Vermont Department of Environmental Conservation

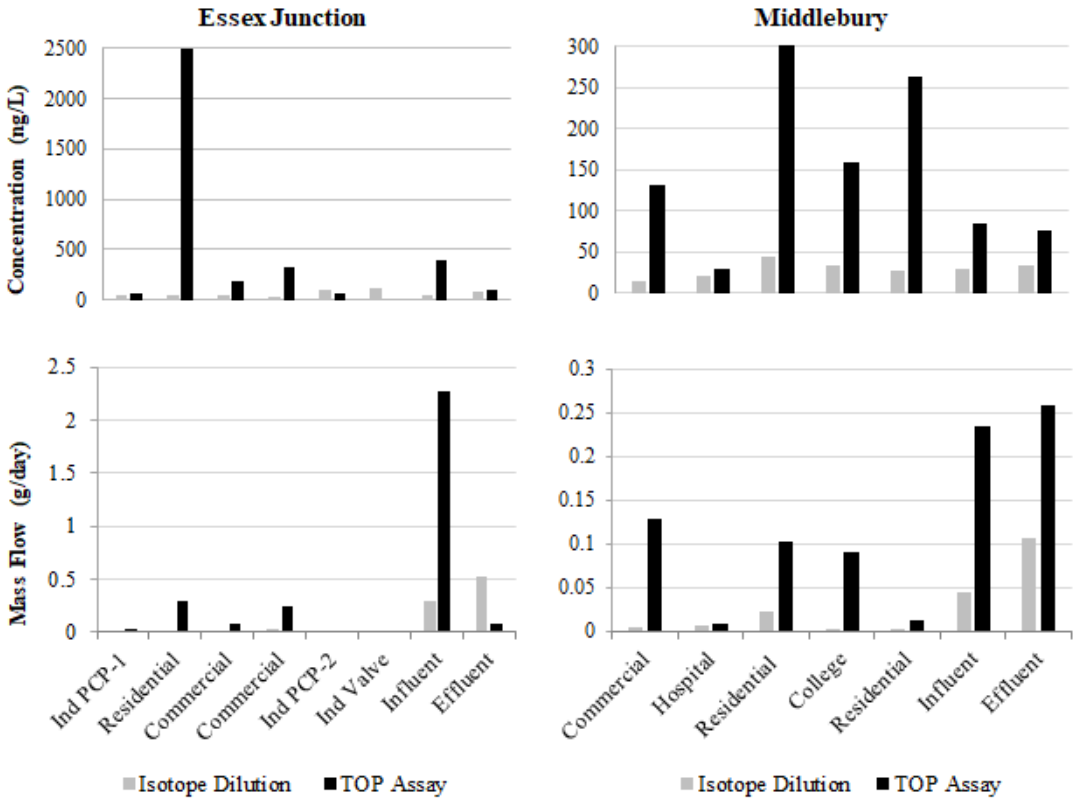
EXECUTIVE SUMMARY

Poly- and Perfluoroalkyl Substances Inputs to Wastewater Treatment Facilities

Previous research has indicated that per- and polyfluoroalkyl substances (PFAS) are present in sewage, are not removed by wastewater treatment facilities (WWTF), and are therefore conveyed to the environment. Less attention has been given to the sources of PFAS originating from residential, commercial, and industrial sectors within municipal sewer systems. Identifying sources of PFAS to WWTFs is needed to develop mitigation strategies, however, obtaining PFAS samples within sewers is challenging due to the identification of representative sample locations, the variety of potential sources, and costs associated with PFAS testing.

In collaboration with two Vermont municipalities, Middlebury and Essex Junction, and the University of New Hampshire, this study builds upon previous investigations of PFAS at Vermont WWTFs and aims to identify and better understand the relative contribution of PFAS from residential, commercial, and industrial discharges to WWTFs. Our findings include:

- The mass of PFAS measured in wastewater originating from residential communities was as great or greater than that from commercial or industrial discharges in these municipalities.
- Industrial facility discharges tested accounted for < 1% of the total mass of PFAS entering the WWTF.
- Using a total oxidizable precursor (TOP) analysis allows for the detection and measurement of additional PFAS that would otherwise be unaccounted for when testing wastewater samples for PFAS.
- The methodology used in this study may be a model for similar municipalities seeking to identify sources of PFAS in wastewater generated by their communities.



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REPORT

March 26, 2022

Poly- and Perfluoroalkyl Substances Inputs to Wastewater Treatment Facilities

Summary Report

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EXECUTIVE SUMMARY

Weston & Sampson Engineers, Inc. (Weston & Sampson), on behalf of the Vermont Department of Environmental Conservation (VTDEC) through contract #41634, has completed sampling and analysis of wastewater treatment facility (WWTF) influent, effluent, and several manhole/pump station locations within the Essex Junction and Middlebury WWTF collection systems for the presence of per and poly fluoroalkyl substances (PFAS).

In 2018, the VTDEC completed preliminary work to assess PFAS within landfill leachate and at WWTFs that process that leachate. PFAS were detected in all landfill leachate, WWTF influent, effluent, and sludges/biosolids sampled.

In 2019, follow-on work assessed the contribution of landfill leachate to PFAS at WWTFs and the potential for PFAS contributions to the environment from WWTFs. PFAS were detected in all landfill leachate and WWTF influent, effluent, and sludge sampled. Relative WWTF influent and effluent PFAS concentrations were greater at facilities handling landfill leachates. The type of PFAS observed included the 5 PFAS regulated in Vermont water supplies and numerous currently unregulated PFAS, reported to be replacement compounds for historically utilized PFAS such as perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). In many cases, the concentrations of non-Regulated PFAS exceeded the 5 Regulated PFAS concentrations.

For the current contract, Weston & Sampson collected 53 PFAS samples from sewersheds/input areas selected in conjunction with the VTDEC and representative from Essex Jct. and Middlebury WWTFs. The sample locations were selected to isolate wastewater flows from residential, commercial, or industrial sewersheds/input areas.

All of the WWTF sewersheds/input types sampled contain concentrations of multiple individual PFAS identifiable by the “standard”, proprietary, laboratory analytical method. The 8 most frequently reported PFAS are the same at both WWTFs and include the 5 Regulated PFAS. Additionally, the concentrations and relative ratios of the 8 PFAS are similar in residential, commercial, and mixed industrial sewersheds. While the individual industry discharges sampled do show some unique characteristics and concentrations of PFAS, they do not appear to significantly impact their respective WWTFs influent chemistry.

Total Oxidizable Precursor (TOP) assay data revealed that precursor compounds (PFAS not quantified by the “standard” analytical method) can be present at concentrations 2 to 70 times those identified in the “standard” analytical results. This indicates that precursors may be the predominant source of PFAS in wastewater. The data also indicate that only a portion of the precursor mass is oxidized/degraded into its fully perfluorinated species by the wastewater treatment processes prior to effluent discharge.

The concentrations of quantifiable and precursor PFAS in the individual sewershed/input types cannot be directly related to PFAS mass loading into a WWTF or receiving stream. Flow data are required to determine the relative mass contributed by each input. Determination of these mass loading rates will be important to inform decision making regarding the need for, and methods of, PFAS reduction and/or treatment measures throughout specific areas of WWTF collection systems.

1.0 PROJECT BACKGROUND

Weston & Sampson Engineers, Inc. (Weston & Sampson), on behalf of the Vermont Department of Environmental Conservation (VTDEC) through contract #41634, has completed sampling and analysis of wastewater treatment facility (WWTF) influent, effluent, and several manhole/pump station locations within the Essex Jct. and Middlebury WWTF collection systems for the presence of per and poly fluoroalkyl substances (PFAS). This work is being performed to establish a better understanding of the potential PFAS inputs to WWTF collection systems and the receiving streams.

In 2018, the VTDEC completed preliminary work to assess the presence and concentrations of PFAS within landfill leachate and at WWTFs that process that leachate. The results of that work indicated that PFAS were detected in all landfill leachate, WWTF influent, effluent, and sludges/biosolids sampled.

In 2019, follow-on work was performed regarding the contribution of landfill leachate to influent and effluent concentrations of PFAS at WWTFs and to assess the potential for PFAS contributions to the environment from WWTFs. The data collected during this phase of study indicate that PFAS are present in all landfill leachate and WWTF influent, effluent, and sludge tested. Relative WWTF influent and effluent PFAS concentrations are greater at facilities handling landfill leachates. The type of PFAS observed include the 5 PFAS regulated in Vermont water supplies and numerous currently unregulated PFAS that are reported to be replacement compounds for historically utilized PFAS such as perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). In many cases, the concentrations of non-Regulated PFAS exceeded the 5 Regulated PFAS concentrations.

For the current contract, Weston & Sampson collected 53 PFAS samples from sewersheds/input areas selected in conjunction with the VTDEC and representative from Essex Jct. and Middlebury WWTFs. The sample locations were selected to isolate wastewater flows from residential, commercial, or industrial sewersheds/input areas. Sampling was performed in accordance with a VTDEC approved Site Specific Quality Assurance Project Plan (SSQAPP) which detailed sample collection and analyses methods for the project.

The samples were analyzed by Alpha Analytical using their proprietary modified EPA 537.1 method, incorporating isotope dilution. This analytical method is based upon the Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, Table B-15. This method quantifies 24 individual PFAS. Prior to initiating the sampling efforts, Weston & Sampson developed an SSQAPP detailing sampling and analytical methods, data quality objectives, and quality assurance/quality control evaluation methods. The SSQAPP was reviewed and approved by the VTDEC.

The sampling effort was completed in August 2021. Samples were generally collected weekly from the collection system locations and WWTF influent and effluent. Several individual industrial plant discharges in Essex Jct. were sampled, but not all of these samples were collected concurrently with the WWTF samples due to scheduling and access-related requirements.

2.0 FIELD ACTIVITIES

2.1 Sampling Locations and Frequency

The collection area (sewershed) location, collection area type, structure type, sampling method, and approximate flow volumes for each sample area in Essex Jct. and Middlebury are summarized in the tables below. The locations of the sampling structures and approximate collection area are shown on **Figure 1** for Essex Jct. and **Figure 2** for Middlebury:

Essex Jct.

Location	Structure Type	Sampling Method	Collection Area Type	Pipe Flow Volume
Effluent - Composite	WWTF	HDPE Jar	WWTF	--
Influent - Composite	WWTF	HDPE Jar	WWTF	--
Cascade Street	Pump Station	Bailer	Residential	1/4
Pearl Street	Manhole	Dipper	Commercial	1/4
Suzie Wilson Road	Manhole	Bailer	Commercial	1/4
Industrial Plant 1 Personal Care Products (PCP)	Pump Station	Dipper	Industrial Plant	1/4
Industrial Plant 2 - PCP	Pump Station	Bailer	Industrial Plant	1/4
Industrial Plant 3 - Valves	Pump Station	Bailer	Industrial Plant	1/3

A single sample of carpet cleaning residue was collected by the Essex Jct. operator. The carpet cleaning company discharges approximately 40 gallons of residual cleaning liquids several times a month directly into the WWTF. A second carpet cleaning residual sample was collected; however, the holding time was exceeded and the sample was not analyzed.

Middlebury

Location	Structure Type	Sampling Method	Collection Area Type	Pipe Flow Volume
Effluent - Composite	WWTP	HDPE Jar	WWTP	--
Influent - Composite	WWTP	HDPE Jar	WWTP	--
Porter Hospital	Pump Station	Bailer	Hospital Only	1/4
PS #3 - Hospital and College	Pump Station	Bailer	Hospital & College	1/4
PS #9	Pump Station	Bailer	Residential	1/4
PS #7 - Rogers Road	Pump Station	Bailer	Commercial	1/4
North Sector (Exchange Street)	Manhole	Bailer	Industrial	1/4

The frequency of sampling at each municipality is shown in the table below:

Location	Number	Sample Frequency	Total # of Samples
Essex Jct – WWTF Influent, WWTF Effluent, 3 sewer system collection locations, 3 individual industrial plants	8	3 each	24
Essex Jct – Carpet Cleaner Discharge	1	1	1
Middlebury - WWTF Influent, WWTF Effluent, 5 sewer system collection locations	7	4 each	28

2.2 Sampling Methods

The sampling methods specified in the SSQAPP were utilized at all locations. A summary of the sampling methods used at each location are included in the tables above. Weston & Sampson coordinated with the VTDEC and facility operators to select sewershed areas and sample structures within the WWTF collection system based upon function and accessibility. Once a location was selected, all subsequent samples were collected from the same location and using the same methods.

Bailer Sample Method

A 1.5" HDPE bailer was utilized to collect samples where sufficient liquid depth was present. The bailer is lowered by nylon twine into the subsurface space until either the bailer hits the bottom of the structure or is full of sample liquid. Upon retrieval the liquid was slowly poured into the HDPE sample containers over the structure opening. Each sample was obtained using a new bailer, which was disposed of after use.

Dipper Sample Method

The dipper method was utilized when there was insufficient liquid depth for bailer use. A 250-mL HDPE sample collection container was attached to the end of a 6 foot long, plastic "dipper" pole which was lowered via nylon twine into the flowing liquid within the invert until full. Upon retrieval the liquid was slowly poured into the HDPE sample containers over the structure opening. A single HDPE container was used per sampling location. The dipper containers were disposed of after use. The dipper pole was decontaminated with Alconox soap and PFAS-free water solution and then rinsed with PFAS-free water after each use.

Influent/Effluent Sample Method

The WWTPs influent and effluent liquid samples were collected by the plant operator. Samples were collected in a HDPE container (provided by Weston & Sampson) at four 1- to 1.5-hour intervals and poured into a 1-gallon HDPE, lidded, bucket (provided by Weston & Sampson). Following the capture of four rounds of samples, Weston & Sampson personnel poured the liquid into 250-mL HDPE sample

containers for laboratory analysis. New HDPE sample collection containers and composite buckets were provided for each day of sample capture. The used containers were disposed of after each day's use.

2.3 Analytical Methods

Sample analyses were provided by Alpha Analytical Laboratory (Alpha) of Mansfield Massachusetts. There are currently no EPA-certified methods for analysis of PFAS to single part per trillion (ppt) levels in media other than drinking water. Therefore, the analytical methods utilized were developed by, and are specific to, Alpha. The proprietary methods used by Alpha were presented in the SSQAPP and approved by the VTDEC.

The analytical method for "standard" analysis of PFAS in wastewater is based upon the EPA 537 Version 1.1 and the DoD QSM 5.3, Table B-15 solid phase extraction and liquid chromatograph/tandem mass spectrographic methods and uses isotope dilution for QA/QC adjustments to compensate for matrix interferences and related recovery percentages. The PFAS quantified by Alpha's wastewater method are shown in the table below.

"Standard" Analysis PFAS Quantified

Compound Name	*Compound Acronym*
Perfluorobutanoic acid	PFBA
Perfluoropentanoic acid	PFPeA
Perfluorohexanoic acid	PFHxA
Perfluoroheptanoic acid	PFHpA
Perfluorooctanoic acid	PFOA
Perfluorononanoic acid	PFNA
Perfluorodecanoic acid	PFDA
Perfluoroundecanoic acid	PFUnA
Perfluorododecanoic acid	PFDoA
Perfluorotridecanoic acid	PFTrDA
Perfluorotetradecanoic acid	PFTA
Perfluorobutanesulfonic acid	PFBS
Perfluoropentanesulfonic acid	PFPeS
Perfluorohexanesulfonic acid	PFHxS
Perfluoroheptanesulfonic acid	PFHpS
Perfluorooctanesulfonic acid	PFOS
Perfluorononanesulfonic acid	PFNS
Perfluorodecanesulfonic acid	PFDS
Perfluorooctanesulfonamide	FOSA
1H,1H,2H,2H-perfluorohexane sulfonate (4:2)	4:2FTS
1H,1H,2H,2H-perfluorooctane sulfonate (6:2)	6:2FTS
1H,1H,2H,2H-perfluorodecane sulfonate (8:2)	8:2FTS
N-methyl perfluorooctane- sulfonamidoacetic acid	NMeFOSAA
N-ethyl perfluorooctane- sulfonamidoacetic acid	NEtFOSAA

Total Oxidizable Precursor (TOP) assays were performed once on each of the sewershed area, WWTF influent, and WWTF effluent samples. This assay is designed to oxidize polyfluoroalkyl substances

(precursors) into their respective perfluorinated terminal end-products. This assay is performed by first analyzing a sample aliquot by the "standard" PFAS in wastewater method above. A second aliquot of sample is then subjected to strong oxidizers and then analyzed by the "standard" PFAS in wastewater method. The difference in perfluorinated PFAS concentrations between the pre and post oxidizer analyses gives an indication of precursor PFAS presence, because only perfluorinated compounds remain in the post oxidizer sample. The following PFAS were reported for the TOP assay samples:

Compound Name	*Compound Acronym*
Perfluorobutanoic acid	PFBA
Perfluoropentanoic acid	PFPeA
Perfluorohexanoic acid	PFHxA
Perfluoroheptanoic acid	PFHpA
Perfluorooctanoic acid	PFOA
Perfluorononanoic acid	PFNA
Perfluorodecanoic acid	PFDA
Perfluoroundecanoic acid	PFUnA
Perfluorododecanoic acid	PFDoA
Perfluorotridecanoic acid	PFTrDA
Perfluorotetradecanoic acid	PFTA
Perfluorobutanesulfonic acid	PFBS
Perfluoropentanesulfonic acid	PFPeS
Perfluorohexanesulfonic acid	PFHxS
Perfluoroheptanesulfonic acid	PFHpS
Perfluorooctanesulfonic acid	PFOS
Perfluorononanesulfonic acid	PFNS
Perfluorodecanesulfonic acid	PFDS

Due to the oxidative process, the majority of precursors transform into perfluorinated carboxyl acids (PFCAs). This is particularly true for telomer derived precursors. Importantly, the chain length of the PFAS identified in the post TOP sample does not necessarily relate to the "parent" precursor carbon chain length. Therefore, a direct correlation of TOP PFAS concentrations to precursor types is not possible.

Analysis of complex mixtures such as wastewater commonly results in elevated detection limits and surrogate recoveries outside the limits of the lab SOPs. These issues are a result of interferences caused by the sample matrix. The SOPs utilized by Alpha are designed to reduce the impacts of matrix interference, but often quality assurance/quality control (QA/QC) limits could not be met. Detailed review of the reported QA/QC related issues has been performed and is discussed in Section 4.

2.4 Standard Operating Procedures

The following Weston & Sampson SOP was used during the described field activities and was submitted to the VTDEC in the SSQAPP.

SOP-25	Leachate, Influent, Effluent Sampling

3.0 RESULTS

The complete laboratory packages for all samples are included in Appendix A. The data packages are organized by municipality and date.

3.1 Essex Jct.

Weston & Sampson collected samples from 6 individual sewershed locations within the Essex Jct. WWTF sewage collection system and from the influent and effluent streams of the WWTF on 3 occasions. A single carpet cleaning residue sample was collected by the WWTF operator. A summary of "standard" and TOP PFAS analyses results are presented on Table 1. TOP related results are also compiled on Table 2. Review of the data tables indicates the following:

1) PFAS are present in quantifiable concentrations at all locations during each sampling event.
2) Generally, perfluoroalkylcarboxylates (PFCAs) species are more prevalent than perfluoroalkylsulfonates (PFSAs) species in the sample results.
3) Individual PFAS concentrations in the WWTF Effluent are consistently higher than in the WWTF Influent.
4) Generally, individual PFAS concentrations observed within the sewersheds and in the WWTF influent and effluent are less than 10 nanograms per liter (ng/L) or parts per trillion (ppt).
5) Higher individual PFAS concentrations, between 20 and 90 ppt, are seen in the Industrial 1 – PCP, Industrial 2 – PCP and Industrial 3 – Valves samples. These samples were collected from manholes/pump stations receiving wastewater from each individual plant.
6) The carpet cleaning residual has the highest number of quantifiable individual PFAS and the highest concentrations of PFAS in this sample set.
7) Concentrations of individual PFAS seen at each individual sampling location show little fluctuation between sampling rounds.

The following eight (8) PFAS were quantified above the reporting limits in the majority of the samples collected:

a. Perfluorobutanoic acid (PFBA)
b. Perfluoropentanoic acid (PFPeA)
c. Perfluorohexanoic acid (PFHxA)
d. Perfluoroheptanoic acid (PFHpA)
e. Perfluorooctanoic acid (PFOA)
f. Perfluorobutanesulfonic acid (PFBS)
g. Perfluorohexanesulfonic acid (PFHxS)
h. Perfluorooctanesulfonic acid (PFOS)

Other PFAS were observed at several locations, though their concentrations were typically below the reporting level and are estimated concentrations. The exception is the single carpet cleaning residue sample, which contained concentrations of 20 individual PFAS above the reporting levels.

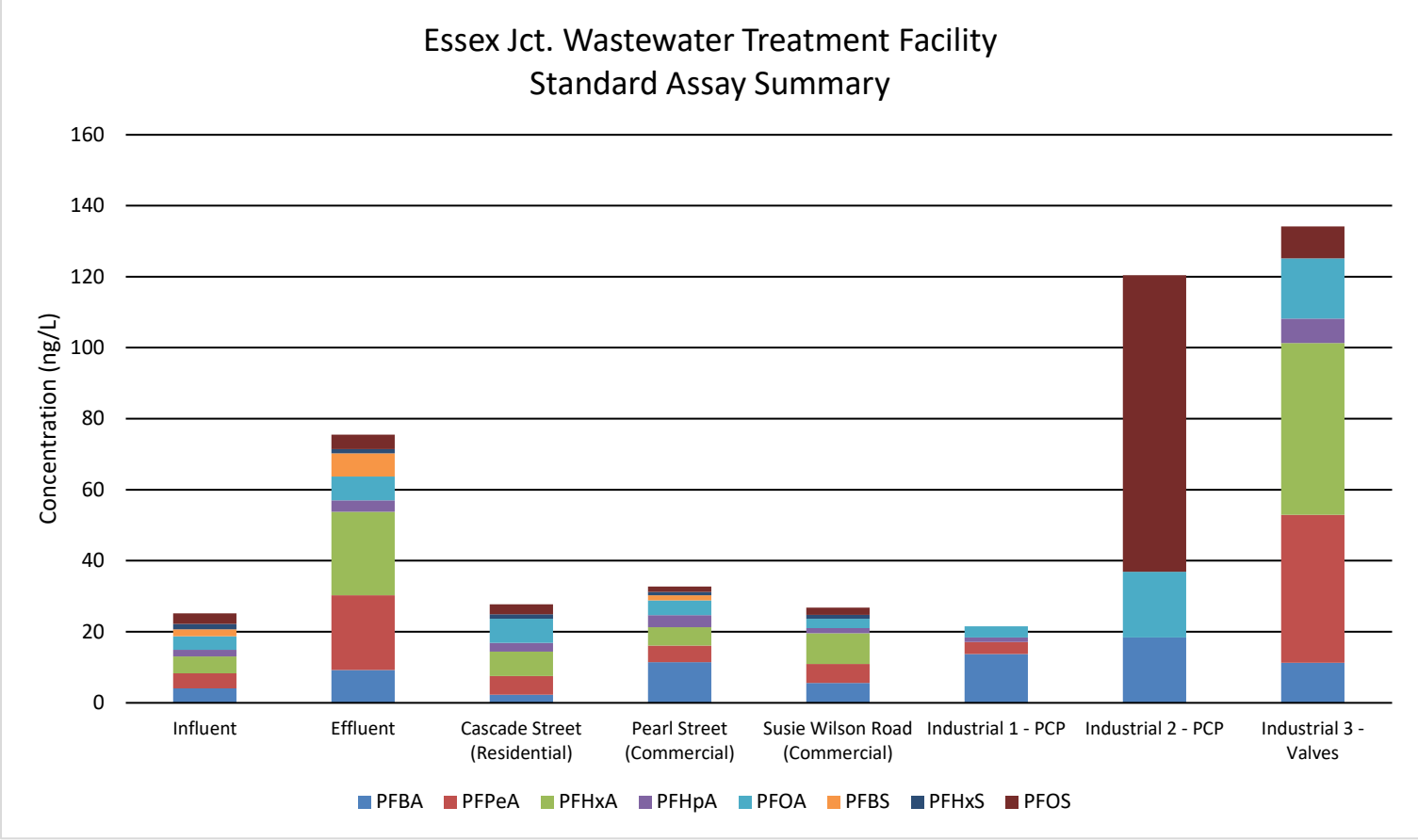
Multivariate plots of the 8 PFAS above have been generated for each sampling location. The shape of the plotted PFAS concentration line gives a visual representation of the concentration ratios between

the 8 individual PFAS. Differing shaped plot lines indicate differing characteristics of the PFAS mixture within a sample. As the concentrations of individual PFAS showed little variation between each sampling location and round, we selected the dataset with the highest concentrations of the 8 PFAS for each location plot. The multivariate plots for Essex Jct. are presented on Figure 3. The PFAS concentrations are presented on logarithmic scaled axes so that the shape of the plot is easily identified regardless of concentrations.

Observations regarding the multivariant plots include:

1) The shape of the plots for the WWTF Influent, WWTF Effluent, Susie Wilson Road, and carpet cleaner are generally "rounded" showing e relatively similar concentrations of all 8 PFAS per sample.
2) The Cascade Street (Residential) plot shows a PFCA dominated pattern. This is also seen in the Industrial 1 – PCP location.
3) The plot patterns for the Pearl Street (Commercial), Industrial 2 -PCP and Industrial 3 – Valves locations are unique to each location and the shapes are impacted by the presence of PFSAs.

The figure below presents the same 8 PFAS concentration data as the multivariant plots, but in a bar graph format. This allows for evaluation of relative concentrations of all sampled locations on a single figure.



The relative concentrations of the individual 8 PFAS and sum of their concentrations shows how much the short chain PFCAs (PFBA, PFPeA and PFHxA) dominate the chemical mixture seen in the sewersheds and WWTF influent and effluent. The figure also indicates an increase in PFAS concentrations between the WWTF influent and WWTF Effluent. This is a direct result of precursor PFAS breakdown within the wastewater treatment process. The nearly 4 times higher PFAS concentration increase in the effluent is indicative of a substantial mass of precursors present in the waste stream.

TOP Assay results are presented in Table 1 and are condensed in Table 2. The tabulated data show significant increases in PFAS concentrations in the post TOP analyses at all locations except the WWTF Effluent. This is likely due to precursor transformation during the wastewater treatment process prior to the effluent sampling location.

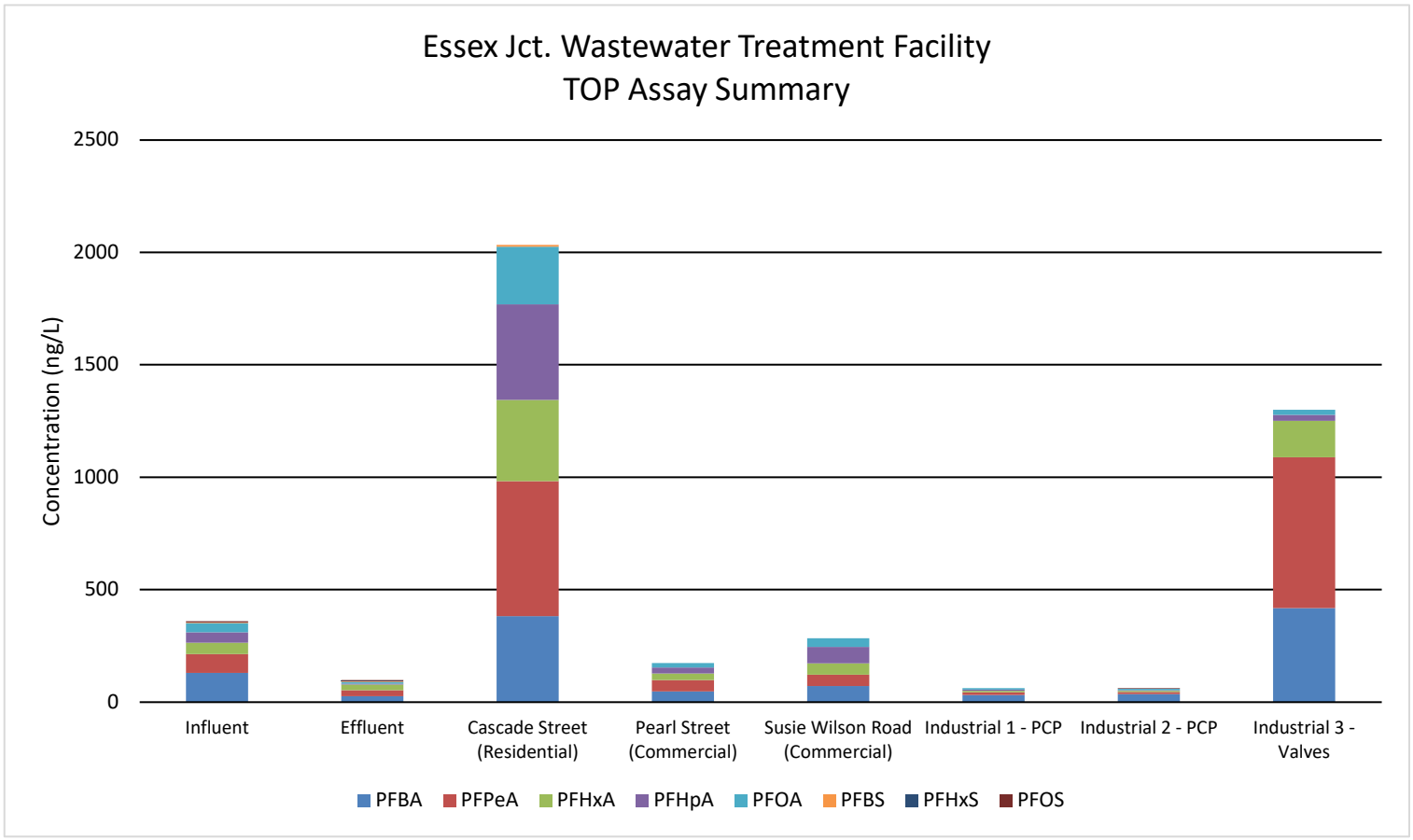
Pre and post TOP assay results have been graphed utilizing the same 8 PFAS consistently present above the reporting limits as discussed above (PFBA, PFPeA, PFHxA, PFOA, PFBS, PFHxS and PFOS). The graphs for each sampling location are presented on Figure 4. The following observations are made review of the tabulated and graphic data:

1) Post TOP Pearl Street (Commercial), Industrial 1 – PCP, Industrial 2 – PCP and WWTF Effluent concentration increases are approximately 2 times the pre-TOP levels.

2) Post TOP concentration increases are approximately 10 times in the Susie Wilson Road (Commercial), Industrial 3 – Valves and WWTF Influent samples. The relative precursor presence in these locations appears to be greater than those in #1 above.

3) Post TOP concentration increases at Cascade Street (Residential) (2,009 ppt) are nearly 75 times pre-TOP concentrations (28 ppt). This is indicative of a significant mass of precursors present in this location. Also noted in Table 2 is the presence of many PFAS not included in the 8 selected for graphing. Many of these PFAS are longer chain compounds similar to those seen in the Carpet Cleaning “standard” PFAS analyses.

The figure below presents the post TOP results for the same 8 PFAS as the multivariant plots for each sampling location. When compared to the “standard” analyses results in the figure above, the impacts of precursor presence in each sewershed area can be seen. The significant increase in PFAS concentration in the Cascade Street (Residential) location is obvious.



3.2 Middlebury

Weston & Sampson collected samples from 5 individual sewershed locations within the Middlebury WWTF sewage collection system and from the influent and effluent streams of the WWTF on 4 occasions. A summary of "standard" and TOP PFAS analyses results are presented on Table 1. TOP related results are also compiled on Table 2. Review of the data regarding the Middlebury sampling indicates the following:

1) The individual PFAS and their relative concentrations appear to be relatively stable at each sampling location.
2) Generally, quantified PFAS concentrations are less than 10 ppt.
3) WWTF Effluent concentrations are slightly higher than the WWTF Influent concentrations.
4) Concentrations of individual PFAS seen at each individual sampling location show little fluctuation between sampling rounds.

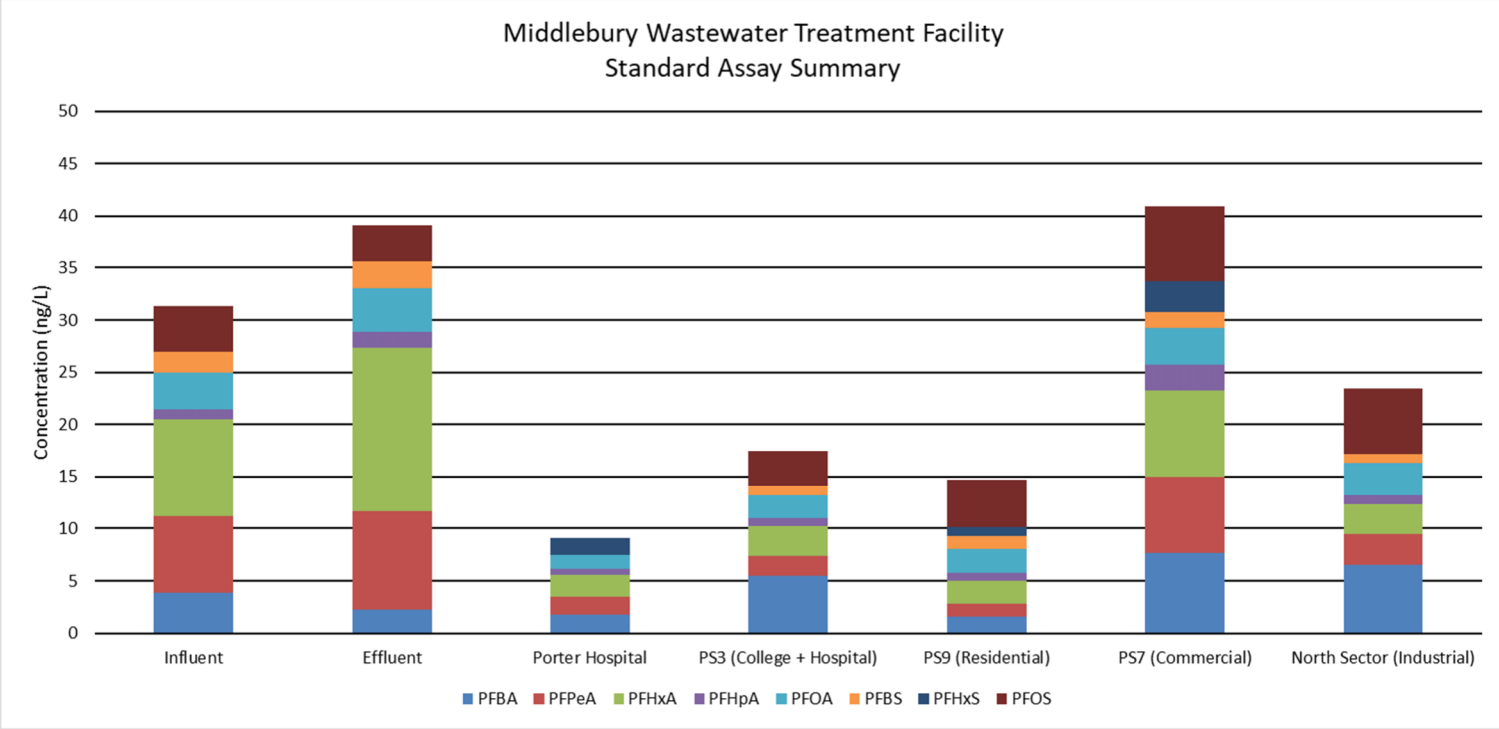
As described in Section 3.1, multivariate plots of the 8 PFAS consistently quantified (PFBA, PFPeA, PFHxA, PFOA, PFBS, PFHxS and PFOS) have been generated for each sampling location. Differing shaped plot lines indicate differing characteristics of the PFAs mixture within a sample. As the concentrations of individual PFAS did not fluctuate greatly at each sampling location between sampling

rounds we selected the data set with the highest concentrations of the 8 PFAS for each location plot. The multivariate plots for Middlebury are presented on Figure 5. The PFAS concentrations data are presented on logarithmic scaled axes so that the shape of the plot is easily identified regardless of concentrations.

Observations regarding the multivariant plots include:

1) The shape of the plots for all locations except Porter Hospital are very similar.
2) The Porter Hospital data show a PFCA dominated shape.
3) The shapes of the plots for the Middlebury WWTF residential and commercial sewershed locations are distinctly different than the Essex Jct. WWTF residential and commercial sewershed locations, despite the similar sum of 8 PFAS concentrations.

The figure below presents the same 8 PFAS concentration data as the multivariant plots, but in a bar graph format. This allows for evaluation of relative concentrations of all sampled locations on a single figure.



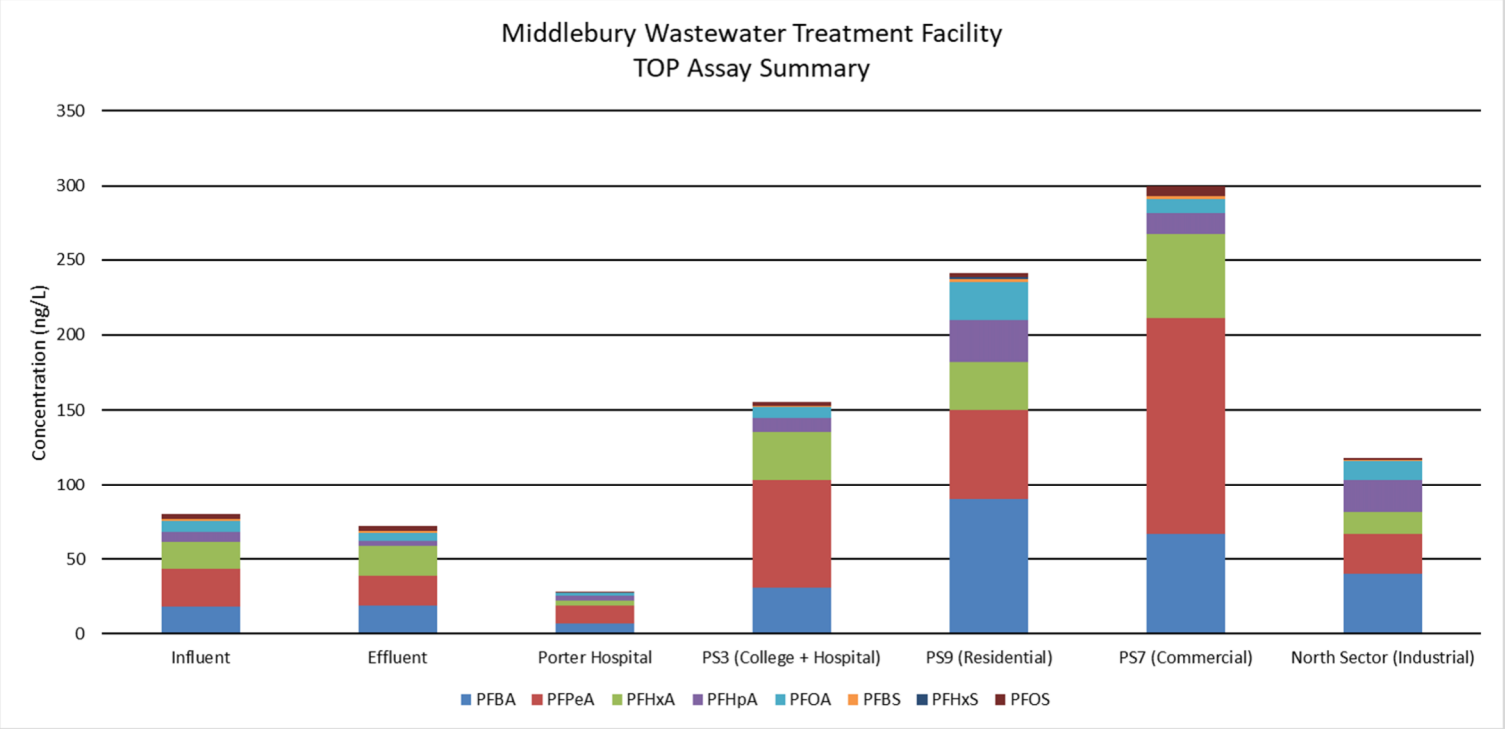
The relative concentrations of the individual 8 PFAS and sum of their concentrations shows how the short chain PFCAs (PFBA, PFPeA and PFHxA) dominate the chemical mixture seen in the sewersheds and WWTF influent and effluent. However, PFOS (long chain) is seen as a significant contributor at all locations except Porter Hospital. The figure also indicates a slight increase in PFAS concentrations between the WWTF Influent and WWTF Effluent. This is likely a direct result of precursor PFAS breakdown within the wastewater treatment process.

TOP Assay results are presented in Table 1 and are condensed in Table 2. The tabulated data show increases in PFAS concentrations in the post TOP analyses at all locations.

Pre and post TOP assay results have been graphed utilizing the same 8 PFAS consistently present above the reporting limits as discussed above (PFBA, PFPeA, PFHxA, PFOA, PFBS, PFHxS and PFOS). The graphs for each sampling location are presented on Figure 6. The following observations are made review of the tabulated and graphic data:

1) Post TOP WWTF Effluent concentration increases are the same as the pre-TOP concentrations, essentially doubling the PFAS concentrations
2) Post TOP Porter Hospital and WWTF Influent concentration increases are approximately 2 times the pre-TOP levels.
3) Post TOP concentration increases in the PS3 (College & Hospital), PS17 (Commercial) and North Sector (Industrial) are 4 to 8 times the Pre TOP concentrations. The relative precursor presence in these locations appears to be notably greater than those in #1 and #2 above.
4) Post TOP concentration increases at PS9 (Residential) are approximately 16 times pre-TOP concentrations. This is indicative of greater precursor presence in this location than other sampled locations within the Middlebury WWTF sewersheds.

The figure below presents the post TOP results for the same 8 PFAS as the multivariant plots for each sampling location. When compared to the "standard" analyses results in the figure above, the impacts of precursor presence in each sewershed area can be seen.



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4.0 DATA USABILITY

4.1.1 Laboratory Data Evaluation

Weston & Sampson performed a Tier I evaluation of the data to identify bias or other interference that could affect the quality of sample results. Quality control components that were evaluated include the following:

- Data completeness
- Holding times
- Sample preservation
- Blank results
- Surrogate recoveries
- Laboratory control sample results
- Field duplicates

A total of 53 samples were collected for analysis during this study. QA/QC duplicate samples were collected for analysis by the "standard" method of a rate of 10% (5). One (1) duplicate sample was also collected for TOP analysis. Table 1 includes all duplicate sample results and relative percent difference calculations. The laboratory result packages are included in Appendix A.

PARCCS Evaluation

Weston & Sampson evaluated the data in general accordance with the PARCCS (precision, accuracy, representativeness, completeness, comparability, and sensitivity) parameters outlined in the *U.S. Environmental Protection Agency Guidance on Quality Assurance Project Plans (December 2002).*

Precision

Precision is a measure of agreement among individual measurements of the same property and is generally expressed as the reproducibility of the analytical result between initial sample and field duplicate as expressed by the relative percent difference (RPD). Precision is a measure of the reproducibility of sampling technique, matrix homogeneity, and analytical method. An RPD value of <50% is considered acceptable for wastewater. Table 1 provides RPD's for each duplicate sample collected.

The RPD for all samples are within the acceptable range for all analytes except for 1 compound in the Susie Wilson Road duplicate. N-EtFOSAA showed a RPD of 68%. This exceedance of the RPD is related to a detection of less than 5 times the reporting limit. Concentrations in this low range are difficult to obtain the RPD goals and the data are typically not considered to be a precision issue.

Weston & Sampson is of the opinion that the single exceedance of the RPD value for N-EtFOSAA is not indicative of a systemic bias and that the data are suitably precise to support the conclusions of this report.

Accuracy

Accuracy is the degree of measurement with an accepted reference or true value. Weston & Sampson evaluated accuracy by reviewing surrogate results, laboratory control sample results, and calibration QC results. A detailed summary of our review of sample surrogate recoveries is included in Appendix

B. Surrogate recoveries within the analytic method limits for PFAS are currently recognized as difficult to meet, particularly with complex media such as WWTF fluids. The acceptable range of recovery for surrogates is very wide due to interferences from the media and the complexity of the method. Surrogate recovery exceedances for the perfluorinated compounds quantified tend to be both lower and higher than the acceptable range by less than 10%. However, polyfluorinated/precursor compounds, such as 6:2FTS, 4:2FTS, 8:2FTS, NEtFOSAA and NMeFOSAA and large perfluorinated compounds PFUDA and PFDoA have recovery exceedances that are consistently more than 30% high. This results in high biased results which must be considered when reviewing the data.

