is our compost and soil blends are safe by these strict standards.

Additional research with our consultant found studies describing background levels of PFAS in the environment (see Table 3). Some PFAS can be detected in most soils and homes because they have been heavily used by society since the 1950's. For comparison, we then collected publicly available data from high-profile PFAS contamination that occurred on Maine farms and in central Massachusetts at a compost facility which made news this summer (see Table 4).

Finally, we show data that the levels of PFAS, taken by the US Center for Disease Control, in blood serum has dropped significantly since 2001 (see Table 5). This may indicate that we may be past peak exposure to the PFAS that are of most concern and are highly regulated.

There is much fear associated with PFAS, but it is important to remember that we have been living with them for over 70 years. More importantly we have been depending on them every minute of every day to create the modern lifestyle we enjoy and depend on. Any transition away needs to be orderly and phased and not have impossible expectations of getting back to a zero PFAS world.

Background Information

PFAS, or per- and poly-fluoroalkyl substances have been widely used since the 1950s and are now ubiquitous in the environment. The reason for their popularity and utility is the molecules are able to provide simultaneous grease and water resistance while also being resistant to degradation by life and heat. Due to their use in Teflon cooking ware, Gore-Tex containing outdoor gear, stain-resistant furniture, stain-resistant carpeting, food packaging, mascara, school floor waxes, firefighting foam, and scores of other widely used products, we are all exposed to PFAS daily. Fortunately, due to the apparent toxicity of some PFAS compounds, many of the compounds are already being phased out of production, and our exposure to these have been decreasing (see Table 5 for the reduction in the US population's blood serum level of PFAS compounds in the last two decades). PFAS compounds last a very long time in the world, so that even with this reduction, background levels still persist and in some media, such as household dust, levels are quite high (see Table 4). Due to this we still see them in our daily lives for many years to come.

It is important to realize that PFAS exists in our world in a range from high concentrations to low concentrations. On the high end of the spectrum, there has been extensive media coverage recently related to Towns that have high levels of PFAS that are a concern (see Table 4). These sites have been taking ingredients that are high in PFAS such as paper mill waste. On the other end of the spectrum, studies have found low levels of PFAS in rain water which means that all environmental media (soils, plants, animals, fresh water, salt water, etc.) will show detectable amounts. This is shown to be true in studies that analyze for PFAS across forest, rural and urban soils in Maine and Vermont (see Table 3). It's important to realize that low levels exist in most environmental media, including composts, and generally are not a concern to human health.

2022 Results

Black Earth Compost tests well below the limits set for human safety by the state of Massachusetts, the US EPA and the Canadian government. For the 6 PFAS compounds that are common and considered harmful, they are either **not detected** or are at least **180 fold below** the human safety limits set by the state. For example, the threshold for PFOA is 300 ug/kg (300 parts per billion); the PFOA level in our compost tests 1.6 ug/kg on average (see Table 2).

Massachusetts bases its human safety thresholds around a worst case scenario of soil being used at a daycare where children will be exposed to it through play and inhalation. The state then adds safety factors on top of that threshold to account for persons who may react differently or are particularly frail.

Black Earth Compost used in a soil directly on top of a drinking water supply does not contain enough concerning PFAS to accumulate to threatening levels. It is important to remember that compost is only applied to soil as an amendment, making up a fraction of the overall soil mass. To test this theory, we analyzed a farm soil that had used our compost about 10 times over 8 years (see Table 2). Levels of PFAS in this soil are still below the strict state thresholds to protect drinking water. On top of that, the levels found are lower than or in the range of background soil levels found at uncontaminated sites in Maine and Vermont (see Table 3).

There are 28 other PFAS molecules that EPA regularly advises testing for. 25 out of 28 of those are not detectable in Black Earth Compost or soil blends. The 3 that we do find are in low concentrations and are generally used on food and food packaging and thus people are already regularly exposed to them at higher concentrations on their food. These compounds are typically not regulated by states or countries because their toxicity is lower than those 6 PFAS that are near-universally regulated. Where safety standards do exist, Black Earth Compost is well below those thresholds as well. For example, the threshold for PFHxA is 800 ug/kg in Canada (one of the few countries to even regulate it) and our compost tests at 25 ug/kg; Threshold for PFBA in Canada is 114,000 ug/kg and our compost tests at 2.9 ug/kg.

Reducing PFAS impact - Getting to zero PFAS

Society will never get to zero PFAS. They have been heavily used in modern society in suburbs, cities, processed food supply chain and the single-use packaging culture. As we wean ourselves off of them and lower demand, manufacturers will respond and slowly start to produce less each day. When those production levels drop, PFAS will slowly disperse into the environment adding to the background 'chemical noise' found all over the Earth. Over 100's or 1000's of years that background amount will continue to decrease until it is only found in sedimentary rocks from our era. This is how persistent pollutants work.

Some people are demanding that all traces of PFAS be cleaned up and our world be set back to zero PFAS. That is impossible because PFAS is already in rain water from the Northern Hemisphere's continents down to Antarctica (Cousins et al.)¹. Reducing the manufacturing of PFAS is a smart first step. This stops new PFAS from entering into the environment and allows what is here to slowly disperse. Realistically though, a wind down of these PFAS containing products is going to take 10 to 20 years. On top of that, there may not be a replacement for many uses of PFAS. The reason they harm living beings and that they persist in the environment may be the same reason they provide the beneficial properties we want. Therefore, part of the solution is to lower our expectations of what we ask from consumer products.

Compostable Packaging

Black Earth Compost requires that any food packaging that you place in our bins is certified compostable. We only allow the following certifications because they have PFAS standards.

- Biodegradable Product Institute (BPI)
- Compost Manufacturer's Alliance (CMA)
- TÜV Austria/OK Compost
- EN 13432 or EN 14995



Legislative and Personal Actions

Black Earth Compost supports the following actions in government, schools, businesses and people...

- Legislative and Executive branch of government
 - The question of how to handle PFAS needs to be dealt with at the Executive level rather than legislative, judicial or with regulators. These later groups often have strict mandates that may prevent decision making where there are difficult tradeoffs for all decision pathways. There are too many complexities, PFAS is too pervasive and deeply integrated into modern living; Therefore Executive level thought, research and decision is required.
 - Scenario 1 – Mandate phase out of all PFAS from consumer food products and food packaging.
 - Scenario 2 – Require that if PFAS are to be used on consumer food and food packaging that they are first approved by FDA.
 - Either scenario should likely be phased in on a 5 year time frame in order to prevent shock to the supply chains. Going zero tolerance does not work for something that is used every minute of every day by people.
 - Regulate the term ‘compostable’ and ‘biodegradable’. These terms are used very loosely on consumer single use items. Two side by side products at a supermarket can say ‘compostable’, but one likely has PFAS and the other does not because it is certified compostable.
- Restaurants and Cafeterias
 - For single use plastic to-go items, first try to utilize PLA (polylactic acid) based items that are certified compostable (BPI, CMA, TUV, or the European compostable standards, see above). PLA doesn’t need a PFAS coating and can be cheaper. If you do use paper or fiber-based containers (trays, plates, wrappers, etc.), ensure that they are certified compostable by our standards in order to avoid PFAS (see above)
- Schools
 - Consider whether daily or weekly waxing of your hallways and floors is necessary. Determine if there are non-PFAS containing alternatives to the wax and wax strippers.
 - If you choose to use single use trays to serve lunches, ensure they are certified compostable. Do not bother searching the internet for affordable certified 5-compartment trays, contact Black Earth for a source. We have asked a New England distributor to carry affordable trays.
- Consumers
 - Ask that single-use food packaging that you consume be certified compostable by BPI, CMA, TUV or European standards (the ASTM 6400, developed by the American Society for Testing and Materials, does not consider anything regarding PFAS; nor does Forest Stewardship Council certification have anything to do with PFAS). So whether you are into composting or not, if you are against PFAS then you should be buying single use products that are certified by BPI, CMA, TUV or the European standards. <https://blackearthcompost.com/compostables/>
 - Consider consuming less greasy food. Not only is the greasy food likely bad for your health, but the PFAS needed to contain it in its bag or box is likely bad for you too.
 - Consume less total number of products.
 - Consume more simply. Do you need that stylish waterproof jacket? Or will a poncho and boiled-wool tunic work?

