

BROOKHAVEN CALABRO AIRPORT TERMINAL BUILDING
135 DAWN DRIVE
SHIRLEY, NEW YORK 11967
SITE #152263

INTERIM REMEDIAL MEASURE WORK PLAN

SUBMITTED TO:



New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
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ON BEHALF OF:



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ACRONYMS

ACRONYM	DEFINITION
µg/kg	Micrograms per kilogram
AOC	Areas of Concern
ASP	Analytical Standard Procedure
DER	Division of Environmental Remediation
DER-10	Technical Guidance for Site Investigation and Remediation
DUSR	Data Usability Summary Report
IDW	Investigative Derived Waste
IRM	Interim Remedial Measure
MDL	Method Detection Limit
MS/MSD	Matrix Spike / Matrix Spike Duplicate
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PE	Professional Engineer
PG	Professional Geologist
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PID	Photo-ionization Detector
POG	Protection of Groundwater
PWGC	P.W. Grosser Consulting, Inc.
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance / Quality Control
QEP	Qualified Environmental Professional
RL	Reporting Limit
SCDHS	Suffolk County Department of Health Services
SCG	Standards, Criteria, and Guidance
SCO	Soil Cleanup Objective
SCR	Site Characterization Report
SDG	Sample Delivery Group
SOP	Standard Operating Procedure
SVOC	Semi-Volatile Organic Compound
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
YORK	York Analytical Laboratories Inc.



CERTIFICATION

I, Michael Scanlon, certify that I am currently a New York State registered professional engineer (PE), as defined in 6 New York Codes, Rules, and Regulations (NYCRR) Part 375, and that this Interim Remedial Measure (IRM) Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the Division of Environmental (DER) Technical Guidance for Site Investigation and Remediation (DER-10).

Michael Scanlon

PE Name

Michael Scanlon

PE Signature

103321

PE License #

4/12/2023

Date





1.0 INTRODUCTION

This IRM Work Plan has been prepared by P.W. Grosser Consulting, Inc. (PWGC) for Brookhaven Calabro Airport, located in Shirley, New York (site) to propose the remediation of sanitary systems connected to the airport's terminal building. The proposed scope of work is based on preliminary data obtained during PWGC's site characterization performed between September 13, 2022 and January 3, 2023 which identified the presence of contaminants of concern in the on-site sanitary systems.



2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

The airport terminal building is located at 135 Dawn Drive in Shirley, New York. Previous investigations have identified that there are two sanitary systems associated with the airport terminal building. One system is connected to the north side of the terminal building which includes bathrooms and a restaurant. The sanitary system consists of a grease trap (GT_001) for the restaurant, a septic tank (ST_001), a distribution box, and three primary leaching pools (LP_002, LP_003, and LP_004). The other system is connected to the south side of the terminal building which includes a bathroom, slop sink, and former floor drains that have since been abandoned. There is one leaching pool (LP_001) associated with this system.

A Site Location Map is included as **Figure 1** and a Site Plan with structures shown is included as **Figure 2**.

2.2 Sanitary System Sampling to Date

2.2.1 Initial Characterization

Between September 13 and September 16, 2022, PWGC collected sediment samples from the four leaching pools (LP_001 through LP_004). The samples from each structure were analyzed for per- and polyfluoroalkyl substances (PFAS) by United States Environmental Protection Agency (USEPA) Method 537, rev1.1 (modified).

Multiple PFAS compounds were detected in soil/sediment within the structures. Perfluorooctanesulfonic acid (PFOS) was detected above its respective proposed Protection of Groundwater (POG) Soil Cleanup Objective (SCO) of 1.0 micrograms per kilogram ($\mu\text{g}/\text{kg}$) in each of the four sanitary system samples collected with concentrations of 44.1 $\mu\text{g}/\text{kg}$ in LP_001, 133 $\mu\text{g}/\text{kg}$ in LP_002, 87.6 $\mu\text{g}/\text{kg}$ in LP_003, and 49.1 $\mu\text{g}/\text{kg}$ in LP_004. Perfluorooctanoic acid (PFOA) was detected above its respective proposed POGSCO of 0.8 $\mu\text{g}/\text{kg}$ in two of the four sanitary system samples collected with a concentration of 11.4 $\mu\text{g}/\text{kg}$ in LP_002 and 25.8 $\mu\text{g}/\text{kg}$ in LP_002.

2.2.2 Supplemental Characterization

On January 3, 2023, PWGC mobilized to the site to perform supplemental characterization of the onsite sanitary systems associated with the maintenance building. This supplemental characterization included the existing grease trap (GT_001) and septic tank (ST_001) and all sanitary leaching pools.

The samples from each structure were analyzed for:

- Volatile Organic Compounds (VOCs) by USEPA Method 8260 (SCDHS List)
- Semi-Volatile Organic Compounds (SVOCs) by USEPA Method 8270 (SCDHS List)
- Metals by USEPA Methods 6020/7470 (SCDHS) List
- PFAS by USEPA Method 1633 (Limited to the GT_001 and ST_001)

A total of two soil/sediment samples were collected from two additional structures (GT_001 and ST_001) and analyzed for PFAS analysis during this supplemental characterization. Multiple PFAS compounds were detected in soil/sediment within the structures. PFOS was detected above its respective proposed POGSCO of 1.0 µg/kg in each of the two additional sanitary system samples collected with concentrations of 12.1 µg/kg in GT_001 and 2.90 µg/kg in ST_001. PFOA was detected above its respective proposed POGSCO of 0.8 µg/kg in one of the two additional sanitary system samples collected with a concentration of 1.58 µg/kg in ST_001. It should be noted that the method detection limit for GT_001 had to be raised above the proposed POGSCO due to the inability to break down the grease portion of the sample.

Several VOCs were detected above the lower of either the NYSDEC POGSCO or SCDHS Action level in three (GT_001, LP_003, and LP_004) of the six sanitary structures. These included either 1,4-Dichlorobenzene, 2-Butanone, Acetone, and Toluene.

Several SVOCs were detected above the lower of either the NYSDEC POGSCO or SCDHS Action level in two (LP_002 and LP_003) of the six sanitary structures. These included either Benzo(a)anthracene and Chrysene.

Several metals were detected above the lower of either the NYSDEC POGSCO or SCDHS Action level in four (LP__001, LP__002, LP__003, and LP__004) of the six sanitary structures. These included Cadmium, Chromium, Copper, and Mercury.

Soil sample analytical data for each structure is shown on **Tables 1** through **4**.

2.2.3 Waste Characterization

Prior to remediation at the site, PWGC collected solid and liquid waste characterization samples from the impacted structures, in accordance with the disposal facility's requirements. Based upon waste characterization sample analytical data, soil/sludge and liquids could be disposed of as non-hazardous waste.

- Dale Transfer Corp. (Dale) has reviewed the information and determined that they can accept up to 200 cubic yards of non-hazardous solids from the remedial efforts. Dale operates an existing solid waste management facility (Permit #1-4720-03277/00001).
- Clear Flo Technologies, Inc. (CFT) has reviewed the information and determined that they can accept up to 15,000 gallons of non-hazardous liquids from the remedial efforts. CFT operates an existing solid waste management facility (Permit #1-4720-02934/00001).

Waste characterization samples laboratory analytical reports are included as **Appendix A** and waste acceptance letters are included in **Appendix B**.

3.0 DESCRIPTION OF INTERIM REMEDIAL MEASURE

Based upon the depth of the leaching pools, the design of these structures to drain liquids to the subsurface in an efficient manner, and the concentrations of PFAS, VOCs, and metals greater than the lower of the POGSCO or SCDHS Action Levels, contaminants of concern within the structures may continue to spread to deeper depths. While PWGC continues to finalize the overall Site Characterization Report (SCR), PWGC recommends that an IRM be implemented at the site to remediate the PFAS, VOCs, and metals impact to the structures.

The IRM activities will include the remediation of the six structures (GT_001, ST_001, LP_001, LP_002, LP_003, and LP_004). A vacuum truck will be used to remove liquids from within the impacted structures. Liquids will be disposed of in accordance with federal, state, and local regulations. Following the removal of liquids, a vector truck will be used to remove impacted sediments from the base of each structure until soils appear visibly clean, or a solid bottom is exposed with all solids removed to the extent feasible. Materials will not be removed from deeper than the bottom ring of each structure during this phase of work to maintain structural integrity of the structures. If backfill is determined to be necessary, laboratory results shall be provided to confirm that material placed within the drainage structures meets DER-10 requirements.

To confirm soil remaining in the structures, if applicable, meets the lower of POGSCOs or SCDHS Cleanup Objectives, endpoint samples will be collected from each of the remediated leaching pools. Soils in the structures will be sampled using stainless steel hand augers. Soil samples will be analyzed for the following:

- VOCs by USEPA Method 8260C (expanded to include SCDHS compounds)
- SVOCs by USEPA Method 8270D
- TAL Metals by USEPA Method 6010C/7471B
- Pesticides & PCBs by USEPA Method 8081B/8082A
- Trivalent & Hexavalent Chromium by USEPA Method 7196A
- Total Cyanide by USEPA Method 9012B
- Silvex by USEPA Method 8151A
- PFAS by USEPA Method 1633
- 1,4-Dioxane by USEPA Method 8270-SIM

Samples will be retrieved from the base of each structure utilizing a stainless-steel hand auger. Samples collected for volatile organic analysis will be collected directly from the hand auger bucket. The remaining sample volumes will then be transferred to a stainless-steel bowl and homogenized. Once homogenized, samples will be transferred to laboratory supplied glassware and packed in a cooler with ice and shipped under proper chain-of-custody procedures to York Analytical Laboratories.

Analytical results for the endpoint samples will be compared to the lower of their respective POGSCOs and SCDHS Cleanup Objectives. If a solid bottom structure is encountered, the structure will be inspected for deficiencies in its integrity, such as cracks or holes.

Solid and liquid sanitary waste removed during remediation activities will be stored directly in the appropriate pump and vector truck, respectively. Solid and liquid sanitary waste will be removed immediately from the site and disposed of at an offsite disposal facility, determined prior to the start of remediation activities.

Island Pump and Tank of East Northport, New York is the contractor for solid and liquid waste disposal. ClearFlo Technologies, Inc. of Lindenhurst, New York is the facility accepting the liquid waste. Dale Transfer Corp of West Babylon, New York is the facility accepting solid waste. Both facilities will supply licensed industrial waste haulers.

The remediation will be conducted under the Health and Safety Plan (**Appendix C**) previously submitted as part of the Site Characterization Work Plan dated June 2021 and Quality Assurance Project Plan (QAPP) outlined in **Section 5**.



4.0 COMMUNITY AIR MONITORING PLAN

A site-specific Community Air Monitoring Plan (CAMP) has been prepared to provide measures for protection for on-site workers and the downwind community from potential airborne contaminants as a direct result of the Site Characterization. The CAMP is included as **Appendix D**.

The Community Air Monitoring Plan will be implemented and executed for all ground intrusive activities in accordance with 29 CFR 1910.120(h), the New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan, and NYSDEC DER-10, Appendix 1A and 1B.



5.0 QUALITY ASSURANCE PROJECT PLAN

This QAPP presents the objectives, functional activities, methods, and quality assurance / quality control (QA/QC) requirements associated with sample collection and laboratory analysis for characterization activities. The QAPP follows requirements detailed in DER-10, Section 2.

5.1 Laboratory Analysis

Requirements for sample analysis are described below. Samples will be submitted to a NYSDOH ELAP certified laboratory (York Analytical) for analysis. Analytical methods, preservation, container requirements, and holding times are summarized below:

ANALYTICAL METHODS (SOIL)

Analyte/ Analyte Group	Matrix	Method/ SOP	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Estimated Number of Samples to be Collected
TAL Metals	Soil	USEPA 6010D	1 x 20z, glass	Cool $\leq 4^{\circ}\text{C}$	180 days	180 days	6
Mercury	Soil	USEPA 7471B	1 x 20z, glass	Cool $\leq 4^{\circ}\text{C}$	28 days	28 days	6
TCL VOCs	Soil	USEPA 8260C	3 x 40 ml VOA, glass vial	1 x Methanol 2 x DI H ₂ O Cool $\leq 4^{\circ}\text{C}$	48 hours	14 Days	6
TCL SVOCs	Soil	USEPA 8270D	1 x 4 oz, glass	Cool $\leq 4^{\circ}\text{C}$	14 days	40 days	6
PCBs	Soil	USEPA 8082A	1 x 4 oz, glass	Cool $\leq 4^{\circ}\text{C}$	7 days	7 Days	6
Cyanide	Soil	USEPA 9010C/901 2B	1 x 20z, glass	Cool $\leq 4^{\circ}\text{C}$	14 days	14 days	6
Cr+6	Soil	USEPA 7196A	1 x 20z, glass	Cool $\leq 4^{\circ}\text{C}$	28 days	28 days	6
Pesticides	Soil	USEPA 8081B	1 x 4 oz, glass	Cool $\leq 4^{\circ}\text{C}$	7 days	7 days	6
PFAS	Soil	USEPA 1633	1 x 8 oz, glass	Cool $\leq 4^{\circ}\text{C}$	14 days	14 days	6
1,4- dioxane*	Soil	USEPA 8270 (SIM)	1 x 4oz, glass	Cool $\leq 4^{\circ}\text{C}$	2 days	14 days	6
*SIM Mode only necessary if USEPA 8260 analysis cannot meet a method detection limit (MDL) of 0.1 mg/kg							

ANALYTICAL METHODS (WATER)

Analyte/ Analyte Group	Matrix	Method/ SOP	Container(s) (number, size & type per sample)	Preservation	Preparation Holding Time	Analytical Holding Time	Estimated Number of Samples to be Collected
Metals	Water	USEPA 6020B	1 x 250 ml plastic	HNO ₃ Cool ≤ 4 °C	180 days	180 days	2
Mercury	Water	USEPA 7470A	1 x 250 ml plastic	HNO ₃ Cool ≤ 4 °C	28 days	28 days	2
VOCs	Water	USEPA 8260C	3 x 40 ml VOA Vials	HCl Cool ≤ 4 °C	None	14 Days	4
SVOCs	Water	USEPA 8270D	2 x 250 ml, amber glass	Cool ≤ 4 °C	7 days	7 days	2
PCBs	Water	USEPA 8082A	2 x 120 ml, amber glass	Cool ≤ 4 °C	7 days	7 Days	2
Pesticides	Water	USEPA 8081B	2 x 120 ml, amber glass	Cool ≤ 4 °C	7 days	7 days	2
PFAS	Water	USEPA 1633	4 x 250 ml HDPE, unlined cap	Cool < 4 °C	14 days	28 days	4
1,4- Dioxane*	Water	USEPA 8270D SIM Mode	2 x 250 ml, Glass	Cool ≤ 4 °C	7 days	40 days	2

*SIM Mode to be used to meet required detection limit of 0.35 ug/L

Laboratory MDLs and Reporting Limits (RLs) for PFAS analysis are detailed in the tables below:

PFAS MDLs & RLs (SOIL)

Analyte	CAS Number	RL (ng/g)	MDL (ng/g)
11CL-PF3OUdS	763051-92-9	3.64	1.41
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	39108-34-4	3.64	3.43
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	757124-72-4	3.64	2.70
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	27619-97-2	3.64	2.70
3-Perfluoroheptyl propanoic acid (FHpPA)	812-70-4	22.7	6.82
3-Perfluoropentyl propanoic acid (FPePA)	914637-49-3	22.7	9.53
3-Perfluoropropyl propanoic acid (FPrPA)	356-02-2	4.54	2.88
9CL-PF3ONS	756426-58-1	3.64	1.12
ADONA	919005-14-4	3.64	0.791
HFPO-DA (Gen-X)	13252-13-6	3.64	2.76
N-EtFOSA	4151-50-2	0.909	0.900
N-EtFOSAA	2991-50-6	0.909	0.882
N-EtFOSE	1691-99-2	9.09	3.17
N-MeFOSA	31506-32-8	0.909	0.818

Analyte	CAS Number	RL (ng/g)	MDL (ng/g)
N-MeFOSAA	2355-31-9	0.909	0.673
N-MeFOSE	24448-09-7	9.09	2.78
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	113507-82-7	1.82	0.632
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	0.909	0.868
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	0.909	0.704
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	0.909	0.563
Perfluoro-1-octanesulfonamide (FOSA)	754-91-6	0.909	0.663
Perfluoro-1-pentanesulfonate (PFPeS)	2706-91-4	0.909	0.713
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	151772-58-6	1.82	0.877
Perfluoro-4-oxapentanoic acid (PFMPA)	377-73-1	1.82	0.282
Perfluoro-5-oxahexanoic acid (PFMBA)	863090-89-5	1.82	0.436
Perfluorobutanesulfonic acid (PFBS)	375-73-5	0.909	0.504
Perfluorodecanoic acid (PFDA)	335-76-2	0.909	0.868
Perfluorododecanesulfonic acid (PFDoS)	79780-39-5	0.909	0.904
Perfluorododecanoic acid (PFDoA)	307-55-1	0.909	0.741
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.909	0.477
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	0.909	0.813
Perfluorohexanoic acid (PFHxA)	307-24-4	0.909	0.241
Perfluoro-n-butanoic acid (PFBA)	375-22-4	3.64	0.495
Perfluorononanoic acid (PFNA)	375-95-1	0.909	0.859
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.909	0.759
Perfluorooctanoic acid (PFOA)	335-67-1	0.909	0.782
Perfluoropentanoic acid (PFPeA)	2706-90-3	1.82	0.495
Perfluorotetradecanoic acid (PFTA)	376-06-7	0.909	0.468
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.909	0.568
Perfluoroundecanoic acid (PFUnA)	2058-94-8	0.909	0.900

PFAS MDLs & RLs (WATER)

Analyte	CAS Number	RL (ng/L)	MDL (ng/L)
11CL-PF3OUdS	763051-92-9	7.26	1.25
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	39108-34-4	7.26	1.86
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	757124-72-4	7.26	1.62
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	27619-97-2	7.26	0.961
3-Perfluoroheptyl propanoic acid (FHpPA)	812-70-4	22.7	8.59
3-Perfluoropentyl propanoic acid (FPePA)	914637-49-3	22.7	6.65
3-Perfluoropropyl propanoic acid (FPrPA)	356-02-2	4.54	1.84
9CL-PF3ONS	756426-58-1	7.26	0.635
ADONA	919005-14-4	7.26	0.481
HFPO-DA (Gen-X)	13252-13-6	7.26	2.93

Analyte	CAS Number	RL (ng/L)	MDL (ng/L)
N-EtFOSA	4151-50-2	0.181	1.63
N-EtFOSAA	2991-50-6	1.81	0.934
N-EtFOSE	1691-99-2	18.1	3.62
N-MeFOSA	31506-32-8	1.81	1.43
N-MeFOSAA	2355-31-9	1.81	0.717
N-MeFOSE	24448-09-7	18.1	3.62
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	113507-82-7	3.63	0.454
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	1.81	1.20
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	1.81	0.825
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	1.81	0.780
Perfluoro-1-octanesulfonamide (FOSA)	754-91-6	1.81	0.798
Perfluoro-1-pentanesulfonate (PFPeS)	2706-91-4	1.81	0.689
Perfluoro-3,6-dioxahheptanoic acid (NFDHA)	151772-58-6	3.63	1.94
Perfluoro-4-oxapentanoic acid (PFMPA)	377-73-1	3.63	0.227
Perfluoro-5-oxahexanoic acid (PFMBA)	863090-89-5	3.63	0.336
Perfluorobutanesulfonic acid (PFBS)	375-73-5	1.81	0.426
Perfluorodecanoic acid (PFDA)	335-76-2	1.81	0.680
Perfluorododecanesulfonic acid (PFDoS)	79780-39-5	1.81	0.844
Perfluorododecanoic acid (PFDoA)	307-55-1	1.81	0.798
Perfluoroheptanoic acid (PFHpA)	375-85-9	1.81	0.644
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	1.81	0.617
Perfluorohexanoic acid (PFHxA)	307-24-4	1.81	0.317
Perfluoro-n-butanoic acid (PFBA)	375-22-4	7.26	0.299
Perfluorononanoic acid (PFNA)	375-95-1	1.81	0.472
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	1.81	0.744
Perfluorooctanoic acid (PFOA)	335-67-1	1.81	0.381
Perfluoropentanoic acid (PFPeA)	2706-90-3	3.63	0.209
Perfluorotetradecanoic acid (PFTA)	376-06-7	1.81	0.626
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	1.81	0.671
Perfluoroundecanoic acid (PFUnA)	2058-94-8	1.81	1.02

5.1.1 Soil Samples

Soil samples will be collected as described in Section 3.0. Analysis will conform to NYSDEC Analytical Standard Procedure (ASP) Category B data deliverables in accordance with NYSDEC DER-10, Appendix 2B, 1.0 (b), including calibration standards, surrogate recoveries, and chromatograms.

5.2 Field/Laboratory Data Control Requirements

QC procedures will be followed in the field and at the laboratory to facilitate that reliable data are obtained. When performing field sampling, care shall be taken to prevent the cross-contamination of sampling equipment, sample bottles, and other equipment that could compromise sample integrity. QC samples will include the following:

- Blind Duplicates – one per 20 environmental samples for each matrix sampled.
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) – one per 20 environmental samples for each matrix sampled.
- Equipment Blank – one per day for each matrix sampled.
- Field Blank – one per day when PFAS samples are collected.
- Trip Blank – one per day.

ESTIMATED QA/QC SAMPLE FREQUENCY

QA/QC Sample Type	Est. Total Soil Samples	Est. Days of Soil Sampling	Est. Total Soil QA/QC Samples
Blind Duplicate	4	2	1
MS/MSD	4	2	1
Equipment Blank	NA	2	2
Field Blank	NA	2	2
Trip Blank	4	2	2

QA/QC Sample analysis will conform to NYSDEC ASP Category B data deliverables in accordance with NYSDEC DER-10, Appendix 2B, 1.0 (b), including calibration standards, surrogate recoveries, and chromatograms.

5.3 Special Sampling Considerations for PFAS Sampling

There are several potential sources of PFAS that could contribute to the cross-contamination of environmental samples collected during the Remedial Investigation. Weatherproof clothing, pens, logbooks, cosmetics, personal hygiene products, insect repellents, and sampling equipment could contain PFAS that could lead to false positive sampling results.

To ensure that the analytical results obtained during the RI are representative of the actual site conditions several measures should be taken:

- Collection of appropriate field QA/QC samples (blanks, duplicates, etc.) as detailed in Section 4.2.
- Analysis by the analytical laboratory using established laboratory QA/QC procedures and methods as detailed in Section 4.1.
- During decon, non-dedicated equipment to be used for PFAS sampling will be rinsed with PFAS free water supplied by the laboratory. Equipment will be allowed to fully air dry before use.
- New nitrile gloves shall be worn between each sample interval.
- Only clean cotton or synthetic clothes shall be worn – preferably washed more than six times, and without the use of fabric softeners. No waterproof or insecticide treated clothing, boots or rain jackets made or treated with Teflon products shall be used at the collection site. This includes all Gore-Tex® and Tyvek® products.
- Do not apply moisturizers or hand creams to hands or face on the day of sampling. No sunblock or insect repellants. Do not bring packaged food to the work site or use aluminum foil.
- Field notes shall be taken using a computer tablet or by using ink pens on non-waterproof plain paper attached to a metal clipboard. Do not use Sharpies or markers. Transcribe field notes to Chain-of-Custody forms and official field books when back in the office after the collection process.
- For water samples use only laboratory supplied 250 ml polypropylene sample bottles. Sample bottles should be pre-preserved by the laboratory, if dictated by the analysis method.
- Print labels before going into the field and apply to the sample containers.
- Use only laboratory supplied PFAS-free water for trip, field and equipment blanks.
- Place each sample container in a separate polypropylene zip-lock bag.
- For the shipping coolers, use only regular crushed ice packaged in polypropylene zip-lock plastic bags.
- Use only laboratory supplied shipping coolers that were used to ship sample containers for this project. Tape the cooler shut before shipping samples to the laboratory.

5.4 Sample Identification

Each sample will be identified with a set of information relating individual sample characteristics. Required information consists of Sample Designation, Depth, Date, Time, and Matrix. Examples of sample IDs are shown below.

- LP__001 (leaching pool sample, designation 01)

Sample frequency, locations, depths, and nomenclature may change subject to field decisions and professional judgment.

5.5 Chain-of-Custody, Sample Packaging and Shipment

A chain-of-custody/request for analysis form will be completed and submitted to the laboratory with samples to be analyzed. A copy of the chain-of-custody will be retained by the Project Manager. The chain-of-custody will include the project name, sampler's signature, sample IDs, date and time of sample collection, and analysis requested.

Samples will be packaged and shipped in a manner that maintains sample preservation requirements during transport (i.e., ice to keep samples cool until receipt at the laboratory), ensures that sample holding times can be achieved by the laboratory, and prevents samples from being tampered with.

If a commercial carrier ships samples, a bill of lading (waybill) will be used as documentation of sample custody. Receipts for bills of lading and other documentation of shipment shall be maintained as part of the permanent custody documentation. Commercial carriers are not required to sign the chain-of-custody as long as it is enclosed in the shipping container and evidence tape (custody seal) remains in place on the shipping container.

5.6 Data Usability and Validation

The main purpose of the data is for use in defining the extent of contamination at the site, to aid in evaluation of potential human health and ecological exposure assessments, and to support remedial action decisions. Based upon this, data usability and validation will be performed as described below. Complete data packages will be archived in the project files,

and if deemed necessary additional validation can be performed using procedures in the following sections.

Data collected as part of the IRM will be validated in accordance with Sections 4.6.1 and 4.6.2.

5.6.1 Data Usability and Validation Requirements

Data usability and validation are performed on analytical data sets, primarily to confirm that sampling and chain-of-custody documentation are complete, sample IDs can be tied to specific sampling locations, samples were analyzed within the required holding times, and analyses are reported in conformance with NYSDEC ASP, Category B data deliverable requirements as applicable to the method utilized.

5.6.2 Data Usability and Validation Methods

A designee of the PWGC Project Manager will complete a data usability evaluation for the data collected during the IRM and a data usability summary report (DUSR) will be prepared. The DUSR will be prepared in accordance with NYSDEC DER-10, Appendix 2B.

Independent third-party data validation will be performed on 5% of the sample data, or on one sample from each sample delivery group (SDG), whichever is greater. Data validation will be performed by Laboratory Data Consultants (LDC). LDC resumes are included in **Appendix E**.

5.7 Field Equipment Calibration

Equipment will be inspected and approved by the Field Team Leader before being used. Equipment will be calibrated to factory specifications, if required. Monitoring equipment will be calibrated following manufacturers recommended schedules. Daily field response checks and calibrations will be performed as necessary (i.e. PID calibrations) following manufacturer's standard operating procedures. Equipment calibrations will be documented in a designated field logbook.

5.8 Equipment Decontamination

In order to minimize the potential for cross-contamination, non-dedicated sampling equipment shall be properly decontaminated prior to and between sampling locations.

5.8.1 General Procedures

Sampling equipment will be decontaminated in an area covered with plastic sheeting near the sampling location. Waste material generated during decontamination activities will be containerized, stored and disposed of in accordance with the procedures detailed in Section 4.9. Decontamination of sampling equipment shall be kept to a minimum, and wherever possible, dedicated sampling equipment shall be used. Personnel directly involved in equipment decontamination shall wear appropriate personal protective equipment (PPE).

5.8.2 Sampling Equipment

Sampling equipment (i.e., trowels, bowls, etc...) will be decontaminated prior to each use as follows:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
- Generous tap water rinse
- Distilled water rinse

5.8.3 Meters and Probes

All meters and probes that are used in the field (other than those used solely for air monitoring purposes, e.g., PID meters) will be decontaminated between uses as follows:

- Laboratory-grade detergent and tap water solution wash
- Tap water rinse
- Distilled water rinse (triple rinse)

5.9 Management of Investigation Derived Waste

Waste materials generated from the field operations may consist of solid and liquid sanitary waste, and miscellaneous solid materials such as PPE and supplies. Investigative derived waste (IDW) generated during field operations will be disposed of in accordance with applicable regulations.

5.10 Field Documentation

Documentation will take place on either appropriate forms or in a dedicated site logbook. Permanent black or blue ink will be used to record information in the logbook. Errors in field documentation will be lined through, initialed, dated, and corrected. Forms will be kept by the PWGC Field Team Leader during the field activities. Field activities will be documented in the field logbook. The logbook will contain pages that are consecutively numbered and be permanently bound with a hard cover. Upon completion of daily activities, unused portions of pages will be lined-through and initialed.

The primary purpose of the field logbook is to document the daily field activities and to provide descriptions of each activity. All entries in the field logbook will be recorded and dated by person making the entry.

6.0 PROJECT ORGANIZATION

The Remedial Engineer (RE) and Qualified Environmental Professional (QEP) for this project are Michael Scanlon, PE and Michael Pecoraro, respectively. Principal personnel who will participate in the interim remedial measure include an environmental scientist or engineer. The environmental scientist/engineer, under the supervision of the RE and QEP, will document that the remedial actions are implemented in accordance with this IRMWP, HASP, CAMP, and supporting documents, and promptly report deviations from these documents to the appropriate team members, the RE, and the QEP so that the issue can be rectified in a timely manner. The environmental scientist/engineer will report directly to the QEP and RE and will provide daily summary reports of the remedial activities. Resumes of the RE, QEP, and associated environmental scientists/engineers are included in **Appendix E**.



7.0 INTERIM REMEDIAL MEASURE COMPLETION REPORT PREPARATION

A report documenting the remedial activities and analytical results of the IRM will be prepared. Analytical results will be compared to the lower of SCDHS Cleanup Objectives and NYSDEC POGSCOs. The report will contain conclusions and recommendations, as well as appropriate figures, tables, and waste manifests.





8.0 SCHEDULE

The estimated duration of the project is six weeks from approval of this IRM Work Plan. Following approval of the IRM Work Plan by the NYSDEC and SCDHS, PWGC will begin coordination of the remedial work with the NYSDEC, SCDHS, Town of Brookhaven, and necessary subcontractors. Soil analytical results will be forwarded to the disposal facilities for acceptance. Once acceptance of the soil is approved, the NYSDEC and SCDHS will be notified that remediation of the structures will begin within two weeks. Remediation of the structures and endpoint samples collection is anticipated to take two days. Analytical results will be received in approximately one to two weeks.





9.0 REFERENCES

NYSDEC, Division of Environmental Restoration, 6 NYCRR Part 375, Environmental Remediation Programs, December 14, 2006.

NYSDEC, Division of Environmental Remediation, DER-10, Technical Guidance for Site Investigation and Remediation, May 2010.

NYSDEC, Division of Environmental Remediation, Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs, November 2022.

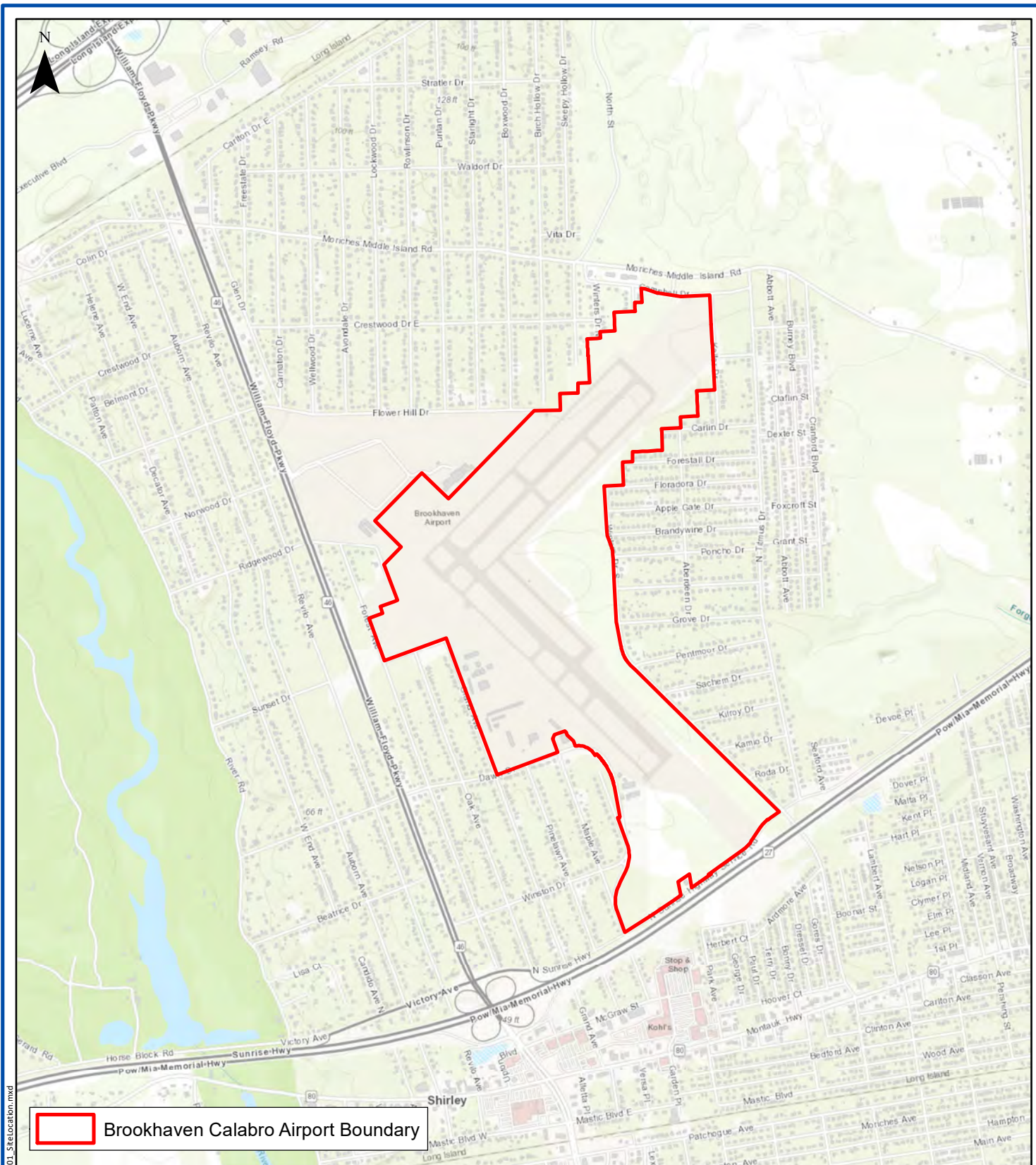
PWGC, Site Characterization Work Plan, June 8, 2021.

SCDHS, Standard Operating Procedure (SOP) 9-95, Pumpout and Soil Cleanup Criteria, January 2011.



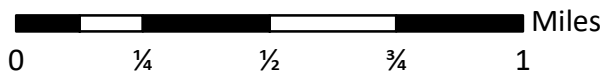
FIGURES





SITE LOCATION

135 Dawn Dr
Shirley, NY



Project:	BRK2201
Date:	7/17/2020
Designed by:	JL
Drawn by:	PH
Approved by:	JL
Figure No:	1



PWGC
CLIENT DRIVEN SOLUTIONS

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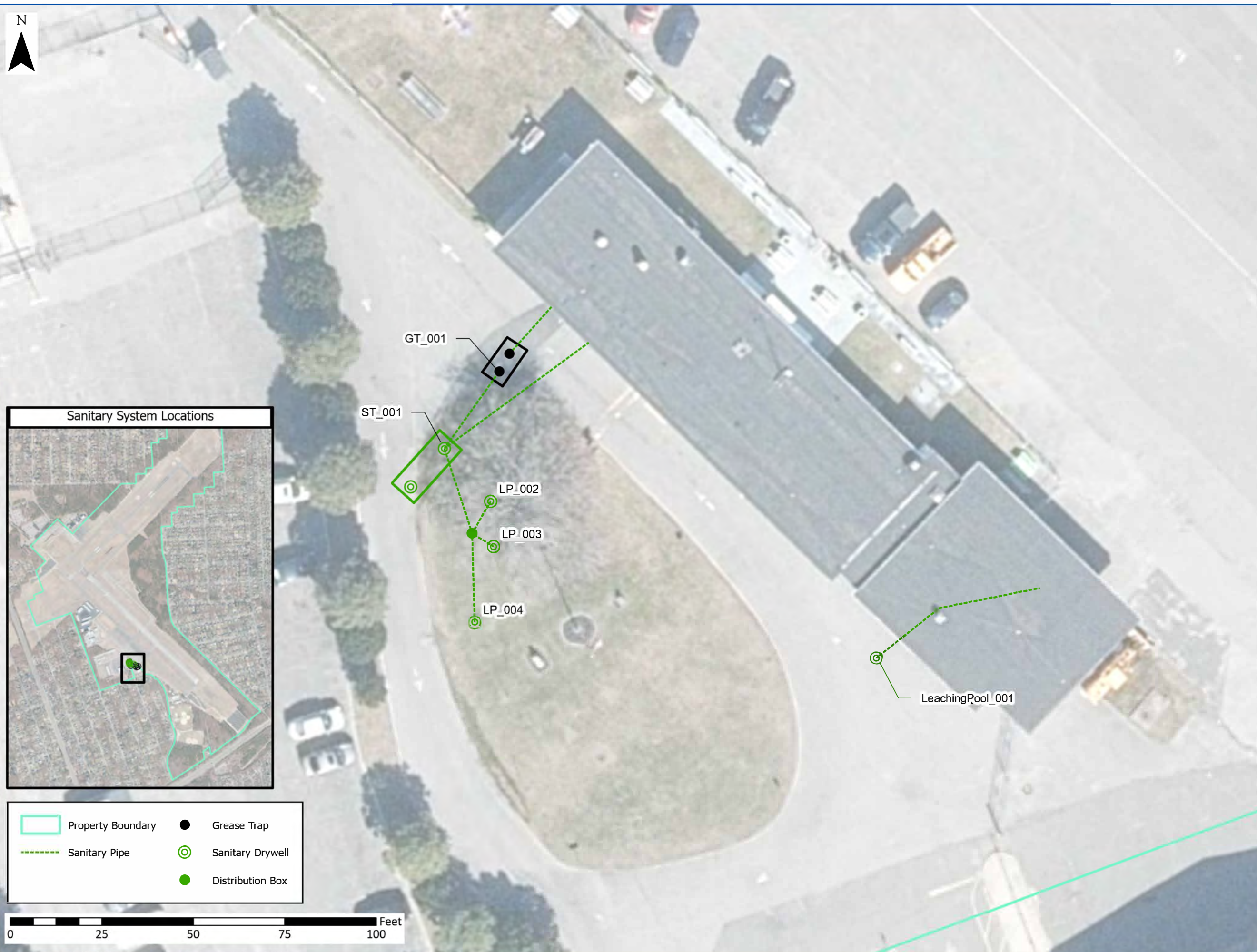
REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:			
Project:	BRK2202	Designed by:	MP
Date:	1/18/2023	Drawn by:	PH
Scale:	AS SHOWN	Approved by:	DE

**SANITARY SYSTEM
LOCATIONS**
135 Dawn Drive
Shirley, New York 11967

FIGURE NO:

2



TABLES



Table 1
Soil/Sediment Sample Analytical Data Summary
Perfluorinated Alkyl Acids
Brookhaven Calabro Airport Site
135 Dawn Drive
Shirley, New York 11967

Client Sample ID:		Proposed NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives ⁽¹⁾	Proposed NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Protection of Groundwater ⁽²⁾	LeachingPool_001 22I0650-01 9/13/2022	GT_001 23A0038-05 1/3/2023	ST_001 23A0038-06 1/3/2023	LP_002 22I0909-08 9/16/2022	LP_003 22I0909-05 9/16/2022	LP_004 22I0909-04 9/16/2022
Laboratory ID:									
Sampling Date:									
PFAS by EPA 537m or 1633 (µg/kg)									
11CL-PF3OUdS	763051-92-9	NS	NS	-	21.8 U	3.64 U	-	-	-
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	39108-34-4	NS	NS	1.65 U	21.8 U	3.64 U	0.534 U	5.05 U	4.32 U
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	757124-72-4	NS	NS	-	21.8 U	3.64 U	-	-	-
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	27619-97-2	NS	NS	1.65 U	21.8 U	3.64 U	0.534 U	5.05 U	4.32 U
3-Perfluoroheptyl propanoic acid (FHpPA)	812-70-4	NS	NS	-	136 U	22.7 U	-	-	-
3-Perfluoropentyl propanoic acid (FPePA)	914637-49-3	NS	NS	-	401	22.7 U	-	-	-
3-Perfluoropropyl propanoic acid (FPrPA)	356-02-2	NS	NS	-	98.6	14.8	-	-	-
9CL-PF3ONS	756426-58-1	NS	NS	-	21.8 U	3.64 U	-	-	-
ADONA	919005-14-4	NS	NS	-	21.8 U	3.64 U	-	-	-
HFPO-DA (Gen-X)	13252-13-6	NS	NS	-	68.9	3.64 U	-	-	-
N-EtFOSA	4151-50-2	NS	NS	-	24.2	3.67	-	-	-
N-EtFOSAA	2991-50-6	NS	NS	8.48	7.87	12.8	32.3	1,020	255
N-EtFOSE	1691-99-2	NS	NS	-	204	9.09 J	-	-	-
N-MeFOSA	31506-32-8	NS	NS	-	5.44 U	13.7 B	-	-	-
N-MeFOSAA	2355-31-9	NS	NS	1.65 U	5.44 J	51.7	24.3	5.05 U	47.8
N-MeFOSE	24448-09-7	NS	NS	-	251	82.5	-	-	-
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	113507-82-7	NS	NS	-	10.9	1.82 U	-	-	-
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	NS	NS	1.65 U	5.44 U	0.909 U	3.97	40.9	17.4
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	NS	NS	1.91	5.44 U	0.909 U	2.12	5.05 U	4.32 U
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	NS	NS	-	6.48	0.909 U	-	-	-
Perfluoro-1-octanesulfonamide (FOSA)	754-91-6	NS	NS	1.65 U	33.8	0.909 U	5.09	7.70	6.26
Perfluoro-1-pentanesulfonate (PFPeS)	2706-91-4	NS	NS	-	10.1	0.909 U	-	-	-
Perfluoro-3,6-dioxaheptanoic acid (NFDHA)	151772-58-6	NS	NS	-	10.9 U	1.82 U	-	-	-
Perfluoro-4-oxapentanoic acid (PFMPA)	377-73-1	NS	NS	-	10.9 U	1.82 U	-	-	-
Perfluoro-5-oxahexanoic acid (PFMBA)	863090-89-5	NS	NS	-	10.9 U	1.82 U	-	-	-
Perfluorobutanesulfonic acid (PFBS)	375-73-5	NS	NS	1.65 U	5.44 U	0.909 U	0.757	5.05 U	4.32 U
Perfluorodecanoic acid (PFDA)	335-76-2	NS	NS	1.65 U	5.44 U	0.909 U	12.5	5.05 U	12.4
Perfluorododecanesulfonic acid (PFDoS)	79780-39-5	NS	NS	-	15.4	0.909 U	-	-	-
Perfluorododecanoic acid (PFDoA)	307-55-1	NS	NS	1.65 U	5.44 U	2.95	5.32	5.05 U	4.32 U
Perfluoroheptanoic acid (PFHpA)	375-85-9	NS	NS	1.70	5.44 U	0.909 U	1.24	5.05 U	4.32 U
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	NS	NS	7.18	20.3	0.909 U	8.12	20.8	25.7
Perfluorohexanoic acid (PFHxA)	307-24-4	NS	NS	1.65 U	57.4	4.84	2.14	5.05 U	4.32 U
Perfluoro-n-butanoic acid (PFBA)	375-22-4	NS	NS	20.3	21.8 J	3.64 U	0.534 U	5.05 U	4.32 U
Perfluorononanoic acid (PFNA)	375-95-1	NS	NS	1.65 U	5.44 U	0.909 U	5.60	5.05 U	12.1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	[0.88]	[1.0]	44.1	12.1	2.90	133	87.6	49.1
Perfluorooctanoic acid (PFOA)	335-67-1	[0.66]	[0.8]	1.65 U	5.44 U	1.58	11.4	5.05 U	25.8
Perfluoropentanoic acid (PFPeA)	2706-90-3	NS	NS	1.65 U	10.9 J	1.82 U	0.534 U	5.05 U	4.32 U
Perfluorotetradecanoic acid (PFTA)	376-06-7	NS	NS	1.65 U	5.44 U	0.909 U	1.74	5.05 U	4.32 U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	NS	NS	1.65 U	5.44 U	0.909 U	6.45	24.9	4.32 U
Perfluoroundecanoic acid (PFUnA)	2058-94-8	NS	NS	1.65 U	5.44 U	0.909 U	4.16	5.05 U	4.88

NOTES:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Objective Table 375-6.8a (Proposed Amendment)
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restricted Use of Soil Cleanup Objective Table 375-6.8b (Proposed Amendment)
[] = Proposed Standard
(-) Compound not analyzed for under 537m method
B - Analyte is found in the associated analysis batch blank.
J - Analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
U - Analyte not detected at or above the level indicated
U - Data Validation Qualifier - The analyte was analyzed for, but due to blank contamination was folgged as nondetect. The result is usable as nondetect.
UJ - Data Validation Qualifier - The data may be biased low.
NS - No Standard

Highlighted text denotes concentrations exceeding the NYSDEC Proposed Protection of Groundwater Soil Cleanup Objective

Table 2
Soil/Sediment Sample Analytical Data Summary
Volatile Organic Compounds
Brookhaven Calabro Airport Site
135 Dawn Drive
Shirley, New York 11967

Client Sample ID:		NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives (1)	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Protection of Groundwater (2)	SCDHS Action Levels (3)	LP_001	DUP_008	GT_001	ST_001	LP_002	LP_003	LP_004
Laboratory ID:					23A0038-01	23A0038-07	23A0038-05	23A0038-06	23A0038-02	23A0038-03	23A0038-04
Sampling Date:					1/3/2023	1/3/2023	1/3/2023	1/3/2023	1/3/2023	1/3/2023	1/3/2023
Volatile Organic Compounds by USEPA method 8260 in mg/kg											
1,1,1,2-Tetrachloroethane	630-20-6	NS	NS	0.60	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,1,1-Trichloroethane	71-55-6	0.68	0.68	1.4	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,1,2,2-Tetrachloroethane	79-34-5	NS	NS	0.80	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	76-13-1	NS	NS	12	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,1,2-Trichloroethane	79-00-5	NS	NS	0.20	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,1-Dichloroethane	75-34-3	0.27	0.27	0.60	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,1-Dichloroethylene	75-35-4	0.33	0.33	0.60	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,1-Dichloropropylene	563-58-6	NS	NS	0.20	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,2,3-Trichlorobenzene	87-61-6	NS	NS	17	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,2,3-Trichloropropane	96-18-4	NS	NS	0.10	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,2,4,5-Tetramethylbenzene	95-93-2	NS	NS	18	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.027	0.010 U
1,2,4-Trichlorobenzene	120-82-1	NS	NS	17	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,2,4-Trimethylbenzene	95-63-6	3.6	3.6	7.2	0.0073 U	0.0058 U	0.067	0.016 U	0.017 U	0.380	0.010 U
1,2-Dibromo-3-chloropropane	96-12-8	NS	NS	0.10	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,2-Dibromoethane	106-93-4	NS	NS	0.60	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,2-Dichlorobenzene	95-50-1	1.1	1.1	2.2	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,2-Dichloroethane	107-06-2	0.02	0.02	0.10	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,2-Dichloropropane	78-87-5	NS	NS	0.10	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,3,5-Trimethylbenzene	108-67-8	8.4	8.4	16.8	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.120	0.010 U
1,3-Dichlorobenzene	541-73-1	2.4	2.4	4.8	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,3-Dichloropropane	142-28-9	NS	NS	0.60	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
1,4-Dichlorobenzene	106-46-7	1.8	1.8	3.6	0.0073 U	0.0058 U	0.690	0.230	0.017 U	5.80	0.017 J
1,4-Dioxane	123-91-1	0.1	0.1	NS	0.150 U	0.120 U	0.230 U	0.330 U	0.017 U	0.350 U	0.200 U
2,2-Dichloropropane	594-20-7	NS	NS	0.60	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
2-Butanone	78-93-3	0.12	0.12	0.40	0.0073 U	0.0058 U	0.270	0.073	0.017 U	0.120	0.390
2-Chloroethylvinyl ether	110-75-8	NS	NS	1.0	0.029 U	0.023 U	0.046 U	0.066 U	0.069 U	0.040	0.040 U
2-Chlorotoluene	95-49-8	NS	NS	5.2	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
2-Hexanone	591-78-6	NS	NS	13	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
2-Nitropropane	79-46-9	NS	NS	0.60	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
4-Chlorotoluene	106-43-4	NS	NS	5.2	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
4-Methyl-2-pentanone	108-10-1	NS	NS	1.4	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Acetone	67-64-1	0.05	0.05	NS	0.036	0.048	2.70 U	0.320	0.068 J	2.80 J	1.00
Acrolein	107-02-8	NS	NS	0.10	0.015 U	0.012 U	0.023 U	0.033 U	0.035 U	0.020 U	0.020 U
Acrylonitrile	107-13-1	NS	NS	0.10	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Allyl chloride	107-05-1	NS	NS	0.40	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Benzene	71-43-2	0.06	0.06	0.12	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Bromobenzene	108-96-1	NS	NS	2.8	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Bromochloromethane	74-97-5	NS	NS	0.40	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Bromodichloromethane	75-27-4	NS	NS	4.6	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Bromoform	75-25-2	NS	NS	13	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Bromomethane	74-83-9	NS	NS	NS	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Carbon disulfide	75-15-0	NS	NS	5.6	0.0073 U	0.0058 U	0.046	0.016 U	0.017 U	0.013 J	0.010 U
Carbon tetrachloride	56-23-5	0.76	0.76	1.6	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Chlorobenzene	108-90-7	1.1	1.1	2.2	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.024	0.010 U
Chlorodifluoromethane (Freon 22)	75-45-6	NS	NS	0.10	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Chloroethane	75-00-3	NS	NS	0.40	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Chloroform	67-66-3	0.37	0.37	0.80	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Chloromethane	74-87-3	NS	NS	0.10	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
cis-1,2-Dichloroethylene	156-59-2	0.25	0.25	0.50	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
cis-1,3-Dichloropropylene	10061-01-5	NS	NS	0.10	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
cis-decahydronaphthalene	493-01-6	NS	NS	200	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.072	0.010 U
Dibromochloromethane	124-48-1	NS	NS	6.2	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Dibromomethane	74-95-3	NS	NS	0.40	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Dichlorodifluoromethane	75-71-8	NS	NS	0.60	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Ethyl Benzene	100-41-4	1	1	2.0	0.0073 U	0.0058 U	0.034	0.016 U	0.017 U	0.0099 U	0.010 U
Ethyl Ether	60-29-7	NS	NS	0.60	0.073 U	0.058 U	0.120 U	0.160 U	0.099 U	0.099 U	0.100 U
Ethyl Methacrylate	97-63-2	NS	NS	4.2	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Ethyl tert-butyl ether (ETBE)	637-92-3	NS	NS	4.0	0.012 U	0.0093 U	0.018 U	0.026 U	0.028 U	0.016 U	0.016 U
Hexachlorobutadiene	87-68-3	NS	NS	54	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Hexachloroethane	67-72-1	NS	NS	22	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Iodomethane	74-88-4	NS	NS	0.20	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Isopropylbenzene	98-82-8	NS	NS	9.4	0.0073 U	0.0058 U	0.084	0.016 U	0.017 U	0.0099 U	0.010 U
Limonene	5989-27-5	NS	NS	200	0.058	0.0058 U	26.0	0.016 U	0.017 U	0.160	0.037
Methyl Isothiocyanate (TIC)	556-61-6	NS	NS	0.60	0.150 U	0.120 U	0.230 U	0.330 U	0.350 U	0.200 U	0.200 U
Methyl Methacrylate	80-62-6	NS	NS	1.4	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Methyl tert-butyl ether (MTBE)	1634-04-4	0.93	0.93	0.20	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Methylene chloride	75-09-2	0.05	0.05	0.10	0.015 U	0.012 U	0.023 U	0.033 U	0.035 U	0.020 U	0.020 U
Naphthalene	91-20-3	12	12	24	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.018 J	0.010 U
n-butyl acetate	123-86-4	NS	NS	20	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
n-Butylbenzene	104-51-8	12	12	12	0.0073 U	0.0058 U	0.087	0.016 U	0.017 U	0.036	0.010 U
n-Decane	124-18-5	NS	NS	200	0.0073 U	0.0058 U	1.70	0.016 U	0.017 U	13.0	0.010 U
n-Hexane	110-54-3	NS	NS	150	0.0073 U	0.0058 U	0.230	0.016 U	0.017 U	0.0099 U	0.010 U
Nitrobenzene	98-95-3	NS	NS	0.10	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
n-Nonane	111-84-2	NS	NS	200	0.0073 U	0.0058 U	0.250	0.016 U	0.017 U	0.210	0.010 U
n-octane	111-65-9	NS	NS	200	0.0073 U	0.0058 U	2.30 J	0.016 U	0.017 U	0.040	0.010 U
n-Propylbenzene	103-65-1	3.9	3.9	8.0	0.0073 U	0.0058 U	0.083	0.016 U	0.017 U	0.044	0.010 U
n-undecane	1120-21-4	NS	NS	200	0.0073 U	0.0058 U	0.310	0.016 U	0.017 U	7.90	0.010 U
o-Xylene	95-47-6	NS	NS	NS	0.0073 U	0.0058 U	0.027	0.016 U	0.017 U	0.0099 U	0.010 U
p- & m- Xylenes	179601-23-1	NS	NS	NS	0.015 U	0.012 U	0.094	0.033 U	0.035 U	0.020 U	0.020 U
p-Diethylbenzene	105-05-5	NS	NS	52	0.0073 U	0.0058 U	0.016 J	0.016 U	0.017 U	0.030	0.010 U
p-Ethyltoluene	622-96-8	NS	NS	9.0	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.140	0.010 U
p-Isopropyltoluene	99-87-6	NS	NS	22	0.0073 U	0.0058 U	1.40 U	0.019 J	0.017 U	0.023	0.010 U
sec-Butylbenzene	135-98-8	11	11	12	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.019 J	0.010 U
Styrene	100-42-5	NS	NS	9.2	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
tert-Amyl methyl ether (TAME)	994-05-8	NS	NS	4.0	0.012 U	0.0093 U	0.018 U	0.026 U	0.028 U	0.016 U	0.016 U
tert-Butylbenzene	98-06-6	5.9	5.9	12	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Tetrachloroethylene	127-18-4	1.3	1.3	2.6	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
Tetrahydrofuran	109-99-9	NS	NS	2.2	0.015 U	0.012 U	0.023 U	0.033 U	0.035 U	0.020 U	0.020 U
Toluene	108-88-3	0.7	0.7	3.0	0.0073 U	0.0058 U	5.30	0.580	0.017 U	0.160	0.012 J
trans-1,2-Dichloroethylene	156-60-5	0.19	0.19	0.40	0.0073 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
trans-1,3-Dichloropropylene	10061-02-6	NS	NS	0.10	0.00730 U	0.0058 U	0.012 U	0.016 U	0.017 U	0.0099 U	0.010 U
trans-decahydronaphthalene											

Table 3
Soil/Sediment Sample Analytical Data Summary
Semi-Volatile Organic Compounds
Brookhaven Calabro Airport Site
135 Dawn Drive
Shirley, New York 11967

Client Sample ID:		NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives (1)	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Protection of Groundwater (2)	SCDHS Action Levels (3)	LP_001 23A0038-01 1/3/2023	DUP_008 23A0038-07 1/3/2023	GT_001 23A0038-05 1/3/2023	ST_001 23A0038-06 1/3/2023	LP_002 23A0038-02 1/3/2023	LP_003 23A0038-03 1/3/2023	LP_004 23A0038-04 1/3/2023
Laboratory ID:											
Sampling Date:											
Semi-Volatile Organic Compounds by USEPA method 8270 in mg/kg											
Acenaphthene	83-32-9	20	98	200	0.106 U	0.150 U	168 U	0.277 U	0.581 U	0.622 U	0.093 U
Anthracene	120-12-7	100	1,000	200	0.106 U	0.150 U	168 U	0.277 U	0.581 U	0.622 U	0.093 U
Benzo(a)anthracene	56-55-3	1.0	1.0	2.0	0.106 U	0.368	168 U	0.575	0.890 J	1.77	0.745
Benzo(a)pyrene	50-32-8	1.0	22	44	0.163 J	0.647	168 U	0.800	0.992 J	1.34	0.582
Benzo(b)fluoranthene	205-99-2	1.0	1.7	3.4	0.178 J	0.716	168 U	0.915	1.37	1.19 J	0.627
Benzo(g,h,i)perylene	191-24-2	100	1,000	200	0.154 J	0.587	168 U	0.358 J	0.695 J	0.622 U	0.093 U
Benzo(k)fluoranthene	207-08-9	0.80	1.7	3.4	0.171 J	0.642	168 U	1.06	1.21	1.22 J	0.637
Chrysene	218-01-9	1.0	1.0	2.0	0.134 J	0.482	168 U	0.707	1.17	1.72	0.858
Dibenzo(a,h)anthracene	53-70-3	0.33	1,000	200	0.106 U	0.174 J	168 U	0.809	0.581 U	0.622 U	0.093 U
Fluoranthene	206-44-0	100	1,000	200	0.175 J	0.575	168 U	1.20	1.43	2.99	1.07
Fluorene	86-73-7	30	386	200	0.106 U	0.150 U	168 U	0.277 U	0.581 U	0.622 U	0.093 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.50	8.2	16	0.127 J	0.446	168 U	0.827	0.584 J	0.622 U	0.093 U
Phenanthrene	85-01-8	100	1,000	200	0.106 U	0.150 U	168 U	0.508 J	0.581 U	1.48	0.226
Pyrene	129-00-0	100	1,000	200	0.153 J	0.489	168 U	1.45	1.04 J	2.40	0.931

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Objective Table 375-6.8a (Proposed Amendment)
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restricted Use of Soil Cleanup Objective Table 375-6.8b (Proposed Amendment)
(3) Action Levels, SCDHS Article 12 - SOP 9-95, July 2010.
J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U - The analyte was analyzed for, but was not detected above the reported sample quantification limit.
J - Data Validation Qualifier - A QC analysis failed outside the primary acceptance limits and the data may be biased high or low or the direction of the bias may be indeterminable.
UJ - Data Validation Qualifier - The data may be biased low.
Highlighted text denotes concentrations exceeding the lower of either NYSDEC Protection of Groundwater Soil Cleanup Objective or SCDHS Action level

Table 4
Soil Sample Analytical Data Summary
Total Metals
Hampton Bays Fire District
69 West Montauk Highway
Hampton Bays, New York 11946

Client Sample ID:		NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives (1)	NYSDEC Part 375 Restricted Use Soil Cleanup Objectives - Protection of Groundwater (2)	SCDHS Action Levels (3)	LP_001 23A0038-01 1/3/2023	DUP_008 23A0038-07 1/3/2023	GT_001 23A0038-05 1/3/2023	ST_001 23A0038-06 1/3/2023	LP_002 23A0038-02 1/3/2023	LP_003 23A0038-03 1/3/2023	LP_004 23A0038-04 1/3/2023
Total Metals by USEPA Method 6010 in mg/kg											
Arsenic	7440-38-2	13	16	30	3.22 U	3.02 U	3.41 U	5.69 U	14.0	3.77 U	3.87
Barium	7440-39-3	350	820	4,000	66	63.2	10.6	41.3	137	170	160
Beryllium	7440-41-7	7.2	47	240	0.107 U	0.101 U	0.114 U	0.190 U	0.221	0.126 U	0.135
Cadmium	7440-43-9	2.5	7.5	40	12.5	5.75	0.681 U	1.88	0.465 U	6.98	6.30
Chromium	7440-47-3	NS	NS	100	15.9	13.9	5.64	18.3	131	19.3	17.3
Copper	7440-50-8	50	1,720	8,500	937	759	176	263	498	2,580	988
Lead	7439-92-1	63	450	2,000	96.0	86.2	11.6	68.6	115	132	80.9
Nickel	7440-02-0	30	130	650	10.7	8.88	3.02	13.3	48.7	20.1	14.1
Selenium	7782-49-2	3.9	4	NS	5.37 U	5.04 U	5.68 U	9.49 U	3.88 U	6.28 U	4.69 U
Silver	7440-22-4	2.0	8.3	50	1.07 U	1.01 U	1.14 U	1.90 U	0.775 U	5.04	1.22
Total Mercury by USEPA Method 7473 in mg/kg											
Mercury	7439-97-6	0.18	0.73	3.7	1.00	1.09	0.082 U	0.202	1.70	1.41	0.962

Notes:
(1) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Unrestricted Use of Soil Cleanup Objective Table 375-6.8a (Proposed Amendment)
(2) NYSDEC 6 NYCRR Environmental Remediation Programs Part 375 Restricted Use of Soil Cleanup Objective Table 375-6.8b (Proposed Amendment)
(3) Action Levels, SCDHS Article 12 - SOP 9-95, July 2010.
NS - No Standard
J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U - The analyte was analyzed for, but was not detected above the reported sample quantification limit.
J - Data Validation Qualifier - A QC analysis failed outside the primary acceptance limits and the data may be biased high or low or the direction of the bias may be indeterminable.
UJ - Data Validation Qualifier - The data may be biased low.