The surrogate recovery results for most perfluorinated PFAS and the laboratory control sample results and calibration QC results indicate that the data are suitably accurate to support the conclusions of this report related to perfluorinated compounds. The polyfluorinated/precursor compounds, such as 6:2FTS, 4:2FTS, 8:2FTS, NEtFOSAA, and NMeFOSAA and large perfluorinated compounds PFUDA and PFDoA are infrequently detected, however the results should take into consideration the frequently high biased surrogate recoveries. These compounds are infrequently detected; therefore, we believe the results are suitably accurate to be included in the data analyses and support the conclusions of this report.

It should be noted that calculated ("Y") and estimated ("J") values are presented in the summary tables and utilized in the overall assessment of conditions at each sampling location. Although the strict accuracy of these concentrations do not meet the reporting limits of the method, we do feel they have sufficient accuracy for qualitative use in data evaluation.

Representativeness

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of the sampled facilities, parameter variation, or environmental condition. The VTDEC and Weston & Sampson designed the sampling protocol to ensure representativeness by incorporating factors such as frequency of sampling, sample locations, proper sample collection and preservation procedures, appropriate testing methodology, and field observations. The samples collected are considered representative based on the known facility operations and potential contaminant presence and transport mechanisms. This said, the sewershed samples were collected via instantaneous "grab" methods which inherently provide a representation of wastewater quality at that specific instant in time. WWTF influent and effluent samples were collected by compositing 4 grab style samples. This method of sample collection may provide a representation of average wastewater quality over the 4 hour sample period. The wide variability in volume of wastewater flow at both the individual sewershed locations and WWTF headworks was considered during sampling program development and the representativeness of the sampling methods utilized was deemed acceptable within the scope of the investigative sampling.

Completeness

Completeness is a measure of whether enough valid data have been collected expressed as a percentage representing the ratio of valid data to expected data. Data may be considered invalid for reasons such as exceeding the holding time, poor calibration of analytical instruments, and poor surrogate or matrix spike recoveries. Based on a review of the case narratives and lab QA/QC samples, the data collected for this project are considered complete.

Comparability

Comparability refers to the level of confidence with the correlation of data collected during separate events or by different persons or analyzed by different methods. This may be measured qualitatively based on a review of sampling and testing procedures or quantitatively by comparison of sample data collected at the same location using the same sampling and testing procedures. All sampling and testing procedures were followed utilizing accepted standards for quality assurance and quality control and are expected to be comparable to future data assuming the same laboratory methods are utilized. Sample analyses by a lab different than Alpha, or by a different methodology may result in a lack of direct comparability. This is inherent in the use of proprietary methods.

Sensitivity

Sensitivity is a measure of whether the laboratory method was sufficient to report detected contaminants at concentrations which could be utilized in the evaluation of relative PFAS presence in the sampled media types. In some cases, a contaminant was reported as "not detected" but the laboratory method detection limit was above what may be relevant for screening level evaluation.

The complex makeup of wastewater often results in elevated detection limits due to interferences within the matrix. As such, the reporting limits in several samples were adjusted to values that, in some instances, were above the anticipated reporting levels of 2 ppt. However, this typically occurred in only one of the multiple samples collected at a facility allowing for review of remaining data associated with a different sampling date. Weston & Sampson is of the opinion that the sample results are adequately sensitive to support the conclusions of this report.

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5.0 FINDINGS AND CONCLUSIONS

The PFAS data collected to address questions regarding the contribution of industrial, commercial, and residential sources to concentrations of PFAS in WWTFs and in potential discharges to the environment. The following conclusions, based upon the available data, are presented with the understanding that our understanding of the dynamics of PFAS presence in wastewater continues to evolve:

1. The laboratory methods utilized for this study are unique to Alpha Analytical. Comparison of these data to data analyzed by other methods may not be appropriate. Detailed assessment of the sampling methods, extraction, preparation, and analytical methods must be performed to determine if other datasets are comparable.
2. There are currently no regulatory standards for any of the media sampled as part of this study. The use of the sum of 8 PFAS quantified frequently in this data set is used as a point of reference and should not be construed as a standard or guidance value pertaining to risk associated with the materials sampled.
3. Statistical analyses of this data set were not performed due to the limited sampling events (3 or 4) at each sampling location.

5.1 Findings

1. All of the collected samples contained quantifiable levels of PFAS.
2. Eight (8) PFAS were commonly identified in each of the sewershed/input areas sampled. These were:
    a. Perfluorobutanoic acid (PFBA)
    b. Perfluoropentanoic acid (PFPeA)
    c. Perfluorohexanoic acid (PFHxA)
    d. Perfluoroheptanoic acid (PFHpA)
    e. Perfluorooctanoic acid (PFOA)
    f. Perfluorobutanesulfonic acid (PFBS)
    g. Perfluorohexanesulfonic acid (PFHxS)
    h. Perfluorooctanesulfonic acid (PFOS)
3. Individual PFAS concentrations from sewershed locations (i.e. not individual Industrial plants or carpet cleaner residuals) were predominantly less than 10 ppt.
4. Collection of grab samples from sewershed/input sampling locations appears to have provided consistent concentration data during the study. All samples were collected during a 4-week time span with little rain.
5. TOP assays show typical precursor related PFAS concentration increases of 2 to 10 times the “standard” analyses method concentrations. The residential input in Essex Jct. reported an increase in PFAS concentration 72 times the “standard” analyses results.
6. WWTF Effluent PFAS concentrations were consistently slightly higher than WWTF Influent concentrations, indicating precursor breakdown into terminal perfluorinated compounds during

the wastewater treatment process. However, TOP analyses indicate that a significant mass of precursors remain in the WWTF Effluent.

7. Relative PFAS concentration ratios in the Essex Jct. WWTF Influent are similar to the PFAS ratios in the Commercial sewersheds. This may indicate that Commercial discharges represent the dominant PFAS mass input to this WWTF. However, flow estimates coupled with concentration data from each sampling point will provide a more accurate determination of potential mass inputs.
8. Relative PFAS concentration ratios in the Middlebury WWTF Influent are similar to the PFAS ratios in the Residential, Commercial and Industrial sewersheds. This may indicate that none of these discharges present a dominant PFAS mass input to this WWTF. Again, flow estimates coupled with concentration data for each sampling point will provide a more accurate determination of potential mass inputs.
9. Residential and Commercial input PFAS concentrations are similar in concentration. However, precursor concentration increases identified by TOP assay were greatest in Residential samples.
10. Hospital input PFAS concentration ratios differ from other Middlebury sewershed/input ratios, but was similar to the Residential and Industrial 1 – PCP ratios in Essex Jct.
11. Individual Industrial inputs show distinct PFAS ratios which are unique to each input.
12. The Industrial sewershed in Middlebury shows PFAS ratios similar to the Middlebury Commercial and Residential PFAS ratios. This may be indicative of "mixing" of unique plant related discharges resulting in a combined PFAS ratio similar to the Commercial and Residential ratios.

5.2 Conclusions

The data collected during this study indicate that all of the WWTF sewersheds/input types sampled contain concentrations of multiple individual PFAS identifiable by the "standard", proprietary, laboratory analytical method. The 8 most frequently reported PFAS are the same in both WWTFs collection systems. Additionally, the concentrations and relative ratios of the 8 PFAS are similar in residential, commercial, and mixed industrial sewersheds. The individual industry discharges sampled show unique characteristics and concentrations of PFAS, but do not appear to significantly impact their respective WWTFs influent chemistry.

The TOP assay data revealed that precursor compounds can be present at concentrations 2 to 70 times the "standard" analytical PFAS concentrations. This indicates that precursors may actually be the predominant source of PFAS in wastewater. The data also indicate that only a portion of the precursor mass is oxidized/degraded into its perfluorinated species by the wastewater treatment processes prior to effluent discharge into the receiving stream.

The concentrations of quantifiable and precursor PFAS in each of the sewershed/input types cannot be directly related to PFAS mass loading into a WWTF or receiving stream. Flow data is required to determine the relative fraction of PFAS mass being contributed by each sewershed/input type. Determination of relative mass loading rates from the sewersheds/input types will inform decision

making regarding the need for, and methods of, PFAS reduction and/or treatment measures throughout specific areas of WWTF collection systems.

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6.0 RECOMMENDATIONS

Weston & Sampson offers the following recommendations to further an understanding of the PFAS loading from various sewershed/input types to WWTFs:

1) Gather estimated flow rates for each of the sampling locations utilized in this study to estimate PFAS "mass loading" contributions from each sewershed/input type to the WWTFs.

2) Continue collection of samples at Essex Jct. and Middlebury through several seasons. If possible, add additional municipalities to this effort. Sampling analyses should be modified to include the following:
    a. Collect at least one sample from each sampling location utilizing an automated flow pacing composite sampler to compare grab and composite sample results.
    b. Perform "standard" and TOP assays on all samples.
    c. Analyze samples for Total Suspended Solids and Total Organic Carbon. These analyses will inform the potential for PFAS sorption to particulate within the waste stream. Understanding the potential partitioning of PFAS to suspended organic solids will inform evaluation of potential reduction/treatment methods.

3) Expand Residential input sampling to confirm the levels of precursor presence identified to date. This should include collection of septage samples from individual and shared collection systems.

4) Additional specific input types should be added to the sampling efforts if possible. Specific input types which may be important include:
    a. Car Wash
    b. Laundry/Dry Cleaning
    c. Metal Finishing
    d. Paper Mill
    e. Textile Mill/Treatment
    f. Hotel
    g. Furniture Manufacture

7.0 SIGNATURE OF ENVIRONMENTAL PROFESSIONAL

I certify under penalty of perjury that I am an environmental professional and that all content contained within this deliverable is to the best of my knowledge true and correct.

Steven LaRosa
Senior Project Manager

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TABLES

TABLE 1
WASTEWATER TREATMENT FACILITY INPUTS
PFAS CONCENTRATION SUMMARY

Parameter	CAS	Units	VGES	Essex Junction Wastewater Treatment Facility																			
				AUTUMN HARP								CARPET		CASCADE STREET						EFFLUENT			
				8/3/2021		8/3/2021			8/10/2021		8/17/2021		8/25/2021	8/3/2021		8/10/2021		8/17/2021		8/3/2021		8/10/2021		8/17/2021	
				Result	Flag	Result	Flag	RPD	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Per- and Poly Fluoroalkyl Substances (PFAS) - LCMSMS-ID																									
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		9.8	U	9.36	U	--	10	U	50	U	280		3.11	U	20	U	10	U	6.54		4.21		6.97	
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		13.7		9.29	J	38%	24.8		11.8	J	83.2		2.26	J	20	U	3.44	J	9.16		8.84		10.1	
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		9.8	U	9.36	U	--	10	U	50	U	20	U	3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		3.41	J	2.92	J	15%	3.74	J	13.9	J	60.2		5.22		5.2	J	5.4	J	21.1		21.4		23.9	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	9.8	U	9.36	U	--	10	U	50	U	23.8		1.31	J	20	U	10	U	1.24	J	0.804	J	1.81	J
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		9.8	U	1.82	J	--	2.96	J	50	U	184		6.93		4.28	J	4.02	J	23.5		20.5		26.4	
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		9.8	U	9.36	U	--	10	U	50	U	20	U	3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	1.27		9.36	U	--	1.66	J	50	U	46.8		2.39	J	20	U	1.7	J	3.2		2.95		3.44	
Perfluorooctanesulfonamide (FOSA)	75491-6	ng/l		9.8	U	9.36	U	--	10	U	50	U	32.6		3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	9.8	U	9.36	U	--	10	U	50	U	464		2.8	J	20	U	10	U	4		3.28		5.08	
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	3.16	J	2.75	J	14%	4.54	J	7.9	J	250		6.81		4.6	J	3.94	J	6.72		6.22		7.88	
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		9.8	U	9.36	U	--	10	U	50	U	20	U	3.11	U	20	U	5.74		2.1	U	2.27	U	1.94	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	9.8	U	9.36	U	--	10	U	50	U	343		1.63	J	20	U	10	U	1.85	J	1.36	J	1.4	J
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		9.8	U	9.36	U	--	10	U	50	U	13.1	J	3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		9.8	U	9.36	U	--	10	U	50	U	165		1.88	J	4.56	J	1.64	J	0.821	J	0.918	J	1.07	
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		9.8	U	9.36	U	--	10	U	50	U	43.7		3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		9.8	U	9.36	U	--	10	U	50	U	22.2		3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		9.8	U	9.36	U	--	10	U	50	U	23		3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		9.8	U	9.36	U	--	10	U	50	U	116		3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
4:2 Fluorotelomersulfonic acid (4:2FTS A)	757124-72-4	ng/l		9.8	U	9.36	U	--	10	U	50	U	20	U	3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
6:2 Fluorotelomersulfonic acid (6:2FTS A)	27619-97-2	ng/l		11.2	U	10.2	U	--	10	U	58.1		67.2		20	U	20	U	51.5		2.09	U	2.27	U	1.94	U
8:2 Fluorotelomersulfonic acid (8:2FTS A)	39108-34-4	ng/l		9.8	U	9.36	U	--	10	U	50	U	105		3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
N-EtFOSAA	2991-50-6	ng/l		9.8	U	9.36	U	--	10	U	50	U	61.5		3.11	U	20	U	10	U	2.1	U	2.27	U	1.94	U
N-MeFOSAA	2355-31-9	ng/l		9.8	U	9.36	U	--	10	U	50	U	560		3.11	U	20	U	10	U	2.1	U	2.27	U	1.07	J
PFAS VT 5 (total)		ng/l	20	4.43	Y	2.75	Y	47%	6.2	Y	7.9	Y	1127.6	Y	14.94	Y	4.6	Y	5.64	Y	17.01	Y	14.614	Y	19.61	Y
Per- and Poly Fluoroalkyl Substances (PFAS)- LCMSMS-ID-TOP																									
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		20	U	20	U	--							7.76	J					2.96					
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		30.8	J	38.5	J	22%							382						26.1					
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		20	U	20	U	--							20	U					1.8	U				
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		12.1	J	11	J	10%							600						26					
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	20	U	20	U	--							20	U					1.04	J				
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		7.04	J	7	J	1%							361						25.3					
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		20	U	20	U	--							20	U					1.8	U				
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	4.84	J	3.92	J	21%							426						3.81					
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	20	U	20	U	--							20	U					3.72					
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	7.44	J	6.08	J	20%							256						8.82					
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		20	U	20	U	--							20	U					1.8	U				
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	20	U	20	U	--							200						1.91					
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		20	U	20	U	--							20	U					1.8	U				
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		20	U	20	U	--							114						0.93	J				
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		20	U	20	U	--							54.8						1.8	U				
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		20	U	20	U	--							12.6	J					1.8	U				
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		20	U	20	U	--							24.5						1.8	U				
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		20	U	20	U	--							52.9						1.8	U				
PFAS VT 5 (total)		ng/l	20	12.28	Y	10	Y	20%							882	Y					19.3	Y				

NOTES:

VGES	Groundwater: Vermont Groundwater Enforcement Standard (I-Rule; July 6, 2019)
PFAS VT 5 (total)	sum of PFHxS, PFHpA, PFNA, PFOS, PFOA
--	No comparison-analytes not detected above detection limits
RPD	Relative Percent Difference between sample and blind field duplicate
ng/L	nanograms per liter
U	not detected above laboratory reporting limit
Y	calculated value
E	result exceeded calibration range
J	estimated; less than reporting limit, but greater than the method detection limit
Blank Cell	Not Analyzed
Bold	Cncentration above laboratory detection limit
Bold	Exceedance of VGES

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TABLE 1
WASTEWATER TREATMENT FACILITY INPUTS
PFAS CONCENTRATION SUMMARY

Parameter	CAS	Units	VGES	Essex Junction Wastewater Treatment Facility																						
				INFLUENT						PEARL STREET MANHOLE						SUSIE WILSON ROAD										
				8/3/2021		8/10/2021		8/17/2021		8/3/2021		8/10/2021		8/17/2021		8/3/2021		8/10/2021		8/10/2021		RPD	8/17/2021		8/17/2021		RPD
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		Result	Flag	Result	Flag	
Per- and Poly Fluoroalkyl Substances (PFAS) - LCMSMS-ID																										
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		1.97	J	2.19		2.03		1.43		3.32		50	U	2.06	U	1.8	U	10	U	--	0.907	J	1.23	J	30%
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		4		5.06		9.33		11.4		23.4		50	U	5.58		24.3		21.8		11%	3.83		1.86	U	--
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2.06	U	1.8	U	10	U	--	1.76	U	1.86	U	--
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		4.25		3.39		5.68		4.67		4.72	J	14.4	J	5.29		2.47		4.02	J	48%	3.36		3.53		5%
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	1.5		51.4		1.31	J	0.953	J	2.84	J	50	U	1.08		1.24	J	10	U	--	1.18	J	1.22		3%
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		4.77		4.07		6.5		5.18		8.88	J	14.8	J	8.68		3.55		4.38	J	21%	3.88		4.17		7%
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		2.68		2.74		2.76		2.01	U	10	U	50	U	1.93		1.8	U	10	U	--	1.76	U	1.38		--
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	1.85	J	1.26	J	1.48	J	3.39		1.7	J	50	U	1.44	J	1.8	U	10	U	--	1.35	J	1.47	J	9%
Perfluorooctanesulfonamide (FOSA)	75491-6	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2.06	U	1.8	U	10	U	--	1.76	U	1.86	U	--
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	2.94	J	2.18	U	9.48		1.46	J	10	U	50	U	2.04	J	1.8	U	10	U	--	4.41		5.35		19%
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	3.85		2.77		3.58		4.19		3.8	J	8.8	J	2.62		2.33		2.8	J	18%	3.08		3.29		7%
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2		1.8	U	10	U	--	1.76	U	1.86	U	--
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	1.59	J	0.661	J	0.615	J	1.37	J	10	U	50	U	0.811	J	0.483	J	10	U	--	1.05	J	0.712	J	38%
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2.06	U	1.8	U	10	U	--	1.76	U	1.08		--
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		0.734	J	2.18	U	0.584		0.696	J	10	U	50	U	0.453	J	0.281	J	10	U	--	0.356	J	0.574	J	47%
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2.06	U	1.8	U	10	U	--	1.76	U	1.86	U	--
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2.06	U	1.8	U	10	U	--	1.76	U	1.86	U	--
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2.06	U	1.8	U	10	U	--	1.76	U	1.86	U	--
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2.06	U	1.8	U	10	U	--	1.76	U	1.86	U	--
4:2 Fluorotelomersulfonic acid (4:2FTS A)	757124-72-4	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2.06	U	1.8	U	10	U	--	1.76	U	1.86	U	--
6:2 Fluorotelomersulfonic acid (6:2FTS A)	27619-97-2	ng/l		20	U	2.18	U	1.92	U	1.84	U	10	U	50	U	2.78	U	1.8	U	10	U	--	1.76	U	1.86	U	--
8:2 Fluorotelomersulfonic acid (8:2FTS A)	39108-34-4	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2.06	U	1.8	U	10	U	--	1.76	U	1.86	U	--
N-EtFOSAA	2991-50-6	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	1.19	J	1.8	U	10	U	--	5.79		2.84		68%
N-MeFOSAA	2355-31-9	ng/l		3.06	U	2.18	U	1.92	U	2.01	U	10	U	50	U	2.06	U	1.8	U	10	U	--	1.76	U	1.86	U	--
PFAS VT 5 (total)		ng/l	20	11.73	Y	56.091	Y	16.465	Y	11.363	Y	8.34	Y	8.8	Y	7.991	Y	4.053	Y	2.8	Y	37%	11.07	Y	12.042	Y	8%
Per- and Poly Fluoroalkyl Substances (PFAS)- LCMSMS-ID-TOP																										
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		3.52	J					20	U					20	U					--					--
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		130						46.6						71.2						--					--
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		20	U					20	U					20	U					--					--
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		83.3						50.8						51						--					--
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	20	U					20	U					20	U					--					--
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		50.3						29.9						49.4						--					--
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		20	U					20	U					20	U					--					--
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	46.3						26.2						73.4						--					--
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	5.48	J					20	U					20	U					--					--
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	40.8						20.4						39.1						--					--
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		20	U					20	U					20	U					--					--
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	18	J					9.2	J					23.1						--					--
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		20	U					20	U					20	U					--					--
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		8.56	J					5.6						9.08	J					--					--
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		20	U					20	U					20	U					--					--
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		20	U					20	U					20	U					--					--
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		20	U					20	U					20	U					--					--
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		20	U					3.8						2.6						--					--
PFAS VT 5 (total)		ng/l	20	110.58	Y					55.8	Y					135.6	Y					--					--

NOTES:

VGES	Groundwater: Vermont Groundwater Enforcement Standard (I-Rule; July 6, 2019)
PFAS VT 5 (total)	sum of PFHxS, PFHpA, PFNA, PFOS, PFOA
--	No comparison-analytes not detected above detection limits
RPD	Relative Percent Difference between sample and blind field duplicate
ng/L	nanograms per liter
U	not detected above laboratory reporting limit
Y	calculated value
E	result exceeded calibration range
J	estimated; less than reporting limit, but greater than the method detection limit
Blank Cell	Not Analyzed
Bold	Cncentration above laboratory detection limit
Bold	Exceedance of VGES

\\wse03.local\WSE\Projects\VT\VTDEC WWTF PFAS Inputs\2. Deliverables\2021_09_09 Table\[Table 1_PFAS.xlsx]Table 2

TABLE 1
WASTEWATER TREATMENT FACILITY INPUTS
PFAS CONCENTRATION SUMMARY

Parameter	CAS	Units	VGES	Essex Junction Wastewater Treatment Facility												Middlebury Wastewater Treatment Facility											
				TWIN CRAFT						VELAN VALVE						EFFLUENT						INFLUENT					
				8/10/2021		8/17/2021		8/24/2021		8/17/2021		8/24/2021		8/27/2021		7/28/2021		8/4/2021		8/11/2021		8/18/2021		7/28/2021		8/4/2021		8/11/2021		8/18/2021	
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Per- and Poly Fluoroalkyl Substances (PFAS) - LCMSMS-ID																													
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		20	U	50	U	100	U	10	U	1.8	U	20	U	2.5		1.4	J	1.87	U	1.86	U	2.03		1.41	J	0.841		2.07	
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		18.4	J	15.9	J	100	U	11.2		14.5		12	J	2.28		3.17		2.03		2.71		3.82		2.75		6.16		10.2	
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		20	U	50	U	100	U	10	U	1.8	U	20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	0.637		1.87	U	0.299	
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		20	U	50	U	100	U	41.7		32.7		29.2		9.35		7.35		6.77		4.87		7.35		6.74		2.67		6.25	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	20	U	50	U	100	U	10	U	1.8	U	20	U	1.8	U	0.379		1.87	U	1.86	U	1.78	U	1.01		1.87	U	0.37	
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		20	U	50	U	100	U	48.4		42.3		39.6		15.7		10.8		11.2		8.42		9.33		3.87		2.22		5.32	
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		20	U	50	U	100	U	10	U	1.8	U	20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	2.27	U	1.87	U	1.89	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	20	U	50	U	100	U	6.9	J	3.78		4.2	J	1.54	J	1.16	J	1.1	J	1.02	J	0.904	J	0.991	J	0.605	J	1.15	J
Perfluorooctanesulfonamide (FOSA)	75491-6	ng/l		20	U	50	U	100	U	10	U	1.8	U	20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	2.27	U	1.87	U	1.89	U
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	83.5		50	U	100	U	8.96	J	9.37		20	U	3.58		4.63		3.36		3.92		4.38		5.98		1.87	U	3.85	
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	18.5	J	50	U	100	U	17		9.24		8.56	J	4.2		3.15		3.96		3.97		3.54		2	J	1.32	J	3.54	
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		20	U	50	U	100	U	10	U	1.8	U	20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	2.27	U	1.87	U	1.89	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	62.9		50	U	100	U	2.4	J	1.8		20	U	2.54		1.18	J	0.702	J	0.912	J	1.2	J	0.864	J	0.306	J	0.752	J
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		20	U	50	U	100	U	6.66	J	4.54		20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	2.27	U	1.87	U	1.89	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		20	U	50	U	100	U	2.1	J	1.93		20	U	0.788	J	0.857	J	0.926	J	1		1	J	0.737	J	0.486		1.01	J
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		20	U	50	U	100	U	10	U	1.8	U	20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	2.27	U	1.87	U	1.89	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		20	U	50	U	100	U	10	U	1.8	U	20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	2.27	U	1.87	U	1.89	U
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		20	U	50	U	100	U	10	U	1.8	U	20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	2.27	U	1.87	U	1.89	U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		20	U	50	U	100	U	10	U	0.52	J	20	U	1.8	U	1.82	U	1.87	U	1.86	U	0.235		2.27	U	1.87	U	1.89	U
4:2 Fluorotelomersulfonic acid (4:2FTS A)	757124-72-4	ng/l		20	U	50	U	100	U	10	U	1.8	U	20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	2.27	U	1.87	U	1.89	U
6:2 Fluorotelomersulfonic acid (6:2FTS A)	27619-97-2	ng/l		20	U	50	U	100	U	10	U	3.11		20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	2.27	U	1.87	U	1.89	U
8:2 Fluorotelomersulfonic acid (8:2FTS A)	39108-34-4	ng/l		20	U	50	U	100	U	10	U	1.44	J	20	U	1.8	U	1.82	U	1.87	U	1.86	U	1.78	U	2.27	U	1.87	U	1.89	U
N-EtFOSAA	2991-50-6	ng/l		20	U	50	U	86		10	U	3.07		20	U	1.8	U	1.82	U	1.87	U	1.86	U	2.4		2.27	U	1.87	U	2.62	
N-MeFOSAA	2355-31-9	ng/l		20	U	50	U	100	U	10	U	1.8	U	20	U	1.05		0.73	J	1.14		1.86	U	0.819	J	2.27	U	1.87	U	1.89	U
PFAS VT 5 (total)		ng/l	20	164.9	Y	0	U, Y	0	U, Y	35.26	Y	24.19	Y	12.76	Y	11.86	Y	10.499	Y	9.122	Y	9.822	Y	10.024	Y	10.845	Y	2.231	Y	9.662	Y
Per- and Poly Fluoroalkyl Substances (PFAS)- LCMSMS-ID-TOP																													
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		10	U					10	U					1.66	J							1.35	J				
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		35.5	J					418						19.2								18.2					
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		10	U					10	U					2.04	U							1.82	U				
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		9.46	J					670						19.9								25.5					
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	10	U					10	U					2.04	U							1.82	U				
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		5.28	J					162						19.8								18					
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		10	U					10	U					2.04	U							1.82	U				
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	2.92	J					27						3.08								6.45					
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	2.64	J					10	U					3.13								2.93					
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	5.76	J					22.5						5.43								7.5					
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		10	U					10	U					2.04	U							1.82	U				
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	2.08	J					7.24	J					2.44								2.61					
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		10	U					10	U					2.04	U							1.82	U				
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		10	U					4.66	J					0.701	J							1.48	J				
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		10	U					1.88						2.04	U							0.364	J				
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		10	U					10	U					2.04	U							1.82	U				
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		10	U					10	U					2.04	U							1.82	U				
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		10	U					2.7	J					2.04	U							0.561	J				
PFAS VT 5 (total)		ng/l	20	13.4	Y					56.74	Y					14.08	Y							19.49	Y				

NOTES:

VGES	Groundwater: Vermont Groundwater Enforcement Standard (I-Rule; July 6, 2019)
PFAS VT 5 (total)	sum of PFHxS, PFHpA, PFNA, PFOS, PFOA
--	No comparison-analytes not detected above detection limits
RPD	Relative Percent Difference between sample and blind field duplicate
ng/L	nanograms per liter
U	not detected above laboratory reporting limit
Y	calculated value
E	result exceeded calibration range
J	estimated; less than reporting limit, but greater than the method detection limit
Blank Cell	Not Analyzed
Bold	Cncentration above laboratory detection limit
Bold	Exceedance of VGES

TABLE 1
WASTEWATER TREATMENT FACILITY INPUTS
PFAS CONCENTRATION SUMMARY

Parameter	CAS	Units	VGES	Middlebury Wastewater Treatment Facility																			
				NORTH SECTOR								PORTER								PUMP STATION 7			
				7/28/2021		8/4/2021		8/11/2021		8/18/2021		7/28/2021		8/4/2021		8/11/2021		8/18/2021		7/28/2021		8/4/2021		8/11/2021		8/18/2021	
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Per- and Poly Fluoroalkyl Substances (PFAS) - LCMSMS-ID																									
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		0.868		0.676	J	2.39	U	0.634	J	1.97	U	6.66	U	1.96	U	0.439	J	1.5	J	1.33	J	1.05	J	2.34	
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		6.51		1.38	J	1.61	J	2.55		1.78	J	8.05		1.12	J	2.15	U	7.68		6.36		4.88		13.4	
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	1.97	U	6.66	U	1.96	U	2.15	U	1.84	U	1.78	U	1.73	U	1.81	U
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		2.96		2.3		0.957	J	2.35		1.72	J	6.25	J	1.11	J	3.25		7.32		4		6.11		24.5	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	2.09	U	2.22	U	2.39	U	1.92	U	1.64		6.66	U	1.96	U	0.53	J	2.95		0.788		1.73	U	0.554	
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		2.86		1.24	J	0.622	J	1.56	J	2.06		8.97		1.28	J	3.18		8.27		4.2		4.91		16.8	
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	1.97	U	6.66	U	1.96	U	2.15	U	1.84	U	1.78	U	1.73	U	1.81	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	0.805	J	0.458	J	2.39	U	0.369	J	0.574	J	2.23	J	1.96	U	0.892	J	2.45		1.44	J	1.58	J	2.77	
Perfluorooctanesulfonamide (FOSA)	75491-6	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	1.97	U	6.66	U	1.96	U	2.15	U	1.84	U	1.78	U	1.73	U	1.81	U
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	6.28		6.68		2.39	U	2.39		1.97	U	6.66	U	1.96	U	3.64		7.24		6.99		1.73	U	7.53	
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	3.17		0.988	J	0.478	J	1.19	J	1.34	J	5.72	J	0.588	J	2.25		3.53		2.77		2.77		4.43	
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	1.97	U	6.66	U	1.96	U	2.15	U	1.84	U	1.78	U	1.73	U	1.81	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	0.538	J	0.365		2.39	U	1.92	U	0.437	J	2.64	J	1.96	U	1.01	J	1.31	J	0.859	J	0.729	J	1.13	J
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	5.62		6.66	U	1.96	U	2.23		1.84	U	1.78	U	1.73	U	1.81	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		0.893	J	0.351	J	2.39	U	0.338	J	0.429	J	4.05	J	1.96	U	0.913	J	1.58	J	0.927	J	1.1	J	1.16	J
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	1.97	U	6.66	U	1.96	U	2.15	U	1.84	U	1.78	U	1.73	U	1.81	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	1.97	U	6.66	U	1.96	U	2.15	U	1.84	U	1.78	U	1.73	U	1.81	U
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		0.705	J	2.22	U	2.39	U	1.92	U	1.97	U	1.2		1.96	U	2.15	U	0.28	J	1.78	U	1.73	U	1.81	U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	1.97	U	2.19		1.96	U	2.15	U	1.84	U	1.78	U	1.73	U	1.81	U
4:2 Fluorotelomersulfonic acid (4:2FTS A)	757124-72-4	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	1.97	U	6.66	U	1.96	U	2.15	U	1.84	U	1.78	U	1.73	U	1.81	U
6:2 Fluorotelomersulfonic acid (6:2FTS A)	27619-97-2	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	1.97	U	50	U	1.96	U	2.15	U	1.84	U	1.78	U	1.73	U	1.81	U
8:2 Fluorotelomersulfonic acid (8:2FTS A)	39108-34-4	ng/l		2.09	U	2.22	U	2.39	U	1.92	U	1.97	U	6.66	U	1.96	U	2.15	U	1.15	J	1.78	U	1.73	U	1.81	U
N-EtFOSAA	2991-50-6	ng/l		1.23	J	2.22	U	2.39	U	1.92	U	1.97	U	4.42	J	1.96	U	2.15	U	1.84	U	1.78	U	1.73	U	1.81	U
N-MeFOSAA	2355-31-9	ng/l		0.893	J	2.22	U	2.39	U	1.92	U	1.97	U	6.66	U	1.96	U	2.15	U	0.804	J	1.78	U	1.73	U	1.81	U
PFAS VT 5 (total)		ng/l	20	10.793	Y	8.491	Y	0.478	Y	3.949	Y	3.991	Y	10.59	Y	0.588	Y	8.322	Y	17.48	Y	12.847	Y	5.079	Y	16.414	Y
Per- and Poly Fluoroalkyl Substances (PFAS)- LCMSMS-ID-TOP																									
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		0.931	J							1.78	U							1.76	J						
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		40.5								7.25								67							
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		2.18	U							1.78	U							1.81	U						
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		26.6								11.5								144							
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	2.18	U							1.78	U							1.81	U						
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		14.5								3.47								56.6							
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		2.18	U							1.78	U							1.81	U						
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	21.6								3.22								14.2							
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	1.07	J							0.768	J							6.64							
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	12.7								1.91								9.4							
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		2.18	U							1.78	U							1.81	U						
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	6.24								0.886	J							3.25							
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		2.18	U							1.78	U							1.81	U						
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		3.09								0.466	J							2.27							
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		1.33								1.78	U							0.62							
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		2.18	U							1.78	U							1.81	U						
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		0.748								1.78	U							0.261							
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		1.11	J							1.78	U							0.562							
PFAS VT 5 (total)		ng/l	20	41.61	Y							6.784	Y							33.49	Y						

NOTES:

VGES	Groundwater: Vermont Groundwater Enforcement Standard (I-Rule; July 6, 2019)
PFAS VT 5 (total)	sum of PFHxS, PFHpA, PFNA, PFOS, PFOA
--	No comparison-analytes not detected above detection limits
RPD	Relative Percent Difference between sample and blind field duplicate
ng/L	nanograms per liter
U	not detected above laboratory reporting limit
Y	calculated value
E	result exceeded calibration range
J	estimated; less than reporting limit, but greater than the method detection limit
Blank Cell	Not Analyzed
Bold	Cncentration above laboratory detection limit
Bold	Exceedance of VGES

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TABLE 1
WASTEWATER TREATMENT FACILITY INPUTS
PFAS CONCENTRATION SUMMARY

Parameter	CAS	Units	VGES	Middlebury Wastewater Treatment Facility																							
				PUMP STATION 3								PUMP STATION 9															
				7/28/2021		8/4/2021		8/11/2021		8/18/2021		7/28/2021		7/28/2021		RPD	8/4/2021		8/4/2021		RPD	8/11/2021		8/18/2021		8/18/2021		RPD
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag		Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	
Per- and Poly Fluoroalkyl Substances (PFAS) - LCMSMS-ID																											
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		0.944	J	0.888	J	0.475	J	1.66	J	1.32	J	1.58	J	18%	0.961	J	0.799	J	18%	1.78	U	4.16		3.82		9%
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		5.5		23.8		3.98		15.4		1.57	J	1.84	J	16%	2.09		2.79		29%	7.45		6.96		7.03		1%
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		1.8	U	1.73	U	1.75	U	1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	1.73	U	1.88	U	--
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		1.86		3.02		1.58	J	5.17		1.21	J	1.62	J	29%	1.76	J	1.87	J	6%	1.85		4.83		4.67		3%
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	1.8	U	1.73	U	1.75	U	0.394	J	0.794		0.923		15%	1.88	U	1.97	U	--	1.78	U	0.836	J	0.839	J	0%
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		2.83		6.26		2.29		5.25		2.19		2.18		0%	2.04		1.98		3%	2.36		5.22		4.96		5%
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		1.8	U	1.73	U	1.75	U	1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	1.73	U	1.88	U	--
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	0.786	J	1.19	J	0.74	J	2.58		0.837	J	0.806	J	4%	0.668	J	0.65	J	3%	0.661	J	2.41		2.34		3%
Perfluorooctanesulfonamide (FOSA)	75491-6	ng/l		1.8	U	1.73	U	1.75	U	1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	1.73	U	1.88	U	--
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	3.36		5.79		1.75	U	6.4		4.57		5.43		17%	6.47		6.97		7%	1.78	U	3.41		2.84		18%
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	2.21		2.38		2.11		6.59		2.19		2.15		2%	1.88		1.9	J	1%	2.16		6.79		6.64		2%
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		1.8	U	1.73	U	1.75	U	1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	1.73	U	1.88	U	--
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	0.508	J	0.475	J	0.447	J	0.97	J	0.471		0.492	J	4%	0.353	J	0.327	J	8%	0.302	J	1.42	J	1.39	J	2%
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		1.46		1.73	U	1.75	U	1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	1.73	U	1.88	U	--
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		0.498	J	0.735	J	0.72	J	1.39	J	0.584	J	0.686	J	16%	0.931	J	0.918	J	1%	0.611	J	1.79		1.78	J	1%
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		1.8	U	1.73	U	1.75	U	1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	1.73	U	0.368		--
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		1.8	U	1.73	U	1.75	U	1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	1.73	U	1.88	U	--
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		1.8	U	1.73	U	1.75	U	1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	0.273		1.88	U	--
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		1.8	U	1.73	U	1.75	U	0.27	J	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	0.286	J	1.88	U	--
4:2 Fluorotelomersulfonic acid (4:2FTS A)	757124-72-4	ng/l		1.8	U	1.73	U	1.75	U	1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	1.73	U	1.88	U	--
6:2 Fluorotelomersulfonic acid (6:2FTS A)	27619-97-2	ng/l		6.05		1.73	U	1.21	J	1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	1.73	U	1.88	U	--
8:2 Fluorotelomersulfonic acid (8:2FTS A)	39108-34-4	ng/l		1.8	U	1.73	U	1.75	U	1.82	U	1.95	U	1.27	J	--	1.66	J	1.42	J	16%	2.14		9.47		8.16		15%
N-EtFOSAA	2991-50-6	ng/l		1.21	J	0.77	J	3.57		1.82	U	1.95	U	2.02	U	--	1.88	U	1.97	U	--	1.78	U	1.62	J	1.52	J	6%
N-MeFOSAA	2355-31-9	ng/l		1.8	U	1.73	U	1.75	U	1.82	U	1.95	U	2.02	U	--	1.88	U	0.949	J	--	1.78	U	0.608	J	1.88	U	--
PFAS VT 5 (total)		ng/l	20	6.864	Y	9.835	Y	3.297	Y	16.934	Y	8.862	Y	9.801	Y	10%	9.371	Y	9.847	Y	5%	3.123	Y	14.866	Y	14.049	Y	6%
Per- and Poly Fluoroalkyl Substances (PFAS)- LCMSMS-ID-TOP																											
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		0.831	J							2.28				--					--						--
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		31								89.8				--					--						--
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		1.91	U							1.84	U			--					--						--
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		72.4								60.4				--					--						--
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	1.91	U							1.01	J			--					--						--
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		32.2								31.6				--					--						--
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		1.91	U							1.84	U			--					--						--
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	9.3								28.3				--					--						--
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	2.42								3.15				--					--						--
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	7.2								24.8				--					--						--
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		1.91	U							1.84	U			--					--						--
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	1.96								9.03				--					--						--
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		1.91	U							1.84	U			--					--						--
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		1.28	J							5.92				--					--						--
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		0.381								2.38				--					--						--
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		1.91	U							0.42				--					--						--
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		1.91	U							1.15	J			--					--						--
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		0.358								2.04				--					--						--
PFAS VT 5 (total)		ng/l	20	20.88	Y							66.29	Y			--					--						--

NOTES:

VGES	Groundwater: Vermont Groundwater Enforcement Standard (I-Rule; July 6, 2019)
PFAS VT 5 (total)	sum of PFHxS, PFHpA, PFNA, PFOS, PFOA
--	No comparison-analytes not detected above detection limits
RPD	Relative Percent Difference between sample and blind field duplicate
ng/L	nanograms per liter
U	not detected above laboratory reporting limit
Y	calculated value
E	result exceeded calibration range
J	estimated; less than reporting limit, but greater than the method detection limit
Blank Cell	Not Analyzed
Bold	Cncentration above laboratory detection limit
Bold	Exceedance of VGES

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TABLE 2
WASTEWATER TREATMENT FACILITY INPUTS
TOP ANALYSIS SUMMARY

Parameter	CAS	Units	VGES	Essex Junction Wastewater Treatment Facility																			
				AUTUMN HARP					CASCADE STREET		EFFLUENT		INFLUENT		PEARL STREET MANHOLE		SUSIE WILSON ROAD		TWIN CRAFT		VELAN VALVE	
				8/3/2021		8/3/2021		RPD	8/3/2021		8/3/2021		8/3/2021		8/3/2021		8/3/2021		8/10/2021		8/17/2021	
				Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Per- and Poly Fluoroalkyl Substances (PFAS) - LCMSMS-ID																							
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		9.8	U	9.36	U	--	3.11	U	6.54		1.97	J	1.43		2.06	U	20	U	10	U
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		13.7		9.29	J	38%	2.26	J	9.16		4		11.4		5.58		18.4	J	11.2	
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2.06	U	20	U	10	U
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		3.41	J	2.92	J	15%	5.22		21.1		4.25		4.67		5.29		20	U	41.7	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	9.8	U	9.36	U	--	1.31	J	1.24	J	1.5		0.953	J	1.08		20	U	10	U
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		9.8	U	1.82	J	--	6.93		23.5		4.77		5.18		8.68		20	U	48.4	
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	2.68		2.01	U	1.93		20	U	10	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	1.27		9.36	U	--	2.39	J	3.2		1.85	J	3.39		1.44	J	20	U	6.9	J
Perfluorooctanesulfonamide (FOSA)	75491-6	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2.06	U	20	U	10	U
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	9.8	U	9.36	U	--	2.8	J	4		2.94	J	1.46	J	2.04	J	83.5		8.96	J
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	3.16	J	2.75	J	14%	6.81		6.72		3.85		4.19		2.62		18.5	J	17	
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2		20	U	10	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	9.8	U	9.36	U	--	1.63	J	1.85	J	1.59	J	1.37	J	0.811	J	62.9		2.4	J
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2.06	U	20	U	6.66	J
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		9.8	U	9.36	U	--	1.88	J	0.821	J	0.734	J	0.696	J	0.453	J	20	U	2.1	J
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2.06	U	20	U	10	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2.06	U	20	U	10	U
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2.06	U	20	U	10	U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2.06	U	20	U	10	U
4:2 Fluorotelomersulfonic acid (4:2FTS A)	757124-72-4	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2.06	U	20	U	10	U
6:2 Fluorotelomersulfonic acid (6:2FTS A)	27619-97-2	ng/l		11.2	U	10.2	U	--	20	U	2.09	U	20	U	1.84	U	2.78	U	20	U	10	U
8:2 Fluorotelomersulfonic acid (8:2FTS A)	39108-34-4	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2.06	U	20	U	10	U
N-EtFOSAA	2991-50-6	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	1.19	J	20	U	10	U
N-MeFOSAA	2355-31-9	ng/l		9.8	U	9.36	U	--	3.11	U	2.1	U	3.06	U	2.01	U	2.06	U	20	U	10	U
PFAS VT 5 (total)		ng/l	20	4.43	Y	2.75	Y	47%	14.94	Y	17.01	Y	11.73	Y	11.363	Y	7.991	Y	164.9	Y	35.26	Y
Per- and Poly Fluoroalkyl Substances (PFAS)- LCMSMS-ID-TOP																							
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		20	U	20	U	--	7.76	J	2.96		3.52	J	20	U	20	U	10	U	10	U
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		30.8	J	38.5	J	22%	382		26.1		130		46.6	U	71.2		35.5	J	418	
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		20	U	20	U	--	20	U	1.8	U	20	U	20	U	20	U	10	U	10	U
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		12.1	J	11	J	10%	600		26		83.3		50.8		51		9.46	J	670	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	20	U	20	U	--	20	U	1.04	J	20	U	20	U	20	U	10	U	10	U
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		7.04	J	7	J	1%	361		25.3		50.3		29.9		49.4		5.28	J	162	
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		20	U	20	U	--	20	U	1.8	U	20	U	20	U	20	U	10	U	10	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	4.84	J	3.92	J	21%	426		3.81		46.3		26.2		73.4		2.92	J	27	
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	20	U	20	U	--	20	U	3.72		5.48	J	20	U	20	U	2.64	J	10	U
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	7.44	J	6.08	J	20%	256		8.82		40.8		20.4		39.1		5.76	J	22.5	
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		20	U	20	U	--	20	U	1.8	U	20	U	20	U	20	U	10	U	10	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	20	U	20	U	--	200		1.91		18	J	9.2	J	23.1		2.08	J	7.24	J
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		20	U	20	U	--	20	U	1.8	U	20	U	20	U	20	U	10	U	10	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		20	U	20	U	--	114		0.93	J	8.56	J	5.6		9.08	J	10	U	4.66	J
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		20	U	20	U	--	54.8		1.8	U	20	U	20	U	20	U	10	U	1.88	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		20	U	20	U	--	12.6	J	1.8	U	20	U	20	U	20	U	10	U	10	U
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		20	U	20	U	--	24.5		1.8	U	20	U	20	U	20	U	10	U	10	U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		20	U	20	U	--	52.9		1.8	U	20	U	3.8		2.6		10	U	2.7	J
PFAS VT 5 (total)		ng/l	20	12.28	Y	10	Y	20%	882	Y	19.3	Y	110.58	Y	55.8	Y	135.6	Y	13.4	Y	56.74	Y