-Andrew Brousseau
Compost Operations/Managing Partner
Black Earth Compost

PFAS Regulated by MA							PFAS Monitored by EPA			
PFHpA	PFHxS	PFOA	PFNA	PFOS	PFDA	25 other PFAS*	PFBA	PFPeA	PFHxA	

Table 1

STATE AND INTERNATIONAL REGULATIONS											
no std = no regulation/standard, measured in ng/g, dry weight basis (parts per billion)											
Massachusetts Soil Standard - Skin Contact and Inhalation	Soil	300	300	300	300	300	300	no std	no std	no std	no std
Federal - EPA - Skin Contact	Soil	no std	1,300	190	190	190	no std	no std	no std	no std	no std
Canada - Human Contact Safety	Soil	800	2,300	700	80	2,000	no std	no std	114,000	800	800
Massachusetts Soil Standard - Over drinking water source	Soil	0.50	0.30	0.72	0.32	2.00	0.30	no std	no std	no std	no std
Federal - EPA - Over drinking water source	Soil	no std	0.17	0.92	0.25	0.04	no std	no std	no std	no std	no std

Table 2

BLACK EARTH COMPOST - 2022 RESULTS												
no detc = not detected in this soil by analysis, measured in ng/g, dry weight basis (parts per billion)												
Manchester site	Compost	no detc	no detc	1	no detc	no detc	no detc	no detc	no detc	4	7	26
Manchester site	Soil Blend	no detc	no detc	1	no detc	no detc	no detc	no detc	no detc	2	4	15
Groton site	Compost	no detc	no detc	no detc	no detc	1	no detc	no detc	no detc	3	7	34
Framingham	Compost	no detc	no detc	3	no detc	no detc	2	no detc	no detc	3	9	11
Farm soil with long term Black Earth Compost use	Soil	no detc	no detc	0.5	no detc	no detc	no detc	no detc	no detc	no detc	1	1

Table 3

BACKGROUND LEVELS											
no data = not analyzed for this PFAS, measured in ng/g, dry weight basis (parts per billion)											
Vermont State Soil Background	Soil	0.19	0.12	0.39	0.16	0.68	0.095	no data	no data	no data	0.23
Maine State Soil Background	Soil	0.085	min	0.394	0.145	0.275	0.078	no data	0.137	0.098	0.219
Maine State Soil Background (urban)	Soil	no data	no data	no data	min	1.17	0.094	no data	no data	no data	no data
US Household Dust (2001)	Dust	50	46	142	8	201	7	no data	no data	no data	54

Table 4

PFAS IN THE NEWS											
no data = not analyzed for this PFAS, measured in ng/g, dry weight basis (parts per billion)											
(Max concentration) Contaminated Soils - Fairfield Ctr, ME	Soil	no data	no data	64	62	1,020	134	no data	no data	no data	no data
Mass Natural Compost - Westminster, MA	Compost	5	0.3	13	4	26	9	no data	no data	no data	12
(Max concentration) Mass Natural Compost - Westminster, MA	Compost	7	0.5	26	9	62	18	no data	no data	no data	33

Table 5

PFAS IN HUMANS											
no data = not analyzed for this PFAS, measured in ug/L (parts per billion)											
US population 1999-2000	Blood	no data	2.13	5.21	0.551	30.40	no data	no data	no data	no data	no data
US population 2017-2018	Blood	no data	1.08	1.42	0.411	4.25	0.193	no data	no data	no data	no data

Notes:

all data based on median levels unless otherwise noted

NS = no standard

ND = below limit of detection (not detected)

NT = Not Tested

min = detected on less than 10% of samples (only applicable in background level testing)

* Black Earth Compost was analyzed for 25 other PFAS and does not contain the following: PFBS, F53B Major, F53B Minor, ADONA, HFPO-DA, 8:2FTS A, PFDA, PFDoA, PFEESA, PFHpS, N-EtFOSAA, N-MeFOSAA, PFTA, PFTrDA, 4:2FTS A, PFDS, FOSA, PFNS, FHxSA, FBSA, PFMPA, 6:2 FTS A, PFPeS, PFUnA, nor NFDHA.

VT soil background levels from Zhu et al. 2019. *PFAS Background in Vermont Shallow Soils*

ME soil background levels from Sanborn Head. 2022. *Background levels of PFAS and PAHs in Maine Shallow Soils; study report.*

US household dust levels from Strynar and Lindstrom. 2008. *Perfluorinated compounds in house dust from Ohio and North Carolina, USA.*

Contaminated soils in Maine from Maine Department of Environmental Protection testing results summary

Mass Natural compost results from Tighe&Bond report to Massachusetts Department of Environmental Protection, September 16, 2002

Black Earth testing results from BE sampling utilized Pace Analytical labs

Blood serum levels from US Center for Disease Control (CDC). *National Report on Human Exposure to Environmental Chemicals*

Reference 1 - Outside the Safe Operating Space of a New Planetary Boundary for Per- and Polyfluoroalkyl Substances (PFAS)

Ian T. Cousins, Jana H. Johansson, Matthew E. Salter, Bo Sha, and Martin Scheringer

Environmental Science & Technology 2022 56 (16), 11172-11179

DOI: 10.1021/acs.est.2c02765

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAS

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2206042 1-Fram Compost

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-01

Sample Matrix: Soil

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	2.6	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorobutanesulfonic acid (PFBS)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluoropentanoic acid (PFPeA)	9.1	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorohexanoic acid (PFHxA)	11	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
11Cl-PF3OUdS (F53B Major)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
9Cl-PF3ONS (F53B Minor)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorodecanoic acid (PFDA)	1.5	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorododecanoic acid (PFDoA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluoroheptanesulfonic acid (PFHpS)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
N-EtFOSAA	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
N-MeFOSAA	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorotetradecanoic acid (PFTA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorotridecanoic acid (PFTTrDA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorodecanesulfonic acid (PFDS)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorooctanesulfonamide (FOSA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorononanesulfonic acid (PFNS)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluoro-1-butanesulfonamide (FBSA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorohexanesulfonic acid (PFHxS)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluoropentanesulfonic acid (PFPeS)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluoroundecanoic acid (PFUnA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Nonfluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluoroheptanoic acid (PFHpA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorooctanoic acid (PFOA)	2.5	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorooctanesulfonic acid (PFOS)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH
Perfluorononanoic acid (PFNA)	ND	0.73	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:24	BLH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAs

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2206042 1-Fram Compost

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-01

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	60.3		% Wt	1	H-06	SM 2540G	8/4/22	8/5/22 10:03	BRD

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAS

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2206042 2-Groton Compost

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-02

Sample Matrix: Soil

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	3.2	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorobutanesulfonic acid (PFBS)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluoropentanoic acid (PFPeA)	6.9	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorohexanoic acid (PFHxA)	34	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
11Cl-PF3OUdS (F53B Major)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
9Cl-PF3ONS (F53B Minor)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorodecanoic acid (PFDA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorododecanoic acid (PFDoA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluoroheptanesulfonic acid (PFHpS)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
N-EtFOSAA	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
N-MeFOSAA	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorotetradecanoic acid (PFTA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorotridecanoic acid (PFTTrDA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorodecanesulfonic acid (PFDS)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorooctanesulfonamide (FOSA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorononanesulfonic acid (PFNS)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluoro-1-butanesulfonamide (FBSA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorohexanesulfonic acid (PFHxS)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluoropentanesulfonic acid (PFPeS)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluoroundecanoic acid (PFUnA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Nonfluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluoroheptanoic acid (PFHpA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorooctanoic acid (PFOA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorooctanesulfonic acid (PFOS)	1.0	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH
Perfluorononanoic acid (PFNA)	ND	0.61	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:31	BLH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAs

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2206042 2-Groton Compost

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-02

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/PHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	72.3		% Wt	1	H-06	SM 2540G	8/4/22	8/5/22 10:03	BRD

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAS

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2207159 3-Manch Compost

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-03

Sample Matrix: Soil

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	3.5	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorobutanesulfonic acid (PFBS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluoropentanoic acid (PFPeA)	7.4	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorohexanoic acid (PFHxA)	26	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
11Cl-PF3OUdS (F53B Major)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
9Cl-PF3ONS (F53B Minor)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorodecanoic acid (PFDA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorododecanoic acid (PFDoA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluoroheptanesulfonic acid (PFHpS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
N-EtFOSAA	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
N-MeFOSAA	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorotetradecanoic acid (PFTA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorotridecanoic acid (PFTTrDA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorodecanesulfonic acid (PFDS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorooctanesulfonamide (FOSA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorononanesulfonic acid (PFNS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluoro-1-butanesulfonamide (FBSA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorohexanesulfonic acid (PFHxS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluoropentanesulfonic acid (PFPeS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluoroundecanoic acid (PFUnA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Nonfluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluoroheptanoic acid (PFHpA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorooctanoic acid (PFOA)	1.3	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorooctanesulfonic acid (PFOS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH
Perfluorononanoic acid (PFNA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:38	BLH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAs

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2207159 3-Manch Compost

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-03

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	67.9		% Wt	1	H-06	SM 2540G	8/4/22	8/5/22 10:03	BRD

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAS

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2207159 4-Farm Soil

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-04

Sample Matrix: Soil

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorobutanesulfonic acid (PFBS)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluoropentanoic acid (PFPeA)	0.81	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorohexanoic acid (PFHxA)	1.1	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
11Cl-PF3OUdS (F53B Major)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
9Cl-PF3ONS (F53B Minor)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorodecanoic acid (PFDA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorododecanoic acid (PFDoA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluoroheptanesulfonic acid (PFHpS)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
N-EtFOSAA	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
N-MeFOSAA	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorotetradecanoic acid (PFTA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorotridecanoic acid (PFTTrDA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorodecanesulfonic acid (PFDS)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorooctanesulfonamide (FOSA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorononanesulfonic acid (PFNS)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluoro-1-butanesulfonamide (FBSA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorohexanesulfonic acid (PFHxS)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluoropentanesulfonic acid (PFPeS)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluoroundecanoic acid (PFUnA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluoroheptanoic acid (PFHpA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorooctanoic acid (PFOA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorooctanesulfonic acid (PFOS)	0.53	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH
Perfluorononanoic acid (PFNA)	ND	0.50	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 2:45	BLH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAs

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2207159 4-Farm Soil

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-04

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	86.0		% Wt	1	H-06	SM 2540G	8/4/22	8/5/22 10:03	BRD

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAS

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2207159 5-Manch Soil

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-05

Sample Matrix: Soil

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	2.2	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorobutanesulfonic acid (PFBS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluoropentanoic acid (PFPeA)	4.0	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorohexanoic acid (PFHxA)	15	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
11Cl-PF3OUdS (F53B Major)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
9Cl-PF3ONS (F53B Minor)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorodecanoic acid (PFDA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorododecanoic acid (PFDoA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluoroheptanesulfonic acid (PFHpS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
N-EtFOSAA	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
N-MeFOSAA	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorotetradecanoic acid (PFTA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorotridecanoic acid (PFTrDA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorodecanesulfonic acid (PFDS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorooctanesulfonamide (FOSA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorononanesulfonic acid (PFNS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluoro-1-butanesulfonamide (FBSA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorohexanesulfonic acid (PFHxS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluoropentanesulfonic acid (PFPeS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluoroundecanoic acid (PFUnA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluoroheptanoic acid (PFHpA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorooctanoic acid (PFOA)	1.2	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorooctanesulfonic acid (PFOS)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH
Perfluorononanoic acid (PFNA)	ND	0.65	µg/kg dry	1		SOP-466 PFAS	8/12/22	8/22/22 3:00	BLH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAs

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2207159 5-Manch Soil

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-05

Sample Matrix: Soil

Conventional Chemistry Parameters by EPA/APHA/SW-846 Methods (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
% Solids	68.0		% Wt	1	H-06	SM 2540G	8/4/22	8/5/22 10:03	BRD

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: 2022 PFAs

Sample Description:

Work Order: 22G1490

Date Received: 7/27/2022

Field Sample #: 2206042 9-Manch Blank

Sampled: 7/22/2022 00:00

Sample ID: 22G1490-08

Sample Matrix: Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorobutanesulfonic acid (PFBS)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluoropentanoic acid (PFPeA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorohexanoic acid (PFHxA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
11Cl-PF3OUdS (F53B Major)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
9Cl-PF3ONS (F53B Minor)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorodecanoic acid (PFDA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorododecanoic acid (PFDoA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
N-EtFOSAA	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
N-MeFOSAA	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorotetradecanoic acid (PFTA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorotridecanoic acid (PFTTrDA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorodecanesulfonic acid (PFDS)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorooctanesulfonamide (FOSA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorononanesulfonic acid (PFNS)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorohexanesulfonic acid (PFHxS)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluoropetanesulfonic acid (PFPeS)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluoroundecanoic acid (PFUnA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Nonfluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.0	ng/L	1	V-05	SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluoroheptanoic acid (PFHpA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorooctanoic acid (PFOA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorooctanesulfonic acid (PFOS)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH
Perfluorononanoic acid (PFNA)	ND	2.0	ng/L	1		SOP-454 PFAS	8/12/22	8/19/22 2:48	BLH

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B314297 - SOP 465-PFAAS
Blank (B314297-BLK1)

Prepared: 08/12/22 Analyzed: 08/22/22

Perfluorobutanoic acid (PFBA)	ND	0.42	µg/kg wet							
Perfluorobutanesulfonic acid (PFBS)	ND	0.42	µg/kg wet							
Perfluoropentanoic acid (PFPeA)	ND	0.42	µg/kg wet							
Perfluorohexanoic acid (PFHxA)	ND	0.42	µg/kg wet							
11Cl-PF3OUdS (F53B Major)	ND	0.42	µg/kg wet							
9Cl-PF3ONS (F53B Minor)	ND	0.42	µg/kg wet							
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	0.42	µg/kg wet							
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	0.42	µg/kg wet							
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	0.42	µg/kg wet							
Perfluorodecanoic acid (PFDA)	ND	0.42	µg/kg wet							
Perfluorododecanoic acid (PFDoA)	ND	0.42	µg/kg wet							
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	0.42	µg/kg wet							
Perfluoroheptanesulfonic acid (PFHpS)	ND	0.42	µg/kg wet							
N-EtFOSAA	ND	0.42	µg/kg wet							
N-MeFOSAA	ND	0.42	µg/kg wet							
Perfluorotetradecanoic acid (PFTA)	ND	0.42	µg/kg wet							
Perfluorotridecanoic acid (PFTrDA)	ND	0.42	µg/kg wet							
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	0.42	µg/kg wet							
Perfluorodecanesulfonic acid (PFDS)	ND	0.42	µg/kg wet							
Perfluorooctanesulfonamide (FOSA)	ND	0.42	µg/kg wet							
Perfluorononanesulfonic acid (PFNS)	ND	0.42	µg/kg wet							
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	0.42	µg/kg wet							
Perfluoro-1-butanesulfonamide (FBSA)	ND	0.42	µg/kg wet							
Perfluorohexanesulfonic acid (PFHxS)	ND	0.42	µg/kg wet							
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	0.42	µg/kg wet							
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	0.42	µg/kg wet							
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	0.42	µg/kg wet							
Perfluoropentanesulfonic acid (PFPeS)	ND	0.42	µg/kg wet							
Perfluoroundecanoic acid (PFUnA)	ND	0.42	µg/kg wet							
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	0.42	µg/kg wet							
Perfluoroheptanoic acid (PFHpA)	ND	0.42	µg/kg wet							
Perfluorooctanoic acid (PFOA)	ND	0.42	µg/kg wet							
Perfluorooctanesulfonic acid (PFOS)	ND	0.42	µg/kg wet							
Perfluorononanoic acid (PFNA)	ND	0.42	µg/kg wet							

LCS (B314297-BS1)

Prepared: 08/12/22 Analyzed: 08/22/22

Perfluorobutanoic acid (PFBA)	2.49	0.42	µg/kg wet	2.13	117	71-135
Perfluorobutanesulfonic acid (PFBS)	2.21	0.42	µg/kg wet	1.89	117	72-128
Perfluoropentanoic acid (PFPeA)	2.43	0.42	µg/kg wet	2.13	114	69-132
Perfluorohexanoic acid (PFHxA)	2.47	0.42	µg/kg wet	2.13	116	70-132
11Cl-PF3OUdS (F53B Major)	1.63	0.42	µg/kg wet	2.01	81.2	50-150
9Cl-PF3ONS (F53B Minor)	1.66	0.42	µg/kg wet	1.99	83.6	50-150
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	1.78	0.42	µg/kg wet	2.01	88.8	50-150
Hexafluoropropylene oxide dimer acid (HFPO-DA)	1.87	0.42	µg/kg wet	2.13	87.4	50-150
8:2 Fluorotelomersulfonic acid (8:2FTS A)	2.17	0.42	µg/kg wet	2.05	106	65-137
Perfluorodecanoic acid (PFDA)	2.41	0.42	µg/kg wet	2.13	113	69-133
Perfluorododecanoic acid (PFDoA)	2.65	0.42	µg/kg wet	2.13	124	69-135
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	1.38	0.42	µg/kg wet	1.90	72.6	50-150

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B314297 - SOP 465-PFAAS
LCS (B314297-BS1)

Prepared: 08/12/22 Analyzed: 08/22/22

Perfluoroheptanesulfonic acid (PFHpS)	2.01	0.42	µg/kg wet	2.04		98.7	70-132			
N-EtFOSAA	2.89	0.42	µg/kg wet	2.13		136	61-139			
N-MeFOSAA	2.75	0.42	µg/kg wet	2.13		129	63-144			
Perfluorotetradecanoic acid (PFTA)	2.46	0.42	µg/kg wet	2.13		115	69-133			
Perfluorotridecanoic acid (PFTrDA)	2.44	0.42	µg/kg wet	2.13		114	66-139			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	2.36	0.42	µg/kg wet	2.00		118	62-145			
Perfluorodecanesulfonic acid (PFDS)	2.13	0.42	µg/kg wet	2.06		104	59-134			
Perfluorooctanesulfonamide (FOSA)	2.62	0.42	µg/kg wet	2.13		123	67-137			
Perfluorononanesulfonic acid (PFNS)	2.17	0.42	µg/kg wet	2.05		106	69-125			
Perfluoro-1-hexanesulfonamide (FHxSA)	2.10	0.42	µg/kg wet	2.13		98.5	50-150			
Perfluoro-1-butanefulfonamide (FBSA)	2.03	0.42	µg/kg wet	2.13		95.0	50-150			
Perfluorohexanesulfonic acid (PFHxS)	2.15	0.42	µg/kg wet	1.95		110	67-130			
Perfluoro-4-oxapentanoic acid (PFMPA)	1.74	0.42	µg/kg wet	2.13		81.6	50-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	1.76	0.42	µg/kg wet	2.13		82.5	50-150			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	2.45	0.42	µg/kg wet	2.03		121	64-140			
Perfluoropentanesulfonic acid (PFPeS)	2.35	0.42	µg/kg wet	2.01		117	73-123			
Perfluoroundecanoic acid (PFUnA)	2.76	0.42	µg/kg wet	2.13		129	64-136			
Nonafluoro-3,6-dioxahexanoic acid (NFDHA)	1.72	0.42	µg/kg wet	2.13		80.5	50-150			
Perfluoroheptanoic acid (PFHpA)	2.46	0.42	µg/kg wet	2.13		115	71-131			
Perfluorooctanoic acid (PFOA)	2.34	0.42	µg/kg wet	2.13		110	69-133			
Perfluorooctanesulfonic acid (PFOS)	2.24	0.42	µg/kg wet	1.97		114	68-136			
Perfluorononanoic acid (PFNA)	2.64	0.42	µg/kg wet	2.13		124	72-129			