Highlighted text denotes concentrations exceeding the lower of either NYSDEC Protection of Groundwater Soil Cleanup Objective or SCDHS Action level

APPENDIX A

Waste Characterization Laboratory Analytical Reports





Technical Report

prepared for:

P.W. Grosser Consulting

630 Johnson Ave, Suite 7

Bohemia NY, 11716

Attention: Derek Ersbak

Report Date: 09/19/2022

Client Project ID: BRK2201(Brookhaven Calabro Airport)

York Project (SDG) No.: 22I0650

CT Cert. No. PH-0723

New Jersey Cert. No. CT005 and NY037



New York Cert. Nos. 10854 and 12058

PA Cert. No. 68-04440

120 RESEARCH DRIVE
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RICHMOND HILL, NY 11418
ClientServices@yorklab.com

Report Date: 09/19/2022
Client Project ID: BRK2201(Brookhaven Calabro Airport)
York Project (SDG) No.: 22I0650

P.W. Grosser Consulting
630 Johnson Ave, Suite 7
Bohemia NY, 11716
Attention: Derek Ersbak

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on September 13, 2022 and listed below. The project was identified as your project: **BRK2201(Brookhaven Calabro Airport)**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

<u>York Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Collected</u>	<u>Date Received</u>
22I0650-01	LeachingPool_001	Soil	09/12/2022	09/13/2022
22I0650-02	VP012_80-84	Water	09/13/2022	09/13/2022
22I0650-03	VP012_60-64	Water	09/13/2022	09/13/2022
22I0650-04	VP012_40-44	Water	09/13/2022	09/13/2022
22I0650-05	DUP_003	Water	09/13/2022	09/13/2022

General Notes for York Project (SDG) No.: 22I0650

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 09/19/2022

Cassie L. Mosher
Laboratory Manager





Sample Information

Client Sample ID: LeachingPool_001

York Sample ID: 22I0650-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22I0650

BRK2201(Brookhaven Calabro Airport)

Soil

September 12, 2022 2:50 pm

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
375-85-9	* Perfluoroheptanoic acid (PFHpA)	1.70		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	7.18		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	44.1		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	ND	PF-CCV -L, PF-LCS -L	ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
2355-31-9	* N-MeFOSAA	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
2991-50-6	* N-EtFOSAA	8.48		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	1.91		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	20.3		ug/kg dry	1.65	1	EPA 537m Certifications:	09/14/2022 16:19	09/17/2022 03:45	ESJ



Sample Information

Client Sample ID: LeachingPool_001

York Sample ID: 22I0650-01

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

September 12, 2022 2:50 pm

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
Surrogate Recoveries		Result		Acceptance Range						
	Surrogate: M3PFBS	123 %		25-150						
	Surrogate: M5PFHxA	71.3 %		25-150						
	Surrogate: M4PFHpA	62.3 %		25-150						
	Surrogate: M3PFHxS	129 %		25-150						
	Surrogate: Perfluoro-n- [13C8]octanoic acid (M8PFOA)	108 %		25-150						
	Surrogate: M6PFDA	75.0 %		25-150						
	Surrogate: M7PFUdA	33.4 %		25-150						
	Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)	53.4 %		25-150						
	Surrogate: M2PFTeDA	69.1 %		10-150						
	Surrogate: Perfluoro-n- [13C4]butanoic acid (MPFBA)	160 %	PFSu-H	25-150						
	Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)	117 %		25-150						
	Surrogate: Perfluoro-n- [13C5]pentanoic acid (M5PFPeA)	136 %		25-150						
	Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	39.9 %		10-150						
	Surrogate: d3-N-MeFOSAA	44.0 %		25-150						
	Surrogate: d5-N-EtFOSAA	20.5 %	PFSu-L	25-150						
	Surrogate: M2-6:2 FTS	399 %	PFSu-H	25-200						
	Surrogate: M2-8:2 FTS	242 %	PFSu-H	25-200						
	Surrogate: M9PFNA	61.0 %		25-150						

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	13.8		%	0.100	1	SM 2540G	09/15/2022 13:44	09/15/2022 15:01	YR
							Certifications:	CTDOH		

Sample Information

Client Sample ID: VP012_80-84

York Sample ID: 22I0650-02

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 10:48 am

Date Received

09/13/2022



Sample Information

Client Sample ID: VP012_80-84

York Sample ID: 22I0650-02

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 10:48 am

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	3.81		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	11.6		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	3.55		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	7.64		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	2.91		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTTrDA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
2355-31-9	* N-MeFOSAA	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
2991-50-6	* N-EtFOSAA	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	18.8		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	7.97		ng/L	4.46	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	6.70		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:37	WEL

Surrogate Recoveries

Result

Acceptance Range



Sample Information

Client Sample ID: VP012_80-84

York Sample ID: 22I0650-02

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 10:48 am

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: M3PFBS	87.4 %			25-150					
	Surrogate: M5PFHxA	82.5 %			25-150					
	Surrogate: M4PFHpA	86.8 %			25-150					
	Surrogate: M3PFHxS	97.5 %			25-150					
	Surrogate: Perfluoro-n- [13C8]octanoic acid (M8PFOA)	86.4 %			25-150					
	Surrogate: M6PFDA	88.7 %			25-150					
	Surrogate: M7PFUdA	84.4 %			25-150					
	Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)	82.6 %			25-150					
	Surrogate: M2PFTeDA	90.4 %			10-150					
	Surrogate: Perfluoro-n- [13C4]butanoic acid (MPFBA)	82.8 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)	102 %			25-150					
	Surrogate: Perfluoro-n- [13C5]pentanoic acid (M5PFPeA)	74.8 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	8.89 %	PFSu-L		10-150					
	Surrogate: d3-N-MeFOSAA	73.7 %			25-150					
	Surrogate: d5-N-EtFOSAA	65.4 %			25-150					
	Surrogate: M2-6:2 FTS	96.4 %			25-200					
	Surrogate: M2-8:2 FTS	111 %			25-200					
	Surrogate: M9PFNA	82.9 %			25-150					

Sample Information

Client Sample ID: VP012_60-64

York Sample ID: 22I0650-03

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 12:46 pm

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL



Sample Information

Client Sample ID: VP012_60-64

York Sample ID: 22I0650-03

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 12:46 pm

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
2355-31-9	* N-MeFOSAA	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
2991-50-6	* N-EtFOSAA	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	42.8		ng/L	4.53	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ng/L	1.81	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 04:50	WEL
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		79.8 %	25-150							
Surrogate: M5PFHxA		76.1 %	25-150							
Surrogate: M4PFHpA		82.7 %	25-150							
Surrogate: M3PFHxS		90.6 %	25-150							
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)		83.8 %	25-150							
Surrogate: M6PFDA		73.7 %	25-150							



Sample Information

Client Sample ID: VP012_60-64

York Sample ID: 22I0650-03

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 12:46 pm

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: M7PFUdA	71.6 %			25-150					
	Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	77.6 %			25-150					
	Surrogate: M2PFTeDA	86.4 %			10-150					
	Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	80.4 %			25-150					
	Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	89.0 %			25-150					
	Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	71.4 %			25-150					
	Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	7.47 %	PFSu-L		10-150					
	Surrogate: d3-N-MeFOSAA	67.5 %			25-150					
	Surrogate: d5-N-EtFOSAA	64.9 %			25-150					
	Surrogate: M2-6:2 FTS	73.9 %			25-200					
	Surrogate: M2-8:2 FTS	98.9 %			25-200					
	Surrogate: M9PFNA	77.6 %			25-150					

Sample Information

Client Sample ID: VP012_40-44

York Sample ID: 22I0650-04

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 1:48 pm

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL



Sample Information

Client Sample ID: VP012_40-44

York Sample ID: 22I0650-04

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 1:48 pm

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
2355-31-9	* N-MeFOSAA	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
2991-50-6	* N-EtFOSAA	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	24.7		ng/L	4.46	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:03	WEL

Surrogate Recoveries

Result

Acceptance Range

Surrogate: M3PFBS	84.1 %	25-150
Surrogate: M5PFHxA	85.0 %	25-150
Surrogate: M4PFHpA	87.7 %	25-150
Surrogate: M3PFHxS	96.7 %	25-150
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	94.9 %	25-150
Surrogate: M6PFDA	90.3 %	25-150
Surrogate: M7PFUdA	89.4 %	25-150
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	83.7 %	25-150
Surrogate: M2PFTeDA	90.4 %	10-150
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	84.7 %	25-150



Sample Information

Client Sample ID: VP012_40-44

York Sample ID: 22I0650-04

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 1:48 pm

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)	95.0 %			25-150					
	Surrogate: Perfluoro-n- [13C5]pentanoic acid (M5PFPeA)	77.4 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	32.1 %			10-150					
	Surrogate: d3-N-MeFOSAA	79.2 %			25-150					
	Surrogate: d5-N-EtFOSAA	94.5 %			25-150					
	Surrogate: M2-6:2 FTS	87.9 %			25-200					
	Surrogate: M2-8:2 FTS	85.2 %			25-200					
	Surrogate: M9PFNA	87.2 %			25-150					

Sample Information

Client Sample ID: DUP_003

York Sample ID: 22I0650-05

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 1:48 pm

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL



Sample Information

Client Sample ID: DUP_003

York Sample ID: 22I0650-05

York Project (SDG) No.

22I0650

Client Project ID

BRK2201(Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

September 13, 2022 1:48 pm

Date Received

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
72629-94-8	* Perfluorotridecanoic acid (PFTTrDA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
2355-31-9	* N-MeFOSAA	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
2991-50-6	* N-EtFOSAA	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	19.8		ng/L	4.46	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ng/L	1.79	1	EPA 537m Certifications:	09/14/2022 10:59	09/15/2022 05:16	WEL
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		85.5 %	25-150							
Surrogate: M5PFHxA		75.4 %	25-150							
Surrogate: M4PFHpA		81.5 %	25-150							
Surrogate: M3PFHxS		99.0 %	25-150							
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)		88.4 %	25-150							
Surrogate: M6PFDA		80.4 %	25-150							
Surrogate: M7PFUDA		77.3 %	25-150							
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)		81.3 %	25-150							
Surrogate: M2PFTeDA		81.9 %	10-150							
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)		79.4 %	25-150							
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)		89.9 %	25-150							
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)		69.8 %	25-150							
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)		32.5 %	10-150							
Surrogate: d3-N-MeFOSAA		81.8 %	25-150							



Sample Information

Client Sample ID: DUP_003

York Sample ID: 22I0650-05

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22I0650

BRK2201(Brookhaven Calabro Airport)

Water

September 13, 2022 1:48 pm

09/13/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: d5-N-EtFOSAA	89.3 %			25-150					
	Surrogate: M2-6:2 FTS	108 %			25-200					
	Surrogate: M2-8:2 FTS	174 %			25-200					
	Surrogate: M9PFNA	82.4 %			25-150					



Analytical Batch Summary

Batch ID: BI20659 **Preparation Method:** SPE Ext-PFAS-EPA 537.1M **Prepared By:** ER

YORK Sample ID	Client Sample ID	Preparation Date
22I0650-02	VP012_80-84	09/14/22
22I0650-03	VP012_60-64	09/14/22
22I0650-04	VP012_40-44	09/14/22
22I0650-05	DUP_003	09/14/22
BI20659-BLK1	Blank	09/14/22
BI20659-BS1	LCS	09/14/22
BI20659-BSD1	LCS Dup	09/14/22

Batch ID: BI20702 **Preparation Method:** SPE PFAS Extraction-Soil-EPA 537m **Prepared By:** ER

YORK Sample ID	Client Sample ID	Preparation Date
22I0650-01	LeachingPool_001	09/14/22
BI20702-BLK1	Blank	09/14/22
BI20702-BS1	LCS	09/14/22
BI20702-MS1	Matrix Spike	09/14/22
BI20702-MSD1	Matrix Spike Dup	09/14/22

Batch ID: BI20790 **Preparation Method:** % Solids Prep **Prepared By:** YR

YORK Sample ID	Client Sample ID	Preparation Date
22I0650-01	LeachingPool_001	09/15/22
BI20790-DUP1	Duplicate	09/15/22
BI20790-DUP2	Duplicate	09/15/22



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI20659 - SPE Ext-PFAS-EPA 537.1M

Blank (BI20659-BLK1)

Prepared: 09/14/2022 Analyzed: 09/15/2022

Perfluorobutanesulfonic acid (PFBS)	ND	2.00	ng/L								
Perfluorohexanoic acid (PFHxA)	ND	2.00	"								
Perfluoroheptanoic acid (PFHpA)	ND	2.00	"								
Perfluorohexanesulfonic acid (PFHxS)	ND	2.00	"								
Perfluorooctanoic acid (PFOA)	ND	2.00	"								
Perfluorooctanesulfonic acid (PFOS)	ND	2.00	"								
Perfluorononanoic acid (PFNA)	ND	2.00	"								
Perfluorodecanoic acid (PFDA)	ND	2.00	"								
Perfluoroundecanoic acid (PFUnA)	ND	2.00	"								
Perfluorododecanoic acid (PFDoA)	ND	2.00	"								
Perfluorotridecanoic acid (PFTriDA)	ND	2.00	"								
Perfluorotetradecanoic acid (PFTA)	ND	2.00	"								
N-MeFOSAA	ND	2.00	"								
N-EtFOSAA	ND	2.00	"								
Perfluoropentanoic acid (PFPeA)	ND	2.00	"								
Perfluoro-1-octanesulfonamide (FOSA)	ND	2.00	"								
Perfluoro-1-heptanesulfonic acid (PFHpS)	ND	2.00	"								
Perfluoro-1-decanesulfonic acid (PFDS)	ND	2.00	"								
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND	5.00	"								
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND	2.00	"								
Perfluoro-n-butanoic acid (PFBA)	ND	2.00	"								
Surrogate: M3PFBS	63.3		"	74.3		85.2	25-150				
Surrogate: M5PFHxA	70.5		"	80.0		88.1	25-150				
Surrogate: M4PFHpA	75.1		"	80.0		93.9	25-150				
Surrogate: M3PFHxS	72.3		"	75.7		95.6	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	80.8		"	80.0		101	25-150				
Surrogate: M6PFDA	69.1		"	80.0		86.4	25-150				
Surrogate: M7PFUDa	61.3		"	80.0		76.7	25-150				
Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)	59.0		"	80.0		73.7	25-150				
Surrogate: M2PFTeDA	61.5		"	80.0		76.9	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	69.4		"	80.0		86.8	25-150				
Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)	69.8		"	76.6		91.2	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	67.0		"	80.0		83.7	25-150				
Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	31.3		"	80.0		39.2	10-150				
Surrogate: d3-N-MeFOSAA	50.6		"	80.0		63.2	25-150				
Surrogate: d5-N-EtFOSAA	55.9		"	80.0		69.8	25-150				
Surrogate: M2-6:2 FTS	69.5		"	75.9		91.5	25-200				
Surrogate: M2-8:2 FTS	91.2		"	76.6		119	25-200				
Surrogate: M9PFNA	76.9		"	80.0		96.2	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI20659 - SPE Ext-PFAS-EPA 537.1M

LCS (BI20659-BS1)

Prepared: 09/14/2022 Analyzed: 09/15/2022

Perfluorobutanesulfonic acid (PFBS)	73.6	2.00	ng/L	70.8		104	50-130				
Perfluorohexanoic acid (PFHxA)	82.9	2.00	"	80.0		104	50-130				
Perfluoroheptanoic acid (PFHpA)	77.6	2.00	"	80.0		97.1	50-130				
Perfluorohexanesulfonic acid (PFHxS)	65.5	2.00	"	72.8		89.9	50-130				
Perfluorooctanoic acid (PFOA)	83.5	2.00	"	80.0		104	50-130				
Perfluorooctanesulfonic acid (PFOS)	71.9	2.00	"	74.0		97.1	50-130				
Perfluorononanoic acid (PFNA)	80.9	2.00	"	80.0		101	50-130				
Perfluorodecanoic acid (PFDA)	84.2	2.00	"	80.0		105	50-130				
Perfluoroundecanoic acid (PFUnA)	84.8	2.00	"	80.0		106	50-130				
Perfluorododecanoic acid (PFDoA)	79.1	2.00	"	80.0		98.9	50-130				
Perfluorotridecanoic acid (PFTriDA)	70.6	2.00	"	80.0		88.3	50-130				
Perfluorotetradecanoic acid (PFTA)	61.7	2.00	"	80.0		77.1	50-130				
N-MeFOSAA	95.6	2.00	"	80.0		119	50-130				
N-EtFOSAA	81.9	2.00	"	80.0		102	50-130				
Perfluoropentanoic acid (PFPeA)	80.2	2.00	"	80.0		100	50-130				
Perfluoro-1-octanesulfonamide (FOSA)	88.6	2.00	"	80.0		111	50-130				
Perfluoro-1-heptanesulfonic acid (PFHpS)	80.6	2.00	"	76.4		106	50-130				
Perfluoro-1-decanesulfonic acid (PFDS)	76.6	2.00	"	77.2		99.3	50-130				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	83.8	5.00	"	76.0		110	50-175				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	86.5	2.00	"	76.8		113	50-175				
Perfluoro-n-butanoic acid (PFBA)	80.9	2.00	"	80.0		101	50-130				
Surrogate: M3PFBS	68.9		"	74.3		92.7	25-150				
Surrogate: M5PFHxA	80.1		"	80.0		100	25-150				
Surrogate: M4PFHpA	84.2		"	80.0		105	25-150				
Surrogate: M3PFHxS	81.8		"	75.7		108	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	83.5		"	80.0		104	25-150				
Surrogate: M6PFDA	84.9		"	80.0		106	25-150				
Surrogate: M7PFUdA	83.1		"	80.0		104	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	85.5		"	80.0		107	25-150				
Surrogate: M2PFTeDA	90.8		"	80.0		114	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	86.4		"	80.0		108	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	79.8		"	76.6		104	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	73.9		"	80.0		92.4	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	27.8		"	80.0		34.8	10-150				
Surrogate: d3-N-MeFOSAA	69.6		"	80.0		86.9	25-150				
Surrogate: d5-N-EtFOSAA	77.8		"	80.0		97.3	25-150				
Surrogate: M2-6:2 FTS	71.6		"	75.9		94.3	25-200				
Surrogate: M2-8:2 FTS	125		"	76.6		163	25-200				
Surrogate: M9PFNA	85.3		"	80.0		107	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BI20659 - SPE Ext-PFAS-EPA 537.1M											
LCS Dup (BI20659-BSD1)						Prepared: 09/14/2022 Analyzed: 09/15/2022					
Perfluorobutanesulfonic acid (PFBS)	63.2	2.00	ng/L	70.8		89.3	50-130		15.1	30	
Perfluorohexanoic acid (PFHxA)	71.5	2.00	"	80.0		89.3	50-130		14.8	30	
Perfluoroheptanoic acid (PFHpA)	70.6	2.00	"	80.0		88.3	50-130		9.44	30	
Perfluorohexanesulfonic acid (PFHxS)	58.8	2.00	"	72.8		80.8	50-130		10.7	30	
Perfluorooctanoic acid (PFOA)	69.1	2.00	"	80.0		86.4	50-130		18.8	30	
Perfluorooctanesulfonic acid (PFOS)	76.2	2.00	"	74.0		103	50-130		5.90	30	
Perfluorononanoic acid (PFNA)	78.1	2.00	"	80.0		97.6	50-130		3.52	30	
Perfluorodecanoic acid (PFDA)	65.6	2.00	"	80.0		81.9	50-130		24.8	30	
Perfluoroundecanoic acid (PFUnA)	73.3	2.00	"	80.0		91.6	50-130		14.6	30	
Perfluorododecanoic acid (PFDoA)	73.9	2.00	"	80.0		92.4	50-130		6.79	30	
Perfluorotridecanoic acid (PFTriDA)	46.8	2.00	"	80.0		58.4	50-130		40.7	30	Non-dir.
Perfluorotetradecanoic acid (PFTA)	61.8	2.00	"	80.0		77.2	50-130		0.176	30	
N-MeFOSAA	76.8	2.00	"	80.0		96.0	50-130		21.7	30	
N-EtFOSAA	78.7	2.00	"	80.0		98.4	50-130		3.94	30	
Perfluoropentanoic acid (PFPeA)	72.0	2.00	"	80.0		90.0	50-130		10.7	30	
Perfluoro-1-octanesulfonamide (FOSA)	77.9	2.00	"	80.0		97.3	50-130		12.9	30	
Perfluoro-1-heptanesulfonic acid (PFHpS)	73.1	2.00	"	76.4		95.6	50-130		9.85	30	
Perfluoro-1-decanesulfonic acid (PFDS)	69.6	2.00	"	77.2		90.2	50-130		9.58	30	
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	67.5	5.00	"	76.0		88.8	50-175		21.6	30	
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	59.2	2.00	"	76.8		77.1	50-175		37.5	30	Non-dir.
Perfluoro-n-butanoic acid (PFBA)	73.1	2.00	"	80.0		91.4	50-130		10.0	30	
Surrogate: M3PFBS	71.4		"	74.3		96.0	25-150				
Surrogate: M5PFHxA	82.5		"	80.0		103	25-150				
Surrogate: M4PFHpA	85.0		"	80.0		106	25-150				
Surrogate: M3PFHxS	82.6		"	75.7		109	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	90.4		"	80.0		113	25-150				
Surrogate: M6PFDA	95.8		"	80.0		120	25-150				
Surrogate: M7PFUdA	87.3		"	80.0		109	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	82.9		"	80.0		104	25-150				
Surrogate: M2PFTeDA	80.5		"	80.0		101	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	83.2		"	80.0		104	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	77.8		"	76.6		102	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	78.6		"	80.0		98.3	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	50.0		"	80.0		62.5	10-150				
Surrogate: d3-N-MeFOSAA	79.7		"	80.0		99.7	25-150				
Surrogate: d5-N-EtFOSAA	71.6		"	80.0		89.5	25-150				
Surrogate: M2-6:2 FTS	79.4		"	75.9		105	25-200				
Surrogate: M2-8:2 FTS	123		"	76.6		160	25-200				
Surrogate: M9PFNA	81.9		"	80.0		102	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI20702 - SPE PFAS Extraction-Soil-EPA 537m

Blank (BI20702-BLK1)

Prepared: 09/14/2022 Analyzed: 09/17/2022

Perfluorobutanesulfonic acid (PFBS)	ND	0.247	ug/kg wet								
Perfluorohexanoic acid (PFHxA)	ND	0.247	"								
Perfluoroheptanoic acid (PFHpA)	ND	0.247	"								
Perfluorohexanesulfonic acid (PFHxS)	ND	0.247	"								
Perfluorooctanoic acid (PFOA)	ND	0.247	"								
Perfluorooctanesulfonic acid (PFOS)	ND	0.247	"								
Perfluorononanoic acid (PFNA)	ND	0.247	"								
Perfluorodecanoic acid (PFDA)	ND	0.247	"								
Perfluoroundecanoic acid (PFUnA)	ND	0.247	"								
Perfluorododecanoic acid (PFDoA)	ND	0.247	"								
Perfluorotridecanoic acid (PFTDA)	ND	0.247	"								
Perfluorotetradecanoic acid (PFTA)	ND	0.247	"								
N-MeFOSAA	ND	0.247	"								
N-EtFOSAA	ND	0.247	"								
Perfluoropentanoic acid (PFPeA)	ND	0.247	"								
Perfluoro-1-octanesulfonamide (FOSA)	ND	0.247	"								
Perfluoro-1-heptanesulfonic acid (PFHpS)	ND	0.247	"								
Perfluoro-1-decanesulfonic acid (PFDS)	ND	0.247	"								
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND	0.247	"								
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND	0.247	"								
Perfluoro-n-butanoic acid (PFBA)	ND	0.247	"								
Surrogate: M3PFBS	3.77		"	4.58		82.4	25-150				
Surrogate: M5PFHxA	4.11		"	4.93		83.4	25-150				
Surrogate: M4PFHpA	4.60		"	4.93		93.2	25-150				
Surrogate: M3PFHxS	4.30		"	4.67		92.2	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	5.32		"	4.93		108	25-150				
Surrogate: M6PFDA	4.20		"	4.93		85.2	25-150				
Surrogate: M7PFUdA	3.41		"	4.93		69.1	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	3.62		"	4.93		73.3	25-150				
Surrogate: M2PFTeDA	3.38		"	4.93		68.6	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	4.58		"	4.93		92.8	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	3.91		"	4.72		82.8	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	3.84		"	4.93		77.8	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	3.54		"	4.93		71.9	10-150				
Surrogate: d3-N-MeFOSAA	3.37		"	4.93		68.4	25-150				
Surrogate: d5-N-EtFOSAA	3.31		"	4.93		67.1	25-150				
Surrogate: M2-6:2 FTS	3.59		"	4.68		76.7	25-200				
Surrogate: M2-8:2 FTS	2.96		"	4.72		62.7	25-200				
Surrogate: M9PFNA	4.12		"	4.93		83.6	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI20702 - SPE PFAS Extraction-Soil-EPA 537m

LCS (BI20702-BS1)

Prepared: 09/14/2022 Analyzed: 09/17/2022

Perfluorobutanesulfonic acid (PFBS)	3.84	0.230	ug/kg wet	4.07		94.3	50-130				
Perfluorohexanoic acid (PFHxA)	4.23	0.230	"	4.60		91.9	50-130				
Perfluoroheptanoic acid (PFHpA)	4.94	0.230	"	4.60		107	50-130				
Perfluorohexanesulfonic acid (PFHxS)	2.72	0.230	"	4.19		65.1	50-130				
Perfluorooctanoic acid (PFOA)	3.45	0.230	"	4.60		75.1	50-130				
Perfluorooctanesulfonic acid (PFOS)	4.54	0.230	"	4.25		107	50-130				
Perfluorononanoic acid (PFNA)	4.86	0.230	"	4.60		106	50-130				
Perfluorodecanoic acid (PFDA)	4.16	0.230	"	4.60		90.4	50-130				
Perfluoroundecanoic acid (PFUnA)	4.07	0.230	"	4.60		88.6	50-130				
Perfluorododecanoic acid (PFDoA)	4.65	0.230	"	4.60		101	50-130				
Perfluorotridecanoic acid (PFTriDA)	1.79	0.230	"	4.60		38.9	50-130	Low Bias			
Perfluorotetradecanoic acid (PFTA)	4.33	0.230	"	4.60		94.2	50-130				
N-MeFOSAA	4.93	0.230	"	4.60		107	50-130				
N-EtFOSAA	4.77	0.230	"	4.60		104	50-130				
Perfluoropentanoic acid (PFPeA)	4.26	0.230	"	4.60		92.7	50-130				
Perfluoro-1-octanesulfonamide (FOSA)	4.74	0.230	"	4.60		103	50-130				
Perfluoro-1-heptanesulfonic acid (PFHpS)	5.48	0.230	"	4.39		125	50-130				
Perfluoro-1-decanesulfonic acid (PFDS)	4.03	0.230	"	4.44		90.9	50-130				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	3.17	0.230	"	4.37		72.5	50-200				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	4.16	0.230	"	4.42		94.1	50-200				
Perfluoro-n-butanoic acid (PFBA)	4.44	0.230	"	4.60		96.6	50-130				
Surrogate: M3PFBS	3.28		"	4.27		76.8	25-150				
Surrogate: M5PFHxA	4.02		"	4.60		87.5	25-150				
Surrogate: M4PFHpA	3.70		"	4.60		80.4	25-150				
Surrogate: M3PFHxS	4.25		"	4.35		97.6	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	5.20		"	4.60		113	25-150				
Surrogate: M6PFDA	3.81		"	4.60		82.8	25-150				
Surrogate: M7PFUdA	3.66		"	4.60		79.5	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	3.24		"	4.60		70.5	25-150				
Surrogate: M2PFTeDA	3.27		"	4.60		71.2	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	4.22		"	4.60		91.7	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	3.10		"	4.40		70.5	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	3.79		"	4.60		82.3	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	3.40		"	4.60		74.0	10-150				
Surrogate: d3-N-MeFOSAA	3.23		"	4.60		70.2	25-150				
Surrogate: d5-N-EtFOSAA	2.93		"	4.60		63.7	25-150				
Surrogate: M2-6:2 FTS	3.95		"	4.36		90.6	25-200				
Surrogate: M2-8:2 FTS	3.58		"	4.41		81.2	25-200				
Surrogate: M9PFNA	3.55		"	4.60		77.2	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI20702 - SPE PFAS Extraction-Soil-EPA 537m

Matrix Spike (BI20702-MS1)	*Source sample: 22I0647-02 (Matrix Spike)						Prepared: 09/14/2022 Analyzed: 09/17/2022				
Perfluorobutanesulfonic acid (PFBS)	4.93	0.278	ug/kg dry	4.91	ND	100	25-150				
Perfluorohexanoic acid (PFHxA)	5.40	0.278	"	5.55	ND	97.3	25-150				
Perfluoroheptanoic acid (PFHpA)	5.48	0.278	"	5.55	ND	98.7	25-150				
Perfluorohexanesulfonic acid (PFHxS)	4.82	0.278	"	5.05	ND	95.5	25-150				
Perfluorooctanoic acid (PFOA)	3.86	0.278	"	5.55	ND	69.5	25-150				
Perfluorooctanesulfonic acid (PFOS)	4.77	0.278	"	5.14	ND	92.8	25-150				
Perfluorononanoic acid (PFNA)	5.19	0.278	"	5.55	ND	93.4	25-150				
Perfluorodecanoic acid (PFDA)	4.62	0.278	"	5.55	ND	83.2	25-150				
Perfluoroundecanoic acid (PFUnA)	5.39	0.278	"	5.55	ND	97.0	25-150				
Perfluorododecanoic acid (PFDoA)	5.36	0.278	"	5.55	ND	96.5	25-150				
Perfluorotridecanoic acid (PFTDA)	2.86	0.278	"	5.55	ND	51.5	25-150				
Perfluorotetradecanoic acid (PFTA)	5.02	0.278	"	5.55	ND	90.5	25-150				
N-MeFOSAA	6.30	0.278	"	5.55	ND	114	25-150				
N-EtFOSAA	5.04	0.278	"	5.55	ND	90.8	25-150				
Perfluoropentanoic acid (PFPeA)	5.21	0.278	"	5.55	ND	93.8	25-150				
Perfluoro-1-octanesulfonamide (FOSA)	5.88	0.278	"	5.55	ND	106	25-150				
Perfluoro-1-heptanesulfonic acid (PFHpS)	5.53	0.278	"	5.30	ND	104	25-150				
Perfluoro-1-decanesulfonic acid (PFDS)	4.10	0.278	"	5.36	ND	76.5	25-150				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	4.24	0.278	"	5.27	ND	80.4	25-200				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	3.94	0.278	"	5.33	ND	73.9	25-200				
Perfluoro-n-butanoic acid (PFBA)	5.29	0.278	"	5.55	ND	95.4	25-150				
Surrogate: M3PFBS	3.70		"	5.16		71.7	25-150				
Surrogate: M5PFHxA	4.81		"	5.55		86.7	25-150				
Surrogate: M4PFHpA	4.83		"	5.55		86.9	25-150				
Surrogate: M3PFHxS	4.23		"	5.25		80.6	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	6.92		"	5.55		125	25-150				
Surrogate: M6PFDA	4.23		"	5.55		76.2	25-150				
Surrogate: M7PFUdA	3.28		"	5.55		59.0	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	3.25		"	5.55		58.6	25-150				
Surrogate: M2PFTeDA	3.62		"	5.55		65.3	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	4.76		"	5.55		85.8	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	3.66		"	5.31		68.8	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	4.71		"	5.55		84.8	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	3.18		"	5.55		57.2	10-150				
Surrogate: d3-N-MeFOSAA	3.18		"	5.55		57.3	25-150				
Surrogate: d5-N-EtFOSAA	3.68		"	5.55		66.3	25-150				
Surrogate: M2-6:2 FTS	4.57		"	5.27		86.7	25-200				
Surrogate: M2-8:2 FTS	4.42		"	5.32		83.1	25-200				
Surrogate: M9PFNA	4.40		"	5.55		79.3	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI20702 - SPE PFAS Extraction-Soil-EPA 537m

Matrix Spike Dup (BI20702-MSD1)	*Source sample: 22I0647-02 (Matrix Spike Dup)					Prepared: 09/14/2022 Analyzed: 09/17/2022					
Perfluorobutanesulfonic acid (PFBS)	4.87	0.285	ug/kg dry	5.04	ND	96.8	25-150		1.04	35	
Perfluorohexanoic acid (PFHxA)	5.72	0.285	"	5.69	ND	100	25-150		5.70	35	
Perfluoroheptanoic acid (PFHpA)	5.09	0.285	"	5.69	ND	89.5	25-150		7.31	35	
Perfluorohexanesulfonic acid (PFHxS)	3.58	0.285	"	5.18	ND	69.1	25-150		29.6	35	
Perfluorooctanoic acid (PFOA)	4.00	0.285	"	5.69	ND	70.3	25-150		3.60	35	
Perfluorooctanesulfonic acid (PFOS)	5.55	0.285	"	5.26	ND	105	25-150		15.2	35	
Perfluorononanoic acid (PFNA)	5.98	0.285	"	5.69	ND	105	25-150		14.2	35	
Perfluorodecanoic acid (PFDA)	5.26	0.285	"	5.69	ND	92.5	25-150		13.0	35	
Perfluoroundecanoic acid (PFUnA)	6.08	0.285	"	5.69	ND	107	25-150		12.1	35	
Perfluorododecanoic acid (PFDoA)	6.10	0.285	"	5.69	ND	107	25-150		12.9	35	
Perfluorotridecanoic acid (PFTriDA)	2.57	0.285	"	5.69	ND	45.2	25-150		10.6	35	
Perfluorotetradecanoic acid (PFTA)	5.30	0.285	"	5.69	ND	93.1	25-150		5.33	35	
N-MeFOSAA	5.75	0.285	"	5.69	ND	101	25-150		9.10	35	
N-EtFOSAA	6.39	0.285	"	5.69	ND	112	25-150		23.6	35	
Perfluoropentanoic acid (PFPeA)	5.50	0.285	"	5.69	ND	96.6	25-150		5.41	35	
Perfluoro-1-octanesulfonamide (FOSA)	5.82	0.285	"	5.69	ND	102	25-150		0.943	35	
Perfluoro-1-heptanesulfonic acid (PFHpS)	5.72	0.285	"	5.44	ND	105	25-150		3.40	35	
Perfluoro-1-decanesulfonic acid (PFDS)	4.55	0.285	"	5.49	ND	82.8	25-150		10.4	35	
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	6.30	0.285	"	5.41	ND	117	25-200		39.1	35	Non-dir.
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	5.53	0.285	"	5.46	ND	101	25-200		33.6	35	
Perfluoro-n-butanoic acid (PFBA)	5.44	0.285	"	5.69	ND	95.5	25-150		2.64	35	
Surrogate: M3PFBS	3.61		"	5.29		68.3	25-150				
Surrogate: M5PFHxA	4.24		"	5.69		74.5	25-150				
Surrogate: M4PFHpA	4.98		"	5.69		87.5	25-150				
Surrogate: M3PFHxS	4.71		"	5.38		87.5	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	6.26		"	5.69		110	25-150				
Surrogate: M6PFDA	3.82		"	5.69		67.2	25-150				
Surrogate: M7PFUdA	2.86		"	5.69		50.2	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	3.07		"	5.69		54.0	25-150				
Surrogate: M2PFTeDA	3.51		"	5.69		61.7	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	4.69		"	5.69		82.3	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	2.91		"	5.45		53.4	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	4.44		"	5.69		78.0	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	3.24		"	5.69		57.0	10-150				
Surrogate: d3-N-MeFOSAA	3.31		"	5.69		58.2	25-150				
Surrogate: d5-N-EtFOSAA	3.01		"	5.69		53.0	25-150				
Surrogate: M2-6:2 FTS	3.87		"	5.40		71.7	25-200				
Surrogate: M2-8:2 FTS	3.24		"	5.45		59.4	25-200				
Surrogate: M9PFNA	3.93		"	5.69		69.0	25-150				



Miscellaneous Physical Parameters - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC Limits	Flag	RPD Limit	Flag

Batch BI20790 - % Solids Prep

Duplicate (BI20790-DUP1)		*Source sample: 22I0491-03 (Duplicate)					Prepared & Analyzed: 09/15/2022				
% Solids	82.3	0.100	%		82.5			0.253		20	
Duplicate (BI20790-DUP2)		*Source sample: 22I0580-02 (Duplicate)					Prepared & Analyzed: 09/15/2022				
% Solids	93.2	0.100	%		92.0			1.35		20	





Sample and Data Qualifiers Relating to This Work Order

QR-02	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
PFSu-L	The isotopically labeled surrogate recovered below lab control limits due to a matrix effect. Isotope Dilution was applied.
PFSu-H	The isotopically labeled surrogate recovered above lab control limits due to a matrix effect. Isotope Dilution was applied.
PF-QMR	The RPD for the Matrix Spike was outside of control limits due to a non-homogeneous matrix
PF-LCS-L	The LCS recovery was slightly below acceptable limits for the qualified compound. However, sample results are not biased low because results are corrected for isotope recovery.
PF-CCV-L	The CCV recovery was slightly below acceptable limits for the qualified compound. However, sample results are not biased low because results are corrected for isotope recovery.
PF-CCV-H	The CCV recovery was slightly above acceptable limits for the qualified compound. However, sample results are not biased high because results are corrected for isotope recovery.

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.



If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.



Technical Report

prepared for:

P.W. Grosser Consulting

630 Johnson Ave, Suite 7

Bohemia NY, 11716

Attention: Derek Ersbak

Report Date: 09/26/2022

Client Project ID: BRK2201 Calabro Airport

York Project (SDG) No.: 22I0909

CT Cert. No. PH-0723

New Jersey Cert. No. CT005 and NY037



New York Cert. Nos. 10854 and 12058

PA Cert. No. 68-04440

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Report Date: 09/26/2022
Client Project ID: BRK2201 Calabro Airport
York Project (SDG) No.: 22I0909

P.W. Grosser Consulting
630 Johnson Ave, Suite 7
Bohemia NY, 11716
Attention: Derek Ersbak

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on September 16, 2022 and listed below. The project was identified as your project: **BRK2201 Calabro Airport**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

<u>York Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Collected</u>	<u>Date Received</u>
22I0909-01	SD_001	Soil	09/16/2022	09/16/2022
22I0909-02	SD_003	Soil	09/16/2022	09/16/2022
22I0909-03	SD_002	Soil	09/16/2022	09/16/2022
22I0909-04	LP_004	Soil	09/16/2022	09/16/2022
22I0909-05	LP_003	Soil	09/16/2022	09/16/2022
22I0909-06	FB_2022.09.16	Water	09/16/2022	09/16/2022
22I0909-07	EB_2022.09.16	Water	09/16/2022	09/16/2022
22I0909-08	LP_002	Soil	09/16/2022	09/16/2022

General Notes for York Project (SDG) No.: 22I0909

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 09/26/2022

Cassie L. Mosher
Laboratory Manager





Sample Information

Client Sample ID: SD_001

York Sample ID: 22I0909-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

22I0909

BRK2201 Calabro Airport

Soil

September 16, 2022 7:40 am

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTriDA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
2355-31-9	* N-MeFOSAA	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
2991-50-6	* N-EtFOSAA	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ug/kg dry	0.287	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 19:47	WEL
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		96.5 %	25-150							



Sample Information

Client Sample ID: SD_001

York Sample ID: 22I0909-01

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 7:40 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: M5PFHxA	92.5 %			25-150					
	Surrogate: M4PFHpA	84.4 %			25-150					
	Surrogate: M3PFHxS	115 %			25-150					
	Surrogate: Perfluoro-n- [13C8]octanoic acid (M8PFOA)	114 %			25-150					
	Surrogate: M6PFDA	71.6 %			25-150					
	Surrogate: M7PFUdA	85.6 %			25-150					
	Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)	84.7 %			25-150					
	Surrogate: M2PFTeDA	87.0 %			10-150					
	Surrogate: Perfluoro-n- [13C4]butanoic acid (MPFBA)	104 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)	92.9 %			25-150					
	Surrogate: Perfluoro-n- [13C5]pentanoic acid (M5PFPeA)	102 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	63.1 %			10-150					
	Surrogate: d3-N-MeFOSAA	92.7 %			25-150					
	Surrogate: d5-N-EtFOSAA	99.8 %			25-150					
	Surrogate: M2-6:2 FTS	251 %	PFSu-H		25-200					
	Surrogate: M2-8:2 FTS	204 %	PFSu-H		25-200					
	Surrogate: M9PFNA	82.1 %			25-150					

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	86.5		%	0.100	1	SM 2540G Certifications: CTDOH	09/21/2022 11:23	09/21/2022 13:34	YR

Sample Information

Client Sample ID: SD_003

York Sample ID: 22I0909-02

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 8:02 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:



Sample Information

Client Sample ID: SD_003

York Sample ID: 22I0909-02

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 8:02 am

Date Received

09/16/2022

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	0.383		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTTrDA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
2355-31-9	* N-MeFOSAA	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
2991-50-6	* N-EtFOSAA	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ug/kg dry	0.248	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:00	WEL
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		95.5 %	25-150							
Surrogate: M5PFHxA		87.9 %	25-150							
Surrogate: M4PFHpA		84.4 %	25-150							



Sample Information

Client Sample ID: SD_003

York Sample ID: 22I0909-02

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 8:02 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: M3PFHxS	123 %			25-150					
	Surrogate: Perfluoro-n- [13C8]octanoic acid (M8PFOA)	108 %			25-150					
	Surrogate: M6PFDA	81.1 %			25-150					
	Surrogate: M7PFUdA	87.8 %			25-150					
	Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)	76.6 %			25-150					
	Surrogate: M2PFTeDA	81.2 %			10-150					
	Surrogate: Perfluoro-n- [13C4]butanoic acid (MPFBA)	90.7 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)	89.2 %			25-150					
	Surrogate: Perfluoro-n- [13C5]pentanoic acid (M5PFPeA)	93.8 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	68.5 %			10-150					
	Surrogate: d3-N-MeFOSAA	79.1 %			25-150					
	Surrogate: d5-N-EtFOSAA	97.4 %			25-150					
	Surrogate: M2-6:2 FTS	273 %	PFSu-H		25-200					
	Surrogate: M2-8:2 FTS	195 %			25-200					
	Surrogate: M9PFNA	95.0 %			25-150					

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	94.6		%	0.100	1	SM 2540G	09/21/2022 11:23	09/21/2022 13:34	YR
							Certifications:	CTDOH		

Sample Information

Client Sample ID: SD_002

York Sample ID: 22I0909-03

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 8:24 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst



Sample Information

Client Sample ID: SD_002

York Sample ID: 22I0909-03

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 8:24 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	0.257		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	0.476		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
2355-31-9	* N-MeFOSAA	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
2991-50-6	* N-EtFOSAA	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ug/kg dry	0.252	1	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:13	WEL
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		97.5 %	25-150							



Sample Information

Client Sample ID: SD_002

York Sample ID: 22I0909-03

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 8:24 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: M5PFHxA	93.4 %			25-150					
	Surrogate: M4PFHpA	77.2 %			25-150					
	Surrogate: M3PFHxS	105 %			25-150					
	Surrogate: Perfluoro-n- [13C8]octanoic acid (M8PFOA)	106 %			25-150					
	Surrogate: M6PFDA	83.2 %			25-150					
	Surrogate: M7PFUdA	78.1 %			25-150					
	Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)	70.7 %			25-150					
	Surrogate: M2PFTeDA	77.8 %			10-150					
	Surrogate: Perfluoro-n- [13C4]butanoic acid (MPFBA)	106 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)	93.3 %			25-150					
	Surrogate: Perfluoro-n- [13C5]pentanoic acid (M5PFPeA)	92.3 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	77.5 %			10-150					
	Surrogate: d3-N-MeFOSAA	101 %			25-150					
	Surrogate: d5-N-EtFOSAA	103 %			25-150					
	Surrogate: M2-6:2 FTS	226 %	PFSu-H		25-200					
	Surrogate: M2-8:2 FTS	204 %	PFSu-H		25-200					
	Surrogate: M9PFNA	82.5 %			25-150					

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	94.4		%	0.100	1	SM 2540G Certifications: CTDOH	09/21/2022 11:23	09/21/2022 13:34	YR

Sample Information

Client Sample ID: LP_004

York Sample ID: 22I0909-04

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 10:20 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:



Sample Information

Client Sample ID: LP_004

York Sample ID: 22I0909-04

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 10:20 am

Date Received

09/16/2022

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	25.7		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	25.8		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	49.1		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	12.1		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	12.4		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	4.88		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
2355-31-9	* N-MeFOSAA	47.8		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
2991-50-6	* N-EtFOSAA	255		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	6.26		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	17.4		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ug/kg dry	4.32	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 20:39	WEL
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		91.2 %	25-150							
Surrogate: M5PFHxA		91.4 %	25-150							



Sample Information

Client Sample ID: LP_004

York Sample ID: 22I0909-04

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 10:20 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: M4PFHpA	80.8 %			25-150					
	Surrogate: M3PFHxS	76.4 %			25-150					
	Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	85.3 %			25-150					
	Surrogate: M6PFDA	29.7 %			25-150					
	Surrogate: M7PFUdA	67.6 %			25-150					
	Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	41.6 %			25-150					
	Surrogate: M2PFTeDA	61.3 %			10-150					
	Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	115 %			25-150					
	Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	109 %			25-150					
	Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	115 %			25-150					
	Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	46.1 %			10-150					
	Surrogate: d3-N-MeFOSAA	71.0 %			25-150					
	Surrogate: d5-N-EtFOSAA	61.6 %			25-150					
	Surrogate: M2-6:2 FTS	264 %	PFSu-H		25-200					
	Surrogate: M2-8:2 FTS	58.8 %			25-200					
	Surrogate: M9PFNA	77.0 %			25-150					

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	28.8		%	0.100	1	SM 2540G Certifications: CTDOH	09/21/2022 11:23	09/21/2022 13:34	YR

Sample Information

Client Sample ID: LP_003

York Sample ID: 22I0909-05

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 10:45 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:



Sample Information

Client Sample ID: LP_003

York Sample ID: 2210909-05

York Project (SDG) No.

2210909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 10:45 am

Date Received

09/16/2022

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	20.8		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	87.6		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	24.9		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
2355-31-9	* N-MeFOSAA	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
2991-50-6	* N-EtFOSAA	1020		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	7.70		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	40.9		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ug/kg dry	5.05	5	EPA 537m Certifications:	09/20/2022 15:53	09/22/2022 21:31	WEL
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		115 %	25-150							
Surrogate: M5PFHxA		94.7 %	25-150							



Sample Information

Client Sample ID: LP_003

York Sample ID: 22I0909-05

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 10:45 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: M4PFHpA	98.8 %			25-150					
	Surrogate: M3PFHxS	143 %			25-150					
	Surrogate: Perfluoro-n- [13C8]octanoic acid (M8PFOA)	108 %			25-150					
	Surrogate: M6PFDA	41.9 %			25-150					
	Surrogate: M7PFUdA	21.3 %	PFSu-L		25-150					
	Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)	4.22 %	PFSu-L		25-150					
	Surrogate: M2PFTeDA	54.8 %			10-150					
	Surrogate: Perfluoro-n- [13C4]butanoic acid (MPFBA)	128 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)	103 %			25-150					
	Surrogate: Perfluoro-n- [13C5]pentanoic acid (M5PFPeA)	126 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	3.87 %	PFSu-L		10-150					
	Surrogate: d3-N-MeFOSAA	54.4 %			25-150					
	Surrogate: d5-N-EtFOSAA	7.85 %	PFSu-L		25-150					
	Surrogate: M2-6:2 FTS	307 %	PFSu-H		25-200					
	Surrogate: M2-8:2 FTS	172 %			25-200					
	Surrogate: M9PFNA	71.3 %			25-150					

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	24.1		%	0.100	1	SM 2540G Certifications: CTDOH	09/21/2022 11:23	09/21/2022 13:34	YR

Sample Information

Client Sample ID: FB_2022.09.16

York Sample ID: 22I0909-06

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Water

Collection Date/Time

September 16, 2022 11:20 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:



Sample Information

Client Sample ID: FB_2022.09.16

York Sample ID: 22I0909-06

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Water

Collection Date/Time

September 16, 2022 11:20 am

Date Received

09/16/2022

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTriDA)	2.61		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
2355-31-9	* N-MeFOSAA	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
2991-50-6	* N-EtFOSAA	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ng/L	4.63	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:24	WEL
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		74.6 %	25-150							
Surrogate: M5PFHxA		73.7 %	25-150							
Surrogate: M4PFHpA		72.5 %	25-150							



Sample Information

Client Sample ID: FB_2022.09.16

York Sample ID: 22I0909-06

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Water

Collection Date/Time

September 16, 2022 11:20 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: M3PFHxS	93.7 %			25-150					
	Surrogate: Perfluoro-n- [13C8]octanoic acid (M8PFOA)	86.0 %			25-150					
	Surrogate: M6PFDA	67.0 %			25-150					
	Surrogate: M7PFUdA	72.6 %			25-150					
	Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)	60.1 %			25-150					
	Surrogate: M2PFTeDA	51.9 %			10-150					
	Surrogate: Perfluoro-n- [13C4]butanoic acid (MPFBA)	71.7 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)	73.7 %			25-150					
	Surrogate: Perfluoro-n- [13C5]pentanoic acid (M5PFPeA)	66.7 %			25-150					
	Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	41.5 %			10-150					
	Surrogate: d3-N-MeFOSAA	57.3 %			25-150					
	Surrogate: d5-N-EtFOSAA	67.3 %			25-150					
	Surrogate: M2-6:2 FTS	82.9 %			25-200					
	Surrogate: M2-8:2 FTS	90.2 %			25-200					
	Surrogate: M9PFNA	80.1 %			25-150					

Sample Information

Client Sample ID: EB_2022.09.16

York Sample ID: 22I0909-07

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Water

Collection Date/Time

September 16, 2022 11:22 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL



Sample Information

Client Sample ID: EB_2022.09.16

York Sample ID: 22I0909-07

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Water

Collection Date/Time

September 16, 2022 11:22 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTTrDA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTTA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
2355-31-9	* N-MeFOSAA	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
2991-50-6	* N-EtFOSAA	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ng/L	4.63	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ng/L	1.85	1	EPA 537m Certifications:	09/19/2022 13:09	09/21/2022 17:37	WEL
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		76.7 %	25-150							
Surrogate: M5PFHxA		84.0 %	25-150							
Surrogate: M4PFHpA		83.4 %	25-150							
Surrogate: M3PFHxS		98.1 %	25-150							
Surrogate: Perfluoro-n- [13C8]octanoic acid (M8PFOA)		90.5 %	25-150							
Surrogate: M6PFDA		72.0 %	25-150							
Surrogate: M7PFUdA		78.1 %	25-150							
Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)		71.1 %	25-150							
Surrogate: M2PFTeDA		57.8 %	10-150							



Sample Information

Client Sample ID: EB_2022.09.16

York Sample ID: 22I0909-07

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Water

Collection Date/Time

September 16, 2022 11:22 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE Ext-PFAS-EPA 537.1M

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	82.3 %			25-150					
	Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	86.3 %			25-150					
	Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	71.6 %			25-150					
	Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	27.6 %			10-150					
	Surrogate: d3-N-MeFOSAA	55.6 %			25-150					
	Surrogate: d5-N-EtFOSAA	49.7 %			25-150					
	Surrogate: M2-6:2 FTS	75.0 %			25-200					
	Surrogate: M2-8:2 FTS	146 %			25-200					
	Surrogate: M9PFNA	70.2 %			25-150					

Sample Information

Client Sample ID: LP_002

York Sample ID: 22I0909-08

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 11:00 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	0.757		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
307-24-4	* Perfluorohexanoic acid (PFHxA)	2.14		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
375-85-9	* Perfluoroheptanoic acid (PFHpA)	1.24		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	8.12		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
335-67-1	* Perfluorooctanoic acid (PFOA)	11.4		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	133		ug/kg dry	2.67	5	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 13:01	WEL
375-95-1	* Perfluorononanoic acid (PFNA)	5.60		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
335-76-2	* Perfluorodecanoic acid (PFDA)	12.5		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	4.16		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL



Sample Information

Client Sample ID: LP_002

York Sample ID: 22I0909-08

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 11:00 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
307-55-1	* Perfluorododecanoic acid (PFDoA)	5.32		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	6.45		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
376-06-7	* Perfluorotetradecanoic acid (PFTA)	1.74		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
2355-31-9	* N-MeFOSAA	24.3		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
2991-50-6	* N-EtFOSAA	32.3		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	5.09		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	2.12		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	3.97		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ug/kg dry	0.534	1	EPA 537m Certifications:	09/20/2022 15:53	09/23/2022 12:48	WEL
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		167 %	PFSu-H	25-150						
Surrogate: M5PFHxA		91.3 %		25-150						
Surrogate: M4PFHpA		55.1 %		25-150						
Surrogate: M3PFHxS		176 %	PFSu-H	25-150						
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)		84.6 %		25-150						
Surrogate: M6PFDA		70.9 %		25-150						
Surrogate: M7PFUdA		25.4 %		25-150						
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)		42.0 %		25-150						
Surrogate: M2PFTeDA		73.9 %		10-150						
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)		181 %	PFSu-H	25-150						
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)		85.5 %		25-150						
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)		162 %	PFSu-H	25-150						



Sample Information

Client Sample ID: LP_002

York Sample ID: 22I0909-08

York Project (SDG) No.