NOTES:

VGES	Groundwater: Vermont Groundwater Enforcement Standard (I-Rule; July 6, 2019)
PFAS VT 5 (total)	sum of PFHxS, PFHpA, PFNA, PFOS, PFOA
--	No comparison-analytes not detected above detection limits
RPD	Relative Percent Difference between sample and blind field duplicate
ng/L	nanograms per liter
U	not detected above laboratory reporting limit
Y	calculated value
E	result exceeded calibration range
J	estimated; less than reporting limit, but greater than the method detection limit
Blank Cell	Not Analyzed
Bold	Cncentration above laboratory detection limit
Bold	Exceedance of VGES

TABLE 2
WASTEWATER TREATMENT FACILITY INPUTS
TOP ANALYSIS SUMMARY

Parameter	CAS	Units	VGES	Middlebury Wastewater Treatment Facility													
				EFFLUENT		INFLUENT		NORTH SECTOR		PORTER		PUMP STATION 7		PUMP STATION 3		PUMP STATION 9	
				7/28/2021		7/28/2021		7/28/2021		7/28/2021		7/28/2021		7/28/2021		7/28/2021	
				Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
Per- and Poly Fluoroalkyl Substances (PFAS) - LCMSMS-ID																	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		2.5		2.03		0.868		1.97	U	1.5	J	0.944	J	1.32	J
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		2.28		3.82		6.51		1.78	J	7.68		5.5		1.57	J
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		1.8	U	1.78	U	2.09	U	1.97	U	1.84	U	1.8	U	1.95	U
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		9.35		7.35		2.96		1.72	J	7.32		1.86		1.21	J
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	1.8	U	1.78	U	2.09	U	1.64		2.95		1.8	U	0.794	
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		15.7		9.33		2.86		2.06		8.27		2.83		2.19	
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		1.8	U	1.78	U	2.09	U	1.97	U	1.84	U	1.8	U	1.95	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	1.54	J	0.904	J	0.805	J	0.574	J	2.45		0.786	J	0.837	J
Perfluorooctanesulfonamide (FOSA)	75491-6	ng/l		1.8	U	1.78	U	2.09	U	1.97	U	1.84	U	1.8	U	1.95	U
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	3.58		4.38		6.28		1.97	U	7.24		3.36		4.57	
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	4.2		3.54		3.17		1.34	J	3.53		2.21		2.19	
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		1.8	U	1.78	U	2.09	U	1.97	U	1.84	U	1.8	U	1.95	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	2.54		1.2	J	0.538	J	0.437	J	1.31	J	0.508	J	0.471	
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		1.8	U	1.78	U	2.09	U	5.62		1.84	U	1.46		1.95	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		0.788	J	1	J	0.893	J	0.429	J	1.58	J	0.498	J	0.584	J
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		1.8	U	1.78	U	2.09	U	1.97	U	1.84	U	1.8	U	1.95	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		1.8	U	1.78	U	2.09	U	1.97	U	1.84	U	1.8	U	1.95	U
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		1.8	U	1.78	U	0.705	J	1.97	U	0.28	J	1.8	U	1.95	U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		1.8	U	0.235		2.09	U	1.97	U	1.84	U	1.8	U	1.95	U
4:2 Fluorotelomersulfonic acid (4:2FTS A)	757124-72-4	ng/l		1.8	U	1.78	U	2.09	U	1.97	U	1.84	U	1.8	U	1.95	U
6:2 Fluorotelomersulfonic acid (6:2FTS A)	27619-97-2	ng/l		1.8	U	1.78	U	2.09	U	1.97	U	1.84	U	6.05		1.95	U
8:2 Fluorotelomersulfonic acid (8:2FTS A)	39108-34-4	ng/l		1.8	U	1.78	U	2.09	U	1.97	U	1.15	J	1.8	U	1.95	U
N-EtFOSAA	2991-50-6	ng/l		1.8	U	2.4		1.23	J	1.97	U	1.84	U	1.21	J	1.95	U
N-MeFOSAA	2355-31-9	ng/l		1.05		0.819	J	0.893	J	1.97	U	0.804	J	1.8	U	1.95	U
PFAS VT 5 (total)		ng/l	20	11.86	Y	10.024	Y	10.793	Y	3.991	Y	17.48	Y	6.864	Y	8.862	Y
Per- and Poly Fluoroalkyl Substances (PFAS)- LCMSMS-ID-TOP																	
Perfluorobutanesulfonic acid (PFBS)	375-73-5	ng/l		1.66	J	1.35	J	0.931	J	1.78	U	1.76	J	0.831	J	2.28	
Perfluorobutanoic acid (PFBA)	375-22-4	ng/l		19.2		18.2		40.5		7.25		67		31		89.8	
Perfluoropentanesulfonic Acid (PFPeS)	2706-91-4	ng/l		2.04	U	1.82	U	2.18	U	1.78	U	1.81	U	1.91	U	1.84	U
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/l		19.9		25.5		26.6		11.5		144		72.4		60.4	
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	ng/l	20	2.04	U	1.82	U	2.18	U	1.78	U	1.81	U	1.91	U	1.01	J
Perfluorohexanoic acid (PFHxA)	307-24-4	ng/l		19.8		18		14.5		3.47		56.6		32.2		31.6	
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	ng/l		2.04	U	1.82	U	2.18	U	1.78	U	1.81	U	1.91	U	1.84	U
Perfluoroheptanoic acid (PFHpA)	375-85-9	ng/l	20	3.08		6.45		21.6		3.22		14.2		9.3		28.3	
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	ng/l	20	3.13		2.93		1.07	J	0.768	J	6.64		2.42		3.15	
Perfluorooctanoic acid (PFOA)	335-67-1	ng/l	20	5.43		7.5		12.7		1.91		9.4		7.2		24.8	
Perfluorononanesulfonic acid (PFNS)	98789-57-2	ng/l		2.04	U	1.82	U	2.18	U	1.78	U	1.81	U	1.91	U	1.84	U
Perfluorononanoic acid (PFNA)	375-95-1	ng/l	20	2.44		2.61		6.24		0.886	J	3.25		1.96		9.03	
Perfluorodecanesulfonic acid (PFDS)	335-77-3	ng/l		2.04	U	1.82	U	2.18	U	1.78	U	1.81	U	1.91	U	1.84	U
Perfluorodecanoic acid (PFDA)	335-76-2	ng/l		0.701	J	1.48	J	3.09		0.466	J	2.27		1.28	J	5.92	
Perfluorododecanoic acid (PFDoA)	307-55-1	ng/l		2.04	U	0.364	J	1.33		1.78	U	0.62		0.381		2.38	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/l		2.04	U	1.82	U	2.18	U	1.78	U	1.81	U	1.91	U	0.42	
Perfluorotetradecanoic acid (PFTA)	376-06-7	ng/l		2.04	U	1.82	U	0.748		1.78	U	0.261		1.91	U	1.15	J
Perfluoroundecanoic acid (PFUnA)	2058-94-8	ng/l		2.04	U	0.561	J	1.11	J	1.78	U	0.562		0.358		2.04	
PFAS VT 5 (total)		ng/l	20	14.08	Y	19.49	Y	41.61	Y	6.784	Y	33.49	Y	20.88	Y	66.29	Y

NOTES:

VGES	Groundwater: Vermont Groundwater Enforcement Standard (I-Rule; July 6, 2019)
PFAS VT 5 (total)	sum of PFHxS, PFHpA, PFNA, PFOS, PFOA
--	No comparison-analytes not detected above detection limits
RPD	Relative Percent Difference between sample and blind field duplicate
ng/L	nanograms per liter
U	not detected above laboratory reporting limit
Y	calculated value
E	result exceeded calibration range
J	estimated; less than reporting limit, but greater than the method detection limit
Blank Cell	Not Analyzed
Bold	Cncentration above laboratory detection limit
Bold	Exceedance of VGES

FIGURES

Weston & Sampson

SUSIE WILSON ROAD MANHOLE

PEARL STREET MANHOLE

CASCADE STREET PUMP STATION

INFLUENT- COMP

EFFLUENT- COMP

Approximate Sewershed Area

N

700 350 0 700 1400

SCALE: 1"=700'

NO	DATE	BY	DESCRIPTION
-	-	-	-

DRAWN BY: REG | CHK'D BY: SJL | 09/30/2021

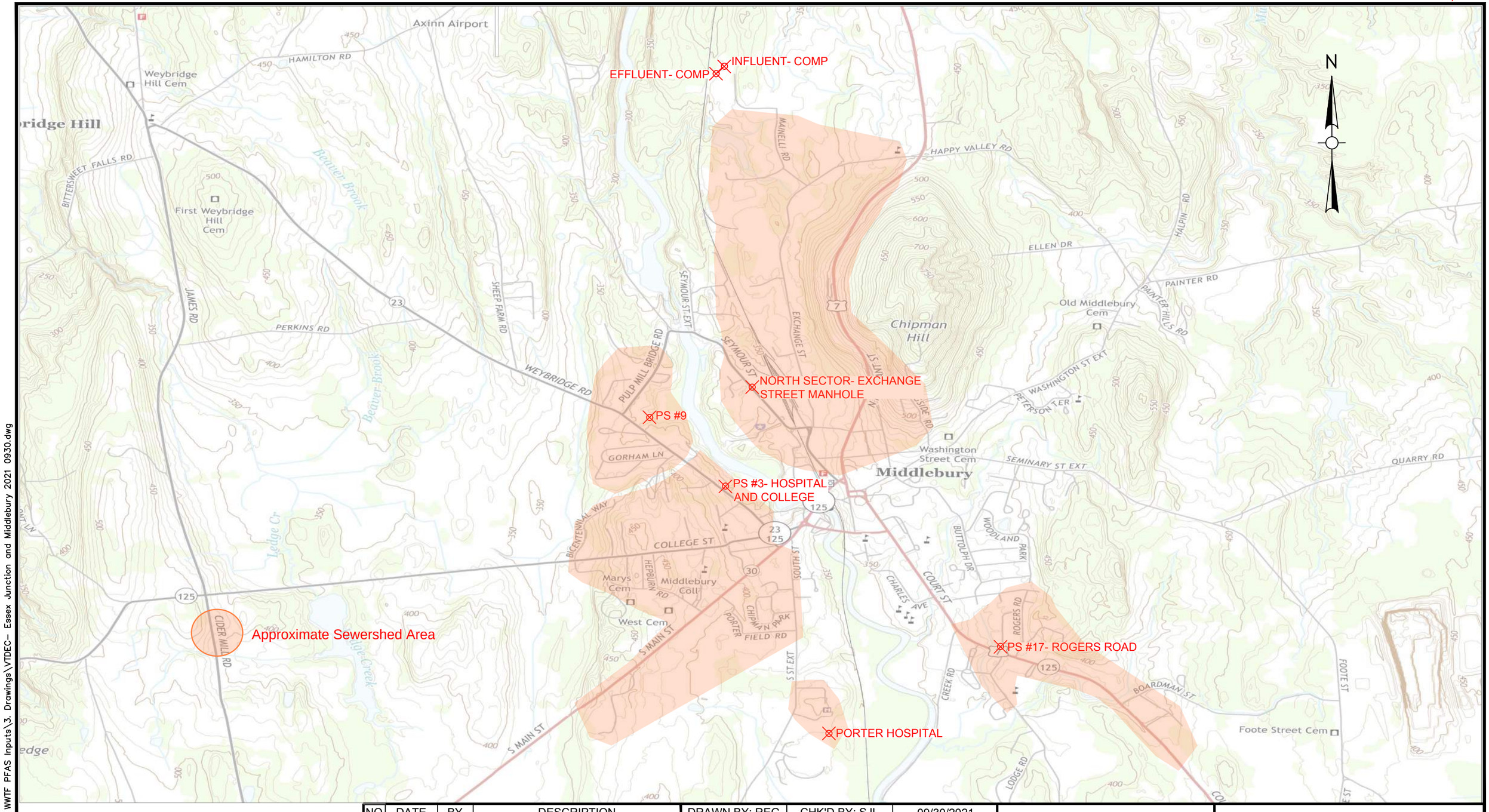
Weston & Sampson℠

ESSEX JUNCTION SAMPLE AND SEWERSHED LOCATIONS

FIGURE 1:
ESSEX JCT, VERMONT
VTDEC PFAS INPUTS TO WWTF

P:\VT\VTDEC WWTF PFAS Inputs\3. Drawings\VTDEC– Essex Junction and Middlebury 2021 0930.dwg

Weston & Sampson



1700 850 0 1700 3400

SCALE: 1”=1700’

NO	DATE	BY	DESCRIPTION
-	-	-	-

DRAWN BY: REG | CHK'D BY: SJL | 09/30/2021

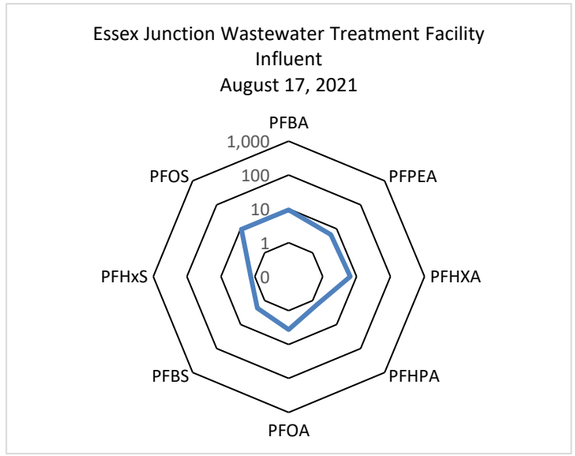
Weston & Sampson

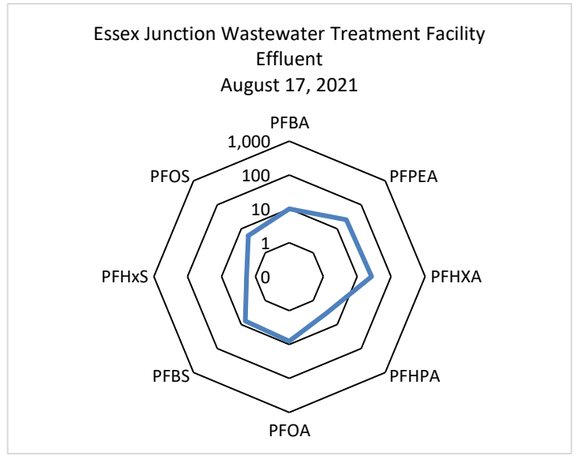
MIDDLEBURY SAMPLE AND SEWERSHED LOCATIONS

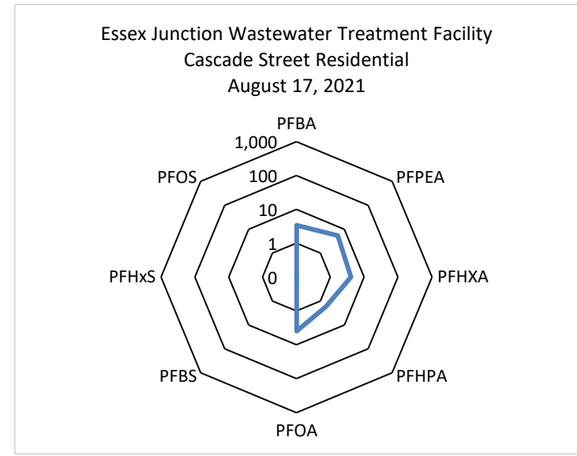
FIGURE 2:
MIDDLEBURY, VERMONT
VTDEC PFAS INPUTS TO WWTF

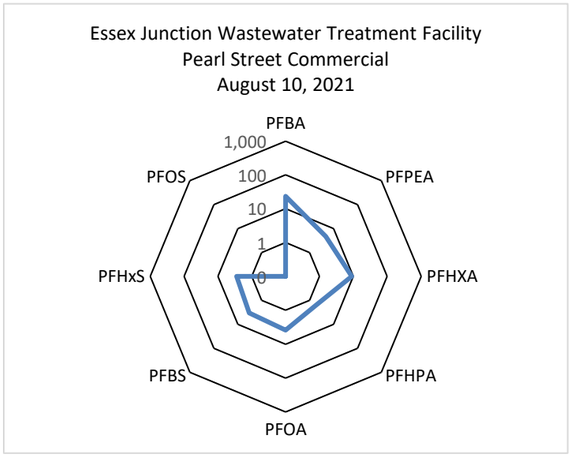
P:\VT\VTDEC WWTF PFAS Inputs\3. Drawings\VTDEC– Essex Junction and Middlebury 2021 0930.dwg

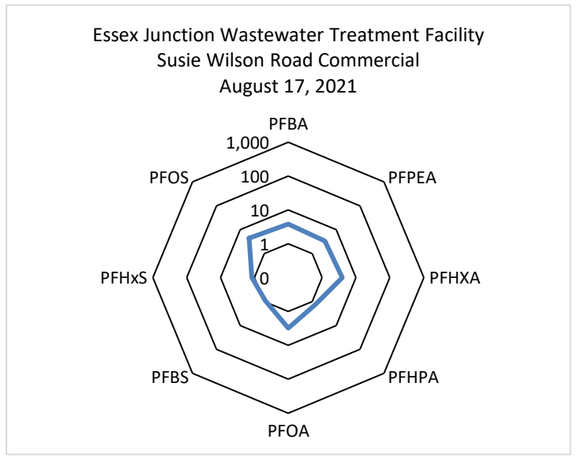
Essex Junction Multivariate Graphs

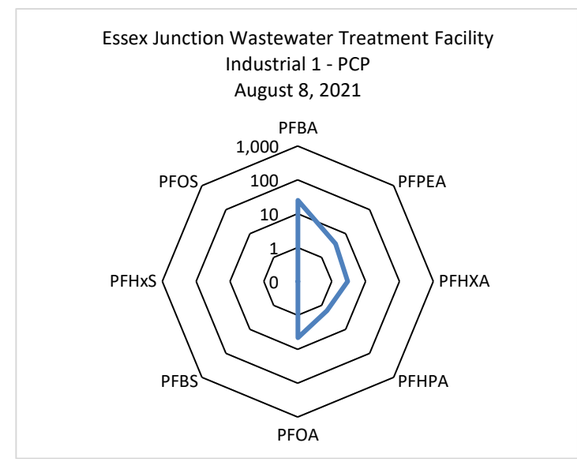


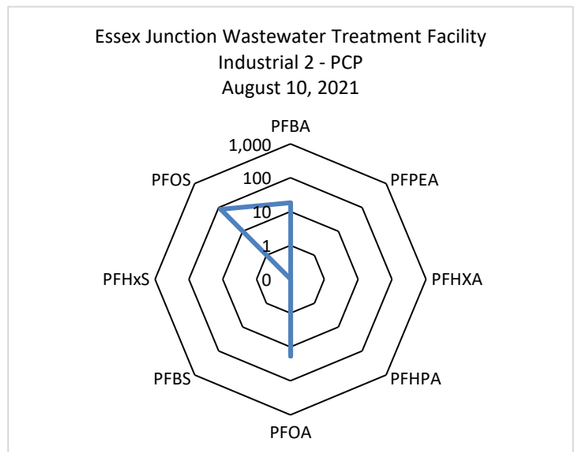


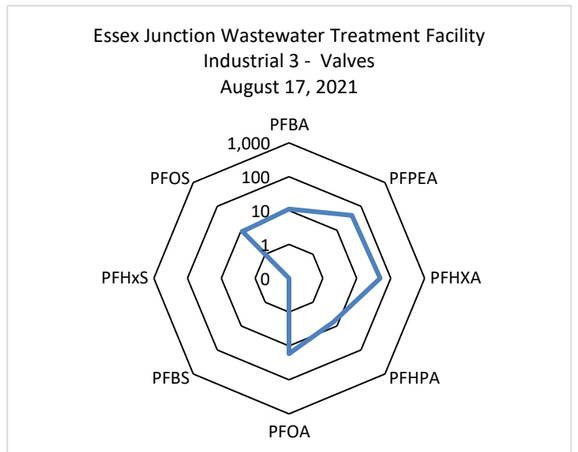


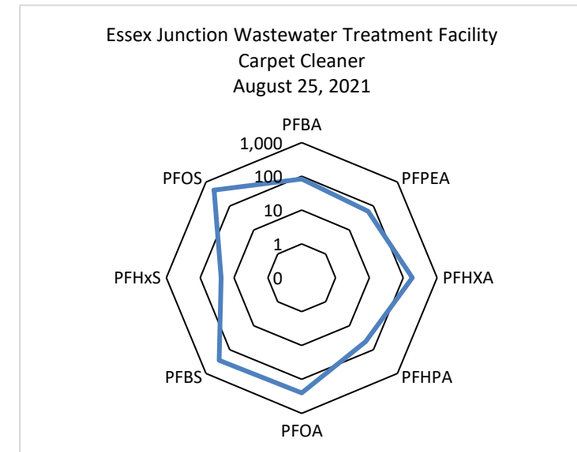




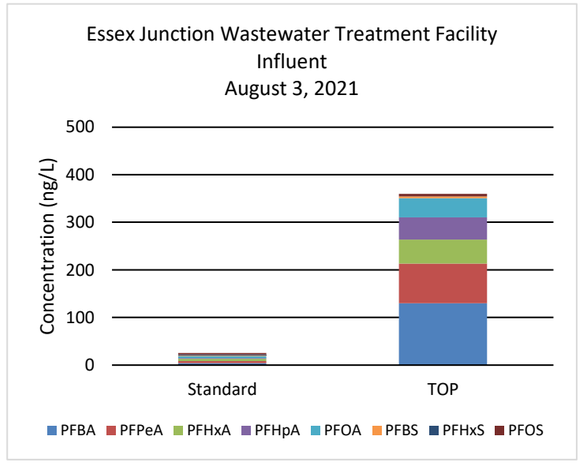


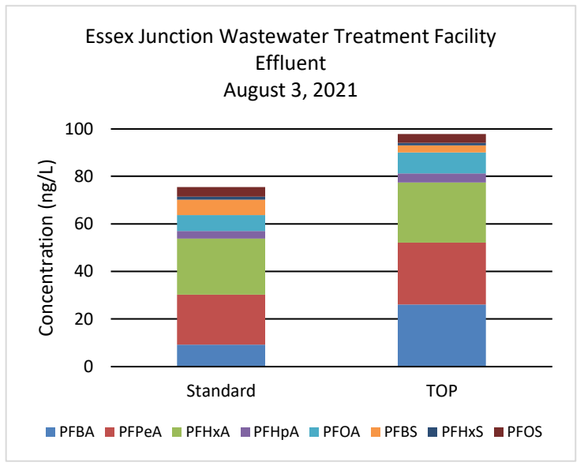


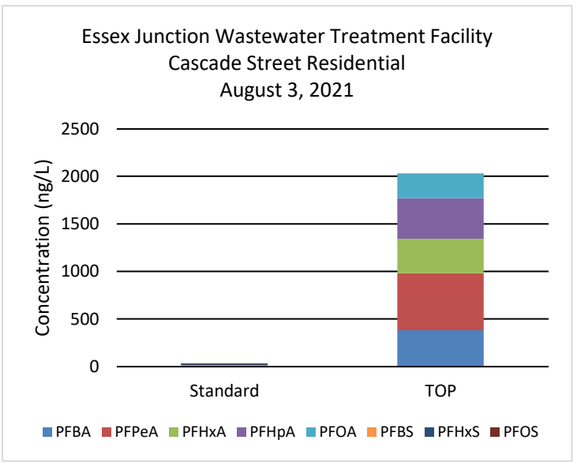


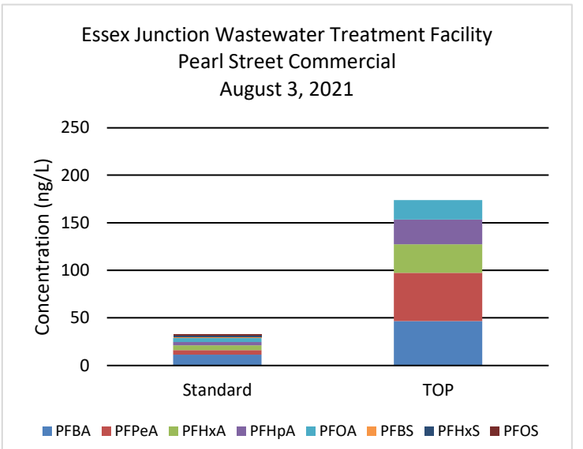


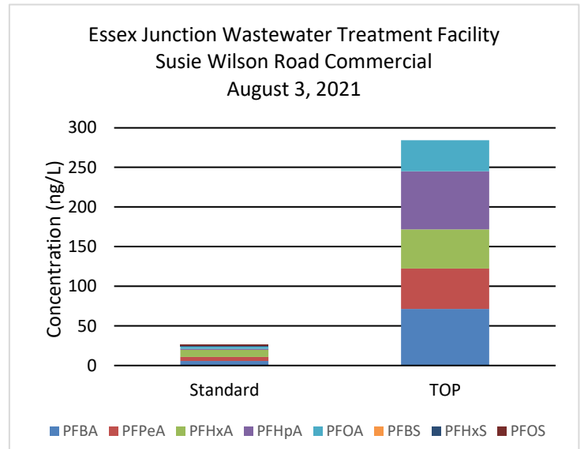
Essex Junction TOP Graphs

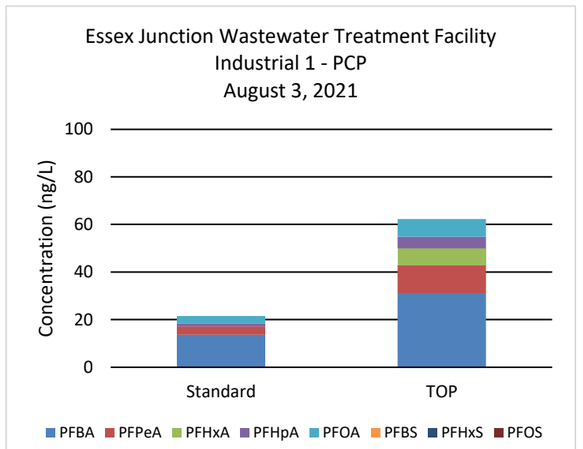


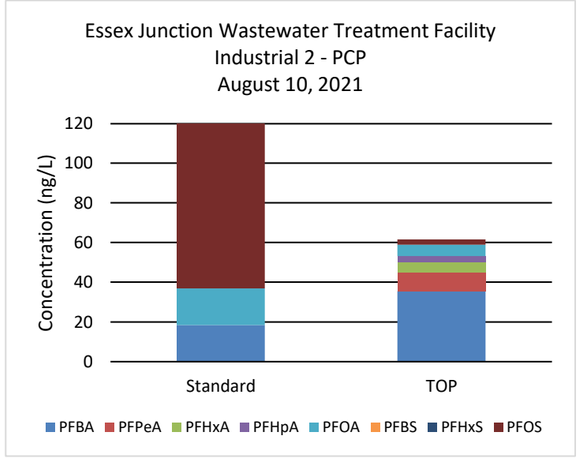


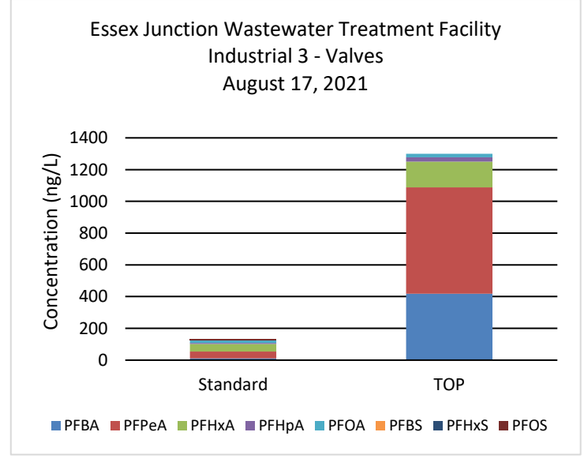






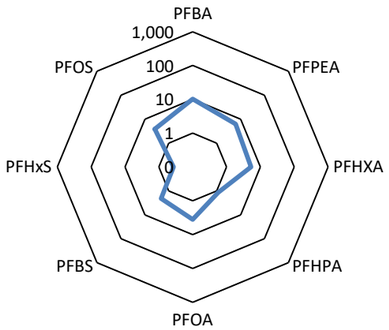




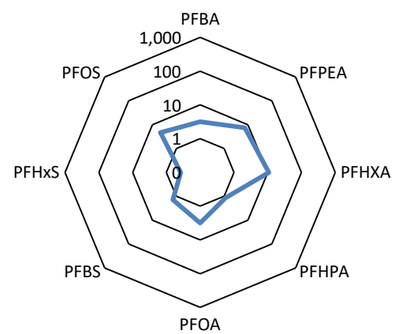


Middlebury Multivariate Graphs

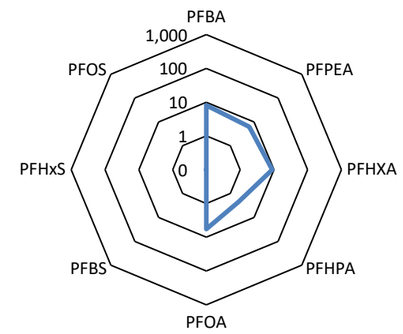
Middlebury Wastewater Treatment Facility
Influent
August 18, 2021



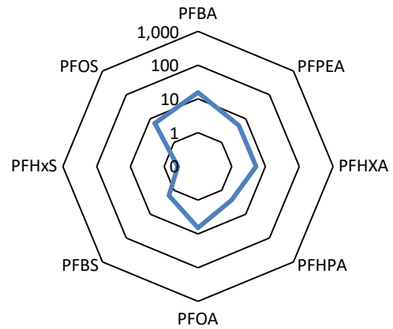
Middlebury Wastewater Treatment Facility
Effluent
August 4, 2021



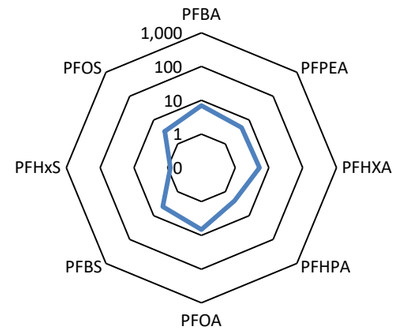
Middlebury Wastewater Treatment Facility
Porter
August 4, 2021



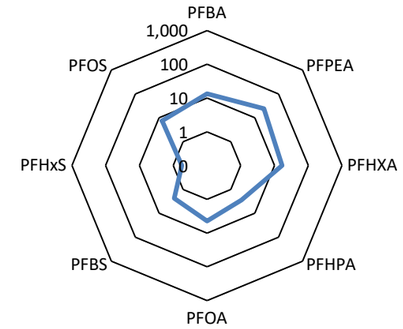
Middlebury Wastewater Treatment Facility
PS3 Porter & College
August 18, 2021



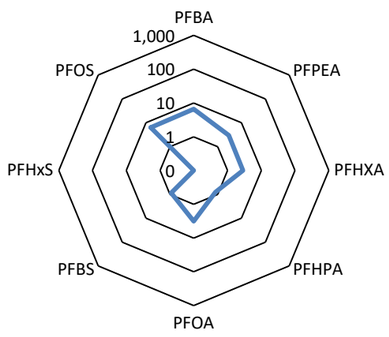
Middlebury Wastewater Treatment Facility
PS9 Residential
August 18, 2021



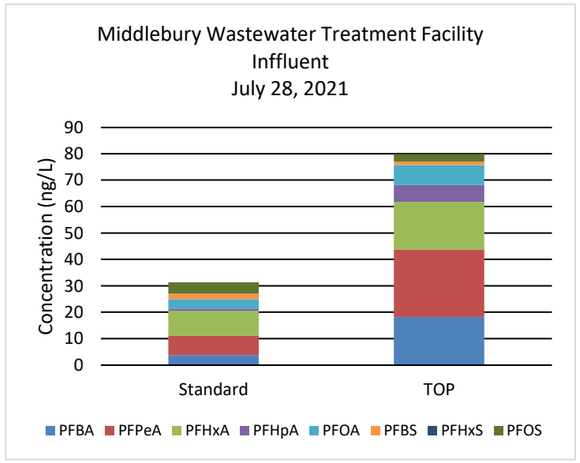
Middlebury Wastewater Treatment Facility
PS7 Commercial
August 18, 2021

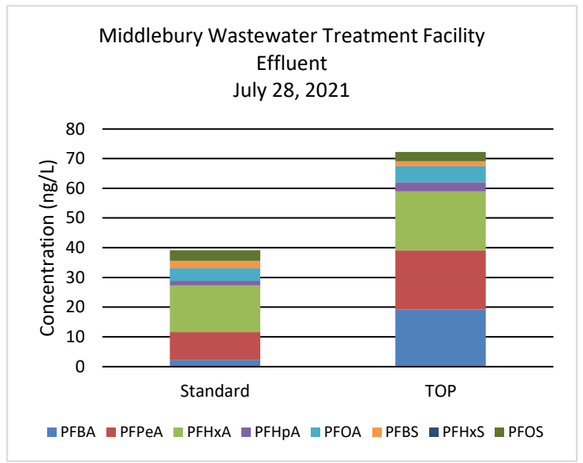


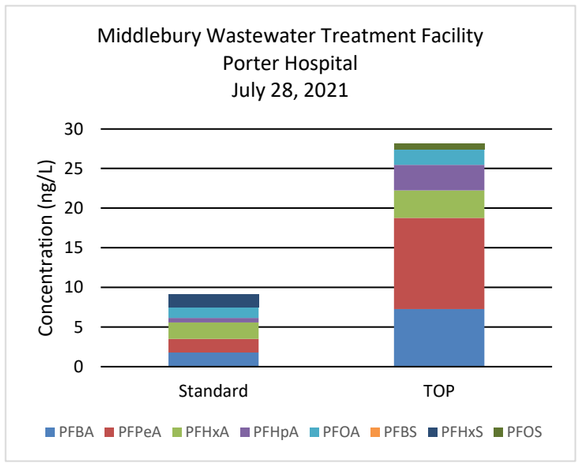
Middlebury Wastewater Treatment Facility
North Sector Industrial
July 28, 2021

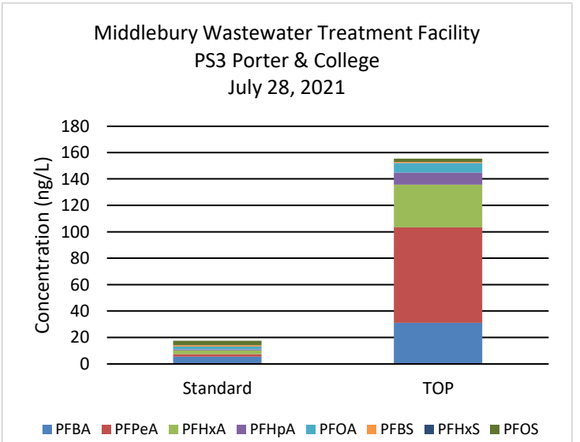


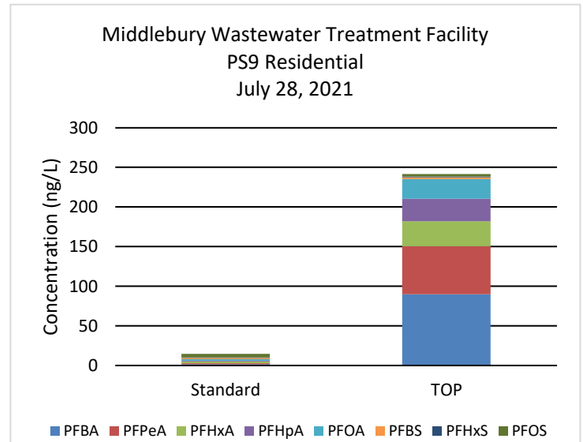
Middlebury TOP Graphs

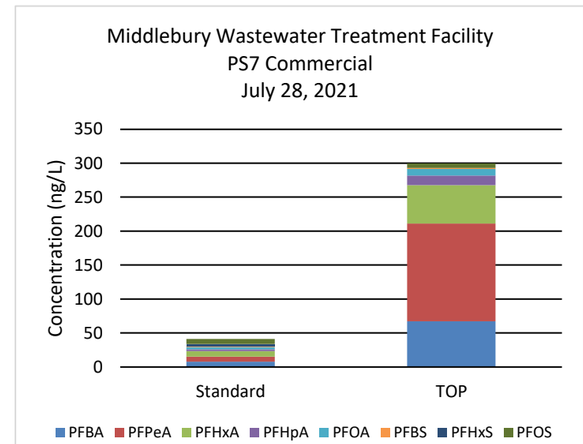


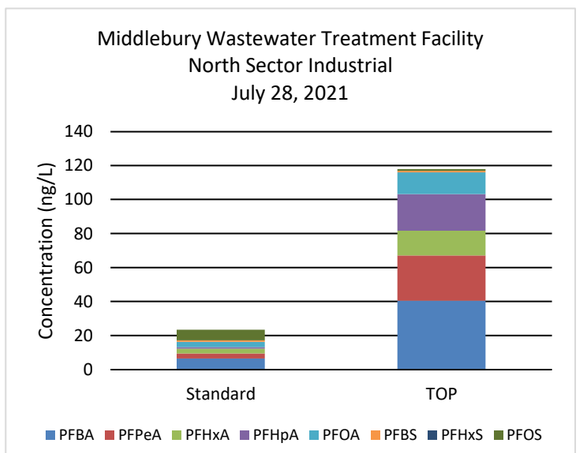












Weston & Sampson SM

APPENDIX A

ANALYTICAL REPORT

Lab Number:	L2140706
Client:	Weston & Sampson 98 South Main Street Suite 2 Waterbury, VT 05676
ATTN:	Steven LaRosa
Phone:	(802) 244-5051
Project Name:	VT DEC WWTF PFAS INPUT
Project Number:	Not Specified
Report Date:	08/05/21

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).

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

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2140706-01	PS17-07282021	WATER	MIDDLEBURY, VT	07/28/21 12:30	07/29/21
L2140706-02	PORTER-07282021	WATER	MIDDLEBURY, VT	07/28/21 14:00	07/29/21
L2140706-03	PS3-07282021	WATER	MIDDLEBURY, VT	07/28/21 13:30	07/29/21
L2140706-04	NSECTOR-07282021	WATER	MIDDLEBURY, VT	07/28/21 10:40	07/29/21
L2140706-05	PS9-07282021	WATER	MIDDLEBURY, VT	07/28/21 13:00	07/29/21
L2140706-06	INFLUENT-07282021	WATER	MIDDLEBURY, VT	07/28/21 14:45	07/29/21
L2140706-07	EFFLUENT-07282021	WATER	MIDDLEBURY, VT	07/28/21 14:45	07/29/21
L2140706-08	QA	WATER	MIDDLEBURY, VT	07/28/21 13:00	07/29/21

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2140706
Project Number:	Not Specified	**Report Date:**	08/05/21

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: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706
Project Number: Not Specified **Report Date:** 08/05/21

Case Narrative (continued)

Report Submission
All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution
L2140706-01, -02, -03, -04, -05, -06, -07, and -08: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.
L2140706-01, -02, -03, -04, -05, -06, and -07: The sample was centrifuged and decanted prior to extraction due to sample matrix.

Perfluorinated Alkyl Acids by Isotope Dil. (Post-Treatment)
L2140706-01, -03, -04, -05, -06, and -07: The following surrogate is a negative control for the TOP Assay: M2-4:2FTS. Low recoveries of this surrogate demonstrate that the associated compounds have been converted to a different PFAS constituent (Limit 0-25%).
L2140706-01 through -06: The samples were centrifuged and decanted prior to extraction due to sample matrix.
L2140706-01, -02, -03, -04, -05, and -07: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.
L2140706-02: The following surrogate is a negative control for the TOP Assay: M2-4:2FTS. Low recoveries of this surrogate demonstrate that the associated compounds have been converted to a different PFAS constituent (Limit 0-25%). Please note, this sample did not exhibit complete oxidation.
WG1530910-4, WG1530910-5, and WG1530910-6: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.
WG1530910-6: This blank represents the TOP extraction blank associated with L2140706-01 through -07.
WG1530910-6: The following surrogate is a negative control for the TOP Assay: M2-4:2FTS. Low recoveries of this surrogate demonstrate that the associated compounds have been converted to a different PFAS constituent (Limit 0-25%).

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2140706
Project Number:	Not Specified	**Report Date:**	08/05/21

Case Narrative (continued)

The WG1530910-4 Laboratory Duplicate RPDs for perfluoroheptanoic acid (pfhpa) (34%), perfluorooctanoic acid (pfoa) (37%), and perfluorodecanoic acid (pfda) (48%) performed on L2140706-04, are outside the acceptance criteria. The elevated RPDs have been attributed to the non-homogeneous nature of the native sample.