Batch B314913 - SOP 454-PFAAS
Blank (B314913-BLK1)

Prepared: 08/12/22 Analyzed: 08/19/22

Perfluorobutanoic acid (PFBA)	ND	1.9	ng/L							
Perfluorobutanesulfonic acid (PFBS)	ND	1.9	ng/L							
Perfluoropentanoic acid (PFPeA)	ND	1.9	ng/L							
Perfluorohexanoic acid (PFHxA)	ND	1.9	ng/L							
11Cl-PF3OUdS (F53B Major)	ND	1.9	ng/L							
9Cl-PF3ONS (F53B Minor)	ND	1.9	ng/L							
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	ng/L							
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	ng/L							
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	ng/L							
Perfluorodecanoic acid (PFDA)	ND	1.9	ng/L							
Perfluorododecanoic acid (PFDoA)	ND	1.9	ng/L							
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	1.9	ng/L							
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.9	ng/L							
N-EtFOSAA	ND	1.9	ng/L							
N-MeFOSAA	ND	1.9	ng/L							
Perfluorotetradecanoic acid (PFTA)	ND	1.9	ng/L							
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	ng/L							
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	ng/L							
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	ng/L							
Perfluorooctanesulfonamide (FOSA)	ND	1.9	ng/L							
Perfluorononanesulfonic acid (PFNS)	ND	1.9	ng/L							
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	ng/L							
Perfluoro-1-butanefulfonamide (FBSA)	ND	1.9	ng/L							
Perfluorohexanesulfonic acid (PFHxS)	ND	1.9	ng/L							

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B314913 - SOP 454-PFAAS										
Blank (B314913-BLK1)										
Prepared: 08/12/22 Analyzed: 08/19/22										
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	ng/L							
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	ng/L							
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.9	ng/L							
Perfluoropentanesulfonic acid (PFPeS)	ND	1.9	ng/L							
Perfluoroundecanoic acid (PFUnA)	ND	1.9	ng/L							
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	ng/L							V-05
Perfluoroheptanoic acid (PFHpA)	ND	1.9	ng/L							
Perfluorooctanoic acid (PFOA)	ND	1.9	ng/L							
Perfluorooctanesulfonic acid (PFOS)	ND	1.9	ng/L							
Perfluorononanoic acid (PFNA)	ND	1.9	ng/L							
LCS (B314913-BS1)										
Prepared: 08/12/22 Analyzed: 08/19/22										
Perfluorobutanoic acid (PFBA)	8.10	1.8	ng/L	9.21		88.0	73-129			
Perfluorobutanesulfonic acid (PFBS)	7.31	1.8	ng/L	8.15		89.8	72-130			
Perfluoropentanoic acid (PFPeA)	8.43	1.8	ng/L	9.21		91.5	72-129			
Perfluorohexanoic acid (PFHxA)	8.43	1.8	ng/L	9.21		91.6	72-129			
11Cl-PF3OUdS (F53B Major)	5.82	1.8	ng/L	8.67		67.1	50-150			
9Cl-PF3ONS (F53B Minor)	6.76	1.8	ng/L	8.58		78.8	50-150			
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	8.12	1.8	ng/L	8.67		93.6	50-150			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	8.03	1.8	ng/L	9.21		87.2	50-150			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	8.48	1.8	ng/L	8.84		96.0	67-138			
Perfluorodecanoic acid (PFDA)	7.38	1.8	ng/L	9.21		80.2	71-129			
Perfluorododecanoic acid (PFDoA)	8.91	1.8	ng/L	9.21		96.8	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	5.31	1.8	ng/L	8.19		64.8	50-150			
Perfluoroheptanesulfonic acid (PFHpS)	8.79	1.8	ng/L	8.79		100	69-134			
N-EtFOSAA	9.95	1.8	ng/L	9.21		108	61-135			
N-MeFOSAA	9.69	1.8	ng/L	9.21		105	65-136			
Perfluorotetradecanoic acid (PFTA)	8.17	1.8	ng/L	9.21		88.7	71-132			
Perfluorotridecanoic acid (PFTrDA)	8.61	1.8	ng/L	9.21		93.5	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	7.50	1.8	ng/L	8.61		87.1	63-143			
Perfluorodecanesulfonic acid (PFDS)	7.36	1.8	ng/L	8.88		82.9	53-142			
Perfluorooctanesulfonamide (FOSA)	8.58	1.8	ng/L	9.21		93.2	67-137			
Perfluorononanesulfonic acid (PFNS)	7.86	1.8	ng/L	8.84		89.0	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	8.12	1.8	ng/L	9.21		88.2	50-150			
Perfluoro-1-butanefulfonamide (FBSA)	7.51	1.8	ng/L	9.21		81.6	50-150			
Perfluorohexanesulfonic acid (PFHxS)	7.96	1.8	ng/L	8.42		94.5	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	7.28	1.8	ng/L	9.21		79.1	50-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	7.37	1.8	ng/L	9.21		80.0	50-150			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	9.49	1.8	ng/L	8.75		108	64-140			
Perfluoropentanesulfonic acid (PFPeS)	8.13	1.8	ng/L	8.65		93.9	71-127			
Perfluoroundecanoic acid (PFUnA)	8.38	1.8	ng/L	9.21		91.1	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	4.32	1.8	ng/L	9.21		46.9	* 50-150			L-03, V-05
Perfluoroheptanoic acid (PFHpA)	8.75	1.8	ng/L	9.21		95.1	72-130			
Perfluorooctanoic acid (PFOA)	7.48	1.8	ng/L	9.21		81.3	71-133			
Perfluorooctanesulfonic acid (PFOS)	7.32	1.8	ng/L	8.52		85.9	65-140			
Perfluorononanoic acid (PFNA)	6.95	1.8	ng/L	9.21		75.4	69-130			