22I0909

Client Project ID

BRK2201 Calabro Airport

Matrix

Soil

Collection Date/Time

September 16, 2022 11:00 am

Date Received

09/16/2022

PFAS, NYSDEC Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: SPE PFAS Extraction-Soil-EPA 537m

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	23.3 %			10-150					
	Surrogate: d3-N-MeFOSAA	42.6 %			25-150					
	Surrogate: d5-N-EtFOSAA	26.5 %			25-150					
	Surrogate: M2-6:2 FTS	466 %	PFSu-H		25-200					
	Surrogate: M2-8:2 FTS	274 %	PFSu-H		25-200					
	Surrogate: M9PFNA	70.3 %			25-150					
	Surrogate: M9PFNA	76.8 %			25-150					

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	44.4		%	0.100	1	SM 2540G	09/21/2022 11:23	09/21/2022 13:34	YR
							Certifications:	CTDOH		



Analytical Batch Summary

Batch ID: BI20939 **Preparation Method:** SPE Ext-PFAS-EPA 537.1M **Prepared By:** ER

YORK Sample ID	Client Sample ID	Preparation Date
22I0909-06	FB_2022.09.16	09/19/22
22I0909-07	EB_2022.09.16	09/19/22
BI20939-BLK1	Blank	09/19/22
BI20939-BS1	LCS	09/19/22
BI20939-BSD1	LCS Dup	09/19/22

Batch ID: BI21036 **Preparation Method:** SPE PFAS Extraction-Soil-EPA 537m **Prepared By:** BAMW

YORK Sample ID	Client Sample ID	Preparation Date
22I0909-01	SD_001	09/20/22
22I0909-02	SD_003	09/20/22
22I0909-03	SD_002	09/20/22
22I0909-04	LP_004	09/20/22
22I0909-05	LP_003	09/20/22
22I0909-08	LP_002	09/20/22
22I0909-08RE1	LP_002	09/20/22
BI21036-BLK1	Blank	09/20/22
BI21036-BS1	LCS	09/20/22
BI21036-MS1	Matrix Spike	09/20/22
BI21036-MSD1	Matrix Spike Dup	09/20/22

Batch ID: BI21100 **Preparation Method:** % Solids Prep **Prepared By:** YR

YORK Sample ID	Client Sample ID	Preparation Date
22I0909-01	SD_001	09/21/22
22I0909-02	SD_003	09/21/22
22I0909-03	SD_002	09/21/22
22I0909-04	LP_004	09/21/22
22I0909-05	LP_003	09/21/22
22I0909-08	LP_002	09/21/22
BI21100-DUP1	Duplicate	09/21/22



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI20939 - SPE Ext-PFAS-EPA 537.1M

Blank (BI20939-BLK1)

Prepared: 09/19/2022 Analyzed: 09/21/2022

Perfluorobutanesulfonic acid (PFBS)	ND	2.00	ng/L								
Perfluorohexanoic acid (PFHxA)	ND	2.00	"								
Perfluoroheptanoic acid (PFHpA)	ND	2.00	"								
Perfluorohexanesulfonic acid (PFHxS)	ND	2.00	"								
Perfluorooctanoic acid (PFOA)	ND	2.00	"								
Perfluorooctanesulfonic acid (PFOS)	ND	2.00	"								
Perfluorononanoic acid (PFNA)	ND	2.00	"								
Perfluorodecanoic acid (PFDA)	ND	2.00	"								
Perfluoroundecanoic acid (PFUnA)	ND	2.00	"								
Perfluorododecanoic acid (PFDoA)	ND	2.00	"								
Perfluorotridecanoic acid (PFTriDA)	ND	2.00	"								
Perfluorotetradecanoic acid (PFTA)	ND	2.00	"								
N-MeFOSAA	ND	2.00	"								
N-EtFOSAA	ND	2.00	"								
Perfluoropentanoic acid (PFPeA)	ND	2.00	"								
Perfluoro-1-octanesulfonamide (FOSA)	ND	2.00	"								
Perfluoro-1-heptanesulfonic acid (PFHpS)	ND	2.00	"								
Perfluoro-1-decanesulfonic acid (PFDS)	ND	2.00	"								
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND	5.00	"								
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND	2.00	"								
Perfluoro-n-butanoic acid (PFBA)	ND	2.00	"								
Surrogate: M3PFBS	55.6		"	74.3		74.8	25-150				
Surrogate: M5PFHxA	57.9		"	80.0		72.3	25-150				
Surrogate: M4PFHpA	64.8		"	80.0		81.0	25-150				
Surrogate: M3PFHxS	65.0		"	75.7		85.8	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	72.0		"	80.0		90.0	25-150				
Surrogate: M6PFDA	62.5		"	80.0		78.1	25-150				
Surrogate: M7PFUDa	68.0		"	80.0		85.0	25-150				
Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)	61.7		"	80.0		77.1	25-150				
Surrogate: M2PFTeDA	53.0		"	80.0		66.2	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	56.3		"	80.0		70.3	25-150				
Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)	71.0		"	76.6		92.7	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	58.4		"	80.0		73.0	25-150				
Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)	28.6		"	80.0		35.7	10-150				
Surrogate: d3-N-MeFOSAA	61.4		"	80.0		76.7	25-150				
Surrogate: d5-N-EtFOSAA	58.4		"	80.0		73.1	25-150				
Surrogate: M2-6:2 FTS	50.1		"	75.9		65.9	25-200				
Surrogate: M2-8:2 FTS	85.7		"	76.6		112	25-200				
Surrogate: M9PFNA	64.8		"	80.0		81.0	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI20939 - SPE Ext-PFAS-EPA 537.1M

LCS (BI20939-BS1)

Prepared: 09/19/2022 Analyzed: 09/21/2022

Perfluorobutanesulfonic acid (PFBS)	73.2	2.00	ng/L	70.8		103	50-130				
Perfluorohexanoic acid (PFHxA)	76.1	2.00	"	80.0		95.1	50-130				
Perfluoroheptanoic acid (PFHpA)	71.3	2.00	"	80.0		89.1	50-130				
Perfluorohexanesulfonic acid (PFHxS)	65.6	2.00	"	72.8		90.0	50-130				
Perfluorooctanoic acid (PFOA)	68.1	2.00	"	80.0		85.1	50-130				
Perfluorooctanesulfonic acid (PFOS)	89.2	2.00	"	74.0		120	50-130				
Perfluorononanoic acid (PFNA)	78.2	2.00	"	80.0		97.7	50-130				
Perfluorodecanoic acid (PFDA)	84.4	2.00	"	80.0		105	50-130				
Perfluoroundecanoic acid (PFUnA)	75.3	2.00	"	80.0		94.1	50-130				
Perfluorododecanoic acid (PFDoA)	74.7	2.00	"	80.0		93.4	50-130				
Perfluorotridecanoic acid (PFTriDA)	92.9	2.00	"	80.0		116	50-130				
Perfluorotetradecanoic acid (PFTA)	76.3	2.00	"	80.0		95.3	50-130				
N-MeFOSAA	78.5	2.00	"	80.0		98.1	50-130				
N-EtFOSAA	84.1	2.00	"	80.0		105	50-130				
Perfluoropentanoic acid (PFPeA)	82.6	2.00	"	80.0		103	50-130				
Perfluoro-1-octanesulfonamide (FOSA)	75.4	2.00	"	80.0		94.3	50-130				
Perfluoro-1-heptanesulfonic acid (PFHpS)	87.0	2.00	"	76.4		114	50-130				
Perfluoro-1-decanesulfonic acid (PFDS)	80.8	2.00	"	77.2		105	50-130				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	74.9	5.00	"	76.0		98.5	50-175				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	85.5	2.00	"	76.8		111	50-175				
Perfluoro-n-butanoic acid (PFBA)	80.6	2.00	"	80.0		101	50-130				
Surrogate: M3PFBS	53.3		"	74.3		71.7	25-150				
Surrogate: M5PFHxA	57.7		"	80.0		72.1	25-150				
Surrogate: M4PFHpA	64.9		"	80.0		81.1	25-150				
Surrogate: M3PFHxS	62.5		"	75.7		82.6	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	67.8		"	80.0		84.7	25-150				
Surrogate: M6PFDA	57.7		"	80.0		72.1	25-150				
Surrogate: M7PFUdA	61.7		"	80.0		77.1	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	60.0		"	80.0		75.0	25-150				
Surrogate: M2PFTeDA	53.8		"	80.0		67.3	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	58.2		"	80.0		72.8	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	57.2		"	76.6		74.8	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	53.8		"	80.0		67.3	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	23.6		"	80.0		29.5	10-150				
Surrogate: d3-N-MeFOSAA	56.9		"	80.0		71.1	25-150				
Surrogate: d5-N-EtFOSAA	58.2		"	80.0		72.8	25-150				
Surrogate: M2-6:2 FTS	53.7		"	75.9		70.7	25-200				
Surrogate: M2-8:2 FTS	79.3		"	76.6		103	25-200				
Surrogate: M9PFNA	60.0		"	80.0		75.0	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI20939 - SPE Ext-PFAS-EPA 537.1M

LCS Dup (BI20939-BSD1)

Prepared: 09/19/2022 Analyzed: 09/21/2022

Perfluorobutanesulfonic acid (PFBS)	77.5	2.00	ng/L	70.8		109	50-130		5.72	30	
Perfluorohexanoic acid (PFHxA)	80.8	2.00	"	80.0		101	50-130		6.08	30	
Perfluoroheptanoic acid (PFHpA)	86.8	2.00	"	80.0		109	50-130		19.6	30	
Perfluorohexanesulfonic acid (PFHxS)	73.9	2.00	"	72.8		102	50-130		12.0	30	
Perfluorooctanoic acid (PFOA)	74.7	2.00	"	80.0		93.4	50-130		9.25	30	
Perfluorooctanesulfonic acid (PFOS)	72.5	2.00	"	74.0		98.0	50-130		20.5	30	
Perfluorononanoic acid (PFNA)	81.3	2.00	"	80.0		102	50-130		3.89	30	
Perfluorodecanoic acid (PFDA)	89.7	2.00	"	80.0		112	50-130		6.12	30	
Perfluoroundecanoic acid (PFUnA)	75.8	2.00	"	80.0		94.7	50-130		0.590	30	
Perfluorododecanoic acid (PFDoA)	74.5	2.00	"	80.0		93.1	50-130		0.303	30	
Perfluorotridecanoic acid (PFTriDA)	79.4	2.00	"	80.0		99.2	50-130		15.7	30	
Perfluorotetradecanoic acid (PFTA)	81.2	2.00	"	80.0		102	50-130		6.31	30	
N-MeFOSAA	81.5	2.00	"	80.0		102	50-130		3.81	30	
N-EtFOSAA	94.1	2.00	"	80.0		118	50-130		11.2	30	
Perfluoropentanoic acid (PFPeA)	85.2	2.00	"	80.0		107	50-130		3.11	30	
Perfluoro-1-octanesulfonamide (FOSA)	94.4	2.00	"	80.0		118	50-130		22.3	30	
Perfluoro-1-heptanesulfonic acid (PFHpS)	69.6	2.00	"	76.4		91.1	50-130		22.3	30	
Perfluoro-1-decanesulfonic acid (PFDS)	64.4	2.00	"	77.2		83.4	50-130		22.6	30	
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	60.1	5.00	"	76.0		79.1	50-175		21.9	30	
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	92.0	2.00	"	76.8		120	50-175		7.36	30	
Perfluoro-n-butanoic acid (PFBA)	83.6	2.00	"	80.0		105	50-130		3.76	30	
Surrogate: M3PFBS	53.4		"	74.3		71.8	25-150				
Surrogate: M5PFHxA	61.2		"	80.0		76.5	25-150				
Surrogate: M4PFHpA	57.9		"	80.0		72.4	25-150				
Surrogate: M3PFHxS	61.4		"	75.7		81.2	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	65.7		"	80.0		82.1	25-150				
Surrogate: M6PFDA	57.6		"	80.0		72.1	25-150				
Surrogate: M7PFUdA	63.0		"	80.0		78.8	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	62.4		"	80.0		78.0	25-150				
Surrogate: M2PFTeDA	51.8		"	80.0		64.8	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	58.9		"	80.0		73.6	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	73.8		"	76.6		96.4	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	55.6		"	80.0		69.4	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	29.1		"	80.0		36.4	10-150				
Surrogate: d3-N-MeFOSAA	61.2		"	80.0		76.5	25-150				
Surrogate: d5-N-EtFOSAA	56.0		"	80.0		70.0	25-150				
Surrogate: M2-6:2 FTS	70.4		"	75.9		92.7	25-200				
Surrogate: M2-8:2 FTS	83.9		"	76.6		109	25-200				
Surrogate: M9PFNA	58.8		"	80.0		73.5	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI21036 - SPE PFAS Extraction-Soil-EPA 537m

Blank (BI21036-BLK1)

Prepared: 09/20/2022 Analyzed: 09/22/2022

Perfluorobutanesulfonic acid (PFBS)	ND	0.236	ug/kg wet								
Perfluorohexanoic acid (PFHxA)	ND	0.236	"								
Perfluoroheptanoic acid (PFHpA)	ND	0.236	"								
Perfluorohexanesulfonic acid (PFHxS)	ND	0.236	"								
Perfluorooctanoic acid (PFOA)	ND	0.236	"								
Perfluorooctanesulfonic acid (PFOS)	ND	0.236	"								
Perfluorononanoic acid (PFNA)	ND	0.236	"								
Perfluorodecanoic acid (PFDA)	ND	0.236	"								
Perfluoroundecanoic acid (PFUnA)	ND	0.236	"								
Perfluorododecanoic acid (PFDoA)	ND	0.236	"								
Perfluorotridecanoic acid (PFTDA)	ND	0.236	"								
Perfluorotetradecanoic acid (PFTA)	ND	0.236	"								
N-MeFOSAA	ND	0.236	"								
N-EtFOSAA	ND	0.236	"								
Perfluoropentanoic acid (PFPeA)	ND	0.236	"								
Perfluoro-1-octanesulfonamide (FOSA)	ND	0.236	"								
Perfluoro-1-heptanesulfonic acid (PFHpS)	ND	0.236	"								
Perfluoro-1-decanesulfonic acid (PFDS)	ND	0.236	"								
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND	0.236	"								
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND	0.236	"								
Perfluoro-n-butanoic acid (PFBA)	ND	0.236	"								
Surrogate: M3PFBS	3.66		"	4.39		83.4	25-150				
Surrogate: M5PFHxA	4.59		"	4.72		97.3	25-150				
Surrogate: M4PFHpA	4.03		"	4.72		85.3	25-150				
Surrogate: M3PFHxS	4.88		"	4.47		109	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	5.37		"	4.72		114	25-150				
Surrogate: M6PFDA	3.69		"	4.72		78.2	25-150				
Surrogate: M7PFUdA	4.13		"	4.72		87.4	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	4.08		"	4.72		86.5	25-150				
Surrogate: M2PFTeDA	4.31		"	4.72		91.4	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	4.54		"	4.72		96.2	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	4.25		"	4.52		94.2	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	4.52		"	4.72		95.7	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	3.69		"	4.72		78.3	10-150				
Surrogate: d3-N-MeFOSAA	3.83		"	4.72		81.1	25-150				
Surrogate: d5-N-EtFOSAA	4.86		"	4.72		103	25-150				
Surrogate: M2-6:2 FTS	4.00		"	4.48		89.3	25-200				
Surrogate: M2-8:2 FTS	4.17		"	4.52		92.2	25-200				
Surrogate: M9PFNA	4.41		"	4.72		93.4	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI21036 - SPE PFAS Extraction-Soil-EPA 537m

LCS (BI21036-BS1)

Prepared: 09/20/2022 Analyzed: 09/22/2022

Perfluorobutanesulfonic acid (PFBS)	4.32	0.247	ug/kg wet	4.37		98.8	50-130				
Perfluorohexanoic acid (PFHxA)	5.15	0.247	"	4.94		104	50-130				
Perfluoroheptanoic acid (PFHpA)	5.28	0.247	"	4.94		107	50-130				
Perfluorohexanesulfonic acid (PFHxS)	4.43	0.247	"	4.49		98.6	50-130				
Perfluorooctanoic acid (PFOA)	4.10	0.247	"	4.94		83.1	50-130				
Perfluorooctanesulfonic acid (PFOS)	4.81	0.247	"	4.57		105	50-130				
Perfluorononanoic acid (PFNA)	4.87	0.247	"	4.94		98.6	50-130				
Perfluorodecanoic acid (PFDA)	5.26	0.247	"	4.94		107	50-130				
Perfluoroundecanoic acid (PFUnA)	4.20	0.247	"	4.94		85.0	50-130				
Perfluorododecanoic acid (PFDoA)	5.00	0.247	"	4.94		101	50-130				
Perfluorotridecanoic acid (PFTriDA)	5.95	0.247	"	4.94		120	50-130				
Perfluorotetradecanoic acid (PFTA)	4.59	0.247	"	4.94		92.9	50-130				
N-MeFOSAA	4.16	0.247	"	4.94		84.2	50-130				
N-EtFOSAA	5.35	0.247	"	4.94		108	50-130				
Perfluoropentanoic acid (PFPeA)	5.00	0.247	"	4.94		101	50-130				
Perfluoro-1-octanesulfonamide (FOSA)	6.08	0.247	"	4.94		123	50-130				
Perfluoro-1-heptanesulfonic acid (PFHpS)	5.66	0.247	"	4.72		120	50-130				
Perfluoro-1-decanesulfonic acid (PFDS)	3.90	0.247	"	4.76		81.9	50-130				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	2.70	0.247	"	4.69		57.6	50-200				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	5.58	0.247	"	4.74		118	50-200				
Perfluoro-n-butanoic acid (PFBA)	5.43	0.247	"	4.94		110	50-130				
Surrogate: M3PFBS	3.74		"	4.59		81.6	25-150				
Surrogate: M5PFHxA	4.47		"	4.94		90.4	25-150				
Surrogate: M4PFHpA	4.33		"	4.94		87.7	25-150				
Surrogate: M3PFHxS	3.70		"	4.67		79.2	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	5.35		"	4.94		108	25-150				
Surrogate: M6PFDA	4.07		"	4.94		82.5	25-150				
Surrogate: M7PFUdA	4.19		"	4.94		84.9	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	3.84		"	4.94		77.8	25-150				
Surrogate: M2PFTeDA	4.35		"	4.94		88.1	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	4.58		"	4.94		92.9	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	4.00		"	4.72		84.6	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	4.83		"	4.94		97.9	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	3.42		"	4.94		69.2	10-150				
Surrogate: d3-N-MeFOSAA	4.52		"	4.94		91.5	25-150				
Surrogate: d5-N-EtFOSAA	4.21		"	4.94		85.2	25-150				
Surrogate: M2-6:2 FTS	4.76		"	4.69		102	25-200				
Surrogate: M2-8:2 FTS	4.22		"	4.73		89.3	25-200				
Surrogate: M9PFNA	4.32		"	4.94		87.5	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI21036 - SPE PFAS Extraction-Soil-EPA 537m

Matrix Spike (BI21036-MS1)		*Source sample: 2210909-04 (LP_004)					Prepared: 09/20/2022 Analyzed: 09/23/2022				
Perfluorobutanesulfonic acid (PFBS)	16.2	4.06	ug/kg dry	14.4	ND	113	25-150				
Perfluorohexanoic acid (PFHxA)	24.1	4.06	"	16.2	4.28	122	25-150				
Perfluoroheptanoic acid (PFHpA)	32.0	4.06	"	16.2	ND	197	25-150	High Bias			
Perfluorohexanesulfonic acid (PFHxS)	25.3	4.06	"	14.8	25.7	NR	25-150	Low Bias			
Perfluorooctanoic acid (PFOA)	33.8	4.06	"	16.2	25.8	49.1	25-150				
Perfluorooctanesulfonic acid (PFOS)	112	4.06	"	15.0	49.1	418	25-150	High Bias			
Perfluorononanoic acid (PFNA)	28.6	4.06	"	16.2	12.1	101	25-150				
Perfluorodecanoic acid (PFDA)	27.4	4.06	"	16.2	12.4	92.9	25-150				
Perfluoroundecanoic acid (PFUnA)	28.2	4.06	"	16.2	4.88	144	25-150				
Perfluorododecanoic acid (PFDoA)	22.1	4.06	"	16.2	ND	136	25-150				
Perfluorotridecanoic acid (PFTriDA)	28.4	4.06	"	16.2	ND	175	25-150	High Bias			
Perfluorotetradecanoic acid (PFTA)	14.6	4.06	"	16.2	ND	89.8	25-150				
N-MeFOSAA	96.6	4.06	"	16.2	47.8	300	25-150	High Bias			
N-EtFOSAA	90.4	4.06	"	16.2	255	NR	25-150	Low Bias			
Perfluoropentanoic acid (PFPeA)	15.3	4.06	"	16.2	ND	94.2	25-150				
Perfluoro-1-octanesulfonamide (FOSA)	32.2	4.06	"	16.2	6.26	160	25-150	High Bias			
Perfluoro-1-heptanesulfonic acid (PFHpS)	32.3	4.06	"	15.5	ND	208	25-150	High Bias			
Perfluoro-1-decanesulfonic acid (PFDS)	24.4	4.06	"	15.7	17.4	44.5	25-150				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	17.3	4.06	"	15.4	ND	112	25-200				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	21.0	4.06	"	15.6	ND	135	25-200				
Perfluoro-n-butanoic acid (PFBA)	18.8	4.06	"	16.2	ND	116	25-150				
Surrogate: M3PFBS	18.1		"	15.1		120	25-150				
Surrogate: M5PFHxA	13.2		"	16.2		81.0	25-150				
Surrogate: M4PFHpA	7.41		"	16.2		45.7	25-150				
Surrogate: M3PFHxS	30.6		"	15.4		199	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	16.2		"	16.2		99.8	25-150				
Surrogate: M6PFDA	9.41		"	16.2		58.0	25-150				
Surrogate: M7PFUdA	5.82		"	16.2		35.9	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	4.99		"	16.2		30.8	25-150				
Surrogate: M2PFTeDA	7.24		"	16.2		44.6	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	21.9		"	16.2		135	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	11.3		"	15.5		72.6	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	15.6		"	16.2		96.0	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	5.22		"	16.2		32.1	10-150				
Surrogate: d3-N-MeFOSAA	5.45		"	16.2		33.6	25-150				
Surrogate: d5-N-EtFOSAA	11.6		"	16.2		71.5	25-150				
Surrogate: M2-6:2 FTS	51.6		"	15.4		335	25-200				
Surrogate: M2-8:2 FTS	24.3		"	15.5		157	25-200				
Surrogate: M9PFNA	11.3		"	16.2		69.4	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BI21036 - SPE PFAS Extraction-Soil-EPA 537m

Matrix Spike Dup (BI21036-MSD1)		*Source sample: 22I0909-04 (LP_004)					Prepared: 09/20/2022 Analyzed: 09/23/2022				
Perfluorobutanesulfonic acid (PFBS)	13.8	4.26	ug/kg dry	15.1	ND	91.6	25-150		15.9	35	
Perfluorohexanoic acid (PFHxA)	27.3	4.26	"	17.0	4.28	135	25-150		12.8	35	
Perfluoroheptanoic acid (PFHpA)	32.0	4.26	"	17.0	ND	188	25-150	High Bias	0.0117	35	
Perfluorohexanesulfonic acid (PFHxS)	28.7	4.26	"	15.5	25.7	19.6	25-150	Low Bias	12.7	35	
Perfluorooctanoic acid (PFOA)	47.1	4.26	"	17.0	25.8	125	25-150		32.8	35	
Perfluorooctanesulfonic acid (PFOS)	69.9	4.26	"	15.8	49.1	132	25-150		46.2	35	Non-dir.
Perfluorononanoic acid (PFNA)	26.7	4.26	"	17.0	12.1	85.7	25-150		6.74	35	
Perfluorodecanoic acid (PFDA)	38.0	4.26	"	17.0	12.4	150	25-150		32.1	35	
Perfluoroundecanoic acid (PFUnA)	24.1	4.26	"	17.0	4.88	113	25-150		15.8	35	
Perfluorododecanoic acid (PFDoA)	15.8	4.26	"	17.0	ND	93.0	25-150		33.2	35	
Perfluorotridecanoic acid (PFTriDA)	37.5	4.26	"	17.0	ND	220	25-150	High Bias	27.6	35	
Perfluorotetradecanoic acid (PFTA)	15.2	4.26	"	17.0	ND	89.2	25-150		4.08	35	
N-MeFOSAA	47.2	4.26	"	17.0	47.8	NR	25-150	Low Bias	68.7	35	Non-dir.
N-EtFOSAA	144	4.26	"	17.0	255	NR	25-150	Low Bias	45.9	35	Non-dir.
Perfluoropentanoic acid (PFPeA)	ND	4.26	"	17.0	ND		25-150	Low Bias		35	
Perfluoro-1-octanesulfonamide (FOSA)	38.9	4.26	"	17.0	6.26	192	25-150	High Bias	18.7	35	
Perfluoro-1-heptanesulfonic acid (PFHpS)	20.7	4.26	"	16.3	ND	128	25-150		43.5	35	Non-dir.
Perfluoro-1-decanesulfonic acid (PFDS)	11.6	4.26	"	16.4	17.4	NR	25-150	Low Bias	71.1	35	Non-dir.
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	14.9	4.26	"	16.2	ND	92.0	25-200		15.0	35	
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	16.1	4.26	"	16.3	ND	98.8	25-200		26.3	35	
Perfluoro-n-butanoic acid (PFBA)	23.1	4.26	"	17.0	ND	136	25-150		20.7	35	
Surrogate: M3PFBS	15.4		"	15.8		97.6	25-150				
Surrogate: M5PFHxA	10.9		"	17.0		63.9	25-150				
Surrogate: M4PFHpA	7.01		"	17.0		41.2	25-150				
Surrogate: M3PFHxS	16.8		"	16.1		104	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	12.7		"	17.0		74.7	25-150				
Surrogate: M6PFDA	7.78		"	17.0		45.7	25-150				
Surrogate: M7PFUdA	6.59		"	17.0		38.7	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	6.34		"	17.0		37.2	25-150				
Surrogate: M2PFTeDA	5.88		"	17.0		34.5	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	19.9		"	17.0		117	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	16.3		"	16.3		99.8	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	12.1		"	17.0		70.9	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	5.67		"	17.0		33.3	10-150				
Surrogate: d3-N-MeFOSAA	11.7		"	17.0		68.6	25-150				
Surrogate: d5-N-EtFOSAA	7.40		"	17.0		43.4	25-150				
Surrogate: M2-6:2 FTS	52.4		"	16.2		325	25-200				
Surrogate: M2-8:2 FTS	33.8		"	16.3		207	25-200				
Surrogate: M9PFNA	10.2		"	17.0		59.7	25-150				



Miscellaneous Physical Parameters - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC Limits	Flag	RPD Limit	Flag

Batch BI21100 - % Solids Prep

Duplicate (BI21100-DUP1)		*Source sample: 22I0938-01 (Duplicate)					Prepared & Analyzed: 09/21/2022				
% Solids	93.9	0.100	%		94.7			0.837	20		





Sample and Data Qualifiers Relating to This Work Order

PFSu-L	The isotopically labeled surrogate recovered below lab control limits due to a matrix effect. Isotope Dilution was applied.
PFSu-H	The isotopically labeled surrogate recovered above lab control limits due to a matrix effect. Isotope Dilution was applied.
PF-QMR	The RPD for the Matrix Spike was outside of control limits due to a non-homogeneous matrix
PF-CCV-H	The CCV recovery was slightly above acceptable limits for the qualified compound. However, sample results are not biased high because results are corrected for isotope recovery.
PFAS-MSL	The recovery for this matrix spike compound was below control limits possibly due to matrix effects or non-homogeneity of the sample verses the native sample
PFAS-MSH	The recovery for this matrix spike compound was above control limits possibly due to matrix effects or non-homogeneity of the sample verses the native sample

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.



2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.



York Analytical Laboratories, Inc.

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YORK
ANALYTICAL LABORATORIES INC.

Field Chain-of-Custody Record

YORK Project No.

22IO909

NOTE: YORK's Standard Terms & Conditions are listed on the back side of this document.
This document serves as your written authorization for YORK to proceed with the analyses requested below.
Your signature binds you to YORK's Standard Terms & Conditions.

Page 1 of 1

YOUR Information		Report To:	Invoice To:	YOUR Project Number	Turn-Around Time
Company: PWGC	Company:	Company:	Company:	BRK2201	RUSH - Next Day
Address: 630 Johnson Ave	Address:	Address:	Address:		RUSH - Two Day
Boronia, NY 11716					RUSH - Three Day
Phone: (631) 589-6353	Phone:	Phone:	Phone:	YOUR Project Name	RUSH - Four Day
Contact: Derek Ersbak	Contact:	Contact:	Contact:	Calabro Airport	Standard (5-7 Day)
E-mail: dereke@pwgnsr.com	E-mail:	E-mail:	E-mail:	YOUR PO#:	

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by YORK are resolved.

Matrix Codes	Samples From	Report / EDD Type (circle selections)	YORK Reg. Comp.
S - soil / solid	New York	Summary Report	Compared to the following Regulation(s): (please fill in)
GW - groundwater	New Jersey	QA Report	
DW - drinking water	Connecticut	NY ASP A Package	
WW - wastewater	Pennsylvania	NY ASP B Package	
O - Oil : Other	Other	NJDEP Reduced Deliverables	
		NJDEP SRP HazSite	
		NJDKQP	
		Other:	

Samples Collected by: (print your name above and sign below)

Jay Usmonov

Sample Identification	Sample Matrix	Date/Time Sampled	Analysis Requested	Container Description
SD-001	S	09/16/22 07:40	PFAS USE PA method 537, rev 1.1 (modified)	
SD-003		08:02		
SD-002		08:24		
LP-004		10:20	MS, MSD	
LP-003		10:45		
FB- 2022. 09.16	W	11:20		
EB- 2022 09.16		11:22		
LP-002	S	11:00		

Comments:

Preservation: (check all that apply)		Special Instruction
HCl ___ MeOH ___ HNO3 ___ H2SO4 ___ NaOH ___ ZnAc ___	Field Filtered ___	
Ascorbic Acid ___ Other: ___	Lab to Filter ___	

Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Relinquished by / Company	Date/Time
David V. Stone / PWGC	9/16/22 230 PM	KBalkyork	9/16/22 230 PM	KBalkyork	9/16/22 1748

Samples Relinquished by / Company	Date/Time	Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time	Temp. Received at Lab
				KBalkyork	9/16/22 1748	3.4



Technical Report

prepared for:

P.W. Grosser Consulting

630 Johnson Ave, Suite 7

Bohemia NY, 11716

Attention: Derek Ersbak

Report Date: 01/13/2023

Client Project ID: BRK2202 (Brookhaven Calabro Airport)

York Project (SDG) No.: 23A0038

CT Cert. No. PH-0723

New Jersey Cert. No. CT005 and NY037



New York Cert. Nos. 10854 and 12058

PA Cert. No. 68-04440

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132-02 89th AVENUE
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RICHMOND HILL, NY 11418
ClientServices@yorklab.com

P.W. Grosser Consulting
630 Johnson Ave, Suite 7
Bohemia NY, 11716
Attention: Derek Ersbak

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on January 03, 2023 and listed below. The project was identified as your project: **BRK2202 (Brookhaven Calabro Airport)**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

<u>York Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Collected</u>	<u>Date Received</u>
23A0038-01	LP_001	Soil	01/03/2023	01/03/2023
23A0038-02	LP_002	Soil	01/03/2023	01/03/2023
23A0038-03	LP_003	Soil	01/03/2023	01/03/2023
23A0038-04	LP_004	Soil	01/03/2023	01/03/2023
23A0038-05	GT_001	Soil	01/03/2023	01/03/2023
23A0038-06	ST_001	Soil	01/03/2023	01/03/2023
23A0038-07	DUP_008	Soil	01/03/2023	01/03/2023
23A0038-08	EB_001	Water	01/03/2023	01/03/2023
23A0038-09	FB_001	Water	01/03/2023	01/03/2023
23A0038-10	Trip Blank	Water	01/03/2023	01/03/2023

General Notes for York Project (SDG) No.: 23A0038

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 01/13/2023

Cassie L. Mosher
Laboratory Manager





Sample Information

Client Sample ID: LP_001

York Sample ID: 23A0038-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 10:15 am

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
79-34-5	1,1,2,2-Tetrachloroethane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
79-00-5	1,1,2-Trichloroethane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
563-58-6	1,1-Dichloropropylene	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
87-61-6	1,2,3-Trichlorobenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
96-18-4	1,2,3-Trichloropropane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
95-93-2	* 1,2,4,5-Tetramethylbenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
120-82-1	1,2,4-Trichlorobenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
95-63-6	1,2,4-Trimethylbenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
96-12-8	1,2-Dibromo-3-chloropropane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
106-93-4	1,2-Dibromoethane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
95-50-1	1,2-Dichlorobenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
78-87-5	1,2-Dichloropropane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
108-67-8	1,3,5-Trimethylbenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
541-73-1	1,3-Dichlorobenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
142-28-9	1,3-Dichloropropane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
106-46-7	1,4-Dichlorobenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC



Sample Information

Client Sample ID: LP_001

York Sample ID: 23A0038-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 10:15 am

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
123-91-1	1,4-Dioxane	ND	IS-LO	ug/kg dry	150	290	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 15:15	BMC
594-20-7	2,2-Dichloropropane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 15:15	BMC
78-93-3	2-Butanone	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
110-75-8	2-Chloroethylvinyl ether	ND	IS-LO	ug/kg dry	29	59	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 15:15	BMC
95-49-8	2-Chlorotoluene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
591-78-6	2-Hexanone	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
106-43-4	4-Chlorotoluene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
108-10-1	4-Methyl-2-pentanone	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
67-64-1	Acetone	36		ug/kg dry	15	29	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
107-02-8	Acrolein	ND		ug/kg dry	15	29	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
107-13-1	Acrylonitrile	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
71-43-2	Benzene	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
108-86-1	Bromobenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 15:15	BMC
74-97-5	Bromochloromethane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 15:15	BMC
75-27-4	Bromodichloromethane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
75-25-2	Bromoform	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
74-83-9	Bromomethane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
75-15-0	Carbon disulfide	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
56-23-5	Carbon tetrachloride	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
108-90-7	Chlorobenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
75-00-3	Chloroethane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
67-66-3	Chloroform	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC
74-87-3	Chloromethane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:15	BMC



Sample Information

Client Sample ID: LP_001

York Sample ID: 23A0038-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 10:15 am

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
10061-01-5	cis-1,3-Dichloropropylene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
124-48-1	Dibromochloromethane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
74-95-3	Dibromomethane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
100-41-4	Ethyl Benzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
60-29-7	* Ethyl Ether	ND		ug/kg dry	73	150	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
87-68-3	Hexachlorobutadiene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
74-88-4	* Iodomethane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
98-82-8	Isopropylbenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
80-62-6	Methyl Methacrylate	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
75-09-2	Methylene chloride	ND		ug/kg dry	15	29	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
91-20-3	Naphthalene	ND	IS-LO	ug/kg dry	7.3	29	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
104-51-8	n-Butylbenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
103-65-1	n-Propylbenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
95-47-6	o-Xylene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
179601-23-1	p- & m- Xylenes	ND	IS-LO	ug/kg dry	15	29	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
105-05-5	* p-Diethylbenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
622-96-8	* p-Ethyltoluene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
99-87-6	p-Isopropyltoluene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
135-98-8	sec-Butylbenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC



Sample Information

Client Sample ID: LP_001

York Sample ID: 23A0038-01

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 10:15 am

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-42-5	Styrene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
994-05-8	* tert-Amyl methyl ether (TAME)	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
98-06-6	tert-Butylbenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
127-18-4	Tetrachloroethylene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
109-99-9	* Tetrahydrofuran	ND		ug/kg dry	15	29	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
108-88-3	Toluene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
10061-02-6	trans-1,3-Dichloropropylene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
79-01-6	Trichloroethylene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
108-05-4	Vinyl acetate	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
75-01-4	Vinyl Chloride	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
1330-20-7	Xylenes, Total	ND	IS-LO	ug/kg dry	22	44	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
107-05-1	* Allyl chloride	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
123-86-4	* n-butyl acetate	ND	CCVE, IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
75-45-6	* Chlorodifluoromethane (Freon 22)	ND	CCVE	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
493-01-6	* cis-decahydronaphthalene	ND	CCVE, IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
493-02-7	* trans-decahydronaphthalene	ND	CCVE, IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
124-18-5	* n-Decane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
97-63-2	* Ethyl Methacrylate	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
67-72-1	* Hexachloroethane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
110-54-3	* n-Hexane	ND		ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
5989-27-5	* Limonene	58	CCVE, IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC



Sample Information

Client Sample ID: LP_001

York Sample ID: 23A0038-01

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 10:15 am

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
98-95-3	* Nitrobenzene	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
79-46-9	* 2-Nitropropane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
111-84-2	* n-Nonane	ND	IS-LO, CCVE	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
111-65-9	* n-octane	ND	CCVE, IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
1120-21-4	* n-undecane	ND	IS-LO	ug/kg dry	7.3	15	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/kg dry	150	150	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:15	BMC
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	112 %			77-125						
2037-26-5	Surrogate: SURR: Toluene-d8	114 %	IS-LO		85-120						
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	171 %	IS-LO, S-03, S-08		76-130						

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/kg dry	106	212	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 21:43	KH
120-12-7	Anthracene	ND		ug/kg dry	106	212	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 21:43	KH
56-55-3	Benzo(a)anthracene	ND		ug/kg dry	106	212	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 21:43	KH
50-32-8	Benzo(a)pyrene	163	J	ug/kg dry	106	212	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 21:43	KH
205-99-2	Benzo(b)fluoranthene	178	J	ug/kg dry	106	212	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 21:43	KH
191-24-2	Benzo(g,h,i)perylene	154	J	ug/kg dry	106	212	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 21:43	KH
207-08-9	Benzo(k)fluoranthene	171	J	ug/kg dry	106	212	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 21:43	KH
218-01-9	Chrysene	134	J	ug/kg dry	106	212	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 21:43	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/kg dry	106	212	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 21:43	KH
206-44-0	Fluoranthene	175	J	ug/kg dry	106	212	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 21:43	KH



Sample Information

Client Sample ID: LP_001

York Sample ID: 23A0038-01

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 10:15 am

Date Received

01/03/2023

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-73-7	Fluorene	ND		ug/kg dry	106	212	2	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 21:43	KH
193-39-5	Indeno(1,2,3-cd)pyrene	127	J	ug/kg dry	106	212	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 21:43	KH
85-01-8	Phenanthrene	ND		ug/kg dry	106	212	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 21:43	KH
129-00-0	Pyrene	153	J	ug/kg dry	106	212	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 21:43	KH
Surrogate Recoveries		Result		Acceptance Range							
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	62.5 %		22-108							
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	56.0 %		21-113							
1718-51-0	Surrogate: SURR: Terphenyl-d14	75.9 %		24-116							

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	ND		mg/kg dry	3.22	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:46	CW
7440-39-3	Barium	66.0		mg/kg dry	5.37	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:46	CW
7440-41-7	Beryllium	ND		mg/kg dry	0.107	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:46	CW
7440-43-9	Cadmium	12.5		mg/kg dry	0.645	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:46	CW
7440-47-3	Chromium	15.9		mg/kg dry	1.07	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:46	CW
7440-50-8	Copper	937		mg/kg dry	4.30	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:46	CW
7439-92-1	Lead	96.0		mg/kg dry	1.07	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:46	CW
7440-02-0	Nickel	10.7		mg/kg dry	2.15	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:46	CW
7782-49-2	Selenium	ND		mg/kg dry	5.37	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:46	CW
7440-22-4	Silver	ND		mg/kg dry	1.07	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:46	CW

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst



Sample Information

Client Sample ID: LP_001

York Sample ID: 23A0038-01

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 10:15 am

Date Received

01/03/2023

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	1.00		mg/kg dry	0.0774	1	EPA 7473 Certifications: CTDOH-PH-0723,NJDEP,NELAC-NY10854,PADEP	01/04/2023 09:06	01/04/2023 12:25	MR

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	38.8		%	0.100	1	SM 2540G Certifications: CTDOH-PH-0723	01/04/2023 15:55	01/04/2023 20:07	AGNR

Sample Information

Client Sample ID: LP_002

York Sample ID: 23A0038-02

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 12:00 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:41	BMC
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:41	BMC
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:41	BMC
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 15:41	BMC
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:41	BMC
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:41	BMC
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:41	BMC
563-58-6	1,1-Dichloropropylene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 15:41	BMC
87-61-6	1,2,3-Trichlorobenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 15:41	BMC
96-18-4	1,2,3-Trichloropropane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 15:41	BMC



Sample Information

Client Sample ID: LP_002

York Sample ID: 23A0038-02

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 12:00 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-93-2	* 1,2,4,5-Tetramethylbenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
120-82-1	1,2,4-Trichlorobenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
95-63-6	1,2,4-Trimethylbenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
95-50-1	1,2-Dichlorobenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
108-67-8	1,3,5-Trimethylbenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
541-73-1	1,3-Dichlorobenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
142-28-9	1,3-Dichloropropane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
106-46-7	1,4-Dichlorobenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
123-91-1	1,4-Dioxane	ND		ug/kg dry	350	690	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
594-20-7	2,2-Dichloropropane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
78-93-3	2-Butanone	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
110-75-8	2-Chloroethylvinyl ether	ND		ug/kg dry	69	140	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
95-49-8	2-Chlorotoluene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
591-78-6	2-Hexanone	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
106-43-4	4-Chlorotoluene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
108-10-1	4-Methyl-2-pentanone	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
67-64-1	Acetone	68	J	ug/kg dry	35	69	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
107-02-8	Acrolein	ND		ug/kg dry	35	69	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
107-13-1	Acrylonitrile	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC



Sample Information

Client Sample ID: LP_002

York Sample ID: 23A0038-02

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:00 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
71-43-2	Benzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
108-86-1	Bromobenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 15:41	BMC
74-97-5	Bromochloromethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 15:41	BMC
75-27-4	Bromodichloromethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
75-25-2	Bromoform	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
74-83-9	Bromomethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
75-15-0	Carbon disulfide	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
56-23-5	Carbon tetrachloride	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
108-90-7	Chlorobenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
75-00-3	Chloroethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
67-66-3	Chloroform	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
74-87-3	Chloromethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
124-48-1	Dibromochloromethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 15:41	BMC
74-95-3	Dibromomethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 15:41	BMC
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 15:41	BMC
100-41-4	Ethyl Benzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
60-29-7	* Ethyl Ether	ND		ug/kg dry	170	350	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/kg dry	28	56	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
87-68-3	Hexachlorobutadiene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 15:41	BMC
74-88-4	* Iodomethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
98-82-8	Isopropylbenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC



Sample Information

Client Sample ID: LP_002

York Sample ID: 23A0038-02

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:00 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
80-62-6	Methyl Methacrylate	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 15:41	BMC
75-09-2	Methylene chloride	ND		ug/kg dry	35	69	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
91-20-3	Naphthalene	ND		ug/kg dry	17	69	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 15:41	BMC
104-51-8	n-Butylbenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
103-65-1	n-Propylbenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
95-47-6	o-Xylene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/04/2023 15:41	BMC
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	35	69	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/04/2023 15:41	BMC
105-05-5	* p-Diethylbenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
622-96-8	* p-Ethyltoluene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
135-98-8	sec-Butylbenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
100-42-5	Styrene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
994-05-8	* tert-Amyl methyl ether (TAME)	ND		ug/kg dry	28	56	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
98-06-6	tert-Butylbenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
127-18-4	Tetrachloroethylene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
109-99-9	* Tetrahydrofuran	ND		ug/kg dry	35	69	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
108-88-3	Toluene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
79-01-6	Trichloroethylene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 15:41	BMC
108-05-4	Vinyl acetate	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 15:41	BMC



Sample Information

Client Sample ID: LP_002

York Sample ID: 23A0038-02

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:00 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-01-4	Vinyl Chloride	ND		ug/kg dry	17	35	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 15:41	BMC
1330-20-7	Xylenes, Total	ND		ug/kg dry	52	100	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 15:41	BMC
107-05-1	* Allyl chloride	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
123-86-4	* n-butyl acetate	ND	CCVE	ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
75-45-6	* Chlorodifluoromethane (Freon 22)	ND	CCVE	ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
493-01-6	* cis-decahydronaphthalene	ND	CCVE	ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
493-02-7	* trans-decahydronaphthalene	ND	CCVE	ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
124-18-5	* n-Decane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
97-63-2	* Ethyl Methacrylate	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
67-72-1	* Hexachloroethane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
110-54-3	* n-Hexane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
5989-27-5	* Limonene	ND	CCVE	ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
98-95-3	* Nitrobenzene	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
79-46-9	* 2-Nitropropane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
111-84-2	* n-Nonane	ND	CCVE	ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
111-65-9	* n-octane	ND	CCVE	ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
1120-21-4	* n-undecane	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/kg dry	350	350	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 15:41	BMC
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	111 %	77-125								
2037-26-5	Surrogate: SURR: Toluene-d8	97.9 %	85-120								
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	120 %	76-130								

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:



Sample Information

Client Sample ID: LP_002

York Sample ID: 23A0038-02

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:00 pm

01/03/2023

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
120-12-7	Anthracene	ND		ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
56-55-3	Benzo(a)anthracene	890	J	ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
50-32-8	Benzo(a)pyrene	992	J	ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
205-99-2	Benzo(b)fluoranthene	1370		ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
191-24-2	Benzo(g,h,i)perylene	695	J	ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
207-08-9	Benzo(k)fluoranthene	1210		ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
218-01-9	Chrysene	1170		ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
206-44-0	Fluoranthene	1430		ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
86-73-7	Fluorene	ND		ug/kg dry	581	1160	10	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
193-39-5	Indeno(1,2,3-cd)pyrene	584	J	ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
85-01-8	Phenanthrene	ND		ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
129-00-0	Pyrene	1040	J	ug/kg dry	581	1160	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 10:38	KH
Surrogate Recoveries		Result	Acceptance Range								
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	94.8 %	22-108								
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	79.2 %	21-113								
1718-51-0	Surrogate: SURR: Terphenyl-d14	89.4 %	24-116								

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	14.0		mg/kg dry	2.33	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:49	CW
7440-39-3	Barium	137		mg/kg dry	3.88	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:49	CW
7440-41-7	Beryllium	0.221		mg/kg dry	0.078	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:49	CW



Sample Information

Client Sample ID: LP_002

York Sample ID: 23A0038-02

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 12:00 pm

Date Received

01/03/2023

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-43-9	Cadmium	ND		mg/kg dry	0.465	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:49	CW
7440-47-3	Chromium	131		mg/kg dry	0.775	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:49	CW
7440-50-8	Copper	498		mg/kg dry	3.10	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:49	CW
7439-92-1	Lead	115		mg/kg dry	0.775	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:49	CW
7440-02-0	Nickel	48.7		mg/kg dry	1.55	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:49	CW
7782-49-2	Selenium	ND		mg/kg dry	3.88	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:49	CW
7440-22-4	Silver	ND		mg/kg dry	0.775	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:49	CW

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	1.70		mg/kg dry	0.0558	1	EPA 7473 Certifications: CTDOH-PH-0723,NJDEP,NELAC-NY10854,PADEP	01/04/2023 09:06	01/04/2023 12:34	MR

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	53.8		%	0.100	1	SM 2540G Certifications: CTDOH-PH-0723	01/04/2023 15:55	01/04/2023 20:07	AGNR

Sample Information

Client Sample ID: LP_003

York Sample ID: 23A0038-03

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 12:15 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst



Sample Information

Client Sample ID: LP_003

York Sample ID: 23A0038-03

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:15 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
79-34-5	1,1,2,2-Tetrachloroethane	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 16:07	BMC
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
563-58-6	1,1-Dichloropropylene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:07	BMC
87-61-6	1,2,3-Trichlorobenzene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:07	BMC
96-18-4	1,2,3-Trichloropropane	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 16:07	BMC
95-93-2	* 1,2,4,5-Tetramethylbenzene	27	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
120-82-1	1,2,4-Trichlorobenzene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:07	BMC
95-63-6	1,2,4-Trimethylbenzene	380	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 16:07	BMC
96-12-8	1,2-Dibromo-3-chloropropane	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
95-50-1	1,2-Dichlorobenzene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
108-67-8	1,3,5-Trimethylbenzene	120	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 16:07	BMC
541-73-1	1,3-Dichlorobenzene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
142-28-9	1,3-Dichloropropane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:07	BMC
106-46-7	1,4-Dichlorobenzene	5800		ug/kg dry	1100	2200	100	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/11/2023 06:16	01/12/2023 00:12	JTG



Sample Information

Client Sample ID: LP_003

York Sample ID: 23A0038-03

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

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23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:15 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
123-91-1	1,4-Dioxane	ND		ug/kg dry	200	400	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:07	BMC
594-20-7	2,2-Dichloropropane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 16:07	BMC
78-93-3	2-Butanone	120		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 16:07	BMC
110-75-8	2-Chloroethylvinyl ether	ND		ug/kg dry	40	80	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:07	BMC
95-49-8	2-Chlorotoluene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
591-78-6	2-Hexanone	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
106-43-4	4-Chlorotoluene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
108-10-1	4-Methyl-2-pentanone	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
67-64-1	Acetone	2800	J	ug/kg dry	2200	4300	100	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/11/2023 06:16	01/12/2023 00:12	JTG
107-02-8	Acrolein	ND		ug/kg dry	20	40	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
107-13-1	Acrylonitrile	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
71-43-2	Benzene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
108-86-1	Bromobenzene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:07	BMC
74-97-5	Bromochloromethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:07	BMC
75-27-4	Bromodichloromethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
75-25-2	Bromoform	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
74-83-9	Bromomethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
75-15-0	Carbon disulfide	13	J	ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 16:07	BMC
56-23-5	Carbon tetrachloride	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
108-90-7	Chlorobenzene	24		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 16:07	BMC
75-00-3	Chloroethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
67-66-3	Chloroform	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC
74-87-3	Chloromethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:07	BMC



Sample Information

Client Sample ID: LP_003

York Sample ID: 23A0038-03

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

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23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:15 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 16:07	BMC
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 16:07	BMC
124-48-1	Dibromochloromethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 16:07	BMC
74-95-3	Dibromomethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 16:07	BMC
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 16:07	BMC
100-41-4	Ethyl Benzene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 16:07	BMC
60-29-7	* Ethyl Ether	ND		ug/kg dry	99	200	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/kg dry	16	32	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
87-68-3	Hexachlorobutadiene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 16:07	BMC
74-88-4	* Iodomethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
98-82-8	Isopropylbenzene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 16:07	BMC
80-62-6	Methyl Methacrylate	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 16:07	BMC
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 16:07	BMC
75-09-2	Methylene chloride	ND		ug/kg dry	20	40	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 16:07	BMC
91-20-3	Naphthalene	18	IS-LO, J	ug/kg dry	9.9	40	1	EPA 8260C Certifications:	01/04/2023 06:20 NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 16:07	BMC
104-51-8	n-Butylbenzene	36	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 16:07	BMC
103-65-1	n-Propylbenzene	44	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 16:07	BMC
95-47-6	o-Xylene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/04/2023 16:07	BMC
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	20	40	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/04/2023 16:07	BMC
105-05-5	* p-Diethylbenzene	30	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
622-96-8	* p-Ethyltoluene	140	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
99-87-6	p-Isopropyltoluene	23	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 16:07	BMC
135-98-8	sec-Butylbenzene	19	IS-LO, J	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20 CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 16:07	BMC



Sample Information

Client Sample ID: LP_003

York Sample ID: 23A0038-03

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

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23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:15 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-42-5	Styrene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
994-05-8	* tert-Amyl methyl ether (TAME)	ND		ug/kg dry	16	32	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
98-06-6	tert-Butylbenzene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
127-18-4	Tetrachloroethylene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
109-99-9	* Tetrahydrofuran	ND		ug/kg dry	20	40	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
108-88-3	Toluene	160		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
79-01-6	Trichloroethylene	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
108-05-4	Vinyl acetate	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
75-01-4	Vinyl Chloride	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
1330-20-7	Xylenes, Total	ND		ug/kg dry	30	60	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
107-05-1	* Allyl chloride	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
123-86-4	* n-butyl acetate	ND	CCVE	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
75-45-6	* Chlorodifluoromethane (Freon 22)	ND	CCVE	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
493-01-6	* cis-decahydronaphthalene	72	CCVE, IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
493-02-7	* trans-decahydronaphthalene	370	CCVE, IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
124-18-5	* n-Decane	13000		ug/kg dry	1100	2200	100	EPA 8260C Certifications:	01/11/2023 06:16	01/12/2023 00:12	JTG
97-63-2	* Ethyl Methacrylate	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
67-72-1	* Hexachloroethane	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
110-54-3	* n-Hexane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
5989-27-5	* Limonene	160	CCVE, IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC



Sample Information

Client Sample ID: LP_003

York Sample ID: 23A0038-03

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 12:15 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
98-95-3	* Nitrobenzene	ND	IS-LO	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
79-46-9	* 2-Nitropropane	ND		ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
111-84-2	* n-Nonane	210	CCVE	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
111-65-9	* n-octane	40	CCVE	ug/kg dry	9.9	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
1120-21-4	* n-undecane	7900		ug/kg dry	1100	2200	100	EPA 8260C Certifications:	01/11/2023 06:16	01/12/2023 00:12	JTG
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/kg dry	200	200	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:07	BMC
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	117 %			77-125						
2037-26-5	Surrogate: SURR: Toluene-d8	101 %			85-120						
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	127 %	IS-LO		76-130						

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
120-12-7	Anthracene	ND		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
56-55-3	Benzo(a)anthracene	1770		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
50-32-8	Benzo(a)pyrene	1340		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
205-99-2	Benzo(b)fluoranthene	1190	J	ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
191-24-2	Benzo(g,h,i)perylene	ND		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
207-08-9	Benzo(k)fluoranthene	1220	J	ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
218-01-9	Chrysene	1720		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
206-44-0	Fluoranthene	2990		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH



Sample Information

Client Sample ID: LP_003

York Sample ID: 23A0038-03

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 12:15 pm

Date Received

01/03/2023

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-73-7	Fluorene	ND		ug/kg dry	622	1240	10	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
85-01-8	Phenanthrene	1480		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
129-00-0	Pyrene	2400		ug/kg dry	622	1240	10	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:10	KH
Surrogate Recoveries		Result		Acceptance Range							
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	72.0 %		22-108							
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	45.2 %		21-113							
1718-51-0	Surrogate: SURR: Terphenyl-d14	54.0 %		24-116							

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	ND		mg/kg dry	3.77	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:52	CW
7440-39-3	Barium	170		mg/kg dry	6.28	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:52	CW
7440-41-7	Beryllium	ND		mg/kg dry	0.126	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:52	CW
7440-43-9	Cadmium	6.98		mg/kg dry	0.754	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:52	CW
7440-47-3	Chromium	19.3		mg/kg dry	1.26	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:52	CW
7440-50-8	Copper	2580		mg/kg dry	5.02	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:52	CW
7439-92-1	Lead	132		mg/kg dry	1.26	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:52	CW
7440-02-0	Nickel	20.1		mg/kg dry	2.51	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:52	CW
7782-49-2	Selenium	ND		mg/kg dry	6.28	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:52	CW
7440-22-4	Silver	5.04		mg/kg dry	1.26	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 10:52	CW

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst



Sample Information

Client Sample ID: LP_003

York Sample ID: 23A0038-03

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 12:15 pm

Date Received

01/03/2023

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	1.41		mg/kg dry	0.0904	1	EPA 7473	01/04/2023 09:06	01/04/2023 10:58	MR
							Certifications:	CTDOH-PH-0723,NJDEP,NELAC-NY10854,PADEP		

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	33.2		%	0.100	1	SM 2540G	01/04/2023 15:55	01/04/2023 20:07	AGNR
							Certifications:	CTDOH-PH-0723		

Sample Information

Client Sample ID: LP_004

York Sample ID: 23A0038-04

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 12:30 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	10	20	1	EPA 8260C	01/04/2023 06:20	01/04/2023 16:33	BMC
								Certifications:	CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI		
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	10	20	1	EPA 8260C	01/04/2023 06:20	01/04/2023 16:33	BMC
								Certifications:	CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI		
79-34-5	1,1,2,2-Tetrachloroethane	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C	01/04/2023 06:20	01/04/2023 16:33	BMC
								Certifications:	CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI		
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	10	20	1	EPA 8260C	01/04/2023 06:20	01/04/2023 16:33	BMC
								Certifications:	CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP		
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	10	20	1	EPA 8260C	01/04/2023 06:20	01/04/2023 16:33	BMC
								Certifications:	CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI		
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	10	20	1	EPA 8260C	01/04/2023 06:20	01/04/2023 16:33	BMC
								Certifications:	CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI		
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	10	20	1	EPA 8260C	01/04/2023 06:20	01/04/2023 16:33	BMC
								Certifications:	CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI		
563-58-6	1,1-Dichloropropylene	ND		ug/kg dry	10	20	1	EPA 8260C	01/04/2023 06:20	01/04/2023 16:33	BMC
								Certifications:	NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP		
87-61-6	1,2,3-Trichlorobenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C	01/04/2023 06:20	01/04/2023 16:33	BMC
								Certifications:	NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP		
96-18-4	1,2,3-Trichloropropane	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C	01/04/2023 06:20	01/04/2023 16:33	BMC
								Certifications:	NELAC-NY10854,NELAC-NY12058,NJDEP		



Sample Information

Client Sample ID: LP_004

York Sample ID: 23A0038-04

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:30 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-93-2	* 1,2,4,5-Tetramethylbenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
120-82-1	1,2,4-Trichlorobenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
95-63-6	1,2,4-Trimethylbenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
96-12-8	1,2-Dibromo-3-chloropropane	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
95-50-1	1,2-Dichlorobenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
108-67-8	1,3,5-Trimethylbenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
541-73-1	1,3-Dichlorobenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
142-28-9	1,3-Dichloropropane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
106-46-7	1,4-Dichlorobenzene	17	IS-LO, J	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
123-91-1	1,4-Dioxane	ND		ug/kg dry	200	400	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
594-20-7	2,2-Dichloropropane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
78-93-3	2-Butanone	390		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
110-75-8	2-Chloroethylvinyl ether	ND		ug/kg dry	40	80	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
95-49-8	2-Chlorotoluene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
591-78-6	2-Hexanone	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
106-43-4	4-Chlorotoluene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
108-10-1	4-Methyl-2-pentanone	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
67-64-1	Acetone	1000	VOA-E	ug/kg dry	20	40	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
107-02-8	Acrolein	ND		ug/kg dry	20	40	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
107-13-1	Acrylonitrile	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC



Sample Information

Client Sample ID: LP_004

York Sample ID: 23A0038-04

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:30 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
71-43-2	Benzene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
108-86-1	Bromobenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
74-97-5	Bromochloromethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
75-27-4	Bromodichloromethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
75-25-2	Bromoform	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
74-83-9	Bromomethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
75-15-0	Carbon disulfide	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
56-23-5	Carbon tetrachloride	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
108-90-7	Chlorobenzene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
75-00-3	Chloroethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
67-66-3	Chloroform	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
74-87-3	Chloromethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
124-48-1	Dibromochloromethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
74-95-3	Dibromomethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
100-41-4	Ethyl Benzene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
60-29-7	* Ethyl Ether	ND		ug/kg dry	100	200	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/kg dry	16	32	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
87-68-3	Hexachlorobutadiene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
74-88-4	* Iodomethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
98-82-8	Isopropylbenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC



Sample Information

Client Sample ID: LP_004

York Sample ID: 23A0038-04

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:30 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
80-62-6	Methyl Methacrylate	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
75-09-2	Methylene chloride	ND		ug/kg dry	20	40	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
91-20-3	Naphthalene	ND	IS-LO	ug/kg dry	10	40	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
104-51-8	n-Butylbenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
103-65-1	n-Propylbenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
95-47-6	o-Xylene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	20	40	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
105-05-5	* p-Diethylbenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
622-96-8	* p-Ethyltoluene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
99-87-6	p-Isopropyltoluene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
135-98-8	sec-Butylbenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
100-42-5	Styrene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
994-05-8	* tert-Amyl methyl ether (TAME)	ND		ug/kg dry	16	32	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
98-06-6	tert-Butylbenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
127-18-4	Tetrachloroethylene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
109-99-9	* Tetrahydrofuran	ND		ug/kg dry	20	40	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
108-88-3	Toluene	12	J	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
79-01-6	Trichloroethylene	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
108-05-4	Vinyl acetate	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC



Sample Information

Client Sample ID: LP_004

York Sample ID: 23A0038-04

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 12:30 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-01-4	Vinyl Chloride	ND		ug/kg dry	10	20	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:33	BMC
1330-20-7	Xylenes, Total	ND		ug/kg dry	30	60	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 16:33	BMC
107-05-1	* Allyl chloride	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
123-86-4	* n-butyl acetate	ND	CCVE	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
75-45-6	* Chlorodifluoromethane (Freon 22)	ND	CCVE	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
493-01-6	* cis-decahydronaphthalene	ND	CCVE, IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
493-02-7	* trans-decahydronaphthalene	ND	CCVE, IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
124-18-5	* n-Decane	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
97-63-2	* Ethyl Methacrylate	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
67-72-1	* Hexachloroethane	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
110-54-3	* n-Hexane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
5989-27-5	* Limonene	37	IS-LO, CCVE	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
98-95-3	* Nitrobenzene	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
79-46-9	* 2-Nitropropane	ND		ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
111-84-2	* n-Nonane	ND	CCVE	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
111-65-9	* n-octane	ND	CCVE	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
1120-21-4	* n-undecane	ND	IS-LO	ug/kg dry	10	20	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/kg dry	200	200	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:33	BMC
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	113 %			77-125						
2037-26-5	Surrogate: SURR: Toluene-d8	101 %			85-120						
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	132 %	IS-LO, S-03, S-08		76-130						

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:



Sample Information

Client Sample ID: LP_004

York Sample ID: 23A0038-04

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 12:30 pm

01/03/2023

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
120-12-7	Anthracene	ND		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
56-55-3	Benzo(a)anthracene	745		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
50-32-8	Benzo(a)pyrene	582		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
205-99-2	Benzo(b)fluoranthene	627		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
191-24-2	Benzo(g,h,i)perylene	ND		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
207-08-9	Benzo(k)fluoranthene	637		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
218-01-9	Chrysene	858		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
206-44-0	Fluoranthene	1070		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
86-73-7	Fluorene	ND		ug/kg dry	93.1	186	2	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
85-01-8	Phenanthrene	226		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
129-00-0	Pyrene	931		ug/kg dry	93.1	186	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 11:41	KH
Surrogate Recoveries		Result	Acceptance Range								
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	65.0 %	22-108								
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	49.0 %	21-113								
1718-51-0	Surrogate: SURR: Terphenyl-d14	67.4 %	24-116								

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	3.87		mg/kg dry	2.81	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:13	CW
7440-39-3	Barium	160		mg/kg dry	4.69	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:13	CW
7440-41-7	Beryllium	0.135		mg/kg dry	0.094	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:13	CW



Sample Information

Client Sample ID: LP_004

York Sample ID: 23A0038-04

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 12:30 pm

Date Received

01/03/2023

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-43-9	Cadmium	6.30		mg/kg dry	0.562	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:13	CW
7440-47-3	Chromium	17.3		mg/kg dry	0.937	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:13	CW
7440-50-8	Copper	988		mg/kg dry	3.75	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:13	CW
7439-92-1	Lead	80.9		mg/kg dry	0.937	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:13	CW
7440-02-0	Nickel	14.1		mg/kg dry	1.87	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:13	CW
7782-49-2	Selenium	ND		mg/kg dry	4.69	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:13	CW
7440-22-4	Silver	1.22		mg/kg dry	0.937	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:13	CW

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	0.962		mg/kg dry	0.0675	1	EPA 7473 Certifications: CTDOH-PH-0723,NJDEP,NELAC-NY10854,PADEP	01/04/2023 09:06	01/04/2023 12:43	MR

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	44.5		%	0.100	1	SM 2540G Certifications: CTDOH-PH-0723	01/04/2023 15:55	01/04/2023 20:07	AGNR

Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0038-05

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 1:15 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0038-05

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 1:15 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
79-34-5	1,1,2,2-Tetrachloroethane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 17:51	BMC
79-00-5	1,1,2-Trichloroethane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
563-58-6	1,1-Dichloropropylene	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
87-61-6	1,2,3-Trichlorobenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
96-18-4	1,2,3-Trichloropropane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 17:51	BMC
95-93-2	* 1,2,4,5-Tetramethylbenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
120-82-1	1,2,4-Trichlorobenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
95-63-6	1,2,4-Trimethylbenzene	67	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
96-12-8	1,2-Dibromo-3-chloropropane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
106-93-4	1,2-Dibromoethane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
95-50-1	1,2-Dichlorobenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
78-87-5	1,2-Dichloropropane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
108-67-8	1,3,5-Trimethylbenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
541-73-1	1,3-Dichlorobenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
142-28-9	1,3-Dichloropropane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
106-46-7	1,4-Dichlorobenzene	690	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
123-91-1	1,4-Dioxane	ND	IS-LO	ug/kg dry	230	460	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0038-05

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 1:15 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
594-20-7	2,2-Dichloropropane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 17:51	BMC
78-93-3	2-Butanone	270		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
110-75-8	2-Chloroethylvinyl ether	ND	IS-LO	ug/kg dry	46	92	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
95-49-8	2-Chlorotoluene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
591-78-6	2-Hexanone	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
106-43-4	4-Chlorotoluene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
108-10-1	4-Methyl-2-pentanone	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
67-64-1	Acetone	ND		ug/kg dry	2700	5400	100	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/11/2023 06:16	01/11/2023 23:42	JTG
107-02-8	Acrolein	ND		ug/kg dry	23	46	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
107-13-1	Acrylonitrile	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
71-43-2	Benzene	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
108-86-1	Bromobenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
74-97-5	Bromochloromethane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
75-27-4	Bromodichloromethane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
75-25-2	Bromoform	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
74-83-9	Bromomethane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
75-15-0	Carbon disulfide	46		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
56-23-5	Carbon tetrachloride	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
108-90-7	Chlorobenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
75-00-3	Chloroethane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
67-66-3	Chloroform	310		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
74-87-3	Chloromethane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0038-05

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 1:15 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
10061-01-5	cis-1,3-Dichloropropylene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
124-48-1	Dibromochloromethane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
74-95-3	Dibromomethane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
100-41-4	Ethyl Benzene	34	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
60-29-7	* Ethyl Ether	ND		ug/kg dry	120	230	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/kg dry	18	37	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
87-68-3	Hexachlorobutadiene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
74-88-4	* Iodomethane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
98-82-8	Isopropylbenzene	84	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
80-62-6	Methyl Methacrylate	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
75-09-2	Methylene chloride	ND		ug/kg dry	23	46	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
91-20-3	Naphthalene	ND	IS-LO	ug/kg dry	12	46	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:51	BMC
104-51-8	n-Butylbenzene	87	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
103-65-1	n-Propylbenzene	83	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PA	01/04/2023 06:20	01/04/2023 17:51	BMC
95-47-6	o-Xylene	27	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
179601-23-1	p- & m- Xylenes	94	IS-LO	ug/kg dry	23	46	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
105-05-5	* p-Diethylbenzene	16	IS-LO, J	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
622-96-8	* p-Ethyltoluene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	1400	2700	100	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/11/2023 06:16	01/11/2023 23:42	JTG
135-98-8	sec-Butylbenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC
100-42-5	Styrene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:51	BMC



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0038-05

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 1:15 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
994-05-8	* tert-Amyl methyl ether (TAME)	ND	IS-LO	ug/kg dry	18	37	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
98-06-6	tert-Butylbenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
127-18-4	Tetrachloroethylene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
109-99-9	* Tetrahydrofuran	ND		ug/kg dry	23	46	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
108-88-3	Toluene	5300		ug/kg dry	1400	2700	100	EPA 8260C Certifications:	01/11/2023 06:16	01/11/2023 23:42	JTG
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
10061-02-6	trans-1,3-Dichloropropylene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
79-01-6	Trichloroethylene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
108-05-4	Vinyl acetate	ND		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
75-01-4	Vinyl Chloride	ND		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
1330-20-7	Xylenes, Total	120	IS-LO	ug/kg dry	35	69	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
107-05-1	* Allyl chloride	ND		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
123-86-4	* n-butyl acetate	ND	CCVE, IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
75-45-6	* Chlorodifluoromethane (Freon 22)	ND	CCVE	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
493-01-6	* cis-decahydronaphthalene	ND	CCVE, IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
493-02-7	* trans-decahydronaphthalene	ND	CCVE, IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
124-18-5	* n-Decane	1700	IS-LO, VOA-E	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
97-63-2	* Ethyl Methacrylate	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
67-72-1	* Hexachloroethane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
110-54-3	* n-Hexane	230		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
5989-27-5	* Limonene	26000		ug/kg dry	1400	2700	100	EPA 8260C Certifications:	01/11/2023 06:16	01/11/2023 23:42	JTG
98-95-3	* Nitrobenzene	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0038-05

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 1:15 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-46-9	* 2-Nitropropane	ND	IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
111-84-2	* n-Nonane	250	CCVE, IS-LO	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
111-65-9	* n-octane	2300	J	ug/kg dry	1400	2700	100	EPA 8260C Certifications:	01/11/2023 06:16	01/11/2023 23:42	JTG
1120-21-4	* n-undecane	310	IS-LO, VOA-E	ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/kg dry	230	230	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:51	BMC
Surrogate Recoveries		Result		Acceptance Range							
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	55.4 %	S-08		77-125						
2037-26-5	Surrogate: SURR: Toluene-d8	124 %	IS-LO, S-03, S-08		85-120						
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	280 %	IS-LO, S-03, S-08		76-130						

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
120-12-7	Anthracene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
56-55-3	Benzo(a)anthracene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
50-32-8	Benzo(a)pyrene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
205-99-2	Benzo(b)fluoranthene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
191-24-2	Benzo(g,h,i)perylene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
207-08-9	Benzo(k)fluoranthene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
218-01-9	Chrysene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
206-44-0	Fluoranthene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
86-73-7	Fluorene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0038-05

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 1:15 pm

01/03/2023

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
85-01-8	Phenanthrene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
129-00-0	Pyrene	ND		ug/kg dry	168000	334000	100	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 22:46	KH
Surrogate Recoveries		Result		Acceptance Range							
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	%	S-01			22-108					
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	600 %	S-01			21-113					
1718-51-0	Surrogate: SURR: Terphenyl-d14	%	S-01			24-116					

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
307-24-4	* Perfluorohexanoic acid (PFHxA)	57.4		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	20.3		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	12.1		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
72629-94-8	* Perfluorotridecanoic acid (PFTriDA)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
2355-31-9	* N-MeFOSAA	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
2991-50-6	* N-EtFOSAA	7.87		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ug/kg dry	10.9	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0038-05

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 1:15 pm

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	33.8		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ug/kg dry	21.8	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ug/kg dry	21.8	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ug/kg dry	21.8	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
113507-82-7	* Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND		ug/kg dry	10.9	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
151772-58-6	* Perfluoro-3,6-dioxahexanoic acid (NFDHA)	ND		ug/kg dry	10.9	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
377-73-1	* Perfluoro-4-oxapentanoic acid (PFMPA)	ND		ug/kg dry	10.9	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
863090-89-5	* Perfluoro-5-oxahexanoic acid (PFMBA)	ND		ug/kg dry	10.9	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
2706-91-4	* Perfluoro-1-pentanesulfonate (PFPeS)	10.1		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
757124-72-4	* 1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	ND		ug/kg dry	21.8	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
13252-13-6	* HFPO-DA (Gen-X)	68.9		ug/kg dry	21.8	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
763051-92-9	* 11CL-PF3OUdS	ND		ug/kg dry	21.8	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
756426-58-1	* 9CL-PF3ONS	ND		ug/kg dry	21.8	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
919005-14-4	* ADONA	ND		ug/kg dry	21.8	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
79780-39-5	* Perfluorododecanesulfonic acid (PFDoS)	15.4		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
68259-12-1	* Perfluoro-1-nonanesulfonic acid (PFNS)	6.48		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
356-02-2	* 3-Perfluoropropyl propanoic acid (FPrPA)	98.6		ug/kg dry	27.2	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
914637-49-3	* 3-Perfluoropentyl propanoic acid (FPePA)	401		ug/kg dry	136	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
812-70-4	* 3-Perfluoroheptyl propanoic acid (FHpPA)	ND		ug/kg dry	136	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
24448-09-7	* N-McFOSE	251		ug/kg dry	54.4	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0038-05

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 1:15 pm

Date Received

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
31506-32-8	* N-MeFOSA	ND		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
1691-99-2	* N-EtFOSE	204		ug/kg dry	54.4	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
4151-50-2	* N-EtFOSA	24.2		ug/kg dry	5.44	10	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:25	ESJ
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		51.7 %	25-150							
Surrogate: M5PFHxA		43.6 %	25-150							
Surrogate: M4PFHpA		39.4 %	25-150							
Surrogate: M3PFHxS		63.7 %	25-150							
Surrogate: Perfluoro-n- [13C8]octanoic acid (M8PFOA)		37.7 %	25-150							
Surrogate: M6PFDA		82.8 %	25-150							
Surrogate: M7PFUdA		27.3 %	25-150							
Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)		14.2 %	25-150							
Surrogate: M2PFTeDA		48.4 %	10-150							
Surrogate: Perfluoro-n- [13C4]butanoic acid (MPFBA)		60.4 %	25-150							
Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)		1420 %	25-150							
Surrogate: Perfluoro-n- [13C5]pentanoic acid (M5PFPeA)		52.3 %	25-150							
Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)		0.428 %	10-150							
Surrogate: d3-N-MeFOSAA		555 %	25-150							
Surrogate: d5-N-EtFOSAA		334 %	25-150							
Surrogate: M2-6:2 FTS		32.7 %	25-200							
Surrogate: M2-8:2 FTS		95.0 %	25-200							
Surrogate: M9PFNA		59.0 %	25-150							
Surrogate: M2-4:2 FTS		18.9 %	25-150							
Surrogate: d-N-MeFOSA		%	25-150							
Surrogate: d-N-EtFOSA		3250 %	25-150							
Surrogate: M3HFPO-DA		31.7 %	25-150							
Surrogate: d9-N-EtFOSE		20.2 %	25-150							
Surrogate: d7-N-MeFOSE		9.54 %	25-150							



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0038-05

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 1:15 pm

Date Received

01/03/2023

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	ND		mg/kg dry	3.41	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:17	CW
7440-39-3	Barium	10.6		mg/kg dry	5.68	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:17	CW
7440-41-7	Beryllium	ND		mg/kg dry	0.114	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:17	CW
7440-43-9	Cadmium	ND		mg/kg dry	0.681	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:17	CW
7440-47-3	Chromium	5.64		mg/kg dry	1.14	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:17	CW
7440-50-8	Copper	176		mg/kg dry	4.54	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:17	CW
7439-92-1	Lead	11.6		mg/kg dry	1.14	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:17	CW
7440-02-0	Nickel	3.02		mg/kg dry	2.27	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:17	CW
7782-49-2	Selenium	ND		mg/kg dry	5.68	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:17	CW
7440-22-4	Silver	ND		mg/kg dry	1.14	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:17	CW

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND		mg/kg dry	0.0818	1	EPA 7473 Certifications: CTDOH-PH-0723,NJDEP,NELAC-NY10854,PADEP	01/04/2023 09:06	01/04/2023 12:52	MR

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	36.7		%	0.100	1	SM 2540G Certifications: CTDOH-PH-0723	01/04/2023 15:55	01/04/2023 20:07	AGNR



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0038-06

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 11:05 am

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
79-34-5	1,1,2,2-Tetrachloroethane	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 16:59	BMC
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
563-58-6	1,1-Dichloropropylene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
87-61-6	1,2,3-Trichlorobenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
96-18-4	1,2,3-Trichloropropane	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 16:59	BMC
95-93-2	* 1,2,4,5-Tetramethylbenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
120-82-1	1,2,4-Trichlorobenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
95-63-6	1,2,4-Trimethylbenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
96-12-8	1,2-Dibromo-3-chloropropane	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
95-50-1	1,2-Dichlorobenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
108-67-8	1,3,5-Trimethylbenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
541-73-1	1,3-Dichlorobenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
142-28-9	1,3-Dichloropropane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
106-46-7	1,4-Dichlorobenzene	230	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
123-91-1	1,4-Dioxane	ND		ug/kg dry	330	660	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0038-06

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 11:05 am

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
594-20-7	2,2-Dichloropropane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 16:59	BMC
78-93-3	2-Butanone	73		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
110-75-8	2-Chloroethylvinyl ether	ND		ug/kg dry	66	130	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
95-49-8	2-Chlorotoluene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
591-78-6	2-Hexanone	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
106-43-4	4-Chlorotoluene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
108-10-1	4-Methyl-2-pentanone	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
67-64-1	Acetone	320		ug/kg dry	33	66	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
107-02-8	Acrolein	ND		ug/kg dry	33	66	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
107-13-1	Acrylonitrile	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
71-43-2	Benzene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
108-86-1	Bromobenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
74-97-5	Bromochloromethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
75-27-4	Bromodichloromethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
75-25-2	Bromoform	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
74-83-9	Bromomethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
75-15-0	Carbon disulfide	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
56-23-5	Carbon tetrachloride	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
108-90-7	Chlorobenzene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
75-00-3	Chloroethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
67-66-3	Chloroform	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
74-87-3	Chloromethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0038-06

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 11:05 am

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
124-48-1	Dibromochloromethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
74-95-3	Dibromomethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
100-41-4	Ethyl Benzene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
60-29-7	* Ethyl Ether	ND		ug/kg dry	160	330	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/kg dry	26	53	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
87-68-3	Hexachlorobutadiene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
74-88-4	* Iodomethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
98-82-8	Isopropylbenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
80-62-6	Methyl Methacrylate	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
75-09-2	Methylene chloride	ND		ug/kg dry	33	66	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
91-20-3	Naphthalene	ND	IS-LO	ug/kg dry	16	66	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
104-51-8	n-Butylbenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
103-65-1	n-Propylbenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
95-47-6	o-Xylene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	33	66	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/04/2023 06:20	01/04/2023 16:59	BMC
105-05-5	* p-Diethylbenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
622-96-8	* p-Ethyltoluene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
99-87-6	p-Isopropyltoluene	19	IS-LO, J	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
135-98-8	sec-Butylbenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC
100-42-5	Styrene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 16:59	BMC



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0038-06

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 11:05 am

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
994-05-8	* tert-Amyl methyl ether (TAME)	ND		ug/kg dry	26	53	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
98-06-6	tert-Butylbenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
127-18-4	Tetrachloroethylene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
109-99-9	* Tetrahydrofuran	ND		ug/kg dry	33	66	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
108-88-3	Toluene	580		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
79-01-6	Trichloroethylene	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
108-05-4	Vinyl acetate	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
75-01-4	Vinyl Chloride	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
1330-20-7	Xylenes, Total	ND		ug/kg dry	49	99	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
107-05-1	* Allyl chloride	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
123-86-4	* n-butyl acetate	ND	CCVE	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
75-45-6	* Chlorodifluoromethane (Freon 22)	ND	CCVE	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
493-01-6	* cis-decahydronaphthalene	ND	CCVE, IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
493-02-7	* trans-decahydronaphthalene	ND	CCVE, IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
124-18-5	* n-Decane	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
97-63-2	* Ethyl Methacrylate	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
67-72-1	* Hexachloroethane	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
110-54-3	* n-Hexane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
5989-27-5	* Limonene	ND	CCVE, IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
98-95-3	* Nitrobenzene	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0038-06

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 11:05 am

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-46-9	* 2-Nitropropane	ND		ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
111-84-2	* n-Nonane	ND	CCVE	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
111-65-9	* n-octane	ND	CCVE	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
1120-21-4	* n-undecane	ND	IS-LO	ug/kg dry	16	33	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/kg dry	330	330	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 16:59	BMC
Surrogate Recoveries		Result		Acceptance Range							
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	110 %				77-125					
2037-26-5	Surrogate: SURR: Toluene-d8	114 %				85-120					
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	126 %	IS-LO			76-130					

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH
120-12-7	Anthracene	ND		ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH
56-55-3	Benzo(a)anthracene	575		ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH
50-32-8	Benzo(a)pyrene	800		ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH
205-99-2	Benzo(b)fluoranthene	915		ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH
191-24-2	Benzo(g,h,i)perylene	358	J	ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH
207-08-9	Benzo(k)fluoranthene	1060		ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH
218-01-9	Chrysene	707		ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH
53-70-3	Dibenzo(a,h)anthracene	809		ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH
206-44-0	Fluoranthene	1200		ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH
86-73-7	Fluorene	ND		ug/kg dry	277	553	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:13	KH



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0038-06

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 11:05 am

Date Received

01/03/2023

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
193-39-5	Indeno(1,2,3-cd)pyrene	827		ug/kg dry	277	553	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 12:13	KH
85-01-8	Phenanthrene	508	J	ug/kg dry	277	553	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 12:13	KH
129-00-0	Pyrene	1450		ug/kg dry	277	553	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 12:13	KH
Surrogate Recoveries		Result	Acceptance Range								
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	80.2 %	22-108								
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	62.0 %	21-113								
1718-51-0	Surrogate: SURR: Terphenyl-d14	91.3 %	24-116								

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
307-24-4	* Perfluorohexanoic acid (PFHxA)	4.84		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
335-67-1	* Perfluorooctanoic acid (PFOA)	1.58		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	2.90		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
307-55-1	* Perfluorododecanoic acid (PFDoA)	2.95		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
72629-94-8	* Perfluorotridecanoic acid (PFTriDA)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
2355-31-9	* N-MeFOSAA	51.7		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
2991-50-6	* N-EtFOSAA	12.8		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0038-06

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 11:05 am

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ug/kg dry	1.82	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ug/kg dry	3.64	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ug/kg dry	3.64	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ug/kg dry	3.64	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
113507-82-7	* Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	ND		ug/kg dry	1.82	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
151772-58-6	* Perfluoro-3,6-dioxahexanoic acid (NFDHA)	ND		ug/kg dry	1.82	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
377-73-1	* Perfluoro-4-oxapentanoic acid (PFMPA)	ND		ug/kg dry	1.82	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
863090-89-5	* Perfluoro-5-oxahexanoic acid (PFMBA)	ND		ug/kg dry	1.82	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
2706-91-4	* Perfluoro-1-pentanesulfonate (PFPeS)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
757124-72-4	* 1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	ND		ug/kg dry	3.64	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
13252-13-6	* HFPO-DA (Gen-X)	ND		ug/kg dry	3.64	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
763051-92-9	* 11CL-PF3OUdS	ND		ug/kg dry	3.64	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
756426-58-1	* 9CL-PF3ONS	ND		ug/kg dry	3.64	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
919005-14-4	* ADONA	ND		ug/kg dry	3.64	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
79780-39-5	* Perfluorododecanesulfonic acid (PFDoS)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
68259-12-1	* Perfluoro-1-nonanesulfonic acid (PFNS)	ND		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
356-02-2	* 3-Perfluoropropyl propanoic acid (FPrPA)	14.8		ug/kg dry	4.54	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
914637-49-3	* 3-Perfluoropentyl propanoic acid (FPePA)	ND		ug/kg dry	22.7	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
812-70-4	* 3-Perfluoroheptyl propanoic acid (FHpPA)	ND		ug/kg dry	22.7	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0038-06

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 11:05 am

Date Received

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
24448-09-7	* N-MeFOSE	82.5		ug/kg dry	9.09	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
31506-32-8	* N-MeFOSA	13.7	B	ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
1691-99-2	* N-EtFOSE	ND		ug/kg dry	9.09	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
4151-50-2	* N-EtFOSA	3.67		ug/kg dry	0.909	1	EPA 1633 Draft 2 Certifications:	01/05/2023 13:18	01/11/2023 22:41	ESJ
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		34.4 %	25-150							
Surrogate: M5PFHxA		26.9 %	25-150							
Surrogate: M4PFHpA		29.0 %	25-150							
Surrogate: M3PFHxS		43.7 %	25-150							
Surrogate: Perfluoro-n- [13C8]octanoic acid (M8PFOA)		39.3 %	25-150							
Surrogate: M6PFDA		34.8 %	25-150							
Surrogate: M7PFUdA		5.57 %	25-150							
Surrogate: Perfluoro-n- [1,2-13C2]dodecanoic acid (MPFDoA)		3.34 %	25-150							
Surrogate: M2PFTeDA		18.9 %	10-150							
Surrogate: Perfluoro-n- [13C4]butanoic acid (MPFBA)		17.9 %	25-150							
Surrogate: Perfluoro-1- [13C8]octanesulfonic acid (M8PFOS)		56.4 %	25-150							
Surrogate: Perfluoro-n- [13C5]pentanoic acid (M5PFPeA)		21.6 %	25-150							
Surrogate: Perfluoro-1- [13C8]octanesulfonamide (M8FOSA)		0.00689 %	10-150							
Surrogate: d3-N-MeFOSAA		6.14 %	25-150							
Surrogate: d5-N-EtFOSAA		0.438 %	25-150							
Surrogate: M2-6:2 FTS		69.1 %	25-200							
Surrogate: M2-8:2 FTS		44.0 %	25-200							
Surrogate: M9PFNA		42.6 %	25-150							
Surrogate: M2-4:2 FTS		31.8 %	25-150							
Surrogate: d-N-MeFOSA		0.409 %	25-150							
Surrogate: d-N-EtFOSA		28.7 %	25-150							
Surrogate: M3HFPO-DA		20.8 %	25-150							
Surrogate: d9-N-EtFOSE		1.10 %	25-150							
Surrogate: d7-N-MeFOSE		0.0431 %	25-150							



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0038-06

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Soil

Collection Date/Time

January 3, 2023 11:05 am

Date Received

01/03/2023

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	ND		mg/kg dry	5.69	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:20	CW
7440-39-3	Barium	41.3		mg/kg dry	9.49	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:20	CW
7440-41-7	Beryllium	ND		mg/kg dry	0.190	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:20	CW
7440-43-9	Cadmium	1.88		mg/kg dry	1.14	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:20	CW
7440-47-3	Chromium	18.3		mg/kg dry	1.90	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:20	CW
7440-50-8	Copper	263		mg/kg dry	7.59	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:20	CW
7439-92-1	Lead	68.6		mg/kg dry	1.90	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:20	CW
7440-02-0	Nickel	13.3		mg/kg dry	3.79	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:20	CW
7782-49-2	Selenium	ND		mg/kg dry	9.49	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:20	CW
7440-22-4	Silver	ND		mg/kg dry	1.90	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:20	CW

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	0.202		mg/kg dry	0.137	1	EPA 7473 Certifications: CTDOH-PH-0723,NJDEP,NELAC-NY10854,PADEP	01/04/2023 09:06	01/04/2023 13:02	MR

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	22.0		%	0.100	1	SM 2540G Certifications: CTDOH-PH-0723	01/04/2023 15:55	01/04/2023 20:07	AGNR



Sample Information

Client Sample ID: DUP_008

York Sample ID: 23A0038-07

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 2:42 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
71-55-6	1,1,1-Trichloroethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 17:25	BMC
79-00-5	1,1,2-Trichloroethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
75-34-3	1,1-Dichloroethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
75-35-4	1,1-Dichloroethylene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
563-58-6	1,1-Dichloropropylene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:25	BMC
87-61-6	1,2,3-Trichlorobenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:25	BMC
96-18-4	1,2,3-Trichloropropane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 17:25	BMC
95-93-2	* 1,2,4,5-Tetramethylbenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
120-82-1	1,2,4-Trichlorobenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:25	BMC
95-63-6	1,2,4-Trimethylbenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
106-93-4	1,2-Dibromoethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
95-50-1	1,2-Dichlorobenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
107-06-2	1,2-Dichloroethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
78-87-5	1,2-Dichloropropane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
108-67-8	1,3,5-Trimethylbenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
541-73-1	1,3-Dichlorobenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
142-28-9	1,3-Dichloropropane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:25	BMC
106-46-7	1,4-Dichlorobenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
123-91-1	1,4-Dioxane	ND		ug/kg dry	120	230	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:25	BMC



Sample Information

Client Sample ID: DUP_008

York Sample ID: 23A0038-07

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 2:42 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
594-20-7	2,2-Dichloropropane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/04/2023 06:20	01/04/2023 17:25	BMC
78-93-3	2-Butanone	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
110-75-8	2-Chloroethylvinyl ether	ND		ug/kg dry	23	47	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:25	BMC
95-49-8	2-Chlorotoluene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
591-78-6	2-Hexanone	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
106-43-4	4-Chlorotoluene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
108-10-1	4-Methyl-2-pentanone	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
67-64-1	Acetone	48		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
107-02-8	Acrolein	ND		ug/kg dry	12	23	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
107-13-1	Acrylonitrile	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
71-43-2	Benzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
108-86-1	Bromobenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:25	BMC
74-97-5	Bromochloromethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/04/2023 06:20	01/04/2023 17:25	BMC
75-27-4	Bromodichloromethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
75-25-2	Bromoform	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
74-83-9	Bromomethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
75-15-0	Carbon disulfide	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
56-23-5	Carbon tetrachloride	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
108-90-7	Chlorobenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
75-00-3	Chloroethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
67-66-3	Chloroform	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
74-87-3	Chloromethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC
156-59-2	cis-1,2-Dichloroethylene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/04/2023 06:20	01/04/2023 17:25	BMC



Sample Information

Client Sample ID: DUP_008

York Sample ID: 23A0038-07

York Project (SDG) No.

Client Project ID

Matrix

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BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 2:42 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
124-48-1	Dibromochloromethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
74-95-3	Dibromomethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
75-71-8	Dichlorodifluoromethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
100-41-4	Ethyl Benzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
60-29-7	* Ethyl Ether	ND		ug/kg dry	58	120	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/kg dry	9.3	19	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
87-68-3	Hexachlorobutadiene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
74-88-4	* Iodomethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
98-82-8	Isopropylbenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
80-62-6	Methyl Methacrylate	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
75-09-2	Methylene chloride	ND		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
91-20-3	Naphthalene	ND		ug/kg dry	5.8	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
104-51-8	n-Butylbenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
103-65-1	n-Propylbenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
95-47-6	o-Xylene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
179601-23-1	p- & m- Xylenes	ND		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
105-05-5	* p-Diethylbenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
622-96-8	* p-Ethyltoluene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
99-87-6	p-Isopropyltoluene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
135-98-8	sec-Butylbenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
100-42-5	Styrene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC



Sample Information

Client Sample ID: DUP_008

York Sample ID: 23A0038-07

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

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23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 2:42 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
994-05-8	* tert-Amyl methyl ether (TAME)	ND		ug/kg dry	9.3	19	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
98-06-6	tert-Butylbenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
127-18-4	Tetrachloroethylene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
109-99-9	* Tetrahydrofuran	ND		ug/kg dry	12	23	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
108-88-3	Toluene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
156-60-5	trans-1,2-Dichloroethylene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
79-01-6	Trichloroethylene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
75-69-4	Trichlorofluoromethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
108-05-4	Vinyl acetate	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
75-01-4	Vinyl Chloride	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
1330-20-7	Xylenes, Total	ND		ug/kg dry	17	35	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
107-05-1	* Allyl chloride	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
123-86-4	* n-butyl acetate	ND	CCVE	ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
75-45-6	* Chlorodifluoromethane (Freon 22)	ND	CCVE	ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
493-01-6	* cis-decahydronaphthalene	ND	CCVE	ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
493-02-7	* trans-decahydronaphthalene	ND	CCVE	ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
124-18-5	* n-Decane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
97-63-2	* Ethyl Methacrylate	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
67-72-1	* Hexachloroethane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
110-54-3	* n-Hexane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
5989-27-5	* Limonene	ND	CCVE	ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
98-95-3	* Nitrobenzene	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC



Sample Information

Client Sample ID: DUP_008

York Sample ID: 23A0038-07

York Project (SDG) No.

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Soil

January 3, 2023 2:42 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-46-9	* 2-Nitropropane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
111-84-2	* n-Nonane	ND	CCVE	ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
111-65-9	* n-octane	ND	CCVE	ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
1120-21-4	* n-undecane	ND		ug/kg dry	5.8	12	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/kg dry	120	120	1	EPA 8260C Certifications:	01/04/2023 06:20	01/04/2023 17:25	BMC
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	109 %	77-125								
2037-26-5	Surrogate: SURR: Toluene-d8	94.8 %	85-120								
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	115 %	76-130								

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH
120-12-7	Anthracene	ND		ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH
56-55-3	Benzo(a)anthracene	368		ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH
50-32-8	Benzo(a)pyrene	647		ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH
205-99-2	Benzo(b)fluoranthene	716		ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH
191-24-2	Benzo(g,h,i)perylene	587		ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH
207-08-9	Benzo(k)fluoranthene	642		ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH
218-01-9	Chrysene	482		ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH
53-70-3	Dibenzo(a,h)anthracene	174	J	ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH
206-44-0	Fluoranthene	575		ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH
86-73-7	Fluorene	ND		ug/kg dry	150	299	2	EPA 8270D Certifications:	01/06/2023 08:31	01/09/2023 12:45	KH



Sample Information

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York Project (SDG) No.

23A0038

Client Project ID

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January 3, 2023 2:42 pm

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Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
193-39-5	Indeno(1,2,3-cd)pyrene	446		ug/kg dry	150	299	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 12:45	KH
85-01-8	Phenanthrene	ND		ug/kg dry	150	299	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 12:45	KH
129-00-0	Pyrene	489		ug/kg dry	150	299	2	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/06/2023 08:31	01/09/2023 12:45	KH
Surrogate Recoveries		Result	Acceptance Range								
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	85.2 %	22-108								
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	67.1 %	21-113								
1718-51-0	Surrogate: SURR: Terphenyl-d14	89.2 %	24-116								

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	ND		mg/kg dry	3.02	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:23	CW
7440-39-3	Barium	63.2		mg/kg dry	5.04	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:23	CW
7440-41-7	Beryllium	ND		mg/kg dry	0.101	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:23	CW
7440-43-9	Cadmium	5.75		mg/kg dry	0.605	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:23	CW
7440-47-3	Chromium	13.9		mg/kg dry	1.01	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:23	CW
7440-50-8	Copper	759		mg/kg dry	4.03	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:23	CW
7439-92-1	Lead	86.2		mg/kg dry	1.01	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:23	CW
7440-02-0	Nickel	8.88		mg/kg dry	2.02	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:23	CW
7782-49-2	Selenium	ND		mg/kg dry	5.04	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:23	CW
7440-22-4	Silver	ND		mg/kg dry	1.01	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/05/2023 17:44	01/09/2023 11:23	CW

Mercury by 7473

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 7473 soil

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	1.09		mg/kg dry	0.0726	1	EPA 7473 Certifications: CTDOH-PH-0723,NJDEP,NELAC-NY10854,PADEP	01/04/2023 09:06	01/04/2023 15:18	MR



Sample Information

Client Sample ID: DUP_008

York Sample ID: 23A0038-07

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Soil

January 3, 2023 2:42 pm

01/03/2023

Total Solids

Log-in Notes:

Sample Notes:

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	* % Solids	41.3		%	0.100	1	SM 2540G Certifications: CTDOH-PH-0723	01/04/2023 15:55	01/04/2023 20:07	AGNR

Sample Information

Client Sample ID: EB_001

York Sample ID: 23A0038-08

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:35 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 12:53	JTG
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 12:53	JTG
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 12:53	JTG
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 12:53	JTG
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 12:53	JTG
75-34-3	1,1-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 12:53	JTG
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 12:53	JTG
563-58-6	1,1-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/10/2023 06:27	01/11/2023 12:53	JTG
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 12:53	JTG
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 12:53	JTG
95-93-2	* 1,2,4,5-Tetramethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 12:53	JTG
95-63-6	1,2,4-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 12:53	JTG
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 12:53	JTG



Sample Information

Client Sample ID: EB_001

York Sample ID: 23A0038-08

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:35 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
106-93-4	1,2-Dibromoethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
107-06-2	1,2-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
78-87-5	1,2-Dichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
108-67-8	1,3,5-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
142-28-9	1,3-Dichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
106-46-7	1,4-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
123-91-1	1,4-Dioxane	ND		ug/L	40	80	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
594-20-7	2,2-Dichloropropane	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
78-93-3	2-Butanone	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
110-75-8	2-Chloroethylvinyl ether	ND		ug/L	10	20	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
95-49-8	2-Chlorotoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
591-78-6	2-Hexanone	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
106-43-4	4-Chlorotoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
108-10-1	4-Methyl-2-pentanone	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
67-64-1	Acetone	2.0		ug/L	1.0	2.0	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
107-02-8	Acrolein	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
107-13-1	Acrylonitrile	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
71-43-2	Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
108-86-1	Bromobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
74-97-5	Bromochloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
75-27-4	Bromodichloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG



Sample Information

Client Sample ID: EB_001

York Sample ID: 23A0038-08

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:35 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-25-2	Bromoform	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
74-83-9	Bromomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
75-15-0	Carbon disulfide	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
56-23-5	Carbon tetrachloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
108-90-7	Chlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
75-00-3	Chloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
67-66-3	Chloroform	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
74-87-3	Chloromethane	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
124-48-1	Dibromochloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
74-95-3	Dibromomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
75-71-8	Dichlorodifluoromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
100-41-4	Ethyl Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
60-29-7	* Ethyl Ether	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/L	0.40	0.80	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
87-68-3	Hexachlorobutadiene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
74-88-4	* Iodomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
98-82-8	Isopropylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
80-62-6	Methyl Methacrylate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
75-09-2	Methylene chloride	ND		ug/L	1.0	2.0	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
91-20-3	Naphthalene	ND		ug/L	1.0	2.0	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG



Sample Information

Client Sample ID: EB_001

York Sample ID: 23A0038-08

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:35 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
104-51-8	n-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
103-65-1	n-Propylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
95-47-6	o-Xylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
179601-23-1	p- & m- Xylenes	ND		ug/L	0.50	1.0	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
105-05-5	* p-Diethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
622-96-8	* p-Ethyltoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
99-87-6	p-Isopropyltoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
135-98-8	sec-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
100-42-5	Styrene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
994-05-8	* tert-Amyl methyl ether (TAME)	ND		ug/L	0.40	0.80	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
98-06-6	tert-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
127-18-4	Tetrachloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
109-99-9	* Tetrahydrofuran	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
108-88-3	Toluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
79-01-6	Trichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
75-69-4	Trichlorofluoromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
108-05-4	Vinyl acetate	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
75-01-4	Vinyl Chloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
1330-20-7	Xylenes, Total	ND		ug/L	0.60	1.5	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
107-05-1	* Allyl chloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
123-86-4	* n-butyl acetate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG



Sample Information

Client Sample ID: EB_001

York Sample ID: 23A0038-08

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

January 3, 2023 2:35 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-45-6	* Chlorodifluoromethane (Freon 22)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
493-01-6	* cis-decahydronaphthalene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
493-02-7	* trans-decahydronaphthalene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
124-18-5	* n-Decane	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
97-63-2	* Ethyl Methacrylate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
67-72-1	* Hexachloroethane	ND	QL-02	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
110-54-3	* n-Hexane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
5989-27-5	* Limonene	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
98-95-3	* Nitrobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
79-46-9	* 2-Nitropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
111-84-2	* n-Nonane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
111-65-9	* n-octane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
1120-21-4	* n-undecane	ND	CCVE, QL-02	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/L	5.0	5.0	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 12:53	JTG
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	101 %	65-135								
2037-26-5	Surrogate: SURR: Toluene-d8	94.3 %	86-118								
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	98.1 %	81-114								

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
120-12-7	Anthracene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH



Sample Information

Client Sample ID: EB_001

York Sample ID: 23A0038-08

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

January 3, 2023 2:35 pm

Date Received

01/03/2023

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
218-01-9	Chrysene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
206-44-0	Fluoranthene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
86-73-7	Fluorene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
85-01-8	Phenanthrene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
129-00-0	Pyrene	ND		ug/L	0.0500	0.0500	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/05/2023 15:51	KH
Surrogate Recoveries		Result			Acceptance Range						
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	73.4 %			50.2-113						
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	56.0 %			39.9-105						
1718-51-0	Surrogate: SURR: Terphenyl-d14	53.0 %			30.7-106						

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ



Sample Information

Client Sample ID: EB_001

York Sample ID: 23A0038-08

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:35 pm

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
72629-94-8	* Perfluorotridecanoic acid (PFTriDA)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
2355-31-9	* N-MeFOSAA	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
2991-50-6	* N-EtFOSAA	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ng/L	3.76	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ng/L	7.52	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ng/L	7.52	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ng/L	7.52	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
113507-82-7	* Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND		ng/L	3.76	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
151772-58-6	* Perfluoro-3,6-dioxahexanoic acid (NFDHA)	ND		ng/L	3.76	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
377-73-1	* Perfluoro-4-oxapentanoic acid (PFMPA)	ND		ng/L	3.76	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
863090-89-5	* Perfluoro-5-oxahexanoic acid (PFMBA)	ND		ng/L	3.76	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
2706-91-4	* Perfluoro-1-pentanesulfonate (PFPeS)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
757124-72-4	* 1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	ND		ng/L	7.52	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
13252-13-6	* HFPO-DA (Gen-X)	ND		ng/L	7.52	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
763051-92-9	* 11CL-PF3OUdS	ND		ng/L	7.52	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ



Sample Information

Client Sample ID: EB_001

York Sample ID: 23A0038-08

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:35 pm

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
756426-58-1	* 9CL-PF3ONS	ND		ng/L	7.52	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
919005-14-4	* ADONA	ND		ng/L	7.52	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
79780-39-5	* Perfluorododecanesulfonic acid (PFDoS)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
68259-12-1	* Perfluoro-1-nonanesulfonic acid (PFNS)	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
356-02-2	* 3-Perfluoropropyl propanoic acid (FPtPA)	ND		ng/L	4.70	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
914637-49-3	* 3-Perfluoropentyl propanoic acid (FPePA)	ND		ng/L	23.5	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
812-70-4	* 3-Perfluoroheptyl propanoic acid (FHpPA)	ND		ng/L	23.5	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
24448-09-7	* N-MeFOSE	ND		ng/L	18.8	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
31506-32-8	* N-MeFOSA	ND		ng/L	1.88	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
1691-99-2	* N-EtFOSE	ND		ng/L	18.8	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
4151-50-2	* N-EtFOSA	ND		ng/L	0.188	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 20:50	ESJ
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		86.1 %	25-150							
Surrogate: M5PFHxA		93.2 %	25-150							
Surrogate: M4PFHpA		92.4 %	25-150							
Surrogate: M3PFHxS		101 %	25-150							
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)		91.7 %	25-150							
Surrogate: M6PFDA		105 %	25-150							
Surrogate: M7PFUdA		80.3 %	25-150							
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)		73.3 %	25-150							
Surrogate: M2PFTeDA		39.6 %	10-150							
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)		8.07 %	25-150							
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)		107 %	25-150							
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)		88.7 %	25-150							
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)		104 %	10-150							
Surrogate: d3-N-MeFOSAA		73.4 %	25-150							
Surrogate: d5-N-EtFOSAA		72.3 %	25-150							
Surrogate: M2-6:2 FTS		74.4 %	25-200							



Sample Information

Client Sample ID: EB_001

York Sample ID: 23A0038-08

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

January 3, 2023 2:35 pm

Date Received

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: M2-8:2 FTS	70.1 %			25-200					
	Surrogate: M9PFNA	111 %			25-150					
	Surrogate: M2-4:2 FTS	64.3 %			25-150					
	Surrogate: d-N-MeFOSA	79.0 %			25-150					
	Surrogate: d-N-EtFOSA	98.1 %			25-150					
	Surrogate: M3HFPO-DA	86.9 %			25-150					
	Surrogate: d9-N-EtFOSE	19.8 %			25-150					
	Surrogate: d7-N-MeFOSE	32.4 %			25-150					

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3015A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	ND		mg/L	0.017	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:37	CW
7440-39-3	Barium	ND		mg/L	0.028	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:37	CW
7440-41-7	Beryllium	ND		mg/L	0.0006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:37	CW
7440-43-9	Cadmium	ND		mg/L	0.003	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:37	CW
7440-47-3	Chromium	ND		mg/L	0.006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:37	CW
7440-50-8	Copper	ND		mg/L	0.022	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:37	CW
7439-92-1	Lead	ND		mg/L	0.006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:37	CW
7440-02-0	Nickel	ND		mg/L	0.011	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:37	CW
7782-49-2	* Selenium	ND		mg/L	0.028	1	EPA 6010D Certifications: CTDOH-PH-0723	01/04/2023 08:56	01/05/2023 14:37	CW
7440-22-4	Silver	ND		mg/L	0.006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:37	CW

Mercury by 7470/7471

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA SW846-7470A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND		mg/L	0.0002	1	EPA 7470 Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/03/2023 17:44	01/03/2023 17:44	AA



Sample Information

Client Sample ID: FB_001

York Sample ID: 23A0038-09

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:25 pm

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
307-24-4	* Perfluorohexanoic acid (PFHxA)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
2355-31-9	* N-MeFOSAA	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
2991-50-6	* N-EtFOSAA	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ng/L	3.63	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ng/L	7.26	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ng/L	7.26	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ng/L	7.26	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
113507-82-7	* Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND		ng/L	3.63	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ



Sample Information

Client Sample ID: FB_001

York Sample ID: 23A0038-09

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

January 3, 2023 2:25 pm

Date Received

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
151772-58-6	* Perfluoro-3,6-dioxaheptanoic acid (NFDHA)	ND		ng/L	3.63	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
377-73-1	* Perfluoro-4-oxapentanoic acid (PFMPA)	ND		ng/L	3.63	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
863090-89-5	* Perfluoro-5-oxahexanoic acid (PFMBA)	ND		ng/L	3.63	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
2706-91-4	* Perfluoro-1-pentanesulfonate (PFPeS)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
757124-72-4	* 1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	ND		ng/L	7.26	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
13252-13-6	* HFPO-DA (Gen-X)	ND		ng/L	7.26	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
763051-92-9	* 11CL-PF3OUdS	ND		ng/L	7.26	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
756426-58-1	* 9CL-PF3ONS	ND		ng/L	7.26	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
919005-14-4	* ADONA	ND		ng/L	7.26	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
79780-39-5	* Perfluorododecanesulfonic acid (PFDoS)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
68259-12-1	* Perfluoro-1-nonanesulfonic acid (PFNS)	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
356-02-2	* 3-Perfluoropropyl propanoic acid (FPPA)	ND		ng/L	4.54	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
914637-49-3	* 3-Perfluoropentyl propanoic acid (FPePA)	ND		ng/L	22.7	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
812-70-4	* 3-Perfluoroheptyl propanoic acid (FHpPA)	ND		ng/L	22.7	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
24448-09-7	* N-MeFOSE	ND		ng/L	18.1	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
31506-32-8	* N-MeFOSA	ND		ng/L	1.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
1691-99-2	* N-EtFOSE	ND		ng/L	18.1	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
4151-50-2	* N-EtFOSA	0.369		ng/L	0.181	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:07	ESJ
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		98.9 %	25-150							
Surrogate: M5PFHxA		112 %	25-150							
Surrogate: M4PFHpA		102 %	25-150							
Surrogate: M3PFHxS		113 %	25-150							
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)		95.5 %	25-150							
Surrogate: M6PFDA		106 %	25-150							
Surrogate: M7PFUdA		82.9 %	25-150							



Sample Information

Client Sample ID: FB_001

York Sample ID: 23A0038-09

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:25 pm

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	71.2 %			25-150					
	Surrogate: M2PFTeDA	26.0 %			10-150					
	Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	7.69 %			25-150					
	Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	108 %			25-150					
	Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	91.8 %			25-150					
	Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	108 %			10-150					
	Surrogate: d3-N-MeFOSAA	70.6 %			25-150					
	Surrogate: d5-N-EtFOSAA	63.9 %			25-150					
	Surrogate: M2-6:2 FTS	81.9 %			25-200					
	Surrogate: M2-8:2 FTS	74.6 %			25-200					
	Surrogate: M9PFNA	118 %			25-150					
	Surrogate: M2-4:2 FTS	78.4 %			25-150					
	Surrogate: d-N-MeFOSA	77.5 %			25-150					
	Surrogate: d-N-EtFOSA	91.7 %			25-150					
	Surrogate: M3HFPO-DA	105 %			25-150					
	Surrogate: d9-N-EtFOSE	16.4 %			25-150					
	Surrogate: d7-N-MeFOSE	23.6 %			25-150					

Sample Information

Client Sample ID: Trip Blank

York Sample ID: 23A0038-10

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:42 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG



Sample Information

Client Sample ID: Trip Blank

York Sample ID: 23A0038-10

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:42 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
75-34-3	1,1-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
563-58-6	1,1-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
95-93-2	* 1,2,4,5-Tetramethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
95-63-6	1,2,4-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
106-93-4	1,2-Dibromoethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
107-06-2	1,2-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
78-87-5	1,2-Dichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
108-67-8	1,3,5-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
142-28-9	1,3-Dichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
106-46-7	1,4-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
123-91-1	1,4-Dioxane	ND		ug/L	40	80	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
594-20-7	2,2-Dichloropropane	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
78-93-3	2-Butanone	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
110-75-8	2-Chloroethylvinyl ether	ND		ug/L	10	20	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG



Sample Information

Client Sample ID: Trip Blank

York Sample ID: 23A0038-10

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

January 3, 2023 2:42 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-49-8	2-Chlorotoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
591-78-6	2-Hexanone	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
106-43-4	4-Chlorotoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
108-10-1	4-Methyl-2-pentanone	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
67-64-1	Acetone	ND		ug/L	1.0	2.0	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
107-02-8	Acrolein	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
107-13-1	Acrylonitrile	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
71-43-2	Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
108-86-1	Bromobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
74-97-5	Bromochloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
75-27-4	Bromodichloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
75-25-2	Bromoform	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
74-83-9	Bromomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
75-15-0	Carbon disulfide	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
56-23-5	Carbon tetrachloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
108-90-7	Chlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
75-00-3	Chloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
67-66-3	Chloroform	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
74-87-3	Chloromethane	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
124-48-1	Dibromochloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
74-95-3	Dibromomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG



Sample Information

Client Sample ID: Trip Blank

York Sample ID: 23A0038-10

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:42 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 08:14	JTG
100-41-4	Ethyl Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
60-29-7	* Ethyl Ether	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/L	0.40	0.80	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
87-68-3	Hexachlorobutadiene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 08:14	JTG
74-88-4	* Iodomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
98-82-8	Isopropylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
80-62-6	Methyl Methacrylate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
75-09-2	Methylene chloride	ND		ug/L	1.0	2.0	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
91-20-3	Naphthalene	ND		ug/L	1.0	2.0	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 08:14	JTG
104-51-8	n-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
103-65-1	n-Propylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
95-47-6	o-Xylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/10/2023 06:27	01/11/2023 08:14	JTG
179601-23-1	p- & m- Xylenes	ND		ug/L	0.50	1.0	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/10/2023 06:27	01/11/2023 08:14	JTG
105-05-5	* p-Diethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
622-96-8	* p-Ethyltoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
99-87-6	p-Isopropyltoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
135-98-8	sec-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
100-42-5	Styrene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
994-05-8	* tert-Amyl methyl ether (TAME)	ND		ug/L	0.40	0.80	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
98-06-6	tert-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG
127-18-4	Tetrachloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 08:14	JTG



Sample Information

Client Sample ID: Trip Blank

York Sample ID: 23A0038-10

York Project (SDG) No.