The WG1530910-5 Laboratory Duplicate RPD for perfluorooctanesulfonic acid (pfos) (91%), performed on L2140706-05, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

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: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 08/05/21

ORGANICS

SEMIVOLATILES

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-01
Client ID: PS17-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 12:30
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 01:06
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	7.68		ng/l	1.84	0.376	1
Perfluoropentanoic Acid (PFPeA)	7.32		ng/l	1.84	0.365	1
Perfluorobutanesulfonic Acid (PFBS)	1.50	J	ng/l	1.84	0.219	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.84	0.416	1
Perfluorohexanoic Acid (PFHxA)	8.27		ng/l	1.84	0.302	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.84	0.226	1
Perfluoroheptanoic Acid (PFHpA)	2.45		ng/l	1.84	0.208	1
Perfluorohexanesulfonic Acid (PFHxS)	2.95	F	ng/l	1.84	0.346	1
Perfluorooctanoic Acid (PFOA)	3.53		ng/l	1.84	0.217	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.84	1.23	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.84	0.634	1
Perfluorononanoic Acid (PFNA)	1.31	J	ng/l	1.84	0.288	1
Perfluorooctanesulfonic Acid (PFOS)	7.24	F	ng/l	1.84	0.464	1
Perfluorodecanoic Acid (PFDA)	1.58	J	ng/l	1.84	0.280	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	1.15	J	ng/l	1.84	1.12	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.84	1.03	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.804	J	ng/l	1.84	0.597	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.84	0.240	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.84	0.903	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.84	0.534	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.84	0.741	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.84	0.343	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.84	0.302	1
Perfluorotetradecanoic Acid (PFTA)	0.280	J	ng/l	1.84	0.228	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-01 Date Collected: 07/28/21 12:30

Client ID: PS17-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	96		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	81		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**168**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	72		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	107		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**414**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	77		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	99		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**172**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	32		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	64		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	17		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	52		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	53		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	47		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-01
Client ID: PS17-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 12:30
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 15:55
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 11:22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	67.0		ng/l	4.53	0.370	1
Perfluoropentanoic Acid (PFPeA)	144		ng/l	1.81	0.359	1
Perfluorobutanesulfonic Acid (PFBS)	1.76	J	ng/l	1.81	0.216	1
Perfluorohexanoic Acid (PFHxA)	56.6		ng/l	1.81	0.298	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.81	0.222	1
Perfluoroheptanoic Acid (PFHpA)	14.2		ng/l	1.81	0.204	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.81	0.341	1
Perfluorooctanoic Acid (PFOA)	9.40		ng/l	1.81	0.214	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.81	0.624	1
Perfluorononanoic Acid (PFNA)	3.25		ng/l	1.81	0.283	1
Perfluorooctanesulfonic Acid (PFOS)	6.64		ng/l	1.81	0.457	1
Perfluorodecanoic Acid (PFDA)	2.27		ng/l	1.81	0.276	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.81	1.02	1
Perfluoroundecanoic Acid (PFUnA)	0.562	JF	ng/l	1.81	0.236	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.81	0.889	1
Perfluorododecanoic Acid (PFDoA)	0.620	JF	ng/l	1.81	0.337	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.81	0.297	1
Perfluorotetradecanoic Acid (PFTA)	0.261	JF	ng/l	1.81	0.225	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-01 Date Collected: 07/28/21 12:30

Client ID: PS17-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	65		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	68		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	86		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	5		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**53**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	**54**	Q	60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	80		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	**59**	Q	62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	64		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	80		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**61**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**53**	Q	55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**46**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	59		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	**45**	Q	50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	57		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	**44**	Q	50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-02
Client ID: PORTER-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 14:00
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 01:23
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	1.78	J	ng/l	1.97	0.401	1
Perfluoropentanoic Acid (PFPeA)	1.72	J	ng/l	1.97	0.390	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.97	0.234	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.97	0.445	1
Perfluorohexanoic Acid (PFHxA)	2.06		ng/l	1.97	0.323	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.97	0.241	1
Perfluoroheptanoic Acid (PFHpA)	0.574	J	ng/l	1.97	0.222	1
Perfluorohexanesulfonic Acid (PFHxS)	1.64	JF	ng/l	1.97	0.370	1
Perfluorooctanoic Acid (PFOA)	1.34	J	ng/l	1.97	0.232	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.97	1.31	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.97	0.677	1
Perfluorononanoic Acid (PFNA)	0.437	J	ng/l	1.97	0.307	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.97	0.496	1
Perfluorodecanoic Acid (PFDA)	0.429	J	ng/l	1.97	0.299	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.97	1.19	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.97	1.10	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.97	0.638	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.97	0.256	1
Perfluorodecanesulfonic Acid (PFDS)	5.62	F	ng/l	1.97	0.964	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.97	0.571	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.97	0.791	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.97	0.366	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.97	0.322	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.97	0.244	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-02 Date Collected: 07/28/21 14:00

Client ID: PORTER-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	83		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	87		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**242**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**51**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	77		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	80		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**394**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	91		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**303**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	32		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**53**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	18		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	66		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	73		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	105		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-02
Client ID: PORTER-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 14:00
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 16:28
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 11:22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	7.25		ng/l	4.45	0.363	1
Perfluoropentanoic Acid (PFPeA)	11.5		ng/l	1.78	0.352	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.78	0.212	1
Perfluorohexanoic Acid (PFHxA)	3.47		ng/l	1.78	0.292	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.78	0.218	1
Perfluoroheptanoic Acid (PFHpA)	3.22		ng/l	1.78	0.200	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.78	0.334	1
Perfluorooctanoic Acid (PFOA)	1.91		ng/l	1.78	0.210	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.78	0.612	1
Perfluorononanoic Acid (PFNA)	0.886	J	ng/l	1.78	0.277	1
Perfluorooctanesulfonic Acid (PFOS)	0.768	J	ng/l	1.78	0.448	1
Perfluorodecanoic Acid (PFDA)	0.466	J	ng/l	1.78	0.270	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.78	0.996	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.78	0.231	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.78	0.872	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.78	0.331	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.78	0.291	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.78	0.220	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-02 Date Collected: 07/28/21 14:00

Client ID: PORTER-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	**56**	Q	58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	63		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	83		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**57**	Q	0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**52**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	**55**	Q	60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	75		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	**58**	Q	62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	69		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	70		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**56**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**53**	Q	55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**17**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	58		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	**40**	Q	50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	53		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	**40**	Q	50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-03
Client ID: PS3-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 13:30
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 01:39
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	5.50		ng/l	1.80	0.368	1
Perfluoropentanoic Acid (PFPeA)	1.86		ng/l	1.80	0.357	1
Perfluorobutanesulfonic Acid (PFBS)	0.944	J	ng/l	1.80	0.214	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.80	0.407	1
Perfluorohexanoic Acid (PFHxA)	2.83		ng/l	1.80	0.296	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.80	0.221	1
Perfluoroheptanoic Acid (PFHpA)	0.786	J	ng/l	1.80	0.203	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.80	0.339	1
Perfluorooctanoic Acid (PFOA)	2.21		ng/l	1.80	0.213	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	6.05		ng/l	1.80	1.20	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.80	0.620	1
Perfluorononanoic Acid (PFNA)	0.508	J	ng/l	1.80	0.281	1
Perfluorooctanesulfonic Acid (PFOS)	3.36	F	ng/l	1.80	0.454	1
Perfluorodecanoic Acid (PFDA)	0.498	J	ng/l	1.80	0.274	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.80	1.09	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.80	1.01	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.80	0.584	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.80	0.234	1
Perfluorodecanesulfonic Acid (PFDS)	1.46	JF	ng/l	1.80	0.883	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.80	0.523	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	1.21	J	ng/l	1.80	0.725	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.80	0.335	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.80	0.295	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.80	0.224	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-03 Date Collected: 07/28/21 13:30

Client ID: PS3-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	92		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	95		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**227**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	83		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**318**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	98		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	103		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	136		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	52		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	67		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	25		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	113		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	102		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**227**	Q	22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-03
Client ID: PS3-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 13:30
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 16:44
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 11:22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	31.0		ng/l	4.78	0.389	1
Perfluoropentanoic Acid (PFPeA)	72.4		ng/l	1.91	0.378	1
Perfluorobutanesulfonic Acid (PFBS)	0.831	J	ng/l	1.91	0.227	1
Perfluorohexanoic Acid (PFHxA)	32.2		ng/l	1.91	0.313	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.91	0.234	1
Perfluoroheptanoic Acid (PFHpA)	9.30		ng/l	1.91	0.215	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.91	0.358	1
Perfluorooctanoic Acid (PFOA)	7.20		ng/l	1.91	0.225	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.91	0.656	1
Perfluorononanoic Acid (PFNA)	1.96		ng/l	1.91	0.297	1
Perfluorooctanesulfonic Acid (PFOS)	2.42		ng/l	1.91	0.480	1
Perfluorodecanoic Acid (PFDA)	1.28	J	ng/l	1.91	0.290	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.91	1.07	1
Perfluoroundecanoic Acid (PFUnA)	0.358	JF	ng/l	1.91	0.248	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.91	0.934	1
Perfluorododecanoic Acid (PFDoA)	0.381	JF	ng/l	1.91	0.355	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.91	0.312	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.91	0.236	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-03 Date Collected: 07/28/21 13:30

Client ID: PS3-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	59		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	62		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	82		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	12		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**52**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	**53**	Q	60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	76		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	**55**	Q	62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	70		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	70		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**54**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**53**	Q	55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**44**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	53		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	**39**	Q	50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	**49**	Q	50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	**39**	Q	50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-04
Client ID: NSECTOR-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 10:40
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 01:56
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	6.51		ng/l	2.09	0.426	1
Perfluoropentanoic Acid (PFPeA)	2.96		ng/l	2.09	0.413	1
Perfluorobutanesulfonic Acid (PFBS)	0.868	JF	ng/l	2.09	0.248	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.09	0.472	1
Perfluorohexanoic Acid (PFHxA)	2.86		ng/l	2.09	0.342	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.09	0.256	1
Perfluoroheptanoic Acid (PFHpA)	0.805	J	ng/l	2.09	0.235	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.09	0.392	1
Perfluorooctanoic Acid (PFOA)	3.17		ng/l	2.09	0.246	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.09	1.39	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.09	0.718	1
Perfluorononanoic Acid (PFNA)	0.538	J	ng/l	2.09	0.326	1
Perfluorooctanesulfonic Acid (PFOS)	6.28		ng/l	2.09	0.526	1
Perfluorodecanoic Acid (PFDA)	0.893	J	ng/l	2.09	0.317	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.09	1.26	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.09	1.17	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.893	J	ng/l	2.09	0.676	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.09	0.271	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.09	1.02	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.09	0.605	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	1.23	J	ng/l	2.09	0.839	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.09	0.388	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.09	0.341	1
Perfluorotetradecanoic Acid (PFTA)	0.705	J	ng/l	2.09	0.259	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-04 Date Collected: 07/28/21 10:40
Client ID: NSECTOR-07282021 Date Received: 07/29/21
Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	88		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	83		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	107		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**189**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	75		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	114		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	102		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**303**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	102		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**167**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	38		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**40**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	17		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	75		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	57		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	122		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-04
Client ID: NSECTOR-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 10:40
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 17:01
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 11:22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	40.5		ng/l	9.81	0.444	1
Perfluoropentanoic Acid (PFPeA)	26.6		ng/l	2.18	0.431	1
Perfluorobutanesulfonic Acid (PFBS)	0.931	J	ng/l	2.18	0.259	1
Perfluorohexanoic Acid (PFHxA)	14.5		ng/l	2.18	0.357	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.18	0.267	1
Perfluoroheptanoic Acid (PFHpA)	21.6		ng/l	2.18	0.245	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.18	0.409	1
Perfluorooctanoic Acid (PFOA)	12.7		ng/l	2.18	0.257	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.18	0.748	1
Perfluorononanoic Acid (PFNA)	6.24		ng/l	2.18	0.339	1
Perfluorooctanesulfonic Acid (PFOS)	1.07	J	ng/l	2.18	0.548	1
Perfluorodecanoic Acid (PFDA)	3.09		ng/l	2.18	0.331	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.18	1.22	1
Perfluoroundecanoic Acid (PFUnA)	1.11	J	ng/l	2.18	0.283	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.18	1.07	1
Perfluorododecanoic Acid (PFDoA)	1.33	JF	ng/l	2.18	0.405	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.18	0.356	1
Perfluorotetradecanoic Acid (PFTA)	0.748	JF	ng/l	2.18	0.270	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-04 Date Collected: 07/28/21 10:40

Client ID: NSECTOR-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	70		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	76		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	90		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	2		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	67		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	65		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	85		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	65		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	71		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	75		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**60**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	61		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	58		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	66		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	**49**	Q	50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	**49**	Q	50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	**47**	Q	50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-05
Client ID: PS9-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 13:00
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 02:13
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	1.57	J	ng/l	1.95	0.397	1
Perfluoropentanoic Acid (PFPeA)	1.21	J	ng/l	1.95	0.385	1
Perfluorobutanesulfonic Acid (PFBS)	1.32	J	ng/l	1.95	0.232	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.95	0.440	1
Perfluorohexanoic Acid (PFHxA)	2.19	F	ng/l	1.95	0.319	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.95	0.239	1
Perfluoroheptanoic Acid (PFHpA)	0.837	J	ng/l	1.95	0.219	1
Perfluorohexanesulfonic Acid (PFHxS)	0.794	JF	ng/l	1.95	0.366	1
Perfluorooctanoic Acid (PFOA)	2.19		ng/l	1.95	0.230	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.95	1.30	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.95	0.670	1
Perfluorononanoic Acid (PFNA)	0.471	JF	ng/l	1.95	0.304	1
Perfluorooctanesulfonic Acid (PFOS)	4.57	F	ng/l	1.95	0.490	1
Perfluorodecanoic Acid (PFDA)	0.584	J	ng/l	1.95	0.296	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.95	1.18	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.95	1.09	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.95	0.631	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.95	0.253	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.95	0.954	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.95	0.564	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.95	0.782	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.95	0.362	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.95	0.318	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.95	0.241	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-05 Date Collected: 07/28/21 13:00

Client ID: PS9-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	103		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	100		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	115		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**307**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	84		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	93		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	117		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	108		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**411**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	108		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	110		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	106		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	152		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	32		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	58		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	17		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	57		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	75		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	125		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-05
Client ID: PS9-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 13:00
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 17:34
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 11:22

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	89.8		ng/l	4.60	0.376	1
Perfluoropentanoic Acid (PFPeA)	60.4		ng/l	1.84	0.365	1
Perfluorobutanesulfonic Acid (PFBS)	2.28		ng/l	1.84	0.219	1
Perfluorohexanoic Acid (PFHxA)	31.6		ng/l	1.84	0.302	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.84	0.226	1
Perfluoroheptanoic Acid (PFHpA)	28.3		ng/l	1.84	0.207	1
Perfluorohexanesulfonic Acid (PFHxS)	1.01	J	ng/l	1.84	0.346	1
Perfluorooctanoic Acid (PFOA)	24.8		ng/l	1.84	0.217	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.84	0.634	1
Perfluorononanoic Acid (PFNA)	9.03		ng/l	1.84	0.287	1
Perfluorooctanesulfonic Acid (PFOS)	3.15		ng/l	1.84	0.464	1
Perfluorodecanoic Acid (PFDA)	5.92		ng/l	1.84	0.280	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.84	1.03	1
Perfluoroundecanoic Acid (PFUnA)	2.04		ng/l	1.84	0.240	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.84	0.903	1
Perfluorododecanoic Acid (PFDoA)	2.38		ng/l	1.84	0.343	1
Perfluorotridecanoic Acid (PFTrDA)	0.420	JF	ng/l	1.84	0.301	1
Perfluorotetradecanoic Acid (PFTA)	1.15	J	ng/l	1.84	0.228	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-05 Date Collected: 07/28/21 13:00

Client ID: PS9-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	68		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	72		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	79		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	1		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	63		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	61		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	76		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	**59**	Q	62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	73		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	72		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**58**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	60		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	53		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	60		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	**46**	Q	50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	50		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	**44**	Q	50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-06
Client ID: INFLUENT-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 14:45
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 02:29
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	3.82		ng/l	1.78	0.363	1
Perfluoropentanoic Acid (PFPeA)	7.35		ng/l	1.78	0.352	1
Perfluorobutanesulfonic Acid (PFBS)	2.03		ng/l	1.78	0.212	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.78	0.402	1
Perfluorohexanoic Acid (PFHxA)	9.33		ng/l	1.78	0.292	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.78	0.218	1
Perfluoroheptanoic Acid (PFHpA)	0.904	J	ng/l	1.78	0.200	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.78	0.335	1
Perfluorooctanoic Acid (PFOA)	3.54		ng/l	1.78	0.210	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.78	1.18	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.78	0.612	1
Perfluorononanoic Acid (PFNA)	1.20	J	ng/l	1.78	0.278	1
Perfluorooctanesulfonic Acid (PFOS)	4.38		ng/l	1.78	0.448	1
Perfluorodecanoic Acid (PFDA)	1.00	J	ng/l	1.78	0.270	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.78	1.08	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.78	0.997	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.819	J	ng/l	1.78	0.577	1
Perfluoroundecanoic Acid (PFUnA)	0.235	JF	ng/l	1.78	0.231	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.78	0.872	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.78	0.516	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2.40	F	ng/l	1.78	0.716	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.78	0.331	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.78	0.291	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.78	0.221	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-06 Date Collected: 07/28/21 14:45

Client ID: INFLUENT-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	84		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	81		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**171**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	65		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	116		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	90		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**313**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	98		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	88		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**253**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	70		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	56		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	64		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	51		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	108		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-06
Client ID: INFLUENT-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 14:45
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 18:07
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 11:24

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	18.2		ng/l	4.55	0.372	1
Perfluoropentanoic Acid (PFPeA)	25.5		ng/l	1.82	0.361	1
Perfluorobutanesulfonic Acid (PFBS)	1.35	J	ng/l	1.82	0.217	1
Perfluorohexanoic Acid (PFHxA)	18.0		ng/l	1.82	0.299	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.82	0.223	1
Perfluoroheptanoic Acid (PFHpA)	6.45		ng/l	1.82	0.205	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.82	0.343	1
Perfluorooctanoic Acid (PFOA)	7.50		ng/l	1.82	0.215	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.82	0.627	1
Perfluorononanoic Acid (PFNA)	2.61		ng/l	1.82	0.284	1
Perfluorooctanesulfonic Acid (PFOS)	2.93		ng/l	1.82	0.459	1
Perfluorodecanoic Acid (PFDA)	1.48	J	ng/l	1.82	0.277	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.82	1.02	1
Perfluoroundecanoic Acid (PFUnA)	0.561	J	ng/l	1.82	0.237	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.82	0.893	1
Perfluorododecanoic Acid (PFDoA)	0.364	J	ng/l	1.82	0.339	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.82	0.298	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.82	0.226	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-06 Date Collected: 07/28/21 14:45

Client ID: INFLUENT-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	71		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	76		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	81		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	66		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	64		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	79		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	64		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	78		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	77		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	66		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	66		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	59		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	69		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	53		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	56		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	51		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-07
Client ID: EFFLUENT-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 14:45
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 02:46
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	2.28		ng/l	1.80	0.367	1
Perfluoropentanoic Acid (PFPeA)	9.35		ng/l	1.80	0.356	1
Perfluorobutanesulfonic Acid (PFBS)	2.50		ng/l	1.80	0.214	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.80	0.406	1
Perfluorohexanoic Acid (PFHxA)	15.7		ng/l	1.80	0.295	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.80	0.220	1
Perfluoroheptanoic Acid (PFHpA)	1.54	J	ng/l	1.80	0.202	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.80	0.338	1
Perfluorooctanoic Acid (PFOA)	4.20		ng/l	1.80	0.212	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.80	1.20	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.80	0.618	1
Perfluorononanoic Acid (PFNA)	2.54		ng/l	1.80	0.280	1
Perfluorooctanesulfonic Acid (PFOS)	3.58		ng/l	1.80	0.453	1
Perfluorodecanoic Acid (PFDA)	0.788	J	ng/l	1.80	0.273	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.80	1.09	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.80	1.01	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	1.05	JF	ng/l	1.80	0.582	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.80	0.234	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.80	0.881	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.80	0.521	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.80	0.723	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.80	0.334	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.80	0.294	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.80	0.223	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-07 Date Collected: 07/28/21 14:45

Client ID: EFFLUENT-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	79		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	75		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**175**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	63		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	70		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	76		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**243**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	75		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	83		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	66		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	157		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	66		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	11		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	83		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	69		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	60		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-07
Client ID: EFFLUENT-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 14:45
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 18:24
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 11:24

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	19.2		ng/l	5.10	0.416	1
Perfluoropentanoic Acid (PFPeA)	19.9		ng/l	2.04	0.404	1
Perfluorobutanesulfonic Acid (PFBS)	1.66	J	ng/l	2.04	0.242	1
Perfluorohexanoic Acid (PFHxA)	19.8		ng/l	2.04	0.334	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.04	0.250	1
Perfluoroheptanoic Acid (PFHpA)	3.08		ng/l	2.04	0.230	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.04	0.383	1
Perfluorooctanoic Acid (PFOA)	5.43		ng/l	2.04	0.240	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.04	0.701	1
Perfluorononanoic Acid (PFNA)	2.44		ng/l	2.04	0.318	1
Perfluorooctanesulfonic Acid (PFOS)	3.13		ng/l	2.04	0.514	1
Perfluorodecanoic Acid (PFDA)	0.701	J	ng/l	2.04	0.310	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.04	1.14	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.04	0.265	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.04	0.999	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.04	0.379	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.04	0.334	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.04	0.253	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-07 Date Collected: 07/28/21 14:45

Client ID: EFFLUENT-07282021 Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	69		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	74		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	86		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	64		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	63		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	85		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	62		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	66		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	73		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**59**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	58		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	56		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	67		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	**48**	Q	50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	50		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	**45**	Q	50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-08
Client ID: QA
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 13:00
Date Received: 07/29/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 03:02
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	1.84	J	ng/l	2.02	0.411	1
Perfluoropentanoic Acid (PFPeA)	1.62	J	ng/l	2.02	0.399	1
Perfluorobutanesulfonic Acid (PFBS)	1.58	J	ng/l	2.02	0.240	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.02	0.456	1
Perfluorohexanoic Acid (PFHxA)	2.18		ng/l	2.02	0.331	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.02	0.247	1
Perfluoroheptanoic Acid (PFHpA)	0.806	J	ng/l	2.02	0.227	1
Perfluorohexanesulfonic Acid (PFHxS)	0.923	JF	ng/l	2.02	0.379	1
Perfluorooctanoic Acid (PFOA)	2.15		ng/l	2.02	0.238	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.02	1.34	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.02	0.694	1
Perfluorononanoic Acid (PFNA)	0.492	J	ng/l	2.02	0.314	1
Perfluorooctanesulfonic Acid (PFOS)	5.43	F	ng/l	2.02	0.508	1
Perfluorodecanoic Acid (PFDA)	0.686	J	ng/l	2.02	0.306	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	1.27	J	ng/l	2.02	1.22	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.02	1.13	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.02	0.653	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.02	0.262	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.02	0.988	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.02	0.585	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.02	0.810	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.02	0.375	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.02	0.330	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.02	0.250	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

SAMPLE RESULTS

Lab ID: L2140706-08 Date Collected: 07/28/21 13:00

Client ID: QA Date Received: 07/29/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	98		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	95		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	109		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**296**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	111		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**383**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	102		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	106		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	100		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**222**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	31		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**44**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	16		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	55		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	53		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	126		22-136

TOTAL OXIDIZABLE PRECURSOR ASSAY

RESULTS SUMMARY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Lab ID: L2140706-01
Client ID: PS17-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 12:30
Date Received: 07/29/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	7.68		ng/l	67.0		ng/l	59.3		ng/l
Perfluoropentanoic Acid (PFPeA)	7.32		ng/l	144		ng/l	137		ng/l
Perfluorobutanesulfonic Acid (PFBS)	1.50	J	ng/l	1.76	J	ng/l	0.260	J	ng/l
Perfluorohexanoic Acid (PFHxA)	8.27		ng/l	56.6		ng/l	48.3		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	2.45		ng/l	14.2		ng/l	11.8		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	2.95	F	ng/l	ND		ng/l	0		ng/l
Perfluorooctanoic Acid (PFOA)	3.53		ng/l	9.40		ng/l	5.87		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	1.31	J	ng/l	3.25		ng/l	1.94		ng/l
Perfluorooctanesulfonic Acid (PFOS)	7.24	F	ng/l	6.64		ng/l	0		ng/l
Perfluorodecanoic Acid (PFDA)	1.58	J	ng/l	2.27		ng/l	0.690		ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	0.562	JF	ng/l	0.562	J	ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	0.620	JF	ng/l	0.620	J	ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	0.280	J	ng/l	0.261	JF	ng/l	0	J	ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							266	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Lab ID: L2140706-02
Client ID: PORTER-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 14:00
Date Received: 07/29/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	1.78	J	ng/l	7.25		ng/l	5.47		ng/l
Perfluoropentanoic Acid (PFPeA)	1.72	J	ng/l	11.5		ng/l	9.78		ng/l
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorohexanoic Acid (PFHxA)	2.06		ng/l	3.47		ng/l	1.41		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	0.574	J	ng/l	3.22		ng/l	2.65		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	1.64	JF	ng/l	ND		ng/l	0	J	ng/l
Perfluorooctanoic Acid (PFOA)	1.34	J	ng/l	1.91		ng/l	0.570		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	0.437	J	ng/l	0.886	J	ng/l	0.449	J	ng/l
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	0.768	J	ng/l	0.768	J	ng/l
Perfluorodecanoic Acid (PFDA)	0.429	J	ng/l	0.466	J	ng/l	0.037	J	ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorodecanesulfonic Acid (PFDS)	5.62	F	ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							21.1	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Lab ID: L2140706-03
Client ID: PS3-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 13:30
Date Received: 07/29/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	5.50		ng/l	31.0		ng/l	25.5		ng/l
Perfluoropentanoic Acid (PFPeA)	1.86		ng/l	72.4		ng/l	70.5		ng/l
Perfluorobutanesulfonic Acid (PFBS)	0.944	J	ng/l	0.831	J	ng/l	0	J	ng/l
Perfluorohexanoic Acid (PFHxA)	2.83		ng/l	32.2		ng/l	29.4		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	0.786	J	ng/l	9.30		ng/l	8.51		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorooctanoic Acid (PFOA)	2.21		ng/l	7.20		ng/l	4.99		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	0.508	J	ng/l	1.96		ng/l	1.45		ng/l
Perfluorooctanesulfonic Acid (PFOS)	3.36	F	ng/l	2.42		ng/l	0		ng/l
Perfluorodecanoic Acid (PFDA)	0.498	J	ng/l	1.28	J	ng/l	0.782	J	ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	0.358	JF	ng/l	0.358	J	ng/l
Perfluorodecanesulfonic Acid (PFDS)	1.46	JF	ng/l	ND		ng/l	0	J	ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	0.381	JF	ng/l	0.381	J	ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							142	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Lab ID: L2140706-04
Client ID: NSECTOR-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 10:40
Date Received: 07/29/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	6.51		ng/l	40.5		ng/l	34.0		ng/l
Perfluoropentanoic Acid (PFPeA)	2.96		ng/l	26.6		ng/l	23.6		ng/l
Perfluorobutanesulfonic Acid (PFBS)	0.868	JF	ng/l	0.931	J	ng/l	0.063	J	ng/l
Perfluorohexanoic Acid (PFHxA)	2.86		ng/l	14.5		ng/l	11.6		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	0.805	J	ng/l	21.6		ng/l	20.8		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorooctanoic Acid (PFOA)	3.17		ng/l	12.7		ng/l	9.53		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	0.538	J	ng/l	6.24		ng/l	5.70		ng/l
Perfluorooctanesulfonic Acid (PFOS)	6.28		ng/l	1.07	J	ng/l	0		ng/l
Perfluorodecanoic Acid (PFDA)	0.893	J	ng/l	3.09		ng/l	2.20		ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.11	J	ng/l	1.11	J	ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.33	JF	ng/l	1.33	J	ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	0.705	J	ng/l	0.748	JF	ng/l	0.043	J	ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							110	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Lab ID: L2140706-05
Client ID: PS9-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 13:00
Date Received: 07/29/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Units	Post-Treatment Results	Post-Treatment Qualifier	Units	Difference Results	Difference Qualifier	Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	1.57	J	ng/l	89.8		ng/l	88.2		ng/l
Perfluoropentanoic Acid (PFPeA)	1.21	J	ng/l	60.4		ng/l	59.2		ng/l
Perfluorobutanesulfonic Acid (PFBS)	1.32	J	ng/l	2.28		ng/l	0.960		ng/l
Perfluorohexanoic Acid (PFHxA)	2.19	F	ng/l	31.6		ng/l	29.4		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	0.837	J	ng/l	28.3		ng/l	27.5		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	0.794	JF	ng/l	1.01	J	ng/l	0.216	J	ng/l
Perfluorooctanoic Acid (PFOA)	2.19		ng/l	24.8		ng/l	22.6		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	0.471	JF	ng/l	9.03		ng/l	8.56		ng/l
Perfluorooctanesulfonic Acid (PFOS)	4.57	F	ng/l	3.15		ng/l	0		ng/l
Perfluorodecanoic Acid (PFDA)	0.584	J	ng/l	5.92		ng/l	5.34		ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.04		ng/l	2.04		ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.38		ng/l	2.38		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	0.420	JF	ng/l	0.420	J	ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.15	J	ng/l	1.15	J	ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							248	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Lab ID: L2140706-06
Client ID: INFLUENT-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 14:45
Date Received: 07/29/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	3.82		ng/l	18.2		ng/l	14.4		ng/l
Perfluoropentanoic Acid (PFPeA)	7.35		ng/l	25.5		ng/l	18.2		ng/l
Perfluorobutanesulfonic Acid (PFBS)	2.03		ng/l	1.35	J	ng/l	0		ng/l
Perfluorohexanoic Acid (PFHxA)	9.33		ng/l	18.0		ng/l	8.67		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	0.904	J	ng/l	6.45		ng/l	5.55		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorooctanoic Acid (PFOA)	3.54		ng/l	7.50		ng/l	3.96		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	1.20	J	ng/l	2.61		ng/l	1.41		ng/l
Perfluorooctanesulfonic Acid (PFOS)	4.38		ng/l	2.93		ng/l	0		ng/l
Perfluorodecanoic Acid (PFDA)	1.00	J	ng/l	1.48	J	ng/l	0.480	J	ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	0.235	JF	ng/l	0.561	J	ng/l	0.326	J	ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	0.364	J	ng/l	0.364	J	ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							53.3	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Lab ID: L2140706-07
Client ID: EFFLUENT-07282021
Sample Location: MIDDLEBURY, VT

Date Collected: 07/28/21 14:45
Date Received: 07/29/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	2.28		ng/l	19.2		ng/l	16.9		ng/l
Perfluoropentanoic Acid (PFPeA)	9.35		ng/l	19.9		ng/l	10.6		ng/l
Perfluorobutanesulfonic Acid (PFBS)	2.50		ng/l	1.66	J	ng/l	0		ng/l
Perfluorohexanoic Acid (PFHxA)	15.7		ng/l	19.8		ng/l	4.10		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	1.54	J	ng/l	3.08		ng/l	1.54		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorooctanoic Acid (PFOA)	4.20		ng/l	5.43		ng/l	1.23		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	2.54		ng/l	2.44		ng/l	0		ng/l
Perfluorooctanesulfonic Acid (PFOS)	3.58		ng/l	3.13		ng/l	0		ng/l
Perfluorodecanoic Acid (PFDA)	0.788	J	ng/l	0.701	J	ng/l	0	J	ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							34.3	J	ng/l

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/21 22:21
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 09:15

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-08 Batch: WG1530808-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/21 22:21
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 09:15

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-08 Batch: WG1530808-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	98		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	126		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	67		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	88		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	90		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	108		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	101		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	103		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	100		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	92		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	81		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	99		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	34		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	88		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	101		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	95		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2140706
Report Date: 08/05/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 13:25
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 11:22

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 01-07 Batch: WG1530910-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	5.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 13:25
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 11:22

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 01-07 Batch: WG1530910-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	111		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		70-131
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	93		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	83		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	89		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	90		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	90		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	96		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2140706
Report Date: 08/05/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 14:15
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 14:57

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 01-07 Batch: WG1530910-6					
Perfluorobutanoic Acid (PFBA)	4.92	J	ng/l	5.00	0.408
Perfluoropentanoic Acid (PFPeA)	0.416	J	ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
Perfluorohexanoic Acid (PFHxA)	0.388	J	ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2140706

Project Number: Not Specified **Report Date:** 08/05/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/04/21 14:15
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/03/21 14:57

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 01-07 Batch: WG1530910-6					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	75		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	83		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	90		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	73		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	68		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	79		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	63		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	63		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	**66**	Q	69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**53**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**51**	Q	55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	49		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	63		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	50		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	53		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	**49**	Q	50-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 Batch: WG1530808-2								
Perfluorobutanoic Acid (PFBA)	114		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	114		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	112		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	136		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	115		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	100		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	112		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	111		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	114		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	129		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	117		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	110		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	116		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	108		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	134		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	104		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	119		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	110		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	114		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	122		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	104		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	123		-		67-153	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 Batch: WG1530808-2								
Perfluorotridecanoic Acid (PFTrDA)	130		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	124		-		59-182	-		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	99				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	125				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	68				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	89				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	98				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	102				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	103				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	99				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	94				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	89				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	101				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	34				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	93				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	103				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	102				22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 01-07 Batch: WG1530910-2 WG1530910-3								
Perfluorobutanoic Acid (PFBA)	102		105		67-148	3		30
Perfluoropentanoic Acid (PFPeA)	105		107		63-161	2		30
Perfluorobutanesulfonic Acid (PFBS)	100		101		65-157	1		30
Perfluorohexanoic Acid (PFHxA)	104		106		69-168	2		30
Perfluoropentanesulfonic Acid (PFPeS)	114		119		52-156	4		30
Perfluoroheptanoic Acid (PFHpA)	103		106		58-159	3		30
Perfluorohexanesulfonic Acid (PFHxS)	101		105		69-177	4		30
Perfluorooctanoic Acid (PFOA)	111		111		63-159	0		30
Perfluoroheptanesulfonic Acid (PFHpS)	106		103		61-179	3		30
Perfluorononanoic Acid (PFNA)	99		101		68-171	2		30
Perfluorooctanesulfonic Acid (PFOS)	110		116		52-151	5		30
Perfluorodecanoic Acid (PFDA)	99		101		63-171	2		30
Perfluorononanesulfonic Acid (PFNS)	105		105		48-150	0		30
Perfluoroundecanoic Acid (PFUnA)	107		101		60-153	6		30
Perfluorodecanesulfonic Acid (PFDS)	105		108		38-156	3		30
Perfluorododecanoic Acid (PFDoA)	110		109		67-153	1		30
Perfluorotridecanoic Acid (PFTrDA)	130		131		48-158	1		30
Perfluorotetradecanoic Acid (PFTA)	110		109		59-182	1		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 01-07 Batch: WG1530910-2 WG1530910-3								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91		91		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	109		109		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99		100		70-131
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	89		92		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		86		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	92		91		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	83		87		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97		100		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94		95		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90		93		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	87		94		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	90		93		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	102		109		22-136

Matrix Spike Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1530808-3 QC Sample: L2140818-01 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	ND	37.9	41.9	111		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	0.482J	37.9	42.7	111		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	ND	33.6	37.1	110		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	35.5	45.6	129		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	ND	37.9	43.3	114		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	35.6	34.6	97		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	37.9	41.7	110		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	34.6	37.4	108		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	0.435J	37.9	42.0	110		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	36.1	44.7	124		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	36.1	44.1	122		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	ND	37.9	39.5	104		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	1.57J	35.2	39.5	108		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	37.9	40.2	106		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	36.4	47.4	130		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	36.4	37.9	104		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	37.9	44.5	117		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	37.9	41.2	109		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	36.5	39.4	108		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	37.9	39.0F	103		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	37.9	39.6	105		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	37.9	44.8	118		-	-		67-153	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2140706

Report Date: 08/05/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1530808-3 QC Sample: L2140818-01 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	37.9	48.3	127		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	37.9	42.8	113		-	-		59-182	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	369	454F	123		-	-		57-162	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	35.8	37.2	104		-	-		69-143	-		30
Perfluorohexadecanoic Acid (PFHxDA)	ND	37.9	46.0	121		-	-		40-167	-		30
Perfluorooctadecanoic Acid (PFODA)	ND	37.9	15.0	40		-	-		10-119	-		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	86				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	66				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	99				14-147
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	105				10-165
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	71				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	87				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	94				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	93				22-136
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	85				10-206

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2140706

Report Date: 08/05/21

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1530808-3 QC Sample: L2140818-01 Client ID: MS Sample												

Surrogate	*MS % Recovery*	*MS Qualifier*	*MSD % Recovery*	*MSD Qualifier*	*Acceptance Criteria*
Perfluoro[13C4]Butanoic Acid (MPFBA)	82				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	107				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	**4**	Q			10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	99				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	88				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	103				70-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1530808-4 QC Sample: L2140818-02 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	ND	ND	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	0.762J	0.711J	ng/l	NC		30
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/l	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	ND	0.424J	ng/l	NC		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	1.39J	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1530808-4 QC Sample: L2140818-02 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	ND	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorohexadecanoic Acid (PFHxDA)	ND	ND	ng/l	NC		30
Perfluorooctadecanoic Acid (PFODA)	ND	ND	ng/l	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	**50**	Q	68		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	67		88		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104		102		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	61		74		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**49**	Q	60		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	**53**	Q	66		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		99		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	**61**	Q	71		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	96		117		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	68		78		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90		98		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	64		72		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	74		94		10-162

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1530808-4 QC Sample: L2140818-02 Client ID: DUP Sample

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	44		57		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68		76		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	**2**	Q	**5**	Q	10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	44		64		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	72		75		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	83		82		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	68		95		10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	78		78		10-206

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1530910-4 QC Sample: L2140706-04 Client ID: NSECTOR-07282021						
Perfluorobutanoic Acid (PFBA)	40.5	40.4	ng/l	0		30
Perfluoropentanoic Acid (PFPeA)	26.6	31.4	ng/l	17		30
Perfluorobutanesulfonic Acid (PFBS)	0.931J	0.987J	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	14.5	19.3	ng/l	28		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	21.6	30.4	ng/l	**34**	Q	30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	12.7	18.5	ng/l	**37**	Q	30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	6.24	8.21	ng/l	27		30
Perfluorooctanesulfonic Acid (PFOS)	1.07J	1.90J	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	3.09	5.04	ng/l	**48**	Q	30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	1.11J	1.34J	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	1.33JF	2.06	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	0.411J	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	0.748JF	1.54J	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1530910-4 QC Sample: L2140706-04 Client ID: NSECTOR-07282021

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	70		69		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	76		75		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	90		84		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	2		8		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	67		67		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	65		65		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	85		82		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	65		65		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	71		73		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	75		74		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**60**	Q	65		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	61		66		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	58		63		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	66		69		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	**49**	Q	**48**	Q	50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	**49**	Q	51		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	**47**	Q	**46**	Q	50-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1530910-5 QC Sample: L2140706-05 Client ID: PS9-07282021						
Perfluorobutanoic Acid (PFBA)	89.8	103	ng/l	14		30
Perfluoropentanoic Acid (PFPeA)	60.4	75.9	ng/l	23		30
Perfluorobutanesulfonic Acid (PFBS)	2.28	2.70	ng/l	17		30
Perfluorohexanoic Acid (PFHxA)	31.6	34.6	ng/l	9		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	28.3	34.8	ng/l	21		30
Perfluorohexanesulfonic Acid (PFHxS)	1.01J	1.07J	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	24.8	25.8	ng/l	4		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	9.03	11.3	ng/l	22		30
Perfluorooctanesulfonic Acid (PFOS)	3.15	8.44	ng/l	**91**	Q	30
Perfluorodecanoic Acid (PFDA)	5.92	6.81	ng/l	14		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	2.04	2.59	ng/l	24		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	2.38	3.12	ng/l	27		30
Perfluorotridecanoic Acid (PFTrDA)	0.420JF	0.812J	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	1.15J	1.47J	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1530910-5 QC Sample: L2140706-05 Client ID: PS9-07282021

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	68		75		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	72		83		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	79		85		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	1		1		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	63		66		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	61		66		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	76		78		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	**59**	Q	68		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	73		78		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	72		79		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**58**	Q	65		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	60		62		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	53		52		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	60		58		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	**46**	Q	57		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	50		65		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	**44**	Q	56		50-150

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

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(*)
L2140706-01A	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-01B	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-01C	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-01D	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-02A	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-02B	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-02C	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-02D	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-03A	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-03B	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-03C	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-03D	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-04A	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-04B	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-04C	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-04D	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-05A	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-05B	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-05C	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-05D	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-06A	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-06B	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-06C	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2140706
Report Date: 08/05/21

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2140706-06D	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-07A	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-07B	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-07C	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-07D	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2140706-08A	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)
L2140706-08B	Plastic 250ml unpreserved	A	NA		3.4	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: VT DEC WWTF PFAS INPUT
Lab Number: L2140706
Project Number:
Report Date: 08/05/21

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2140706
Project Number:	Not Specified	**Report Date:**	08/05/21

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: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2140706
Project Number:	Not Specified	**Report Date:**	08/05/21

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. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. 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 method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2140706
Project Number:	Not Specified	**Report Date:**	08/05/21

Data Qualifiers

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where 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.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

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, NO2, NO3.

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, SM4500Cl-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 1

ALPHA ANALYTICAL — Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193 — Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 7/30/21

ALPHA Job #: L2140706

Client Information

Client: Weston & Sampson
Address: 98 S Main, St
Waterbury, VT
Phone:
Fax:
Email: larosas@wseinc.com
☐ These samples have been Previously analyzed by Alpha

Project Information

Project Name: VT DEC WWTF PFAS Input
Project Location: Middlebury,VT
Project #:
Project Manager: Steven LaRosa
ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ Rush (ONLY IF PRE-APPROVED)
Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:
Report in Envirodata8
Report to MDL

Report Information — Data Deliverables
☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information
☐ Same as Client info PO #:

Regulatory Requirements/Report Limits
State/Fed Program | Criteria

ANALYSIS

PFAS by DoD Isotope Dilution; Alpha TOP

SAMPLE HANDLING
Filtration
☐ Done ☐ Not Needed ☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS by DoD Isotope Dilution	Alpha TOP
40706-01	PS17-07282021	7/28/21	12:30		MLR	☑	☑
-02	Porter-07282021	7/28/21	14:00		MLR	☐	☐
-03	PS3-07282021	7/28/21	13:30		MLR	☐	☐
-04	NSector-07282021	7/28/21	10:40		MLR	☐	☐
-05	PS9-07282021	7/28/21	13:00		MLR	☐	☐
-06	Influent-07282021	7/28/21	14:45		MLR	☐	☐
-07	Effluent-07282021	7/28/21	14:45		MLR	☑	☑
-08	QA	7/30/21	13:00		MLR	☒	☒

1 Bottle for each analysis PFAS + TOP

Container Type	-	-	-	-	-	-	-	-	-	-	-	-
Preservative	-	-	-	-	-	-	-	-	-	-	-	-

Relinquished By:	Date/Time	Received By:	Date/Time
James Sargent	7/28/21 19:00	Sample Fridge	7/28/21 17:00
MRL	7/28/21 16:28		7/28/21 18:25
Wendy Mooney	7/30/21 4:00		7/30/21 04:15
T. Hudilla	7/30/21 0530		7/30/21 0530

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO. 01-01(I-NJ) (rev. 5-JAN-12)

ANALYTICAL REPORT

Lab Number:	L2142144
Client:	Weston & Sampson 98 South Main Street Suite 2 Waterbury, VT 05676
ATTN:	Steven LaRosa
Phone:	(802) 244-5051
Project Name:	VT DEC WWTF PFAS INPUT
Project Number:	Not Specified
Report Date:	08/19/21

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).

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

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2142144-01	CASCADE-08032021	WATER	ESSEX, VT	08/03/21 10:30	08/05/21
L2142144-02	SWR-08032021	WATER	ESSEX, VT	08/03/21 11:20	08/05/21
L2142144-03	AUTUMNHARP-08032021	WATER	ESSEX, VT	08/03/21 12:40	08/05/21
L2142144-04	INFLUENT-08032021	WATER	ESSEX, VT	08/03/21 14:30	08/05/21
L2142144-05	EFFLUENT-08032021	WATER	ESSEX, VT	08/03/21 14:30	08/05/21
L2142144-06	PSM-08032021	WATER	ESSEX, VT	08/03/21 13:50	08/05/21
L2142144-07	QA TOP	WATER	ESSEX, VT	08/03/21 00:00	08/05/21

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2142144
Project Number:	Not Specified	**Report Date:**	08/19/21

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: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144
Project Number: Not Specified **Report Date:** 08/19/21

Case Narrative (continued)

Report Submission
All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution
L2142144-01, -02, -03D, -04, -06, and -07D: The sample was centrifuged and decanted prior to extraction due to sample matrix.
L2142144-01RE, -02RE, -03RE\D, -04RE, -05RE, -06RE, and -07RE\D: The sample was re-extracted within holding time due to QC failures in the original extraction. The results of the re-extraction are reported.
L2142144-01RE: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix.
L2142144-01, -02, -02RE,-03RE\D, -03D, -04, -06, -06RE, and -07D: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.
L2142144-03RE\D, -03D, -07D, and -07RE\D: The sample has elevated detection limits due to the dilution required by the sample matrix.
WG1535434-1: The Method Blank, associated with L2142144--01 through -07, has a concentration above the reporting limit for 6:2FTS. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required.

Perfluorinated Alkyl Acids by Isotope Dil. (Post-Treatment)
L2142144-01 through -07: The following surrogate is a negative control for the TOP Assay: M2-4:2FTS. Low recoveries of this surrogate demonstrate that the associated compounds have been converted to a different PFAS constituent (Limit 0-25%).
L2142144-01 through -07: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix.
L2142144-02, -03, and -04: Extracted Internal Standard recoveries were outside the acceptance criteria for

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2142144
Project Number:	Not Specified	**Report Date:**	08/19/21

Case Narrative (continued)

individual analytes. Please refer to the surrogate section of the report for details.

WG1535438-4: This blank represents the TOP oxidation blank associated with L2142144-01 through -07.

WG1535438-4: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

WG1535438-4: The following surrogate is a negative control for the TOP Assay: M2-4:2FTS. Low recoveries of this surrogate demonstrate that the associated compounds have been converted to a different PFAS constituent (Limit 0-25%).