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL
Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B314913 - SOP 454-PFAAS										
LCS Dup (B314913-BSD1)										
					Prepared: 08/12/22 Analyzed: 08/19/22					
Perfluorobutanoic acid (PFBA)	8.28	1.9	ng/L	9.29		89.1	73-129	2.16	30	
Perfluorobutanesulfonic acid (PFBS)	7.15	1.9	ng/L	8.22		87.0	72-130	2.21	30	
Perfluoropentanoic acid (PFPeA)	8.46	1.9	ng/L	9.29		91.1	72-129	0.427	30	
Perfluorohexanoic acid (PFHxA)	8.32	1.9	ng/L	9.29		89.6	72-129	1.30	30	
11Cl-PF3OUdS (F53B Major)	6.77	1.9	ng/L	8.75		77.3	50-150	15.2	30	
9Cl-PF3ONS (F53B Minor)	6.93	1.9	ng/L	8.66		80.0	50-150	2.40	30	
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	7.59	1.9	ng/L	8.75		86.7	50-150	6.73	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	9.05	1.9	ng/L	9.29		97.4	50-150	12.0	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	8.89	1.9	ng/L	8.92		99.6	67-138	4.65	30	
Perfluorodecanoic acid (PFDA)	8.46	1.9	ng/L	9.29		91.1	71-129	13.7	30	
Perfluorododecanoic acid (PFDoA)	8.23	1.9	ng/L	9.29		88.6	72-134	7.87	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	5.27	1.9	ng/L	8.27		63.7	50-150	0.834	30	
Perfluoroheptanesulfonic acid (PFHpS)	8.30	1.9	ng/L	8.87		93.5	69-134	5.74	30	
N-EtFOSAA	11.6	1.9	ng/L	9.29		125	61-135	15.5	30	
N-MeFOSAA	9.52	1.9	ng/L	9.29		102	65-136	1.70	30	
Perfluorotetradecanoic acid (PFTA)	8.12	1.9	ng/L	9.29		87.4	71-132	0.610	30	
Perfluorotridecanoic acid (PFTrDA)	8.87	1.9	ng/L	9.29		95.5	65-144	3.02	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	7.33	1.9	ng/L	8.69		84.4	63-143	2.23	30	
Perfluorodecanesulfonic acid (PFDS)	7.48	1.9	ng/L	8.97		83.5	53-142	1.63	30	
Perfluorooctanesulfonamide (FOSA)	8.11	1.9	ng/L	9.29		87.2	67-137	5.70	30	
Perfluorononanesulfonic acid (PFNS)	8.27	1.9	ng/L	8.92		92.7	69-127	5.04	30	
Perfluoro-1-hexanesulfonamide (FHxSA)	7.79	1.9	ng/L	9.29		83.8	50-150	4.21	30	
Perfluoro-1-butanesulfonamide (FBSA)	7.30	1.9	ng/L	9.29		78.5	50-150	2.90	30	
Perfluorohexanesulfonic acid (PFHxS)	6.93	1.9	ng/L	8.50		81.5	68-131	13.8	30	
Perfluoro-4-oxapentanoic acid (PFMPA)	7.17	1.9	ng/L	9.29		77.1	50-150	1.55	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	7.27	1.9	ng/L	9.29		78.3	50-150	1.27	30	
6:2 Fluorotelomersulfonic acid (6:2FTS A)	7.56	1.9	ng/L	8.83		85.7	64-140	22.5	30	
Perfluoropentanesulfonic acid (PFPeS)	7.54	1.9	ng/L	8.73		86.4	71-127	7.44	30	
Perfluoroundecanoic acid (PFUnA)	7.79	1.9	ng/L	9.29		83.8	69-133	7.40	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	4.31	1.9	ng/L	9.29		46.4	* 50-150	0.326	30	L-03, V-05
Perfluoroheptanoic acid (PFHpA)	8.31	1.9	ng/L	9.29		89.5	72-130	5.16	30	
Perfluorooctanoic acid (PFOA)	8.22	1.9	ng/L	9.29		88.5	71-133	9.42	30	
Perfluorooctanesulfonic acid (PFOS)	7.65	1.9	ng/L	8.60		89.0	65-140	4.47	30	
Perfluorononanoic acid (PFNA)	7.82	1.9	ng/L	9.29		84.2	69-130	11.8	30	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
H-06	Sample was extracted past the recommended holding time.
L-03	Laboratory fortified blank/laboratory control sample recovery is outside of control limits. Reported value for this compound is likely to be biased on the low side.
PF-17	Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.
S-29	Extracted Internal Standard is outside of control limits.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-466 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
2206042 1-Fram Compost (22G1490-01)			Lab File ID: 22G1490-01.d		Analyzed: 08/22/22 02:24				
M8FOSA	209110.2	3.988583	269,638.00	3.980583	78	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	37252.59	2.44755	126,864.00	2.439333	29	50 - 150	0.0082	+/-0.50	*
M2PFTA	515992.4	4.321583	1,005,267.00	4.321567	51	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	62334.23	3.786883	100,826.00	3.794833	62	50 - 150	-0.0080	+/-0.50	
MPFBA	308596.2	1.066783	383,883.00	1.058467	80	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	79977.41	2.7984	108,969.00	2.790217	73	50 - 150	0.0082	+/-0.50	
M6PFDA	463520.4	3.795367	594,391.00	3.79535	78	50 - 150	0.0000	+/-0.50	
M3PFBS	89519.86	1.861817	102,930.00	1.853533	87	50 - 150	0.0083	+/-0.50	
M7PFUnA	584604.1	3.938067	762,555.00	3.93805	77	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	34216.31	3.437317	72,457.00	3.4373	47	50 - 150	0.0000	+/-0.50	*
M5PFPeA	296772	1.690017	359,506.00	1.681733	83	50 - 150	0.0083	+/-0.50	
M5PFHxA	555365.6	2.531283	692,970.00	2.523067	80	50 - 150	0.0082	+/-0.50	
M3PFHxS	80311.38	3.193833	95,426.00	3.193817	84	50 - 150	0.0000	+/-0.50	
M4PFHpA	665166.9	3.162717	794,471.00	3.154633	84	50 - 150	0.0081	+/-0.50	
M8PFOA	568977.8	3.445833	706,304.00	3.445833	81	50 - 150	0.0000	+/-0.50	
M8PFOS	70676.38	3.6362	91,706.00	3.644183	77	50 - 150	-0.0080	+/-0.50	
M9PFNA	431271.3	3.63725	560,883.00	3.637233	77	50 - 150	0.0000	+/-0.50	
MPFDoA	595541.9	4.080683	857,741.00	4.080667	69	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	105002.7	3.945533	204,574.00	3.945517	51	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	112910	3.865633	189,342.00	3.873783	60	50 - 150	-0.0082	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-466 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
2206042 2-Groton Compost (22G1490-02)			Lab File ID: 22G1490-02.d			Analyzed: 08/22/22 02:31			
M8FOSA	223078.2	3.9806	269,638.00	3.980583	83	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	193472	2.439333	126,864.00	2.439333	153	50 - 150	0.0000	+/-0.50	*
M2PF _{TA}	569261.8	4.321583	1,005,267.00	4.321567	57	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	261658.5	3.79485	100,826.00	3.794833	260	50 - 150	0.0000	+/-0.50	*
MPF _{BA}	295413	1.058467	383,883.00	1.058467	77	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	80729.13	2.782033	108,969.00	2.790217	74	50 - 150	-0.0082	+/-0.50	
M6PF _{DA}	519118.2	3.795383	594,391.00	3.79535	87	50 - 150	0.0000	+/-0.50	
M3PF _{BS}	111305.5	1.853533	102,930.00	1.853533	108	50 - 150	0.0000	+/-0.50	
M7PF _{UnA}	745733.9	3.938067	762,555.00	3.93805	98	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	179304.5	3.429333	72,457.00	3.4373	247	50 - 150	-0.0080	+/-0.50	*
M5PF _{PeA}	338451.7	1.68175	359,506.00	1.681733	94	50 - 150	0.0000	+/-0.50	
M5PF _{HxA}	685512.6	2.523067	692,970.00	2.523067	99	50 - 150	0.0000	+/-0.50	
M3PF _{HxS}	101456.2	3.193833	95,426.00	3.193817	106	50 - 150	0.0000	+/-0.50	
M4PF _{HpA}	809315.9	3.154633	794,471.00	3.154633	102	50 - 150	0.0000	+/-0.50	
M8PF _{OA}	714420.1	3.44585	706,304.00	3.445833	101	50 - 150	0.0000	+/-0.50	
M8PF _{OS}	82543.82	3.636217	91,706.00	3.644183	90	50 - 150	-0.0080	+/-0.50	
M9PF _{NA}	529085.6	3.63725	560,883.00	3.637233	94	50 - 150	0.0000	+/-0.50	
MPF _{DoA}	782075.6	4.072683	857,741.00	4.080667	91	50 - 150	-0.0080	+/-0.50	
d5-NEtFOSAA	208125.4	3.945533	204,574.00	3.945517	102	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	186724.2	3.86565	189,342.00	3.873783	99	50 - 150	-0.0081	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-466 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
2207159 3-Manch Compost (22G1490-03)			Lab File ID: 22G1490-03.d		Analyzed: 08/22/22 02:38				
M8FOSA	177753.2	3.9886	269,638.00	3.980583	66	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	63487.86	2.44755	126,864.00	2.439333	50	50 - 150	0.0082	+/-0.50	
M2PFTA	693342.4	4.321583	1,005,267.00	4.321567	69	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	110382.8	3.79485	100,826.00	3.794833	109	50 - 150	0.0000	+/-0.50	
MPFBA	259547	1.066783	383,883.00	1.058467	68	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	72304.63	2.7902	108,969.00	2.790217	66	50 - 150	0.0000	+/-0.50	
M6PFDA	419388.1	3.795383	594,391.00	3.79535	71	50 - 150	0.0000	+/-0.50	
M3PFBS	86913.45	1.853533	102,930.00	1.853533	84	50 - 150	0.0000	+/-0.50	
M7PFUnA	585475.7	3.938067	762,555.00	3.93805	77	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	78233.76	3.437317	72,457.00	3.4373	108	50 - 150	0.0000	+/-0.50	
M5PFPeA	269364.5	1.690017	359,506.00	1.681733	75	50 - 150	0.0083	+/-0.50	
M5PFHxA	517661.2	2.523067	692,970.00	2.523067	75	50 - 150	0.0000	+/-0.50	
M3PFHxS	79902.26	3.193833	95,426.00	3.193817	84	50 - 150	0.0000	+/-0.50	
M4PFHpA	616702.9	3.15465	794,471.00	3.154633	78	50 - 150	0.0000	+/-0.50	
M8PFOA	558122.7	3.44585	706,304.00	3.445833	79	50 - 150	0.0000	+/-0.50	
M8PFOS	64973.52	3.6362	91,706.00	3.644183	71	50 - 150	-0.0080	+/-0.50	
M9PFNA	404520.9	3.63725	560,883.00	3.637233	72	50 - 150	0.0000	+/-0.50	
MPFDoA	639160.4	4.080683	857,741.00	4.080667	75	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	131358.6	3.945533	204,574.00	3.945517	64	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	118707.4	3.8738	189,342.00	3.873783	63	50 - 150	0.0000	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-466 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