23A0038

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Water

Collection Date/Time

January 3, 2023 2:42 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
109-99-9	* Tetrahydrofuran	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
108-88-3	Toluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
79-01-6	Trichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
75-69-4	Trichlorofluoromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
108-05-4	Vinyl acetate	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
75-01-4	Vinyl Chloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
1330-20-7	Xylenes, Total	ND		ug/L	0.60	1.5	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
107-05-1	* Allyl chloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
123-86-4	* n-butyl acetate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
75-45-6	* Chlorodifluoromethane (Freon 22)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
493-01-6	* cis-decahydronaphthalene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
493-02-7	* trans-decahydronaphthalene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
124-18-5	* n-Decane	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
97-63-2	* Ethyl Methacrylate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
67-72-1	* Hexachloroethane	ND	QL-02	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
110-54-3	* n-Hexane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
5989-27-5	* Limonene	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
98-95-3	* Nitrobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
79-46-9	* 2-Nitropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
111-84-2	* n-Nonane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
111-65-9	* n-octane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG



Sample Information

Client Sample ID: Trip Blank

York Sample ID: 23A0038-10

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0038

BRK2202 (Brookhaven Calabro Airport)

Water

January 3, 2023 2:42 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
1120-21-4	* n-undecane	ND	CCVE, QL-02	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/L	5.0	5.0	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 08:14	JTG
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURRE: 1,2-Dichloroethane-d4	101 %	65-135								
2037-26-5	Surrogate: SURRE: Toluene-d8	95.0 %	86-118								
460-00-4	Surrogate: SURRE: p-Bromofluorobenzene	98.1 %	81-114								



Analytical Batch Summary

Batch ID: BA30070 **Preparation Method:** EPA SW846-7470A **Prepared By:** AA

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-08	EB_001	01/03/23
BA30070-BLK1	Blank	01/03/23
BA30070-BS1	LCS	01/03/23
BA30070-BS2	LCS	01/03/23

Batch ID: BA30081 **Preparation Method:** EPA 3510C **Prepared By:** RST

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-08	EB_001	01/04/23
BA30081-BLK1	Blank	01/04/23
BA30081-BS1	LCS	01/04/23
BA30081-BSD1	LCS Dup	01/04/23

Batch ID: BA30093 **Preparation Method:** EPA 7473 soil **Prepared By:** MR

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-01	LP_001	01/04/23
23A0038-02	LP_002	01/04/23
23A0038-03	LP_003	01/04/23
23A0038-04	LP_004	01/04/23
23A0038-05	GT_001	01/04/23
23A0038-06	ST_001	01/04/23
23A0038-07	DUP_008	01/04/23
BA30093-BLK1	Blank	01/04/23
BA30093-DUP1	Duplicate	01/04/23
BA30093-MS1	Matrix Spike	01/04/23
BA30093-SRM1	Reference	01/04/23

Batch ID: BA30096 **Preparation Method:** EPA 3015A **Prepared By:** MCS

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-08	EB_001	01/04/23
BA30096-BLK1	Blank	01/04/23
BA30096-BS1	LCS	01/04/23
BA30096-DUP1	Duplicate	01/04/23
BA30096-MS1	Matrix Spike	01/04/23
BA30096-PS1	Post Spike	01/04/23

Batch ID: BA30129 **Preparation Method:** % Solids Prep **Prepared By:** AGNR

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-01	LP_001	01/04/23
23A0038-02	LP_002	01/04/23



23A0038-03	LP_003	01/04/23
23A0038-04	LP_004	01/04/23
23A0038-05	GT_001	01/04/23
23A0038-06	ST_001	01/04/23
23A0038-07	DUP_008	01/04/23
BA30129-DUP1	Duplicate	01/04/23

Batch ID: BA30171 **Preparation Method:** EPA 1633 Prep **Prepared By:** BAMW

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-08	EB_001	01/05/23
23A0038-09	FB_001	01/05/23
BA30171-BLK1	Blank	01/05/23
BA30171-BS1	LCS	01/05/23
BA30171-BS2	LCS	01/05/23
BA30171-DUP1	Duplicate	01/05/23

Batch ID: BA30183 **Preparation Method:** EPA 1633 Prep **Prepared By:** WJH

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-05	GT_001	01/05/23
23A0038-06	ST_001	01/05/23
BA30183-BLK1	Blank	01/05/23
BA30183-BS1	LCS	01/05/23
BA30183-BS2	LCS	01/05/23
BA30183-DUP1	Duplicate	01/05/23

Batch ID: BA30210 **Preparation Method:** EPA 3050B **Prepared By:** KMQ

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-01	LP_001	01/05/23
23A0038-02	LP_002	01/05/23
23A0038-03	LP_003	01/05/23
23A0038-04	LP_004	01/05/23
23A0038-05	GT_001	01/05/23
23A0038-06	ST_001	01/05/23
23A0038-07	DUP_008	01/05/23
BA30210-BLK1	Blank	01/05/23
BA30210-DUP1	Duplicate	01/05/23
BA30210-MS1	Matrix Spike	01/05/23
BA30210-PS1	Post Spike	01/05/23
BA30210-SRM1	Reference	01/05/23

Batch ID: BA30233 **Preparation Method:** EPA 3550C **Prepared By:** FK

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-01	LP_001	01/06/23
23A0038-02	LP_002	01/06/23
23A0038-03	LP_003	01/06/23



23A0038-04	LP_004	01/06/23
23A0038-05	GT_001	01/06/23
23A0038-06	ST_001	01/06/23
23A0038-07	DUP_008	01/06/23
BA30233-BLK1	Blank	01/06/23
BA30233-BS1	LCS	01/06/23
BA30233-MS1	Matrix Spike	01/06/23
BA30233-MSD1	Matrix Spike Dup	01/06/23

Batch ID: BA30368 **Preparation Method:** EPA 5035A **Prepared By:** BMC

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-03RE1	LP_003	01/11/23
23A0038-05RE1	GT_001	01/11/23
BA30368-BLK1	Blank	01/11/23
BA30368-BS1	LCS	01/11/23
BA30368-BS2	LCS	01/11/23
BA30368-BSD1	LCS Dup	01/11/23
BA30368-BSD2	LCS Dup	01/11/23

Batch ID: BA30514 **Preparation Method:** EPA 5030B **Prepared By:** JTG

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-08	EB_001	01/10/23
23A0038-10	Trip Blank	01/10/23
BA30514-BLK1	Blank	01/10/23
BA30514-BS1	LCS	01/10/23
BA30514-BS2	LCS	01/10/23
BA30514-BSD1	LCS Dup	01/10/23
BA30514-BSD2	LCS Dup	01/10/23

Batch ID: BL21338 **Preparation Method:** EPA 5035A **Prepared By:** BMC

YORK Sample ID	Client Sample ID	Preparation Date
23A0038-01	LP_001	01/04/23
23A0038-02	LP_002	01/04/23
23A0038-03	LP_003	01/04/23
23A0038-04	LP_004	01/04/23
23A0038-05	GT_001	01/04/23
23A0038-06	ST_001	01/04/23
23A0038-07	DUP_008	01/04/23
BL21338-BLK1	Blank	01/04/23
BL21338-BS1	LCS	01/04/23
BL21338-BS2	LCS	01/04/23
BL21338-BSD1	LCS Dup	01/04/23
BL21338-BSD2	LCS Dup	01/04/23
BL21338-MS1	Matrix Spike	01/04/23
BL21338-MSD1	Matrix Spike Dup	01/04/23



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30368 - EPA 5035A

Blank (BA30368-BLK1)

Prepared & Analyzed: 01/11/2023

1,1,1,2-Tetrachloroethane	ND	5.0	ug/kg wet
1,1,1-Trichloroethane	ND	5.0	"
1,1,2,2-Tetrachloroethane	ND	5.0	"
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	5.0	"
1,1,2-Trichloroethane	ND	5.0	"
1,1-Dichloroethane	ND	5.0	"
1,1-Dichloroethylene	ND	5.0	"
1,1-Dichloropropylene	ND	5.0	"
1,2,3-Trichlorobenzene	ND	5.0	"
1,2,3-Trichloropropane	ND	5.0	"
1,2,4,5-Tetramethylbenzene	ND	5.0	"
1,2,4-Trichlorobenzene	ND	5.0	"
1,2,4-Trimethylbenzene	ND	5.0	"
1,2-Dibromo-3-chloropropane	ND	5.0	"
1,2-Dibromoethane	ND	5.0	"
1,2-Dichlorobenzene	ND	5.0	"
1,2-Dichloroethane	ND	5.0	"
1,2-Dichloropropane	ND	5.0	"
1,3,5-Trimethylbenzene	ND	5.0	"
1,3-Dichlorobenzene	ND	5.0	"
1,3-Dichloropropane	ND	5.0	"
1,4-Dichlorobenzene	ND	5.0	"
1,4-Dioxane	ND	100	"
2,2-Dichloropropane	ND	5.0	"
2-Butanone	ND	5.0	"
2-Chloroethylvinyl ether	ND	20	"
2-Chlorotoluene	ND	5.0	"
2-Hexanone	ND	5.0	"
4-Chlorotoluene	ND	5.0	"
4-Methyl-2-pentanone	ND	5.0	"
Acetone	ND	10	"
Acrolein	ND	10	"
Acrylonitrile	ND	5.0	"
Benzene	ND	5.0	"
Bromobenzene	ND	5.0	"
Bromochloromethane	ND	5.0	"
Bromodichloromethane	ND	5.0	"
Bromoform	ND	5.0	"
Bromomethane	ND	5.0	"
Carbon disulfide	ND	5.0	"
Carbon tetrachloride	ND	5.0	"
Chlorobenzene	ND	5.0	"
Chloroethane	ND	5.0	"
Chloroform	ND	5.0	"
Chloromethane	ND	5.0	"
cis-1,2-Dichloroethylene	ND	5.0	"
cis-1,3-Dichloropropylene	ND	5.0	"
Dibromochloromethane	ND	5.0	"
Dibromomethane	ND	5.0	"



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30368 - EPA 5035A

Blank (BA30368-BLK1)

Prepared & Analyzed: 01/11/2023

Dichlorodifluoromethane	ND	5.0	ug/kg wet
Ethyl Benzene	ND	5.0	"
Ethyl Ether	ND	50	"
Ethyl tert-butyl ether (ETBE)	ND	8.0	"
Hexachlorobutadiene	ND	5.0	"
Iodomethane	ND	5.0	"
Isopropylbenzene	ND	5.0	"
Methyl Methacrylate	ND	5.0	"
Methyl tert-butyl ether (MTBE)	ND	5.0	"
Methylene chloride	ND	10	"
Naphthalene	ND	10	"
n-Butylbenzene	ND	5.0	"
n-Propylbenzene	ND	5.0	"
o-Xylene	ND	5.0	"
p- & m- Xylenes	ND	10	"
p-Diethylbenzene	ND	5.0	"
p-Ethyltoluene	ND	5.0	"
p-Isopropyltoluene	ND	5.0	"
sec-Butylbenzene	ND	5.0	"
Styrene	ND	5.0	"
tert-Amyl methyl ether (TAME)	ND	8.0	"
tert-Butylbenzene	ND	5.0	"
Tetrachloroethylene	ND	5.0	"
Tetrahydrofuran	ND	10	"
Toluene	ND	5.0	"
trans-1,2-Dichloroethylene	ND	5.0	"
trans-1,3-Dichloropropylene	ND	5.0	"
Trichloroethylene	ND	5.0	"
Trichlorofluoromethane	ND	5.0	"
Vinyl acetate	ND	5.0	"
Vinyl Chloride	ND	5.0	"
Xylenes, Total	ND	15	"
Allyl chloride	ND	5.0	"
n-butyl acetate	ND	5.0	"
Chlorodifluoromethane (Freon 22)	ND	5.0	"
cis-decahydronaphthalene	ND	5.0	"
trans-decahydronaphthalene	ND	5.0	"
n-Decane	ND	5.0	"
Ethyl Methacrylate	ND	5.0	"
Hexachloroethane	ND	5.0	"
n-Hexane	ND	5.0	"
Limonene	ND	5.0	"
Nitrobenzene	ND	5.0	"
2-Nitropropane	ND	5.0	"
n-Nonane	ND	5.0	"
n-octane	ND	5.0	"
n-undecane	ND	5.0	"
Methyl Isothiocyanate (TIC)	ND	50	"

Surrogate: SURRE: 1,2-Dichloroethane-d4	54.0	ug/L	50.0	108	77-125
Surrogate: SURRE: Toluene-d8	48.5	"	50.0	97.0	85-120
Surrogate: SURRE: p-Bromofluorobenzene	46.8	"	50.0	93.6	76-130



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30368 - EPA 5035A											
LCS (BA30368-BS1)						Prepared & Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	52		ug/L	50.0		104	75-129				
1,1,1-Trichloroethane	49		"	50.0		97.9	71-137				
1,1,2,2-Tetrachloroethane	49		"	50.0		99.0	79-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	58		"	50.0		117	58-146				
1,1,2-Trichloroethane	46		"	50.0		92.8	83-123				
1,1-Dichloroethane	45		"	50.0		90.0	75-130				
1,1-Dichloroethylene	47		"	50.0		93.3	64-137				
1,1-Dichloropropylene	43		"	50.0		85.0	77-127				
1,2,3-Trichlorobenzene	47		"	50.0		94.8	81-140				
1,2,3-Trichloropropane	49		"	50.0		98.9	81-126				
1,2,4,5-Tetramethylbenzene	46		"	50.0		91.2	63-156				
1,2,4-Trichlorobenzene	47		"	50.0		93.5	80-141				
1,2,4-Trimethylbenzene	45		"	50.0		90.4	84-125				
1,2-Dibromo-3-chloropropane	53		"	50.0		107	74-142				
1,2-Dibromoethane	51		"	50.0		102	86-123				
1,2-Dichlorobenzene	46		"	50.0		92.7	85-122				
1,2-Dichloroethane	48		"	50.0		97.0	71-133				
1,2-Dichloropropane	45		"	50.0		90.7	81-122				
1,3,5-Trimethylbenzene	45		"	50.0		90.1	82-126				
1,3-Dichlorobenzene	45		"	50.0		90.0	84-124				
1,3-Dichloropropane	48		"	50.0		95.9	83-123				
1,4-Dichlorobenzene	45		"	50.0		89.9	84-124				
1,4-Dioxane	1900		"	1050		181	10-228				
2,2-Dichloropropane	49		"	50.0		98.4	67-136				
2-Butanone	49		"	50.0		98.2	58-147				
2-Chloroethylvinyl ether	47		"	50.0		94.3	10-166				
2-Chlorotoluene	46		"	50.0		92.7	78-127				
2-Hexanone	50		"	50.0		100	70-139				
4-Chlorotoluene	45		"	50.0		90.2	79-125				
4-Methyl-2-pentanone	48		"	50.0		95.5	72-132				
Acetone	56		"	50.0		113	36-155				
Acrolein	60		"	50.0		121	10-238				
Acrylonitrile	41		"	50.0		81.3	66-141				
Benzene	46		"	50.0		92.6	77-127				
Bromobenzene	46		"	50.0		91.2	77-129				
Bromochloromethane	49		"	50.0		98.6	74-129				
Bromodichloromethane	50		"	50.0		99.2	81-124				
Bromoform	53		"	50.0		106	80-136				
Bromomethane	56		"	50.0		111	32-177				
Carbon disulfide	48		"	50.0		96.8	10-136				
Carbon tetrachloride	52		"	50.0		103	66-143				
Chlorobenzene	49		"	50.0		97.6	86-120				
Chloroethane	50		"	50.0		101	51-142				
Chloroform	45		"	50.0		90.5	76-131				
Chloromethane	37		"	50.0		73.7	49-132				
cis-1,2-Dichloroethylene	46		"	50.0		91.1	74-132				
cis-1,3-Dichloropropylene	49		"	50.0		99.0	81-129				
Dibromochloromethane	54		"	50.0		108	10-200				
Dibromomethane	47		"	50.0		93.5	83-124				
Dichlorodifluoromethane	30		"	50.0		59.2	28-158				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30368 - EPA 5035A

LCS (BA30368-BS1)

Prepared & Analyzed: 01/11/2023

Ethyl Benzene	45		ug/L	50.0		90.4	84-125				
Ethyl Ether	ND	50	ug/kg wet				70-130				
Ethyl tert-butyl ether (ETBE)	45		ug/L	50.0		89.1	70-130				
Hexachlorobutadiene	46		"	50.0		92.9	83-133				
Iodomethane	48		"	50.0		95.8	70-130				
Isopropylbenzene	46		"	50.0		91.7	81-127				
Methyl Methacrylate	47		"	50.0		94.3	79-125				
Methyl tert-butyl ether (MTBE)	42		"	50.0		84.8	74-131				
Methylene chloride	55		"	50.0		110	57-141				
Naphthalene	49		"	50.0		97.1	86-141				
n-Butylbenzene	45		"	50.0		89.4	80-130				
n-Propylbenzene	46		"	50.0		92.2	74-136				
o-Xylene	47		"	50.0		93.5	83-123				
p- & m- Xylenes	91		"	100		91.1	82-128				
p-Diethylbenzene	46		"	50.0		91.7	70-144				
p-Ethyltoluene	46		"	50.0		92.7	84-123				
p-Isopropyltoluene	47		"	50.0		93.5	85-125				
sec-Butylbenzene	46		"	50.0		92.7	83-125				
Styrene	47		"	50.0		93.3	86-126				
tert-Amyl methyl ether (TAME)	48		"	50.0		95.1	70-130				
tert-Butylbenzene	46		"	50.0		92.6	80-127				
Tetrachloroethylene	41		"	50.0		81.1	80-129				
Tetrahydrofuran	51		"	50.0		102	64-137				
Toluene	44		"	50.0		88.5	85-121				
trans-1,2-Dichloroethylene	46		"	50.0		92.8	72-132				
trans-1,3-Dichloropropylene	51		"	50.0		102	78-132				
Trichloroethylene	46		"	50.0		91.7	84-123				
Trichlorofluoromethane	44		"	50.0		88.1	62-140				
Vinyl acetate	80		"	50.0		160	67-136	High Bias			
Vinyl Chloride	40		"	50.0		80.6	52-130				
Allyl chloride	50		"	50.0		100	70-130				
n-butyl acetate	ND	5.0	ug/kg wet				70-130				
Chlorodifluoromethane (Freon 22)	ND	5.0	"				70-130				
cis-decahydronaphthalene	ND	5.0	"				70-130				
trans-decahydronaphthalene	ND	5.0	"				70-130				
n-Decane	ND	5.0	"				70-130				
Ethyl Methacrylate	48		ug/L	50.0		95.5	70-130				
Hexachloroethane	ND	5.0	ug/kg wet				70-130				
n-Hexane	ND	5.0	"				70-130				
Limonene	ND	5.0	"				70-130				
Nitrobenzene	57		ug/L	50.0		115	70-130				
2-Nitropropane	74	5.0	ug/kg wet				70-130				
n-Nonane	ND	5.0	"				70-130				
n-octane	ND	5.0	"				70-130				
n-undecane	ND	5.0	"				70-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	52.5		ug/L	50.0		105	77-125				
Surrogate: SURR: Toluene-d8	49.4		"	50.0		98.8	85-120				
Surrogate: SURR: p-Bromofluorobenzene	49.9		"	50.0		99.8	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30368 - EPA 5035A

LCS (BA30368-BS2)

Prepared & Analyzed: 01/11/2023

1,1,1,2-Tetrachloroethane	ND	5.0	ug/kg wet				75-129				
1,1,1-Trichloroethane	ND	5.0	"				71-137				
1,1,2,2-Tetrachloroethane	ND	5.0	"				79-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	5.0	"				58-146				
1,1,2-Trichloroethane	ND	5.0	"				83-123				
1,1-Dichloroethane	ND	5.0	"				75-130				
1,1-Dichloroethylene	ND	5.0	"				64-137				
1,1-Dichloropropylene	ND	5.0	"				77-127				
1,2,3-Trichlorobenzene	ND	5.0	"				81-140				
1,2,3-Trichloropropane	ND	5.0	"				81-126				
1,2,4,5-Tetramethylbenzene	ND	5.0	"				63-156				
1,2,4-Trichlorobenzene	ND	5.0	"				80-141				
1,2,4-Trimethylbenzene	ND	5.0	"				84-125				
1,2-Dibromo-3-chloropropane	ND	5.0	"				74-142				
1,2-Dibromoethane	ND	5.0	"				86-123				
1,2-Dichlorobenzene	ND	5.0	"				85-122				
1,2-Dichloroethane	ND	5.0	"				71-133				
1,2-Dichloropropane	ND	5.0	"				81-122				
1,3,5-Trimethylbenzene	ND	5.0	"				82-126				
1,3-Dichlorobenzene	ND	5.0	"				84-124				
1,3-Dichloropropane	ND	5.0	"				83-123				
1,4-Dichlorobenzene	ND	5.0	"				84-124				
1,4-Dioxane	ND	100	"				10-228				
2,2-Dichloropropane	ND	5.0	"				67-136				
2-Butanone	ND	5.0	"				58-147				
2-Chloroethylvinyl ether	ND	20	"				10-166				
2-Chlorotoluene	ND	5.0	"				78-127				
2-Hexanone	ND	5.0	"				70-139				
4-Chlorotoluene	ND	5.0	"				79-125				
4-Methyl-2-pentanone	ND	5.0	"				72-132				
Acetone	ND	10	"				36-155				
Acrolein	ND	10	"				10-238				
Acrylonitrile	ND	5.0	"				66-141				
Benzene	ND	5.0	"				77-127				
Bromobenzene	ND	5.0	"				77-129				
Bromochloromethane	ND	5.0	"				74-129				
Bromodichloromethane	ND	5.0	"				81-124				
Bromoform	ND	5.0	"				80-136				
Bromomethane	ND	5.0	"				32-177				
Carbon disulfide	ND	5.0	"				10-136				
Carbon tetrachloride	ND	5.0	"				66-143				
Chlorobenzene	ND	5.0	"				86-120				
Chloroethane	ND	5.0	"				51-142				
Chloroform	ND	5.0	"				76-131				
Chloromethane	ND	5.0	"				49-132				
cis-1,2-Dichloroethylene	ND	5.0	"				74-132				
cis-1,3-Dichloropropylene	ND	5.0	"				81-129				
Dibromochloromethane	ND	5.0	"				10-200				
Dibromomethane	ND	5.0	"				83-124				
Dichlorodifluoromethane	ND	5.0	"				28-158				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30368 - EPA 5035A

LCS (BA30368-BS2)

Prepared & Analyzed: 01/11/2023

Ethyl Benzene	ND	5.0	ug/kg wet				84-125				
Ethyl Ether	3100	50	"				70-130				
Ethyl tert-butyl ether (ETBE)	ND	8.0	"				70-130				
Hexachlorobutadiene	ND	5.0	"				83-133				
Iodomethane	ND	5.0	"				70-130				
Isopropylbenzene	ND	5.0	"				81-127				
Methyl Methacrylate	ND	5.0	"				79-125				
Methyl tert-butyl ether (MTBE)	ND	5.0	"				74-131				
Methylene chloride	ND	10	"				57-141				
Naphthalene	ND	10	"				86-141				
n-Butylbenzene	ND	5.0	"				80-130				
n-Propylbenzene	ND	5.0	"				74-136				
o-Xylene	ND	5.0	"				83-123				
p- & m- Xylenes	ND	10	"				82-128				
p-Diethylbenzene	ND	5.0	"				70-144				
p-Ethyltoluene	ND	5.0	"				84-123				
p-Isopropyltoluene	ND	5.0	"				85-125				
sec-Butylbenzene	ND	5.0	"				83-125				
Styrene	ND	5.0	"				86-126				
tert-Amyl methyl ether (TAME)	ND	8.0	"				70-130				
tert-Butylbenzene	ND	5.0	"				80-127				
Tetrachloroethylene	ND	5.0	"				80-129				
Tetrahydrofuran	ND	10	"				64-137				
Toluene	ND	5.0	"				85-121				
trans-1,2-Dichloroethylene	ND	5.0	"				72-132				
trans-1,3-Dichloropropylene	ND	5.0	"				78-132				
Trichloroethylene	ND	5.0	"				84-123				
Trichlorofluoromethane	ND	5.0	"				62-140				
Vinyl acetate	ND	5.0	"				67-136				
Vinyl Chloride	ND	5.0	"				52-130				
Allyl chloride	ND	5.0	"				70-130				
n-butyl acetate	50		ug/L	50.0		100	70-130				
Chlorodifluoromethane (Freon 22)	45		"	50.0		90.5	70-130				
cis-decahydronaphthalene	91		"	50.0		182	70-130	High Bias			
trans-decahydronaphthalene	48		"	50.0		96.6	70-130				
n-Decane	59	5.0	ug/kg wet				70-130				
Ethyl Methacrylate	ND	5.0	"				70-130				
Hexachloroethane	ND	5.0	"				70-130				
n-Hexane	59		ug/L	50.0		118	70-130				
Limonene	44		"	50.0		88.3	70-130				
Nitrobenzene	ND	5.0	ug/kg wet				70-130				
2-Nitropropane	ND	5.0	"				70-130				
n-Nonane	64		ug/L	50.0		127	70-130				
n-octane	52		"	50.0		104	70-130				
n-undecane	49		"	50.0		98.3	70-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	51.4		"	50.0		103	77-125				
Surrogate: SURR: Toluene-d8	50.1		"	50.0		100	85-120				
Surrogate: SURR: p-Bromofluorobenzene	48.3		"	50.0		96.5	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30368 - EPA 5035A											
LCS Dup (BA30368-BSD1)						Prepared & Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	53		ug/L	50.0		106	75-129		1.79	30	
1,1,1-Trichloroethane	50		"	50.0		100	71-137		2.20	30	
1,1,2,2-Tetrachloroethane	51		"	50.0		102	79-129		2.67	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	60		"	50.0		120	58-146		2.27	30	
1,1,2-Trichloroethane	48		"	50.0		96.0	83-123		3.43	30	
1,1-Dichloroethane	46		"	50.0		92.7	75-130		2.93	30	
1,1-Dichloroethylene	47		"	50.0		94.5	64-137		1.28	30	
1,1-Dichloropropylene	43		"	50.0		86.1	77-127		1.24	30	
1,2,3-Trichlorobenzene	48		"	50.0		96.8	81-140		2.15	30	
1,2,3-Trichloropropane	51		"	50.0		103	81-126		3.83	30	
1,2,4,5-Tetramethylbenzene	47		"	50.0		94.6	63-156		3.60	30	
1,2,4-Trichlorobenzene	49		"	50.0		97.1	80-141		3.78	30	
1,2,4-Trimethylbenzene	47		"	50.0		93.3	84-125		3.14	30	
1,2-Dibromo-3-chloropropane	55		"	50.0		109	74-142		2.32	30	
1,2-Dibromoethane	52		"	50.0		105	86-123		2.40	30	
1,2-Dichlorobenzene	47		"	50.0		94.6	85-122		1.94	30	
1,2-Dichloroethane	50		"	50.0		99.1	71-133		2.16	30	
1,2-Dichloropropane	47		"	50.0		93.8	81-122		3.27	30	
1,3,5-Trimethylbenzene	47		"	50.0		93.5	82-126		3.75	30	
1,3-Dichlorobenzene	46		"	50.0		92.7	84-124		2.89	30	
1,3-Dichloropropane	49		"	50.0		97.3	83-123		1.47	30	
1,4-Dichlorobenzene	46		"	50.0		93.0	84-124		3.35	30	
1,4-Dioxane	2100		"	1050		196	10-228		8.00	30	
2,2-Dichloropropane	50		"	50.0		99.9	67-136		1.57	30	
2-Butanone	50		"	50.0		100	58-147		2.16	30	
2-Chloroethylvinyl ether	49		"	50.0		97.8	10-166		3.58	30	
2-Chlorotoluene	47		"	50.0		94.2	78-127		1.56	30	
2-Hexanone	51		"	50.0		102	70-139		1.76	30	
4-Chlorotoluene	46		"	50.0		91.4	79-125		1.32	30	
4-Methyl-2-pentanone	49		"	50.0		97.6	72-132		2.22	30	
Acetone	57		"	50.0		113	36-155		0.371	30	
Acrolein	63		"	50.0		126	10-238		4.30	30	
Acrylonitrile	45		"	50.0		90.8	66-141		11.0	30	
Benzene	48		"	50.0		95.3	77-127		2.92	30	
Bromobenzene	47		"	50.0		93.6	77-129		2.62	30	
Bromochloromethane	52		"	50.0		103	74-129		4.75	30	
Bromodichloromethane	51		"	50.0		102	81-124		2.57	30	
Bromoform	53		"	50.0		106	80-136		0.207	30	
Bromomethane	59		"	50.0		118	32-177		5.69	30	
Carbon disulfide	51		"	50.0		101	10-136		4.39	30	
Carbon tetrachloride	53		"	50.0		106	66-143		2.33	30	
Chlorobenzene	50		"	50.0		99.1	86-120		1.55	30	
Chloroethane	55		"	50.0		110	51-142		8.97	30	
Chloroform	46		"	50.0		92.7	76-131		2.34	30	
Chloromethane	37		"	50.0		73.2	49-132		0.681	30	
cis-1,2-Dichloroethylene	47		"	50.0		93.5	74-132		2.60	30	
cis-1,3-Dichloropropylene	51		"	50.0		103	81-129		3.63	30	
Dibromochloromethane	55		"	50.0		110	10-200		1.99	30	
Dibromomethane	49		"	50.0		98.2	83-124		4.92	30	
Dichlorodifluoromethane	28		"	50.0		56.0	28-158		5.49	30	



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30368 - EPA 5035A											
LCS Dup (BA30368-BSD1)						Prepared & Analyzed: 01/11/2023					
Ethyl Benzene	46		ug/L	50.0		92.2	84-125		1.97	30	
Ethyl Ether	ND	50	ug/kg wet				70-130			30	
Ethyl tert-butyl ether (ETBE)	46		ug/L	50.0		93.0	70-130		4.26	30	
Hexachlorobutadiene	47		"	50.0		94.0	83-133		1.11	30	
Iodomethane	46		"	50.0		91.0	70-130		5.10	30	
Isopropylbenzene	48		"	50.0		95.4	81-127		3.93	30	
Methyl Methacrylate	49		"	50.0		98.4	79-125		4.32	30	
Methyl tert-butyl ether (MTBE)	44		"	50.0		88.8	74-131		4.56	30	
Methylene chloride	49		"	50.0		97.5	57-141		11.9	30	
Naphthalene	51		"	50.0		101	86-141		4.33	30	
n-Butylbenzene	46		"	50.0		92.1	80-130		3.06	30	
n-Propylbenzene	47		"	50.0		93.9	74-136		1.85	30	
o-Xylene	48		"	50.0		95.4	83-123		1.99	30	
p- & m- Xylenes	93		"	100		92.6	82-128		1.64	30	
p-Diethylbenzene	46		"	50.0		92.8	70-144		1.24	30	
p-Ethyltoluene	48		"	50.0		95.2	84-123		2.70	30	
p-Isopropyltoluene	48		"	50.0		95.1	85-125		1.65	30	
sec-Butylbenzene	48		"	50.0		95.3	83-125		2.68	30	
Styrene	48		"	50.0		95.2	86-126		2.02	30	
tert-Amyl methyl ether (TAME)	49		"	50.0		98.9	70-130		3.92	30	
tert-Butylbenzene	48		"	50.0		96.3	80-127		3.96	30	
Tetrachloroethylene	42		"	50.0		83.3	80-129		2.63	30	
Tetrahydrofuran	54		"	50.0		107	64-137		5.05	30	
Toluene	45		"	50.0		90.3	85-121		1.95	30	
trans-1,2-Dichloroethylene	48		"	50.0		96.0	72-132		3.39	30	
trans-1,3-Dichloropropylene	53		"	50.0		106	78-132		3.60	30	
Trichloroethylene	46		"	50.0		91.8	84-123		0.109	30	
Trichlorofluoromethane	48		"	50.0		95.1	62-140		7.71	30	
Vinyl acetate	84		"	50.0		168	67-136	High Bias	4.64	30	
Vinyl Chloride	40		"	50.0		80.3	52-130		0.348	30	
Allyl chloride	40		"	50.0		80.7	70-130		21.8	30	
n-butyl acetate	ND	5.0	ug/kg wet				70-130			30	
Chlorodifluoromethane (Freon 22)	ND	5.0	"				70-130			30	
cis-decahydronaphthalene	ND	5.0	"				70-130			30	
trans-decahydronaphthalene	ND	5.0	"				70-130			30	
n-Decane	ND	5.0	"				70-130			30	
Ethyl Methacrylate	48		ug/L	50.0		96.8	70-130		1.35	30	
Hexachloroethane	ND	5.0	ug/kg wet				70-130			30	
n-Hexane	ND	5.0	"				70-130			30	
Limonene	ND	5.0	"				70-130			30	
Nitrobenzene	59		ug/L	50.0		118	70-130		2.95	30	
2-Nitropropane	53	5.0	ug/kg wet				70-130		34.1	30	Non-dir.
n-Nonane	ND	5.0	"				70-130			30	
n-octane	ND	5.0	"				70-130			30	
n-undecane	ND	5.0	"				70-130			30	
Surrogate: SURR: 1,2-Dichloroethane-d4	53.2		ug/L	50.0		106	77-125				
Surrogate: SURR: Toluene-d8	49.4		"	50.0		98.9	85-120				
Surrogate: SURR: p-Bromofluorobenzene	50.2		"	50.0		100	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	Limit	Flag
Batch BA30368 - EPA 5035A											
LCS Dup (BA30368-BSD2)						Prepared & Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	ND	5.0	ug/kg wet				75-129			30	
1,1,1-Trichloroethane	ND	5.0	"				71-137			30	
1,1,2,2-Tetrachloroethane	ND	5.0	"				79-129			30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	5.0	"				58-146			30	
1,1,2-Trichloroethane	ND	5.0	"				83-123			30	
1,1-Dichloroethane	ND	5.0	"				75-130			30	
1,1-Dichloroethylene	ND	5.0	"				64-137			30	
1,1-Dichloropropylene	ND	5.0	"				77-127			30	
1,2,3-Trichlorobenzene	ND	5.0	"				81-140			30	
1,2,3-Trichloropropane	ND	5.0	"				81-126			30	
1,2,4,5-Tetramethylbenzene	ND	5.0	"				63-156			30	
1,2,4-Trichlorobenzene	ND	5.0	"				80-141			30	
1,2,4-Trimethylbenzene	ND	5.0	"				84-125			30	
1,2-Dibromo-3-chloropropane	ND	5.0	"				74-142			30	
1,2-Dibromoethane	ND	5.0	"				86-123			30	
1,2-Dichlorobenzene	ND	5.0	"				85-122			30	
1,2-Dichloroethane	ND	5.0	"				71-133			30	
1,2-Dichloropropane	ND	5.0	"				81-122			30	
1,3,5-Trimethylbenzene	ND	5.0	"				82-126			30	
1,3-Dichlorobenzene	ND	5.0	"				84-124			30	
1,3-Dichloropropane	ND	5.0	"				83-123			30	
1,4-Dichlorobenzene	ND	5.0	"				84-124			30	
1,4-Dioxane	ND	100	"				10-228			30	
2,2-Dichloropropane	ND	5.0	"				67-136			30	
2-Butanone	ND	5.0	"				58-147			30	
2-Chloroethylvinyl ether	ND	20	"				10-166			30	
2-Chlorotoluene	ND	5.0	"				78-127			30	
2-Hexanone	ND	5.0	"				70-139			30	
4-Chlorotoluene	ND	5.0	"				79-125			30	
4-Methyl-2-pentanone	ND	5.0	"				72-132			30	
Acetone	ND	10	"				36-155			30	
Acrolein	ND	10	"				10-238			30	
Acrylonitrile	ND	5.0	"				66-141			30	
Benzene	ND	5.0	"				77-127			30	
Bromobenzene	ND	5.0	"				77-129			30	
Bromochloromethane	ND	5.0	"				74-129			30	
Bromodichloromethane	ND	5.0	"				81-124			30	
Bromoform	ND	5.0	"				80-136			30	
Bromomethane	ND	5.0	"				32-177			30	
Carbon disulfide	ND	5.0	"				10-136			30	
Carbon tetrachloride	ND	5.0	"				66-143			30	
Chlorobenzene	ND	5.0	"				86-120			30	
Chloroethane	ND	5.0	"				51-142			30	
Chloroform	ND	5.0	"				76-131			30	
Chloromethane	ND	5.0	"				49-132			30	
cis-1,2-Dichloroethylene	ND	5.0	"				74-132			30	
cis-1,3-Dichloropropylene	ND	5.0	"				81-129			30	
Dibromochloromethane	ND	5.0	"				10-200			30	
Dibromomethane	ND	5.0	"				83-124			30	
Dichlorodifluoromethane	ND	5.0	"				28-158			30	



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30368 - EPA 5035A											
LCS Dup (BA30368-BSD2)						Prepared & Analyzed: 01/11/2023					
Ethyl Benzene	ND	5.0	ug/kg wet				84-125			30	
Ethyl Ether	2700	50	"				70-130		15.9	30	
Ethyl tert-butyl ether (ETBE)	ND	8.0	"				70-130			30	
Hexachlorobutadiene	ND	5.0	"				83-133			30	
Iodomethane	ND	5.0	"				70-130			30	
Isopropylbenzene	ND	5.0	"				81-127			30	
Methyl Methacrylate	ND	5.0	"				79-125			30	
Methyl tert-butyl ether (MTBE)	ND	5.0	"				74-131			30	
Methylene chloride	ND	10	"				57-141			30	
Naphthalene	ND	10	"				86-141			30	
n-Butylbenzene	ND	5.0	"				80-130			30	
n-Propylbenzene	ND	5.0	"				74-136			30	
o-Xylene	ND	5.0	"				83-123			30	
p- & m- Xylenes	ND	10	"				82-128			30	
p-Diethylbenzene	ND	5.0	"				70-144			30	
p-Ethyltoluene	ND	5.0	"				84-123			30	
p-Isopropyltoluene	ND	5.0	"				85-125			30	
sec-Butylbenzene	ND	5.0	"				83-125			30	
Styrene	ND	5.0	"				86-126			30	
tert-Amyl methyl ether (TAME)	ND	8.0	"				70-130			30	
tert-Butylbenzene	ND	5.0	"				80-127			30	
Tetrachloroethylene	ND	5.0	"				80-129			30	
Tetrahydrofuran	ND	10	"				64-137			30	
Toluene	ND	5.0	"				85-121			30	
trans-1,2-Dichloroethylene	ND	5.0	"				72-132			30	
trans-1,3-Dichloropropylene	ND	5.0	"				78-132			30	
Trichloroethylene	ND	5.0	"				84-123			30	
Trichlorofluoromethane	ND	5.0	"				62-140			30	
Vinyl acetate	ND	5.0	"				67-136			30	
Vinyl Chloride	ND	5.0	"				52-130			30	
Allyl chloride	ND	5.0	"				70-130			30	
n-butyl acetate	51		ug/L	50.0		102	70-130		1.43	30	
Chlorodifluoromethane (Freon 22)	37		"	50.0		73.2	70-130		21.1	30	
cis-decahydronaphthalene	87		"	50.0		174	70-130	High Bias	4.58	30	
trans-decahydronaphthalene	51		"	50.0		101	70-130		4.57	30	
n-Decane	71	5.0	ug/kg wet				70-130		18.1	30	
Ethyl Methacrylate	ND	5.0	"				70-130			30	
Hexachloroethane	ND	5.0	"				70-130			30	
n-Hexane	61		ug/L	50.0		122	70-130		3.10	30	
Limonene	52		"	50.0		104	70-130		16.1	30	
Nitrobenzene	ND	5.0	ug/kg wet				70-130			30	
2-Nitropropane	ND	5.0	"				70-130			30	
n-Nonane	66		ug/L	50.0		133	70-130	High Bias	4.33	30	
n-octane	57		"	50.0		113	70-130		8.17	30	
n-undecane	52		"	50.0		105	70-130		6.63	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	46.3		"	50.0		92.6	77-125				
Surrogate: SURR: Toluene-d8	50.1		"	50.0		100	85-120				
Surrogate: SURR: p-Bromofluorobenzene	52.9		"	50.0		106	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30514 - EPA 5030B

Blank (BA30514-BLK1)

Prepared: 01/10/2023 Analyzed: 01/11/2023

1,1,1,2-Tetrachloroethane	ND	0.50	ug/L
1,1,1-Trichloroethane	ND	0.50	"
1,1,2,2-Tetrachloroethane	ND	0.50	"
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"
1,1,2-Trichloroethane	ND	0.50	"
1,1-Dichloroethane	ND	0.50	"
1,1-Dichloroethylene	ND	0.50	"
1,1-Dichloropropylene	ND	0.50	"
1,2,3-Trichlorobenzene	ND	0.50	"
1,2,3-Trichloropropane	ND	0.50	"
1,2,4,5-Tetramethylbenzene	ND	0.50	"
1,2,4-Trichlorobenzene	ND	0.50	"
1,2,4-Trimethylbenzene	ND	0.50	"
1,2-Dibromo-3-chloropropane	ND	0.50	"
1,2-Dibromoethane	ND	0.50	"
1,2-Dichlorobenzene	ND	0.50	"
1,2-Dichloroethane	ND	0.50	"
1,2-Dichloropropane	ND	0.50	"
1,3,5-Trimethylbenzene	ND	0.50	"
1,3-Dichlorobenzene	ND	0.50	"
1,3-Dichloropropane	ND	0.50	"
1,4-Dichlorobenzene	ND	0.50	"
1,4-Dioxane	ND	80	"
2,2-Dichloropropane	ND	0.50	"
2-Butanone	ND	0.50	"
2-Chloroethylvinyl ether	ND	20	"
2-Chlorotoluene	ND	0.50	"
2-Hexanone	ND	0.50	"
4-Chlorotoluene	ND	0.50	"
4-Methyl-2-pentanone	ND	0.50	"
Acetone	ND	2.0	"
Acrolein	ND	0.50	"
Acrylonitrile	ND	0.50	"
Benzene	ND	0.50	"
Bromobenzene	ND	0.50	"
Bromochloromethane	ND	0.50	"
Bromodichloromethane	ND	0.50	"
Bromoform	ND	0.50	"
Bromomethane	ND	0.50	"
Carbon disulfide	ND	0.50	"
Carbon tetrachloride	ND	0.50	"
Chlorobenzene	ND	0.50	"
Chloroethane	ND	0.50	"
Chloroform	ND	0.50	"
Chloromethane	ND	0.50	"
cis-1,2-Dichloroethylene	ND	0.50	"
cis-1,3-Dichloropropylene	ND	0.50	"
Dibromochloromethane	ND	0.50	"
Dibromomethane	ND	0.50	"
Dichlorodifluoromethane	ND	0.50	"



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30514 - EPA 5030B

Blank (BA30514-BLK1)

Prepared: 01/10/2023 Analyzed: 01/11/2023

Ethyl Benzene	ND	0.50	ug/L
Ethyl Ether	ND	0.50	"
Ethyl tert-butyl ether (ETBE)	ND	0.80	"
Hexachlorobutadiene	ND	0.50	"
Iodomethane	ND	0.50	"
Isopropylbenzene	ND	0.50	"
Methyl Methacrylate	ND	0.50	"
Methyl tert-butyl ether (MTBE)	ND	0.50	"
Methylene chloride	ND	2.0	"
Naphthalene	ND	2.0	"
n-Butylbenzene	ND	0.50	"
n-Propylbenzene	ND	0.50	"
o-Xylene	ND	0.50	"
p- & m- Xylenes	ND	1.0	"
p-Diethylbenzene	ND	0.50	"
p-Ethyltoluene	ND	0.50	"
p-Isopropyltoluene	ND	0.50	"
sec-Butylbenzene	ND	0.50	"
Styrene	ND	0.50	"
tert-Amyl methyl ether (TAME)	ND	0.80	"
tert-Butylbenzene	ND	0.50	"
Tetrachloroethylene	ND	0.50	"
Tetrahydrofuran	ND	0.50	"
Toluene	ND	0.50	"
trans-1,2-Dichloroethylene	ND	0.50	"
trans-1,3-Dichloropropylene	ND	0.50	"
Trichloroethylene	ND	0.50	"
Trichlorofluoromethane	ND	0.50	"
Vinyl acetate	ND	0.50	"
Vinyl Chloride	ND	0.50	"
Xylenes, Total	ND	1.5	"
Allyl chloride	ND	0.50	"
n-butyl acetate	ND	0.50	"
Chlorodifluoromethane (Freon 22)	ND	0.50	"
cis-decahydronaphthalene	ND	0.50	"
trans-decahydronaphthalene	ND	0.50	"
n-Decane	ND	0.50	"
Ethyl Methacrylate	ND	0.50	"
Hexachloroethane	ND	0.50	"
n-Hexane	ND	0.50	"
Limonene	ND	0.50	"
Nitrobenzene	ND	0.50	"
2-Nitropropane	ND	0.50	"
n-Nonane	ND	0.50	"
n-octane	ND	0.50	"
n-undecane	ND	0.50	"
Methyl Isothiocyanate (TIC)	ND	5.0	"

Surrogate: SURR: 1,2-Dichloroethane-d4	10.1	"	10.0	101	65-135
Surrogate: SURR: Toluene-d8	9.43	"	10.0	94.3	86-118
Surrogate: SURR: p-Bromofluorobenzene	10.1	"	10.0	101	81-114



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30514 - EPA 5030B											
LCS (BA30514-BS1)						Prepared: 01/10/2023 Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	9.9		ug/L	10.0		99.2	70-132				
1,1,1-Trichloroethane	11		"	10.0		108	68-138				
1,1,2,2-Tetrachloroethane	11		"	10.0		106	73-132				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11		"	10.0		105	67-136				
1,1,2-Trichloroethane	9.8		"	10.0		98.3	79-125				
1,1-Dichloroethane	9.3		"	10.0		92.8	78-128				
1,1-Dichloroethylene	9.6		"	10.0		96.5	68-134				
1,1-Dichloropropylene	9.6		"	10.0		95.6	74-130				
1,2,3-Trichlorobenzene	10		"	10.0		104	77-140				
1,2,3-Trichloropropane	12		"	10.0		116	79-127				
1,2,4,5-Tetramethylbenzene	9.4		"	10.0		94.1	76-139				
1,2,4-Trichlorobenzene	9.8		"	10.0		98.5	75-141				
1,2,4-Trimethylbenzene	9.3		"	10.0		92.7	78-127				
1,2-Dibromo-3-chloropropane	11		"	10.0		109	60-150				
1,2-Dibromoethane	11		"	10.0		106	86-123				
1,2-Dichlorobenzene	9.4		"	10.0		94.5	79-125				
1,2-Dichloroethane	10		"	10.0		101	69-133				
1,2-Dichloropropane	8.8		"	10.0		88.2	76-124				
1,3,5-Trimethylbenzene	9.3		"	10.0		93.3	78-128				
1,3-Dichlorobenzene	9.6		"	10.0		96.3	81-124				
1,3-Dichloropropane	9.7		"	10.0		97.3	79-125				
1,4-Dichlorobenzene	9.4		"	10.0		94.3	82-124				
1,4-Dioxane	430		"	210		204	10-177	High Bias			
2,2-Dichloropropane	7.6		"	10.0		75.8	61-139				
2-Butanone	12		"	10.0		121	44-169				
2-Chloroethylvinyl ether	8.3		"	10.0		83.4	10-155				
2-Chlorotoluene	9.5		"	10.0		95.3	74-130				
2-Hexanone	11		"	10.0		106	62-145				
4-Chlorotoluene	9.2		"	10.0		92.4	75-127				
4-Methyl-2-pentanone	10		"	10.0		102	67-137				
Acetone	11		"	10.0		112	29-163				
Acrolein	8.8		"	10.0		87.9	10-217				
Acrylonitrile	11		"	10.0		114	47-158				
Benzene	10		"	10.0		100	72-134				
Bromobenzene	9.2		"	10.0		92.1	74-129				
Bromochloromethane	9.9		"	10.0		99.4	69-134				
Bromodichloromethane	9.1		"	10.0		90.6	76-127				
Bromoform	9.7		"	10.0		97.2	77-137				
Bromomethane	4.8		"	10.0		48.1	50-156	Low Bias			
Carbon disulfide	10		"	10.0		100	54-154				
Carbon tetrachloride	11		"	10.0		108	62-145				
Chlorobenzene	10		"	10.0		99.7	85-119				
Chloroethane	9.9		"	10.0		98.9	49-143				
Chloroform	10		"	10.0		103	74-131				
Chloromethane	6.9		"	10.0		68.7	43-134				
cis-1,2-Dichloroethylene	9.0		"	10.0		90.2	73-134				
cis-1,3-Dichloropropylene	8.6		"	10.0		86.5	77-128				
Dibromochloromethane	9.1		"	10.0		90.7	79-130				
Dibromomethane	9.7		"	10.0		97.4	78-128				
Dichlorodifluoromethane	8.6		"	10.0		86.1	38-139				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30514 - EPA 5030B

LCS (BA30514-BS1)

Prepared: 01/10/2023 Analyzed: 01/11/2023

Ethyl Benzene	9.4		ug/L	10.0		94.3	80-129				
Ethyl Ether	ND	0.50	"				70-130				
Ethyl tert-butyl ether (ETBE)	10		"	10.0		102	70-130				
Hexachlorobutadiene	9.4		"	10.0		94.4	72-141				
Iodomethane	9.9		"	10.0		98.6	70-130				
Isopropylbenzene	9.8		"	10.0		98.2	76-128				
Methyl Methacrylate	9.7		"	10.0		96.8	70-130				
Methyl tert-butyl ether (MTBE)	10		"	10.0		103	64-142				
Methylene chloride	8.8		"	10.0		88.3	56-142				
Naphthalene	11		"	10.0		114	79-144				
n-Butylbenzene	8.6		"	10.0		86.1	74-132				
n-Propylbenzene	9.6		"	10.0		95.5	72-135				
o-Xylene	9.4		"	10.0		93.7	81-123				
p- & m- Xylenes	19		"	20.0		94.8	79-130				
p-Diethylbenzene	8.8		"	10.0		87.6	77-128				
p-Ethyltoluene	10		"	10.0		104	76-126				
p-Isopropyltoluene	9.8		"	10.0		97.6	80-127				
sec-Butylbenzene	9.6		"	10.0		95.5	78-127				
Styrene	9.6		"	10.0		95.6	82-124				
tert-Amyl methyl ether (TAME)	10		"	10.0		104	70-130				
tert-Butylbenzene	8.4		"	10.0		84.4	75-131				
Tetrachloroethylene	9.7		"	10.0		97.1	78-133				
Tetrahydrofuran	11		"	10.0		110	70-130				
Toluene	9.0		"	10.0		90.0	83-122				
trans-1,2-Dichloroethylene	9.4		"	10.0		94.1	59-145				
trans-1,3-Dichloropropylene	8.9		"	10.0		88.6	74-131				
Trichloroethylene	9.2		"	10.0		92.3	81-125				
Trichlorofluoromethane	11		"	10.0		113	61-144				
Vinyl acetate	9.1		"	10.0		91.1	32-165				
Vinyl Chloride	8.4		"	10.0		83.6	42-136				
Allyl chloride	10		"	10.0		99.7	70-130				
n-butyl acetate	ND	0.50	"				70-130				
Chlorodifluoromethane (Freon 22)	ND	0.50	"				70-130				
cis-decahydronaphthalene	ND	0.50	"				70-130				
trans-decahydronaphthalene	ND	0.50	"				70-130				
n-Decane	ND	0.50	"				70-130				
Ethyl Methacrylate	10		"	10.0		99.6	70-130				
Hexachloroethane	ND	0.50	"				70-130				
n-Hexane	ND	0.50	"				70-130				
Limonene	ND	0.50	"				70-130				
Nitrobenzene	13		"	10.0		127	70-130				
2-Nitropropane	7.8	0.50	"				70-130				
n-Nonane	ND	0.50	"				70-130				
n-octane	ND	0.50	"				70-130				
n-undecane	ND	0.50	"				70-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	10.5		"	10.0		105	65-135				
Surrogate: SURR: Toluene-d8	9.41		"	10.0		94.1	86-118				
Surrogate: SURR: p-Bromofluorobenzene	9.91		"	10.0		99.1	81-114				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting	Units	Spike	Source*	%REC	%REC	Flag	RPD	RPD	Flag
		Limit		Level	Result		Limits		Limit		
Batch BA30514 - EPA 5030B											
LCS (BA30514-BS2)						Prepared: 01/10/2023 Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	ND	0.50	ug/L				70-132				
1,1,1-Trichloroethane	ND	0.50	"				68-138				
1,1,2,2-Tetrachloroethane	ND	0.50	"				73-132				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"				67-136				
1,1,2-Trichloroethane	ND	0.50	"				79-125				
1,1-Dichloroethane	ND	0.50	"				78-128				
1,1-Dichloroethylene	ND	0.50	"				68-134				
1,1-Dichloropropylene	ND	0.50	"				74-130				
1,2,3-Trichlorobenzene	ND	0.50	"				77-140				
1,2,3-Trichloropropane	ND	0.50	"				79-127				
1,2,4,5-Tetramethylbenzene	ND	0.50	"				76-139				
1,2,4-Trichlorobenzene	ND	0.50	"				75-141				
1,2,4-Trimethylbenzene	ND	0.50	"				78-127				
1,2-Dibromo-3-chloropropane	ND	0.50	"				60-150				
1,2-Dibromoethane	ND	0.50	"				86-123				
1,2-Dichlorobenzene	ND	0.50	"				79-125				
1,2-Dichloroethane	ND	0.50	"				69-133				
1,2-Dichloropropane	ND	0.50	"				76-124				
1,3,5-Trimethylbenzene	ND	0.50	"				78-128				
1,3-Dichlorobenzene	ND	0.50	"				81-124				
1,3-Dichloropropane	ND	0.50	"				79-125				
1,4-Dichlorobenzene	ND	0.50	"				82-124				
1,4-Dioxane	ND	80	"				10-177				
2,2-Dichloropropane	ND	0.50	"				61-139				
2-Butanone	ND	0.50	"				44-169				
2-Chloroethylvinyl ether	ND	20	"				10-155				
2-Chlorotoluene	ND	0.50	"				74-130				
2-Hexanone	ND	0.50	"				62-145				
4-Chlorotoluene	ND	0.50	"				75-127				
4-Methyl-2-pentanone	ND	0.50	"				67-137				
Acetone	ND	2.0	"				29-163				
Acrolein	ND	0.50	"				10-217				
Acrylonitrile	ND	0.50	"				47-158				
Benzene	ND	0.50	"				72-134				
Bromobenzene	ND	0.50	"				74-129				
Bromochloromethane	ND	0.50	"				69-134				
Bromodichloromethane	ND	0.50	"				76-127				
Bromoform	ND	0.50	"				77-137				
Bromomethane	ND	0.50	"				50-156				
Carbon disulfide	ND	0.50	"				54-154				
Carbon tetrachloride	ND	0.50	"				62-145				
Chlorobenzene	ND	0.50	"				85-119				
Chloroethane	ND	0.50	"				49-143				
Chloroform	ND	0.50	"				74-131				
Chloromethane	ND	0.50	"				43-134				
cis-1,2-Dichloroethylene	ND	0.50	"				73-134				
cis-1,3-Dichloropropylene	ND	0.50	"				77-128				
Dibromochloromethane	ND	0.50	"				79-130				
Dibromomethane	ND	0.50	"				78-128				
Dichlorodifluoromethane	ND	0.50	"				38-139				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30514 - EPA 5030B

LCS (BA30514-BS2)

Prepared: 01/10/2023 Analyzed: 01/11/2023

Ethyl Benzene	ND	0.50	ug/L				80-129				
Ethyl Ether	1200	0.50	"				70-130				
Ethyl tert-butyl ether (ETBE)	ND	0.80	"				70-130				
Hexachlorobutadiene	ND	0.50	"				72-141				
Iodomethane	ND	0.50	"				70-130				
Isopropylbenzene	ND	0.50	"				76-128				
Methyl Methacrylate	ND	0.50	"				70-130				
Methyl tert-butyl ether (MTBE)	ND	0.50	"				64-142				
Methylene chloride	ND	2.0	"				56-142				
Naphthalene	ND	2.0	"				79-144				
n-Butylbenzene	ND	0.50	"				74-132				
n-Propylbenzene	ND	0.50	"				72-135				
o-Xylene	ND	0.50	"				81-123				
p- & m- Xylenes	ND	1.0	"				79-130				
p-Diethylbenzene	ND	0.50	"				77-128				
p-Ethyltoluene	ND	0.50	"				76-126				
p-Isopropyltoluene	ND	0.50	"				80-127				
sec-Butylbenzene	ND	0.50	"				78-127				
Styrene	ND	0.50	"				82-124				
tert-Amyl methyl ether (TAME)	ND	0.80	"				70-130				
tert-Butylbenzene	ND	0.50	"				75-131				
Tetrachloroethylene	ND	0.50	"				78-133				
Tetrahydrofuran	ND	0.50	"				70-130				
Toluene	ND	0.50	"				83-122				
trans-1,2-Dichloroethylene	ND	0.50	"				59-145				
trans-1,3-Dichloropropylene	ND	0.50	"				74-131				
Trichloroethylene	ND	0.50	"				81-125				
Trichlorofluoromethane	ND	0.50	"				61-144				
Vinyl acetate	ND	0.50	"				32-165				
Vinyl Chloride	ND	0.50	"				42-136				
Allyl chloride	ND	0.50	"				70-130				
n-butyl acetate	8.5		"	10.0		85.1	70-130				
Chlorodifluoromethane (Freon 22)	10		"	10.0		101	70-130				
cis-decahydronaphthalene	22		"	10.0		218	70-130	High Bias			
trans-decahydronaphthalene	11		"	10.0		107	70-130				
n-Decane	7.2	0.50	"				70-130				
Ethyl Methacrylate	ND	0.50	"				70-130				
Hexachloroethane	ND	0.50	"				70-130				
n-Hexane	12		"	10.0		125	70-130				
Limonene	8.5		"	10.0		84.9	70-130				
Nitrobenzene	ND	0.50	"				70-130				
2-Nitropropane	ND	0.50	"				70-130				
n-Nonane	11		"	10.0		109	70-130				
n-octane	10		"	10.0		100	70-130				
n-undecane	3.4		"	10.0		33.5	70-130	Low Bias			
Surrogate: SURR: 1,2-Dichloroethane-d4	9.24		"	10.0		92.4	65-135				
Surrogate: SURR: Toluene-d8	10.0		"	10.0		100	86-118				
Surrogate: SURR: p-Bromofluorobenzene	10.1		"	10.0		101	81-114				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	Limit	Flag
Batch BA30514 - EPA 5030B											
LCS Dup (BA30514-BSD1)						Prepared: 01/10/2023 Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	9.7		ug/L	10.0		97.1	70-132		2.14	30	
1,1,1-Trichloroethane	10		"	10.0		103	68-138		4.46	30	
1,1,2,2-Tetrachloroethane	10		"	10.0		105	73-132		1.23	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10		"	10.0		101	67-136		4.47	30	
1,1,2-Trichloroethane	9.7		"	10.0		97.1	79-125		1.23	30	
1,1-Dichloroethane	8.9		"	10.0		89.0	78-128		4.18	30	
1,1-Dichloroethylene	9.2		"	10.0		91.5	68-134		5.32	30	
1,1-Dichloropropylene	9.1		"	10.0		91.0	74-130		4.93	30	
1,2,3-Trichlorobenzene	9.9		"	10.0		98.7	77-140		5.13	30	
1,2,3-Trichloropropane	11		"	10.0		113	79-127		2.35	30	
1,2,4,5-Tetramethylbenzene	9.1		"	10.0		90.6	76-139		3.79	30	
1,2,4-Trichlorobenzene	9.5		"	10.0		94.6	75-141		4.04	30	
1,2,4-Trimethylbenzene	8.9		"	10.0		89.2	78-127		3.85	30	
1,2-Dibromo-3-chloropropane	10		"	10.0		102	60-150		5.88	30	
1,2-Dibromoethane	11		"	10.0		106	86-123		0.566	30	
1,2-Dichlorobenzene	9.2		"	10.0		92.2	79-125		2.46	30	
1,2-Dichloroethane	9.9		"	10.0		98.8	69-133		2.00	30	
1,2-Dichloropropane	8.7		"	10.0		87.4	76-124		0.911	30	
1,3,5-Trimethylbenzene	8.9		"	10.0		89.4	78-128		4.27	30	
1,3-Dichlorobenzene	9.3		"	10.0		93.1	81-124		3.38	30	
1,3-Dichloropropane	9.5		"	10.0		95.0	79-125		2.39	30	
1,4-Dichlorobenzene	9.1		"	10.0		91.2	82-124		3.34	30	
1,4-Dioxane	430		"	210		202	10-177	High Bias	0.846	30	
2,2-Dichloropropane	7.1		"	10.0		71.0	61-139		6.54	30	
2-Butanone	12		"	10.0		123	44-169		2.21	30	
2-Chloroethylvinyl ether	7.9		"	10.0		79.4	10-155		4.91	30	
2-Chlorotoluene	9.1		"	10.0		90.6	74-130		5.06	30	
2-Hexanone	10		"	10.0		101	62-145		4.34	30	
4-Chlorotoluene	8.9		"	10.0		89.0	75-127		3.75	30	
4-Methyl-2-pentanone	10		"	10.0		102	67-137		0.784	30	
Acetone	11		"	10.0		110	29-163		2.34	30	
Acrolein	8.5		"	10.0		84.7	10-217		3.71	30	
Acrylonitrile	12		"	10.0		118	47-158		3.55	30	
Benzene	9.7		"	10.0		96.8	72-134		3.45	30	
Bromobenzene	9.0		"	10.0		89.8	74-129		2.53	30	
Bromochloromethane	9.7		"	10.0		96.9	69-134		2.55	30	
Bromodichloromethane	9.0		"	10.0		90.1	76-127		0.553	30	
Bromoform	9.7		"	10.0		96.7	77-137		0.516	30	
Bromomethane	4.8		"	10.0		47.9	50-156	Low Bias	0.417	30	
Carbon disulfide	9.5		"	10.0		95.1	54-154		5.22	30	
Carbon tetrachloride	10		"	10.0		104	62-145		4.43	30	
Chlorobenzene	9.7		"	10.0		97.0	85-119		2.75	30	
Chloroethane	9.5		"	10.0		94.9	49-143		4.13	30	
Chloroform	9.9		"	10.0		99.3	74-131		3.66	30	
Chloromethane	6.7		"	10.0		66.7	43-134		2.95	30	
cis-1,2-Dichloroethylene	8.8		"	10.0		87.9	73-134		2.58	30	
cis-1,3-Dichloropropylene	8.5		"	10.0		85.2	77-128		1.51	30	
Dibromochloromethane	9.0		"	10.0		90.3	79-130		0.442	30	
Dibromomethane	9.7		"	10.0		96.8	78-128		0.618	30	
Dichlorodifluoromethane	8.3		"	10.0		82.6	38-139		4.15	30	