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:  Alycia Mogayzel

Title: Technical Director/Representative Date: 08/19/21

ORGANICS

SEMIVOLATILES

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-01
Client ID: CASCADE-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 10:30
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 13:55
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	2.26	J	ng/l	3.11	0.634	1
Perfluoropentanoic Acid (PFPeA)	5.22		ng/l	3.11	0.615	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	3.11	0.370	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	3.11	0.702	1
Perfluorohexanoic Acid (PFHxA)	6.93		ng/l	3.11	0.510	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	3.11	0.381	1
Perfluoroheptanoic Acid (PFHpA)	2.39	J	ng/l	3.11	0.350	1
Perfluorohexanesulfonic Acid (PFHxS)	1.31	J	ng/l	3.11	0.584	1
Perfluorooctanoic Acid (PFOA)	6.81		ng/l	3.11	0.367	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	3.11	1.07	1
Perfluorononanoic Acid (PFNA)	1.63	J	ng/l	3.11	0.485	1
Perfluorooctanesulfonic Acid (PFOS)	2.80	J	ng/l	3.11	0.783	1
Perfluorodecanoic Acid (PFDA)	1.88	J	ng/l	3.11	0.472	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	3.11	1.88	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	3.11	1.74	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	3.11	1.01	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	3.11	0.404	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	3.11	1.52	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	3.11	0.901	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	3.11	1.25	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	3.11	0.578	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	3.11	0.508	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	3.11	0.385	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-01 Date Collected: 08/03/21 10:30

Client ID: CASCADE-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	113		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	96		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	109		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**181**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	79		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	87		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	128		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	108		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	102		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	104		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**238**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	50		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**49**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	22		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	73		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	67		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	135		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-01
Client ID: CASCADE-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 10:30
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 21:13
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	382		ng/l	60.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	600		ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	7.76	J	ng/l	20.0	2.38	1
Perfluorohexanoic Acid (PFHxA)	361		ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	426		ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	256		ng/l	20.0	2.36	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	200		ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	114		ng/l	20.0	3.04	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
Perfluoroundecanoic Acid (PFUnA)	52.9		ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorododecanoic Acid (PFDoA)	54.8		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	12.6	J	ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	24.5		ng/l	20.0	2.48	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-01 Date Collected: 08/03/21 10:30

Client ID: CASCADE-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	76		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	63		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	108		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	69		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	106		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	67		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	62		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	81		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	64		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	68		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	62		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	67		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	76		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	64		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-01 RE
Client ID: CASCADE-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 10:30
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 12:30
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 21:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	20.0	13.3	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	126		14-147

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-02
Client ID: SWR-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 11:20
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 14:12
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	5.58		ng/l	2.06	0.420	1
Perfluoropentanoic Acid (PFPeA)	5.29		ng/l	2.06	0.407	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.06	0.245	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.06	0.465	1
Perfluorohexanoic Acid (PFHxA)	8.68		ng/l	2.06	0.337	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.06	0.252	1
Perfluoroheptanoic Acid (PFHpA)	1.44	J	ng/l	2.06	0.232	1
Perfluorohexanesulfonic Acid (PFHxS)	1.08	JF	ng/l	2.06	0.387	1
Perfluorooctanoic Acid (PFOA)	2.62		ng/l	2.06	0.243	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.93	JF	ng/l	2.06	0.708	1
Perfluorononanoic Acid (PFNA)	0.811	J	ng/l	2.06	0.321	1
Perfluorooctanesulfonic Acid (PFOS)	2.04	J	ng/l	2.06	0.518	1
Perfluorodecanoic Acid (PFDA)	0.453	J	ng/l	2.06	0.313	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.06	1.25	1
Perfluorononanesulfonic Acid (PFNS)	2.00	JF	ng/l	2.06	1.15	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.06	0.667	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.06	0.268	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.06	1.01	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.06	0.597	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	1.19	J	ng/l	2.06	0.827	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.06	0.383	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.06	0.337	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.06	0.255	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-02 Date Collected: 08/03/21 11:20

Client ID: SWR-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	92		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	76		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**154**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**48**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	68		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	119		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	98		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	81		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	98		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	136		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	45		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**48**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	21		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	66		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	61		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	118		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-02
Client ID: SWR-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 11:20
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 21:30
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	71.2		ng/l	60.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	51.0		ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	20.0	2.38	1
Perfluorohexanoic Acid (PFHxA)	49.4		ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	73.4		ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	39.1		ng/l	20.0	2.36	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	23.1		ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	9.08	J	ng/l	20.0	3.04	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
Perfluoroundecanoic Acid (PFUnA)	2.60	JF	ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	20.0	2.48	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-02 Date Collected: 08/03/21 11:20

Client ID: SWR-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	74		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	**61**	Q	62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	68		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	106		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	63		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	59		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	77		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**57**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	58		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	59		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	57		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	67		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	73		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	63		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-02 RE
Client ID: SWR-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 11:20
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 12:47
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 21:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.78	1.85	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**175**	Q	14-147

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-03
Client ID: AUTUMNHARP-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 12:40
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 21:46
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	30.8	J	ng/l	60.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	12.1	J	ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	20.0	2.38	1
Perfluorohexanoic Acid (PFHxA)	7.04	J	ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	4.84	J	ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	7.44	J	ng/l	20.0	2.36	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	20.0	3.04	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	20.0	2.48	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-03 Date Collected: 08/03/21 12:40

Client ID: AUTUMNHARP-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	80		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	67		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	74		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	109		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	68		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	59		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	69		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**57**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	57		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	59		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	57		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	69		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	76		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	66		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-03 RE\D
Client ID: AUTUMNHARP-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 12:40
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 22:48
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 21:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	11.2	7.47	5

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**154**	Q	14-147

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-03 D
Client ID: AUTUMNHARP-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 12:40
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 18:39
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	13.7		ng/l	9.80	2.00	5
Perfluoropentanoic Acid (PFPeA)	3.41	J	ng/l	9.80	1.94	5
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	9.80	1.17	5
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	9.80	2.22	5
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	9.80	1.61	5
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	9.80	1.20	5
Perfluoroheptanoic Acid (PFHpA)	1.27	JF	ng/l	9.80	1.10	5
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	9.80	1.84	5
Perfluorooctanoic Acid (PFOA)	3.16	J	ng/l	9.80	1.16	5
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	9.80	3.37	5
Perfluorononanoic Acid (PFNA)	ND		ng/l	9.80	1.53	5
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	9.80	2.47	5
Perfluorodecanoic Acid (PFDA)	ND		ng/l	9.80	1.49	5
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	9.80	5.94	5
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	9.80	5.49	5
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	9.80	3.18	5
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	9.80	1.27	5
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	9.80	4.80	5
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	9.80	2.84	5
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	9.80	3.94	5
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	9.80	1.82	5
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	9.80	1.60	5
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	9.80	1.22	5

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-03 D
Client ID: AUTUMNHARP-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 12:40
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	105		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	127		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	107		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**528**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	98		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	106		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	112		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	100		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	109		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	110		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	**120**	Q	24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**221**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	**128**	Q	10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**419**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**330**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**339**	Q	22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-04
Client ID: INFLUENT-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 14:30
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 14:45
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	4.00		ng/l	3.06	0.624	1
Perfluoropentanoic Acid (PFPeA)	4.25		ng/l	3.06	0.606	1
Perfluorobutanesulfonic Acid (PFBS)	1.97	J	ng/l	3.06	0.364	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	3.06	0.692	1
Perfluorohexanoic Acid (PFHxA)	4.77		ng/l	3.06	0.502	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	3.06	0.375	1
Perfluoroheptanoic Acid (PFHpA)	1.85	J	ng/l	3.06	0.344	1
Perfluorohexanesulfonic Acid (PFHxS)	1.50	JF	ng/l	3.06	0.575	1
Perfluorooctanoic Acid (PFOA)	3.85		ng/l	3.06	0.361	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.68	JF	ng/l	3.06	1.05	1
Perfluorononanoic Acid (PFNA)	1.59	J	ng/l	3.06	0.477	1
Perfluorooctanesulfonic Acid (PFOS)	2.94	J	ng/l	3.06	0.771	1
Perfluorodecanoic Acid (PFDA)	0.734	J	ng/l	3.06	0.465	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	3.06	1.85	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	3.06	1.71	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	3.06	0.991	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	3.06	0.398	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	3.06	1.50	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	3.06	0.887	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	3.06	1.23	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	3.06	0.569	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	3.06	0.501	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	3.06	0.379	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-04 Date Collected: 08/03/21 14:30

Client ID: INFLUENT-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	94		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**182**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	62		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	70		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	116		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	96		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	85		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	100		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	150		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	106		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	101		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	41		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**166**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	100		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**150**	Q	22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-04
Client ID: INFLUENT-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 14:30
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 22:03
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	130		ng/l	60.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	83.3		ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	3.52	J	ng/l	20.0	2.38	1
Perfluorohexanoic Acid (PFHxA)	50.3		ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	46.3		ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	40.8		ng/l	20.0	2.36	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	18.0	J	ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	5.48	J	ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	8.56	J	ng/l	20.0	3.04	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	20.0	2.48	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-04 Date Collected: 08/03/21 14:30

Client ID: INFLUENT-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	80		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	65		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	113		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	72		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	109		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	63		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	**54**	Q	59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	69		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**54**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	57		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	57		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	55		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	65		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	70		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	63		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-04 RE
Client ID: INFLUENT-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 14:30
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 13:20
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 21:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	20.0	13.3	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	113		14-147

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-05
Client ID: EFFLUENT-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 14:30
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 15:01
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	9.16		ng/l	2.10	0.427	1
Perfluoropentanoic Acid (PFPeA)	21.1		ng/l	2.10	0.415	1
Perfluorobutanesulfonic Acid (PFBS)	6.54	F	ng/l	2.10	0.249	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.10	0.474	1
Perfluorohexanoic Acid (PFHxA)	23.5		ng/l	2.10	0.344	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.10	0.257	1
Perfluoroheptanoic Acid (PFHpA)	3.20		ng/l	2.10	0.236	1
Perfluorohexanesulfonic Acid (PFHxS)	1.24	J	ng/l	2.10	0.394	1
Perfluorooctanoic Acid (PFOA)	6.72		ng/l	2.10	0.247	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.10	0.721	1
Perfluorononanoic Acid (PFNA)	1.85	J	ng/l	2.10	0.327	1
Perfluorooctanesulfonic Acid (PFOS)	4.00		ng/l	2.10	0.528	1
Perfluorodecanoic Acid (PFDA)	0.821	J	ng/l	2.10	0.318	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.10	1.27	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.10	1.17	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.10	0.679	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.10	0.272	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.10	1.03	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.10	0.608	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.10	0.842	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.10	0.390	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.10	0.343	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.10	0.260	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-05 Date Collected: 08/03/21 14:30

Client ID: EFFLUENT-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	85		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	74		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	95		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	67		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	120		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	82		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	77		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	78		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	76		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	54		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	83		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	25		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	56		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	87		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	80		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-05
Client ID: EFFLUENT-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 14:30
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 22:19
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	26.1		ng/l	5.40	0.366	1
Perfluoropentanoic Acid (PFPeA)	26.0		ng/l	1.80	0.355	1
Perfluorobutanesulfonic Acid (PFBS)	2.96		ng/l	1.80	0.214	1
Perfluorohexanoic Acid (PFHxA)	25.3		ng/l	1.80	0.294	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.80	0.220	1
Perfluoroheptanoic Acid (PFHpA)	3.81		ng/l	1.80	0.202	1
Perfluorohexanesulfonic Acid (PFHxS)	1.04	J	ng/l	1.80	0.338	1
Perfluorooctanoic Acid (PFOA)	8.82		ng/l	1.80	0.212	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.80	0.618	1
Perfluorononanoic Acid (PFNA)	1.91		ng/l	1.80	0.280	1
Perfluorooctanesulfonic Acid (PFOS)	3.72		ng/l	1.80	0.452	1
Perfluorodecanoic Acid (PFDA)	0.930	J	ng/l	1.80	0.273	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.80	1.00	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.80	0.233	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.80	0.880	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.80	0.334	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.80	0.294	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.80	0.223	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-05 Date Collected: 08/03/21 14:30

Client ID: EFFLUENT-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	79		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	66		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	112		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	71		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	80		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	107		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	66		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	64		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	87		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	69		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	75		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	74		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	67		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	66		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	72		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	64		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-05 RE
Client ID: EFFLUENT-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 14:30
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 13:37
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 21:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.09	1.39	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	94		14-147

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-06
Client ID: PSM-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 13:50
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 15:35
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	11.4		ng/l	2.01	0.410	1
Perfluoropentanoic Acid (PFPeA)	4.67		ng/l	2.01	0.398	1
Perfluorobutanesulfonic Acid (PFBS)	1.43	JF	ng/l	2.01	0.239	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.01	0.454	1
Perfluorohexanoic Acid (PFHxA)	5.18		ng/l	2.01	0.330	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.01	0.246	1
Perfluoroheptanoic Acid (PFHpA)	3.39		ng/l	2.01	0.226	1
Perfluorohexanesulfonic Acid (PFHxS)	0.953	J	ng/l	2.01	0.378	1
Perfluorooctanoic Acid (PFOA)	4.19		ng/l	2.01	0.237	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.01	0.692	1
Perfluorononanoic Acid (PFNA)	1.37	J	ng/l	2.01	0.314	1
Perfluorooctanesulfonic Acid (PFOS)	1.46	J	ng/l	2.01	0.507	1
Perfluorodecanoic Acid (PFDA)	0.696	J	ng/l	2.01	0.306	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.01	1.22	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.01	1.13	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.01	0.652	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.01	0.261	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.01	0.985	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.01	0.583	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.01	0.808	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.01	0.374	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.01	0.329	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.01	0.249	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-06 Date Collected: 08/03/21 13:50

Client ID: PSM-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	77		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	94		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**268**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	58		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	116		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	98		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	99		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	64		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	28		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	65		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	54		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	84		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-06
Client ID: PSM-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 13:50
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 22:36
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	46.6		ng/l	60.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	50.8		ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	20.0	2.38	1
Perfluorohexanoic Acid (PFHxA)	29.9		ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	26.2		ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	20.4		ng/l	20.0	2.36	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	9.20	J	ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	5.60	JF	ng/l	20.0	3.04	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
Perfluoroundecanoic Acid (PFUnA)	3.80	JF	ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	20.0	2.48	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-06 Date Collected: 08/03/21 13:50

Client ID: PSM-08032021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	78		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	65		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	113		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	72		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	112		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	68		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	65		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	84		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	67		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	68		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	59		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	62		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	72		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	62		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-06 RE
Client ID: PSM-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 13:50
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 13:53
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 21:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.84	1.22	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**226**	Q	14-147

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-07
Client ID: QA TOP
Sample Location: ESSEX, VT

Date Collected: 08/03/21 00:00
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 22:53
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	38.5	J	ng/l	60.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	11.0	J	ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	20.0	2.38	1
Perfluorohexanoic Acid (PFHxA)	7.00	J	ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	3.92	J	ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	6.08	J	ng/l	20.0	2.36	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	20.0	3.04	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	20.0	2.48	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-07 Date Collected: 08/03/21 00:00

Client ID: QA TOP Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	82		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	67		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	108		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	106		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	71		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	0		0-25
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	63		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	78		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	65		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	70		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	63		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	70		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	78		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	69		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-07 RE\D
Client ID: QA TOP
Sample Location: ESSEX, VT

Date Collected: 08/03/21 00:00
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 23:04
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 21:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	10.2	6.77	5

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	135		14-147

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-07 D
Client ID: QA TOP
Sample Location: ESSEX, VT

Date Collected: 08/03/21 00:00
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 18:56
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	9.29	J	ng/l	9.36	1.91	5
Perfluoropentanoic Acid (PFPeA)	2.92	J	ng/l	9.36	1.85	5
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	9.36	1.11	5
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	9.36	2.12	5
Perfluorohexanoic Acid (PFHxA)	1.82	J	ng/l	9.36	1.54	5
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	9.36	1.15	5
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	9.36	1.05	5
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	9.36	1.76	5
Perfluorooctanoic Acid (PFOA)	2.75	J	ng/l	9.36	1.10	5
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	9.36	3.22	5
Perfluorononanoic Acid (PFNA)	ND		ng/l	9.36	1.46	5
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	9.36	2.36	5
Perfluorodecanoic Acid (PFDA)	ND		ng/l	9.36	1.42	5
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	9.36	5.68	5
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	9.36	5.24	5
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	9.36	3.03	5
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	9.36	1.22	5
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	9.36	4.59	5
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	9.36	2.72	5
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	9.36	3.76	5
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	9.36	1.74	5
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	9.36	1.53	5
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	9.36	1.16	5

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142144-07 D Date Collected: 08/03/21 00:00

Client ID: QA TOP Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	112		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**508**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	105		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	111		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	100		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	104		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	87		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	103		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**229**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	**128**	Q	10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**435**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**1640**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**329**	Q	22-136

TOTAL OXIDIZABLE PRECURSOR ASSAY

RESULTS SUMMARY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Lab ID: L2142144-01
Client ID: CASCADE-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 10:30
Date Received: 08/05/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	2.26	J	ng/l	382		ng/l	382		ng/l
Perfluoropentanoic Acid (PFPeA)	5.22		ng/l	600		ng/l	595		ng/l
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	7.76	J	ng/l	0	J	ng/l
Perfluorohexanoic Acid (PFHxA)	6.93		ng/l	361		ng/l	354		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	2.39	J	ng/l	426		ng/l	426		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	1.31	J	ng/l	ND		ng/l	0	J	ng/l
Perfluorooctanoic Acid (PFOA)	6.81		ng/l	256		ng/l	249		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	1.63	J	ng/l	200		ng/l	200		ng/l
Perfluorooctanesulfonic Acid (PFOS)	2.80	J	ng/l	ND		ng/l	0	J	ng/l
Perfluorodecanoic Acid (PFDA)	1.88	J	ng/l	114		ng/l	114		ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	52.9		ng/l	52.9		ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	54.8		ng/l	54.8		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	12.6	J	ng/l	0	J	ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	24.5		ng/l	24.5		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							2450	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Lab ID: L2142144-02
Client ID: SWR-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 11:20
Date Received: 08/05/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	5.58		ng/l	71.2		ng/l	65.6		ng/l
Perfluoropentanoic Acid (PFPeA)	5.29		ng/l	51.0		ng/l	45.7		ng/l
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorohexanoic Acid (PFHxA)	8.68		ng/l	49.4		ng/l	40.7		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	1.44	J	ng/l	73.4		ng/l	73.4		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	1.08	JF	ng/l	ND		ng/l	0	J	ng/l
Perfluorooctanoic Acid (PFOA)	2.62		ng/l	39.1		ng/l	36.5		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	1.93	JF	ng/l	ND		ng/l	0	J	ng/l
Perfluorononanoic Acid (PFNA)	0.811	J	ng/l	23.1		ng/l	23.1		ng/l
Perfluorooctanesulfonic Acid (PFOS)	2.04	J	ng/l	ND		ng/l	0	J	ng/l
Perfluorodecanoic Acid (PFDA)	0.453	J	ng/l	9.08	J	ng/l	0	J	ng/l
Perfluorononanesulfonic Acid (PFNS)	2.00	JF	ng/l	ND		ng/l	0	J	ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.60	JF	ng/l	0	J	ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							285	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Lab ID: L2142144-03
Client ID: AUTUMNHARP-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 12:40
Date Received: 08/05/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	13.7		ng/l	30.8	J	ng/l	17.1		ng/l
Perfluoropentanoic Acid (PFPeA)	3.41	J	ng/l	12.1	J	ng/l	0	J	ng/l
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	7.04	J	ng/l	0	J	ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	1.27	JF	ng/l	4.84	J	ng/l	0	J	ng/l
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorooctanoic Acid (PFOA)	3.16	J	ng/l	7.44	J	ng/l	0	J	ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorodecanoic Acid (PFDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							17.1	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Lab ID: L2142144-04
Client ID: INFLUENT-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 14:30
Date Received: 08/05/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	4.00		ng/l	130		ng/l	126		ng/l
Perfluoropentanoic Acid (PFPeA)	4.25		ng/l	83.3		ng/l	79.1		ng/l
Perfluorobutanesulfonic Acid (PFBS)	1.97	J	ng/l	3.52	J	ng/l	0	J	ng/l
Perfluorohexanoic Acid (PFHxA)	4.77		ng/l	50.3		ng/l	45.5		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	1.85	J	ng/l	46.3		ng/l	46.3		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	1.50	JF	ng/l	ND		ng/l	0	J	ng/l
Perfluorooctanoic Acid (PFOA)	3.85		ng/l	40.8		ng/l	37.0		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	2.68	JF	ng/l	ND		ng/l	0	J	ng/l
Perfluorononanoic Acid (PFNA)	1.59	J	ng/l	18.0	J	ng/l	0	J	ng/l
Perfluorooctanesulfonic Acid (PFOS)	2.94	J	ng/l	5.48	J	ng/l	0	J	ng/l
Perfluorodecanoic Acid (PFDA)	0.734	J	ng/l	8.56	J	ng/l	0	J	ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							334	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Lab ID: L2142144-05
Client ID: EFFLUENT-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 14:30
Date Received: 08/05/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	9.16		ng/l	26.1		ng/l	16.9		ng/l
Perfluoropentanoic Acid (PFPeA)	21.1		ng/l	26.0		ng/l	4.90		ng/l
Perfluorobutanesulfonic Acid (PFBS)	6.54	F	ng/l	2.96		ng/l	0		ng/l
Perfluorohexanoic Acid (PFHxA)	23.5		ng/l	25.3		ng/l	1.80		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	3.20		ng/l	3.81		ng/l	0.610		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	1.24	J	ng/l	1.04	J	ng/l	0	J	ng/l
Perfluorooctanoic Acid (PFOA)	6.72		ng/l	8.82		ng/l	2.10		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	1.85	J	ng/l	1.91		ng/l	1.91		ng/l
Perfluorooctanesulfonic Acid (PFOS)	4.00		ng/l	3.72		ng/l	0		ng/l
Perfluorodecanoic Acid (PFDA)	0.821	J	ng/l	0.930	J	ng/l	0	J	ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							28.3	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Lab ID: L2142144-06
Client ID: PSM-08032021
Sample Location: ESSEX, VT

Date Collected: 08/03/21 13:50
Date Received: 08/05/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	11.4		ng/l	46.6		ng/l	35.2		ng/l
Perfluoropentanoic Acid (PFPeA)	4.67		ng/l	50.8		ng/l	46.1		ng/l
Perfluorobutanesulfonic Acid (PFBS)	1.43	JF	ng/l	ND		ng/l	0	J	ng/l
Perfluorohexanoic Acid (PFHxA)	5.18		ng/l	29.9		ng/l	24.7		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	3.39		ng/l	26.2		ng/l	22.8		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	0.953	J	ng/l	ND		ng/l	0	J	ng/l
Perfluorooctanoic Acid (PFOA)	4.19		ng/l	20.4		ng/l	16.2		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	1.37	J	ng/l	9.20	J	ng/l	0	J	ng/l
Perfluorooctanesulfonic Acid (PFOS)	1.46	J	ng/l	ND		ng/l	0	J	ng/l
Perfluorodecanoic Acid (PFDA)	0.696	J	ng/l	5.60	JF	ng/l	0	J	ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	3.80	JF	ng/l	0	J	ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							145	J	ng/l

TOTAL OXIDIZABLE PRECURSOR ASSAY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Lab ID: L2142144-07
Client ID: QA TOP
Sample Location: ESSEX, VT

Date Collected: 08/03/21 00:00
Date Received: 08/05/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	9.29	J	ng/l	38.5	J	ng/l	38.5	J	ng/l
Perfluoropentanoic Acid (PFPeA)	2.92	J	ng/l	11.0	J	ng/l	0	J	ng/l
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorohexanoic Acid (PFHxA)	1.82	J	ng/l	7.00	J	ng/l	0	J	ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	3.92	J	ng/l	0	J	ng/l
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorooctanoic Acid (PFOA)	2.75	J	ng/l	6.08	J	ng/l	0	J	ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorodecanoic Acid (PFDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							38.5	J	ng/l

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 13:22
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-07 Batch: WG1535434-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	0.300	J	ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	2.12		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	0.516	J	ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 13:22
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-07 Batch: WG1535434-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	103		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	118		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	103		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	50		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	87		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	97		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	124		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	98		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	89		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	98		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	109		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	97		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	77		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	75		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	66		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	108		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	92		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 20:23
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 01-07 Batch: WG1535438-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	6.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 20:23
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 01-07 Batch: WG1535438-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	96		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110		70-131
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	95		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	102		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	111		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	95		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	101		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	102		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	88		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2142144
Report Date: 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 20:07
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 01-07 Batch: WG1535438-4					
Perfluorobutanoic Acid (PFBA)	5.07	J	ng/l	6.00	0.408
Perfluoropentanoic Acid (PFPeA)	0.420	J	ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: Not Specified **Report Date:** 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 20:07
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 09:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 01-07 Batch: WG1535438-4					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	71		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	**60**	Q	62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	107		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	67		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	77		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	107		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	65		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	61		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	75		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**61**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	66		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	68		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	62		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	64		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	78		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	63		50-150

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2142144
Report Date: 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 11:41
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 21:20

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-07 Batch: WG1536177-1					
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	71		14-147

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 Batch: WG1535434-2								
Perfluorobutanoic Acid (PFBA)	109		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	109		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	106		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	126		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	111		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	92		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	106		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	108		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	110		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	127		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	122		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	108		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	111		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	115		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	129		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	105		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	98		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	109		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	115		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	111		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	110		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	120		-		67-153	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 Batch: WG1535434-2								
Perfluorotridecanoic Acid (PFTrDA)	125		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	114		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	99				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	114				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	52				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	83				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	93				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	112				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	89				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	94				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	75				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	90				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	102				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	60				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	76				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	103				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	90				22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 01-07 Batch: WG1535438-2 WG1535438-3								
Perfluorobutanoic Acid (PFBA)	97		100		67-148	3		30
Perfluoropentanoic Acid (PFPeA)	104		105		63-161	1		30
Perfluorobutanesulfonic Acid (PFBS)	94		95		65-157	1		30
Perfluorohexanoic Acid (PFHxA)	101		103		69-168	2		30
Perfluoropentanesulfonic Acid (PFPeS)	104		109		52-156	5		30
Perfluoroheptanoic Acid (PFHpA)	99		101		58-159	2		30
Perfluorohexanesulfonic Acid (PFHxS)	96		102		69-177	6		30
Perfluorooctanoic Acid (PFOA)	108		111		63-159	3		30
Perfluoroheptanesulfonic Acid (PFHpS)	105		105		61-179	0		30
Perfluorononanoic Acid (PFNA)	98		102		68-171	4		30
Perfluorooctanesulfonic Acid (PFOS)	110		110		52-151	0		30
Perfluorodecanoic Acid (PFDA)	97		100		63-171	3		30
Perfluorononanesulfonic Acid (PFNS)	106		104		48-150	2		30
Perfluoroundecanoic Acid (PFUnA)	97		101		60-153	4		30
Perfluorodecanesulfonic Acid (PFDS)	108		109		38-156	1		30
Perfluorododecanoic Acid (PFDoA)	102		107		67-153	5		30
Perfluorotridecanoic Acid (PFTrDA)	124		128		48-158	3		30
Perfluorotetradecanoic Acid (PFTA)	103		103		59-182	0		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2142144

Report Date: 08/19/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 01-07 Batch: WG1535438-2 WG1535438-3								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	98		95		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		97		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	113		110		70-131
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	94		93		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	102		101		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	114		108		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	88		87		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		87		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		99		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	97		94		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	106		103		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	100		99		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	88		86		22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2142144

Report Date: 08/19/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 Batch: WG1536177-2 WG1536177-3								
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	122		120		49-187	2		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	76		80		14-147

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2142144

Report Date: 08/19/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1535434-3 QC Sample: L2100462-66 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	10.6	40.9	55.6	110		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	21.1	40.9	65.6	109		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	6.24F	36.3	45.8	109		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	38.3	49.4	129		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	23.5	40.9	67.6	108		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	38.4	37.0	96		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	3.20	40.9	47.2	108		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	1.33J	37.4	43.1	112		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	6.81	40.9	52.9	113		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	2.49B	38.9	49.8	122		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	38.9	47.1	121		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	1.85J	40.9	47.2	111		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	4.05	38	47.0	113		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	0.842J	40.9	47.1	113		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	39.3	52.3	133		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	39.3	39.9	101		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	40.9	44.8	110		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	40.9	44.4	109		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	39.4	42.4	108		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	40.9	44.4F	109		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	40.9	45.2	111		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	40.9	49.4	121		-	-		67-153	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2142144

Report Date: 08/19/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1535434-3 QC Sample: L2100462-66 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	40.9	49.8	122		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	40.9	45.8	112		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	77				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	101				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	108				14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	54				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	54				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	81				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	79				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	68				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	110				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	76				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	85				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	75				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	27				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	78				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98				70-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1535434-4 QC Sample: L2100462-67 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	ND	10.1	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	7.43	4.31	ng/l	**53**	Q	30
Perfluorobutanesulfonic Acid (PFBS)	1.51J	1.28J	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	5.18	5.89	ng/l	13		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	3.39	3.71	ng/l	9		30
Perfluorohexanesulfonic Acid (PFHxS)	1.06J	1.10JF	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	4.25	4.01	ng/l	6		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	3.35B	3.24	ng/l	3		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	1.37J	1.70J	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	1.64J	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	0.696J	0.655J	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1535434-4 QC Sample: L2100462-67 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	1.21JF	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94		100		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	77		81		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	94		98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**268**	Q	**193**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	58		**56**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	116		127		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		103		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**286**	Q	**295**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		105		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		102		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91		98		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	98		128		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	99		65		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	64		62		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	28		25		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	65		64		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	54		57		48-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1535434-4 QC Sample: L2100462-67 Client ID: DUP Sample

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	84		97		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

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(*)
L2142144-01A	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-01B	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-01C	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-01D	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-02A	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-02B	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-02C	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-02D	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-03A	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-03B	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-03C	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-03D	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-04A	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-04B	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-04C	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-04D	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-05A	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-05B	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-05C	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-05D	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-06A	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-06B	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14)
L2142144-06C	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142144
Report Date: 08/19/21

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2142144-06D	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2142144-07A	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14),A2-TOP-537-ISOTOPE(14)
L2142144-07B	Plastic 250ml unpreserved	A	NA		3.2	Y	Absent		A2-537-ISOTOPE(14),A2-TOP-537-ISOTOPE(14)

Container Comments

L2142144-04C	low volume

*Values in parentheses indicate holding time in days

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142144

Project Number: **Report Date:** 08/19/21

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2142144
Project Number:	Not Specified	**Report Date:**	08/19/21

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: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2142144
Project Number:	Not Specified	**Report Date:**	08/19/21

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. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. 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 method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2142144
Project Number:	Not Specified	**Report Date:**	08/19/21

Data Qualifiers

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where 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.

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

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, NO2, NO3.

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, SM4500Cl-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.

8/6/21 L2142144

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL — World Class Chemistry

Westborough, MA — TEL: 508-898-9220 — FAX: 508-898-9193
Mansfield, MA — TEL: 508-822-9300 — FAX: 508-822-3288

Date Rec'd in Lab:

ALPHA Job #:

Project Information

Project Name: VT DEC WWTF PFAS Input

Project Location: Essex, VT

Project #

Project Manager: Steven LaRosa

ALPHA Quote #

Client Information

Client: Weston & Sampson

Address: 98 S Main, St

Waterbury, VT

Phone:

Fax:

Email: larosas@wseinc.com

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☐ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Report Information Data Deliverables

☐ FAX ☑ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #

Regulatory Requirements/Report Limits

State/Fed Program: Criteria:

Other Project Specific Requirements/Comments/Detection Limits:

Report in EnvirodataB

Report to MDL

ANALYSIS

SAMPLE HANDLING: Filtration ☐ Done ☐ Not Needed ☐ Lab to do; Preservation ☐ Lab to do (Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS by DoD Isotope Dilution	Alpha TOP
L2142144 -01	Cascade-08032021	8/3/21	10:30		MLR	☑	☑
-02	SWR-08032021	8/3/21	11:20		MLR	☑	☑
	~~[struck-through]-08032021~~ 8/6/21 MLR	~~8/3/21~~			MLR	☐	☐
-03	AutumnHarp-08032021	8/3/21	12:40		MLR	☑	☑
~~-X~~	~~TwinCraft-08032021~~	~~8/3/21~~			~~MLR~~	☐	☐
-04	Influent-08032021	8/3/21	14:30		MLR	☑	☑
-05	Effluent-08032021	8/3/21	14:30		MLR	☑	☑
-06	PSM ~~[struck-through]~~-08032021	8/3/21	1350		MLR	☑	☑
-07	QA-TOP	8/3/21	—		MLR	☐	☑

Container Type

Preservative

Relinquished By	Date/Time	Received By	Date/Time
		[signature]	8/5/21 1200
[signature]	8/6/21 4100	T. Hudak	8/6/21 0200 / 8/6/21 0415
T. Hudak	8/6/21 0530	[signature]	8/6/21 05:30

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

ANALYTICAL REPORT

Lab Number:	L2142145
Client:	Weston & Sampson 98 South Main Street Suite 2 Waterbury, VT 05676
ATTN:	Steven LaRosa
Phone:	(802) 244-5051
Project Name:	VT DEC WWTF PFAS INPUT
Project Number:	Not Specified
Report Date:	08/19/21

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142145
Report Date: 08/19/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2142145-01	PS17-08042021	WATER	ESSEX, VT	08/04/21 10:40	08/05/21
L2142145-02	PORTER-08042021	WATER	ESSEX, VT	08/04/21 12:00	08/05/21
L2142145-03	PS3-08042021	WATER	ESSEX, VT	08/04/21 11:40	08/05/21
L2142145-04	NSECTOR-08042021	WATER	ESSEX, VT	08/04/21 09:35	08/05/21
L2142145-05	PS9-08042021	WATER	ESSEX, VT	08/04/21 11:10	08/05/21
L2142145-06	INFLUENT-08042021	WATER	ESSEX, VT	08/04/21 14:00	08/05/21
L2142145-07	EFFLUENT-08042021	WATER	ESSEX, VT	08/04/21 14:00	08/05/21
L2142145-08	QA-08042021	WATER	ESSEX, VT	08/04/21 11:10	08/05/21

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2142145
Project Number:	Not Specified	**Report Date:**	08/19/21

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: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145
Project Number: Not Specified **Report Date:** 08/19/21

Case Narrative (continued)

Perfluorinated Alkyl Acids by Isotope Dilution

L2142145-01 and -02: The sample was centrifuged and decanted prior to extraction due to sample matrix.

L2142145-01 through -08: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2142145-02 and -02RE: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix.

L2142145-02RE: Sample was re-extracted within holding time due to 6:2 FTS hit in the Blank and in the sample. The results of the re-extraction are reported for 6:2FTS only.

WG1535434-1: The Method Blank, associated with L2142145-02 and -02RE, has a concentration above the reporting limit for 6:2FTS. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required.

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:  Alycia Mogayzel

Title: Technical Director/Representative Date: 08/19/21

ORGANICS

SEMIVOLATILES

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-01
Client ID: PS17-08042021
Sample Location: ESSEX, VT

Date Collected: 08/04/21 10:40
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/10/21 01:46
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/09/21 10:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	6.36		ng/l	1.78	0.362	1
Perfluoropentanoic Acid (PFPeA)	4.00		ng/l	1.78	0.352	1
Perfluorobutanesulfonic Acid (PFBS)	1.33	J	ng/l	1.78	0.211	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.78	0.401	1
Perfluorohexanoic Acid (PFHxA)	4.20		ng/l	1.78	0.291	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.78	0.218	1
Perfluoroheptanoic Acid (PFHpA)	1.44	J	ng/l	1.78	0.200	1
Perfluorohexanesulfonic Acid (PFHxS)	0.788	JF	ng/l	1.78	0.334	1
Perfluorooctanoic Acid (PFOA)	2.77		ng/l	1.78	0.209	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.78	1.18	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.78	0.611	1
Perfluorononanoic Acid (PFNA)	0.859	J	ng/l	1.78	0.277	1
Perfluorooctanesulfonic Acid (PFOS)	6.99	F	ng/l	1.78	0.447	1
Perfluorodecanoic Acid (PFDA)	0.927	J	ng/l	1.78	0.270	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.78	1.08	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.78	0.994	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.78	0.575	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.78	0.231	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.78	0.870	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.78	0.515	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.78	0.714	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.78	0.330	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.78	0.290	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.78	0.220	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-01 Date Collected: 08/04/21 10:40

Client ID: PS17-08042021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	90		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	92		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	94		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**171**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	67		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	97		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**209**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	90		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	87		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**174**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	35		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**51**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	23		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	66		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	73		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	130		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-02
Client ID: PORTER-08042021
Sample Location: ESSEX, VT

Date Collected: 08/04/21 12:00
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 16:24
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	8.05		ng/l	6.66	1.36	1
Perfluoropentanoic Acid (PFPeA)	6.25	J	ng/l	6.66	1.32	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	6.66	0.793	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	6.66	1.51	1
Perfluorohexanoic Acid (PFHxA)	8.97		ng/l	6.66	1.09	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	6.66	0.817	1
Perfluoroheptanoic Acid (PFHpA)	2.23	J	ng/l	6.66	0.750	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	6.66	1.25	1
Perfluorooctanoic Acid (PFOA)	5.72	J	ng/l	6.66	0.786	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	6.66	2.29	1
Perfluorononanoic Acid (PFNA)	2.64	J	ng/l	6.66	1.04	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	6.66	1.68	1
Perfluorodecanoic Acid (PFDA)	4.05	J	ng/l	6.66	1.01	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	6.66	4.04	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	6.66	3.73	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	6.66	2.16	1
Perfluoroundecanoic Acid (PFUnA)	2.19	JF	ng/l	6.66	0.866	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	6.66	3.26	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	6.66	1.93	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	4.42	J	ng/l	6.66	2.68	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	6.66	1.24	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	6.66	1.09	1
Perfluorotetradecanoic Acid (PFTA)	1.20	JF	ng/l	6.66	0.826	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-02 Date Collected: 08/04/21 12:00

Client ID: PORTER-08042021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	107		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	93		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	114		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**202**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	81		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	132		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	158		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	**153**	Q	24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	87		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	30		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**162**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	108		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	110		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-02 RE
Client ID: PORTER-08042021
Sample Location: ESSEX, VT

Date Collected: 08/04/21 12:00
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 14:26
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 21:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	50.0	33.3	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	101		14-147

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-03
Client ID: PS3-08042021
Sample Location: ESSEX, VT

Date Collected: 08/04/21 11:40
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/10/21 02:02
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/09/21 10:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	23.8		ng/l	1.73	0.354	1
Perfluoropentanoic Acid (PFPeA)	3.02		ng/l	1.73	0.343	1
Perfluorobutanesulfonic Acid (PFBS)	0.888	J	ng/l	1.73	0.206	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.73	0.392	1
Perfluorohexanoic Acid (PFHxA)	6.26		ng/l	1.73	0.284	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.73	0.213	1
Perfluoroheptanoic Acid (PFHpA)	1.19	J	ng/l	1.73	0.195	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.73	0.326	1
Perfluorooctanoic Acid (PFOA)	2.38		ng/l	1.73	0.205	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.73	1.16	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.73	0.597	1
Perfluorononanoic Acid (PFNA)	0.475	J	ng/l	1.73	0.270	1
Perfluorooctanesulfonic Acid (PFOS)	5.79	GF	ng/l	1.73	0.437	1
Perfluorodecanoic Acid (PFDA)	0.735	J	ng/l	1.73	0.264	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.73	1.05	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.73	0.971	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.73	0.562	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.73	0.225	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.73	0.850	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.73	0.503	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	0.770	J	ng/l	1.73	0.697	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.73	0.323	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.73	0.284	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.73	0.215	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-03 Date Collected: 08/04/21 11:40

Client ID: PS3-08042021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	78		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	88		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	84		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**175**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	61		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	68		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	81		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	86		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**240**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	78		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	76		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	90		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	28		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	22		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	77		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	101		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**205**	Q	22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-04
Client ID: NSECTOR-08042021
Sample Location: ESSEX, VT

Date Collected: 08/04/21 09:35
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/10/21 02:19
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/09/21 10:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	1.38	J	ng/l	2.22	0.454	1
Perfluoropentanoic Acid (PFPeA)	2.30		ng/l	2.22	0.440	1
Perfluorobutanesulfonic Acid (PFBS)	0.676	J	ng/l	2.22	0.265	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.22	0.503	1
Perfluorohexanoic Acid (PFHxA)	1.24	J	ng/l	2.22	0.365	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.22	0.273	1
Perfluoroheptanoic Acid (PFHpA)	0.458	J	ng/l	2.22	0.250	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.22	0.418	1
Perfluorooctanoic Acid (PFOA)	0.988	J	ng/l	2.22	0.262	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.22	1.48	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.22	0.765	1
Perfluorononanoic Acid (PFNA)	0.365	JF	ng/l	2.22	0.347	1
Perfluorooctanesulfonic Acid (PFOS)	6.68	F	ng/l	2.22	0.560	1
Perfluorodecanoic Acid (PFDA)	0.351	J	ng/l	2.22	0.338	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.22	1.35	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.22	1.24	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.22	0.721	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.22	0.289	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.22	1.09	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.22	0.645	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.22	0.894	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.22	0.414	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.22	0.364	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.22	0.276	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-04 Date Collected: 08/04/21 09:35

Client ID: NSECTOR-08042021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	77		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	68		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	84		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	133		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	58		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	68		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	88		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**204**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	73		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	**66**	Q	69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	62		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	93		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	28		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**35**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	16		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	51		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	56		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	106		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-05
Client ID: PS9-08042021
Sample Location: ESSEX, VT

Date Collected: 08/04/21 11:10
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/10/21 02:36
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/09/21 10:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	2.09		ng/l	1.88	0.383	1
Perfluoropentanoic Acid (PFPeA)	1.76	J	ng/l	1.88	0.372	1
Perfluorobutanesulfonic Acid (PFBS)	0.961	J	ng/l	1.88	0.223	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.88	0.424	1
Perfluorohexanoic Acid (PFHxA)	2.04		ng/l	1.88	0.308	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.88	0.230	1
Perfluoroheptanoic Acid (PFHpA)	0.668	J	ng/l	1.88	0.211	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.88	0.353	1
Perfluorooctanoic Acid (PFOA)	1.88		ng/l	1.88	0.221	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.88	1.25	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.88	0.646	1
Perfluorononanoic Acid (PFNA)	0.353	J	ng/l	1.88	0.293	1
Perfluorooctanesulfonic Acid (PFOS)	6.47	GF	ng/l	1.88	0.473	1
Perfluorodecanoic Acid (PFDA)	0.931	J	ng/l	1.88	0.285	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	1.66	J	ng/l	1.88	1.14	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.88	1.05	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.88	0.608	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.88	0.244	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.88	0.919	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.88	0.544	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.88	0.754	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.88	0.349	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.88	0.307	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.88	0.233	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-05 Date Collected: 08/04/21 11:10

Client ID: PS9-08042021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	92		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	103		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**211**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	72		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	105		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	94		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**294**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	97		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	92		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**174**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	35		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**47**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	51		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	65		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	108		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-06
Client ID: INFLUENT-08042021
Sample Location: ESSEX, VT

Date Collected: 08/04/21 14:00
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/10/21 02:52
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/09/21 10:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	2.75		ng/l	2.27	0.464	1
Perfluoropentanoic Acid (PFPeA)	6.74		ng/l	2.27	0.450	1
Perfluorobutanesulfonic Acid (PFBS)	1.41	J	ng/l	2.27	0.270	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.27	0.514	1
Perfluorohexanoic Acid (PFHxA)	3.87		ng/l	2.27	0.373	1
Perfluoropentanesulfonic Acid (PFPeS)	0.637	JF	ng/l	2.27	0.279	1
Perfluoroheptanoic Acid (PFHpA)	0.991	J	ng/l	2.27	0.256	1
Perfluorohexanesulfonic Acid (PFHxS)	1.01	JF	ng/l	2.27	0.427	1
Perfluorooctanoic Acid (PFOA)	2.00	J	ng/l	2.27	0.268	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.27	1.51	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.27	0.782	1
Perfluorononanoic Acid (PFNA)	0.864	J	ng/l	2.27	0.355	1
Perfluorooctanesulfonic Acid (PFOS)	5.98	G	ng/l	2.27	0.573	1
Perfluorodecanoic Acid (PFDA)	0.737	J	ng/l	2.27	0.346	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.27	1.38	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.27	1.27	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.27	0.737	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.27	0.296	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.27	1.11	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.27	0.659	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.27	0.914	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.27	0.423	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.27	0.372	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.27	0.282	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-06 Date Collected: 08/04/21 14:00

Client ID: INFLUENT-08042021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	88		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	75		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	125		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**173**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	63		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	70		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	123		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	92		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**304**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	85		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	85		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	78		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	108		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	55		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	65		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	16		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	92		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	82		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	107		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-07
Client ID: EFFLUENT-08042021
Sample Location: ESSEX, VT

Date Collected: 08/04/21 14:00
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/10/21 03:09
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/09/21 10:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	3.17		ng/l	1.82	0.372	1
Perfluoropentanoic Acid (PFPeA)	7.35		ng/l	1.82	0.361	1
Perfluorobutanesulfonic Acid (PFBS)	1.40	J	ng/l	1.82	0.217	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.82	0.412	1
Perfluorohexanoic Acid (PFHxA)	10.8		ng/l	1.82	0.299	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.82	0.224	1
Perfluoroheptanoic Acid (PFHpA)	1.16	J	ng/l	1.82	0.205	1
Perfluorohexanesulfonic Acid (PFHxS)	0.379	JF	ng/l	1.82	0.343	1
Perfluorooctanoic Acid (PFOA)	3.15		ng/l	1.82	0.215	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.82	1.21	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.82	0.628	1
Perfluorononanoic Acid (PFNA)	1.18	J	ng/l	1.82	0.284	1
Perfluorooctanesulfonic Acid (PFOS)	4.63	G	ng/l	1.82	0.460	1
Perfluorodecanoic Acid (PFDA)	0.857	J	ng/l	1.82	0.277	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.82	1.10	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.82	1.02	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.730	J	ng/l	1.82	0.591	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.82	0.237	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.82	0.894	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.82	0.529	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.82	0.733	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.82	0.339	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.82	0.298	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.82	0.226	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-07 Date Collected: 08/04/21 14:00

Client ID: EFFLUENT-08042021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	80		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	83		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	103		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	129		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	71		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	72		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	77		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	146		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	70		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	79		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	67		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	95		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	44		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**53**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	10		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	49		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	69		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	61		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-08
Client ID: QA-08042021
Sample Location: ESSEX, VT