2207159 4-Farm Soil (22G1490-04)									
			Lab File ID: 22G1490-04.d			Analyzed: 08/22/22 02:45			
M8FOSA	205524.3	3.980583	269,638.00	3.980583	76	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	34690.56	2.44755	126,864.00	2.439333	27	50 - 150	0.0082	+/-0.50	*
M2PFTA	442959.9	4.321567	1,005,267.00	4.321567	44	50 - 150	0.0000	+/-0.50	*
M2-8:2FTS	52690.83	3.786867	100,826.00	3.794833	52	50 - 150	-0.0080	+/-0.50	
MPFBA	286791.1	1.066783	383,883.00	1.058467	75	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	84993.7	2.790217	108,969.00	2.790217	78	50 - 150	0.0000	+/-0.50	
M6PFDA	409888	3.795367	594,391.00	3.79535	69	50 - 150	0.0000	+/-0.50	
M3PFBS	80452.46	1.853533	102,930.00	1.853533	78	50 - 150	0.0000	+/-0.50	
M7PFUnA	456241.2	3.93805	762,555.00	3.93805	60	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	24097.71	3.437317	72,457.00	3.4373	33	50 - 150	0.0000	+/-0.50	*
M5PFPeA	277688.8	1.690017	359,506.00	1.681733	77	50 - 150	0.0083	+/-0.50	
M5PFHxA	507116.7	2.523083	692,970.00	2.523067	73	50 - 150	0.0000	+/-0.50	
M3PFHxS	73303.38	3.193833	95,426.00	3.193817	77	50 - 150	0.0000	+/-0.50	
M4PFHpA	605978.9	3.15465	794,471.00	3.154633	76	50 - 150	0.0000	+/-0.50	
M8PFOA	514531.3	3.445833	706,304.00	3.445833	73	50 - 150	0.0000	+/-0.50	
M8PFOS	60895.55	3.6362	91,706.00	3.644183	66	50 - 150	-0.0080	+/-0.50	
M9PFNA	375892.1	3.637233	560,883.00	3.637233	67	50 - 150	0.0000	+/-0.50	
MPFDoA	537780.7	4.080667	857,741.00	4.080667	63	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	91976.77	3.945517	204,574.00	3.945517	45	50 - 150	0.0000	+/-0.50	*
d3-NMeFOSAA	96194.32	3.865633	189,342.00	3.873783	51	50 - 150	-0.0082	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-466 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
2207159 5-Manch Soil (22G1490-05)									
			Lab File ID: 22G1490-05.d			Analyzed: 08/22/22 03:00			
M8FOSA	147366.5	3.988567	269,638.00	3.980567	55	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	47780.52	2.439333	126,864.00	2.439333	38	50 - 150	0.0000	+/-0.50	*
M2PFTA	520767.1	4.32155	1,005,267.00	4.321567	52	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	88432.52	3.78685	100,826.00	3.794833	88	50 - 150	-0.0080	+/-0.50	
MPFBA	235046.1	1.066783	383,883.00	1.058467	61	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	77351.34	2.7902	108,969.00	2.7902	71	50 - 150	0.0000	+/-0.50	
M6PFDA	362166	3.79535	594,391.00	3.79535	61	50 - 150	0.0000	+/-0.50	
M3PFBS	82678.99	1.853533	102,930.00	1.853533	80	50 - 150	0.0000	+/-0.50	
M7PFUnA	521953.5	3.938033	762,555.00	3.938033	68	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	50890.42	3.4373	72,457.00	3.4293	70	50 - 150	0.0080	+/-0.50	
M5PFPeA	258649.2	1.690017	359,506.00	1.681733	72	50 - 150	0.0083	+/-0.50	
M5PFHxA	497258.5	2.523067	692,970.00	2.523067	72	50 - 150	0.0000	+/-0.50	
M3PFHxS	62091.52	3.193817	95,426.00	3.193817	65	50 - 150	0.0000	+/-0.50	
M4PFHpA	577060.4	3.154633	794,471.00	3.154633	73	50 - 150	0.0000	+/-0.50	
M8PFOA	425944	3.445833	706,304.00	3.445833	60	50 - 150	0.0000	+/-0.50	
M8PFOS	56666.2	3.636183	91,706.00	3.636183	62	50 - 150	0.0000	+/-0.50	
M9PFNA	296976.2	3.637217	560,883.00	3.637217	53	50 - 150	0.0000	+/-0.50	
MPFDoA	524423.8	4.072667	857,741.00	4.072667	61	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	107694.9	3.945517	204,574.00	3.945517	53	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	112254.2	3.865617	189,342.00	3.865617	59	50 - 150	0.0000	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
2207159 7-Groton Juice (22G1490-06)									
			Lab File ID: 22G1490-06.d			Analyzed: 08/19/22 02:33			
M8FOSA	233085.1	3.988583	273,243.00	3.988567	85	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	215286.9	2.2083	149,241.00	2.472183	144	50 - 150	-0.2639	+/-0.50	
M2PF _{TA}	921635.8	4.321567	1,076,632.00	4.329683	86	50 - 150	-0.0081	+/-0.50	
M2-8:2FTS	174394.5	3.794833	108,340.00	3.8028	161	50 - 150	-0.0080	+/-0.50	*
MPFBA	281474.5	1.016917	407,554.00	1.066783	69	50 - 150	-0.0499	+/-0.50	
M3HFPO-DA	46032.32	2.7984	127,853.00	2.81475	36	50 - 150	-0.0164	+/-0.50	*
M6PFDA	525327.8	3.795367	557,999.00	3.803317	94	50 - 150	-0.0079	+/-0.50	
M3PFBS	87350.11	1.83695	116,402.00	1.878383	75	50 - 150	-0.0414	+/-0.50	
M7PFU _{nA}	694371.7	3.93805	785,434.00	3.946033	88	50 - 150	-0.0080	+/-0.50	
M2-6:2FTS	151445.2	3.437317	78,070.00	3.4373	194	50 - 150	0.0000	+/-0.50	*
M5PFPeA	303569.8	1.55765	397,667.00	1.706567	76	50 - 150	-0.1489	+/-0.50	
M5PFHxA	608430.3	2.24315	771,175.00	2.555917	79	50 - 150	-0.3128	+/-0.50	
M3PFHxS	96147.83	3.193817	103,977.00	3.201883	92	50 - 150	-0.0081	+/-0.50	
M4PFHpA	764576.8	3.162717	909,083.00	3.170783	84	50 - 150	-0.0081	+/-0.50	
M8PFOA	661733.8	3.445833	755,731.00	3.453817	88	50 - 150	-0.0080	+/-0.50	
M8PFOS	80767.67	3.6362	92,484.00	3.644167	87	50 - 150	-0.0080	+/-0.50	
M9PFNA	469418.3	3.637233	511,836.00	3.6452	92	50 - 150	-0.0080	+/-0.50	
MPFD _{oA}	767002.1	4.080667	937,669.00	4.08865	82	50 - 150	-0.0080	+/-0.50	
d5-NEtFOSAA	221921.9	3.945517	189,849.00	3.9535	117	50 - 150	-0.0080	+/-0.50	
d3-NMeFOSAA	225143.3	3.873783	209,569.00	3.873767	107	50 - 150	0.0000	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
2207159 8-Water (22G1490-07)									
			Lab File ID: 22G1490-07.d			Analyzed: 08/19/22 02:41			
M8FOSA	156390.5	3.988583	273,243.00	3.988567	57	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	89703.51	2.463967	149,241.00	2.472183	60	50 - 150	-0.0082	+/-0.50	
M2PF _T A	644870.1	4.321567	1,076,632.00	4.329683	60	50 - 150	-0.0081	+/-0.50	
M2-8:2FTS	117224.7	3.794833	108,340.00	3.8028	108	50 - 150	-0.0080	+/-0.50	
MPFBA	312310.3	1.066783	407,554.00	1.066783	77	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	117479.4	2.806583	127,853.00	2.81475	92	50 - 150	-0.0082	+/-0.50	
M6PFDA	482823	3.795367	557,999.00	3.803317	87	50 - 150	-0.0079	+/-0.50	
M3PFBS	99476.97	1.8701	116,402.00	1.878383	85	50 - 150	-0.0083	+/-0.50	
M7PFU _n A	611183.5	3.94605	785,434.00	3.946033	78	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	66806.3	3.4373	78,070.00	3.4373	86	50 - 150	0.0000	+/-0.50	
M5PFPeA	334316.1	1.698283	397,667.00	1.706567	84	50 - 150	-0.0083	+/-0.50	
M5PFH _x A	641628.8	2.5477	771,175.00	2.555917	83	50 - 150	-0.0082	+/-0.50	
M3PFH _x S	81480.22	3.2019	103,977.00	3.201883	78	50 - 150	0.0000	+/-0.50	
M4PFH _p A	736148.8	3.162717	909,083.00	3.170783	81	50 - 150	-0.0081	+/-0.50	
M8PFOA	617385.8	3.445833	755,731.00	3.453817	82	50 - 150	-0.0080	+/-0.50	
M8PFOS	70116.91	3.644183	92,484.00	3.644167	76	50 - 150	0.0000	+/-0.50	
M9PFNA	434292.3	3.645217	511,836.00	3.6452	85	50 - 150	0.0000	+/-0.50	
MPFD _o A	559931.4	4.080667	937,669.00	4.08865	60	50 - 150	-0.0080	+/-0.50	
d5-NEtFOSAA	152962.9	3.945517	189,849.00	3.9535	81	50 - 150	-0.0080	+/-0.50	
d3-NMeFOSAA	167995.7	3.873783	209,569.00	3.873767	80	50 - 150	0.0000	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
2206042 9-Manch Blank (22G1490-08)			Lab File ID: 22G1490-08.d			Analyzed: 08/19/22 02:48			
M8FOSA	104702.9	3.988583	273,243.00	3.988567	38	50 - 150	0.0000	+/-0.50	*
M2-4:2FTS	62760.59	2.45575	149,241.00	2.472183	42	50 - 150	-0.0164	+/-0.50	*
M2PF _T A	500526.2	4.321567	1,076,632.00	4.329683	46	50 - 150	-0.0081	+/-0.50	*
M2-8:2FTS	69715.17	3.794833	108,340.00	3.8028	64	50 - 150	-0.0080	+/-0.50	
MPFBA	316809.4	1.058467	407,554.00	1.066783	78	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	104753.1	2.806567	127,853.00	2.81475	82	50 - 150	-0.0082	+/-0.50	
M6PFDA	417237.5	3.79535	557,999.00	3.803317	75	50 - 150	-0.0080	+/-0.50	
M3PFBS	94430.31	1.8701	116,402.00	1.878383	81	50 - 150	-0.0083	+/-0.50	
M7PFU _n A	592682.2	3.93005	785,434.00	3.946033	75	50 - 150	-0.0160	+/-0.50	
M2-6:2FTS	59474.68	3.4373	78,070.00	3.4373	76	50 - 150	0.0000	+/-0.50	
M5PFPeA	322902.9	1.698283	397,667.00	1.706567	81	50 - 150	-0.0083	+/-0.50	
M5PFH _x A	588440.9	2.539483	771,175.00	2.555917	76	50 - 150	-0.0164	+/-0.50	
M3PFH _x S	82564.59	3.201883	103,977.00	3.201883	79	50 - 150	0.0000	+/-0.50	
M4PFH _p A	680621.7	3.1627	909,083.00	3.170783	75	50 - 150	-0.0081	+/-0.50	
M8PFOA	543603.2	3.445833	755,731.00	3.453817	72	50 - 150	-0.0080	+/-0.50	
M8PFOS	68299.46	3.6362	92,484.00	3.644167	74	50 - 150	-0.0080	+/-0.50	
M9PFNA	406313	3.637233	511,836.00	3.6452	79	50 - 150	-0.0080	+/-0.50	
MPFD _o A	543711.7	4.072667	937,669.00	4.08865	58	50 - 150	-0.0160	+/-0.50	
d5-NEtFOSAA	144577	3.937517	189,849.00	3.9535	76	50 - 150	-0.0160	+/-0.50	
d3-NMeFOSAA	136744.2	3.865617	209,569.00	3.873767	65	50 - 150	-0.0082	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-466 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B314297-BLK1)			Lab File ID: B314297-BLK1.d			Analyzed: 08/22/22 01:05			