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30514 - EPA 5030B											
LCS Dup (BA30514-BSD1)						Prepared: 01/10/2023 Analyzed: 01/11/2023					
Ethyl Benzene	9.2		ug/L	10.0		91.6	80-129		2.90	30	
Ethyl Ether	ND	0.50	"				70-130			30	
Ethyl tert-butyl ether (ETBE)	10		"	10.0		99.7	70-130		2.08	30	
Hexachlorobutadiene	9.1		"	10.0		91.4	72-141		3.23	30	
Iodomethane	9.5		"	10.0		94.6	70-130		4.14	30	
Isopropylbenzene	9.5		"	10.0		94.9	76-128		3.42	30	
Methyl Methacrylate	9.9		"	10.0		99.0	70-130		2.25	30	
Methyl tert-butyl ether (MTBE)	10		"	10.0		101	64-142		1.86	30	
Methylene chloride	8.5		"	10.0		85.3	56-142		3.46	30	
Naphthalene	11		"	10.0		111	79-144		2.66	30	
n-Butylbenzene	8.2		"	10.0		81.8	74-132		5.12	30	
n-Propylbenzene	9.2		"	10.0		91.6	72-135		4.17	30	
o-Xylene	9.2		"	10.0		92.2	81-123		1.61	30	
p- & m- Xylenes	18		"	20.0		92.2	79-130		2.89	30	
p-Diethylbenzene	8.4		"	10.0		83.9	77-128		4.31	30	
p-Ethyltoluene	10		"	10.0		100	76-126		3.91	30	
p-Isopropyltoluene	9.3		"	10.0		93.3	80-127		4.50	30	
sec-Butylbenzene	9.2		"	10.0		91.9	78-127		3.84	30	
Styrene	9.4		"	10.0		93.5	82-124		2.22	30	
tert-Amyl methyl ether (TAME)	10		"	10.0		103	70-130		0.193	30	
tert-Butylbenzene	8.1		"	10.0		81.0	75-131		4.11	30	
Tetrachloroethylene	9.3		"	10.0		92.6	78-133		4.74	30	
Tetrahydrofuran	11		"	10.0		111	70-130		0.451	30	
Toluene	8.8		"	10.0		87.6	83-122		2.70	30	
trans-1,2-Dichloroethylene	9.0		"	10.0		90.1	59-145		4.34	30	
trans-1,3-Dichloropropylene	8.8		"	10.0		88.4	74-131		0.226	30	
Trichloroethylene	8.9		"	10.0		88.9	81-125		3.75	30	
Trichlorofluoromethane	11		"	10.0		110	61-144		2.86	30	
Vinyl acetate	8.4		"	10.0		84.1	32-165		7.99	30	
Vinyl Chloride	7.9		"	10.0		78.9	42-136		5.78	30	
Allyl chloride	9.5		"	10.0		94.8	70-130		5.04	30	
n-butyl acetate	ND	0.50	"				70-130			30	
Chlorodifluoromethane (Freon 22)	ND	0.50	"				70-130			30	
cis-decahydronaphthalene	ND	0.50	"				70-130			30	
trans-decahydronaphthalene	ND	0.50	"				70-130			30	
n-Decane	ND	0.50	"				70-130			30	
Ethyl Methacrylate	9.9		"	10.0		98.8	70-130		0.806	30	
Hexachloroethane	ND	0.50	"				70-130			30	
n-Hexane	ND	0.50	"				70-130			30	
Limonene	ND	0.50	"				70-130			30	
Nitrobenzene	11		"	10.0		110	70-130		15.0	30	
2-Nitropropane	8.0	0.50	"				70-130		2.27	30	
n-Nonane	ND	0.50	"				70-130			30	
n-octane	ND	0.50	"				70-130			30	
n-undecane	ND	0.50	"				70-130			30	
Surrogate: SURR: 1,2-Dichloroethane-d4	10.4		"	10.0		104	65-135				
Surrogate: SURR: Toluene-d8	9.44		"	10.0		94.4	86-118				
Surrogate: SURR: p-Bromofluorobenzene	9.86		"	10.0		98.6	81-114				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30514 - EPA 5030B											
LCS Dup (BA30514-BSD2)						Prepared: 01/10/2023 Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	ND	0.50	ug/L				70-132			30	
1,1,1-Trichloroethane	ND	0.50	"				68-138			30	
1,1,2,2-Tetrachloroethane	ND	0.50	"				73-132			30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"				67-136			30	
1,1,2-Trichloroethane	ND	0.50	"				79-125			30	
1,1-Dichloroethane	ND	0.50	"				78-128			30	
1,1-Dichloroethylene	ND	0.50	"				68-134			30	
1,1-Dichloropropylene	ND	0.50	"				74-130			30	
1,2,3-Trichlorobenzene	ND	0.50	"				77-140			30	
1,2,3-Trichloropropane	ND	0.50	"				79-127			30	
1,2,4,5-Tetramethylbenzene	ND	0.50	"				76-139			30	
1,2,4-Trichlorobenzene	ND	0.50	"				75-141			30	
1,2,4-Trimethylbenzene	ND	0.50	"				78-127			30	
1,2-Dibromo-3-chloropropane	ND	0.50	"				60-150			30	
1,2-Dibromoethane	ND	0.50	"				86-123			30	
1,2-Dichlorobenzene	ND	0.50	"				79-125			30	
1,2-Dichloroethane	ND	0.50	"				69-133			30	
1,2-Dichloropropane	ND	0.50	"				76-124			30	
1,3,5-Trimethylbenzene	ND	0.50	"				78-128			30	
1,3-Dichlorobenzene	ND	0.50	"				81-124			30	
1,3-Dichloropropane	ND	0.50	"				79-125			30	
1,4-Dichlorobenzene	ND	0.50	"				82-124			30	
1,4-Dioxane	ND	80	"				10-177			30	
2,2-Dichloropropane	ND	0.50	"				61-139			30	
2-Butanone	ND	0.50	"				44-169			30	
2-Chloroethylvinyl ether	ND	20	"				10-155			30	
2-Chlorotoluene	ND	0.50	"				74-130			30	
2-Hexanone	ND	0.50	"				62-145			30	
4-Chlorotoluene	ND	0.50	"				75-127			30	
4-Methyl-2-pentanone	ND	0.50	"				67-137			30	
Acetone	ND	2.0	"				29-163			30	
Acrolein	ND	0.50	"				10-217			30	
Acrylonitrile	ND	0.50	"				47-158			30	
Benzene	ND	0.50	"				72-134			30	
Bromobenzene	ND	0.50	"				74-129			30	
Bromochloromethane	ND	0.50	"				69-134			30	
Bromodichloromethane	ND	0.50	"				76-127			30	
Bromoform	ND	0.50	"				77-137			30	
Bromomethane	ND	0.50	"				50-156			30	
Carbon disulfide	ND	0.50	"				54-154			30	
Carbon tetrachloride	ND	0.50	"				62-145			30	
Chlorobenzene	ND	0.50	"				85-119			30	
Chloroethane	ND	0.50	"				49-143			30	
Chloroform	ND	0.50	"				74-131			30	
Chloromethane	ND	0.50	"				43-134			30	
cis-1,2-Dichloroethylene	ND	0.50	"				73-134			30	
cis-1,3-Dichloropropylene	ND	0.50	"				77-128			30	
Dibromochloromethane	ND	0.50	"				79-130			30	
Dibromomethane	ND	0.50	"				78-128			30	
Dichlorodifluoromethane	ND	0.50	"				38-139			30	



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30514 - EPA 5030B

LCS Dup (BA30514-BSD2)

Prepared: 01/10/2023 Analyzed: 01/11/2023

Ethyl Benzene	ND	0.50	ug/L				80-129			30	
Ethyl Ether	1200	0.50	"				70-130		0.848	30	
Ethyl tert-butyl ether (ETBE)	ND	0.80	"				70-130			30	
Hexachlorobutadiene	ND	0.50	"				72-141			30	
Iodomethane	ND	0.50	"				70-130			30	
Isopropylbenzene	ND	0.50	"				76-128			30	
Methyl Methacrylate	ND	0.50	"				70-130			30	
Methyl tert-butyl ether (MTBE)	ND	0.50	"				64-142			30	
Methylene chloride	ND	2.0	"				56-142			30	
Naphthalene	ND	2.0	"				79-144			30	
n-Butylbenzene	ND	0.50	"				74-132			30	
n-Propylbenzene	ND	0.50	"				72-135			30	
o-Xylene	ND	0.50	"				81-123			30	
p- & m- Xylenes	ND	1.0	"				79-130			30	
p-Diethylbenzene	ND	0.50	"				77-128			30	
p-Ethyltoluene	ND	0.50	"				76-126			30	
p-Isopropyltoluene	ND	0.50	"				80-127			30	
sec-Butylbenzene	ND	0.50	"				78-127			30	
Styrene	ND	0.50	"				82-124			30	
tert-Amyl methyl ether (TAME)	ND	0.80	"				70-130			30	
tert-Butylbenzene	ND	0.50	"				75-131			30	
Tetrachloroethylene	ND	0.50	"				78-133			30	
Tetrahydrofuran	ND	0.50	"				70-130			30	
Toluene	ND	0.50	"				83-122			30	
trans-1,2-Dichloroethylene	ND	0.50	"				59-145			30	
trans-1,3-Dichloropropylene	ND	0.50	"				74-131			30	
Trichloroethylene	ND	0.50	"				81-125			30	
Trichlorofluoromethane	ND	0.50	"				61-144			30	
Vinyl acetate	ND	0.50	"				32-165			30	
Vinyl Chloride	ND	0.50	"				42-136			30	
Allyl chloride	ND	0.50	"				70-130			30	
n-butyl acetate	8.4		"	10.0		84.2	70-130		1.06	30	
Chlorodifluoromethane (Freon 22)	9.5		"	10.0		94.6	70-130		6.15	30	
cis-decahydronaphthalene	21		"	10.0		211	70-130	High Bias	3.59	30	
trans-decahydronaphthalene	10		"	10.0		102	70-130		4.21	30	
n-Decane	6.7	0.50	"				70-130		8.48	30	
Ethyl Methacrylate	ND	0.50	"				70-130			30	
Hexachloroethane	ND	0.50	"				70-130			30	
n-Hexane	12		"	10.0		119	70-130		4.85	30	
Limonene	7.8		"	10.0		78.2	70-130		8.22	30	
Nitrobenzene	ND	0.50	"				70-130			30	
2-Nitropropane	ND	0.50	"				70-130			30	
n-Nonane	10		"	10.0		99.8	70-130		8.45	30	
n-octane	9.2		"	10.0		92.3	70-130		8.11	30	
n-undecane	3.1		"	10.0		31.0	70-130	Low Bias	7.75	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	9.21		"	10.0		92.1	65-135				
Surrogate: SURR: Toluene-d8	10.1		"	10.0		101	86-118				
Surrogate: SURR: p-Bromofluorobenzene	10.1		"	10.0		101	81-114				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BL21338 - EPA 5035A

Blank (BL21338-BLK1)

Prepared & Analyzed: 01/04/2023

1,1,1,2-Tetrachloroethane	ND	5.0	ug/kg wet
1,1,1-Trichloroethane	ND	5.0	"
1,1,2,2-Tetrachloroethane	ND	5.0	"
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	5.0	"
1,1,2-Trichloroethane	ND	5.0	"
1,1-Dichloroethane	ND	5.0	"
1,1-Dichloroethylene	ND	5.0	"
1,1-Dichloropropylene	ND	5.0	"
1,2,3-Trichlorobenzene	ND	5.0	"
1,2,3-Trichloropropane	ND	5.0	"
1,2,4,5-Tetramethylbenzene	ND	5.0	"
1,2,4-Trichlorobenzene	ND	5.0	"
1,2,4-Trimethylbenzene	ND	5.0	"
1,2-Dibromo-3-chloropropane	ND	5.0	"
1,2-Dibromoethane	ND	5.0	"
1,2-Dichlorobenzene	ND	5.0	"
1,2-Dichloroethane	ND	5.0	"
1,2-Dichloropropane	ND	5.0	"
1,3,5-Trimethylbenzene	ND	5.0	"
1,3-Dichlorobenzene	ND	5.0	"
1,3-Dichloropropane	ND	5.0	"
1,4-Dichlorobenzene	ND	5.0	"
1,4-Dioxane	ND	100	"
2,2-Dichloropropane	ND	5.0	"
2-Butanone	ND	5.0	"
2-Chloroethylvinyl ether	ND	20	"
2-Chlorotoluene	ND	5.0	"
2-Hexanone	ND	5.0	"
4-Chlorotoluene	ND	5.0	"
4-Methyl-2-pentanone	ND	5.0	"
Acetone	ND	10	"
Acrolein	ND	10	"
Acrylonitrile	ND	5.0	"
Benzene	ND	5.0	"
Bromobenzene	ND	5.0	"
Bromochloromethane	ND	5.0	"
Bromodichloromethane	ND	5.0	"
Bromoform	ND	5.0	"
Bromomethane	ND	5.0	"
Carbon disulfide	ND	5.0	"
Carbon tetrachloride	ND	5.0	"
Chlorobenzene	ND	5.0	"
Chloroethane	ND	5.0	"
Chloroform	ND	5.0	"
Chloromethane	ND	5.0	"
cis-1,2-Dichloroethylene	ND	5.0	"
cis-1,3-Dichloropropylene	ND	5.0	"
Dibromochloromethane	ND	5.0	"
Dibromomethane	ND	5.0	"
Dichlorodifluoromethane	ND	5.0	"



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BL21338 - EPA 5035A

Blank (BL21338-BLK1)

Prepared & Analyzed: 01/04/2023

Ethyl Benzene	ND	5.0	ug/kg wet								
Ethyl Ether	ND	50	"								
Ethyl tert-butyl ether (ETBE)	ND	8.0	"								
Hexachlorobutadiene	ND	5.0	"								
Iodomethane	ND	5.0	"								
Isopropylbenzene	ND	5.0	"								
Methyl Methacrylate	ND	5.0	"								
Methyl tert-butyl ether (MTBE)	ND	5.0	"								
Methylene chloride	ND	10	"								
Naphthalene	ND	10	"								
n-Butylbenzene	ND	5.0	"								
n-Propylbenzene	ND	5.0	"								
o-Xylene	ND	5.0	"								
p- & m- Xylenes	ND	10	"								
p-Diethylbenzene	ND	5.0	"								
p-Ethyltoluene	ND	5.0	"								
p-Isopropyltoluene	ND	5.0	"								
sec-Butylbenzene	ND	5.0	"								
Styrene	ND	5.0	"								
tert-Amyl methyl ether (TAME)	ND	8.0	"								
tert-Butylbenzene	ND	5.0	"								
Tetrachloroethylene	ND	5.0	"								
Tetrahydrofuran	ND	10	"								
Toluene	ND	5.0	"								
trans-1,2-Dichloroethylene	ND	5.0	"								
trans-1,3-Dichloropropylene	ND	5.0	"								
Trichloroethylene	ND	5.0	"								
Trichlorofluoromethane	ND	5.0	"								
Vinyl acetate	ND	5.0	"								
Vinyl Chloride	ND	5.0	"								
Xylenes, Total	ND	15	"								
Allyl chloride	ND	5.0	"								
n-butyl acetate	ND	5.0	"								
Chlorodifluoromethane (Freon 22)	ND	5.0	"								
cis-decahydronaphthalene	ND	5.0	"								
trans-decahydronaphthalene	ND	5.0	"								
n-Decane	ND	5.0	"								
Ethyl Methacrylate	ND	5.0	"								
Hexachloroethane	ND	5.0	"								
n-Hexane	ND	5.0	"								
Limonene	ND	5.0	"								
Nitrobenzene	ND	5.0	"								
2-Nitropropane	ND	5.0	"								
n-Nonane	ND	5.0	"								
n-octane	ND	5.0	"								
n-undecane	ND	5.0	"								
Methyl Isothiocyanate (TIC)	ND	50	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	50.9		ug/L	50.0		102	77-125				
Surrogate: SURR: Toluene-d8	48.4		"	50.0		96.8	85-120				
Surrogate: SURR: p-Bromofluorobenzene	56.0		"	50.0		112	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BL21338 - EPA 5035A											
LCS (BL21338-BS1)						Prepared & Analyzed: 01/04/2023					
1,1,1,2-Tetrachloroethane	45		ug/L	50.0		89.8	75-129				
1,1,1-Trichloroethane	51		"	50.0		102	71-137				
1,1,2,2-Tetrachloroethane	45		"	50.0		90.4	79-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	75		"	50.0		150	58-146	High Bias			
1,1,2-Trichloroethane	43		"	50.0		86.6	83-123				
1,1-Dichloroethane	46		"	50.0		92.9	75-130				
1,1-Dichloroethylene	63		"	50.0		126	64-137				
1,1-Dichloropropylene	46		"	50.0		91.4	77-127				
1,2,3-Trichlorobenzene	41		"	50.0		81.7	81-140				
1,2,3-Trichloropropane	42		"	50.0		84.1	81-126				
1,2,4,5-Tetramethylbenzene	43		"	50.0		85.8	63-156				
1,2,4-Trichlorobenzene	42		"	50.0		84.4	80-141				
1,2,4-Trimethylbenzene	42		"	50.0		84.1	84-125				
1,2-Dibromo-3-chloropropane	45		"	50.0		90.2	74-142				
1,2-Dibromoethane	45		"	50.0		89.4	86-123				
1,2-Dichlorobenzene	43		"	50.0		85.7	85-122				
1,2-Dichloroethane	50		"	50.0		101	71-133				
1,2-Dichloropropane	45		"	50.0		89.6	81-122				
1,3,5-Trimethylbenzene	42		"	50.0		84.9	82-126				
1,3-Dichlorobenzene	42		"	50.0		83.0	84-124	Low Bias			
1,3-Dichloropropane	44		"	50.0		88.0	83-123				
1,4-Dichlorobenzene	41		"	50.0		82.4	84-124	Low Bias			
1,4-Dioxane	1100		"	1050		101	10-228				
2,2-Dichloropropane	48		"	50.0		96.3	67-136				
2-Butanone	41		"	50.0		81.3	58-147				
2-Chloroethylvinyl ether	61		"	50.0		123	10-166				
2-Chlorotoluene	42		"	50.0		83.5	78-127				
2-Hexanone	44		"	50.0		87.2	70-139				
4-Chlorotoluene	44		"	50.0		88.1	79-125				
4-Methyl-2-pentanone	34		"	50.0		68.9	72-132	Low Bias			
Acetone	35		"	50.0		69.3	36-155				
Acrolein	51		"	50.0		101	10-238				
Acrylonitrile	48		"	50.0		95.6	66-141				
Benzene	49		"	50.0		98.2	77-127				
Bromobenzene	42		"	50.0		83.8	77-129				
Bromochloromethane	49		"	50.0		99.0	74-129				
Bromodichloromethane	45		"	50.0		90.0	81-124				
Bromoform	43		"	50.0		85.7	80-136				
Bromomethane	66		"	50.0		133	32-177				
Carbon disulfide	51		"	50.0		102	10-136				
Carbon tetrachloride	51		"	50.0		102	66-143				
Chlorobenzene	46		"	50.0		92.1	86-120				
Chloroethane	69		"	50.0		138	51-142				
Chloroform	50		"	50.0		99.4	76-131				
Chloromethane	61		"	50.0		121	49-132				
cis-1,2-Dichloroethylene	47		"	50.0		94.6	74-132				
cis-1,3-Dichloropropylene	45		"	50.0		89.6	81-129				
Dibromochloromethane	41		"	50.0		82.6	10-200				
Dibromomethane	44		"	50.0		87.8	83-124				
Dichlorodifluoromethane	64		"	50.0		128	28-158				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BL21338 - EPA 5035A											
LCS (BL21338-BS1)						Prepared & Analyzed: 01/04/2023					
Ethyl Benzene	44		ug/L	50.0		88.4	84-125				
Ethyl Ether	ND	50	ug/kg wet				70-130				
Ethyl tert-butyl ether (ETBE)	44		ug/L	50.0		87.6	70-130				
Hexachlorobutadiene	41		"	50.0		81.4	83-133	Low Bias			
Iodomethane	48		"	50.0		96.6	70-130				
Isopropylbenzene	43		"	50.0		86.1	81-127				
Methyl Methacrylate	44		"	50.0		87.4	79-125				
Methyl tert-butyl ether (MTBE)	45		"	50.0		90.8	74-131				
Methylene chloride	48		"	50.0		96.0	57-141				
Naphthalene	43		"	50.0		86.5	86-141				
n-Butylbenzene	44		"	50.0		88.4	80-130				
n-Propylbenzene	43		"	50.0		85.9	74-136				
o-Xylene	44		"	50.0		87.9	83-123				
p- & m- Xylenes	92		"	100		92.0	82-128				
p-Diethylbenzene	44		"	50.0		88.2	70-144				
p-Ethyltoluene	44		"	50.0		87.8	84-123				
p-Isopropyltoluene	43		"	50.0		86.3	85-125				
sec-Butylbenzene	43		"	50.0		86.2	83-125				
Styrene	45		"	50.0		89.1	86-126				
tert-Amyl methyl ether (TAME)	45		"	50.0		90.9	70-130				
tert-Butylbenzene	36		"	50.0		72.5	80-127	Low Bias			
Tetrachloroethylene	39		"	50.0		77.3	80-129	Low Bias			
Tetrahydrofuran	53		"	50.0		105	64-137				
Toluene	44		"	50.0		87.8	85-121				
trans-1,2-Dichloroethylene	47		"	50.0		94.9	72-132				
trans-1,3-Dichloropropylene	45		"	50.0		89.2	78-132				
Trichloroethylene	43		"	50.0		86.9	84-123				
Trichlorofluoromethane	59		"	50.0		118	62-140				
Vinyl acetate	51		"	50.0		103	67-136				
Vinyl Chloride	62		"	50.0		124	52-130				
Allyl chloride	50		"	50.0		100	70-130				
n-butyl acetate	ND	5.0	ug/kg wet				70-130				
Chlorodifluoromethane (Freon 22)	ND	5.0	"				70-130				
cis-decahydronaphthalene	ND	5.0	"				70-130				
trans-decahydronaphthalene	ND	5.0	"				70-130				
n-Decane	ND	5.0	"				70-130				
Ethyl Methacrylate	44		ug/L	50.0		87.7	70-130				
Hexachloroethane	ND	5.0	ug/kg wet				70-130				
n-Hexane	ND	5.0	"				70-130				
Limonene	ND	5.0	"				70-130				
Nitrobenzene	56		ug/L	50.0		111	70-130				
2-Nitropropane	49	5.0	ug/kg wet				70-130				
n-Nonane	ND	5.0	"				70-130				
n-octane	ND	5.0	"				70-130				
n-undecane	ND	5.0	"				70-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	49.8		ug/L	50.0		99.7	77-125				
Surrogate: SURR: Toluene-d8	47.7		"	50.0		95.4	85-120				
Surrogate: SURR: p-Bromofluorobenzene	48.9		"	50.0		97.9	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BL21338 - EPA 5035A											
LCS (BL21338-BS2)						Prepared & Analyzed: 01/04/2023					
1,1,1,2-Tetrachloroethane	ND	5.0	ug/kg wet				75-129				
1,1,1-Trichloroethane	ND	5.0	"				71-137				
1,1,2,2-Tetrachloroethane	ND	5.0	"				79-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	5.0	"				58-146				
1,1,2-Trichloroethane	ND	5.0	"				83-123				
1,1-Dichloroethane	ND	5.0	"				75-130				
1,1-Dichloroethylene	ND	5.0	"				64-137				
1,1-Dichloropropylene	ND	5.0	"				77-127				
1,2,3-Trichlorobenzene	ND	5.0	"				81-140				
1,2,3-Trichloropropane	ND	5.0	"				81-126				
1,2,4,5-Tetramethylbenzene	ND	5.0	"				63-156				
1,2,4-Trichlorobenzene	ND	5.0	"				80-141				
1,2,4-Trimethylbenzene	ND	5.0	"				84-125				
1,2-Dibromo-3-chloropropane	ND	5.0	"				74-142				
1,2-Dibromoethane	ND	5.0	"				86-123				
1,2-Dichlorobenzene	ND	5.0	"				85-122				
1,2-Dichloroethane	ND	5.0	"				71-133				
1,2-Dichloropropane	ND	5.0	"				81-122				
1,3,5-Trimethylbenzene	ND	5.0	"				82-126				
1,3-Dichlorobenzene	ND	5.0	"				84-124				
1,3-Dichloropropane	ND	5.0	"				83-123				
1,4-Dichlorobenzene	ND	5.0	"				84-124				
1,4-Dioxane	ND	100	"				10-228				
2,2-Dichloropropane	ND	5.0	"				67-136				
2-Butanone	ND	5.0	"				58-147				
2-Chloroethylvinyl ether	ND	20	"				10-166				
2-Chlorotoluene	ND	5.0	"				78-127				
2-Hexanone	ND	5.0	"				70-139				
4-Chlorotoluene	ND	5.0	"				79-125				
4-Methyl-2-pentanone	ND	5.0	"				72-132				
Acetone	ND	10	"				36-155				
Acrolein	ND	10	"				10-238				
Acrylonitrile	ND	5.0	"				66-141				
Benzene	ND	5.0	"				77-127				
Bromobenzene	ND	5.0	"				77-129				
Bromochloromethane	ND	5.0	"				74-129				
Bromodichloromethane	ND	5.0	"				81-124				
Bromoform	ND	5.0	"				80-136				
Bromomethane	ND	5.0	"				32-177				
Carbon disulfide	ND	5.0	"				10-136				
Carbon tetrachloride	ND	5.0	"				66-143				
Chlorobenzene	ND	5.0	"				86-120				
Chloroethane	ND	5.0	"				51-142				
Chloroform	ND	5.0	"				76-131				
Chloromethane	ND	5.0	"				49-132				
cis-1,2-Dichloroethylene	ND	5.0	"				74-132				
cis-1,3-Dichloropropylene	ND	5.0	"				81-129				
Dibromochloromethane	ND	5.0	"				10-200				
Dibromomethane	ND	5.0	"				83-124				
Dichlorodifluoromethane	ND	5.0	"				28-158				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BL21338 - EPA 5035A

LCS (BL21338-BS2)

Prepared & Analyzed: 01/04/2023

Ethyl Benzene	ND	5.0	ug/kg wet				84-125				
Ethyl Ether	700	50	"				70-130				
Ethyl tert-butyl ether (ETBE)	ND	8.0	"				70-130				
Hexachlorobutadiene	ND	5.0	"				83-133				
Iodomethane	ND	5.0	"				70-130				
Isopropylbenzene	ND	5.0	"				81-127				
Methyl Methacrylate	ND	5.0	"				79-125				
Methyl tert-butyl ether (MTBE)	ND	5.0	"				74-131				
Methylene chloride	ND	10	"				57-141				
Naphthalene	ND	10	"				86-141				
n-Butylbenzene	ND	5.0	"				80-130				
n-Propylbenzene	ND	5.0	"				74-136				
o-Xylene	ND	5.0	"				83-123				
p- & m- Xylenes	ND	10	"				82-128				
p-Diethylbenzene	ND	5.0	"				70-144				
p-Ethyltoluene	ND	5.0	"				84-123				
p-Isopropyltoluene	ND	5.0	"				85-125				
sec-Butylbenzene	ND	5.0	"				83-125				
Styrene	ND	5.0	"				86-126				
tert-Amyl methyl ether (TAME)	ND	8.0	"				70-130				
tert-Butylbenzene	ND	5.0	"				80-127				
Tetrachloroethylene	ND	5.0	"				80-129				
Tetrahydrofuran	ND	10	"				64-137				
Toluene	ND	5.0	"				85-121				
trans-1,2-Dichloroethylene	ND	5.0	"				72-132				
trans-1,3-Dichloropropylene	ND	5.0	"				78-132				
Trichloroethylene	ND	5.0	"				84-123				
Trichlorofluoromethane	ND	5.0	"				62-140				
Vinyl acetate	ND	5.0	"				67-136				
Vinyl Chloride	ND	5.0	"				52-130				
Allyl chloride	ND	5.0	"				70-130				
n-butyl acetate	36		ug/L	50.0		71.4	70-130				
Chlorodifluoromethane (Freon 22)	660		"	50.0		NR	70-130	High Bias			
cis-decahydronaphthalene	42		"	50.0		84.1	70-130				
trans-decahydronaphthalene	43		"	50.0		86.9	70-130				
n-Decane	56	5.0	ug/kg wet				70-130				
Ethyl Methacrylate	ND	5.0	"				70-130				
Hexachloroethane	ND	5.0	"				70-130				
n-Hexane	39		ug/L	50.0		78.3	70-130				
Limonene	47		"	50.0		93.8	70-130				
Nitrobenzene	ND	5.0	ug/kg wet				70-130				
2-Nitropropane	ND	5.0	"				70-130				
n-Nonane	47		ug/L	50.0		93.4	70-130				
n-octane	40		"	50.0		80.3	70-130				
n-undecane	58		"	50.0		115	70-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	46.6		"	50.0		93.1	77-125				
Surrogate: SURR: Toluene-d8	48.3		"	50.0		96.5	85-120				
Surrogate: SURR: p-Bromofluorobenzene	58.0		"	50.0		116	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BL21338 - EPA 5035A											
LCS Dup (BL21338-BSD1)						Prepared & Analyzed: 01/04/2023					
1,1,1,2-Tetrachloroethane	51		ug/L	50.0		102	75-129		13.2	30	
1,1,1-Trichloroethane	57		"	50.0		115	71-137		12.1	30	
1,1,2,2-Tetrachloroethane	49		"	50.0		98.1	79-129		8.17	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	83		"	50.0		167	58-146	High Bias	10.4	30	
1,1,2-Trichloroethane	48		"	50.0		96.9	83-123		11.2	30	
1,1-Dichloroethane	52		"	50.0		104	75-130		11.1	30	
1,1-Dichloroethylene	70		"	50.0		140	64-137	High Bias	10.8	30	
1,1-Dichloropropylene	52		"	50.0		104	77-127		12.6	30	
1,2,3-Trichlorobenzene	44		"	50.0		88.4	81-140		7.83	30	
1,2,3-Trichloropropane	46		"	50.0		92.3	81-126		9.34	30	
1,2,4,5-Tetramethylbenzene	46		"	50.0		92.2	63-156		7.19	30	
1,2,4-Trichlorobenzene	44		"	50.0		88.8	80-141		5.03	30	
1,2,4-Trimethylbenzene	46		"	50.0		92.6	84-125		9.60	30	
1,2-Dibromo-3-chloropropane	50		"	50.0		100	74-142		10.7	30	
1,2-Dibromoethane	49		"	50.0		98.2	86-123		9.41	30	
1,2-Dichlorobenzene	47		"	50.0		94.7	85-122		10.0	30	
1,2-Dichloroethane	56		"	50.0		112	71-133		10.6	30	
1,2-Dichloropropane	50		"	50.0		101	81-122		11.7	30	
1,3,5-Trimethylbenzene	47		"	50.0		94.1	82-126		10.4	30	
1,3-Dichlorobenzene	45		"	50.0		89.5	84-124		7.49	30	
1,3-Dichloropropane	49		"	50.0		98.9	83-123		11.6	30	
1,4-Dichlorobenzene	44		"	50.0		88.8	84-124		7.52	30	
1,4-Dioxane	1100		"	1050		108	10-228		6.70	30	
2,2-Dichloropropane	54		"	50.0		109	67-136		12.3	30	
2-Butanone	46		"	50.0		92.9	58-147		13.4	30	
2-Chloroethylvinyl ether	68		"	50.0		137	10-166		10.7	30	
2-Chlorotoluene	45		"	50.0		90.6	78-127		8.22	30	
2-Hexanone	47		"	50.0		94.4	70-139		7.86	30	
4-Chlorotoluene	48		"	50.0		95.9	79-125		8.43	30	
4-Methyl-2-pentanone	38		"	50.0		75.9	72-132		9.78	30	
Acetone	36		"	50.0		72.5	36-155		4.54	30	
Acrolein	56		"	50.0		113	10-238		10.7	30	
Acrylonitrile	53		"	50.0		107	66-141		11.0	30	
Benzene	56		"	50.0		111	77-127		12.4	30	
Bromobenzene	46		"	50.0		92.0	77-129		9.35	30	
Bromochloromethane	57		"	50.0		114	74-129		13.8	30	
Bromodichloromethane	51		"	50.0		102	81-124		12.1	30	
Bromoform	49		"	50.0		97.9	80-136		13.3	30	
Bromomethane	75		"	50.0		151	32-177		12.6	30	
Carbon disulfide	58		"	50.0		116	10-136		12.4	30	
Carbon tetrachloride	58		"	50.0		116	66-143		13.1	30	
Chlorobenzene	52		"	50.0		104	86-120		11.7	30	
Chloroethane	76		"	50.0		153	51-142	High Bias	9.96	30	
Chloroform	56		"	50.0		111	76-131		11.3	30	
Chloromethane	67		"	50.0		133	49-132	High Bias	9.73	30	
cis-1,2-Dichloroethylene	55		"	50.0		109	74-132		14.5	30	
cis-1,3-Dichloropropylene	50		"	50.0		100	81-129		11.1	30	
Dibromochloromethane	46		"	50.0		91.7	10-200		10.4	30	
Dibromomethane	49		"	50.0		98.8	83-124		11.7	30	
Dichlorodifluoromethane	70		"	50.0		140	28-158		8.42	30	



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BL21338 - EPA 5035A											
LCS Dup (BL21338-BSD1)						Prepared & Analyzed: 01/04/2023					
Ethyl Benzene	49		ug/L	50.0		98.2	84-125		10.5	30	
Ethyl Ether	ND	50	ug/kg wet				70-130			30	
Ethyl tert-butyl ether (ETBE)	50		ug/L	50.0		99.5	70-130		12.7	30	
Hexachlorobutadiene	44		"	50.0		87.8	83-133		7.61	30	
Iodomethane	54		"	50.0		107	70-130		10.2	30	
Isopropylbenzene	47		"	50.0		95.0	81-127		9.79	30	
Methyl Methacrylate	49		"	50.0		98.0	79-125		11.5	30	
Methyl tert-butyl ether (MTBE)	53		"	50.0		105	74-131		14.7	30	
Methylene chloride	54		"	50.0		109	57-141		12.5	30	
Naphthalene	47		"	50.0		93.5	86-141		7.78	30	
n-Butylbenzene	48		"	50.0		96.7	80-130		9.03	30	
n-Propylbenzene	47		"	50.0		94.5	74-136		9.56	30	
o-Xylene	50		"	50.0		99.4	83-123		12.2	30	
p- & m- Xylenes	100		"	100		103	82-128		11.4	30	
p-Diethylbenzene	49		"	50.0		97.3	70-144		9.77	30	
p-Ethyltoluene	48		"	50.0		96.8	84-123		9.84	30	
p-Isopropyltoluene	47		"	50.0		94.7	85-125		9.32	30	
sec-Butylbenzene	47		"	50.0		94.8	83-125		9.46	30	
Styrene	50		"	50.0		100	86-126		11.7	30	
tert-Amyl methyl ether (TAME)	51		"	50.0		103	70-130		12.4	30	
tert-Butylbenzene	39		"	50.0		78.9	80-127	Low Bias	8.45	30	
Tetrachloroethylene	43		"	50.0		86.2	80-129		10.9	30	
Tetrahydrofuran	53		"	50.0		106	64-137		0.569	30	
Toluene	50		"	50.0		99.2	85-121		12.2	30	
trans-1,2-Dichloroethylene	53		"	50.0		106	72-132		11.3	30	
trans-1,3-Dichloropropylene	51		"	50.0		101	78-132		12.4	30	
Trichloroethylene	48		"	50.0		96.8	84-123		10.8	30	
Trichlorofluoromethane	67		"	50.0		134	62-140		13.0	30	
Vinyl acetate	58		"	50.0		116	67-136		12.1	30	
Vinyl Chloride	68		"	50.0		136	52-130	High Bias	9.04	30	
Allyl chloride	53		"	50.0		105	70-130		5.05	30	
n-butyl acetate	ND	5.0	ug/kg wet				70-130			30	
Chlorodifluoromethane (Freon 22)	ND	5.0	"				70-130			30	
cis-decahydronaphthalene	ND	5.0	"				70-130			30	
trans-decahydronaphthalene	ND	5.0	"				70-130			30	
n-Decane	ND	5.0	"				70-130			30	
Ethyl Methacrylate	49		ug/L	50.0		98.9	70-130		11.9	30	
Hexachloroethane	ND	5.0	ug/kg wet				70-130			30	
n-Hexane	ND	5.0	"				70-130			30	
Limonene	ND	5.0	"				70-130			30	
Nitrobenzene	64		ug/L	50.0		128	70-130		14.3	30	
2-Nitropropane	54	5.0	ug/kg wet				70-130		10.4	30	
n-Nonane	ND	5.0	"				70-130			30	
n-octane	ND	5.0	"				70-130			30	
n-undecane	ND	5.0	"				70-130			30	
Surrogate: SURR: 1,2-Dichloroethane-d4	49.9		ug/L	50.0		99.8	77-125				
Surrogate: SURR: Toluene-d8	47.2		"	50.0		94.4	85-120				
Surrogate: SURR: p-Bromofluorobenzene	47.3		"	50.0		94.7	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	Limit	Flag
Batch BL21338 - EPA 5035A											
LCS Dup (BL21338-BSD2)						Prepared & Analyzed: 01/04/2023					
1,1,1,2-Tetrachloroethane	ND	5.0	ug/kg wet				75-129			30	
1,1,1-Trichloroethane	ND	5.0	"				71-137			30	
1,1,2,2-Tetrachloroethane	ND	5.0	"				79-129			30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	5.0	"				58-146			30	
1,1,2-Trichloroethane	ND	5.0	"				83-123			30	
1,1-Dichloroethane	ND	5.0	"				75-130			30	
1,1-Dichloroethylene	ND	5.0	"				64-137			30	
1,1-Dichloropropylene	ND	5.0	"				77-127			30	
1,2,3-Trichlorobenzene	ND	5.0	"				81-140			30	
1,2,3-Trichloropropane	ND	5.0	"				81-126			30	
1,2,4,5-Tetramethylbenzene	ND	5.0	"				63-156			30	
1,2,4-Trichlorobenzene	ND	5.0	"				80-141			30	
1,2,4-Trimethylbenzene	ND	5.0	"				84-125			30	
1,2-Dibromo-3-chloropropane	ND	5.0	"				74-142			30	
1,2-Dibromoethane	ND	5.0	"				86-123			30	
1,2-Dichlorobenzene	ND	5.0	"				85-122			30	
1,2-Dichloroethane	ND	5.0	"				71-133			30	
1,2-Dichloropropane	ND	5.0	"				81-122			30	
1,3,5-Trimethylbenzene	ND	5.0	"				82-126			30	
1,3-Dichlorobenzene	ND	5.0	"				84-124			30	
1,3-Dichloropropane	ND	5.0	"				83-123			30	
1,4-Dichlorobenzene	ND	5.0	"				84-124			30	
1,4-Dioxane	ND	100	"				10-228			30	
2,2-Dichloropropane	ND	5.0	"				67-136			30	
2-Butanone	ND	5.0	"				58-147			30	
2-Chloroethylvinyl ether	ND	20	"				10-166			30	
2-Chlorotoluene	ND	5.0	"				78-127			30	
2-Hexanone	ND	5.0	"				70-139			30	
4-Chlorotoluene	ND	5.0	"				79-125			30	
4-Methyl-2-pentanone	ND	5.0	"				72-132			30	
Acetone	ND	10	"				36-155			30	
Acrolein	ND	10	"				10-238			30	
Acrylonitrile	ND	5.0	"				66-141			30	
Benzene	ND	5.0	"				77-127			30	
Bromobenzene	ND	5.0	"				77-129			30	
Bromochloromethane	ND	5.0	"				74-129			30	
Bromodichloromethane	ND	5.0	"				81-124			30	
Bromoform	ND	5.0	"				80-136			30	
Bromomethane	ND	5.0	"				32-177			30	
Carbon disulfide	ND	5.0	"				10-136			30	
Carbon tetrachloride	ND	5.0	"				66-143			30	
Chlorobenzene	ND	5.0	"				86-120			30	
Chloroethane	ND	5.0	"				51-142			30	
Chloroform	ND	5.0	"				76-131			30	
Chloromethane	ND	5.0	"				49-132			30	
cis-1,2-Dichloroethylene	ND	5.0	"				74-132			30	
cis-1,3-Dichloropropylene	ND	5.0	"				81-129			30	
Dibromochloromethane	ND	5.0	"				10-200			30	
Dibromomethane	ND	5.0	"				83-124			30	
Dichlorodifluoromethane	ND	5.0	"				28-158			30	



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BL21338 - EPA 5035A

LCS Dup (BL21338-BSD2)

Prepared & Analyzed: 01/04/2023

Ethyl Benzene	ND	5.0	ug/kg wet				84-125			30	
Ethyl Ether	800	50	"				70-130		12.6	30	
Ethyl tert-butyl ether (ETBE)	ND	8.0	"				70-130			30	
Hexachlorobutadiene	ND	5.0	"				83-133			30	
Iodomethane	ND	5.0	"				70-130			30	
Isopropylbenzene	ND	5.0	"				81-127			30	
Methyl Methacrylate	ND	5.0	"				79-125			30	
Methyl tert-butyl ether (MTBE)	ND	5.0	"				74-131			30	
Methylene chloride	ND	10	"				57-141			30	
Naphthalene	ND	10	"				86-141			30	
n-Butylbenzene	ND	5.0	"				80-130			30	
n-Propylbenzene	ND	5.0	"				74-136			30	
o-Xylene	ND	5.0	"				83-123			30	
p- & m- Xylenes	ND	10	"				82-128			30	
p-Diethylbenzene	ND	5.0	"				70-144			30	
p-Ethyltoluene	ND	5.0	"				84-123			30	
p-Isopropyltoluene	ND	5.0	"				85-125			30	
sec-Butylbenzene	ND	5.0	"				83-125			30	
Styrene	ND	5.0	"				86-126			30	
tert-Amyl methyl ether (TAME)	ND	8.0	"				70-130			30	
tert-Butylbenzene	ND	5.0	"				80-127			30	
Tetrachloroethylene	ND	5.0	"				80-129			30	
Tetrahydrofuran	ND	10	"				64-137			30	
Toluene	ND	5.0	"				85-121			30	
trans-1,2-Dichloroethylene	ND	5.0	"				72-132			30	
trans-1,3-Dichloropropylene	ND	5.0	"				78-132			30	
Trichloroethylene	ND	5.0	"				84-123			30	
Trichlorofluoromethane	ND	5.0	"				62-140			30	
Vinyl acetate	ND	5.0	"				67-136			30	
Vinyl Chloride	ND	5.0	"				52-130			30	
Allyl chloride	ND	5.0	"				70-130			30	
n-butyl acetate	39		ug/L	50.0		77.8	70-130		8.61	30	
Chlorodifluoromethane (Freon 22)	750		"	50.0		NR	70-130	High Bias	12.6	30	
cis-decahydronaphthalene	46		"	50.0		91.4	70-130		8.30	30	
trans-decahydronaphthalene	48		"	50.0		95.2	70-130		9.11	30	
n-Decane	61	5.0	ug/kg wet				70-130		8.42	30	
Ethyl Methacrylate	ND	5.0	"				70-130			30	
Hexachloroethane	ND	5.0	"				70-130			30	
n-Hexane	43		ug/L	50.0		86.1	70-130		9.46	30	
Limonene	50		"	50.0		101	70-130		7.39	30	
Nitrobenzene	ND	5.0	ug/kg wet				70-130			30	
2-Nitropropane	ND	5.0	"				70-130			30	
n-Nonane	52		ug/L	50.0		103	70-130		9.95	30	
n-octane	44		"	50.0		87.7	70-130		8.86	30	
n-undecane	62		"	50.0		124	70-130		7.35	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	47.0		"	50.0		94.0	77-125				
Surrogate: SURR: Toluene-d8	48.2		"	50.0		96.3	85-120				
Surrogate: SURR: p-Bromofluorobenzene	57.1		"	50.0		114	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BL21338 - EPA 5035A											
Matrix Spike (BL21338-MS1)		*Source sample: 23A0038-03 (LP_003)					Prepared & Analyzed: 01/04/2023				
1,1,1,2-Tetrachloroethane	23		ug/L	50.0	0.0	45.3	15-161				
1,1,1-Trichloroethane	30		"	50.0	0.0	60.0	42-145				
1,1,2,2-Tetrachloroethane	41		"	50.0	0.0	82.5	16-167				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	48		"	50.0	0.0	96.1	11-160				
1,1,2-Trichloroethane	28		"	50.0	0.0	56.4	44-145				
1,1-Dichloroethane	34		"	50.0	0.0	67.7	46-142				
1,1-Dichloroethylene	45		"	50.0	0.0	89.2	30-153				
1,1-Dichloropropylene	27		"	50.0	0.0	54.6	40-133				
1,2,3-Trichlorobenzene	8.3		"	50.0	0.0	16.5	10-157				
1,2,3-Trichloropropane	35		"	50.0	0.0	70.8	38-155				
1,2,4,5-Tetramethylbenzene	19		"	50.0	9.0	21.0	10-138				
1,2,4-Trichlorobenzene	11		"	50.0	0.0	22.9	10-151				
1,2,4-Trimethylbenzene	54		"	50.0	130	NR	10-170	Low Bias			
1,2-Dibromo-3-chloropropane	24		"	50.0	0.0	48.9	36-138				
1,2-Dibromoethane	29		"	50.0	0.0	57.4	40-142				
1,2-Dichlorobenzene	20		"	50.0	0.0	40.3	10-147				
1,2-Dichloroethane	35		"	50.0	0.0	69.0	48-133				
1,2-Dichloropropane	32		"	50.0	0.0	64.9	47-141				
1,3,5-Trimethylbenzene	33		"	50.0	38	NR	10-150	Low Bias			
1,3-Dichlorobenzene	22		"	50.0	0.0	43.2	10-144				
1,3-Dichloropropane	30		"	50.0	0.0	59.6	43-142				
1,4-Dichlorobenzene	290		"	50.0	550	NR	10-160	Low Bias			
1,4-Dioxane	1300		"	1050	0.0	125	10-191				
2,2-Dichloropropane	30		"	50.0	0.0	59.2	38-130				
2-Butanone	56		"	50.0	40	31.3	10-189				
2-Chloroethylvinyl ether	40		"	50.0	0.0	80.7	10-161				
2-Chlorotoluene	29		"	50.0	0.0	58.0	14-144				
2-Hexanone	34		"	50.0	0.0	67.5	10-181				
4-Chlorotoluene	29		"	50.0	0.0	57.1	15-138				
4-Methyl-2-pentanone	31		"	50.0	0.0	61.4	10-166				
Acetone	160		"	50.0	290	NR	10-196	Low Bias			
Acrolein	2.6		"	50.0	0.0	5.12	10-192	Low Bias			
Acrylonitrile	39		"	50.0	0.0	77.5	13-161				
Benzene	30		"	50.0	0.0	59.8	43-139				
Bromobenzene	30		"	50.0	0.0	60.3	23-142				
Bromochloromethane	36		"	50.0	0.0	71.4	38-145				
Bromodichloromethane	28		"	50.0	0.0	55.0	38-147				
Bromoform	18		"	50.0	0.0	36.9	29-156				
Bromomethane	40		"	50.0	0.0	79.3	10-166				
Carbon disulfide	38		"	50.0	4.4	67.1	10-131				
Carbon tetrachloride	26		"	50.0	0.0	51.2	35-145				
Chlorobenzene	28		"	50.0	7.8	39.4	21-154				
Chloroethane	58		"	50.0	0.0	117	15-160				
Chloroform	32		"	50.0	0.0	64.7	47-142				
Chloromethane	52		"	50.0	0.0	105	10-159				
cis-1,2-Dichloroethylene	32		"	50.0	0.0	63.4	42-144				
cis-1,3-Dichloropropylene	18		"	50.0	0.0	35.7	18-159				
Dibromochloromethane	22		"	50.0	0.0	43.5	10-179				
Dibromomethane	32		"	50.0	0.0	64.1	47-143				
Dichlorodifluoromethane	56		"	50.0	0.0	111	10-145				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BL21338 - EPA 5035A											
Matrix Spike (BL21338-MS1)	*Source sample: 23A0038-03 (LP_003)						Prepared & Analyzed: 01/04/2023				
Ethyl Benzene	23		ug/L	50.0	0.0	45.5	11-158				
Ethyl Ether	ND	150	ug/kg dry		ND		70-130				
Ethyl tert-butyl ether (ETBE)	32		ug/L	50.0	0.0	63.8	70-130	Low Bias			
Hexachlorobutadiene	7.5		"	50.0	0.0	15.1	10-158				
Iodomethane	14		"	50.0	0.0	28.0	70-130	Low Bias			
Isopropylbenzene	28		"	50.0	0.0	55.5	10-162				
Methyl Methacrylate	35		"	50.0	0.0	70.8	22-162				
Methyl tert-butyl ether (MTBE)	35		"	50.0	0.0	70.2	42-152				
Methylene chloride	38		"	50.0	0.0	75.9	28-151				
Naphthalene	13		"	50.0	5.8	14.8	10-158				
n-Butylbenzene	21		"	50.0	12	18.7	10-162				
n-Propylbenzene	30		"	50.0	14	31.9	10-155				
o-Xylene	21		"	50.0	0.0	41.8	10-158				
p- & m- Xylenes	44		"	100	0.0	43.6	10-156				
p-Diethylbenzene	21		"	50.0	9.8	21.8	10-146				
p-Ethyltoluene	38		"	50.0	48	NR	10-135	Low Bias			
p-Isopropyltoluene	22		"	50.0	7.5	29.4	10-147				
sec-Butylbenzene	23		"	50.0	6.3	33.6	10-157				
Styrene	17		"	50.0	0.0	34.7	13-171				
tert-Amyl methyl ether (TAME)	32		"	50.0	0.0	63.6	70-130	Low Bias			
tert-Butylbenzene	20		"	50.0	0.0	39.1	10-160				
Tetrachloroethylene	21		"	50.0	0.0	41.2	30-167				
Tetrahydrofuran	43		"	50.0	0.0	86.7	25-160				
Toluene	65		"	50.0	52	25.8	21-160				
trans-1,2-Dichloroethylene	33		"	50.0	0.0	66.0	29-153				
trans-1,3-Dichloropropylene	19		"	50.0	0.0	37.8	18-155				
Trichloroethylene	27		"	50.0	0.0	54.7	24-169				
Trichlorofluoromethane	42		"	50.0	0.0	84.4	35-142				
Vinyl acetate	16		"	50.0	0.0	31.5	10-119				
Vinyl Chloride	53		"	50.0	0.0	107	12-160				
Allyl chloride	30		"	50.0	0.0	59.3	70-130	Low Bias			
n-butyl acetate	ND	15	ug/kg dry		ND		70-130				
Chlorodifluoromethane (Freon 22)	ND	15	"		ND		70-130				
cis-decahydronaphthalene	ND	15	"		72		70-130				
trans-decahydronaphthalene	ND	15	"		370		70-130				
n-Decane	ND	15	"		2400		70-130				
Ethyl Methacrylate	28		ug/L	50.0	0.0	55.2	70-130	Low Bias			
Hexachloroethane	ND	15	ug/kg dry		ND		70-130				
n-Hexane	ND	15	"		ND		70-130				
Limonene	ND	15	"		160		70-130				
Nitrobenzene	83		ug/L	50.0	0.0	166	70-130	High Bias			
2-Nitropropane	120	15	ug/kg dry		ND		70-130				
n-Nonane	ND	15	"		210		70-130				
n-octane	ND	15	"		40		70-130				
n-undecane	ND	15	"		2000		70-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	53.4		ug/L	50.0		107	77-125				
Surrogate: SURR: Toluene-d8	50.2		"	50.0		100	85-120				
Surrogate: SURR: p-Bromofluorobenzene	66.1		"	50.0		132	76-130				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	Limit	Flag
Batch BL21338 - EPA 5035A											
Matrix Spike Dup (BL21338-MSD1)		*Source sample: 23A0038-03 (LP_003)					Prepared & Analyzed: 01/04/2023				
1,1,1,2-Tetrachloroethane	10		ug/L	50.0	0.0	20.1	15-161		77.0	33	Non-dir.
1,1,1-Trichloroethane	18		"	50.0	0.0	35.2	42-145	Low Bias	52.1	30	Non-dir.
1,1,2,2-Tetrachloroethane	23		"	50.0	0.0	46.6	16-167		55.7	56	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	30		"	50.0	0.0	59.2	11-160		47.5	31	Non-dir.
1,1,2-Trichloroethane	16		"	50.0	0.0	32.6	44-145	Low Bias	53.7	40	Non-dir.
1,1-Dichloroethane	24		"	50.0	0.0	48.5	46-142		33.0	36	
1,1-Dichloroethylene	32		"	50.0	0.0	64.2	30-153		32.5	31	Non-dir.
1,1-Dichloropropylene	16		"	50.0	0.0	32.4	40-133	Low Bias	51.1	28	Non-dir.
1,2,3-Trichlorobenzene	3.4		"	50.0	0.0	6.84	10-157	Low Bias		47	
1,2,3-Trichloropropane	25		"	50.0	0.0	49.8	38-155		34.8	48	
1,2,4,5-Tetramethylbenzene	11		"	50.0	9.0	4.65	10-138	Low Bias	53.0	44	Non-dir.
1,2,4-Trichlorobenzene	5.1		"	50.0	0.0	10.2	10-151		76.6	52	Non-dir.
1,2,4-Trimethylbenzene	60		"	50.0	130	NR	10-170	Low Bias	10.5	242	
1,2-Dibromo-3-chloropropane	8.5		"	50.0	0.0	16.9	36-138	Low Bias	97.1	54	Non-dir.
1,2-Dibromoethane	17		"	50.0	0.0	34.6	40-142	Low Bias	49.5	39	Non-dir.
1,2-Dichlorobenzene	8.7		"	50.0	0.0	17.4	10-147		79.4	52	Non-dir.
1,2-Dichloroethane	25		"	50.0	0.0	49.4	48-133		33.1	32	Non-dir.
1,2-Dichloropropane	20		"	50.0	0.0	40.7	47-141	Low Bias	45.9	37	Non-dir.
1,3,5-Trimethylbenzene	25		"	50.0	38	NR	10-150	Low Bias	27.3	62	
1,3-Dichlorobenzene	10		"	50.0	0.0	20.9	10-144		69.5	51	Non-dir.
1,3-Dichloropropane	19		"	50.0	0.0	37.3	43-142	Low Bias	46.0	36	Non-dir.
1,4-Dichlorobenzene	270		"	50.0	550	NR	10-160	Low Bias	6.38	52	
1,4-Dioxane	1000		"	1050	0.0	96.4	10-191		25.6	196	
2,2-Dichloropropane	18		"	50.0	0.0	36.7	38-130	Low Bias	46.8	31	Non-dir.
2-Butanone	53		"	50.0	40	25.2	10-189		5.71	67	
2-Chloroethylvinyl ether	21		"	50.0	0.0	41.4	10-161		64.4	30	Non-dir.
2-Chlorotoluene	17		"	50.0	0.0	33.9	14-144		52.5	49	Non-dir.
2-Hexanone	28		"	50.0	0.0	55.1	10-181		20.2	60	
4-Chlorotoluene	14		"	50.0	0.0	27.0	15-138		71.5	39	Non-dir.
4-Methyl-2-pentanone	23		"	50.0	0.0	46.9	10-166		26.9	47	
Acetone	130		"	50.0	290	NR	10-196	Low Bias	18.9	150	
Acrolein	0.0		"	50.0	0.0		10-192	Low Bias		128	
Acrylonitrile	30		"	50.0	0.0	60.5	13-161		24.7	48	
Benzene	20		"	50.0	0.0	39.8	43-139	Low Bias	40.1	64	
Bromobenzene	15		"	50.0	0.0	29.1	23-142		69.8	44	Non-dir.
Bromochloromethane	26		"	50.0	0.0	52.2	38-145		31.0	30	Non-dir.
Bromodichloromethane	17		"	50.0	0.0	33.1	38-147	Low Bias	49.9	37	Non-dir.
Bromoform	8.4		"	50.0	0.0	16.7	29-156	Low Bias	75.2	51	Non-dir.
Bromomethane	27		"	50.0	0.0	54.9	10-166		36.4	42	
Carbon disulfide	29		"	50.0	4.4	49.3	10-131		26.5	36	
Carbon tetrachloride	14		"	50.0	0.0	28.9	35-145	Low Bias	55.7	31	Non-dir.
Chlorobenzene	15		"	50.0	7.8	14.4	21-154	Low Bias	58.6	32	Non-dir.
Chloroethane	46		"	50.0	0.0	92.6	15-160		23.1	40	
Chloroform	22		"	50.0	0.0	43.4	47-142	Low Bias	39.5	29	Non-dir.
Chloromethane	44		"	50.0	0.0	88.8	10-159		16.5	31	
cis-1,2-Dichloroethylene	22		"	50.0	0.0	43.3	42-144		37.6	30	Non-dir.
cis-1,3-Dichloropropylene	8.1		"	50.0	0.0	16.2	18-159	Low Bias	75.3	39	Non-dir.
Dibromochloromethane	12		"	50.0	0.0	23.2	10-179		61.1	41	Non-dir.
Dibromomethane	22		"	50.0	0.0	43.5	47-143	Low Bias	38.2	41	
Dichlorodifluoromethane	46		"	50.0	0.0	91.1	10-145		20.1	34	



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BL21338 - EPA 5035A											
Matrix Spike Dup (BL21338-MSD1)		*Source sample: 23A0038-03 (LP_003)					Prepared & Analyzed: 01/04/2023				
Ethyl Benzene	11		ug/L	50.0	0.0	22.0	11-158		69.7	42	Non-dir.
Ethyl Ether	ND	150	ug/kg dry		ND		70-130			30	
Ethyl tert-butyl ether (ETBE)	23		ug/L	50.0	0.0	47.0	70-130	Low Bias	30.4	30	Non-dir.
Hexachlorobutadiene	3.9		"	50.0	0.0	7.78	10-158	Low Bias		45	
Iodomethane	5.8		"	50.0	0.0	11.7	70-130	Low Bias	82.2	30	Non-dir.
Isopropylbenzene	13		"	50.0	0.0	26.1	10-162		71.9	57	Non-dir.
Methyl Methacrylate	27		"	50.0	0.0	53.6	22-162		27.7	30	
Methyl tert-butyl ether (MTBE)	27		"	50.0	0.0	53.7	42-152		26.6	47	
Methylene chloride	29		"	50.0	0.0	58.7	28-151		25.6	49	
Naphthalene	7.2		"	50.0	5.8	2.66	10-158	Low Bias	59.7	95	
n-Butylbenzene	13		"	50.0	12	2.61	10-162	Low Bias	46.7	96	
n-Propylbenzene	18		"	50.0	14	6.79	10-155	Low Bias	52.0	56	
o-Xylene	9.4		"	50.0	0.0	18.8	10-158		75.9	51	Non-dir.
p- & m- Xylenes	20		"	100	0.0	19.9	10-156		74.6	47	Non-dir.
p-Diethylbenzene	12		"	50.0	9.8	4.95	10-146	Low Bias	51.1	39	Non-dir.
p-Ethyltoluene	19		"	50.0	48	NR	10-135	Low Bias	68.4	40	Non-dir.
p-Isopropyltoluene	12		"	50.0	7.5	8.87	10-147	Low Bias	60.2	60	Non-dir.
sec-Butylbenzene	13		"	50.0	6.3	12.5	10-157		59.0	56	Non-dir.
Styrene	7.1		"	50.0	0.0	14.3	13-171		83.5	39	Non-dir.
tert-Amyl methyl ether (TAME)	22		"	50.0	0.0	43.2	70-130	Low Bias	38.3	30	Non-dir.
tert-Butylbenzene	9.1		"	50.0	0.0	18.2	10-160		73.0	79	
Tetrachloroethylene	10		"	50.0	0.0	20.8	30-167	Low Bias	65.6	33	Non-dir.
Tetrahydrofuran	38		"	50.0	0.0	75.8	25-160		13.4	30	
Toluene	44		"	50.0	52	NR	21-160	Low Bias	38.7	50	
trans-1,2-Dichloroethylene	24		"	50.0	0.0	47.6	29-153		32.4	30	Non-dir.
trans-1,3-Dichloropropylene	8.7		"	50.0	0.0	17.4	18-155	Low Bias	74.2	30	Non-dir.
Trichloroethylene	16		"	50.0	0.0	31.6	24-169		53.4	30	Non-dir.
Trichlorofluoromethane	30		"	50.0	0.0	60.1	35-142		33.6	30	Non-dir.
Vinyl acetate	12		"	50.0	0.0	23.6	10-119		28.8	82	
Vinyl Chloride	42		"	50.0	0.0	84.6	12-160		23.2	35	
Allyl chloride	18		"	50.0	0.0	35.4	70-130	Low Bias	50.6	30	Non-dir.
n-butyl acetate	ND	15	ug/kg dry		ND		70-130			30	
Chlorodifluoromethane (Freon 22)	ND	15	"		ND		70-130			30	
cis-decahydronaphthalene	ND	15	"		72		70-130			30	
trans-decahydronaphthalene	ND	15	"		370		70-130			30	
n-Decane	ND	15	"		2400		70-130			30	
Ethyl Methacrylate	20		ug/L	50.0	0.0	40.2	70-130	Low Bias	31.5	30	Non-dir.
Hexachloroethane	ND	15	ug/kg dry		ND		70-130			30	
n-Hexane	ND	15	"		ND		70-130			30	
Limonene	ND	15	"		160		70-130			30	
Nitrobenzene	28		ug/L	50.0	0.0	55.7	70-130	Low Bias	99.5	30	Non-dir.
2-Nitropropane	95	15	ug/kg dry		ND		70-130		26.7	30	
n-Nonane	ND	15	"		210		70-130			30	
n-octane	ND	15	"		40		70-130			30	
n-undecane	ND	15	"		2000		70-130			30	
Surrogate: SURR: 1,2-Dichloroethane-d4	54.2		ug/L	50.0		108	77-125				
Surrogate: SURR: Toluene-d8	49.8		"	50.0		99.6	85-120				
Surrogate: SURR: p-Bromofluorobenzene	65.8		"	50.0		132	76-130				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30081 - EPA 3510C