Date Collected: 08/04/21 11:10
Date Received: 08/05/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/10/21 03:25
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/09/21 10:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	2.79		ng/l	1.97	0.402	1
Perfluoropentanoic Acid (PFPeA)	1.87	J	ng/l	1.97	0.390	1
Perfluorobutanesulfonic Acid (PFBS)	0.799	J	ng/l	1.97	0.234	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.97	0.445	1
Perfluorohexanoic Acid (PFHxA)	1.98		ng/l	1.97	0.323	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.97	0.241	1
Perfluoroheptanoic Acid (PFHpA)	0.650	J	ng/l	1.97	0.222	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.97	0.370	1
Perfluorooctanoic Acid (PFOA)	1.90	J	ng/l	1.97	0.232	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.97	1.31	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.97	0.677	1
Perfluorononanoic Acid (PFNA)	0.327	J	ng/l	1.97	0.307	1
Perfluorooctanesulfonic Acid (PFOS)	6.97	GF	ng/l	1.97	0.496	1
Perfluorodecanoic Acid (PFDA)	0.918	J	ng/l	1.97	0.299	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	1.42	J	ng/l	1.97	1.19	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.97	1.10	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.949	J	ng/l	1.97	0.638	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.97	0.256	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.97	0.965	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.97	0.571	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.97	0.792	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.97	0.366	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.97	0.322	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.97	0.244	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

SAMPLE RESULTS

Lab ID: L2142145-08 Date Collected: 08/04/21 11:10

Client ID: QA-08042021 Date Received: 08/05/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	93		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**222**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	77		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**277**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	95		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**175**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	33		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**42**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	11		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	46		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	63		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	98		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/09/21 21:16
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/09/21 10:46

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01,03-08 Batch: WG1532864-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2142145

Project Number: Not Specified **Report Date:** 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/09/21 21:16
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/09/21 10:46

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01,03-08 Batch: WG1532864-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	90		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	97		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	70		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	84		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	97		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	90		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	109		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	88		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	100		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	77		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	90		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	10		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	72		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	94		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	83		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2142145
Report Date: 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 13:22
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 02 Batch: WG1535434-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	0.300	J	ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	2.12		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	0.516	J	ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2142145
Report Date: 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/17/21 13:22
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/16/21 12:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 02 Batch: WG1535434-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	103		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	118		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	103		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	50		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	87		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	97		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	124		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	98		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	89		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	98		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	109		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	97		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	77		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	75		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	66		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	108		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	92		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2142145
Report Date: 08/19/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 11:41
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 21:20

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 02 Batch: WG1536177-1					
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	71		14-147

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142145
Report Date: 08/19/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01,03-08 Batch: WG1532864-2								
Perfluorobutanoic Acid (PFBA)	121		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	119		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	121		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	142		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	125		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	109		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	121		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	122		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	120		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	137		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	132		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	120		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	126		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	119		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	157		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	116		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	136		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	119		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	127		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	134		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	107		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	130		-		67-153	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142145
Report Date: 08/19/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01,03-08 Batch: WG1532864-2								
Perfluorotridecanoic Acid (PFTrDA)	134		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	127		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	96				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	109				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	108				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	77				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	88				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	86				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	116				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	95				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	97				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	94				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	103				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	79				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	38				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	90				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	104				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	90				22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142145
Report Date: 08/19/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 Batch: WG1535434-2								
Perfluorobutanoic Acid (PFBA)	109		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	109		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	106		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	126		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	111		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	92		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	106		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	108		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	110		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	127		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	122		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	108		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	111		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	115		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	129		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	105		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	98		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	109		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	115		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	111		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	110		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	120		-		67-153	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142145
Report Date: 08/19/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 Batch: WG1535434-2								
Perfluorotridecanoic Acid (PFTrDA)	125		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	114		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	99				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	114				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	52				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	83				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	93				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	112				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	89				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	94				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	75				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	90				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	102				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	60				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	76				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	103				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	90				22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2142145

Report Date: 08/19/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 Batch: WG1536177-2 WG1536177-3								
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	122		120		49-187	2		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	76		80		14-147

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2142145

Report Date: 08/19/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01,03-08 QC Batch ID: WG1532864-3 WG1532864-4 QC Sample: L2142439-01 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	20.4	36.1	63.5	119		63.9	119		67-148	1		30
Perfluoropentanoic Acid (PFPeA)	65.5	36.1	106	112		108	116		63-161	2		30
Perfluorobutanesulfonic Acid (PFBS)	8.10	32.1	46.8	121		46.6	119		65-157	0		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	33.8	48.2	143		47.8	140		37-219	1		30
Perfluorohexanoic Acid (PFHxA)	39.2	36.1	81.7	118		84.0	123		69-168	3		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	33.9	34.4	101		35.0	102		52-156	2		30
Perfluoroheptanoic Acid (PFHpA)	10.1	36.1	53.0	119		54.4	121		58-159	3		30
Perfluorohexanesulfonic Acid (PFHxS)	0.870J	33	38.6	114		39.5	116		69-177	2		30
Perfluorooctanoic Acid (PFOA)	21.4	36.1	66.6	125		67.7	127		63-159	2		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	1.35J	34.4	45.8	129		45.0	126		49-187	2		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	34.4	49.4	144		44.7	129		61-179	10		30
Perfluorononanoic Acid (PFNA)	1.60J	36.1	44.6	119		45.0	119		68-171	1		30
Perfluorooctanesulfonic Acid (PFOS)	5.48	33.5	47.8	126		48.2	126		52-151	1		30
Perfluorodecanoic Acid (PFDA)	0.422JF	36.1	41.6	114		43.9	119		63-171	5		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	34.7	48.3	139		48.4	138		56-173	0		30
Perfluorononanesulfonic Acid (PFNS)	ND	34.7	35.4	102		36.4	104		48-150	3		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	36.1	41.5	115		42.6	117		60-166	3		30
Perfluoroundecanoic Acid (PFUnA)	ND	36.1	40.6	112		40.8	112		60-153	0		30
Perfluorodecanesulfonic Acid (PFDS)	ND	34.8	35.1	101		36.4	103		38-156	4		30
Perfluorooctanesulfonamide (FOSA)	ND	36.1	41.4F	115		42.8	117		46-170	3		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	36.1	35.6	99		38.7	106		45-170	8		30
Perfluorododecanoic Acid (PFDoA)	ND	36.1	42.7	118		42.9	118		67-153	0		30

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2142145

Report Date: 08/19/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01,03-08 QC Batch ID: WG1532864-3 WG1532864-4 QC Sample: L2142439-01 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	36.1	45.7	127		47.3	130		48-158	3		30
Perfluorotetradecanoic Acid (PFTA)	ND	36.1	45.8	127		45.0	123		59-182	2		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	108		109		10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	135		124		12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**167**	Q	**160**	Q	14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	59		54		27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	60		53		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	73		69		55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	78		71		62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	79		72		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		74		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	107		100		71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	75		71		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	70		70		22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	92		83		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	93		86		62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	16		20		10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90		83		69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89		82		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	84		79		59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		94		70-131

Matrix Spike Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142145
Report Date: 08/19/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1535434-3 QC Sample: L2100462-66 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	10.6	40.9	55.6	110		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	21.1	40.9	65.6	109		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	6.24F	36.3	45.8	109		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	38.3	49.4	129		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	23.5	40.9	67.6	108		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	38.4	37.0	96		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	3.20	40.9	47.2	108		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	1.33J	37.4	43.1	112		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	6.81	40.9	52.9	113		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	2.49B	38.9	49.8	122		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	38.9	47.1	121		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	1.85J	40.9	47.2	111		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	4.05	38	47.0	113		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	0.842J	40.9	47.1	113		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	39.3	52.3	133		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	39.3	39.9	101		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	40.9	44.8	110		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	40.9	44.4	109		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	39.4	42.4	108		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	40.9	44.4F	109		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	40.9	45.2	111		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	40.9	49.4	121		-	-		67-153	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2142145

Report Date: 08/19/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1535434-3 QC Sample: L2100462-66 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	40.9	49.8	122		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	40.9	45.8	112		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	77				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	101				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	108				14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	54				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	54				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	81				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	79				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	68				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	110				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	76				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	85				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	75				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	27				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	78				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98				70-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142145
Report Date: 08/19/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1535434-4 QC Sample: L2100462-67 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	ND	10.1	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	7.43	4.31	ng/l	**53**	Q	30
Perfluorobutanesulfonic Acid (PFBS)	1.51J	1.28J	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	5.18	5.89	ng/l	13		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	3.39	3.71	ng/l	9		30
Perfluorohexanesulfonic Acid (PFHxS)	1.06J	1.10JF	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	4.25	4.01	ng/l	6		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	3.35B	3.24	ng/l	3		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	1.37J	1.70J	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	1.64J	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	0.696J	0.655J	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142145
Report Date: 08/19/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1535434-4 QC Sample: L2100462-67 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	1.21JF	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94		100		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	77		81		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	94		98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**268**	Q	**193**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	58		**56**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	116		127		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		103		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**286**	Q	**295**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		105		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		102		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91		98		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	98		128		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	99		65		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	64		62		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	28		25		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	65		64		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	54		57		48-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142145
Report Date: 08/19/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 02 QC Batch ID: WG1535434-4 QC Sample: L2100462-67 Client ID: DUP Sample

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	84		97		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2142145
Report Date: 08/19/21

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(*)
L2142145-01A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-01B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-02A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-02B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-03A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-03B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-04A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-04B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-05A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-05B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-06A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-06B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-07A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-07B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-08A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2142145-08B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: VT DEC WWTF PFAS INPUT
Lab Number: L2142145
Project Number:
Report Date: 08/19/21

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2142145
Project Number:	Not Specified	**Report Date:**	08/19/21

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: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2142145
Project Number:	Not Specified	**Report Date:**	08/19/21

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. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. 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 method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2142145
Project Number:	Not Specified	**Report Date:**	08/19/21

Data Qualifiers

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where 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.

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

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, NO2, NO3.

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, SM4500Cl-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 1

ALPHA ANALYTICAL

Westborough, MA TEL 508-898-9220 FAX 508-898-9193
Mansfield, MA TEL 508-822-9300 FAX 508-822-3288

Date Rec'd in Lab: 8/6/21

ALPHA Job #: L2142145

Client Information

Client: Weston & Sampson
Address: 98 S Main, St
Waterbury, VT
Phone
Fax:
Email: larosas@wseinc.com

☐ These samples have been Previously analyzed by Alpha

Project Information

Project Name: VT DEC WWTF PFAS Input
Project Location: Middlebury,VT
Project #
Project Manager: Steven LaRosa
ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Report Information / Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #

Regulatory Requirements/Report Limits

State/Fed Program | Criteria

Other Project Specific Requirements/Comments/Detection Limits:
Report in Envirodata8
Report to MDL

ANALYSIS

PFAS by DoD Isotope Dilution

SAMPLE HANDLING
Filtration
☐ Done
☐ Not Needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below.)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS by DoD Isotope Dilution	Sample Specific Comments
L2145-01	PS17-08042021	8/4/21	1040		MLR	☒	
-02	Porter-08042021	8/4/21	1200		MLR	☒	
-03	PS3-08042021	8/4/21	1140		MLR	☒	
-04	NSector-08042021	8/4/21	0935		MLR	☒	
-05	PS9-08042021	8/4/21	1110		MLR	☒	
-06	Influent-08042021	8/4/21	1400		MLR	☒	
-07	Effluent-08042021	8/4/21	1400		MLR	☒	
-08	QA-08042021	8/4/21	~~0935~~ 1110 mod		MLR	☒	
						☐	
						☐	

Container Type													
Preservative													

Relinquished By	Date/Time	Received By	Date/Time
Margaret Reilly	8/4/21 1640	Fridge	8/4/21 1640
R-Welty	8/5/21	RWelty	8/5/21 1200
Wendy Harvey	8/6/21 0400	T. Hurdle	8/6/21 0200
T. Hurdle	8/6/21 0530	AR	8/6/21 0530

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

ANALYTICAL REPORT

Lab Number:	L2143348
Client:	Weston & Sampson 98 South Main Street Suite 2 Waterbury, VT 05676
ATTN:	Steven LaRosa
Phone:	(802) 244-5051
Project Name:	VT DEC WWTF PFAS INPUT
Project Number:	Not Specified
Report Date:	08/20/21

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-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143348
Report Date: 08/20/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2143348-01	PS17-08112021	WATER	MIDDLEBURY, VT	08/11/21 10:00	08/12/21
L2143348-02	PORTER-08112021	WATER	MIDDLEBURY, VT	08/11/21 11:10	08/12/21
L2143348-03	PS3-08112021	WATER	MIDDLEBURY, VT	08/11/21 10:50	08/12/21
L2143348-04	NSECTOR-08112021	WATER	MIDDLEBURY, VT	08/11/21 09:25	08/12/21
L2143348-05	PS9-08112021	WATER	MIDDLEBURY, VT	08/11/21 10:30	08/12/21
L2143348-06	INFLUENT-08112021	WATER	MIDDLEBURY, VT	08/11/21 13:10	08/12/21
L2143348-07	EFFLUENT-08112021	WATER	MIDDLEBURY, VT	08/11/21 13:10	08/12/21

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2143348
Project Number:	Not Specified	**Report Date:**	08/20/21

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: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348
Project Number: Not Specified **Report Date:** 08/20/21

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

L2143348-01 through -06: The sample was centrifuged and decanted prior to extraction due to sample matrix.

L2143348-01 through -07: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

WG1536096-3 and WG1536096-4: The sample was centrifuged and decanted prior to extraction due to sample matrix.

WG1536096-3 and WG1536096-4: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

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:  Alycia Mogayzel

Title: Technical Director/Representative Date: 08/20/21

ORGANICS

SEMIVOLATILES

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-01
Client ID: PS17-08112021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/11/21 10:00
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 13:25
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	4.88		ng/l	1.73	0.352	1
Perfluoropentanoic Acid (PFPeA)	6.11		ng/l	1.73	0.342	1
Perfluorobutanesulfonic Acid (PFBS)	1.05	J	ng/l	1.73	0.206	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.73	0.390	1
Perfluorohexanoic Acid (PFHxA)	4.91		ng/l	1.73	0.283	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.73	0.212	1
Perfluoroheptanoic Acid (PFHpA)	1.58	J	ng/l	1.73	0.194	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.73	0.325	1
Perfluorooctanoic Acid (PFOA)	2.77		ng/l	1.73	0.204	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.73	1.15	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.73	0.594	1
Perfluorononanoic Acid (PFNA)	0.729	J	ng/l	1.73	0.270	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.73	0.435	1
Perfluorodecanoic Acid (PFDA)	1.10	J	ng/l	1.73	0.263	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.73	1.05	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.73	0.968	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.73	0.560	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.73	0.225	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.73	0.847	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.73	0.501	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.73	0.694	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.73	0.321	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.73	0.283	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.73	0.214	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-01 Date Collected: 08/11/21 10:00

Client ID: PS17-08112021 Date Received: 08/12/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	87		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	118		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**323**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	68		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	118		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	101		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**390**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	103		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	102		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**172**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	66		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	71		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	24		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	77		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	76		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	112		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-02
Client ID: PORTER-08112021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/11/21 11:10
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 13:58
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	1.12	J	ng/l	1.96	0.400	1
Perfluoropentanoic Acid (PFPeA)	1.11	J	ng/l	1.96	0.388	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.96	0.233	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.96	0.443	1
Perfluorohexanoic Acid (PFHxA)	1.28	J	ng/l	1.96	0.321	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.96	0.240	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.96	0.221	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.96	0.368	1
Perfluorooctanoic Acid (PFOA)	0.588	J	ng/l	1.96	0.231	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.96	1.30	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.96	0.674	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.96	0.306	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.96	0.494	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.96	0.298	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.96	1.19	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.96	1.10	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.96	0.635	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.96	0.255	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.96	0.960	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.96	0.568	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.96	0.788	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.96	0.364	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.96	0.320	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.96	0.243	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-02 Date Collected: 08/11/21 11:10

Client ID: PORTER-08112021 Date Received: 08/12/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	121		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	101		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	131		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**558**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	97		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	108		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	**141**	Q	71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	120		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**433**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	129		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	125		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	122		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**325**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	95		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	21		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**138**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**138**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**150**	Q	22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-03
Client ID: PS3-08112021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/11/21 10:50
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 14:31
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	3.98		ng/l	1.75	0.356	1
Perfluoropentanoic Acid (PFPeA)	1.58	J	ng/l	1.75	0.346	1
Perfluorobutanesulfonic Acid (PFBS)	0.475	J	ng/l	1.75	0.208	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.75	0.395	1
Perfluorohexanoic Acid (PFHxA)	2.29		ng/l	1.75	0.286	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.75	0.214	1
Perfluoroheptanoic Acid (PFHpA)	0.740	J	ng/l	1.75	0.197	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.75	0.328	1
Perfluorooctanoic Acid (PFOA)	2.11		ng/l	1.75	0.206	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	1.21	J	ng/l	1.75	1.16	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.75	0.601	1
Perfluorononanoic Acid (PFNA)	0.447	J	ng/l	1.75	0.272	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.75	0.440	1
Perfluorodecanoic Acid (PFDA)	0.720	J	ng/l	1.75	0.265	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.75	1.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.75	0.978	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.75	0.566	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.75	0.227	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.75	0.856	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.75	0.506	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	3.57		ng/l	1.75	0.702	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.75	0.325	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.75	0.286	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.75	0.216	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-03 Date Collected: 08/11/21 10:50

Client ID: PS3-08112021 Date Received: 08/12/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	100		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	92		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	**61**	Q	70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**201**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	70		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	**64**	Q	71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**174**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	**59**	Q	69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	97		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	104		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	35		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	79		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	25		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	101		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	100		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**163**	Q	22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-04
Client ID: NSECTOR-08112021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/11/21 09:25
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 14:47
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	1.61	J	ng/l	2.39	0.488	1
Perfluoropentanoic Acid (PFPeA)	0.957	J	ng/l	2.39	0.474	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.39	0.285	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.39	0.541	1
Perfluorohexanoic Acid (PFHxA)	0.622	J	ng/l	2.39	0.392	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.39	0.293	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.39	0.269	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.39	0.450	1
Perfluorooctanoic Acid (PFOA)	0.478	J	ng/l	2.39	0.282	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.39	1.59	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.39	0.823	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.39	0.373	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.39	0.603	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.39	0.364	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.39	1.45	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.39	1.34	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.39	0.775	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.39	0.311	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.39	1.17	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.39	0.694	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.39	0.962	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.39	0.445	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.39	0.391	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.39	0.297	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-04 Date Collected: 08/11/21 09:25

Client ID: NSECTOR-08112021 Date Received: 08/12/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	110		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	79		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	124		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**315**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	82		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	103		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	**147**	Q	71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	104		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**345**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	109		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**169**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	90		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**54**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	22		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	111		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	67		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	123		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-05
Client ID: PS9-08112021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/11/21 10:30
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 15:04
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	7.45		ng/l	1.78	0.362	1
Perfluoropentanoic Acid (PFPeA)	1.85		ng/l	1.78	0.352	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.78	0.211	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.78	0.402	1
Perfluorohexanoic Acid (PFHxA)	2.36		ng/l	1.78	0.291	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.78	0.218	1
Perfluoroheptanoic Acid (PFHpA)	0.661	J	ng/l	1.78	0.200	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.78	0.334	1
Perfluorooctanoic Acid (PFOA)	2.16		ng/l	1.78	0.210	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.78	1.18	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.78	0.611	1
Perfluorononanoic Acid (PFNA)	0.302	J	ng/l	1.78	0.277	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.78	0.448	1
Perfluorodecanoic Acid (PFDA)	0.611	J	ng/l	1.78	0.270	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	2.14		ng/l	1.78	1.08	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.78	0.995	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.78	0.576	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.78	0.231	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.78	0.870	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.78	0.515	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.78	0.714	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.78	0.330	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.78	0.291	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.78	0.220	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-05 Date Collected: 08/11/21 10:30

Client ID: PS9-08112021 Date Received: 08/12/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	74		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**295**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	71		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**256**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	104		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	93		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	102		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**186**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	42		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**49**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	16		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	67		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	57		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	112		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-06
Client ID: INFLUENT-08112021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/11/21 13:10
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 15:21
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	6.16		ng/l	1.87	0.381	1
Perfluoropentanoic Acid (PFPeA)	2.67		ng/l	1.87	0.370	1
Perfluorobutanesulfonic Acid (PFBS)	0.841	JF	ng/l	1.87	0.222	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.87	0.422	1
Perfluorohexanoic Acid (PFHxA)	2.22		ng/l	1.87	0.306	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.87	0.229	1
Perfluoroheptanoic Acid (PFHpA)	0.605	J	ng/l	1.87	0.210	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.87	0.351	1
Perfluorooctanoic Acid (PFOA)	1.32	J	ng/l	1.87	0.220	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.87	1.24	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.87	0.643	1
Perfluorononanoic Acid (PFNA)	0.306	J	ng/l	1.87	0.291	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.87	0.471	1
Perfluorodecanoic Acid (PFDA)	0.486	JF	ng/l	1.87	0.284	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.87	1.13	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.87	1.05	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.87	0.605	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.87	0.243	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.87	0.915	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.87	0.542	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.87	0.751	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.87	0.347	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.87	0.306	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.87	0.232	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-06 Date Collected: 08/11/21 13:10
Client ID: INFLUENT-08112021 Date Received: 08/12/21
Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	72		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**202**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	68		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	87		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	119		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	101		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**330**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	108		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	106		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	106		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**184**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	94		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	65		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	23		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	114		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	67		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	103		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-07
Client ID: EFFLUENT-08112021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/11/21 13:10
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 15:37
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	2.03		ng/l	1.87	0.381	1
Perfluoropentanoic Acid (PFPeA)	6.77		ng/l	1.87	0.370	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.87	0.222	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.87	0.422	1
Perfluorohexanoic Acid (PFHxA)	11.2		ng/l	1.87	0.306	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.87	0.229	1
Perfluoroheptanoic Acid (PFHpA)	1.10	J	ng/l	1.87	0.210	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.87	0.351	1
Perfluorooctanoic Acid (PFOA)	3.96		ng/l	1.87	0.220	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.87	1.24	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.87	0.642	1
Perfluorononanoic Acid (PFNA)	0.702	J	ng/l	1.87	0.291	1
Perfluorooctanesulfonic Acid (PFOS)	3.36	G	ng/l	1.87	0.470	1
Perfluorodecanoic Acid (PFDA)	0.926	J	ng/l	1.87	0.284	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.87	1.13	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.87	1.04	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	1.14	JF	ng/l	1.87	0.605	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.87	0.243	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.87	0.914	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.87	0.541	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.87	0.750	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.87	0.347	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.87	0.305	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.87	0.231	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

SAMPLE RESULTS

Lab ID: L2143348-07 Date Collected: 08/11/21 13:10

Client ID: EFFLUENT-08112021 Date Received: 08/12/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	100		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	80		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	113		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**227**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	101		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	120		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	96		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**170**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	90		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	110		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	98		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	126		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	71		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	87		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	34		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**188**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	88		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	59		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2143348
Report Date: 08/20/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 12:51
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-07 Batch: WG1536096-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143348

Project Number: Not Specified **Report Date:** 08/20/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 12:51
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-07 Batch: WG1536096-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	107		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	113		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	120		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	119		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	118		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	118		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	124		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	102		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	97		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	91		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	112		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	101		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	99		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	86		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	101		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	49		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	89		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	101		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	80		22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143348
Report Date: 08/20/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 Batch: WG1536096-2								
Perfluorobutanoic Acid (PFBA)	93		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	98		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	92		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	100		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	94		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	98		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	90		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	89		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	96		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	101		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	94		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	91		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	99		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	91		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	90		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	94		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	96		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	92		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	98		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	87		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	98		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	87		-		67-153	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143348
Report Date: 08/20/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 Batch: WG1536096-2								
Perfluorotridecanoic Acid (PFTrDA)	113		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	95		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	106				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	111				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	117				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	123				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	114				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	118				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	123				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	102				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	99				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	94				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	114				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	106				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	100				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	87				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	39				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	90				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	108				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	93				22-136

Matrix Spike Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143348
Report Date: 08/20/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1536096-3 QC Sample: L2143348-01 Client ID: PS17-08112021												
Perfluorobutanoic Acid (PFBA)	4.88	36.1	40.3	98		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	6.11	36.1	40.5	95		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	1.05J	32	30.0	90		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	33.8	34.1	101		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	4.91	36.1	39.6	96		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	33.9	33.1	98		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	1.58J	36.1	34.7	92		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	33	31.4	95		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	2.77	36.1	37.3	96		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	34.3	33.7	98		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	34.3	36.6	107		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	0.729J	36.1	33.0	89		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	ND	33.5	39.9	119		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	1.10J	36.1	34.0	91		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	34.6	36.9	107		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	34.7	30.3	87		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	36.1	36.9	102		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	36.1	34.8	96		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	34.8	31.5	91		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	36.1	31.0	86		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	36.1	33.3	92		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	36.1	33.0	92		-	-		67-153	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2143348

Report Date: 08/20/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1536096-3 QC Sample: L2143348-01 Client ID: PS17-08112021												
Perfluorotridecanoic Acid (PFTrDA)	ND	36.1	55.8	155		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	36.1	35.2	98		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**171**	Q			10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**323**	Q			12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**435**	Q			14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	72				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	63				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	104				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	67				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	117				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	77				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	110				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	102				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	90				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	24				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	101				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	90				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	112				70-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143348
Report Date: 08/20/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1536096-4 QC Sample: L2143348-02 Client ID: PORTER-08112021						
Perfluorobutanoic Acid (PFBA)	1.12J	0.906J	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	1.11J	0.976J	ng/l	NC		30
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	1.28J	1.20J	ng/l	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	0.267J	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	0.588J	0.655J	ng/l	NC		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	ND	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	ND	0.337J	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143348
Report Date: 08/20/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1536096-4 QC Sample: L2143348-02 Client ID: PORTER-08112021						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	121		105		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	101		88		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	131		105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**558**	Q	**490**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	97		80		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	108		89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	141	Q	113		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	120		103		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**433**	Q	**368**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	129		109		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	125		99		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	122		103		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**325**	Q	**247**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	95		78		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96		79		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	21		20		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	138	Q	112		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	138	Q	113		48-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143348
Report Date: 08/20/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1536096-4 QC Sample: L2143348-02 Client ID: PORTER-08112021

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	150	Q	111		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143348
Report Date: 08/20/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2143348-01A	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-01B	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-02A	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-02B	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-03A	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-03B	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-04A	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-04B	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-05A	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-05B	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-06A	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-06B	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-07A	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2143348-07B	Plastic 250ml unpreserved	B	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: VT DEC WWTF PFAS INPUT
Lab Number: L2143348
Project Number:
Report Date: 08/20/21

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2143348
Project Number:	Not Specified	**Report Date:**	08/20/21

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: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2143348
Project Number:	Not Specified	**Report Date:**	08/20/21

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. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. 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 method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2143348
Project Number:	Not Specified	**Report Date:**	08/20/21

Data Qualifiers

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where 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.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

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, NO2, NO3.

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, SM4500Cl-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 1

Date Rec'd in Lab: 8/13/21

ALPHA Job #: L2143348

Westborough, MA
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA
TEL: 508-822-9300
FAX: 508-822-3288

Client Information

Client: Weston & Sampson

Address: 98 S Main, St

Waterbury, VT

Phone:

Fax:

Email: larosas@wseinc.com

☐ These samples have been Previously analyzed by Alpha

Project Information

Project Name: VT DEC WWTF PFAS Input

Project Location: Middlebury,VT

Project #:

Project Manager: Steven LaRosa

ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:

Report in Envirodata8

Report to MDL

Report Information — Data Deliverables

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program Criteria

ANALYSIS

PFAS by DoD Isotope Dilution

SAMPLE HANDLING

Filtration
☐ Done
☐ Not Needed
☐ Lab to do

Preservation
☐ Lab to do

(Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS by DoD Isotope Dilution
43348-01	PS17-08112021	8/11/21	1000		MLR	☒
-02	Porter-08112021	8/11/21	1110		MLR	☒
-03	PS3-08112021	8/11/21	1050		MLR	☒
-04	NSector-08112021	8/11/21	0945		MLR	☒
-05	PS9-08112021	8/11/21	1030		MLR	☒
-06	Influent-08112021	8/11/21	1310		MLR	☒
-07	Effluent-08112021	8/11/21	1310		MLR	☒
	[redacted]				MLR	☐
						☐
						☐

NC1 -AAC 8/13/21 0930

Container Type	-	-	-	-	-	-	-	-	-	-	-	-	-
Preservative	-	-	-	-	-	-	-	-	-	-	-	-	-

Relinquished By:	Date/Time	Received By:	Date/Time
Margaret Dilley	8/11/21 1700	Fridge	8/11/21 1700
	8/12/21 16:30		8/12/21 12:30
Wendy Mann	8/13/21 4:00		8/13/21 0410

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO. 01-01(I)-NJ) (rev. 5-JAN-12)

ANALYTICAL REPORT

Lab Number:	L2143350
Client:	Weston & Sampson 98 South Main Street Suite 2 Waterbury, VT 05676
ATTN:	Steven LaRosa
Phone:	(802) 244-5051
Project Name:	VT DEC WWTF PFAS INPUT
Project Number:	Not Specified
Report Date:	08/26/21

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-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2143350-01	CASCADE-08102021	WATER	ESSEX, VT	08/10/21 12:30	08/12/21
L2143350-02	SWR-08102021	WATER	ESSEX, VT	08/10/21 13:00	08/12/21
L2143350-03	AUTUMNHARP-08102021	WATER	ESSEX, VT	08/10/21 10:30	08/12/21
L2143350-04	PSM-08102021	WATER	ESSEX, VT	08/10/21 13:50	08/12/21
L2143350-05	EFFLUENT-08102021	WATER	ESSEX, VT	08/10/21 14:30	08/12/21
L2143350-06	INFLUENT-08102021	WATER	ESSEX, VT	08/10/21 14:30	08/12/21
L2143350-07	TWINCRAFT-08102021	WATER	ESSEX, VT	08/10/21 09:35	08/12/21
L2143350-08	QA-08102021	WATER	ESSEX, VT	08/10/21 09:35	08/12/21

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2143350
Project Number:	Not Specified	**Report Date:**	08/26/21

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:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2143350
Project Number:	Not Specified	**Report Date:**	08/26/21

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

L2143350-01: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix.

.L2143350-01, -02, -03RE, -04RE, -05, -06, -07RE and -08RE: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2143350-02 and -06: The sample was centrifuged and decanted prior to extraction due to sample matrix.

L2143350-03, -04, -07, and -08RE: The sample was re-extracted within the method required holding time due to matrix interferences with the original extraction. The results of the re-extraction are reported.

L2143350-03, -04, -07, and -08RE: The sample has elevated detection limits due to the dilution required by the sample matrix.

WG1537061-1: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

Perfluorinated Alkyl Acids by Isotope Dil. (Post-Treatment)

L2143350-07: The following surrogate is a negative control for the TOP Assay: M2-4:2FTS. Low recoveries of this surrogate demonstrate that the associated compounds have been converted to a different PFAS constituent (Limit 0-25%).

L2143350-07R: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported.

L2143350-07R: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix. Please note, the discrepancy between the Isotope and TOP data results are attributed to the nonhomogenity of the matrix between sampled bottles.

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2143350
Project Number:	Not Specified	**Report Date:**	08/26/21

Case Narrative (continued)

WG1536344-1 and WG1536344-4: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported.

WG1536344-4: This blank represents the TOP oxidation blank associated with L2143350-07R.

WG1536344-4: The following surrogate is a negative control for the TOP Assay: M2-4:2FTS. Low recoveries of this surrogate demonstrate that the associated compounds have been converted to a different PFAS constituent (Limit 0-25%).

WG1536344-4: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

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: Alycia Mogayzel

Title: Technical Director/Representative Date: 08/26/21

ORGANICS

SEMIVOLATILES

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-01
Client ID: CASCADE-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 12:30
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 15:54
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	20.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	5.20	J	ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	20.0	2.38	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	20.0	4.52	1
Perfluorohexanoic Acid (PFHxA)	4.28	J	ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	4.60	J	ng/l	20.0	2.36	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	20.0	13.3	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	4.56	J	ng/l	20.0	3.04	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	20.0	12.1	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	20.0	6.48	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	20.0	5.80	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	20.0	8.04	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	20.0	2.48	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-01 Date Collected: 08/10/21 12:30

Client ID: CASCADE-08102021 Date Received: 08/12/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	**57**	Q	58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	**51**	Q	62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	**64**	Q	70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**160**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**55**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	**58**	Q	60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	**63**	Q	71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	**49**	Q	62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	83		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	**51**	Q	59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	**46**	Q	69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**42**	Q	62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	81		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	36		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**49**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	16		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	43		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**42**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	50		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-02
Client ID: SWR-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 13:00
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 16:10
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	24.3		ng/l	1.80	0.367	1
Perfluoropentanoic Acid (PFPeA)	2.47		ng/l	1.80	0.357	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.80	0.214	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.80	0.407	1
Perfluorohexanoic Acid (PFHxA)	3.55		ng/l	1.80	0.295	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.80	0.221	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.80	0.203	1
Perfluorohexanesulfonic Acid (PFHxS)	1.24	J	ng/l	1.80	0.339	1
Perfluorooctanoic Acid (PFOA)	2.33		ng/l	1.80	0.212	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.80	1.20	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.80	0.620	1
Perfluorononanoic Acid (PFNA)	0.483	J	ng/l	1.80	0.281	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.80	0.454	1
Perfluorodecanoic Acid (PFDA)	0.281	J	ng/l	1.80	0.274	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.80	1.09	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.80	1.01	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.80	0.584	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.80	0.234	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.80	0.883	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.80	0.522	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.80	0.724	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.80	0.335	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.80	0.295	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.80	0.223	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-02 Date Collected: 08/10/21 13:00

Client ID: SWR-08102021 Date Received: 08/12/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	88		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	93		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	91		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**143**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	68		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	66		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	81		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	88		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**148**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	84		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	81		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	88		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**166**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	44		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	55		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	22		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	81		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	88		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	134		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-03 RE
Client ID: AUTUMNHARP-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 10:30
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/20/21 08:29
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/19/21 17:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	24.8		ng/l	10.0	2.04	1
Perfluoropentanoic Acid (PFPeA)	3.74	J	ng/l	10.0	1.98	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	10.0	1.19	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	10.0	2.26	1
Perfluorohexanoic Acid (PFHxA)	2.96	J	ng/l	10.0	1.64	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	10.0	1.23	1
Perfluoroheptanoic Acid (PFHpA)	1.66	J	ng/l	10.0	1.13	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	10.0	1.88	1
Perfluorooctanoic Acid (PFOA)	4.54	J	ng/l	10.0	1.18	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	10.0	6.66	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	10.0	3.44	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	10.0	1.56	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	10.0	2.52	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	10.0	1.52	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	10.0	6.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	10.0	5.60	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	10.0	3.24	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	10.0	1.30	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	10.0	4.90	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	10.0	2.90	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	10.0	4.02	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	10.0	1.86	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	10.0	1.64	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	10.0	1.24	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-03 RE
Client ID: AUTUMNHARP-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 10:30
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	85		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	100		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**494**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	91		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	82		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**162**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	138		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	**117**	Q	24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	46		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	98		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	107		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	80		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-04 RE
Client ID: PSM-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 13:50
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/20/21 08:45
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/19/21 17:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	23.4		ng/l	10.0	2.04	1
Perfluoropentanoic Acid (PFPeA)	4.72	J	ng/l	10.0	1.98	1
Perfluorobutanesulfonic Acid (PFBS)	3.32	JF	ng/l	10.0	1.19	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	10.0	2.26	1
Perfluorohexanoic Acid (PFHxA)	8.88	J	ng/l	10.0	1.64	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	10.0	1.23	1
Perfluoroheptanoic Acid (PFHpA)	1.70	J	ng/l	10.0	1.13	1
Perfluorohexanesulfonic Acid (PFHxS)	2.84	J	ng/l	10.0	1.88	1
Perfluorooctanoic Acid (PFOA)	3.80	J	ng/l	10.0	1.18	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	10.0	6.66	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	10.0	3.44	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	10.0	1.56	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	10.0	2.52	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	10.0	1.52	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	10.0	6.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	10.0	5.60	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	10.0	3.24	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	10.0	1.30	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	10.0	4.90	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	10.0	2.90	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	10.0	4.02	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	10.0	1.86	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	10.0	1.64	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	10.0	1.24	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-04 RE
Client ID: PSM-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 13:50
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	77		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**247**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	85		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	106		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	90		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**237**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	89		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**237**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	64		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	65		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	60		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	93		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-05
Client ID: EFFLUENT-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 14:30
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 19:45
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	8.84		ng/l	2.27	0.463	1
Perfluoropentanoic Acid (PFPeA)	21.4		ng/l	2.27	0.450	1
Perfluorobutanesulfonic Acid (PFBS)	4.21		ng/l	2.27	0.270	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.27	0.513	1
Perfluorohexanoic Acid (PFHxA)	20.5		ng/l	2.27	0.372	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.27	0.278	1
Perfluoroheptanoic Acid (PFHpA)	2.95		ng/l	2.27	0.256	1
Perfluorohexanesulfonic Acid (PFHxS)	0.804	J	ng/l	2.27	0.427	1
Perfluorooctanoic Acid (PFOA)	6.22		ng/l	2.27	0.268	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.27	1.51	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.27	0.781	1
Perfluorononanoic Acid (PFNA)	1.36	J	ng/l	2.27	0.354	1
Perfluorooctanesulfonic Acid (PFOS)	3.28		ng/l	2.27	0.572	1
Perfluorodecanoic Acid (PFDA)	0.918	J	ng/l	2.27	0.345	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.27	1.38	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.27	1.27	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.27	0.736	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.27	0.295	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.27	1.11	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.27	0.659	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.27	0.913	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.27	0.422	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.27	0.372	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.27	0.282	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-05 Date Collected: 08/10/21 14:30

Client ID: EFFLUENT-08102021 Date Received: 08/12/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	79		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	64		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	103		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**181**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	73		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	110		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	73		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	140		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	65		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	89		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	68		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	120		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	50		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	70		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	12		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	46		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	72		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	69		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-06
Client ID: INFLUENT-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 14:30
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 20:02
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	5.06		ng/l	2.18	0.444	1
Perfluoropentanoic Acid (PFPeA)	3.39		ng/l	2.18	0.431	1
Perfluorobutanesulfonic Acid (PFBS)	2.19		ng/l	2.18	0.259	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.18	0.492	1
Perfluorohexanoic Acid (PFHxA)	4.07		ng/l	2.18	0.357	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.18	0.267	1
Perfluoroheptanoic Acid (PFHpA)	1.26	J	ng/l	2.18	0.245	1
Perfluorohexanesulfonic Acid (PFHxS)	51.4	F	ng/l	2.18	0.409	1
Perfluorooctanoic Acid (PFOA)	2.77		ng/l	2.18	0.257	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.18	1.45	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.74	F	ng/l	2.18	0.748	1
Perfluorononanoic Acid (PFNA)	0.661	J	ng/l	2.18	0.339	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.18	0.548	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.18	0.331	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.18	1.32	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.18	1.22	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.18	0.705	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.18	0.283	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.18	1.06	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.18	0.631	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.18	0.874	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.18	0.404	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.18	0.356	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.18	0.270	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-06 Date Collected: 08/10/21 14:30

Client ID: INFLUENT-08102021 Date Received: 08/12/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	102		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	80		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	117		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**264**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	75		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	121		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**265**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	113		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	103		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**222**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	67		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	59		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	21		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	94		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	63		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	93		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-07 RE
Client ID: TWINCRAFT-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 09:35
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/20/21 09:02
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/19/21 17:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	18.4	J	ng/l	20.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	20.0	2.38	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	20.0	4.52	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	18.5	J	ng/l	20.0	2.36	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	20.0	13.3	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	62.9		ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	83.5		ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	20.0	3.04	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	20.0	12.1	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	20.0	6.48	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	20.0	5.80	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	20.0	8.04	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	20.0	2.48	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-07 RE
Client ID: TWINCRAFT-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 09:35
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	86		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	129		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**478**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	86		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	104		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	107		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**453**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	62		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	101		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	61		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	**443**	Q	24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**494**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	**185**	Q	10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**418**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**340**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**749**	Q	22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-07 R
Client ID: TWINCRAFT-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 09:35
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/19/21 22:26
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/18/21 08:46

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	35.5	J	ng/l	120	2.04	1
Perfluoropentanoic Acid (PFPeA)	9.46	J	ng/l	10.0	1.98	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	10.0	1.19	1
Perfluorohexanoic Acid (PFHxA)	5.28	J	ng/l	10.0	1.64	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	10.0	1.23	1
Perfluoroheptanoic Acid (PFHpA)	2.92	J	ng/l	10.0	1.13	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	10.0	1.88	1
Perfluorooctanoic Acid (PFOA)	5.76	J	ng/l	10.0	1.18	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	10.0	3.44	1
Perfluorononanoic Acid (PFNA)	2.08	J	ng/l	10.0	1.56	1
Perfluorooctanesulfonic Acid (PFOS)	2.64	J	ng/l	10.0	2.52	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	10.0	1.52	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	10.0	5.60	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	10.0	1.30	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	10.0	4.90	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	10.0	1.86	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	10.0	1.64	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	10.0	1.24	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-07 R
Client ID: TWINCRAFT-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 09:35
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	86		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	69		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	112		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	85		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	112		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	76		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	100		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	86		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	84		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	74		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	52		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	51		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	52		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-08 RE
Client ID: QA-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 09:35
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/20/21 09:19
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/19/21 17:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	21.8		ng/l	10.0	2.04	1
Perfluoropentanoic Acid (PFPeA)	4.02	J	ng/l	10.0	1.98	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	10.0	1.19	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	10.0	2.26	1
Perfluorohexanoic Acid (PFHxA)	4.38	J	ng/l	10.0	1.64	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	10.0	1.23	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	10.0	1.13	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	10.0	1.88	1
Perfluorooctanoic Acid (PFOA)	2.80	J	ng/l	10.0	1.18	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	10.0	6.66	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	10.0	3.44	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	10.0	1.56	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	10.0	2.52	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	10.0	1.52	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	10.0	6.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	10.0	5.60	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	10.0	3.24	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	10.0	1.30	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	10.0	4.90	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	10.0	2.90	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	10.0	4.02	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	10.0	1.86	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	10.0	1.64	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	10.0	1.24	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

SAMPLE RESULTS

Lab ID: L2143350-08 RE
Client ID: QA-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 09:35
Date Received: 08/12/21
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	83		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	72		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	114		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**188**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	70		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	72		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	114		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**175**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	73		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	87		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	149		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	67		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	87		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	31		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	102		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	101		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	94		22-136

TOTAL OXIDIZABLE PRECURSOR ASSAY

RESULTS SUMMARY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Lab ID: L2143350-07
Client ID: TWINCRAFT-08102021
Sample Location: ESSEX, VT

Date Collected: 08/10/21 09:35
Date Received: 08/12/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	18.4	J	ng/l	35.5	J	ng/l	17.1	J	ng/l
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	9.46	J	ng/l	9.46	J	ng/l
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	5.28	J	ng/l	5.28	J	ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.92	J	ng/l	2.92	J	ng/l
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorooctanoic Acid (PFOA)	18.5	J	ng/l	5.76	J	ng/l	0	J	ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	62.9		ng/l	2.08	J	ng/l	0		ng/l
Perfluorooctanesulfonic Acid (PFOS)	83.5		ng/l	2.64	J	ng/l	0		ng/l
Perfluorodecanoic Acid (PFDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							34.8	J	ng/l

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 12:51
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02,05-06 Batch: WG1536096-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/18/21 12:51
Analyst: JW

Extraction Method: ALPHA 23528
Extraction Date: 08/17/21 17:50

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02,05-06 Batch: WG1536096-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	107		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	113		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	120		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	119		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	118		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	118		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	124		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	102		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	97		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	91		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	112		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	101		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	99		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	86		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	101		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	49		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	89		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	101		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	80		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2143350
Report Date: 08/26/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/19/21 21:20
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/18/21 08:46

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 07 Batch: WG1536344-1 R					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/19/21 21:20
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/18/21 08:46

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 07 Batch: WG1536344-1 R					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	108		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	114		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	120		70-131
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	110		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	113		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	121		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	96		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	112		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	103		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	108		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	107		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	95		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2143350
Report Date: 08/26/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/19/21 22:10
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/18/21 08:46

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 07 Batch: WG1536344-4 R					
Perfluorobutanoic Acid (PFBA)	5.00	J	ng/l	6.00	0.408
Perfluoropentanoic Acid (PFPeA)	0.432	J	ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	0.312	J	ng/l	2.00	0.236
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/19/21 22:10
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/18/21 08:46