M8FOSA	265467.2	3.980583	269,638.00	3.980583	98	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	138941.2	2.439333	126,864.00	2.439333	110	50 - 150	0.0000	+/-0.50	
M2PFTA	962268.2	4.321567	1,005,267.00	4.321567	96	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	150180.7	3.794833	100,826.00	3.794833	149	50 - 150	0.0000	+/-0.50	
MPFBA	420522.2	1.058467	383,883.00	1.058467	110	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	107485.7	2.790217	108,969.00	2.790217	99	50 - 150	0.0000	+/-0.50	
M6PFDA	622771	3.795367	594,391.00	3.79535	105	50 - 150	0.0000	+/-0.50	
M3PFBS	115163.7	1.853533	102,930.00	1.853533	112	50 - 150	0.0000	+/-0.50	
M7PFUnA	760591.8	3.94605	762,555.00	3.93805	100	50 - 150	0.0080	+/-0.50	
M2-6:2FTS	81132.32	3.437317	72,457.00	3.4373	112	50 - 150	0.0000	+/-0.50	
M5PFPeA	393682.6	1.690017	359,506.00	1.681733	110	50 - 150	0.0083	+/-0.50	
M5PFHxA	724681.8	2.523067	692,970.00	2.523067	105	50 - 150	0.0000	+/-0.50	
M3PFHxS	101388.8	3.193833	95,426.00	3.193817	106	50 - 150	0.0000	+/-0.50	
M4PFHpA	833453.2	3.162717	794,471.00	3.154633	105	50 - 150	0.0081	+/-0.50	
M8PFOA	748578.8	3.445833	706,304.00	3.445833	106	50 - 150	0.0000	+/-0.50	
M8PFOS	91949.78	3.644183	91,706.00	3.644183	100	50 - 150	0.0000	+/-0.50	
M9PFNA	546978.3	3.645217	560,883.00	3.637233	98	50 - 150	0.0080	+/-0.50	
MPFD _o A	804101.8	4.080667	857,741.00	4.080667	94	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	188522.2	3.945517	204,574.00	3.945517	92	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	205287.9	3.873783	189,342.00	3.873783	108	50 - 150	0.0000	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-466 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B314297-BS1)			Lab File ID: B314297-BS1.d			Analyzed: 08/22/22 00:58			
M8FOSA	278174.7	3.980583	269,638.00	3.980583	103	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	161837.6	2.439333	126,864.00	2.439333	128	50 - 150	0.0000	+/-0.50	
M2PF _{TA}	1020966	4.321567	1,005,267.00	4.321567	102	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	141930.1	3.794833	100,826.00	3.794833	141	50 - 150	0.0000	+/-0.50	
MPF _{BA}	438995.2	1.058467	383,883.00	1.058467	114	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	132197.9	2.7902	108,969.00	2.790217	121	50 - 150	0.0000	+/-0.50	
M6PF _{DA}	632244.9	3.79535	594,391.00	3.79535	106	50 - 150	0.0000	+/-0.50	
M3PF _B S	119752.4	1.853533	102,930.00	1.853533	116	50 - 150	0.0000	+/-0.50	
M7PF _U nA	784737.8	3.93805	762,555.00	3.93805	103	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	96237.19	3.4373	72,457.00	3.4373	133	50 - 150	0.0000	+/-0.50	
M5PF _{Pe} A	417059.6	1.681733	359,506.00	1.681733	116	50 - 150	0.0000	+/-0.50	
M5PF _{Hx} A	759967.1	2.523067	692,970.00	2.523067	110	50 - 150	0.0000	+/-0.50	
M3PF _{Hx} S	106876.6	3.193817	95,426.00	3.193817	112	50 - 150	0.0000	+/-0.50	
M4PF _{Hp} A	885919.8	3.154633	794,471.00	3.154633	112	50 - 150	0.0000	+/-0.50	
M8PF _{OA}	813422.3	3.445833	706,304.00	3.445833	115	50 - 150	0.0000	+/-0.50	
M8PF _{OS}	103761.5	3.636183	91,706.00	3.644183	113	50 - 150	-0.0080	+/-0.50	
M9PF _{NA}	555241.4	3.637217	560,883.00	3.637233	99	50 - 150	0.0000	+/-0.50	
MPF _{Do} A	848878.1	4.08065	857,741.00	4.080667	99	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	207149.2	3.945517	204,574.00	3.945517	101	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	220044.1	3.873767	189,342.00	3.873783	116	50 - 150	0.0000	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B314913-BLK1)			Lab File ID: B314913-BLK1.d			Analyzed: 08/19/22 00:31			
M8FOSA	162809.5	3.988567	273,243.00	3.9886	60	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	105228.3	2.4886	149,241.00	2.4886	71	50 - 150	0.0000	+/-0.50	
M2PF _{TA}	601253.1	4.3378	1,076,632.00	4.33785	56	50 - 150	-0.0001	+/-0.50	
M2-8:2FTS	80338.32	3.810767	108,340.00	3.8108	74	50 - 150	0.0000	+/-0.50	
MPFBA	317755	1.075083	407,554.00	1.075083	78	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	105626.6	2.831117	127,853.00	2.831117	83	50 - 150	0.0000	+/-0.50	
M6PFDA	432259.7	3.811283	557,999.00	3.811317	77	50 - 150	0.0000	+/-0.50	
M3PFBS	93012.21	1.894967	116,402.00	1.894967	80	50 - 150	0.0000	+/-0.50	
M7PFU _{nA}	517768.2	3.954033	785,434.00	3.954067	66	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	63727.91	3.445283	78,070.00	3.4453	82	50 - 150	0.0000	+/-0.50	
M5PFPeA	312971.3	1.714833	397,667.00	1.7231	79	50 - 150	-0.0083	+/-0.50	
M5PFHxA	594902	2.572333	771,175.00	2.572333	77	50 - 150	0.0000	+/-0.50	
M3PFHxS	77345.77	3.218333	103,977.00	3.21025	74	50 - 150	0.0081	+/-0.50	
M4PFHpA	671046.9	3.17885	909,083.00	3.178867	74	50 - 150	0.0000	+/-0.50	
M8PFOA	558108	3.461933	755,731.00	3.461967	74	50 - 150	0.0000	+/-0.50	
M8PFOS	66136.87	3.65215	92,484.00	3.652183	72	50 - 150	0.0000	+/-0.50	
M9PFNA	396150.9	3.653183	511,836.00	3.653217	77	50 - 150	0.0000	+/-0.50	
MPFDoA	540306.8	4.096633	937,669.00	4.096684	58	50 - 150	-0.0001	+/-0.50	
d5-NEtFOSAA	121383.5	3.9615	189,849.00	3.961533	64	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	131749.7	3.88175	209,569.00	3.881783	63	50 - 150	0.0000	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B314913-BS1)			Lab File ID: B314913-BS1.d			Analyzed: 08/19/22 00:17			
M8FOSA	155376.5	3.988567	273,243.00	3.9886	57	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	90416.95	2.488617	149,241.00	2.4886	61	50 - 150	0.0000	+/-0.50	
M2PFTA	589439.3	4.3378	1,076,632.00	4.33785	55	50 - 150	-0.0001	+/-0.50	
M2-8:2FTS	70225.99	3.810767	108,340.00	3.8108	65	50 - 150	0.0000	+/-0.50	
MPFBA	297201.6	1.075083	407,554.00	1.075083	73	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	79897.62	2.831117	127,853.00	2.831117	62	50 - 150	0.0000	+/-0.50	
M6PFDA	438068.4	3.811283	557,999.00	3.811317	79	50 - 150	0.0000	+/-0.50	
M3PFBS	89635.83	1.894967	116,402.00	1.894967	77	50 - 150	0.0000	+/-0.50	
M7PFUnA	498110.7	3.954033	785,434.00	3.954067	63	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	47088.86	3.445283	78,070.00	3.4453	60	50 - 150	0.0000	+/-0.50	
M5PFPeA	291913.1	1.7231	397,667.00	1.7231	73	50 - 150	0.0000	+/-0.50	
M5PFHxA	559084.4	2.57235	771,175.00	2.572333	72	50 - 150	0.0000	+/-0.50	
M3PFHxS	73961.86	3.218333	103,977.00	3.21025	71	50 - 150	0.0081	+/-0.50	
M4PFHpA	622773.1	3.178867	909,083.00	3.178867	69	50 - 150	0.0000	+/-0.50	
M8PFOA	563732.1	3.46195	755,731.00	3.461967	75	50 - 150	0.0000	+/-0.50	
M8PFOS	68812.83	3.652167	92,484.00	3.652183	74	50 - 150	0.0000	+/-0.50	
M9PFNA	422139.8	3.6532	511,836.00	3.653217	82	50 - 150	0.0000	+/-0.50	
MPFDoA	508032.8	4.09665	937,669.00	4.096684	54	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	120069.6	3.9615	189,849.00	3.961533	63	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	134949.2	3.88175	209,569.00	3.881783	64	50 - 150	0.0000	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY
SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS Dup (B314913-BSD1)			Lab File ID: B314913-BSD1.d			Analyzed: 08/19/22 00:24			
M8FOSA	168354.6	3.9886	273,243.00	3.9886	62	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	103244.3	2.488617	149,241.00	2.4886	69	50 - 150	0.0000	+/-0.50	
M2PF _{TA}	656802.6	4.337833	1,076,632.00	4.33785	61	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	74871.97	3.810783	108,340.00	3.8108	69	50 - 150	0.0000	+/-0.50	
MPF _{BA}	321515.3	1.0751	407,554.00	1.075083	79	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	77279.39	2.831133	127,853.00	2.831117	60	50 - 150	0.0000	+/-0.50	
M6PF _{DA}	437203.8	3.811317	557,999.00	3.811317	78	50 - 150	0.0000	+/-0.50	
M3PF _B S	96155.3	1.894967	116,402.00	1.894967	83	50 - 150	0.0000	+/-0.50	
M7PF _U nA	555200.8	3.95405	785,434.00	3.954067	71	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	56147.79	3.4453	78,070.00	3.4453	72	50 - 150	0.0000	+/-0.50	
M5PF _{Pe} A	317012.7	1.723117	397,667.00	1.7231	80	50 - 150	0.0000	+/-0.50	
M5PF _{Hx} A	601797.7	2.57235	771,175.00	2.572333	78	50 - 150	0.0000	+/-0.50	
M3PF _{Hx} S	85562.06	3.21835	103,977.00	3.21025	82	50 - 150	0.0081	+/-0.50	
M4PF _{Hp} A	700234.9	3.178867	909,083.00	3.178867	77	50 - 150	0.0000	+/-0.50	
M8PF _{OA}	595325.7	3.461967	755,731.00	3.461967	79	50 - 150	0.0000	+/-0.50	
M8PF _{OS}	71159.31	3.652183	92,484.00	3.652183	77	50 - 150	0.0000	+/-0.50	
M9PF _{NA}	412223.2	3.653217	511,836.00	3.653217	81	50 - 150	0.0000	+/-0.50	
MPF _{Do} A	575298.1	4.096667	937,669.00	4.096684	61	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	113066.5	3.961517	189,849.00	3.961533	60	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	141252.3	3.881783	209,569.00	3.881783	67	50 - 150	0.0000	+/-0.50	