Blank (BA30081-BLK1)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Acenaphthene	ND	0.0500	ug/L								
Anthracene	ND	0.0500	"								
Benzo(a)anthracene	ND	0.0500	"								
Benzo(a)pyrene	ND	0.0500	"								
Benzo(b)fluoranthene	ND	0.0500	"								
Benzo(g,h,i)perylene	ND	0.0500	"								
Benzo(k)fluoranthene	ND	0.0500	"								
Chrysene	ND	0.0500	"								
Dibenzo(a,h)anthracene	ND	0.0500	"								
Fluoranthene	ND	0.0500	"								
Fluorene	ND	0.0500	"								
Indeno(1,2,3-cd)pyrene	ND	0.0500	"								
Phenanthrene	ND	0.0500	"								
Pyrene	ND	0.0500	"								
Surrogate: SURR: Nitrobenzene-d5	27.2		"	25.0		109	50.2-113				
Surrogate: SURR: 2-Fluorobiphenyl	21.6		"	25.0		86.4	39.9-105				
Surrogate: SURR: Terphenyl-d14	24.7		"	25.0		98.8	30.7-106				

LCS (BA30081-BS1)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Acenaphthene	18.6	0.0500	ug/L	25.0		74.5	24-114				
Anthracene	20.3	0.0500	"	25.0		81.1	35-114				
Benzo(a)anthracene	20.0	0.0500	"	25.0		80.0	38-127				
Benzo(a)pyrene	19.4	0.0500	"	25.0		77.8	30-146				
Benzo(b)fluoranthene	21.4	0.0500	"	25.0		85.5	36-145				
Benzo(g,h,i)perylene	21.3	0.0500	"	25.0		85.2	10-163				
Benzo(k)fluoranthene	21.7	0.0500	"	25.0		87.0	16-149				
Chrysene	19.9	0.0500	"	25.0		79.6	33-120				
Dibenzo(a,h)anthracene	20.8	0.0500	"	25.0		83.3	10-149				
Fluoranthene	20.6	0.0500	"	25.0		82.6	33-126				
Fluorene	19.6	0.0500	"	25.0		78.6	28-117				
Indeno(1,2,3-cd)pyrene	20.4	0.0500	"	25.0		81.4	10-150				
Phenanthrene	20.4	0.0500	"	25.0		81.4	31-112				
Pyrene	18.3	0.0500	"	25.0		73.2	42-125				
Surrogate: SURR: Nitrobenzene-d5	24.2		"	25.0		96.7	50.2-113				
Surrogate: SURR: 2-Fluorobiphenyl	19.0		"	25.0		76.1	39.9-105				
Surrogate: SURR: Terphenyl-d14	20.4		"	25.0		81.8	30.7-106				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30081 - EPA 3510C

LCS Dup (BA30081-BSD1)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Acenaphthene	19.4	0.0500	ug/L	25.0		77.7	24-114		4.20	20
Anthracene	20.8	0.0500	"	25.0		83.1	35-114		2.44	20
Benzo(a)anthracene	20.6	0.0500	"	25.0		82.3	38-127		2.86	20
Benzo(a)pyrene	19.7	0.0500	"	25.0		78.8	30-146		1.38	20
Benzo(b)fluoranthene	21.7	0.0500	"	25.0		86.9	36-145		1.62	20
Benzo(g,h,i)perylene	21.8	0.0500	"	25.0		87.1	10-163		2.18	20
Benzo(k)fluoranthene	22.3	0.0500	"	25.0		89.2	16-149		2.54	20
Chrysene	20.7	0.0500	"	25.0		82.7	33-120		3.85	20
Dibenzo(a,h)anthracene	21.3	0.0500	"	25.0		85.3	10-149		2.33	20
Fluoranthene	20.8	0.0500	"	25.0		83.2	33-126		0.724	20
Fluorene	20.4	0.0500	"	25.0		81.8	28-117		4.04	20
Indeno(1,2,3-cd)pyrene	20.8	0.0500	"	25.0		83.0	10-150		1.99	20
Phenanthrene	20.8	0.0500	"	25.0		83.0	31-112		1.95	20
Pyrene	19.0	0.0500	"	25.0		76.2	42-125		4.02	20
Surrogate: SURR: Nitrobenzene-d5	25.2		"	25.0		101	50.2-113			
Surrogate: SURR: 2-Fluorobiphenyl	19.8		"	25.0		79.4	39.9-105			
Surrogate: SURR: Terphenyl-d14	21.5		"	25.0		86.1	30.7-106			

Batch BA30233 - EPA 3550C

Blank (BA30233-BLK1)

Prepared: 01/06/2023 Analyzed: 01/09/2023

Acenaphthene	ND	41.7	ug/kg wet							
Anthracene	ND	41.7	"							
Benzo(a)anthracene	ND	41.7	"							
Benzo(a)pyrene	ND	41.7	"							
Benzo(b)fluoranthene	ND	41.7	"							
Benzo(g,h,i)perylene	ND	41.7	"							
Benzo(k)fluoranthene	ND	41.7	"							
Chrysene	ND	41.7	"							
Dibenzo(a,h)anthracene	ND	41.7	"							
Fluoranthene	ND	41.7	"							
Fluorene	ND	41.7	"							
Indeno(1,2,3-cd)pyrene	ND	41.7	"							
Phenanthrene	ND	41.7	"							
Pyrene	ND	41.7	"							
Surrogate: SURR: Nitrobenzene-d5	439		"	833		52.7	22-108			
Surrogate: SURR: 2-Fluorobiphenyl	406		"	833		48.7	21-113			
Surrogate: SURR: Terphenyl-d14	507		"	833		60.8	24-116			



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30233 - EPA 3550C

LCS (BA30233-BS1)

Prepared: 01/06/2023 Analyzed: 01/10/2023

Acenaphthene	403	41.7	ug/kg wet	833		48.3	17-124				
Anthracene	436	41.7	"	833		52.4	24-124				
Benzo(a)anthracene	423	41.7	"	833		50.8	25-134				
Benzo(a)pyrene	374	41.7	"	833		44.9	29-144				
Benzo(b)fluoranthene	403	41.7	"	833		48.4	20-151				
Benzo(g,h,i)perylene	384	41.7	"	833		46.0	10-153				
Benzo(k)fluoranthene	413	41.7	"	833		49.5	10-148				
Chrysene	407	41.7	"	833		48.8	24-116				
Dibenzo(a,h)anthracene	382	41.7	"	833		45.9	17-147				
Fluoranthene	401	41.7	"	833		48.1	36-125				
Fluorene	408	41.7	"	833		48.9	16-130				
Indeno(1,2,3-cd)pyrene	383	41.7	"	833		45.9	10-155				
Phenanthrene	423	41.7	"	833		50.8	24-123				
Pyrene	410	41.7	"	833		49.2	24-132				
Surrogate: SURR: Nitrobenzene-d5	405		"	833		48.6	22-108				
Surrogate: SURR: 2-Fluorobiphenyl	398		"	833		47.8	21-113				
Surrogate: SURR: Terphenyl-d14	447		"	833		53.6	24-116				

Matrix Spike (BA30233-MS1)

*Source sample: 23A0038-03 (LP_003)

Prepared: 01/06/2023 Analyzed: 01/09/2023

Acenaphthene	1380	1880	ug/kg dry	2500	ND	55.2	13-133				
Anthracene	1620	1880	"	2500	ND	64.8	27-128				
Benzo(a)anthracene	3270	1880	"	2500	1770	60.3	20-147				
Benzo(a)pyrene	2870	1880	"	2500	1340	61.1	18-153				
Benzo(b)fluoranthene	2760	1880	"	2500	1190	62.9	10-163				
Benzo(g,h,i)perylene	1940	1880	"	2500	ND	77.4	10-157				
Benzo(k)fluoranthene	2870	1880	"	2500	1220	65.9	10-157				
Chrysene	3210	1880	"	2500	1720	59.9	18-133				
Dibenzo(a,h)anthracene	2430	1880	"	2500	ND	97.2	10-146				
Fluoranthene	4210	1880	"	2500	2990	48.4	10-155				
Fluorene	1410	1880	"	2500	ND	56.4	12-150				
Indeno(1,2,3-cd)pyrene	2790	1880	"	2500	ND	112	10-155				
Phenanthrene	2610	1880	"	2500	1480	45.4	10-151				
Pyrene	3670	1880	"	2500	2400	50.6	13-148				
Surrogate: SURR: Nitrobenzene-d5	1620		"	2500		64.8	22-108				
Surrogate: SURR: 2-Fluorobiphenyl	1100		"	2500		43.8	21-113				
Surrogate: SURR: Terphenyl-d14	1350		"	2500		54.0	24-116				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30233 - EPA 3550C

Matrix Spike Dup (BA30233-MSD1)	*Source sample: 23A0038-03 (LP_003)					Prepared: 01/06/2023 Analyzed: 01/09/2023					
Acenaphthene	1140	1880	ug/kg dry	2500	ND	45.6	13-133		19.0	30	
Anthracene	1440	1880	"	2500	ND	57.6	27-128		11.8	30	
Benzo(a)anthracene	2940	1880	"	2500	1770	47.1	20-147		10.6	30	
Benzo(a)pyrene	2400	1880	"	2500	1340	42.5	18-153		17.7	30	
Benzo(b)fluoranthene	2420	1880	"	2500	1190	49.1	10-163		13.3	30	
Benzo(g,h,i)perylene	1560	1880	"	2500	ND	62.4	10-157		21.5	30	
Benzo(k)fluoranthene	2280	1880	"	2500	1220	42.5	10-157		22.7	30	
Chrysene	2700	1880	"	2500	1720	39.5	18-133		17.3	30	
Dibenzo(a,h)anthracene	2300	1880	"	2500	ND	91.8	10-146		5.71	30	
Fluoranthene	3770	1880	"	2500	2990	31.0	10-155		10.9	30	
Fluorene	1250	1880	"	2500	ND	49.8	12-150		12.4	30	
Indeno(1,2,3-cd)pyrene	2520	1880	"	2500	ND	101	10-155		10.2	30	
Phenanthrene	2300	1880	"	2500	1480	32.8	10-151		12.8	30	
Pyrene	3210	1880	"	2500	2400	32.6	13-148		13.1	30	
Surrogate: SURR: Nitrobenzene-d5	1410		"	2500		56.4	22-108				
Surrogate: SURR: 2-Fluorobiphenyl	901		"	2500		36.0	21-113				
Surrogate: SURR: Terphenyl-d14	1140		"	2500		45.6	24-116				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30171 - EPA 1633 Prep

Blank (BA30171-BLK1)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Perfluorobutanesulfonic acid (PFBS)	ND	2.00	ng/L								
Perfluorohexanoic acid (PFHxA)	ND	2.00	"								
Perfluoroheptanoic acid (PFHpA)	ND	2.00	"								
Perfluorohexanesulfonic acid (PFHxS)	ND	2.00	"								
Perfluorooctanoic acid (PFOA)	ND	2.00	"								
Perfluorooctanesulfonic acid (PFOS)	ND	2.00	"								
Perfluorononanoic acid (PFNA)	ND	2.00	"								
Perfluorodecanoic acid (PFDA)	ND	2.00	"								
Perfluoroundecanoic acid (PFUnA)	ND	2.00	"								
Perfluorododecanoic acid (PFDoA)	ND	2.00	"								
Perfluorotridecanoic acid (PFTriDA)	ND	2.00	"								
Perfluorotetradecanoic acid (PFTA)	ND	2.00	"								
N-MeFOSAA	ND	2.00	"								
N-EtFOSAA	ND	2.00	"								
Perfluoropentanoic acid (PFPeA)	ND	4.00	"								
Perfluoro-1-octanesulfonamide (FOSA)	ND	2.00	"								
Perfluoro-1-heptanesulfonic acid (PFHpS)	ND	2.00	"								
Perfluoro-1-decanesulfonic acid (PFDS)	ND	2.00	"								
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND	8.00	"								
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND	8.00	"								
Perfluoro-n-butanoic acid (PFBA)	ND	8.00	"								
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	4.00	"								
Perfluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	4.00	"								
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	4.00	"								
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	4.00	"								
Perfluoro-1-pentanesulfonate (PFPeS)	ND	2.00	"								
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	ND	8.00	"								
HFPO-DA (Gen-X)	ND	8.00	"								
11CL-PF3OUdS	ND	8.00	"								
9CL-PF3ONS	ND	8.00	"								
ADONA	ND	8.00	"								
Perfluorododecanesulfonic acid (PFDoS)	ND	2.00	"								
Perfluoro-1-nonanesulfonic acid (PFNS)	ND	2.00	"								
3-Perfluoropropyl propanoic acid (FPrPA)	ND	5.00	"								
3-Perfluoropentyl propanoic acid (FPePA)	ND	25.0	"								
3-Perfluoroheptyl propanoic acid (FHpPA)	ND	25.0	"								
N-MeFOSE	ND	20.0	"								
N-MeFOSA	ND	2.00	"								
N-EtFOSE	ND	20.0	"								
N-EtFOSA	ND	0.200	"								
Surrogate: M3PFBS	51.0		"	46.6		110	25-150				
Surrogate: M5PFHxA	55.0		"	50.0		110	25-150				
Surrogate: M4PFHpA	53.4		"	50.0		107	25-150				
Surrogate: M3PFHxS	57.9		"	47.4		122	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	53.0		"	50.0		106	25-150				
Surrogate: M6PFDA	26.7		"	25.0		107	25-150				
Surrogate: M7PFUdA	22.0		"	25.0		87.9	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30171 - EPA 1633 Prep

Blank (BA30171-BLK1)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	19.0		ng/L	25.0		75.9	25-150				
Surrogate: M2PFTeDA	8.15		"	25.0		32.6	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	230		"	200		115	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	57.9		"	47.9		121	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	115		"	100		115	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	46.2		"	50.0		92.4	10-150				
Surrogate: d3-N-MeFOSAA	68.9		"	100		68.9	25-150				
Surrogate: d5-N-EtFOSAA	60.9		"	100		60.9	25-150				
Surrogate: M2-6:2 FTS	82.0		"	95.1		86.2	25-200				
Surrogate: M2-8:2 FTS	77.2		"	96.0		80.5	25-200				
Surrogate: M9PFNA	28.3		"	25.0		113	25-150				
Surrogate: M2-4:2 FTS	74.0		"	93.8		78.9	25-150				
Surrogate: d-N-MeFOSA	33.0		"	50.0		66.1	25-150				
Surrogate: d-N-EtFOSA	46.4		"	50.0		92.9	25-150				
Surrogate: M3HFPO-DA	192		"	200		96.0	25-150				
Surrogate: d9-N-EtFOSE	123		"	500		24.7	25-150				
Surrogate: d7-N-MeFOSE	179		"	500		35.9	25-150				

LCS (BA30171-BS1)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Perfluorobutanesulfonic acid (PFBS)	71.8	2.00	ng/L	70.8		101	50-150				
Perfluorohexanoic acid (PFHxA)	78.5	2.00	"	80.0		98.1	50-150				
Perfluoroheptanoic acid (PFHpA)	88.2	2.00	"	80.0		110	50-150				
Perfluorohexanesulfonic acid (PFHxS)	92.3	2.00	"	73.2		126	50-150				
Perfluorooctanoic acid (PFOA)	81.7	2.00	"	80.0		102	50-150				
Perfluorooctanesulfonic acid (PFOS)	72.6	2.00	"	74.4		97.6	50-150				
Perfluorononanoic acid (PFNA)	70.0	2.00	"	80.0		87.5	50-150				
Perfluorodecanoic acid (PFDA)	83.7	2.00	"	80.0		105	50-150				
Perfluoroundecanoic acid (PFUnA)	95.9	2.00	"	80.0		120	50-150				
Perfluorododecanoic acid (PFDoA)	85.9	2.00	"	80.0		107	50-150				
Perfluorotridecanoic acid (PFTriDA)	117	2.00	"	80.0		147	50-150				
Perfluorotetradecanoic acid (PFTA)	77.8	2.00	"	80.0		97.2	50-150				
N-MeFOSAA	81.3	2.00	"	80.0		102	50-150				
N-EtFOSAA	86.4	2.00	"	80.0		108	50-150				
Perfluoropentanoic acid (PFPeA)	162	4.00	"	160		101	50-150				
Perfluoro-1-octanesulfonamide (FOSA)	89.8	2.00	"	80.0		112	50-150				
Perfluoro-1-heptanesulfonic acid (PFHpS)	80.7	2.00	"	76.4		106	50-150				
Perfluoro-1-decanesulfonic acid (PFDS)	57.3	2.00	"	77.2		74.2	50-150				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	304	8.00	"	304		99.9	50-150				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	312	8.00	"	307		101	50-150				
Perfluoro-n-butanoic acid (PFBA)	320	8.00	"	320		100	50-150				
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	158	4.00	"	142		111	50-150				
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	107	4.00	"	160		67.0	50-150				
Perfluoro-4-oxapentanoic acid (PFMPA)	172	4.00	"	160		108	50-150				
Perfluoro-5-oxahexanoic acid (PFMBA)	170	4.00	"	160		106	50-150				
Perfluoro-1-pentanesulfonate (PFPeS)	72.4	2.00	"	75.2		96.2	50-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30171 - EPA 1633 Prep											
LCS (BA30171-BS1)						Prepared: 01/05/2023 Analyzed: 01/09/2023					
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	294	8.00	ng/L	300		98.1	50-150				
HFPO-DA (Gen-X)	162	8.00	"	160		102	50-150				
11CL-PF3OUdS	129	8.00	"	151		85.2	50-150				
9CL-PF3ONS	175	8.00	"	150		117	50-150				
ADONA	172	8.00	"	151		114	50-150				
Perfluorododecanesulfonic acid (PFDoS)	34.6	2.00	"	77.6		44.6	50-150	Low Bias			
Perfluoro-1-nonanesulfonic acid (PFNS)	83.4	2.00	"	76.8		109	50-150				
3-Perfluoropropyl propanoic acid (FPrPA)	383	5.00	"	320		120	50-150				
3-Perfluoropentyl propanoic acid (FPePA)	2150	25.0	"	1600		134	50-150				
3-Perfluoroheptyl propanoic acid (FHpPA)	2340	25.0	"	1600		146	50-150				
N-MeFOSE	799	20.0	"	800		99.9	50-150				
N-MeFOSA	91.2	2.00	"	80.0		114	50-150				
N-EtFOSE	850	20.0	"	800		106	50-150				
N-EtFOSA	64.0	0.200	"	80.0		80.0	50-150				
Surrogate: M3PFBS	49.1		"	46.6		105	25-150				
Surrogate: M5PFHxA	55.7		"	50.0		111	25-150				
Surrogate: M4PFHpA	49.4		"	50.0		98.9	25-150				
Surrogate: M3PFHxS	56.8		"	47.4		120	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	47.8		"	50.0		95.7	25-150				
Surrogate: M6PFDA	23.9		"	25.0		95.7	25-150				
Surrogate: M7PFUdA	17.9		"	25.0		71.5	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	15.0		"	25.0		60.2	25-150				
Surrogate: M2PFTeDA	7.96		"	25.0		31.9	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	219		"	200		110	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	54.0		"	47.9		113	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	110		"	100		110	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	41.3		"	50.0		82.7	10-150				
Surrogate: d3-N-MeFOSAA	68.0		"	100		68.0	25-150				
Surrogate: d5-N-EtFOSAA	60.2		"	100		60.2	25-150				
Surrogate: M2-6:2 FTS	88.5		"	95.1		93.0	25-200				
Surrogate: M2-8:2 FTS	83.0		"	96.0		86.5	25-200				
Surrogate: M9PFNA	26.7		"	25.0		107	25-150				
Surrogate: M2-4:2 FTS	77.9		"	93.8		83.0	25-150				
Surrogate: d-N-MeFOSA	29.0		"	50.0		58.0	25-150				
Surrogate: d-N-EtFOSA	45.2		"	50.0		90.4	25-150				
Surrogate: M3HFPO-DA	208		"	200		104	25-150				
Surrogate: d9-N-EtFOSE	119		"	500		23.9	25-150				
Surrogate: d7-N-MeFOSE	174		"	500		34.8	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30171 - EPA 1633 Prep											
LCS (BA30171-BS2)						Prepared: 01/05/2023 Analyzed: 01/09/2023					
Perfluorobutanesulfonic acid (PFBS)	7.40	2.00	ng/L	7.08		105	50-150				
Perfluorohexanoic acid (PFHxA)	7.50	2.00	"	8.00		93.7	50-150				
Perfluoroheptanoic acid (PFHpA)	7.72	2.00	"	8.00		96.6	50-150				
Perfluorohexanesulfonic acid (PFHxS)	9.38	2.00	"	7.32		128	50-150				
Perfluorooctanoic acid (PFOA)	7.92	2.00	"	8.00		99.1	50-150				
Perfluorooctanesulfonic acid (PFOS)	8.39	2.00	"	7.44		113	50-150				
Perfluorononanoic acid (PFNA)	6.11	2.00	"	8.00		76.4	50-150				
Perfluorodecanoic acid (PFDA)	8.30	2.00	"	8.00		104	50-150				
Perfluoroundecanoic acid (PFUnA)	8.15	2.00	"	8.00		102	50-150				
Perfluorododecanoic acid (PFDoA)	6.98	2.00	"	8.00		87.3	50-150				
Perfluorotridecanoic acid (PFTriDA)	13.4	2.00	"	8.00		167	50-150	High Bias			
Perfluorotetradecanoic acid (PFTA)	7.43	2.00	"	8.00		92.9	50-150				
N-MeFOSAA	7.13	2.00	"	8.00		89.2	50-150				
N-EtFOSAA	8.95	2.00	"	8.00		112	50-150				
Perfluoropentanoic acid (PFPeA)	16.1	4.00	"	16.0		100	50-150				
Perfluoro-1-octanesulfonamide (FOSA)	8.39	2.00	"	8.00		105	50-150				
Perfluoro-1-heptanesulfonic acid (PFHpS)	7.74	2.00	"	7.64		101	50-150				
Perfluoro-1-decanesulfonic acid (PFDS)	5.42	2.00	"	7.72		70.2	50-150				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	31.7	8.00	"	30.4		104	50-150				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	35.3	8.00	"	30.7		115	50-150				
Perfluoro-n-butanoic acid (PFBA)	30.7	8.00	"	32.0		95.8	50-150				
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	15.9	4.00	"	14.2		112	50-150				
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	9.56	4.00	"	16.0		59.7	50-150				
Perfluoro-4-oxapentanoic acid (PFMPA)	17.3	4.00	"	16.0		108	50-150				
Perfluoro-5-oxahexanoic acid (PFMBA)	16.8	4.00	"	16.0		105	50-150				
Perfluoro-1-pentanesulfonate (PFPeS)	7.69	2.00	"	7.52		102	50-150				
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	33.6	8.00	"	30.0		112	50-150				
HFPO-DA (Gen-X)	15.6	8.00	"	16.0		97.5	50-150				
11CL-PF3OUdS	12.2	8.00	"	15.1		80.9	50-150				
9CL-PF3ONS	17.0	8.00	"	15.0		114	50-150				
ADONA	18.2	8.00	"	15.1		120	50-150				
Perfluorododecanesulfonic acid (PFDoS)	3.01	2.00	"	7.76		38.9	50-150	Low Bias			
Perfluoro-1-nonanesulfonic acid (PFNS)	9.23	2.00	"	7.68		120	50-150				
3-Perfluoropropyl propanoic acid (FPrPA)	38.2	5.00	"	32.0		119	50-150				
3-Perfluoropentyl propanoic acid (FPePA)	211	25.0	"	160		132	50-150				
3-Perfluoroheptyl propanoic acid (FHpPA)	227	25.0	"	160		142	50-150				
N-MeFOSE	70.4	20.0	"	80.0		88.1	50-150				
N-MeFOSA	8.40	2.00	"	8.00		105	50-150				
N-EtFOSE	86.0	20.0	"	80.0		108	50-150				
N-EtFOSA	27.9	0.200	"	8.00		349	50-150	High Bias			
Surrogate: M3PFBS	47.5		"	46.6		102	25-150				
Surrogate: M5PFHxA	57.9		"	50.0		116	25-150				
Surrogate: M4PFHpA	54.0		"	50.0		108	25-150				
Surrogate: M3PFHxS	53.4		"	47.4		113	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	50.9		"	50.0		102	25-150				
Surrogate: M6PFDA	26.2		"	25.0		105	25-150				
Surrogate: M7PFUdA	23.0		"	25.0		91.8	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	Limit	Flag

Batch BA30171 - EPA 1633 Prep

LCS (BA30171-BS2)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	19.6		ng/L	25.0		78.4	25-150				
Surrogate: M2PFTeDA	6.01		"	25.0		24.1	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	222		"	200		111	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	53.0		"	47.9		111	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	114		"	100		114	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	45.4		"	50.0		90.8	10-150				
Surrogate: d3-N-MeFOSAA	64.3		"	100		64.3	25-150				
Surrogate: d5-N-EtFOSAA	56.4		"	100		56.4	25-150				
Surrogate: M2-6:2 FTS	76.7		"	95.1		80.7	25-200				
Surrogate: M2-8:2 FTS	71.0		"	96.0		74.0	25-200				
Surrogate: M9PFNA	29.5		"	25.0		118	25-150				
Surrogate: M2-4:2 FTS	65.3		"	93.8		69.6	25-150				
Surrogate: d-N-MeFOSA	29.2		"	50.0		58.3	25-150				
Surrogate: d-N-EtFOSA	36.1		"	50.0		72.2	25-150				
Surrogate: M3HFPO-DA	206		"	200		103	25-150				
Surrogate: d9-N-EtFOSE	73.7		"	500		14.7	25-150				
Surrogate: d7-N-MeFOSE	122		"	500		24.4	25-150				

Duplicate (BA30171-DUP1)

*Source sample: 22L1383-02 (Duplicate)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Perfluorobutanesulfonic acid (PFBS)	78.9	1.86	ng/L		84.2		6.55	30
Perfluorohexanoic acid (PFHxA)	447	1.86	"		474		5.83	30
Perfluoroheptanoic acid (PFHpA)	385	1.86	"		401		3.91	30
Perfluorooctanoic acid (PFOA)	565	1.86	"		564		0.0754	30
Perfluorononanoic acid (PFNA)	186	1.86	"		181		3.15	30
Perfluorodecanoic acid (PFDA)	16.2	1.86	"		18.6		13.6	30
Perfluoroundecanoic acid (PFUnA)	51.5	1.86	"		53.5		3.92	30
Perfluorododecanoic acid (PFDoA)	ND	1.86	"		ND			30
Perfluorotridecanoic acid (PFTriDA)	1.06	1.86	"		ND			30
Perfluorotetradecanoic acid (PFTA)	ND	1.86	"		ND			30
N-MeFOSAA	ND	1.86	"		ND			30
N-EtFOSAA	ND	1.86	"		ND			30
Perfluoropentanoic acid (PFPeA)	679	3.72	"		692		1.86	30
Perfluoro-1-octanesulfonamide (FOSA)	8.51	1.86	"		8.03		5.78	30
Perfluoro-1-heptanesulfonic acid (PFHpS)	78.8	1.86	"		80.6		2.28	30
Perfluoro-1-decanesulfonic acid (PFDS)	ND	1.86	"		ND			30
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	258	7.44	"		265		2.81	30
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	42.5	7.44	"		37.3		13.0	30
Perfluoro-n-butanoic acid (PFBA)	165	7.44	"		167		1.21	30
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	3.72	"		ND			30
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	ND	3.72	"		ND			30
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	3.72	"		ND			30
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	3.72	"		ND			30
Perfluoro-1-pentanesulfonate (PFPeS)	171	1.86	"		188		9.45	30
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	ND	7.44	"		ND			30



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30171 - EPA 1633 Prep

Duplicate (BA30171-DUP1)		*Source sample: 22L1383-02 (Duplicate)				Prepared: 01/05/2023 Analyzed: 01/09/2023					
HFPO-DA (Gen-X)	ND	7.44	ng/L		3.36					30	
11CL-PF3OUdS	ND	7.44	"		ND					30	
9CL-PF3ONS	ND	7.44	"		ND					30	
ADONA	ND	7.44	"		ND					30	
Perfluorododecanesulfonic acid (PFDoS)	ND	1.86	"		ND					30	
Perfluoro-1-nonanesulfonic acid (PFNS)	1.80	1.86	"		1.25				35.6	30	Non-dir.
3-Perfluoropropyl propanoic acid (FPrPA)	ND	4.65	"		ND					30	
3-Perfluoropentyl propanoic acid (FPePA)	ND	23.3	"		ND					30	
3-Perfluoroheptyl propanoic acid (FHpPA)	ND	23.3	"		ND					30	
N-MeFOSE	ND	18.6	"		ND					30	
N-MeFOSA	ND	1.86	"		ND					30	
N-EtFOSE	ND	18.6	"		ND					30	
N-EtFOSA	ND	0.186	"		ND					30	
Surrogate: M3PFBS	51.0		"	43.4		118	25-150				
Surrogate: M5PFHxA	44.8		"	46.5		96.3	25-150				
Surrogate: M4PFHpA	40.2		"	46.5		86.4	25-150				
Surrogate: M3PFHxS	46.8		"	44.1		106	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	44.3		"	46.5		95.2	25-150				
Surrogate: M6PFDA	20.9		"	23.3		89.8	25-150				
Surrogate: M7PFUdA	16.8		"	23.3		72.2	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	13.7		"	23.3		58.8	25-150				
Surrogate: M2PFTeDA	7.92		"	23.3		34.0	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	196		"	186		105	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	47.3		"	44.6		106	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	94.8		"	93.1		102	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	58.8		"	46.5		126	10-150				
Surrogate: d3-N-MeFOSAA	93.1		"	93.1		100	25-150				
Surrogate: d5-N-EtFOSAA	84.9		"	93.1		91.2	25-150				
Surrogate: M2-6:2 FTS	83.9		"	88.5		94.8	25-200				
Surrogate: M2-8:2 FTS	80.0		"	89.3		89.5	25-200				
Surrogate: M9PFNA	26.6		"	23.3		114	25-150				
Surrogate: M2-4:2 FTS	126		"	87.3		145	25-150				
Surrogate: d-N-MeFOSA	37.8		"	46.5		81.3	25-150				
Surrogate: d-N-EtFOSA	43.3		"	46.5		93.1	25-150				
Surrogate: M3HFPO-DA	169		"	186		91.0	25-150				
Surrogate: d9-N-EtFOSE	111		"	465		23.9	25-150				
Surrogate: d7-N-MeFOSE	187		"	465		40.3	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30183 - EPA 1633 Prep											
Blank (BA30183-BLK1)											
Prepared: 01/05/2023 Analyzed: 01/11/2023											
Perfluorobutanesulfonic acid (PFBS)	ND	0.200	ug/kg wet								
Perfluorohexanoic acid (PFHxA)	ND	0.200	"								
Perfluoroheptanoic acid (PFHpA)	ND	0.200	"								
Perfluorohexanesulfonic acid (PFHxS)	ND	0.200	"								
Perfluorooctanoic acid (PFOA)	ND	0.200	"								
Perfluorooctanesulfonic acid (PFOS)	ND	0.200	"								
Perfluorononanoic acid (PFNA)	ND	0.200	"								
Perfluorodecanoic acid (PFDA)	ND	0.200	"								
Perfluoroundecanoic acid (PFUnA)	ND	0.200	"								
Perfluorododecanoic acid (PFDoA)	ND	0.200	"								
Perfluorotridecanoic acid (PFTriDA)	ND	0.200	"								
Perfluorotetradecanoic acid (PFTA)	ND	0.200	"								
N-MeFOSAA	ND	0.200	"								
N-EtFOSAA	ND	0.200	"								
Perfluoropentanoic acid (PFPeA)	ND	0.400	"								
Perfluoro-1-octanesulfonamide (FOSA)	ND	0.200	"								
Perfluoro-1-heptanesulfonic acid (PFHpS)	ND	0.200	"								
Perfluoro-1-decanesulfonic acid (PFDS)	ND	0.200	"								
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND	0.800	"								
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND	0.800	"								
Perfluoro-n-butanoic acid (PFBA)	ND	0.800	"								
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	0.400	"								
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	ND	0.400	"								
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	0.400	"								
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	0.400	"								
Perfluoro-1-pentanesulfonate (PFPeS)	ND	0.200	"								
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	ND	0.800	"								
HFPO-DA (Gen-X)	ND	0.800	"								
11CL-PF3OUdS	ND	0.800	"								
9CL-PF3ONS	ND	0.800	"								
ADONA	ND	0.800	"								
Perfluorododecanesulfonic acid (PFDoS)	ND	0.200	"								
Perfluoro-1-nonanesulfonic acid (PFNS)	ND	0.200	"								
3-Perfluoropropyl propanoic acid (FPrPA)	ND	1.00	"								
3-Perfluoropentyl propanoic acid (FPePA)	ND	5.00	"								
3-Perfluoroheptyl propanoic acid (FHpPA)	ND	5.00	"								
N-MeFOSE	ND	2.00	"								
N-MeFOSA	0.217	0.200	"								
N-EtFOSE	ND	2.00	"								
N-EtFOSA	ND	0.200	"								
Surrogate: M3PFBS	1.50		"	2.33		64.6	25-150				
Surrogate: M5PFHxA	1.68		"	2.50		67.3	25-150				
Surrogate: M4PFHpA	1.55		"	2.50		62.2	25-150				
Surrogate: M3PFHxS	1.51		"	2.37		63.7	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	1.31		"	2.50		52.4	25-150				
Surrogate: M6PFDA	0.762		"	1.25		60.9	25-150				
Surrogate: M7PFUdA	0.652		"	1.25		52.2	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30183 - EPA 1633 Prep

Blank (BA30183-BLK1)

Prepared: 01/05/2023 Analyzed: 01/11/2023

Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	0.545		ug/kg wet	1.25		43.6	25-150				
Surrogate: M2PFTeDA	0.504		"	1.25		40.3	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	8.56		"	10.0		85.6	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	1.52		"	2.40		63.4	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	4.02		"	5.00		80.3	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	0.211		"	2.50		8.43	10-150				
Surrogate: d3-N-MeFOSAA	2.60		"	5.00		52.1	25-150				
Surrogate: d5-N-EtFOSAA	2.80		"	5.00		56.1	25-150				
Surrogate: M2-6:2 FTS	2.09		"	4.76		44.0	25-200				
Surrogate: M2-8:2 FTS	2.36		"	4.80		49.2	25-200				
Surrogate: M9PFNA	0.789		"	1.25		63.1	25-150				
Surrogate: M2-4:2 FTS	2.55		"	4.69		54.4	25-150				
Surrogate: d-N-MeFOSA	0.171		"	2.50		6.85	25-150				
Surrogate: d-N-EtFOSA	0.454		"	2.50		18.2	25-150				
Surrogate: M3HFPO-DA	6.33		"	10.0		63.3	25-150				
Surrogate: d9-N-EtFOSE	2.48		"	25.0		9.90	25-150				
Surrogate: d7-N-MeFOSE	2.25		"	25.0		9.01	25-150				

LCS (BA30183-BS1)

Prepared: 01/05/2023 Analyzed: 01/11/2023

Perfluorobutanesulfonic acid (PFBS)	3.87	0.196	ug/kg wet	3.48		111	50-150				
Perfluorohexanoic acid (PFHxA)	4.16	0.196	"	3.93		106	50-150				
Perfluoroheptanoic acid (PFHpA)	4.72	0.196	"	3.93		120	50-150				
Perfluorohexanesulfonic acid (PFHxS)	5.18	0.196	"	3.60		144	50-150				
Perfluorooctanoic acid (PFOA)	4.51	0.196	"	3.93		115	50-150				
Perfluorooctanesulfonic acid (PFOS)	3.89	0.196	"	3.65		106	50-150				
Perfluorononanoic acid (PFNA)	3.64	0.196	"	3.93		92.6	50-150				
Perfluorodecanoic acid (PFDA)	4.55	0.196	"	3.93		116	50-150				
Perfluoroundecanoic acid (PFUnA)	4.69	0.196	"	3.93		119	50-150				
Perfluorododecanoic acid (PFDoA)	4.75	0.196	"	3.93		121	50-150				
Perfluorotridecanoic acid (PFTriDA)	4.61	0.196	"	3.93		117	50-150				
Perfluorotetradecanoic acid (PFTA)	4.29	0.196	"	3.93		109	50-150				
N-MeFOSAA	4.37	0.196	"	3.93		111	50-150				
N-EtFOSAA	4.37	0.196	"	3.93		111	50-150				
Perfluoropentanoic acid (PFPeA)	8.90	0.393	"	7.86		113	50-150				
Perfluoro-1-octanesulfonamide (FOSA)	3.97	0.196	"	3.93		101	50-150				
Perfluoro-1-heptanesulfonic acid (PFHpS)	4.25	0.196	"	3.75		113	50-150				
Perfluoro-1-decanesulfonic acid (PFDS)	3.84	0.196	"	3.79		101	50-150				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	18.1	0.786	"	14.9		121	50-150				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	17.1	0.786	"	15.1		113	50-150				
Perfluoro-n-butanoic acid (PFBA)	17.3	0.786	"	15.7		110	50-150				
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	8.49	0.393	"	6.99		121	50-150				
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	5.29	0.393	"	7.86		67.3	50-150				
Perfluoro-4-oxapentanoic acid (PFMPA)	9.72	0.393	"	7.86		124	50-150				
Perfluoro-5-oxahexanoic acid (PFMBA)	9.21	0.393	"	7.86		117	50-150				
Perfluoro-1-pentanesulfonate (PFPeS)	4.08	0.196	"	3.69		110	50-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30183 - EPA 1633 Prep

LCS (BA30183-BS1)

Prepared: 01/05/2023 Analyzed: 01/11/2023

1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	15.9	0.786	ug/kg wet	14.7		108	50-150				
HFPO-DA (Gen-X)	9.20	0.786	"	7.86		117	50-150				
11CL-PF3OUdS	8.40	0.786	"	7.43		113	50-150				
9CL-PF3ONS	9.49	0.786	"	7.35		129	50-150				
ADONA	9.93	0.786	"	7.43		134	50-150				
Perfluorododecanesulfonic acid (PFDoS)	3.35	0.196	"	3.81		88.0	50-150				
Perfluoro-1-nonanesulfonic acid (PFNS)	4.45	0.196	"	3.77		118	50-150				
3-Perfluoropropyl propanoic acid (FPrPA)	4.15	0.982	"	15.7		26.4	50-150	Low Bias			
3-Perfluoropentyl propanoic acid (FPePA)	29.2	4.91	"	78.6		37.1	50-150	Low Bias			
3-Perfluoroheptyl propanoic acid (FHpPA)	36.3	4.91	"	78.6		46.2	50-150	Low Bias			
N-MeFOSE	43.8	1.96	"	39.3		111	50-150				
N-MeFOSA	4.44	0.196	"	3.93		113	50-150				
N-EtFOSE	40.9	1.96	"	39.3		104	50-150				
N-EtFOSA	1.89	0.196	"	3.93		48.0	50-150	Low Bias			
Surrogate: M3PFBS	2.36		"	2.29		103	25-150				
Surrogate: M5PFHxA	2.46		"	2.46		100	25-150				
Surrogate: M4PFHpA	2.30		"	2.46		93.5	25-150				
Surrogate: M3PFHxS	2.46		"	2.33		106	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	2.02		"	2.46		82.2	25-150				
Surrogate: M6PFDA	1.11		"	1.23		90.3	25-150				
Surrogate: M7PFUdA	0.916		"	1.23		74.6	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	0.787		"	1.23		64.1	25-150				
Surrogate: M2PFTeDA	0.755		"	1.23		61.5	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	9.49		"	9.82		96.6	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	2.21		"	2.35		93.8	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	4.90		"	4.91		99.8	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	0.443		"	2.46		18.0	10-150				
Surrogate: d3-N-MeFOSAA	3.61		"	4.91		73.5	25-150				
Surrogate: d5-N-EtFOSAA	3.63		"	4.91		73.9	25-150				
Surrogate: M2-6:2 FTS	3.59		"	4.67		77.0	25-200				
Surrogate: M2-8:2 FTS	4.58		"	4.72		97.2	25-200				
Surrogate: M9PFNA	1.16		"	1.23		94.1	25-150				
Surrogate: M2-4:2 FTS	4.10		"	4.61		89.0	25-150				
Surrogate: d-N-MeFOSA	0.379		"	2.46		15.5	25-150				
Surrogate: d-N-EtFOSA	1.24		"	2.46		50.4	25-150				
Surrogate: M3HFPO-DA	8.79		"	9.82		89.4	25-150				
Surrogate: d9-N-EtFOSE	4.00		"	24.6		16.3	25-150				
Surrogate: d7-N-MeFOSE	3.47		"	24.6		14.1	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30183 - EPA 1633 Prep											
LCS (BA30183-BS2)						Prepared: 01/05/2023 Analyzed: 01/11/2023					
Perfluorobutanesulfonic acid (PFBS)	0.412	0.200	ug/kg wet	0.353		117	50-150				
Perfluorohexanoic acid (PFHxA)	0.451	0.200	"	0.399		113	50-150				
Perfluoroheptanoic acid (PFHpA)	0.459	0.200	"	0.399		115	50-150				
Perfluorohexanesulfonic acid (PFHxS)	0.518	0.200	"	0.365		142	50-150				
Perfluorooctanoic acid (PFOA)	0.441	0.200	"	0.399		110	50-150				
Perfluorooctanesulfonic acid (PFOS)	0.366	0.200	"	0.371		98.5	50-150				
Perfluorononanoic acid (PFNA)	0.383	0.200	"	0.399		95.9	50-150				
Perfluorodecanoic acid (PFDA)	0.461	0.200	"	0.399		116	50-150				
Perfluoroundecanoic acid (PFUnA)	0.438	0.200	"	0.399		110	50-150				
Perfluorododecanoic acid (PFDoA)	0.423	0.200	"	0.399		106	50-150				
Perfluorotridecanoic acid (PFTriDA)	0.491	0.200	"	0.399		123	50-150				
Perfluorotetradecanoic acid (PFTA)	0.413	0.200	"	0.399		104	50-150				
N-MeFOSAA	0.406	0.200	"	0.399		102	50-150				
N-EtFOSAA	0.446	0.200	"	0.399		112	50-150				
Perfluoropentanoic acid (PFPeA)	0.870	0.399	"	0.798		109	50-150				
Perfluoro-1-octanesulfonamide (FOSA)	0.352	0.200	"	0.399		88.2	50-150				
Perfluoro-1-heptanesulfonic acid (PFHpS)	0.380	0.200	"	0.381		99.6	50-150				
Perfluoro-1-decanesulfonic acid (PFDS)	0.375	0.200	"	0.385		97.3	50-150				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	1.61	0.798	"	1.52		106	50-150				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	1.83	0.798	"	1.53		120	50-150				
Perfluoro-n-butanoic acid (PFBA)	1.63	0.798	"	1.60		102	50-150				
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	0.896	0.399	"	0.711		126	50-150				
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	0.680	0.399	"	0.798		85.2	50-150				
Perfluoro-4-oxapentanoic acid (PFMPA)	0.912	0.399	"	0.798		114	50-150				
Perfluoro-5-oxahexanoic acid (PFMBA)	0.919	0.399	"	0.798		115	50-150				
Perfluoro-1-pentanesulfonate (PFPeS)	0.407	0.200	"	0.375		109	50-150				
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	1.81	0.798	"	1.50		121	50-150				
HFPO-DA (Gen-X)	0.992	0.798	"	0.798		124	50-150				
11CL-PF3OUdS	0.847	0.798	"	0.754		112	50-150				
9CL-PF3ONS	1.01	0.798	"	0.747		135	50-150				
ADONA	1.05	0.798	"	0.754		139	50-150				
Perfluorododecanesulfonic acid (PFDoS)	0.283	0.200	"	0.387		73.1	50-150				
Perfluoro-1-nonanesulfonic acid (PFNS)	0.439	0.200	"	0.383		115	50-150				
3-Perfluoropropyl propanoic acid (FPrPA)	ND	0.998	"	1.60			50-150	Low Bias			
3-Perfluoropentyl propanoic acid (FPePA)	2.93	4.99	"	7.98		36.7	50-150	Low Bias			
3-Perfluoroheptyl propanoic acid (FHpPA)	3.66	4.99	"	7.98		45.8	50-150	Low Bias			
N-MeFOSE	4.86	2.00	"	3.99		122	50-150				
N-MeFOSA	0.470	0.200	"	0.399		118	50-150				
N-EtFOSE	3.76	2.00	"	3.99		94.2	50-150				
N-EtFOSA	ND	0.200	"	0.399			50-150	Low Bias			
Surrogate: M3PFBS	2.13		"	2.33		91.6	25-150				
Surrogate: M5PFHxA	2.37		"	2.50		95.0	25-150				
Surrogate: M4PFHpA	2.36		"	2.50		94.4	25-150				
Surrogate: M3PFHxS	2.28		"	2.37		96.2	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	2.09		"	2.50		83.8	25-150				
Surrogate: M6PFDA	1.13		"	1.25		90.7	25-150				
Surrogate: M7PFUdA	1.01		"	1.25		81.3	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30183 - EPA 1633 Prep

LCS (BA30183-BS2)

Prepared: 01/05/2023 Analyzed: 01/11/2023

Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	0.884		ug/kg wet	1.25		70.9	25-150				
Surrogate: M2PFTeDA	0.672		"	1.25		53.9	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	9.82		"	9.98		98.4	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	2.58		"	2.39		108	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	5.13		"	4.99		103	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	0.506		"	2.50		20.3	10-150				
Surrogate: d3-N-MeFOSAA	4.27		"	4.99		85.6	25-150				
Surrogate: d5-N-EtFOSAA	4.05		"	4.99		81.1	25-150				
Surrogate: M2-6:2 FTS	3.47		"	4.75		73.2	25-200				
Surrogate: M2-8:2 FTS	3.89		"	4.79		81.1	25-200				
Surrogate: M9PFNA	1.17		"	1.25		93.4	25-150				
Surrogate: M2-4:2 FTS	3.68		"	4.68		78.6	25-150				
Surrogate: d-N-MeFOSA	0.408		"	2.50		16.3	25-150				
Surrogate: d-N-EtFOSA	1.07		"	2.50		42.7	25-150				
Surrogate: M3HFPO-DA	8.26		"	9.98		82.7	25-150				
Surrogate: d9-N-EtFOSE	3.58		"	25.0		14.4	25-150				
Surrogate: d7-N-MeFOSE	3.66		"	25.0		14.6	25-150				

Duplicate (BA30183-DUP1)

*Source sample: 22L1453-01 (Duplicate)

Prepared: 01/05/2023 Analyzed: 01/11/2023

Perfluorobutanesulfonic acid (PFBS)	ND	0.224	ug/kg dry		ND					30	
Perfluorohexanoic acid (PFHxA)	0.103	0.224	"		0.102				1.45	30	
Perfluoroheptanoic acid (PFHpA)	ND	0.224	"		ND					30	
Perfluorohexanesulfonic acid (PFHxS)	ND	0.224	"		ND					30	
Perfluorooctanoic acid (PFOA)	0.202	0.224	"		0.214				6.13	30	
Perfluorooctanesulfonic acid (PFOS)	0.755	0.224	"		0.732				3.03	30	
Perfluorononanoic acid (PFNA)	ND	0.224	"		ND					30	
Perfluorodecanoic acid (PFDA)	ND	0.224	"		ND					30	
Perfluoroundecanoic acid (PFUnA)	ND	0.224	"		ND					30	
Perfluorododecanoic acid (PFDoA)	ND	0.224	"		ND					30	
Perfluorotridecanoic acid (PFTriDA)	ND	0.224	"		ND					30	
Perfluorotetradecanoic acid (PFTA)	ND	0.224	"		ND					30	
N-MeFOSAA	ND	0.224	"		ND					30	
N-EtFOSAA	ND	0.224	"		ND					30	
Perfluoropentanoic acid (PFPeA)	0.144	0.447	"		0.162				11.3	30	
Perfluoro-1-octanesulfonamide (FOSA)	ND	0.224	"		ND					30	
Perfluoro-1-heptanesulfonic acid (PFHpS)	ND	0.224	"		ND					30	
Perfluoro-1-decanesulfonic acid (PFDS)	ND	0.224	"		ND					30	
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND	0.895	"		ND					30	
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND	0.895	"		ND					30	
Perfluoro-n-butanoic acid (PFBA)	ND	0.895	"		ND					30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND	0.447	"		ND					30	
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	ND	0.447	"		ND					30	
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	0.447	"		ND					30	
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	0.447	"		ND					30	
Perfluoro-1-pentanesulfonate (PFPeS)	ND	0.224	"		ND					30	



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30183 - EPA 1633 Prep											
Duplicate (BA30183-DUP1)		*Source sample: 22L1453-01 (Duplicate)					Prepared: 01/05/2023 Analyzed: 01/11/2023				
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	ND	0.895	ug/kg dry		ND					30	
HFPO-DA (Gen-X)	ND	0.895	"		ND					30	
11CL-PF3OUdS	ND	0.895	"		ND					30	
9CL-PF3ONS	ND	0.895	"		ND					30	
ADONA	ND	0.895	"		ND					30	
Perfluorododecanesulfonic acid (PFDoS)	ND	0.224	"		ND					30	
Perfluoro-1-nonanesulfonic acid (PFNS)	ND	0.224	"		ND					30	
3-Perfluoropropyl propanoic acid (FPrPA)	ND	1.12	"		ND					30	
3-Perfluoropentyl propanoic acid (FPePA)	ND	5.59	"		ND					30	
3-Perfluoroheptyl propanoic acid (FHpPA)	ND	5.59	"		ND					30	
N-MeFOSE	ND	2.24	"		ND					30	
N-MeFOSA	ND	0.224	"		0.251					30	
N-EtFOSE	ND	2.24	"		ND					30	
N-EtFOSA	0.409	0.224	"		0.288				34.7	30	Non-dir.
Surrogate: M3PFBS	2.51		"	2.61		96.2	25-150				
Surrogate: M5PFHxA	2.53		"	2.80		90.7	25-150				
Surrogate: M4PFHpA	2.57		"	2.80		91.7	25-150				
Surrogate: M3PFHxS	2.83		"	2.65		107	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	2.50		"	2.80		89.3	25-150				
Surrogate: M6PFDA	1.15		"	1.40		82.5	25-150				
Surrogate: M7PFUdA	1.13		"	1.40		80.7	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	0.923		"	1.40		66.1	25-150				
Surrogate: M2PFTeDA	0.618		"	1.40		44.2	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	9.97		"	11.2		89.1	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	2.88		"	2.68		107	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	5.16		"	5.59		92.2	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	0.125		"	2.80		4.46	10-150				
Surrogate: d3-N-MeFOSAA	4.21		"	5.59		75.3	25-150				
Surrogate: d5-N-EtFOSAA	4.63		"	5.59		82.8	25-150				
Surrogate: M2-6:2 FTS	4.39		"	5.32		82.6	25-200				
Surrogate: M2-8:2 FTS	5.24		"	5.37		97.6	25-200				
Surrogate: M9PFNA	1.38		"	1.40		98.5	25-150				
Surrogate: M2-4:2 FTS	4.37		"	5.24		83.3	25-150				
Surrogate: d-N-MeFOSA	0.146		"	2.80		5.23	25-150				
Surrogate: d-N-EtFOSA	1.13		"	2.80		40.5	25-150				
Surrogate: M3HFPO-DA	8.87		"	11.2		79.3	25-150				
Surrogate: d9-N-EtFOSE	1.25		"	28.0		4.49	25-150				
Surrogate: d7-N-MeFOSE	1.17		"	28.0		4.17	25-150				



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30096 - EPA 3015A

Blank (BA30096-BLK1)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Arsenic	ND	0.017	mg/L
Barium	ND	0.028	"
Beryllium	ND	0.0006	"
Cadmium	ND	0.003	"
Chromium	ND	0.006	"
Copper	ND	0.022	"
Lead	ND	0.006	"
Nickel	ND	0.011	"
Selenium	ND	0.028	"
Silver	ND	0.006	"

LCS (BA30096-BS1)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Arsenic	1.68	ug/mL	2.00	84.1	80-120
Barium	1.97	"	2.00	98.6	80-120
Beryllium	0.048	"	0.0500	95.5	80-120
Cadmium	0.044	"	0.0500	87.1	80-120
Chromium	0.189	"	0.200	94.3	80-120
Copper	0.244	"	0.250	97.7	80-120
Lead	0.442	"	0.500	88.5	80-120
Nickel	0.489	"	0.500	97.9	80-120
Selenium	1.48	"	2.00	74.0	80-120 Low Bias
Silver	0.046	"	0.0500	91.1	80-120

Duplicate (BA30096-DUP1)

*Source sample: 23A0046-02 (Duplicate)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Arsenic	ND	0.017	mg/L	ND	20
Barium	0.031	0.028	"	0.033	5.26 20
Beryllium	ND	0.0006	"	ND	20
Cadmium	ND	0.003	"	ND	20
Chromium	ND	0.006	"	ND	20
Copper	0.099	0.022	"	0.103	4.46 20
Lead	ND	0.006	"	ND	20
Nickel	ND	0.011	"	ND	20
Selenium	ND	0.028	"	ND	20
Silver	ND	0.006	"	ND	20



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30096 - EPA 3015A

Matrix Spike (BA30096-MS1)		*Source sample: 23A0046-02 (Matrix Spike)						Prepared: 01/04/2023 Analyzed: 01/05/2023			
Arsenic	1.91	0.017	mg/L	2.22	ND	86.1	75-125				
Barium	2.20	0.028	"	2.22	0.033	97.5	75-125				
Beryllium	0.053	0.0006	"	0.0556	ND	96.2	75-125				
Cadmium	0.047	0.003	"	0.0556	ND	85.2	75-125				
Chromium	0.209	0.006	"	0.222	ND	93.9	75-125				
Copper	0.378	0.022	"	0.278	0.103	98.8	75-125				
Lead	0.465	0.006	"	0.556	ND	83.6	75-125				
Nickel	0.536	0.011	"	0.556	ND	96.4	75-125				
Selenium	1.60	0.028	"	2.22	ND	71.8	75-125	Low Bias			
Silver	0.051	0.006	"	0.0556	ND	92.0	75-125				

Post Spike (BA30096-PS1)		*Source sample: 23A0046-02 (Post Spike)						Prepared: 01/04/2023 Analyzed: 01/05/2023			
Arsenic	0.250		ug/mL	2.00	-0.003	12.5	75-125	Low Bias			
Barium	0.281		"	2.00	0.030	12.6	75-125	Low Bias			
Beryllium	0.007		"	0.0500	-0.00001	13.0	75-125	Low Bias			
Cadmium	0.007		"	0.0500	0.0004	12.6	75-125	Low Bias			
Chromium	0.027		"	0.200	0.002	12.4	75-125	Low Bias			
Copper	0.123		"	0.250	0.093	12.0	75-125	Low Bias			
Lead	0.061		"	0.500	0.004	11.6	75-125	Low Bias			
Nickel	0.072		"	0.500	0.002	13.9	75-125	Low Bias			
Selenium	0.216		"	2.00	0.021	9.78	75-125	Low Bias			
Silver	0.005		"	0.0500	-0.002	9.27	75-125	Low Bias			

Batch BA30210 - EPA 3050B

Blank (BA30210-BLK1)								Prepared: 01/05/2023 Analyzed: 01/09/2023			
Arsenic	ND	1.25	mg/kg wet								
Barium	ND	2.08	"								
Beryllium	ND	0.042	"								
Cadmium	ND	0.250	"								
Chromium	ND	0.417	"								
Copper	ND	1.67	"								
Lead	ND	0.417	"								
Nickel	ND	0.833	"								
Selenium	ND	2.08	"								
Silver	ND	0.417	"								



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30210 - EPA 3050B

Duplicate (BA30210-DUP1)		*Source sample: 23A0038-03 (LP_003)					Prepared: 01/05/2023 Analyzed: 01/09/2023				
Arsenic	3.93	3.77	mg/kg dry		ND					35	
Barium	142	6.28	"		170				18.0	35	
Beryllium	ND	0.126	"		ND					35	
Cadmium	6.76	0.754	"		6.98				3.21	35	
Chromium	18.3	1.26	"		19.3				5.23	35	
Copper	2610	5.02	"		2580				1.33	35	
Lead	126	1.26	"		132				4.85	35	
Nickel	17.9	2.51	"		20.1				11.4	35	
Selenium	ND	6.28	"		ND					35	
Silver	6.04	1.26	"		5.04				18.1	35	

Matrix Spike (BA30210-MS1)		*Source sample: 23A0038-03 (LP_003)					Prepared: 01/05/2023 Analyzed: 01/09/2023				
Arsenic	495	3.77	mg/kg dry	502	ND	98.5	75-125				
Barium	687	6.28	"	502	170	103	75-125				
Beryllium	12.6	0.126	"	12.6	ND	100	75-125				
Cadmium	20.0	0.754	"	12.6	6.98	104	75-125				
Chromium	66.5	1.26	"	50.2	19.3	94.0	75-125				
Copper	2620	5.02	"	62.8	2580	65.9	75-125	Low Bias			
Lead	276	1.26	"	126	132	114	75-125				
Nickel	149	2.51	"	126	20.1	103	75-125				
Selenium	388	6.28	"	502	ND	77.3	75-125				
Silver	16.6	1.26	"	12.6	5.04	92.2	75-125				

Post Spike (BA30210-PS1)		*Source sample: 23A0038-03 (LP_003)					Prepared: 01/05/2023 Analyzed: 01/09/2023				
Arsenic	2.12		ug/mL	2.00	0.006	105	75-125				
Barium	2.92		"	2.00	0.678	112	75-125				
Beryllium	0.052		"	0.0500	0.0001	104	75-125				
Cadmium	0.082		"	0.0500	0.028	109	75-125				
Chromium	0.290		"	0.200	0.077	107	75-125				
Copper	10.4		"	0.250	10.3	56.0	75-125	Low Bias			
Lead	1.07		"	0.500	0.526	108	75-125				
Nickel	0.640		"	0.500	0.080	112	75-125				
Selenium	1.67		"	2.00	-0.004	83.5	75-125				
Silver	0.075		"	0.0500	0.020	109	75-125				



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30210 - EPA 3050B

Reference (BA30210-SRM1)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Arsenic	98.8	1.25	mg/kg wet	87.4		113	70-130.4				
Barium	389	2.08	"	347		112	75.2-130.3				
Beryllium	105	0.042	"	103		102	74.8-132				
Cadmium	167	0.250	"	160		104	75-145.6				
Chromium	244	0.417	"	231		105	70.1-134.2				
Copper	161	1.67	"	144		112	75-126.4				
Lead	286	0.417	"	266		107	74.1-125.9				
Nickel	386	0.833	"	350		110	70-144				
Selenium	94.6	2.08	"	130		72.8	66.9-133.8				
Silver	60.6	0.417	"	57.1		106	70.2-129.8				



Mercury by EPA 7000/200 Series Methods - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30070 - EPA SW846-7470A											
Blank (BA30070-BLK1)											
Prepared & Analyzed: 01/03/2023											
Mercury	ND	0.0002	mg/L								
LCS (BA30070-BS1)											
Prepared & Analyzed: 01/03/2023											
Mercury	0.0020643	0.0002	mg/L	0.00200		103	80-120				
LCS (BA30070-BS2)											
Prepared & Analyzed: 01/03/2023											
Mercury	0.0021167	0.0002	mg/L	0.00200		106	80-120				
Batch BA30093 - EPA 7473 soil											
Blank (BA30093-BLK1)											
Prepared & Analyzed: 01/04/2023											
Mercury	ND	0.0300	mg/kg wet								
Duplicate (BA30093-DUP1)											
*Source sample: 23A0038-03 (LP_003)											
Prepared & Analyzed: 01/04/2023											
Mercury	2.66	0.0904	mg/kg dry		1.41				61.4	35	Non-dir.
Matrix Spike (BA30093-MS1)											
*Source sample: 23A0038-03 (LP_003)											
Prepared & Analyzed: 01/04/2023											
Mercury	1.53		mg/kg	0.500	0.468	213	75-125	High Bias			
Reference (BA30093-SRM1)											
Prepared & Analyzed: 01/04/2023											
Mercury	23.708		mg/kg	27.2		87.2	59.9-140.1				



Miscellaneous Physical Parameters - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30129 - % Solids Prep

Duplicate (BA30129-DUP1)		*Source sample: 23A0038-03 (LP_003)					Prepared & Analyzed: 01/04/2023				
% Solids	35.9	0.100	%		33.2				7.79	20	



Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
23A0038-01	LP_001	40mL Vial with Stir Bar-Cool 4° C
23A0038-02	LP_002	40mL Vial with Stir Bar-Cool 4° C
23A0038-03	LP_003	40mL Vial with Stir Bar-Cool 4° C
23A0038-04	LP_004	40mL Vial with Stir Bar-Cool 4° C
23A0038-05	GT_001	40mL Vial with Stir Bar-Cool 4° C
23A0038-06	ST_001	40mL Vial with Stir Bar-Cool 4° C
23A0038-07	DUP_008	40mL Vial with Stir Bar-Cool 4° C
23A0038-08	EB_001	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
23A0038-10	Trip Blank	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C



Sample and Data Qualifiers Relating to This Work Order

VOA-E	The concentration reported for this analyte is an estimated value above the linear range of the instrument for EPA SW846-5035/8260 (>200ppb). Re-analysis using 5035/8260 medium level prep. resulted in a detection below the reporting limit (<500ppb).
S-08	The recovery of this surrogate was outside of QC limits.
S-03	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect. This effect was confirmed by reanalysis.
S-01	The surrogate recovery for this sample may not be available due to sample dilution required from high analyte concentration and/or matrix interferences.
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
M-SPKM	The spike recovery is not within acceptance windows due to sample non-homogeneity, or matrix interference.
M-PS	This Element exhibited recovery outside control limits for the Post Spike.
M-CRL	The RL check for this element recovered outside of control limits.
M-BS	The recovery for this element in the batch blank spike recovered slightly outside of control limits
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL/LOD) or in the case of a TIC, the result is an estimated concentration.
IS-LO	The internal std associated with this target compound did not meet acceptance criteria (area <50% CCV) at the stated dilution due to matrix effects. Sample was rerun to confirm matrix effects.
CCVE	The value reported is ESTIMATED. The value is estimated due to its behavior during continuing calibration verification (>20% Difference for average Rf or >20% Drift for quadratic fit).
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants.