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 07 Batch: WG1536344-4 R					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	72		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	**59**	Q	62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	113		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	71		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	112		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	68		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	67		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	82		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	67		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	69		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	70		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	68		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	**47**	Q	50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	54		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	**46**	Q	50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/20/21 07:56
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/19/21 17:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 03-04,07-08 Batch: WG1537061-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2143350

Project Number: Not Specified **Report Date:** 08/26/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/20/21 07:56
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/19/21 17:30

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 03-04,07-08 Batch: WG1537061-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	100		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	111		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**146**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	97		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	104		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	112		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**154**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	91		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	108		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	100		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	131		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	89		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	105		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	39		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	90		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	81		22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06 Batch: WG1536096-2								
Perfluorobutanoic Acid (PFBA)	93		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	98		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	92		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	100		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	94		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	98		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	90		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	89		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	96		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	101		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	94		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	91		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	99		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	91		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	90		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	94		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	96		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	92		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	98		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	87		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	98		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	87		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2143350

Report Date: 08/26/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06 Batch: WG1536096-2								
Perfluorotridecanoic Acid (PFTrDA)	113		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	95		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	106				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	111				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	117				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	123				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	114				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	118				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	123				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	102				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	99				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	94				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	114				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	106				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	100				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	87				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	39				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	90				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	108				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	93				22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 07 Batch: WG1536344-2 WG1536344-3								
Perfluorobutanoic Acid (PFBA)	100		100		67-148	0		30
Perfluoropentanoic Acid (PFPeA)	104		104		63-161	0		30
Perfluorobutanesulfonic Acid (PFBS)	93		93		65-157	0		30
Perfluorohexanoic Acid (PFHxA)	102		100		69-168	2		30
Perfluoropentanesulfonic Acid (PFPeS)	101		101		52-156	0		30
Perfluoroheptanoic Acid (PFHpA)	99		100		58-159	1		30
Perfluorohexanesulfonic Acid (PFHxS)	96		94		69-177	2		30
Perfluorooctanoic Acid (PFOA)	108		110		63-159	2		30
Perfluoroheptanesulfonic Acid (PFHpS)	99		98		61-179	1		30
Perfluorononanoic Acid (PFNA)	101		101		68-171	0		30
Perfluorooctanesulfonic Acid (PFOS)	106		105		52-151	1		30
Perfluorodecanoic Acid (PFDA)	97		101		63-171	4		30
Perfluorononanesulfonic Acid (PFNS)	105		100		48-150	5		30
Perfluoroundecanoic Acid (PFUnA)	102		102		60-153	0		30
Perfluorodecanesulfonic Acid (PFDS)	110		105		38-156	5		30
Perfluorododecanoic Acid (PFDoA)	99		99		67-153	0		30
Perfluorotridecanoic Acid (PFTrDA)	122		124		48-158	2		30
Perfluorotetradecanoic Acid (PFTA)	100		101		59-182	1		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 07 Batch: WG1536344-2 WG1536344-3								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	107		106		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	105		106		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	117		118		70-131
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	106		107		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	112		109		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	118		123		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	94		94		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	94		95		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	110		114		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	108		104		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	112		109		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	112		111		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	102		94		22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07-08 Batch: WG1537061-2								
Perfluorobutanoic Acid (PFBA)	97		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	98		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	91		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	109		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	96		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	101		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	95		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	95		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	100		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	105		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	96		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	99		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	105		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	101		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	103		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	103		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	95		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	101		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	106		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	91		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	96		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	96		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2143350

Report Date: 08/26/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07-08 Batch: WG1537061-2								
Perfluorotridecanoic Acid (PFTrDA)	115		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	95		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	97				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	97				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	127				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	92				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	98				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	92				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	131				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	93				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	129				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	89				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	98				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	50				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	87				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	86				22-136

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2143350

Report Date: 08/26/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06 QC Batch ID: WG1536096-3 QC Sample: L2143348-01 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	4.88	36.1	40.3	98		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	6.11	36.1	40.5	95		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	1.05J	32	30.0	90		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	33.8	34.1	101		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	4.91	36.1	39.6	96		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	33.9	33.1	98		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	1.58J	36.1	34.7	92		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	33	31.4	95		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	2.77	36.1	37.3	96		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	34.3	33.7	98		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	34.3	36.6	107		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	0.729J	36.1	33.0	89		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	ND	33.5	39.9	119		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	1.10J	36.1	34.0	91		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	34.6	36.9	107		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	34.7	30.3	87		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	36.1	36.9	102		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	36.1	34.8	96		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	34.8	31.5	91		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	36.1	31.0	86		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	36.1	33.3	92		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	36.1	33.0	92		-	-		67-153	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2143350

Report Date: 08/26/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06 QC Batch ID: WG1536096-3 QC Sample: L2143348-01 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	36.1	55.8	155		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	36.1	35.2	98		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**171**	Q			10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**323**	Q			12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**435**	Q			14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	72				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	63				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	104				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	67				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	117				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	77				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	110				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	102				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	90				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	24				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	101				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	90				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	112				70-131

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2143350

Report Date: 08/26/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07-08 QC Batch ID: WG1537061-3 QC Sample: L2143535-01 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	404	39	441	95		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	988E	39	1040E	133		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	238	34.7	274	104		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	8.50	36.6	48.2	109		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	1370E	39	1440E	**179**	Q	-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	524	36.7	574	136		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	750	39	780	77		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	4890E	35.7	5050E	**448**	Q	-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	1010E	39	1070E	154		-	-		63-159	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	150	37.2	232	**221**	Q	-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	506	39	582	**195**	Q	-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	4470E	36.2	4670E	**552**	Q	-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	28.4	39	68.8	103		-	-		63-171	-		30
Perfluorononanesulfonic Acid (PFNS)	14.2	37.6	80.6	**177**	Q	-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	39	34.3	88		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	2600E	39	2560E	**0**	Q	-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	37.6	50.9	135		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	39	32.3	83		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	39	32.1	82		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	39	31.4	80		-	-		67-153	-		30
Perfluorotridecanoic Acid (PFTrDA)	2.29	39	41.4	100		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	39	37.1	95		-	-		59-182	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2143350

Report Date: 08/26/21

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07-08 QC Batch ID: WG1537061-3 QC Sample: L2143535-01 Client ID: MS Sample												

Surrogate (Extracted Internal Standard)	*MS % Recovery*	*MS Qualifier*	*MSD % Recovery*	*MSD Qualifier*	*Acceptance Criteria*
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**310**	Q			10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**421**	Q			12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**693**	Q			14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	93				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	80				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	72				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	89				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**48**	Q			57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	65				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	97				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	108				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	92				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	94				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	**52**	Q			62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	64				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	92				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	**156**	Q			70-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06 QC Batch ID: WG1536096-4 QC Sample: L2143348-02 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	1.12J	0.906J	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	1.11J	0.976J	ng/l	NC		30
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	1.28J	1.20J	ng/l	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	0.267J	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	0.588J	0.655J	ng/l	NC		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	ND	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	ND	0.337J	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06 QC Batch ID: WG1536096-4 QC Sample: L2143348-02 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	121		105		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	101		88		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	131		105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**558**	Q	**490**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	97		80		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	108		89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	141	Q	113		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	120		103		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**433**	Q	**368**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	129		109		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	125		99		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	122		103		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**325**	Q	**247**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	95		78		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96		79		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	21		20		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	138	Q	112		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	138	Q	113		48-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06 QC Batch ID: WG1536096-4 QC Sample: L2143348-02 Client ID: DUP Sample

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	150	Q	111		22-136

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07-08 QC Batch ID: WG1537061-4 QC Sample: L2143535-02 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	672	677	ng/l	1		30
Perfluoropentanoic Acid (PFPeA)	1960E	1960E	ng/l	0		30
Perfluorobutanesulfonic Acid (PFBS)	643	642	ng/l	0		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	3.16	3.19	ng/l	1		30
Perfluorohexanoic Acid (PFHxA)	1790E	1790E	ng/l	0		30
Perfluoropentanesulfonic Acid (PFPeS)	1200E	1160E	ng/l	3		30
Perfluoroheptanoic Acid (PFHpA)	1100E	1110E	ng/l	1		30
Perfluorohexanesulfonic Acid (PFHxS)	6060E	5880E	ng/l	3		30
Perfluorooctanoic Acid (PFOA)	1300E	1270E	ng/l	2		30
Perfluoroheptanesulfonic Acid (PFHpS)	378	305	ng/l	21		30
Perfluorononanoic Acid (PFNA)	1330E	1260E	ng/l	5		30
Perfluorooctanesulfonic Acid (PFOS)	5280E	4580E	ng/l	14		30
Perfluorodecanoic Acid (PFDA)	102	80.9	ng/l	23		30
Perfluorononanesulfonic Acid (PFNS)	24.5	15.1	ng/l	**47**	Q	30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	932E	801	ng/l	15		30
Perfluorodecanesulfonic Acid (PFDS)	6.90	5.50F	ng/l	23		30
Perfluorooctanesulfonamide (FOSA)	4.15	4.03	ng/l	3		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	12.6	12.8	ng/l	2		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07-08 QC Batch ID: WG1537061-4 QC Sample: L2143535-02 Client ID: DUP Sample						
Perfluorotridecanoic Acid (PFTrDA)	76.9	79.1	ng/l	3		30
Perfluorotetradecanoic Acid (PFTA)	0.611J	0.650J	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	89		91		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	**58**	Q	**60**	Q	62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	**205**	Q	**180**	Q	70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**366**	Q	**312**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	68		69		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	116		107		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	83		85		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**909**	Q	**750**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	75		77		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94		97		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	82		84		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**466**	Q	**369**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	71		66		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	75		76		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	52		51		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	68		63		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	86		83		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	80		69		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2143350
Report Date: 08/26/21

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(*)
L2143350-01A	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-01B	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-02A	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-02B	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-03A	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-03B	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-04A	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-04B	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-05A	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-05B	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-06A	Plastic 8oz unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-06B	Plastic 8oz unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-07A	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-07B	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-07C	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2143350-07D	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2143350-08A	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)
L2143350-08B	Plastic 250ml unpreserved	A	NA		3.0	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2143350
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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: DU Report with 'J' Qualifiers

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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. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. 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 method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

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Data Qualifiers

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where 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.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

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, NO2, NO3.

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, SM4500Cl-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 1

ALPHA ANALYTICAL — World Class Chemistry

Westborough, MA
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA
TEL: 508-822-9300
FAX: 508-822-3288

Date Rec'd in Lab: 8/13/21

ALPHA Job #: L2143350

Client Information

Client: Weston & Sampson

Address: 98 S Main, St

Waterbury, VT

Phone:

Fax:

Email: larosas@wseinc.com

☐ These samples have been Previously analyzed by Alpha

Project Information

Project Name: VT DEC WWTF PFAS Input

Project Location: Essex, VT

Project #:

Project Manager: Steven LaRosa

ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Report Information Data Deliverables

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program | Criteria

Other Project Specific Requirements/Comments/Detection Limits:

Report in Envirodata8

Report to MDL

ANALYSIS

SAMPLE HANDLING
Filtration
☐ Done
☐ Not Needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

Sample Specific Comments

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS by DoD Isotope Dilution	TOP
43350-01	Cascade-08102021	8/10/21	1230		MLR	☒	☐
-02	SWR-08102021	8/10/21	1300		MLR	☒	☐
-03	AutumnHarp-08102021	8/10/21	1030		MLR	☒	☐
-04	PSM-08102021	8/10/21	1350		MLR	☒	☐
-05	Effluent-08102021	8/10/21	1430		MLR	☒	☐
-06	Influent-08102021	8/10/21	1430		MLR	☒	☐
-07	Twincraft-08102021	8/10/21	0935		MLR	☒	☒
-08	QA-08102021	8/10/21	am		MLR	☒	☐

Container Type: -
Preservative: -

Relinquished By:	Date/Time	Received By:	Date/Time
Margaret Reilly	8/11/21 1700	Sidney	8/11/21 1700
[signature]	8/12/21 Kiss	[signature]	8/12/21 12:20
[signature]		[signature]	8/13/21 00:20
Wendy Massey	8/13/21 4300	[signature]	8/13/21 0530

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NH) (rev. 5-JAN-12)

ANALYTICAL REPORT

Lab Number:	L2145065
Client:	Weston & Sampson 98 South Main Street Suite 2 Waterbury, VT 05676
ATTN:	Steven LaRosa
Phone:	(802) 244-5051
Project Name:	VT DEC WWTF PFAS INPUT
Project Number:	Not Specified
Report Date:	08/31/21

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-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2145065-01	CASCADE-08172021	WATER	ESSEX, VT	08/17/21 13:25	08/20/21
L2145065-02	SWR-08172021	WATER	ESSEX, VT	08/17/21 12:25	08/20/21
L2145065-03	AUTUMNHARP-08172021	WATER	ESSEX, VT	08/17/21 09:15	08/20/21
L2145065-04	PSM-08172021	WATER	ESSEX, VT	08/17/21 12:50	08/20/21
L2145065-05	EFFLUENT-08172021	WATER	ESSEX, VT	08/17/21 13:35	08/20/21
L2145065-06	INFLUENT-08172021	WATER	ESSEX, VT	08/17/21 13:35	08/20/21
L2145065-07	TWINCRAFT-08172021	WATER	ESSEX, VT	08/17/21 09:50	08/20/21
L2145065-08	VELAN08172021	WATER	ESSEX, VT	08/17/21 11:30	08/20/21
L2145065-09	QA08172021	WATER	ESSEX, VT	08/17/21 00:00	08/20/21

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2145065
Project Number:	Not Specified	**Report Date:**	08/31/21

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:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2145065
Project Number:	Not Specified	**Report Date:**	08/31/21

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

L2145065-01, -02, -06, and -09: The sample was centrifuged and decanted prior to extraction due to sample matrix.

L2145065-03RE, -04RE, and -07RE: The sample was re-extracted within holding time due to QC failures in the original extraction. The results of the re-extraction are reported.

L2145065-01, -03RE, -04RE, -07RE, and -08: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix.

L2145065-01, -03RE, -05, -06, -07RE, -08, and -09: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

Perfluorinated Alkyl Acids by Isotope Dil. (Post-Treatment)

L2145065-08: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix.

L2145065-08: The following surrogate is a negative control for the TOP Assay: M2-4:2FTS. Low recoveries of this surrogate demonstrate that the associated compounds have been converted to a different PFAS constituent (Limit 0-25%).

WG1538912-4: This blank represents the SPLP tumbling blank associated with L2145065-08.

WG1538912-4: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

WG1538912-4: The following surrogate is a negative control for the TOP Assay: M2-4:2FTS. Low recoveries of this surrogate demonstrate that the associated compounds have been converted to a different PFAS constituent (Limit 0-25%).

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:  Alycia Mogayzel

Title: Technical Director/Representative Date: 08/31/21

ORGANICS

SEMIVOLATILES

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-01
Client ID: CASCADE-08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 13:25
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/25/21 10:48
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/24/21 16:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	3.44	J	ng/l	10.0	2.04	1
Perfluoropentanoic Acid (PFPeA)	5.40	J	ng/l	10.0	1.98	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	10.0	1.19	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	10.0	2.26	1
Perfluorohexanoic Acid (PFHxA)	4.02	J	ng/l	10.0	1.64	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	10.0	1.23	1
Perfluoroheptanoic Acid (PFHpA)	1.70	J	ng/l	10.0	1.13	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	10.0	1.88	1
Perfluorooctanoic Acid (PFOA)	3.94	J	ng/l	10.0	1.18	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	51.5		ng/l	10.0	6.66	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	10.0	3.44	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	10.0	1.56	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	10.0	2.52	1
Perfluorodecanoic Acid (PFDA)	1.64	J	ng/l	10.0	1.52	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	10.0	6.06	1
Perfluorononanesulfonic Acid (PFNS)	5.74	JF	ng/l	10.0	5.60	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	10.0	3.24	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	10.0	1.30	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	10.0	4.90	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	10.0	2.90	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	10.0	4.02	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	10.0	1.86	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	10.0	1.64	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	10.0	1.24	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-01 Date Collected: 08/17/21 13:25

Client ID: CASCADE-08172021 Date Received: 08/20/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	81		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	77		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	90		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	120		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	64		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	66		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	86		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	69		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	135		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	72		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	**68**	Q	69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	64		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	94		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	60		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	59		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	13		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	71		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**36**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	69		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-02
Client ID: SWR-08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 12:25
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/25/21 11:04
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/24/21 16:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	3.83		ng/l	1.76	0.360	1
Perfluoropentanoic Acid (PFPeA)	3.36		ng/l	1.76	0.349	1
Perfluorobutanesulfonic Acid (PFBS)	0.907	J	ng/l	1.76	0.210	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.76	0.399	1
Perfluorohexanoic Acid (PFHxA)	3.88		ng/l	1.76	0.289	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.76	0.216	1
Perfluoroheptanoic Acid (PFHpA)	1.35	J	ng/l	1.76	0.199	1
Perfluorohexanesulfonic Acid (PFHxS)	1.18	J	ng/l	1.76	0.332	1
Perfluorooctanoic Acid (PFOA)	3.08		ng/l	1.76	0.208	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.76	1.18	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.76	0.607	1
Perfluorononanoic Acid (PFNA)	1.05	J	ng/l	1.76	0.275	1
Perfluorooctanesulfonic Acid (PFOS)	4.41		ng/l	1.76	0.445	1
Perfluorodecanoic Acid (PFDA)	0.356	J	ng/l	1.76	0.268	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.76	1.07	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.76	0.988	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.76	0.572	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.76	0.229	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.76	0.864	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.76	0.512	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	5.79	F	ng/l	1.76	0.709	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.76	0.328	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.76	0.289	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.76	0.219	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-02 Date Collected: 08/17/21 12:25

Client ID: SWR-08172021 Date Received: 08/20/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	84		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	79		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	134		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	62		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	62		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	90		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	86		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	131		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	79		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	84		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	81		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	95		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	61		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	55		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	35		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	86		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	54		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	118		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-03 RE
Client ID: AUTUMNHARP-08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 09:15
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/28/21 11:31
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/27/21 12:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	11.8	J	ng/l	50.0	10.2	1
Perfluoropentanoic Acid (PFPeA)	13.9	J	ng/l	50.0	9.90	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	50.0	5.95	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	50.0	11.3	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	50.0	8.20	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	50.0	6.13	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	50.0	5.63	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	50.0	9.40	1
Perfluorooctanoic Acid (PFOA)	7.90	J	ng/l	50.0	5.90	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	58.1		ng/l	50.0	33.3	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	50.0	17.2	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	50.0	7.80	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	50.0	12.6	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	50.0	7.60	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	50.0	30.3	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	50.0	28.0	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	50.0	16.2	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	50.0	6.50	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	50.0	24.5	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	50.0	14.5	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	50.0	20.1	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	50.0	9.30	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	50.0	8.18	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	50.0	6.20	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-03 RE
Client ID: AUTUMNHARP-08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 09:15
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	89		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	89		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	114		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**379**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	78		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	116		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**173**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	91		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	58		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	84		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	31		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	62		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	76		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	67		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-04 RE
Client ID: PSM-08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 12:50
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/28/21 11:48
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/27/21 12:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	50.0	10.2	1
Perfluoropentanoic Acid (PFPeA)	14.4	J	ng/l	50.0	9.90	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	50.0	5.95	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	50.0	11.3	1
Perfluorohexanoic Acid (PFHxA)	14.8	J	ng/l	50.0	8.20	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	50.0	6.13	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	50.0	5.63	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	50.0	9.40	1
Perfluorooctanoic Acid (PFOA)	8.80	J	ng/l	50.0	5.90	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	50.0	33.3	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	50.0	17.2	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	50.0	7.80	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	50.0	12.6	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	50.0	7.60	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	50.0	30.3	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	50.0	28.0	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	50.0	16.2	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	50.0	6.50	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	50.0	24.5	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	50.0	14.5	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	50.0	20.1	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	50.0	9.30	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	50.0	8.18	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	50.0	6.20	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-04 RE
Client ID: PSM-08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 12:50
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	93		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	118		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	103		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	93		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	119		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	101		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	130		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	107		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	107		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	99		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	89		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	76		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	101		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	32		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	94		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	94		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-05
Client ID: EFFLUENT-08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 13:35
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/25/21 12:27
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/24/21 16:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	10.1		ng/l	1.94	0.397	1
Perfluoropentanoic Acid (PFPeA)	23.9		ng/l	1.94	0.385	1
Perfluorobutanesulfonic Acid (PFBS)	6.97	F	ng/l	1.94	0.232	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.94	0.440	1
Perfluorohexanoic Acid (PFHxA)	26.4		ng/l	1.94	0.319	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.94	0.238	1
Perfluoroheptanoic Acid (PFHpA)	3.44		ng/l	1.94	0.219	1
Perfluorohexanesulfonic Acid (PFHxS)	1.81	J	ng/l	1.94	0.366	1
Perfluorooctanoic Acid (PFOA)	7.88		ng/l	1.94	0.230	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.94	1.30	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.94	0.669	1
Perfluorononanoic Acid (PFNA)	1.40	J	ng/l	1.94	0.304	1
Perfluorooctanesulfonic Acid (PFOS)	5.08		ng/l	1.94	0.490	1
Perfluorodecanoic Acid (PFDA)	1.07	JF	ng/l	1.94	0.296	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.94	1.18	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.94	1.09	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	1.07	J	ng/l	1.94	0.630	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.94	0.253	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.94	0.953	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.94	0.564	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.94	0.782	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.94	0.362	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.94	0.318	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.94	0.241	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-05 Date Collected: 08/17/21 13:35

Client ID: EFFLUENT-08172021 Date Received: 08/20/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	75		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	65		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	89		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	108		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	65		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	69		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	69		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	112		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	63		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	83		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**59**	Q	62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	72		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	42		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	65		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	11		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	51		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	65		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	60		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-06
Client ID: INFLUENT-08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 13:35
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/25/21 12:44
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/24/21 16:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	9.33		ng/l	1.92	0.392	1
Perfluoropentanoic Acid (PFPeA)	5.68		ng/l	1.92	0.380	1
Perfluorobutanesulfonic Acid (PFBS)	2.03		ng/l	1.92	0.229	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.92	0.434	1
Perfluorohexanoic Acid (PFHxA)	6.50		ng/l	1.92	0.315	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.92	0.236	1
Perfluoroheptanoic Acid (PFHpA)	1.48	J	ng/l	1.92	0.216	1
Perfluorohexanesulfonic Acid (PFHxS)	1.31	J	ng/l	1.92	0.361	1
Perfluorooctanoic Acid (PFOA)	3.58		ng/l	1.92	0.227	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.92	1.28	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.76	F	ng/l	1.92	0.661	1
Perfluorononanoic Acid (PFNA)	0.615	J	ng/l	1.92	0.300	1
Perfluorooctanesulfonic Acid (PFOS)	9.48	F	ng/l	1.92	0.484	1
Perfluorodecanoic Acid (PFDA)	0.584	JF	ng/l	1.92	0.292	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.92	1.16	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.92	1.08	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.92	0.622	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.92	0.250	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.92	0.942	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.92	0.557	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.92	0.772	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.92	0.357	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.92	0.314	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.92	0.238	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-06 Date Collected: 08/17/21 13:35

Client ID: INFLUENT-08172021 Date Received: 08/20/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	79		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	73		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	90		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**144**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	57		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	66		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	88		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	77		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**196**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	71		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	82		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	75		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	83		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	80		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	35		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	99		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	100		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**184**	Q	22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-07 RE
Client ID: TWINCRAFT-08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 09:50
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/28/21 12:04
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/27/21 12:56

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	15.9	J	ng/l	50.0	10.2	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	50.0	9.90	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	50.0	5.95	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	50.0	11.3	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	50.0	8.20	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	50.0	6.13	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	50.0	5.63	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	50.0	9.40	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	50.0	5.90	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	50.0	33.3	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	50.0	17.2	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	50.0	7.80	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	50.0	12.6	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	50.0	7.60	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	50.0	30.3	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	50.0	28.0	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	50.0	16.2	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	50.0	6.50	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	50.0	24.5	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	50.0	14.5	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	50.0	20.1	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	50.0	9.30	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	50.0	8.18	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	50.0	6.20	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-07 RE
Client ID: TWINCRAFT-08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 09:50
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	105		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	114		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	123		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**186**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	92		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	108		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	122		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	109		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**215**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	116		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	116		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	108		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	30		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	**764**	Q	24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**573**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	**222**	Q	10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**412**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**275**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**768**	Q	22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-08
Client ID: VELAN08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 11:30
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/25/21 13:17
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/24/21 16:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	11.2		ng/l	10.0	2.04	1
Perfluoropentanoic Acid (PFPeA)	41.7		ng/l	10.0	1.98	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	10.0	1.19	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	10.0	2.26	1
Perfluorohexanoic Acid (PFHxA)	48.4		ng/l	10.0	1.64	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	10.0	1.23	1
Perfluoroheptanoic Acid (PFHpA)	6.90	J	ng/l	10.0	1.13	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	10.0	1.88	1
Perfluorooctanoic Acid (PFOA)	17.0		ng/l	10.0	1.18	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	10.0	6.66	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	10.0	3.44	1
Perfluorononanoic Acid (PFNA)	2.40	J	ng/l	10.0	1.56	1
Perfluorooctanesulfonic Acid (PFOS)	8.96	J	ng/l	10.0	2.52	1
Perfluorodecanoic Acid (PFDA)	2.10	J	ng/l	10.0	1.52	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	10.0	6.06	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	10.0	5.60	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	10.0	3.24	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	10.0	1.30	1
Perfluorodecanesulfonic Acid (PFDS)	6.66	J	ng/l	10.0	4.90	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	10.0	2.90	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	10.0	4.02	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	10.0	1.86	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	10.0	1.64	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	10.0	1.24	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-08 Date Collected: 08/17/21 11:30

Client ID: VELAN08172021 Date Received: 08/20/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	85		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	80		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	133		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	67		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	86		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**215**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	76		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	86		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	77		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	95		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	95		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	103		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	38		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**174**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	119		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	98		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-08
Client ID: VELAN08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 11:30
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/27/21 02:52
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:01

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	418		ng/l	25.0	2.04	1
Perfluoropentanoic Acid (PFPeA)	670		ng/l	10.0	1.98	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	10.0	1.19	1
Perfluorohexanoic Acid (PFHxA)	162		ng/l	10.0	1.64	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	10.0	1.23	1
Perfluoroheptanoic Acid (PFHpA)	27.0		ng/l	10.0	1.13	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	10.0	1.88	1
Perfluorooctanoic Acid (PFOA)	22.5		ng/l	10.0	1.18	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	10.0	3.44	1
Perfluorononanoic Acid (PFNA)	7.24	J	ng/l	10.0	1.56	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	10.0	2.52	1
Perfluorodecanoic Acid (PFDA)	4.66	J	ng/l	10.0	1.52	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	10.0	5.60	1
Perfluoroundecanoic Acid (PFUnA)	2.70	J	ng/l	10.0	1.30	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	10.0	4.90	1
Perfluorododecanoic Acid (PFDoA)	1.88	JF	ng/l	10.0	1.86	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	10.0	1.64	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	10.0	1.24	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-08 Date Collected: 08/17/21 11:30

Client ID: VELAN08172021 Date Received: 08/20/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	78		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	68		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	93		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	74		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	91		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	65		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	67		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	80		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	63		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	63		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	58		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	48		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	54		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	56		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	54		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-09
Client ID: QA08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 00:00
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/25/21 13:33
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/24/21 16:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.86	0.380	1
Perfluoropentanoic Acid (PFPeA)	3.53		ng/l	1.86	0.369	1
Perfluorobutanesulfonic Acid (PFBS)	1.23	J	ng/l	1.86	0.222	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.86	0.421	1
Perfluorohexanoic Acid (PFHxA)	4.17		ng/l	1.86	0.306	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.86	0.228	1
Perfluoroheptanoic Acid (PFHpA)	1.47	J	ng/l	1.86	0.210	1
Perfluorohexanesulfonic Acid (PFHxS)	1.22	JF	ng/l	1.86	0.350	1
Perfluorooctanoic Acid (PFOA)	3.29		ng/l	1.86	0.220	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.86	1.24	1
Perfluoroheptanesulfonic Acid (PFHpS)	1.38	JF	ng/l	1.86	0.641	1
Perfluorononanoic Acid (PFNA)	0.712	J	ng/l	1.86	0.291	1
Perfluorooctanesulfonic Acid (PFOS)	5.35	F	ng/l	1.86	0.470	1
Perfluorodecanoic Acid (PFDA)	0.574	J	ng/l	1.86	0.283	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.86	1.13	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.86	1.04	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.86	0.604	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.86	0.242	1
Perfluorodecanesulfonic Acid (PFDS)	1.08	JF	ng/l	1.86	0.913	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.86	0.540	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2.84		ng/l	1.86	0.749	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.86	0.347	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.86	0.305	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.86	0.231	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

SAMPLE RESULTS

Lab ID: L2145065-09 Date Collected: 08/17/21 00:00

Client ID: QA08172021 Date Received: 08/20/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	83		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	78		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	130		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	60		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	60		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	92		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	83		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	141		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	77		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	85		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	79		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	97		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	51		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**52**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	26		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	54		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	116		22-136

TOTAL OXIDIZABLE PRECURSOR ASSAY

RESULTS SUMMARY

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Lab ID: L2145065-08
Client ID: VELAN08172021
Sample Location: ESSEX, VT

Date Collected: 08/17/21 11:30
Date Received: 08/20/21
Field Prep: Not Specified

Parameter	Pre-Treatment Results	Pre-Treatment Qualifier	Pre-Treatment Units	Post-Treatment Results	Post-Treatment Qualifier	Post-Treatment Units	Difference Results	Difference Qualifier	Difference Units
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab									
Perfluorobutanoic Acid (PFBA)	11.2		ng/l	418		ng/l	407		ng/l
Perfluoropentanoic Acid (PFPeA)	41.7		ng/l	670		ng/l	628		ng/l
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorohexanoic Acid (PFHxA)	48.4		ng/l	162		ng/l	114		ng/l
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroheptanoic Acid (PFHpA)	6.90	J	ng/l	27.0		ng/l	20.1		ng/l
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorooctanoic Acid (PFOA)	17.0		ng/l	22.5		ng/l	5.50		ng/l
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorononanoic Acid (PFNA)	2.40	J	ng/l	7.24	J	ng/l	4.84	J	ng/l
Perfluorooctanesulfonic Acid (PFOS)	8.96	J	ng/l	ND		ng/l	0	J	ng/l
Perfluorodecanoic Acid (PFDA)	2.10	J	ng/l	4.66	J	ng/l	2.56	J	ng/l
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	ND		ng/l	0		ng/l
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.70	J	ng/l	2.70	J	ng/l
Perfluorodecanesulfonic Acid (PFDS)	6.66	J	ng/l	ND		ng/l	0	J	ng/l
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.88	JF	ng/l	1.88	J	ng/l
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	ND		ng/l	0		ng/l
Perfluorinated Carboxylic Acids (PFCA), Total							1190	J	ng/l

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/25/21 08:19
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/24/21 16:20

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02,05-06,08-09 Batch: WG1538567-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	0.236	J	ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/25/21 08:19
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 08/24/21 16:20

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02,05-06,08-09 Batch: WG1538567-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	92		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	99		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	101		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	65		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	103		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	90		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	88		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	70		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	75		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	90		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	61		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	74		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	75		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2145065
Report Date: 08/31/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/27/21 01:46
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:01

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 08 Batch: WG1538912-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	5.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/27/21 01:46
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:01

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 08 Batch: WG1538912-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	87		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	88		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	87		70-131
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	85		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	84		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	84		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	75		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	82		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	86		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	83		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	85		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	86		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	66		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2145065
Report Date: 08/31/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/27/21 02:02
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:01

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 08 Batch: WG1538912-4					
Perfluorobutanoic Acid (PFBA)	4.91	J	ng/l	5.00	0.408
Perfluoropentanoic Acid (PFPeA)	0.408	J	ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/27/21 02:02
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:01

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab for sample(s): 08 Batch: WG1538912-4					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	79		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	70		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	90		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	0		0-25
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	75		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	87		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	62		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	59		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	**62**	Q	69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**53**	Q	62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**53**	Q	55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	51		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	44		22-136
Perfluoro[13C3]Pentanoic Acid (M3PFPEA)	54		50-150
Perfluoro[1,2,3,4-13C4]Octanoic Acid (M4PFOA)	57		50-150
Perfluoro[1,2-13C2]Hexanoic Acid (M2PFHXA)	55		50-150

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/28/21 10:58
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/27/21 12:56

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 03-04,07 Batch: WG1539928-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145065

Project Number: Not Specified **Report Date:** 08/31/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/28/21 10:58
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 08/27/21 12:56

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 03-04,07 Batch: WG1539928-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	108		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	117		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	117		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	72		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	107		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	106		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	121		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	106		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	91		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	104		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	107		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	104		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	70		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	93		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	105		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	65		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	91		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	102		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	95		22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06,08-09 Batch: WG1538567-2								
Perfluorobutanoic Acid (PFBA)	108		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	110		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	105		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	129		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	110		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	96		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	107		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	107		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	111		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	126		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	120		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	110		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	114		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	110		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	132		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	110		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	109		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	112		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	118		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	117		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	116		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	109		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2145065

Report Date: 08/31/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06,08-09 Batch: WG1538567-2								
Perfluorotridecanoic Acid (PFTrDA)	124		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	119		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	92				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	97				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	68				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	90				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	107				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	93				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	89				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	75				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	83				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	92				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	63				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	74				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	84				22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 08 Batch: WG1538912-2 WG1538912-3								
Perfluorobutanoic Acid (PFBA)	103		101		67-148	2		30
Perfluoropentanoic Acid (PFPeA)	103		101		63-161	2		30
Perfluorobutanesulfonic Acid (PFBS)	99		96		65-157	3		30
Perfluorohexanoic Acid (PFHxA)	108		103		69-168	5		30
Perfluoropentanesulfonic Acid (PFPeS)	105		103		52-156	2		30
Perfluoroheptanoic Acid (PFHpA)	104		102		58-159	2		30
Perfluorohexanesulfonic Acid (PFHxS)	104		101		69-177	3		30
Perfluorooctanoic Acid (PFOA)	116		112		63-159	4		30
Perfluoroheptanesulfonic Acid (PFHpS)	97		99		61-179	2		30
Perfluorononanoic Acid (PFNA)	104		103		68-171	1		30
Perfluorooctanesulfonic Acid (PFOS)	111		106		52-151	5		30
Perfluorodecanoic Acid (PFDA)	108		104		63-171	4		30
Perfluorononanesulfonic Acid (PFNS)	103		103		48-150	0		30
Perfluoroundecanoic Acid (PFUnA)	108		108		60-153	0		30
Perfluorodecanesulfonic Acid (PFDS)	104		97		38-156	7		30
Perfluorododecanoic Acid (PFDoA)	106		103		67-153	3		30
Perfluorotridecanoic Acid (PFTrDA)	126		118		48-158	7		30
Perfluorotetradecanoic Acid (PFTA)	103		105		59-182	2		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution (Post-Treatment) - Mansfield Lab Associated sample(s): 08 Batch: WG1538912-2 WG1538912-3								

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	87		88		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	88		89		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	88		93		70-131
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	85		88		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	88		89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	87		92		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	79		80		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	86		85		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	89		93		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	83		84		62-124
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	88		88		55-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	86		86		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	72		71		22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07 Batch: WG1539928-2								
Perfluorobutanoic Acid (PFBA)	107		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	105		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	105		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	127		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	107		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	90		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	105		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	103		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	108		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	117		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	122		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	106		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	112		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	108		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	133		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	107		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	113		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	105		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	113		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	117		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	107		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	120		-		67-153	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07 Batch: WG1539928-2								
Perfluorotridecanoic Acid (PFTrDA)	120		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	116		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	109				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	119				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	122				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	78				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	112				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	110				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	127				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	111				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	101				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	110				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	116				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	109				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	81				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	94				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	112				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	82				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	91				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	107				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	99				22-136

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2145065

Report Date: 08/31/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06,08-09 QC Batch ID: WG1538567-3 QC Sample: L2145016-01 Client ID: MS Sample												
Perfluoroheptanoic Acid (PFHpA)	16.2	37.7	55.8	105		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	1.21J	34.5	36.2	101		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	11.6	37.7	53.8	112		-	-		63-159	-		30
Perfluorononanoic Acid (PFNA)	0.604J	37.7	43.4	113		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	1.31J	35	40.7	112		-	-		52-151	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	68				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	103				71-134
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	86				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	70				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	66				59-139

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2145065

Report Date: 08/31/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07 QC Batch ID: WG1539928-3 QC Sample: L2145512-01 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	1.66J	37.5	43.3	111		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	1.90	37.5	43.4	111		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	0.982JF	33.3	38.0	111		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	35.1	46.2	132		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	1.20J	37.5	43.6	113		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	35.3	34.6	98		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	0.790J	37.5	41.9	110		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	34.3	39.6	115		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	1.06J	37.5	43.2	112		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	35.7	43.2	121		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	35.7	43.8	123		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	0.627J	37.5	41.9	110		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	2.99	34.8	43.4	116		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	0.555J	37.5	42.6	112		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	36	54.9	152		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	36.1	37.9	105		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	37.5	45.5	121		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	0.283J	37.5	41.6	110		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	36.2	40.2	111		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	37.5	45.2	120		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	37.5	41.3	110		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	37.5	48.2	128		-	-		67-153	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2145065

Report Date: 08/31/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07 QC Batch ID: WG1539928-3 QC Sample: L2145512-01 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	37.5	47.4	126		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	37.5	45.8	122		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	97				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**154**	Q			12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**192**	Q			14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	68				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	69				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	94				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	98				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	82				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	114				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	87				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	80				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	99				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	101				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	46				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	108				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	98				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	111				70-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06,08-09 QC Batch ID: WG1538567-4 QC Sample: L2100462-68 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	ND	ND	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	4.39	3.81	ng/l	14		30
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/l	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	0.598JF	0.652J	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	6.38	6.78	ng/l	6		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	1.46J	1.64J	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	0.438J	0.404J	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	0.638JF	0.509JF	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.755JF	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06,08-09 QC Batch ID: WG1538567-4 QC Sample: L2100462-68 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	**29**	Q	61		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	**1414**	Q	**2530**	Q	62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96		91		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**286**	Q	**288**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**33**	Q	**34**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	**50**	Q	**55**	Q	60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	105		99		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		81		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**351**	Q	**341**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	95		95		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	86		83		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	77		74		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	66		82		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	**162**	Q	**155**	Q	24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**165**	Q	**138**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	70		57		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**289**	Q	**255**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**336**	Q	**276**	Q	48-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02,05-06,08-09 QC Batch ID: WG1538567-4 QC Sample: L2100462-68 Client ID: DUP Sample

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**255**	Q	**230**	Q	22-136

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07 QC Batch ID: WG1539928-4 QC Sample: L2145513-01 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	9.64	9.80	ng/l	2		30
Perfluoropentanoic Acid (PFPeA)	8.67	8.83	ng/l	2		30
Perfluorobutanesulfonic Acid (PFBS)	2.20	2.17	ng/l	1		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	7.65	7.82	ng/l	2		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	3.48	3.58	ng/l	3		30
Perfluorohexanesulfonic Acid (PFHxS)	3.54	3.54	ng/l	0		30
Perfluorooctanoic Acid (PFOA)	6.32	6.71	ng/l	6		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	0.905J	0.903J	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	12.6	12.9	ng/l	2		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07 QC Batch ID: WG1539928-4 QC Sample: L2145513-01 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	65		68		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	72		75		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	117		118		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	102		97		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	66		66		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	68		67		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	121		123		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	71		70		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	113		117		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	71		69		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	113		108		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	76		73		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	88		85		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	62		59		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	81		79		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	13		**8**	Q	10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	57		50		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	86		78		48-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 03-04,07 QC Batch ID: WG1539928-4 QC Sample: L2145513-01 Client ID: DUP Sample						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	80		81		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145065
Report Date: 08/31/21

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2145065-01A	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-01B	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-02A	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-02B	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-03A	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-03B	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-04A	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-04B	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-05A	Plastic 8oz unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145065-05B	Plastic 8oz unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145065-06A	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-06B	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-07A	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-07B	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-08A	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-08B	Plastic 250ml unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-08C	Plastic 8oz unpreserved	A	NA		3.7	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2145065-08D	Plastic 8oz unpreserved	A	NA		3.7	Y	Absent		A2-TOP-537-ISOTOPE(14)
L2145065-09A	Plastic 8oz unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)
L2145065-09B	Plastic 8oz unpreserved	A	NA		3.7	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: VT DEC WWTF PFAS INPUT
Lab Number: L2145065
Project Number:
Report Date: 08/31/21

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2145065
Project Number:	Not Specified	**Report Date:**	08/31/21

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: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2145065
Project Number:	Not Specified	**Report Date:**	08/31/21

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. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. 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 method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2145065
Project Number:	Not Specified	**Report Date:**	08/31/21

Data Qualifiers

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where 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.

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

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, NO2, NO3.

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, SM4500Cl-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 1

ALPHA ANALYTICAL
World Class Chemistry

Westborough, MA
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA
TEL: 508-822-9300
FAX: 508-822-3288

Date Rec'd in Lab: 8/21/21

ALPHA Job #: L2145065

Project Information

Project Name: VT DEC WWTF PFAS Input

Project Location: Essex, VT

Project #:

Project Manager: Steven LaRosa

ALPHA Quote #:

Client Information

Client: Weston & Sampson

Address: 98 S Main, St

Waterbury, VT

Phone:

Fax:

Email: larosas@wseinc.com

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☐ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Report Information Data Deliverables

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program

Criteria

Other Project Specific Requirements/Comments/Detection Limits:

Report in Envirodata8

Report to MDL

ANALYSIS

SAMPLE HANDLING
Filtration
☐ Done
☐ Not Needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS by DoD Isotope Dilution	[illegible]	Sample Specific Comments
45065-01	Cascade-08172021	8/17/21	~~0915~~ 1325		MLR	☒	☐	
-02	SWR-08172021	8/17/21	1225		MLR	☒	☐	
-03	AutumnHarp-08172021	8/17/21	0915		MLR	☒	☐	
-04	PSM-08172021	8/17/21	1250		MLR	☒	☐	
-05	Effluent-08172021	8/17/21	13:35		MLR	☒	☐	
-06	Influent-08172021	8/17/21	13:35		MLR	☒	☐	
-07	TwinCraft-08172021	8/17/21	0950		MLR	☒	☐	
-08	Velan08172021	8/17/21	11:30		MLR	☒	☒	
-09	QA08172021	8/17/21			MLR	☒	☐	
						☐	☐	

Container Type: -

Preservative: -

Relinquished By:	Date/Time	Received By:	Date/Time
Margaret Reilly	8/17/21 1440	Fridge	8/17/21 1440
[signature]	8/20/21 1030	[signature]	8/20/21 13:20
[signature]	8/20/21 1632	[signature]	8/21/21 [illegible]
[signature]	8/21/21 4:08	[signature]	8/21/21 4:35
[signature]	8/21/21 5:55	[signature]	8/21/21 0535

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NJ) (rev. 5-JAN-12)

ANALYTICAL REPORT

Lab Number:	L2145067
Client:	Weston & Sampson 98 South Main Street Suite 2 Waterbury, VT 05676
ATTN:	Steven LaRosa
Phone:	(802) 244-5051
Project Name:	VT DEC WWTF PFAS INPUT
Project Number:	Not Specified
Report Date:	09/01/21

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-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145067
Report Date: 09/01/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2145067-01	PS17-08182021	WATER	MIDDLEBURY, VT	08/18/21 10:00	08/20/21
L2145067-02	PORTER-08182021	WATER	MIDDLEBURY, VT	08/18/21 11:05	08/20/21
L2145067-03	PS3-08182021	WATER	MIDDLEBURY, VT	08/18/21 10:50	08/20/21
L2145067-04	NSECTOR-08182021	WATER	MIDDLEBURY, VT	08/18/21 09:25	08/20/21
L2145067-05	PS9-08182021	WATER	MIDDLEBURY, VT	08/18/21 10:25	08/20/21
L2145067-06	INFLUENT-08182021	WATER	MIDDLEBURY, VT	08/18/21 13:50	08/20/21
L2145067-07	EFFLUENT-08182021	WATER	MIDDLEBURY, VT	08/18/21 13:50	08/20/21
L2145067-08	QA-08182021	WATER	MIDDLEBURY, VT	08/18/21 00:00	08/20/21

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2145067
Project Number:	Not Specified	**Report Date:**	09/01/21

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:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2145067
Project Number:	Not Specified	**Report Date:**	09/01/21

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

L2145067-01, -02, -03, -04, -05R, -06, and -08R: The sample was centrifuged and decanted prior to extraction due to sample matrix.

L2145067-01, -02, -03, -04, -05R, -06, and -08R: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2145067-05R and -08R: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported.