CERTIFICATIONS
Certified Analyses included in this Report

Analyte	Certifications
<i>SOP-454 PFAS in Water</i>	
Perfluorobutanoic acid (PFBA)	NH-P
Perfluorobutanesulfonic acid (PFBS)	NH-P
Perfluoropentanoic acid (PFPeA)	NH-P
Perfluorohexanoic acid (PFHxA)	NH-P
11Cl-PF3OUdS (F53B Major)	NH-P
9Cl-PF3ONS (F53B Minor)	NH-P
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NH-P
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P
Perfluorodecanoic acid (PFDA)	NH-P
Perfluorododecanoic acid (PFDoA)	NH-P
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	NH-P
Perfluoroheptanesulfonic acid (PFHpS)	NH-P
N-EtFOSAA	NH-P
N-MeFOSAA	NH-P
Perfluorotetradecanoic acid (PFTA)	NH-P
Perfluorotridecanoic acid (PFTrDA)	NH-P
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P
Perfluorodecanesulfonic acid (PFDS)	NH-P
Perfluorooctanesulfonamide (FOSA)	NH-P
Perfluorononanesulfonic acid (PFNS)	NH-P
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P
Perfluoro-1-butanesulfonamide (FBSA)	NH-P
Perfluorohexanesulfonic acid (PFHxS)	NH-P
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P
Perfluoropetanesulfonic acid (PFPeS)	NH-P
Perfluoroundecanoic acid (PFUnA)	NH-P
Nonafluoro-3,6-dioxahexanoic acid (NFDHA)	NH-P
Perfluoroheptanoic acid (PFHpA)	NH-P
Perfluorooctanoic acid (PFOA)	NH-P
Perfluorooctanesulfonic acid (PFOS)	NH-P
Perfluorononanoic acid (PFNA)	NH-P
<i>SOP-466 PFAS in Soil</i>	
Perfluorobutanoic acid (PFBA)	NH-P
Perfluorobutanesulfonic acid (PFBS)	NH-P
Perfluoropentanoic acid (PFPeA)	NH-P
Perfluorohexanoic acid (PFHxA)	NH-P
11Cl-PF3OUdS (F53B Major)	NH-P
9Cl-PF3ONS (F53B Minor)	NH-P
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NH-P
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P
Perfluorodecanoic acid (PFDA)	NH-P
Perfluorododecanoic acid (PFDoA)	NH-P

CERTIFICATIONS
Certified Analyses included in this Report

Analyte	Certifications
SOP-466 PFAS in Soil	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	NH-P
Perfluoroheptanesulfonic acid (PFHpS)	NH-P
N-EtFOSAA	NH-P
N-MeFOSAA	NH-P
Perfluorotetradecanoic acid (PFTA)	NH-P
Perfluorotridecanoic acid (PFTrDA)	NH-P
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P
Perfluorodecanesulfonic acid (PFDS)	NH-P
Perfluorooctanesulfonamide (FOSA)	NH-P
Perfluorononanesulfonic acid (PFNS)	NH-P
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P
Perfluoro-1-butanefulfonamide (FBSA)	NH-P
Perfluorohexanesulfonic acid (PFHxS)	NH-P
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P
Perfluoropetanesulfonic acid (PFPeS)	NH-P
Perfluoroundecanoic acid (PFUnA)	NH-P
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P
Perfluoroheptanoic acid (PFHpA)	NH-P
Perfluorooctanoic acid (PFOA)	NH-P
Perfluorooctanesulfonic acid (PFOS)	NH-P
Perfluorononanoic acid (PFNA)	NH-P

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO 17025:2017	100033	03/1/2024
MA	Massachusetts DEP	M-MA100	06/30/2023
CT	Connecticut Department of Public Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2023
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2023
RI	Rhode Island Department of Health	LAO00373	12/30/2022
NC	North Carolina Div. of Water Quality	652	12/31/2022
NJ	New Jersey DEP	MA007 NELAP	06/30/2023
FL	Florida Department of Health	E871027 NELAP	06/30/2023
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2023
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2023
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2022
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
NC-DW	North Carolina Department of Health and Human Services	25703	07/31/2023
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2023
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022