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: Michelle M. Morris

Title: Technical Director/Representative Date: 09/01/21

ORGANICS

SEMIVOLATILES

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-01
Client ID: PS17-08182021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/18/21 10:00
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/26/21 00:45
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	13.4		ng/l	1.81	0.369	1
Perfluoropentanoic Acid (PFPeA)	24.5		ng/l	1.81	0.358	1
Perfluorobutanesulfonic Acid (PFBS)	2.34		ng/l	1.81	0.215	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.81	0.409	1
Perfluorohexanoic Acid (PFHxA)	16.8		ng/l	1.81	0.297	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.81	0.222	1
Perfluoroheptanoic Acid (PFHpA)	2.77		ng/l	1.81	0.204	1
Perfluorohexanesulfonic Acid (PFHxS)	0.554	JF	ng/l	1.81	0.340	1
Perfluorooctanoic Acid (PFOA)	4.43		ng/l	1.81	0.214	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.81	1.20	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.81	0.623	1
Perfluorononanoic Acid (PFNA)	1.13	J	ng/l	1.81	0.282	1
Perfluorooctanesulfonic Acid (PFOS)	7.53	F	ng/l	1.81	0.456	1
Perfluorodecanoic Acid (PFDA)	1.16	J	ng/l	1.81	0.275	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.81	1.10	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.81	1.01	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.81	0.586	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.81	0.235	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.81	0.887	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.81	0.525	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.81	0.728	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.81	0.337	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.81	0.296	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.81	0.224	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-01 Date Collected: 08/18/21 10:00

Client ID: PS17-08182021 Date Received: 08/20/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	82		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	81		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**173**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	58		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	65		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	103		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**346**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	89		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	158		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	57		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**50**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	20		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	58		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	112		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-02
Client ID: PORTER-08182021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/18/21 11:05
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/26/21 01:02
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.15	0.439	1
Perfluoropentanoic Acid (PFPeA)	3.25		ng/l	2.15	0.426	1
Perfluorobutanesulfonic Acid (PFBS)	0.439	J	ng/l	2.15	0.256	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.15	0.487	1
Perfluorohexanoic Acid (PFHxA)	3.18		ng/l	2.15	0.353	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.15	0.264	1
Perfluoroheptanoic Acid (PFHpA)	0.892	J	ng/l	2.15	0.242	1
Perfluorohexanesulfonic Acid (PFHxS)	0.530	J	ng/l	2.15	0.405	1
Perfluorooctanoic Acid (PFOA)	2.25		ng/l	2.15	0.254	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.15	1.43	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.15	0.741	1
Perfluorononanoic Acid (PFNA)	1.01	J	ng/l	2.15	0.336	1
Perfluorooctanesulfonic Acid (PFOS)	3.64	F	ng/l	2.15	0.543	1
Perfluorodecanoic Acid (PFDA)	0.913	J	ng/l	2.15	0.327	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.15	1.30	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.15	1.21	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.15	0.698	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.15	0.280	1
Perfluorodecanesulfonic Acid (PFDS)	2.23	F	ng/l	2.15	1.06	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.15	0.625	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.15	0.866	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.15	0.401	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.15	0.352	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.15	0.267	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-02 Date Collected: 08/18/21 11:05

Client ID: PORTER-08182021 Date Received: 08/20/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	92		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**279**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	75		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	117		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	94		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**338**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	90		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	88		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	87		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	55		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	84		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	28		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	96		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**144**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	131		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-03
Client ID: PS3-08182021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/18/21 10:50
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/26/21 01:19
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	15.4		ng/l	1.82	0.372	1
Perfluoropentanoic Acid (PFPeA)	5.17		ng/l	1.82	0.361	1
Perfluorobutanesulfonic Acid (PFBS)	1.66	J	ng/l	1.82	0.217	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.82	0.412	1
Perfluorohexanoic Acid (PFHxA)	5.25		ng/l	1.82	0.299	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.82	0.224	1
Perfluoroheptanoic Acid (PFHpA)	2.58		ng/l	1.82	0.205	1
Perfluorohexanesulfonic Acid (PFHxS)	0.394	J	ng/l	1.82	0.343	1
Perfluorooctanoic Acid (PFOA)	6.59		ng/l	1.82	0.215	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.82	1.21	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.82	0.628	1
Perfluorononanoic Acid (PFNA)	0.970	J	ng/l	1.82	0.284	1
Perfluorooctanesulfonic Acid (PFOS)	6.40		ng/l	1.82	0.460	1
Perfluorodecanoic Acid (PFDA)	1.39	J	ng/l	1.82	0.277	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.82	1.10	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.82	1.02	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.82	0.591	1
Perfluoroundecanoic Acid (PFUnA)	0.270	J	ng/l	1.82	0.237	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.82	0.894	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.82	0.529	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.82	0.733	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.82	0.339	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.82	0.298	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.82	0.226	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-03 Date Collected: 08/18/21 10:50

Client ID: PS3-08182021 Date Received: 08/20/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	80		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	80		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**181**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	58		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	67		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	95		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**224**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	77		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	90		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	82		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	139		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	47		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**47**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	22		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	80		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	53		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	105		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-04
Client ID: NSECTOR-08182021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/18/21 09:25
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/26/21 01:35
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	2.55		ng/l	1.92	0.392	1
Perfluoropentanoic Acid (PFPeA)	2.35		ng/l	1.92	0.381	1
Perfluorobutanesulfonic Acid (PFBS)	0.634	J	ng/l	1.92	0.229	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.92	0.434	1
Perfluorohexanoic Acid (PFHxA)	1.56	J	ng/l	1.92	0.315	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.92	0.236	1
Perfluoroheptanoic Acid (PFHpA)	0.369	J	ng/l	1.92	0.216	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.92	0.361	1
Perfluorooctanoic Acid (PFOA)	1.19	J	ng/l	1.92	0.227	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.92	1.28	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.92	0.661	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.92	0.300	1
Perfluorooctanesulfonic Acid (PFOS)	2.39	F	ng/l	1.92	0.484	1
Perfluorodecanoic Acid (PFDA)	0.338	J	ng/l	1.92	0.292	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.92	1.16	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.92	1.08	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.92	0.623	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.92	0.250	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.92	0.942	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.92	0.558	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.92	0.773	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.92	0.358	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.92	0.314	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.92	0.238	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-04 Date Collected: 08/18/21 09:25

Client ID: NSECTOR-08182021 Date Received: 08/20/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	81		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	68		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	82		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**143**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	64		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	94		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	86		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**193**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	79		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	82		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	76		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	133		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	43		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**46**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	24		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	89		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	55		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	96		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-05 R
Client ID: PS9-08182021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/18/21 10:25
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/27/21 07:00
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	6.96		ng/l	1.73	0.352	1
Perfluoropentanoic Acid (PFPeA)	4.83		ng/l	1.73	0.342	1
Perfluorobutanesulfonic Acid (PFBS)	4.16		ng/l	1.73	0.205	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.73	0.390	1
Perfluorohexanoic Acid (PFHxA)	5.22		ng/l	1.73	0.283	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.73	0.212	1
Perfluoroheptanoic Acid (PFHpA)	2.41		ng/l	1.73	0.194	1
Perfluorohexanesulfonic Acid (PFHxS)	0.836	J	ng/l	1.73	0.324	1
Perfluorooctanoic Acid (PFOA)	6.79		ng/l	1.73	0.204	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.73	1.15	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.73	0.594	1
Perfluorononanoic Acid (PFNA)	1.42	J	ng/l	1.73	0.269	1
Perfluorooctanesulfonic Acid (PFOS)	3.41	F	ng/l	1.73	0.435	1
Perfluorodecanoic Acid (PFDA)	1.79		ng/l	1.73	0.262	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	9.47		ng/l	1.73	1.05	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.73	0.967	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.608	J	ng/l	1.73	0.559	1
Perfluoroundecanoic Acid (PFUnA)	0.286	J	ng/l	1.73	0.224	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.73	0.846	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.73	0.501	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	1.62	J	ng/l	1.73	0.694	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.73	0.321	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.73	0.282	1
Perfluorotetradecanoic Acid (PFTA)	0.273	JF	ng/l	1.73	0.214	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-05 R
Client ID: PS9-08182021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/18/21 10:25
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	86		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	76		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	85		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**256**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	66		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	85		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**247**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	86		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**209**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	33		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**45**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	43		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	48		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	79		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-06
Client ID: INFLUENT-08182021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/18/21 13:50
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/26/21 02:08
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	10.2		ng/l	1.89	0.386	1
Perfluoropentanoic Acid (PFPeA)	6.25		ng/l	1.89	0.374	1
Perfluorobutanesulfonic Acid (PFBS)	2.07		ng/l	1.89	0.225	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.89	0.427	1
Perfluorohexanoic Acid (PFHxA)	5.32		ng/l	1.89	0.310	1
Perfluoropentanesulfonic Acid (PFPeS)	0.299	JF	ng/l	1.89	0.232	1
Perfluoroheptanoic Acid (PFHpA)	1.15	J	ng/l	1.89	0.213	1
Perfluorohexanesulfonic Acid (PFHxS)	0.370	JF	ng/l	1.89	0.355	1
Perfluorooctanoic Acid (PFOA)	3.54		ng/l	1.89	0.223	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.89	1.26	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.89	0.650	1
Perfluorononanoic Acid (PFNA)	0.752	J	ng/l	1.89	0.295	1
Perfluorooctanesulfonic Acid (PFOS)	3.85		ng/l	1.89	0.476	1
Perfluorodecanoic Acid (PFDA)	1.01	J	ng/l	1.89	0.287	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.89	1.14	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.89	1.06	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.89	0.612	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.89	0.246	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.89	0.926	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.89	0.548	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	2.62	F	ng/l	1.89	0.760	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.89	0.352	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.89	0.309	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.89	0.234	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-06 Date Collected: 08/18/21 13:50

Client ID: INFLUENT-08182021 Date Received: 08/20/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	84		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	74		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	94		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	130		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**55**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	66		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	98		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	89		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**213**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	81		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	92		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	135		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	67		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**48**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	14		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	73		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	52		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	90		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-07
Client ID: EFFLUENT-08182021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/18/21 13:50
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/26/21 02:25
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	2.71		ng/l	1.86	0.380	1
Perfluoropentanoic Acid (PFPeA)	4.87		ng/l	1.86	0.369	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.86	0.222	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.86	0.421	1
Perfluorohexanoic Acid (PFHxA)	8.42		ng/l	1.86	0.305	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.86	0.228	1
Perfluoroheptanoic Acid (PFHpA)	1.02	J	ng/l	1.86	0.210	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.86	0.350	1
Perfluorooctanoic Acid (PFOA)	3.97		ng/l	1.86	0.220	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.86	1.24	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.86	0.641	1
Perfluorononanoic Acid (PFNA)	0.912	J	ng/l	1.86	0.290	1
Perfluorooctanesulfonic Acid (PFOS)	3.92	F	ng/l	1.86	0.469	1
Perfluorodecanoic Acid (PFDA)	1.00	JF	ng/l	1.86	0.283	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.86	1.13	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.86	1.04	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.86	0.603	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.86	0.242	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.86	0.912	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.86	0.540	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.86	0.749	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.86	0.346	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.86	0.305	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.86	0.231	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-07 Date Collected: 08/18/21 13:50

Client ID: EFFLUENT-08182021 Date Received: 08/20/21

Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	74		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	69		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	85		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	113		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	65		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	70		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	91		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	72		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	119		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	68		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	80		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	68		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	68		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	56		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	22		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	59		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	63		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	49		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-08 R
Client ID: QA-08182021
Sample Location: MIDDLEBURY, VT

Date Collected: 08/18/21 00:00
Date Received: 08/20/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/27/21 07:17
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	7.03		ng/l	1.88	0.384	1
Perfluoropentanoic Acid (PFPeA)	4.67		ng/l	1.88	0.372	1
Perfluorobutanesulfonic Acid (PFBS)	3.82		ng/l	1.88	0.224	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.88	0.425	1
Perfluorohexanoic Acid (PFHxA)	4.96		ng/l	1.88	0.308	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.88	0.230	1
Perfluoroheptanoic Acid (PFHpA)	2.34		ng/l	1.88	0.212	1
Perfluorohexanesulfonic Acid (PFHxS)	0.839	J	ng/l	1.88	0.354	1
Perfluorooctanoic Acid (PFOA)	6.64		ng/l	1.88	0.222	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.88	1.25	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.88	0.647	1
Perfluorononanoic Acid (PFNA)	1.39	J	ng/l	1.88	0.293	1
Perfluorooctanesulfonic Acid (PFOS)	2.84		ng/l	1.88	0.474	1
Perfluorodecanoic Acid (PFDA)	1.78	J	ng/l	1.88	0.286	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	8.16		ng/l	1.88	1.14	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.88	1.05	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.88	0.609	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.88	0.244	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.88	0.921	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.88	0.545	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	1.52	J	ng/l	1.88	0.756	1
Perfluorododecanoic Acid (PFDoA)	0.368	JF	ng/l	1.88	0.350	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.88	0.308	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.88	0.233	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

SAMPLE RESULTS

Lab ID: L2145067-08 R Date Collected: 08/18/21 00:00
Client ID: QA-08182021 Date Received: 08/20/21
Sample Location: MIDDLEBURY, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	83		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	95		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**295**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	72		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	97		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	93		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**285**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	94		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	100		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	97		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**243**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	42		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**52**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	17		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	50		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	52		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	87		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/26/21 00:12
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:12

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-08 Batch: WG1538903-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	0.280	J	ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	0.612	J	ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2145067

Project Number: Not Specified **Report Date:** 09/01/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/26/21 00:12
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/25/21 10:12

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-08 Batch: WG1538903-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	87		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	101		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	92		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	61		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	85		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	87		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	94		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	83		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	84		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	91		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	71		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	85		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	93		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	52		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	73		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	95		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	81		22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145067
Report Date: 09/01/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 Batch: WG1538903-2								
Perfluorobutanoic Acid (PFBA)	112		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	110		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	109		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	136		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	114		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	107		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	111		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	118		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	117		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	120		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	118		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	114		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	119		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	115		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	127		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	113		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	122		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	116		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	121		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	108		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	106		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	120		-		67-153	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145067
Report Date: 09/01/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 Batch: WG1538903-2								
Perfluorotridecanoic Acid (PFTrDA)	128		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	120		-		59-182	-		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	104				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	66				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	89				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	88				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	98				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	88				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	94				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	89				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	82				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	79				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	91				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	54				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	96				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	83				22-136

Matrix Spike Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145067
Report Date: 09/01/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1538903-3 QC Sample: L2145393-01 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	0.526J	36.5	41.9	113		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	0.957J	36.5	41.6	111		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	1.06J	32.4	37.1	111		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	34.2	45.8	134		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	1.02J	36.5	43.1	115		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	34.3	36.0	105		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	0.438J	36.5	41.8	113		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	0.445J	33.4	39.7	118		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	1.44J	36.5	43.7	116		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	34.8	42.6	123		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	34.8	42.1	121		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	ND	36.5	41.6	114		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	ND	33.9	42.2	125		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	36.5	43.3	119		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	35	47.4	135		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	35.1	40.4	115		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	36.5	43.0	118		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	36.5	42.2	116		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	35.2	43.0	122		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	0.789JF	36.5	46.7	126		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	36.5	40.6	111		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	36.5	41.8	114		-	-		67-153	-		30

Matrix Spike Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified
Lab Number: L2145067
Report Date: 09/01/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1538903-3 QC Sample: L2145393-01 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	36.5	44.3	121		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	36.5	43.1	118		-	-		59-182	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	356	600F	**169**	Q	-	-		57-162	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	34.5	40.8	118		-	-		69-143	-		30
Perfluorohexadecanoic Acid (PFHxDA)	ND	36.5	48.6	133		-	-		40-167	-		30
Perfluorooctadecanoic Acid (PFODA)	ND	36.5	16.8	46		-	-		10-119	-		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	68				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	50				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	77				14-147
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	85				10-165
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	73				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	70				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	89				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	86				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	84				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	87				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	99				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	97				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	88				22-136
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	84				10-206

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2145067

Report Date: 09/01/21

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1538903-3 QC Sample: L2145393-01 Client ID: MS Sample												

Surrogate	*MS % Recovery*	*MS Qualifier*	*MSD % Recovery*	*MSD Qualifier*	*Acceptance Criteria*
Perfluoro[13C4]Butanoic Acid (MPFBA)	83				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	99				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	13				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	88				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	99				70-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145067
Report Date: 09/01/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1538903-4 QC Sample: L2145393-02 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	0.602J	0.591J	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	0.972J	0.931J	ng/l	NC		30
Perfluorobutanesulfonic Acid (PFBS)	1.15J	1.09J	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	1.62J	0.920J	ng/l	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	0.475J	0.440J	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	0.500J	0.414J	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	1.54J	1.43J	ng/l	NC		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	9.42	ND	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	0.651J	0.510J	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145067
Report Date: 09/01/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1538903-4 QC Sample: L2145393-02 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	ND	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorohexadecanoic Acid (PFHxDA)	ND	ND	ng/l	NC		30
Perfluorooctadecanoic Acid (PFODA)	ND	ND	ng/l	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	72		75		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	88		91		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	86		94		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	40		47		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	73		77		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	78		79		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	88		98		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	77		82		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	66		68		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	76		80		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	83		90		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	78		79		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	58		62		10-162

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2145067
Report Date: 09/01/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-08 QC Batch ID: WG1538903-4 QC Sample: L2145393-02 Client ID: DUP Sample

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	59		55		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	83		85		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	**6**	Q	**7**	Q	10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	63		55		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	87		84		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	74		75		22-136
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	81		90		10-165
Perfluoro[13C2]Hexadecanoic Acid (M2PFHxDA)	66		71		10-206

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

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Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2145067-01A	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-01B	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-02A	Plastic 500ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-02B	Plastic 500ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-03A	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-03B	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-04A	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-04B	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-05A	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-05B	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-06A	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-06B	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-07A	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-07B	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-08A	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)
L2145067-08B	Plastic 250ml unpreserved	B	NA		4.1	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: VT DEC WWTF PFAS INPUT
Lab Number: L2145067
Project Number:
Report Date: 09/01/21

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2145067
Project Number:	Not Specified	**Report Date:**	09/01/21

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: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2145067
Project Number:	Not Specified	**Report Date:**	09/01/21

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. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. 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 method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2145067
Project Number:	Not Specified	**Report Date:**	09/01/21

Data Qualifiers

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where 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.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

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, NO2, NO3.

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, SM4500Cl-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 1

Date Rec'd in Lab: 8/21/21

ALPHA Job #: L2145067

ALPHA ANALYTICAL
Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Report Information — Data Deliverables: ☐ FAX ☒ EMAIL ☐ ADEx ☐ Add'l Deliverables

Billing Information: ☐ Same as Client info PO #:

Regulatory Requirements/Report Limits: State/Fed Program | Criteria

Client Information
Client: Weston & Sampson
Address: 98 S Main, St
Waterbury, VT
Phone:
Fax:
Email: larosas@wseinc.com
☐ These samples have been Previously analyzed by Alpha

Project Information
Project Name: VT DEC WWTF PFAS Input
Project Location: Middlebury,VT
Project #:
Project Manager: Steven LaRosa
ALPHA Quote #:

Turn-Around Time
☐ Standard ☐ Rush (ONLY IF PRE-APPROVED)
Due Date: Time:

Other Project Specific Requirements/Comments/Detection Limits:
Report in Envirodata8
Report to MDL

ANALYSIS

PFAS by DoD Isotope Dilution

SAMPLE HANDLING
Filtration
☐ Done ☐ Not Needed ☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials
L2145067-01	PS17-08182021	8/18/21	1000	WASTE WATER	MLR
-02	Porter-08182021	8/18/21	1105		MLR
-03	PS3-08182021	8/18/21	1050		MLR
-04	NSector-08182021	8/18/21	0925		MLR
-05	PS9-08182021	8/18/21	1025		MLR
-06	Influent-08182021	8/18/21	1350		MLR
-07	Effluent-08182021	8/18/21	1350		MLR
-08	BA-08182021	8/18/21	—		MLR

Container Type												
Preservative												

Relinquished By:	Date/Time	Received By:	Date/Time
	8/18/21 1605	Fredge	8/18/21 1605
	8/20/21 1030		8/20/21 13:20
	8/20/21 16:37		8/21/21 00:55
Wesley Moreau	8/21/21 4:30		8/21/21 435
	8/21/21 555		8/21/21 0555

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO. 01-01(LHL) (rev. 5-JAN-12)

ANALYTICAL REPORT

Lab Number:	L2146211
Client:	Weston & Sampson 98 South Main Street Suite 2 Waterbury, VT 05676
ATTN:	Steven LaRosa
Phone:	(802) 244-5051
Project Name:	VT DEC WWTF PFAS INPUT
Project Number:	Not Specified
Report Date:	09/13/21

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

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Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146211
Report Date: 09/13/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2146211-01	TWINCRAFT-08242021	WATER	ESSEX, VT	08/24/21 09:40	08/27/21
L2146211-02	VALEN-08242021	WATER	ESSEX, VT	08/24/21 10:30	08/27/21

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2146211
Project Number:	Not Specified	**Report Date:**	09/13/21

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: VT DEC WWTF PFAS INPUT **Lab Number:** L2146211
Project Number: Not Specified **Report Date:** 09/13/21

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

L2146211-01R2: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported.

L2146211-01R2: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix.

L2146211-01R2 and -02: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2146211-02: The sample was centrifuged and decanted prior to extraction due to sample matrix.

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:  Alycia Mogayzel

Title: Technical Director/Representative Date: 09/13/21

ORGANICS

SEMIVOLATILES

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146211

Project Number: Not Specified **Report Date:** 09/13/21

SAMPLE RESULTS

Lab ID: L2146211-01 R2
Client ID: TWINCRAFT-08242021
Sample Location: ESSEX, VT

Date Collected: 08/24/21 09:40
Date Received: 08/27/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/31/21 12:37
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/30/21 16:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	100	20.4	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	100	19.8	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	100	11.9	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	100	22.6	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	100	16.4	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	100	12.3	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	100	11.3	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	100	18.8	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	100	11.8	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	100	66.6	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	100	34.4	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	100	15.6	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	100	25.2	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	100	15.2	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	100	60.6	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	100	56.0	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	100	32.4	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	100	13.0	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	100	49.0	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	100	29.0	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	86.0	JF	ng/l	100	40.2	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	100	18.6	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	100	16.4	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	100	12.4	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146211

Project Number: Not Specified **Report Date:** 09/13/21

SAMPLE RESULTS

Lab ID: L2146211-01 R2 Date Collected: 08/24/21 09:40
Client ID: TWINCRAFT-08242021 Date Received: 08/27/21
Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	110		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	125		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	**142**	Q	70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	100		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	94		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	95		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	132		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	109		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**174**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	123		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	115		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	106		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	157		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	76		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	132		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	83		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**157**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**147**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	61		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146211

Project Number: Not Specified **Report Date:** 09/13/21

SAMPLE RESULTS

Lab ID: L2146211-02
Client ID: VALEN-08242021
Sample Location: ESSEX, VT

Date Collected: 08/24/21 10:30
Date Received: 08/27/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/31/21 07:37
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/30/21 16:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	14.5		ng/l	1.80	0.368	1
Perfluoropentanoic Acid (PFPeA)	32.7		ng/l	1.80	0.357	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.80	0.215	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.80	0.408	1
Perfluorohexanoic Acid (PFHxA)	42.3		ng/l	1.80	0.296	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.80	0.221	1
Perfluoroheptanoic Acid (PFHpA)	3.78		ng/l	1.80	0.203	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.80	0.339	1
Perfluorooctanoic Acid (PFOA)	9.24		ng/l	1.80	0.213	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	3.11		ng/l	1.80	1.20	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.80	0.621	1
Perfluorononanoic Acid (PFNA)	1.80		ng/l	1.80	0.282	1
Perfluorooctanesulfonic Acid (PFOS)	9.37	G	ng/l	1.80	0.455	1
Perfluorodecanoic Acid (PFDA)	1.93		ng/l	1.80	0.274	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	1.44	J	ng/l	1.80	1.09	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.80	1.01	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.80	0.585	1
Perfluoroundecanoic Acid (PFUnA)	0.520	J	ng/l	1.80	0.235	1
Perfluorodecanesulfonic Acid (PFDS)	4.54		ng/l	1.80	0.884	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.80	0.523	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	3.07		ng/l	1.80	0.726	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.80	0.336	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.80	0.295	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.80	0.224	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146211

Project Number: Not Specified **Report Date:** 09/13/21

SAMPLE RESULTS

Lab ID: L2146211-02 Date Collected: 08/24/21 10:30

Client ID: VALEN-08242021 Date Received: 08/27/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	103		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	77		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	126		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**194**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	64		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	94		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**353**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	99		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**221**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	99		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	80		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	38		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	80		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	113		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	82		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146211

Project Number: Not Specified **Report Date:** 09/13/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/31/21 04:18
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/30/21 16:40

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1540834-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146211

Project Number: Not Specified **Report Date:** 09/13/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/31/21 04:18
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/30/21 16:40

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1540834-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	98		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	112		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	110		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	69		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	92		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	113		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	108		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	101		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	100		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	94		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	92		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	105		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	65		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	88		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	101		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	86		22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146211
Report Date: 09/13/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1540834-2								
Perfluorobutanoic Acid (PFBA)	118		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	115		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	116		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	132		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	119		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	99		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	115		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	110		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	119		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	133		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	126		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	118		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	121		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	117		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	143		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	113		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	122		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	116		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	119		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	129		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	120		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	132		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2146211

Report Date: 09/13/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1540834-2								
Perfluorotridecanoic Acid (PFTrDA)	134		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	117		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	103				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	115				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	114				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	75				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	98				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	99				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	122				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	102				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	116				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	105				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	110				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	101				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	95				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	99				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	56				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	94				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	105				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	101				22-136

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2146211

Report Date: 09/13/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1540834-3 QC Sample: L2145878-02 Client ID: MS Sample												
Perfluorobutanoic Acid (PFBA)	3.32	38.9	48.4	116		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	6.48	38.9	51.5	116		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	3.30	34.6	43.2	115		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	36.4	53.1	146		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	4.60	38.9	51.6	121		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	0.243J	36.6	39.0	106		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	2.60	38.9	47.5	115		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	1.06J	35.6	43.4	119		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	6.94	38.9	53.2	119		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	37.1	45.8	124		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	37.1	50.5	136		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	1.14J	38.9	46.1	115		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	4.74	36.1	48.6	121		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	0.467J	38.9	45.9	117		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	37.4	51.3	137		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	37.5	40.4	108		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	38.9	48.3	124		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	38.9	47.4	122		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	37.5	43.1	115		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	38.9	49.8	128		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	38.9	41.5	107		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	38.9	49.8	128		-	-		67-153	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2146211

Report Date: 09/13/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1540834-3 QC Sample: L2145878-02 Client ID: MS Sample												
Perfluorotridecanoic Acid (PFTrDA)	ND	38.9	54.8	141		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	38.9	48.3	124		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	74				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	126				12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	118				14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	76				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	71				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	87				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	93				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	113				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	92				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	86				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	96				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	106				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	43				10-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	112				70-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146211
Report Date: 09/13/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1540834-4 QC Sample: L2145878-03 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	3.41	3.40	ng/l	0		30
Perfluoropentanoic Acid (PFPeA)	6.60	6.61	ng/l	0		30
Perfluorobutanesulfonic Acid (PFBS)	3.45	3.17	ng/l	8		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	4.42	4.54	ng/l	3		30
Perfluoropentanesulfonic Acid (PFPeS)	0.227JF	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	2.69	2.54	ng/l	6		30
Perfluorohexanesulfonic Acid (PFHxS)	1.11J	1.24J	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	6.65	6.71	ng/l	1		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	0.828J	0.828J	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	4.46	4.57	ng/l	2		30
Perfluorodecanoic Acid (PFDA)	0.484J	0.544J	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146211
Report Date: 09/13/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1540834-4 QC Sample: L2145878-03 Client ID: DUP Sample						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	96		92		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	108		106		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	121		118		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	84		80		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91		85		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	109		104		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	96		90		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	107		100		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		88		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		97		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	92		87		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	66		57		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	69		57		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95		88		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	34		28		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	69		55		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	87		89		48-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146211
Report Date: 09/13/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1540834-4 QC Sample: L2145878-03 Client ID: DUP Sample

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	87		82		22-136

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146211
Report Date: 09/13/21

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(*)
L2146211-01A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2146211-01B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2146211-02A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2146211-02B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: VT DEC WWTF PFAS INPUT
Lab Number: L2146211
Project Number:
Report Date: 09/13/21

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2146211
Project Number:	Not Specified	**Report Date:**	09/13/21

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: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2146211
Project Number:	Not Specified	**Report Date:**	09/13/21

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. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. 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 method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2146211
Project Number:	Not Specified	**Report Date:**	09/13/21

Data Qualifiers

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where 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.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

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, NO2, NO3.

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, SM4500Cl-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

ALPHA ANALYTICAL — World Class Chemistry

PAGE 1 OF 1

Date Rec'd in Lab: 8/28/21

ALPHA Job #: L2146211

Westborough, MA
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA
TEL: 508-822-9300
FAX: 508-822-3288

Project Information

Project Name: VT DEC WWTF PFAS Input

Project Location: Essex, VT

Project #:

Project Manager: Steven LaRosa

ALPHA Quote #:

Client Information

Client: Weston & Sampson

Address: 98 S Main, St

Waterbury, VT

Phone:

Fax:

Email: larosas@wseinc.com

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☑ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Report Information Data Deliverables

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed Program | Criteria

Other Project Specific Requirements/Comments/Detection Limits:

Report in Envirodata8

Report to MDL

ANALYSIS

SAMPLE HANDLING
Filtration
☐ Done
☐ Not Needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS by DoD Isotope Dilution	Sample Specific Comments
46211-01	TwinCraft-08242021	8/24/21	9:40	WW	JMG	☒	
02	Valen-08242021	8/24/21	10:30	WW	JMG	☒	

Container Type

Preservative

Relinquished By:	Date/Time	Received By:	Date/Time
James Gorgol	8/24/21 11:30	Sonde Fatzp	8/24/21 11:30
R. Welty	8/27/21	R. Welty	8/27/21 1300
Wendy Moreng	8/28/21 4:00	[illegible]	8/28/21 [illegible]
Nal	8/28/21 6:00	Nal	8/28/21 4:25
		[illegible]	8/28/21 [illegible]

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I-NE) (rev. 5-JAN-12)

ANALYTICAL REPORT

Lab Number:	L2146214
Client:	Weston & Sampson 98 South Main Street Suite 2 Waterbury, VT 05676
ATTN:	Steven LaRosa
Phone:	(802) 244-5051
Project Name:	VT DEC WWTF PFAS INPUT
Project Number:	Not Specified
Report Date:	09/13/21

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-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146214
Report Date: 09/13/21

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2146214-01	VELAN08272021	WATER	ESSEX, VT	08/27/21 10:00	08/27/21
L2146214-02	CARPET CLEANER	WATER	ESSEX, VT	08/25/21 13:45	08/27/21

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2146214
Project Number:	Not Specified	**Report Date:**	09/13/21

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: VT DEC WWTF PFAS INPUT **Lab Number:** L2146214
Project Number: Not Specified **Report Date:** 09/13/21

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

L2146214-01 and -02: The sample has elevated detection limits due to the limited sample volume utilized during extraction, as required by the sample matrix.

L2146214-01 and -02: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

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:  Elizabeth Porta

Title: Technical Director/Representative Date: 09/13/21

ORGANICS

SEMIVOLATILES

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146214

Project Number: Not Specified **Report Date:** 09/13/21

SAMPLE RESULTS

Lab ID: L2146214-01
Client ID: VELAN08272021
Sample Location: ESSEX, VT

Date Collected: 08/27/21 10:00
Date Received: 08/27/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 09/01/21 04:29
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/31/21 10:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	12.0	J	ng/l	20.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	29.2		ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	20.0	2.38	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	20.0	4.52	1
Perfluorohexanoic Acid (PFHxA)	39.6		ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	4.20	J	ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	8.56	J	ng/l	20.0	2.36	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	20.0	13.3	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	20.0	3.04	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	20.0	12.1	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	20.0	6.48	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	20.0	9.80	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	20.0	5.80	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	20.0	8.04	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	20.0	2.48	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146214

Project Number: Not Specified **Report Date:** 09/13/21

SAMPLE RESULTS

Lab ID: L2146214-01 Date Collected: 08/27/21 10:00

Client ID: VELAN08272021 Date Received: 08/27/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	82		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	82		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	103		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**165**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	70		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	98		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	84		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**252**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	88		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	72		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	100		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	54		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	67		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	26		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	103		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	63		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	68		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146214

Project Number: Not Specified **Report Date:** 09/13/21

SAMPLE RESULTS

Lab ID: L2146214-02
Client ID: CARPET CLEANER
Sample Location: ESSEX, VT

Date Collected: 08/25/21 13:45
Date Received: 08/27/21
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 09/01/21 04:46
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/31/21 10:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	83.2		ng/l	20.0	4.08	1
Perfluoropentanoic Acid (PFPeA)	60.2		ng/l	20.0	3.96	1
Perfluorobutanesulfonic Acid (PFBS)	280		ng/l	20.0	2.38	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	20.0	4.52	1
Perfluorohexanoic Acid (PFHxA)	184		ng/l	20.0	3.28	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	20.0	2.45	1
Perfluoroheptanoic Acid (PFHpA)	46.8		ng/l	20.0	2.25	1
Perfluorohexanesulfonic Acid (PFHxS)	23.8		ng/l	20.0	3.76	1
Perfluorooctanoic Acid (PFOA)	250		ng/l	20.0	2.36	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	67.2		ng/l	20.0	13.3	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	20.0	6.88	1
Perfluorononanoic Acid (PFNA)	343		ng/l	20.0	3.12	1
Perfluorooctanesulfonic Acid (PFOS)	464	F	ng/l	20.0	5.04	1
Perfluorodecanoic Acid (PFDA)	165		ng/l	20.0	3.04	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	105		ng/l	20.0	12.1	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	20.0	11.2	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	560		ng/l	20.0	6.48	1
Perfluoroundecanoic Acid (PFUnA)	116		ng/l	20.0	2.60	1
Perfluorodecanesulfonic Acid (PFDS)	13.1	J	ng/l	20.0	9.80	1
Perfluorooctanesulfonamide (FOSA)	32.6	F	ng/l	20.0	5.80	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	61.5	F	ng/l	20.0	8.04	1
Perfluorododecanoic Acid (PFDoA)	43.7		ng/l	20.0	3.72	1
Perfluorotridecanoic Acid (PFTrDA)	22.2		ng/l	20.0	3.27	1
Perfluorotetradecanoic Acid (PFTA)	23.0		ng/l	20.0	2.48	1

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146214

Project Number: Not Specified **Report Date:** 09/13/21

SAMPLE RESULTS

Lab ID: L2146214-02 Date Collected: 08/25/21 13:45

Client ID: CARPET CLEANER Date Received: 08/27/21

Sample Location: ESSEX, VT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	86		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	**61**	Q	62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	89		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	62		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**33**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**303**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	99		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	92		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	115		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	**172**	Q	24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**155**	Q	55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	43		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**131**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	77		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	110		22-136

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146214

Project Number: Not Specified **Report Date:** 09/13/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/31/21 21:30
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/31/21 10:10

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1541107-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: VT DEC WWTF PFAS INPUT **Lab Number:** L2146214

Project Number: Not Specified **Report Date:** 09/13/21

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/31/21 21:30
Analyst: HT

Extraction Method: ALPHA 23528
Extraction Date: 08/31/21 10:10

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1541107-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	97		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	115		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	50		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	106		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	74		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	63		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	70		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	58		10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	77		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	92		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	91		22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146214
Report Date: 09/13/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1541107-2								
Perfluorobutanoic Acid (PFBA)	111		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	113		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	109		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	133		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	112		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	96		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	109		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	108		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	110		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	123		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	115		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	107		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	114		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	108		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	138		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	106		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	118		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	109		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	114		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	115		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	93		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	107		-		67-153	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146214
Report Date: 09/13/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1541107-2								
Perfluorotridecanoic Acid (PFTrDA)	122		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	110		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	96				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	112				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	47				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	90				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	106				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	79				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	98				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	99				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	97				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	61				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	77				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	98				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	45				10-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	88				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	96				22-136

Matrix Spike Analysis

Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT

Project Number: Not Specified

Lab Number: L2146214

Report Date: 09/13/21

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1541107-3 QC Sample: L2146076-01 Client ID: MS Sample												
Perfluorooctanoic Acid (PFOA)	10.1	37.7	53.5	115		-	-		63-159	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanoic Acid (M8PFOA)	72				62-129

Lab Duplicate Analysis
Batch Quality Control

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146214
Report Date: 09/13/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1541107-4 QC Sample: L2146076-02 Client ID: DUP Sample						
Perfluorooctanoic Acid (PFOA)	7.41	7.94	ng/l	7		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanoic Acid (M8PFOA)	68		71		62-129

Project Name: VT DEC WWTF PFAS INPUT
Project Number: Not Specified

Lab Number: L2146214
Report Date: 09/13/21

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(*)
L2146214-01A	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2146214-01B	Plastic 250ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)
L2146214-02A	Plastic 500ml unpreserved	A	NA		3.6	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: VT DEC WWTF PFAS INPUT
Lab Number: L2146214
Project Number:
Report Date: 09/13/21

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2146214
Project Number:	Not Specified	**Report Date:**	09/13/21

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: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2146214
Project Number:	Not Specified	**Report Date:**	09/13/21

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. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. 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 method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	VT DEC WWTF PFAS INPUT	**Lab Number:**	L2146214
Project Number:	Not Specified	**Report Date:**	09/13/21

Data Qualifiers

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where 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.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

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, NO2, NO3.

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, SM4500Cl-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

ALPHA ANALYTICAL — World Class Chemistry

PAGE 1 OF 1

Date Rec'd in Lab: 8/28/21

ALPHA Job #: L2146214

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 FAX: 508-822-3288

Project Information

Project Name: VT DEC WWTF PFAS Input

Project Location: Essex, VT

Project #:

Project Manager: Steven LaRosa

ALPHA Quote #:

Client Information

Client: Weston & Sampson

Address: 98 S Main, St

Waterbury, VT

Phone:

Fax:

Email: larosas@wseinc.com

☐ These samples have been Previously analyzed by Alpha

Turn-Around Time

☐ Standard ☐ Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

Report Information Data Deliverables

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #

Regulatory Requirements/Report Limits

State/Fed Program | Criteria

Other Project Specific Requirements/Comments/Detection Limits:

Report in Envirodata8

Report to MDL

ANALYSIS

SAMPLE HANDLING: Filtration ☐ Done ☐ Not Needed ☐ Lab to do; Preservation ☐ Lab to do (Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS by DoD Isotope Dilution	Sample Specific Comments	TOTAL # BOTTLES
46214-01	Velan08272021	8/27/21	10:00	WW	JMG	☒		
02	CarpetCleaner	8/25/21	13:45	carpet cleaner wash water	JJ	☒		

Container Type

Preservative

Relinquished By	Date/Time	Received By	Date/Time
[signature]	8/27/21 11:30	[signature] Cooler - Fmm	8/27/21 1300
R.W. [signature] 8/27/21		[signature] 8/27/21	8/28/21 0115
[signature]	8/28/21 4100	[signature]	8/28/21 425
[signature]	8/28/21 6100	[signature]	8/28/21 0600

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.

FORM NO: 01-01(I) (rev. 5-JAN-12)

APPENDIX B

Laboratory Data Package QA/QC Summary Table

Lab Number	Lab and Sample ID	Date Collected	Sample Type	Analyte(s) Qualified	Lab Flag/Qualifier ID	Data Bias	Resolution	Data Usability Issue
L2140706	L2140706-01, -02, -03, -04, -05, -06, -07, and -08	7/28/2021	Wastewater	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria. Considering the complex matrix being analyzed, this low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2140706	L2140706-01, -02, -03, -04, -05, and -07 Post TOP	7/28/2021	Wastewater	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria. Considering the complex matrix being analyzed, this low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2140706	WG1530910-4, WG1530910-5, and WG1530910-6	7/28/2021	Lab QA	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria. Considering the complex matrix being analyzed, this low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2140706	WG1530910-4	7/28/2021	Lab QA	Laboratory Duplicate RPDs for perfluoroheptanoic acid (pfhpa) (34%), perfluorooctanoic acid (pfoa) (37%), and perfluorodecanoic acid (pfda) (48%)	Q	Laboratory Duplicate RPDs for perfluoroheptanoic acid (pfhpa) (34%), perfluorooctanoic acid (pfoa) (37%), and perfluorodecanoic acid (pfda) (48%) performed on L2140706-04, are outside the acceptance criteria.	The elevated RPDs have been attributed to the non-homogeneous nature of the native sample.	Potential low bias to PFHpA, PFOA and PFDA in L2140706-04
L2140706	WG1530910-5	7/28/2021	Lab QA	Laboratory Duplicate RPD for perfluorooctanesulfonic acid (pfos) (91%)	Q	Laboratory Duplicate RPD for perfluorooctanesulfonic acid (pfos) (91%), performed on L2140706-05, is outside the acceptance criteria.	The elevated RPDs have been attributed to the non-homogeneous nature of the native sample.	Potential low bias to PFOS in L2140706-05
L2142144	WG1535434-1: The Method Blank, associated with L2142144--01 through -07	8/3/2021	Blank & Wastewater	1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	Q, F	Surrogate recovery(ies) above upper control limit, resulting in high bias on reported result.	Method Blank has a concentration above the reporting limit for 6:2FTS. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required.	No
L2142144	L2142144-01, -02, -02RE,-03RE\D, -03D, -04, -06, 06RE, -07D; Post TOP L2142144-02, -03, and -04	8/3/2021	Wastewater	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria. Considering the complex matrix being analyzed, this low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2142144	WG1535438-4	8/3/2021	Lab QA	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria . This low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2142145	L2142145-01 through -08	8/4/2021	Wastewater	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria except for d5-NEtFOSSA. Considering the complex matrix being analyzed, this low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	Potenial high bias to NEtFOSSA in L2142145-02.
L2142145	WG1535434-1	8/4/2021	Lab QA	Method Blank, associated with L2142145-02 and -02RE, has a concentration above the reporting limit for 6:2FTS	Q, F	Compound presence in the Blank could result in high bias in respective samples.	Since the associated sample concentrations are non-detect to the RL for this target analyte, no corrective action is required	No
L2142145	WG1535434-1	8/4/2021	Lab QA	Method Blank, associated with L2142145-03, -05, -06, -07, and -08, has a concentration above the detection limit for PFOS	G	Compound presence in the Blank could result in high bias in respective samples.	The PFOS concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.	Potential high bias of PFOS in L2142145-03, -05, -06, 07, and -08
L2143348	L2143348-01 through -07	8/11/2021	Wastewater	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria . This low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2143348	WG1536096-3 and WG1536096-4	8/11/2021	Lab QA	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria . This low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2143350	L2143350-01, -02, -03RE, -04RE, -05, -06, -07RE and -08RE	8/10/2021	Wastewater	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria except for M8PFOA, M8PFOS and M6PFDA in -01. Considering the complex matrix being analyzed, this low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	Potential low bias for PFOA, PFOS and PFDA in L2143350-01
L2143350	WG1537061-1, WG1536344-4	8/10/2021	Lab QA	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria . This low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2145065	L2145065-01, -03RE, -05, -06, -07RE, -08, and -09	8/17/2021	Wastewater	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria . This low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2145065	WG1538912-4	8/17/2021	Lab QA	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria . This low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2145067	L2145067-01, -02, -03, -04, -05R, -06, and -08R	8/18/2021	Wastewater	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria . This low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	No
L2146211	L2146211-01R2 and -02	8/24/2021	Wastewater	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria except for d5-NEtFOSSA. Considering the complex matrix being analyzed, this low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	Potenial high bias to NEtFOSSA in L2146211-01R2.
L2146211	L2146211-02	8/24/2021	Wastewater	Method Blank, associated with L2146211-02, has a concentration above the reporting limit for PFOS	G	Compound presence in the Blank could result in high bias in respective samples.	The PFOS concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.	Potential high bias to PFOS in L2146211-02
L2146214	L2146214-01, -02	8/27/2021	Wastewater	Extracted Internal Standard recoveries were outside the acceptance criteria for several individual analytes	Q, F	Surrogate recovery(ies) above upper and below lower control limits reported for several compounds. These could result in high or low bias respectively on reported results.	Surrogate recoveries for all compounds quantified above the detection limit were within 10% of the upper and/or lower acceptable criteria except for M5PFHxA. Considering the complex matrix being analyzed, this low degree of variance from the acceptance criteria is not considered sufficient to warrant resolution and does not effect data uasbility for the DQOs of the project.	Potential low bias for PFHxA in L2146214-02