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis



- Low Bias** Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
- High Bias** High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
- Non-Dir.** Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.



Field Chain-of-Custody Record

York Analytical Laboratories, Inc. (YORK)'s Standard Terms & Conditions are listed on the back side of this document. This document serves as your written authorization for YORK to proceed with the analyses requested below. Your signature binds you to YORK's Standard Terms & Conditions.

YORK Project No.

23A0038

120 Research Drive Stratford, CT 06615 - 132-02 89th Ave Queens, NY 11418 - 56 Church Hill Rd. #2 Newtown, CT 06470

clientservices@yorklab.com

www.yorklab.com

800-306-YORK

Page 1 of 1

YOUR Information		Report To:		Invoice To:		YOUR Project Number		Turn-Around Time	
Company: PWGC	Company:	Company:	Company:	BRK2202		YOUR Project Name		RUSH - Next Day	
Address: 650 Johnson Ave	Address:	Address:	Address:					RUSH - Two Day	
Bohemia, NY 11716								RUSH - Three Day	
Phone: 631-549-6553	Phone:	Phone:	Phone:					RUSH - Four Day	
Contact: Mike Pecoraro	Contact:	Contact:	Contact:					Standard (5-7 Day)	☒
E-mail: mpecoraro@pwgros.com	E-mail:	E-mail:	E-mail:			YOUR PO#:		(7-10 for PFAS)	

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by YORK are resolved.

Mike Pecoraro
Michael Pecoraro

Samples Collected by: (print AND sign your name)

Matrix Codes

S - soil / solid
GW - groundwater
DW - drinking water
WW - wastewater
O - Oil | Other

Samples From

New York
New Jersey
Connecticut
Pennsylvania
Other:

Report / EDD Type (circle selections)

☒ Summary Report CT RCP EQUIS (Standard)
☐ QA Report CT RCP DQA/DUE NYSDEC EQUIS
☐ Standard Excel EDD NJDEP Reduced NJDKQP
☒ ASP B Package Deliverables NJDEP SRP HazSite
Other:

YORK Reg. Comp.

Compared to the following Regulation(s): (please fill in)

Sample Identification	Sample Matrix	Date/Time Sampled	Analyses Requested	Container Type	No.
LP-001	S	11/3/23 015	VOCs, SVOCs, Metals		
LP-002		1200			
LP-003 MS/MSD		1215			
LP-004		1230			
GT-001		1315			
ST-001		1105			
DUP-006					
EB-001	W	1435			
FB-001		1425	PFAS		
True Blank			VOCs		

Comments: Also email Derek Erskine: derek@pwgros.com

SCDHS List for VOCs, SVOCs, + Metals (+Se). EPA 1631 for PFAS

Samples iced/chilled at time of lab pickup? circle Yes or No

Preservation: (check all that apply)

HCl ___ MeOH ___ HNO3 ___ H2SO4 ___ NaOH ___
ZnAc ___ Ascorbic Acid ___ Other: ___

Special Instruction

Field Filtered
Lab to Filter

Samples Relinquished by / Company Michael Pecoraro Date/Time 11/3/23 1442	1. Samples Received by / Company K. B. York Date/Time 11/3/23 1442	2. Samples Relinquished by / Company K. B. York Date/Time 11/3/23 1716
Samples Received by / Company	3. Samples Relinquished by / Company	3. Samples Received by / Company
Samples Relinquished by / Company	4. Samples Received by / Company	Samples Received in LAB by J. B. Date/Time 11/3/23 1716 Temperature 2.3 Degrees C



Technical Report

prepared for:

P.W. Grosser Consulting

630 Johnson Ave, Suite 7

Bohemia NY, 11716

Attention: Derek Ersbak

Report Date: 01/11/2023

Client Project ID: BRK2202 (Brookhaven Calabro Airport)

York Project (SDG) No.: 23A0046



CT Cert. No. PH-0723

New Jersey Cert. No. CT005 and NY037

New York Cert. Nos. 10854 and 12058

PA Cert. No. 68-04440

Report Date: 01/11/2023
Client Project ID: BRK2202 (Brookhaven Calabro Airport)
York Project (SDG) No.: 23A0046

P.W. Grosser Consulting
630 Johnson Ave, Suite 7
Bohemia NY, 11716
Attention: Derek Ersbak

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on January 03, 2023 and listed below. The project was identified as your project: **BRK2202 (Brookhaven Calabro Airport)**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

<u>York Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Collected</u>	<u>Date Received</u>
23A0046-01	GT_001	Waste Water	01/03/2023	01/03/2023
23A0046-02	ST_001	Waste Water	01/03/2023	01/03/2023

General Notes for York Project (SDG) No.: 23A0046

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By:



Cassie L. Mosher
Laboratory Manager

Date: 01/11/2023





Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0046-01

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Waste Water

Collection Date/Time

January 3, 2023 12:50 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
75-34-3	1,1-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
563-58-6	1,1-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/10/2023 06:27	01/11/2023 09:08	JTG
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
95-93-2	* 1,2,4,5-Tetramethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
95-63-6	1,2,4-Trimethylbenzene	0.28	J	ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
106-93-4	1,2-Dibromoethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
107-06-2	1,2-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
78-87-5	1,2-Dichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
108-67-8	1,3,5-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
142-28-9	1,3-Dichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0046-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0046

BRK2202 (Brookhaven Calabro Airport)

Waste Water

January 3, 2023 12:50 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
106-46-7	1,4-Dichlorobenzene	0.31	J	ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
123-91-1	1,4-Dioxane	ND		ug/L	40	80	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
594-20-7	2,2-Dichloropropane	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
78-93-3	2-Butanone	14		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
110-75-8	2-Chloroethylvinyl ether	29		ug/L	10	20	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
95-49-8	2-Chlorotoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
591-78-6	2-Hexanone	1.8		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
106-43-4	4-Chlorotoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
108-10-1	4-Methyl-2-pentanone	0.36	J	ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
67-64-1	Acetone	29		ug/L	1.0	2.0	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
107-02-8	Acrolein	2.3		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
107-13-1	Acrylonitrile	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
71-43-2	Benzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
108-86-1	Bromobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
74-97-5	Bromochloromethane	0.91		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
75-27-4	Bromodichloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
75-25-2	Bromoform	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
74-83-9	Bromomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
75-15-0	Carbon disulfide	5.7		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
56-23-5	Carbon tetrachloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
108-90-7	Chlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
75-00-3	Chloroethane	0.86		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0046-01

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Waste Water

Collection Date/Time

January 3, 2023 12:50 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
67-66-3	Chloroform	34		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
74-87-3	Chloromethane	0.88	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
124-48-1	Dibromochloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
74-95-3	Dibromomethane	0.38	J	ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
75-71-8	Dichlorodifluoromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
100-41-4	Ethyl Benzene	1.5		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
60-29-7	* Ethyl Ether	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/L	0.40	0.80	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
87-68-3	Hexachlorobutadiene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
74-88-4	* Iodomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
98-82-8	Isopropylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
80-62-6	Methyl Methacrylate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
75-09-2	Methylene chloride	1.6	J	ug/L	1.0	2.0	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
91-20-3	Naphthalene	ND		ug/L	1.0	2.0	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
104-51-8	n-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
103-65-1	n-Propylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
95-47-6	o-Xylene	2.3		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
179601-23-1	p- & m- Xylenes	6.0		ug/L	0.50	1.0	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
105-05-5	* p-Diethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0046-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0046

BRK2202 (Brookhaven Calabro Airport)

Waste Water

January 3, 2023 12:50 pm

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
622-96-8	* p-Ethyltoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
99-87-6	p-Isopropyltoluene	1.2		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
135-98-8	sec-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
100-42-5	Styrene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
994-05-8	* tert-Amyl methyl ether (TAME)	ND		ug/L	0.40	0.80	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
98-06-6	tert-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
127-18-4	Tetrachloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
109-99-9	* Tetrahydrofuran	0.29	J	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
108-88-3	Toluene	31		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
79-01-6	Trichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
75-69-4	Trichlorofluoromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
108-05-4	Vinyl acetate	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 09:08	JTG
75-01-4	Vinyl Chloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 09:08	JTG
1330-20-7	Xylenes, Total	8.2		ug/L	0.60	1.5	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP	01/10/2023 06:27	01/11/2023 09:08	JTG
107-05-1	* Allyl chloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
123-86-4	* n-butyl acetate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
75-45-6	* Chlorodifluoromethane (Freon 22)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
493-01-6	* cis-decahydronaphthalene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
493-02-7	* trans-decahydronaphthalene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
124-18-5	* n-Decane	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0046-01

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Waste Water

Collection Date/Time

January 3, 2023 12:50 pm

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
97-63-2	* Ethyl Methacrylate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
67-72-1	* Hexachloroethane	ND	QL-02	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
110-54-3	* n-Hexane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
5989-27-5	* Limonene	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
98-95-3	* Nitrobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
79-46-9	* 2-Nitropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
111-84-2	* n-Nonane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
111-65-9	* n-octane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
1120-21-4	* n-undecane	ND	CCVE, QL-02	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/L	5.0	5.0	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 09:08	JTG
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	100 %	65-135								
2037-26-5	Surrogate: SURR: Toluene-d8	95.3 %	86-118								
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	101 %	81-114								

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes: EXT-D, EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
120-12-7	Anthracene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
56-55-3	Benzo(a)anthracene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
50-32-8	Benzo(a)pyrene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0046-01

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Waste Water

Collection Date/Time

January 3, 2023 12:50 pm

Date Received

01/03/2023

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes: EXT-D, EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
218-01-9	Chrysene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
206-44-0	Fluoranthene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
86-73-7	Fluorene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
85-01-8	Phenanthrene	0.350		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
129-00-0	Pyrene	ND		ug/L	0.250	0.250	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 11:42	KH
Surrogate Recoveries		Result		Acceptance Range							
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	45.6 %	S-08	50.2-113							
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	23.2 %	S-08	39.9-105							
1718-51-0	Surrogate: SURR: Terphenyl-d14	8.92 %	S-08	30.7-106							

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
307-24-4	* Perfluorohexanoic acid (PFHxA)	6.38		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
335-67-1	* Perfluorooctanoic acid (PFOA)	1.88		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	53.3		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0046-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0046

BRK2202 (Brookhaven Calabro Airport)

Waste Water

January 3, 2023 12:50 pm

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
2355-31-9	* N-MeFOSAA	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
2991-50-6	* N-EtFOSAA	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ng/L	3.68	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ng/L	7.36	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	8.25		ng/L	7.36	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ng/L	7.36	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
113507-82-7	* Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	ND		ng/L	3.68	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
151772-58-6	* Perfluoro-3,6-dioxahexanoic acid (NFDHA)	ND		ng/L	3.68	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
377-73-1	* Perfluoro-4-oxapentanoic acid (PFMPA)	ND		ng/L	3.68	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
863090-89-5	* Perfluoro-5-oxahexanoic acid (PFMBA)	ND		ng/L	3.68	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
2706-91-4	* Perfluoro-1-pentanesulfonate (PFPeS)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
757124-72-4	* 1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	ND		ng/L	7.36	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
13252-13-6	* HFPO-DA (Gen-X)	ND		ng/L	7.36	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
763051-92-9	* 11CL-PF3OUdS	ND		ng/L	7.36	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0046-01

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Waste Water

Collection Date/Time

January 3, 2023 12:50 pm

Date Received

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
756426-58-1	* 9CL-PF3ONS	ND		ng/L	7.36	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
919005-14-4	* ADONA	ND		ng/L	7.36	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
79780-39-5	* Perfluorododecanesulfonic acid (PFDoS)	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
68259-12-1	* Perfluoro-1-nonanesulfonic acid (PFNS)	1.87		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
356-02-2	* 3-Perfluoropropyl propanoic acid (FPrPA)	192		ng/L	4.60	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
914637-49-3	* 3-Perfluoropentyl propanoic acid (FPePA)	28.8		ng/L	23.0	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
812-70-4	* 3-Perfluoroheptyl propanoic acid (FHpPA)	ND		ng/L	23.0	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
24448-09-7	* N-MeFOSE	ND		ng/L	18.4	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
31506-32-8	* N-MeFOSA	ND		ng/L	1.84	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
1691-99-2	* N-EtFOSE	ND		ng/L	18.4	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
4151-50-2	* N-EtFOSA	2.20		ng/L	0.184	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:23	ESJ
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		92.1 %	25-150							
Surrogate: M5PFHxA		94.4 %	25-150							
Surrogate: M4PFHpA		64.4 %	25-150							
Surrogate: M3PFHxS		96.2 %	25-150							
Surrogate: Perfluoro-n-[13C8]octanoic aci		90.0 %	25-150							
Surrogate: M6PFDA		62.3 %	25-150							
Surrogate: M7PFUdA		33.1 %	25-150							
Surrogate: Perfluoro-n-[1,2-13C2]dodecan		23.3 %	25-150							
Surrogate: M2PFTeDA		257 %	10-150							
Surrogate: Perfluoro-n-[13C4]butanoic aci		73.1 %	25-150							
Surrogate: Perfluoro-1-[13C8]octanesulfor		62.8 %	25-150							
Surrogate: Perfluoro-n-[13C5]pentanoic a		106 %	25-150							
Surrogate: Perfluoro-1-[13C8]octanesulfor		0.724 %	10-150							
Surrogate: d3-N-MeFOSAA		2.53 %	25-150							
Surrogate: d5-N-EtFOSAA		0.307 %	25-150							
Surrogate: M2-6:2 FTS		161 %	25-200							
Surrogate: M2-8:2 FTS		19.8 %	25-200							
Surrogate: M9PFNA		92.1 %	25-150							
Surrogate: M2-4:2 FTS		168 %	25-150							
Surrogate: d-N-MeFOSA		12.5 %	25-150							



Sample Information

Client Sample ID: GT_001

York Sample ID: 23A0046-01

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Waste Water

Collection Date/Time

January 3, 2023 12:50 pm

Date Received

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: d-N-EtFOSA	23.8 %			25-150					
	Surrogate: M3HFPO-DA	76.9 %			25-150					
	Surrogate: d9-N-EtFOSE	11.3 %			25-150					
	Surrogate: d7-N-MeFOSE	12.1 %			25-150					

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3015A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	ND		mg/L	0.017	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:41	CW
7440-39-3	Barium	0.067		mg/L	0.028	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:41	CW
7440-41-7	Beryllium	ND		mg/L	0.0006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:41	CW
7440-43-9	Cadmium	ND		mg/L	0.003	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:41	CW
7440-47-3	Chromium	0.012		mg/L	0.006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:41	CW
7440-50-8	Copper	0.303		mg/L	0.022	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:41	CW
7439-92-1	Lead	0.006		mg/L	0.006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:41	CW
7440-02-0	Nickel	ND		mg/L	0.011	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:41	CW
7782-49-2	* Selenium	ND		mg/L	0.028	1	EPA 6010D Certifications: CTDOH-PH-0723	01/04/2023 08:56	01/05/2023 14:41	CW
7440-22-4	Silver	ND		mg/L	0.006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:41	CW

Mercury by 7470/7471

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA SW846-7470A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND		mg/L	0.0002	1	EPA 7470 Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/03/2023 17:44	01/03/2023 17:44	AA



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0046-02

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23A0046

BRK2202 (Brookhaven Calabro Airport)

Waste Water

January 3, 2023 10:30 am

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
71-55-6	1,1,1-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
79-34-5	1,1,2,2-Tetrachloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
79-00-5	1,1,2-Trichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
75-34-3	1,1-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
75-35-4	1,1-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
563-58-6	1,1-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP	01/10/2023 06:27	01/11/2023 10:03	JTG
87-61-6	1,2,3-Trichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
96-18-4	1,2,3-Trichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
95-93-2	* 1,2,4,5-Tetramethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
95-63-6	1,2,4-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
96-12-8	1,2-Dibromo-3-chloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
106-93-4	1,2-Dibromoethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
95-50-1	1,2-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
107-06-2	1,2-Dichloroethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
78-87-5	1,2-Dichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
108-67-8	1,3,5-Trimethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
541-73-1	1,3-Dichlorobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
142-28-9	1,3-Dichloropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0046-02

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Waste Water

Collection Date/Time

January 3, 2023 10:30 am

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
106-46-7	1,4-Dichlorobenzene	0.78		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
123-91-1	1,4-Dioxane	ND		ug/L	40	80	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
594-20-7	2,2-Dichloropropane	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
78-93-3	2-Butanone	17		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
110-75-8	2-Chloroethylvinyl ether	110		ug/L	10	20	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
95-49-8	2-Chlorotoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
591-78-6	2-Hexanone	0.52		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
106-43-4	4-Chlorotoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
108-10-1	4-Methyl-2-pentanone	0.34	J	ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
67-64-1	Acetone	38		ug/L	1.0	2.0	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
107-02-8	Acrolein	4.1		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
107-13-1	Acrylonitrile	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
71-43-2	Benzene	1.1		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
108-86-1	Bromobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
74-97-5	Bromochloromethane	0.44	J	ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
75-27-4	Bromodichloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
75-25-2	Bromoform	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
74-83-9	Bromomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
75-15-0	Carbon disulfide	3.8		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
56-23-5	Carbon tetrachloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
108-90-7	Chlorobenzene	0.73		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
75-00-3	Chloroethane	0.57		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0046-02

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Waste Water

Collection Date/Time

January 3, 2023 10:30 am

Date Received

01/03/2023

Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
67-66-3	Chloroform	14		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
74-87-3	Chloromethane	0.85	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
156-59-2	cis-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
10061-01-5	cis-1,3-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
124-48-1	Dibromochloromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
74-95-3	Dibromomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
75-71-8	Dichlorodifluoromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
100-41-4	Ethyl Benzene	0.47	J	ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
60-29-7	* Ethyl Ether	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
637-92-3	* Ethyl tert-butyl ether (ETBE)	ND		ug/L	0.40	0.80	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
87-68-3	Hexachlorobutadiene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
74-88-4	* Iodomethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
98-82-8	Isopropylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
80-62-6	Methyl Methacrylate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
1634-04-4	Methyl tert-butyl ether (MTBE)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
75-09-2	Methylene chloride	2.7		ug/L	1.0	2.0	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
91-20-3	Naphthalene	ND		ug/L	1.0	2.0	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
104-51-8	n-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
103-65-1	n-Propylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
95-47-6	o-Xylene	0.70		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
179601-23-1	p- & m- Xylenes	1.7		ug/L	0.50	1.0	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
105-05-5	* p-Diethylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0046-02

York Project (SDG) No.

Client Project ID

Matrix

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Waste Water

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Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
622-96-8	* p-Ethyltoluene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
99-87-6	p-Isopropyltoluene	1.1		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
135-98-8	sec-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
100-42-5	Styrene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
994-05-8	* tert-Amyl methyl ether (TAME)	ND		ug/L	0.40	0.80	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
98-06-6	tert-Butylbenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
127-18-4	Tetrachloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
109-99-9	* Tetrahydrofuran	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
108-88-3	Toluene	110		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
156-60-5	trans-1,2-Dichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
10061-02-6	trans-1,3-Dichloropropylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
79-01-6	Trichloroethylene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
75-69-4	Trichlorofluoromethane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
108-05-4	Vinyl acetate	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications: NELAC-NY10854,NELAC-NY12058,NJDEP,PADEP	01/10/2023 06:27	01/11/2023 10:03	JTG
75-01-4	Vinyl Chloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP,PAI	01/10/2023 06:27	01/11/2023 10:03	JTG
1330-20-7	Xylenes, Total	2.4		ug/L	0.60	1.5	1	EPA 8260C Certifications: CTDOH-PH-0723,NELAC-NY10854,NELAC-NY12058,NJDEP	01/10/2023 06:27	01/11/2023 10:03	JTG
107-05-1	* Allyl chloride	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
123-86-4	* n-butyl acetate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
75-45-6	* Chlorodifluoromethane (Freon 22)	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
493-01-6	* cis-decahydronaphthalene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
493-02-7	* trans-decahydronaphthalene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
124-18-5	* n-Decane	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0046-02

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

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Volatile Organics, Suffolk Co. App.A DHS List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
97-63-2	* Ethyl Methacrylate	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
67-72-1	* Hexachloroethane	ND	QL-02	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
110-54-3	* n-Hexane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
5989-27-5	* Limonene	ND	CCVE	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
98-95-3	* Nitrobenzene	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
79-46-9	* 2-Nitropropane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
111-84-2	* n-Nonane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
111-65-9	* n-octane	ND		ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
1120-21-4	* n-undecane	ND	CCVE, QL-02	ug/L	0.20	0.50	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
556-61-6	* Methyl Isothiocyanate (TIC)	ND		ug/L	5.0	5.0	1	EPA 8260C Certifications:	01/10/2023 06:27	01/11/2023 10:03	JTG
Surrogate Recoveries		Result	Acceptance Range								
17060-07-0	Surrogate: SURR: 1,2-Dichloroethane-d4	99.8 %	65-135								
2037-26-5	Surrogate: SURR: Toluene-d8	95.4 %	86-118								
460-00-4	Surrogate: SURR: p-Bromofluorobenzene	97.6 %	81-114								

Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes: EXT-D, EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
120-12-7	Anthracene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
56-55-3	Benzo(a)anthracene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
50-32-8	Benzo(a)pyrene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH



Sample Information

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York Sample ID: 23A0046-02

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Semi-Volatiles, Suffolk Co. DHS App. A List

Log-in Notes:

Sample Notes: EXT-D, EXT-EM

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	Reported to LOD/MDL	LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
218-01-9	Chrysene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
206-44-0	Fluoranthene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
86-73-7	Fluorene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
85-01-8	Phenanthrene	0.250		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
129-00-0	Pyrene	ND		ug/L	0.125	0.125	1	EPA 8270D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 07:53	01/06/2023 12:14	KH
Surrogate Recoveries		Result		Acceptance Range							
4165-60-0	Surrogate: SURR: Nitrobenzene-d5	28.0 %	S-08	50.2-113							
321-60-8	Surrogate: SURR: 2-Fluorobiphenyl	26.4 %	S-08	39.9-105							
1718-51-0	Surrogate: SURR: Terphenyl-d14	27.1 %	S-08	30.7-106							

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
375-73-5	* Perfluorobutanesulfonic acid (PFBS)	2.76		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
307-24-4	* Perfluorohexanoic acid (PFHxA)	6.90		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
375-85-9	* Perfluoroheptanoic acid (PFHpA)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
355-46-4	* Perfluorohexanesulfonic acid (PFHxS)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
335-67-1	* Perfluorooctanoic acid (PFOA)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
1763-23-1	* Perfluorooctanesulfonic acid (PFOS)	20.3		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
375-95-1	* Perfluorononanoic acid (PFNA)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
335-76-2	* Perfluorodecanoic acid (PFDA)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ



Sample Information

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Waste Water

January 3, 2023 10:30 am

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PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
2058-94-8	* Perfluoroundecanoic acid (PFUnA)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
307-55-1	* Perfluorododecanoic acid (PFDoA)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
72629-94-8	* Perfluorotridecanoic acid (PFTrDA)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
376-06-7	* Perfluorotetradecanoic acid (PFTA)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
2355-31-9	* N-MeFOSAA	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
2991-50-6	* N-EtFOSAA	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
2706-90-3	* Perfluoropentanoic acid (PFPeA)	ND		ng/L	3.85	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
754-91-6	* Perfluoro-1-octanesulfonamide (FOSA)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
375-92-8	* Perfluoro-1-heptanesulfonic acid (PFHpS)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
335-77-3	* Perfluoro-1-decanesulfonic acid (PFDS)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
27619-97-2	* 1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	ND		ng/L	7.69	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
39108-34-4	* 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	ND		ng/L	7.69	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
375-22-4	* Perfluoro-n-butanoic acid (PFBA)	ND		ng/L	7.69	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
113507-82-7	* Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND		ng/L	3.85	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
151772-58-6	* Perfluoro-3,6-dioxahexanoic acid (NFDHA)	ND		ng/L	3.85	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
377-73-1	* Perfluoro-4-oxapentanoic acid (PFMPA)	ND		ng/L	3.85	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
863090-89-5	* Perfluoro-5-oxahexanoic acid (PFMBA)	ND		ng/L	3.85	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
2706-91-4	* Perfluoro-1-pentanesulfonate (PFPeS)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
757124-72-4	* 1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	ND		ng/L	7.69	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
13252-13-6	* HFPO-DA (Gen-X)	14.9		ng/L	7.69	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
763051-92-9	* 11CL-PF3OUdS	ND		ng/L	7.69	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0046-02

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Waste Water

Collection Date/Time

January 3, 2023 10:30 am

Date Received

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
756426-58-1	* 9CL-PF3ONS	ND		ng/L	7.69	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
919005-14-4	* ADONA	ND		ng/L	7.69	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
79780-39-5	* Perfluorododecanesulfonic acid (PFDoS)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
68259-12-1	* Perfluoro-1-nonanesulfonic acid (PFNS)	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
356-02-2	* 3-Perfluoropropyl propanoic acid (FPrPA)	247		ng/L	4.81	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
914637-49-3	* 3-Perfluoropentyl propanoic acid (FPePA)	ND		ng/L	24.0	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
812-70-4	* 3-Perfluoroheptyl propanoic acid (FHpPA)	ND		ng/L	24.0	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
24448-09-7	* N-MeFOSE	ND		ng/L	19.2	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
31506-32-8	* N-MeFOSA	ND		ng/L	1.92	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
1691-99-2	* N-EtFOSE	ND		ng/L	19.2	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
4151-50-2	* N-EtFOSA	ND		ng/L	0.192	1	EPA 1633 Draft 2 Certifications:	01/05/2023 09:41	01/09/2023 21:39	ESJ
Surrogate Recoveries		Result	Acceptance Range							
Surrogate: M3PFBS		97.3 %	25-150							
Surrogate: M5PFHxA		106 %	25-150							
Surrogate: M4PFHpA		89.6 %	25-150							
Surrogate: M3PFHxS		106 %	25-150							
Surrogate: Perfluoro-n-[13C8]octanoic aci		110 %	25-150							
Surrogate: M6PFDA		98.9 %	25-150							
Surrogate: M7PFUdA		36.6 %	25-150							
Surrogate: Perfluoro-n-[1,2-13C2]dodecan		26.7 %	25-150							
Surrogate: M2PFTeDA		141 %	10-150							
Surrogate: Perfluoro-n-[13C4]butanoic aci		79.0 %	25-150							
Surrogate: Perfluoro-1-[13C8]octanesulfo		121 %	25-150							
Surrogate: Perfluoro-n-[13C5]pentanoic a		149 %	25-150							
Surrogate: Perfluoro-1-[13C8]octanesulfo		4.75 %	10-150							
Surrogate: d3-N-MeFOSAA		17.7 %	25-150							
Surrogate: d5-N-EtFOSAA		3.44 %	25-150							
Surrogate: M2-6:2 FTS		230 %	25-200							
Surrogate: M2-8:2 FTS		47.7 %	25-200							
Surrogate: M9PFNA		108 %	25-150							
Surrogate: M2-4:2 FTS		203 %	25-150							
Surrogate: d-N-MeFOSA		42.6 %	25-150							



Sample Information

Client Sample ID: ST_001

York Sample ID: 23A0046-02

York Project (SDG) No.

23A0046

Client Project ID

BRK2202 (Brookhaven Calabro Airport)

Matrix

Waste Water

Collection Date/Time

January 3, 2023 10:30 am

Date Received

01/03/2023

PFAS, EPA 1633 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 1633 Prep

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate: d-N-EtFOSA	57.9 %			25-150					
	Surrogate: M3HFPO-DA	98.4 %			25-150					
	Surrogate: d9-N-EtFOSE	32.0 %			25-150					
	Surrogate: d7-N-MeFOSE	47.2 %			25-150					

Metals, Suffolk Co. App. B

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3015A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-38-2	Arsenic	ND		mg/L	0.017	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:50	CW
7440-39-3	Barium	0.033		mg/L	0.028	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:50	CW
7440-41-7	Beryllium	ND		mg/L	0.0006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:50	CW
7440-43-9	Cadmium	ND		mg/L	0.003	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:50	CW
7440-47-3	Chromium	ND		mg/L	0.006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:50	CW
7440-50-8	Copper	0.103		mg/L	0.022	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:50	CW
7439-92-1	Lead	ND		mg/L	0.006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:50	CW
7440-02-0	Nickel	ND		mg/L	0.011	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:50	CW
7782-49-2	* Selenium	ND		mg/L	0.028	1	EPA 6010D Certifications: CTDOH-PH-0723	01/04/2023 08:56	01/05/2023 14:50	CW
7440-22-4	Silver	ND		mg/L	0.006	1	EPA 6010D Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/04/2023 08:56	01/05/2023 14:50	CW

Mercury by 7470/7471

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA SW846-7470A

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	0.0002		mg/L	0.0002	1	EPA 7470 Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	01/03/2023 17:44	01/03/2023 17:44	AA



Analytical Batch Summary

Batch ID: BA30070 **Preparation Method:** EPA SW846-7470A **Prepared By:** AA

YORK Sample ID	Client Sample ID	Preparation Date
23A0046-01	GT_001	01/03/23
23A0046-02	ST_001	01/03/23
BA30070-BLK1	Blank	01/03/23
BA30070-BS1	LCS	01/03/23
BA30070-BS2	LCS	01/03/23

Batch ID: BA30081 **Preparation Method:** EPA 3510C **Prepared By:** RST

YORK Sample ID	Client Sample ID	Preparation Date
23A0046-01	GT_001	01/04/23
23A0046-02	ST_001	01/04/23
BA30081-BLK1	Blank	01/04/23
BA30081-BS1	LCS	01/04/23
BA30081-BSD1	LCS Dup	01/04/23

Batch ID: BA30096 **Preparation Method:** EPA 3015A **Prepared By:** MCS

YORK Sample ID	Client Sample ID	Preparation Date
23A0046-01	GT_001	01/04/23
23A0046-02	ST_001	01/04/23
BA30096-BLK1	Blank	01/04/23
BA30096-BS1	LCS	01/04/23
BA30096-DUP1	Duplicate	01/04/23
BA30096-MS1	Matrix Spike	01/04/23
BA30096-PS1	Post Spike	01/04/23

Batch ID: BA30171 **Preparation Method:** EPA 1633 Prep **Prepared By:** BAMW

YORK Sample ID	Client Sample ID	Preparation Date
23A0046-01	GT_001	01/05/23
23A0046-02	ST_001	01/05/23
BA30171-BLK1	Blank	01/05/23
BA30171-BS1	LCS	01/05/23
BA30171-BS2	LCS	01/05/23
BA30171-DUP1	Duplicate	01/05/23

Batch ID: BA30514 **Preparation Method:** EPA 5030B **Prepared By:** JTG

YORK Sample ID	Client Sample ID	Preparation Date
23A0046-01	GT_001	01/10/23
23A0046-02	ST_001	01/10/23
BA30514-BLK1	Blank	01/10/23
BA30514-BS1	LCS	01/10/23



BA30514-BS2	LCS	01/10/23
BA30514-BSD1	LCS Dup	01/10/23
BA30514-BSD2	LCS Dup	01/10/23



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30514 - EPA 5030B

Blank (BA30514-BLK1)

Prepared: 01/10/2023 Analyzed: 01/11/2023

1,1,1,2-Tetrachloroethane	ND	0.50	ug/L
1,1,1-Trichloroethane	ND	0.50	"
1,1,2,2-Tetrachloroethane	ND	0.50	"
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"
1,1,2-Trichloroethane	ND	0.50	"
1,1-Dichloroethane	ND	0.50	"
1,1-Dichloroethylene	ND	0.50	"
1,1-Dichloropropylene	ND	0.50	"
1,2,3-Trichlorobenzene	ND	0.50	"
1,2,3-Trichloropropane	ND	0.50	"
1,2,4,5-Tetramethylbenzene	ND	0.50	"
1,2,4-Trichlorobenzene	ND	0.50	"
1,2,4-Trimethylbenzene	ND	0.50	"
1,2-Dibromo-3-chloropropane	ND	0.50	"
1,2-Dibromoethane	ND	0.50	"
1,2-Dichlorobenzene	ND	0.50	"
1,2-Dichloroethane	ND	0.50	"
1,2-Dichloropropane	ND	0.50	"
1,3,5-Trimethylbenzene	ND	0.50	"
1,3-Dichlorobenzene	ND	0.50	"
1,3-Dichloropropane	ND	0.50	"
1,4-Dichlorobenzene	ND	0.50	"
1,4-Dioxane	ND	80	"
2,2-Dichloropropane	ND	0.50	"
2-Butanone	ND	0.50	"
2-Chloroethylvinyl ether	ND	20	"
2-Chlorotoluene	ND	0.50	"
2-Hexanone	ND	0.50	"
4-Chlorotoluene	ND	0.50	"
4-Methyl-2-pentanone	ND	0.50	"
Acetone	ND	2.0	"
Acrolein	ND	0.50	"
Acrylonitrile	ND	0.50	"
Benzene	ND	0.50	"
Bromobenzene	ND	0.50	"
Bromochloromethane	ND	0.50	"
Bromodichloromethane	ND	0.50	"
Bromoform	ND	0.50	"
Bromomethane	ND	0.50	"
Carbon disulfide	ND	0.50	"
Carbon tetrachloride	ND	0.50	"
Chlorobenzene	ND	0.50	"
Chloroethane	ND	0.50	"
Chloroform	ND	0.50	"
Chloromethane	ND	0.50	"
cis-1,2-Dichloroethylene	ND	0.50	"
cis-1,3-Dichloropropylene	ND	0.50	"
Dibromochloromethane	ND	0.50	"
Dibromomethane	ND	0.50	"
Dichlorodifluoromethane	ND	0.50	"



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30514 - EPA 5030B

Blank (BA30514-BLK1)

Prepared: 01/10/2023 Analyzed: 01/11/2023

Ethyl Benzene	ND	0.50	ug/L								
Ethyl Ether	ND	0.50	"								
Ethyl tert-butyl ether (ETBE)	ND	0.80	"								
Hexachlorobutadiene	ND	0.50	"								
Iodomethane	ND	0.50	"								
Isopropylbenzene	ND	0.50	"								
Methyl Methacrylate	ND	0.50	"								
Methyl tert-butyl ether (MTBE)	ND	0.50	"								
Methylene chloride	ND	2.0	"								
Naphthalene	ND	2.0	"								
n-Butylbenzene	ND	0.50	"								
n-Propylbenzene	ND	0.50	"								
o-Xylene	ND	0.50	"								
p- & m- Xylenes	ND	1.0	"								
p-Diethylbenzene	ND	0.50	"								
p-Ethyltoluene	ND	0.50	"								
p-Isopropyltoluene	ND	0.50	"								
sec-Butylbenzene	ND	0.50	"								
Styrene	ND	0.50	"								
tert-Amyl methyl ether (TAME)	ND	0.80	"								
tert-Butylbenzene	ND	0.50	"								
Tetrachloroethylene	ND	0.50	"								
Tetrahydrofuran	ND	0.50	"								
Toluene	ND	0.50	"								
trans-1,2-Dichloroethylene	ND	0.50	"								
trans-1,3-Dichloropropylene	ND	0.50	"								
Trichloroethylene	ND	0.50	"								
Trichlorofluoromethane	ND	0.50	"								
Vinyl acetate	ND	0.50	"								
Vinyl Chloride	ND	0.50	"								
Xylenes, Total	ND	1.5	"								
Allyl chloride	ND	0.50	"								
n-butyl acetate	ND	0.50	"								
Chlorodifluoromethane (Freon 22)	ND	0.50	"								
cis-decahydronaphthalene	ND	0.50	"								
trans-decahydronaphthalene	ND	0.50	"								
n-Decane	ND	0.50	"								
Ethyl Methacrylate	ND	0.50	"								
Hexachloroethane	ND	0.50	"								
n-Hexane	ND	0.50	"								
Limonene	ND	0.50	"								
Nitrobenzene	ND	0.50	"								
2-Nitropropane	ND	0.50	"								
n-Nonane	ND	0.50	"								
n-octane	ND	0.50	"								
n-undecane	ND	0.50	"								
Methyl Isothiocyanate (TIC)	ND	5.0	"								
Surrogate: SURR: 1,2-Dichloroethane-d4	10.1		"	10.0		101	65-135				
Surrogate: SURR: Toluene-d8	9.43		"	10.0		94.3	86-118				
Surrogate: SURR: p-Bromofluorobenzene	10.1		"	10.0		101	81-114				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30514 - EPA 5030B											
LCS (BA30514-BS1)						Prepared: 01/10/2023 Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	9.9		ug/L	10.0		99.2	70-132				
1,1,1-Trichloroethane	11		"	10.0		108	68-138				
1,1,2,2-Tetrachloroethane	11		"	10.0		106	73-132				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11		"	10.0		105	67-136				
1,1,2-Trichloroethane	9.8		"	10.0		98.3	79-125				
1,1-Dichloroethane	9.3		"	10.0		92.8	78-128				
1,1-Dichloroethylene	9.6		"	10.0		96.5	68-134				
1,1-Dichloropropylene	9.6		"	10.0		95.6	74-130				
1,2,3-Trichlorobenzene	10		"	10.0		104	77-140				
1,2,3-Trichloropropane	12		"	10.0		116	79-127				
1,2,4,5-Tetramethylbenzene	9.4		"	10.0		94.1	76-139				
1,2,4-Trichlorobenzene	9.8		"	10.0		98.5	75-141				
1,2,4-Trimethylbenzene	9.3		"	10.0		92.7	78-127				
1,2-Dibromo-3-chloropropane	11		"	10.0		109	60-150				
1,2-Dibromoethane	11		"	10.0		106	86-123				
1,2-Dichlorobenzene	9.4		"	10.0		94.5	79-125				
1,2-Dichloroethane	10		"	10.0		101	69-133				
1,2-Dichloropropane	8.8		"	10.0		88.2	76-124				
1,3,5-Trimethylbenzene	9.3		"	10.0		93.3	78-128				
1,3-Dichlorobenzene	9.6		"	10.0		96.3	81-124				
1,3-Dichloropropane	9.7		"	10.0		97.3	79-125				
1,4-Dichlorobenzene	9.4		"	10.0		94.3	82-124				
1,4-Dioxane	430		"	210		204	10-177	High Bias			
2,2-Dichloropropane	7.6		"	10.0		75.8	61-139				
2-Butanone	12		"	10.0		121	44-169				
2-Chloroethylvinyl ether	8.3		"	10.0		83.4	10-155				
2-Chlorotoluene	9.5		"	10.0		95.3	74-130				
2-Hexanone	11		"	10.0		106	62-145				
4-Chlorotoluene	9.2		"	10.0		92.4	75-127				
4-Methyl-2-pentanone	10		"	10.0		102	67-137				
Acetone	11		"	10.0		112	29-163				
Acrolein	8.8		"	10.0		87.9	10-217				
Acrylonitrile	11		"	10.0		114	47-158				
Benzene	10		"	10.0		100	72-134				
Bromobenzene	9.2		"	10.0		92.1	74-129				
Bromochloromethane	9.9		"	10.0		99.4	69-134				
Bromodichloromethane	9.1		"	10.0		90.6	76-127				
Bromoform	9.7		"	10.0		97.2	77-137				
Bromomethane	4.8		"	10.0		48.1	50-156	Low Bias			
Carbon disulfide	10		"	10.0		100	54-154				
Carbon tetrachloride	11		"	10.0		108	62-145				
Chlorobenzene	10		"	10.0		99.7	85-119				
Chloroethane	9.9		"	10.0		98.9	49-143				
Chloroform	10		"	10.0		103	74-131				
Chloromethane	6.9		"	10.0		68.7	43-134				
cis-1,2-Dichloroethylene	9.0		"	10.0		90.2	73-134				
cis-1,3-Dichloropropylene	8.6		"	10.0		86.5	77-128				
Dibromochloromethane	9.1		"	10.0		90.7	79-130				
Dibromomethane	9.7		"	10.0		97.4	78-128				
Dichlorodifluoromethane	8.6		"	10.0		86.1	38-139				
Ethyl Benzene	9.4		"	10.0		94.3	80-129				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30514 - EPA 5030B

LCS (BA30514-BS1)

Prepared: 01/10/2023 Analyzed: 01/11/2023

Ethyl Ether	ND	0.50	ug/L				70-130				
Ethyl tert-butyl ether (ETBE)	10		"	10.0		102	70-130				
Hexachlorobutadiene	9.4		"	10.0		94.4	72-141				
Iodomethane	9.9		"	10.0		98.6	70-130				
Isopropylbenzene	9.8		"	10.0		98.2	76-128				
Methyl Methacrylate	9.7		"	10.0		96.8	70-130				
Methyl tert-butyl ether (MTBE)	10		"	10.0		103	64-142				
Methylene chloride	8.8		"	10.0		88.3	56-142				
Naphthalene	11		"	10.0		114	79-144				
n-Butylbenzene	8.6		"	10.0		86.1	74-132				
n-Propylbenzene	9.6		"	10.0		95.5	72-135				
o-Xylene	9.4		"	10.0		93.7	81-123				
p- & m- Xylenes	19		"	20.0		94.8	79-130				
p-Diethylbenzene	8.8		"	10.0		87.6	77-128				
p-Ethyltoluene	10		"	10.0		104	76-126				
p-Isopropyltoluene	9.8		"	10.0		97.6	80-127				
sec-Butylbenzene	9.6		"	10.0		95.5	78-127				
Styrene	9.6		"	10.0		95.6	82-124				
tert-Amyl methyl ether (TAME)	10		"	10.0		104	70-130				
tert-Butylbenzene	8.4		"	10.0		84.4	75-131				
Tetrachloroethylene	9.7		"	10.0		97.1	78-133				
Tetrahydrofuran	11		"	10.0		110	70-130				
Toluene	9.0		"	10.0		90.0	83-122				
trans-1,2-Dichloroethylene	9.4		"	10.0		94.1	59-145				
trans-1,3-Dichloropropylene	8.9		"	10.0		88.6	74-131				
Trichloroethylene	9.2		"	10.0		92.3	81-125				
Trichlorofluoromethane	11		"	10.0		113	61-144				
Vinyl acetate	9.1		"	10.0		91.1	32-165				
Vinyl Chloride	8.4		"	10.0		83.6	42-136				
Allyl chloride	10		"	10.0		99.7	70-130				
n-butyl acetate	ND	0.50	"				70-130				
Chlorodifluoromethane (Freon 22)	ND	0.50	"				70-130				
cis-decahydronaphthalene	ND	0.50	"				70-130				
trans-decahydronaphthalene	ND	0.50	"				70-130				
n-Decane	ND	0.50	"				70-130				
Ethyl Methacrylate	10		"	10.0		99.6	70-130				
Hexachloroethane	ND	0.50	"				70-130				
n-Hexane	ND	0.50	"				70-130				
Limonene	ND	0.50	"				70-130				
Nitrobenzene	13		"	10.0		127	70-130				
2-Nitropropane	7.8	0.50	"				70-130				
n-Nonane	ND	0.50	"				70-130				
n-octane	ND	0.50	"				70-130				
n-undecane	ND	0.50	"				70-130				
Surrogate: SURR: 1,2-Dichloroethane-d4	10.5		"	10.0		105	65-135				
Surrogate: SURR: Toluene-d8	9.41		"	10.0		94.1	86-118				
Surrogate: SURR: p-Bromofluorobenzene	9.91		"	10.0		99.1	81-114				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30514 - EPA 5030B											
LCS (BA30514-BS2)						Prepared: 01/10/2023 Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	ND	0.50	ug/L				70-132				
1,1,1-Trichloroethane	ND	0.50	"				68-138				
1,1,2,2-Tetrachloroethane	ND	0.50	"				73-132				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"				67-136				
1,1,2-Trichloroethane	ND	0.50	"				79-125				
1,1-Dichloroethane	ND	0.50	"				78-128				
1,1-Dichloroethylene	ND	0.50	"				68-134				
1,1-Dichloropropylene	ND	0.50	"				74-130				
1,2,3-Trichlorobenzene	ND	0.50	"				77-140				
1,2,3-Trichloropropane	ND	0.50	"				79-127				
1,2,4,5-Tetramethylbenzene	ND	0.50	"				76-139				
1,2,4-Trichlorobenzene	ND	0.50	"				75-141				
1,2,4-Trimethylbenzene	ND	0.50	"				78-127				
1,2-Dibromo-3-chloropropane	ND	0.50	"				60-150				
1,2-Dibromoethane	ND	0.50	"				86-123				
1,2-Dichlorobenzene	ND	0.50	"				79-125				
1,2-Dichloroethane	ND	0.50	"				69-133				
1,2-Dichloropropane	ND	0.50	"				76-124				
1,3,5-Trimethylbenzene	ND	0.50	"				78-128				
1,3-Dichlorobenzene	ND	0.50	"				81-124				
1,3-Dichloropropane	ND	0.50	"				79-125				
1,4-Dichlorobenzene	ND	0.50	"				82-124				
1,4-Dioxane	ND	80	"				10-177				
2,2-Dichloropropane	ND	0.50	"				61-139				
2-Butanone	ND	0.50	"				44-169				
2-Chloroethylvinyl ether	ND	20	"				10-155				
2-Chlorotoluene	ND	0.50	"				74-130				
2-Hexanone	ND	0.50	"				62-145				
4-Chlorotoluene	ND	0.50	"				75-127				
4-Methyl-2-pentanone	ND	0.50	"				67-137				
Acetone	ND	2.0	"				29-163				
Acrolein	ND	0.50	"				10-217				
Acrylonitrile	ND	0.50	"				47-158				
Benzene	ND	0.50	"				72-134				
Bromobenzene	ND	0.50	"				74-129				
Bromochloromethane	ND	0.50	"				69-134				
Bromodichloromethane	ND	0.50	"				76-127				
Bromoform	ND	0.50	"				77-137				
Bromomethane	ND	0.50	"				50-156				
Carbon disulfide	ND	0.50	"				54-154				
Carbon tetrachloride	ND	0.50	"				62-145				
Chlorobenzene	ND	0.50	"				85-119				
Chloroethane	ND	0.50	"				49-143				
Chloroform	ND	0.50	"				74-131				
Chloromethane	ND	0.50	"				43-134				
cis-1,2-Dichloroethylene	ND	0.50	"				73-134				
cis-1,3-Dichloropropylene	ND	0.50	"				77-128				
Dibromochloromethane	ND	0.50	"				79-130				
Dibromomethane	ND	0.50	"				78-128				
Dichlorodifluoromethane	ND	0.50	"				38-139				
Ethyl Benzene	ND	0.50	"				80-129				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30514 - EPA 5030B

LCS (BA30514-BS2)

Prepared: 01/10/2023 Analyzed: 01/11/2023

Ethyl Ether	1200	0.50	ug/L				70-130				
Ethyl tert-butyl ether (ETBE)	ND	0.80	"				70-130				
Hexachlorobutadiene	ND	0.50	"				72-141				
Iodomethane	ND	0.50	"				70-130				
Isopropylbenzene	ND	0.50	"				76-128				
Methyl Methacrylate	ND	0.50	"				70-130				
Methyl tert-butyl ether (MTBE)	ND	0.50	"				64-142				
Methylene chloride	ND	2.0	"				56-142				
Naphthalene	ND	2.0	"				79-144				
n-Butylbenzene	ND	0.50	"				74-132				
n-Propylbenzene	ND	0.50	"				72-135				
o-Xylene	ND	0.50	"				81-123				
p- & m- Xylenes	ND	1.0	"				79-130				
p-Diethylbenzene	ND	0.50	"				77-128				
p-Ethyltoluene	ND	0.50	"				76-126				
p-Isopropyltoluene	ND	0.50	"				80-127				
sec-Butylbenzene	ND	0.50	"				78-127				
Styrene	ND	0.50	"				82-124				
tert-Amyl methyl ether (TAME)	ND	0.80	"				70-130				
tert-Butylbenzene	ND	0.50	"				75-131				
Tetrachloroethylene	ND	0.50	"				78-133				
Tetrahydrofuran	ND	0.50	"				70-130				
Toluene	ND	0.50	"				83-122				
trans-1,2-Dichloroethylene	ND	0.50	"				59-145				
trans-1,3-Dichloropropylene	ND	0.50	"				74-131				
Trichloroethylene	ND	0.50	"				81-125				
Trichlorofluoromethane	ND	0.50	"				61-144				
Vinyl acetate	ND	0.50	"				32-165				
Vinyl Chloride	ND	0.50	"				42-136				
Allyl chloride	ND	0.50	"				70-130				
n-butyl acetate	8.5		"	10.0		85.1	70-130				
Chlorodifluoromethane (Freon 22)	10		"	10.0		101	70-130				
cis-decahydronaphthalene	22		"	10.0		218	70-130	High Bias			
trans-decahydronaphthalene	11		"	10.0		107	70-130				
n-Decane	7.2	0.50	"				70-130				
Ethyl Methacrylate	ND	0.50	"				70-130				
Hexachloroethane	ND	0.50	"				70-130				
n-Hexane	12		"	10.0		125	70-130				
Limonene	8.5		"	10.0		84.9	70-130				
Nitrobenzene	ND	0.50	"				70-130				
2-Nitropropane	ND	0.50	"				70-130				
n-Nonane	11		"	10.0		109	70-130				
n-octane	10		"	10.0		100	70-130				
n-undecane	3.4		"	10.0		33.5	70-130	Low Bias			
Surrogate: SURR: 1,2-Dichloroethane-d4	9.24		"	10.0		92.4	65-135				
Surrogate: SURR: Toluene-d8	10.0		"	10.0		100	86-118				
Surrogate: SURR: p-Bromofluorobenzene	10.1		"	10.0		101	81-114				





Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30514 - EPA 5030B											
LCS Dup (BA30514-BSD1)						Prepared: 01/10/2023 Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	9.7		ug/L	10.0		97.1	70-132		2.14	30	
1,1,1-Trichloroethane	10		"	10.0		103	68-138		4.46	30	
1,1,2,2-Tetrachloroethane	10		"	10.0		105	73-132		1.23	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	10		"	10.0		101	67-136		4.47	30	
1,1,2-Trichloroethane	9.7		"	10.0		97.1	79-125		1.23	30	
1,1-Dichloroethane	8.9		"	10.0		89.0	78-128		4.18	30	
1,1-Dichloroethylene	9.2		"	10.0		91.5	68-134		5.32	30	
1,1-Dichloropropylene	9.1		"	10.0		91.0	74-130		4.93	30	
1,2,3-Trichlorobenzene	9.9		"	10.0		98.7	77-140		5.13	30	
1,2,3-Trichloropropane	11		"	10.0		113	79-127		2.35	30	
1,2,4,5-Tetramethylbenzene	9.1		"	10.0		90.6	76-139		3.79	30	
1,2,4-Trichlorobenzene	9.5		"	10.0		94.6	75-141		4.04	30	
1,2,4-Trimethylbenzene	8.9		"	10.0		89.2	78-127		3.85	30	
1,2-Dibromo-3-chloropropane	10		"	10.0		102	60-150		5.88	30	
1,2-Dibromoethane	11		"	10.0		106	86-123		0.566	30	
1,2-Dichlorobenzene	9.2		"	10.0		92.2	79-125		2.46	30	
1,2-Dichloroethane	9.9		"	10.0		98.8	69-133		2.00	30	
1,2-Dichloropropane	8.7		"	10.0		87.4	76-124		0.911	30	
1,3,5-Trimethylbenzene	8.9		"	10.0		89.4	78-128		4.27	30	
1,3-Dichlorobenzene	9.3		"	10.0		93.1	81-124		3.38	30	
1,3-Dichloropropane	9.5		"	10.0		95.0	79-125		2.39	30	
1,4-Dichlorobenzene	9.1		"	10.0		91.2	82-124		3.34	30	
1,4-Dioxane	430		"	210		202	10-177	High Bias	0.846	30	
2,2-Dichloropropane	7.1		"	10.0		71.0	61-139		6.54	30	
2-Butanone	12		"	10.0		123	44-169		2.21	30	
2-Chloroethylvinyl ether	7.9		"	10.0		79.4	10-155		4.91	30	
2-Chlorotoluene	9.1		"	10.0		90.6	74-130		5.06	30	
2-Hexanone	10		"	10.0		101	62-145		4.34	30	
4-Chlorotoluene	8.9		"	10.0		89.0	75-127		3.75	30	
4-Methyl-2-pentanone	10		"	10.0		102	67-137		0.784	30	
Acetone	11		"	10.0		110	29-163		2.34	30	
Acrolein	8.5		"	10.0		84.7	10-217		3.71	30	
Acrylonitrile	12		"	10.0		118	47-158		3.55	30	
Benzene	9.7		"	10.0		96.8	72-134		3.45	30	
Bromobenzene	9.0		"	10.0		89.8	74-129		2.53	30	
Bromochloromethane	9.7		"	10.0		96.9	69-134		2.55	30	
Bromodichloromethane	9.0		"	10.0		90.1	76-127		0.553	30	
Bromoform	9.7		"	10.0		96.7	77-137		0.516	30	
Bromomethane	4.8		"	10.0		47.9	50-156	Low Bias	0.417	30	
Carbon disulfide	9.5		"	10.0		95.1	54-154		5.22	30	
Carbon tetrachloride	10		"	10.0		104	62-145		4.43	30	
Chlorobenzene	9.7		"	10.0		97.0	85-119		2.75	30	
Chloroethane	9.5		"	10.0		94.9	49-143		4.13	30	
Chloroform	9.9		"	10.0		99.3	74-131		3.66	30	
Chloromethane	6.7		"	10.0		66.7	43-134		2.95	30	
cis-1,2-Dichloroethylene	8.8		"	10.0		87.9	73-134		2.58	30	
cis-1,3-Dichloropropylene	8.5		"	10.0		85.2	77-128		1.51	30	
Dibromochloromethane	9.0		"	10.0		90.3	79-130		0.442	30	
Dibromomethane	9.7		"	10.0		96.8	78-128		0.618	30	
Dichlorodifluoromethane	8.3		"	10.0		82.6	38-139		4.15	30	
Ethyl Benzene	9.2		"	10.0		91.6	80-129		2.90	30	



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30514 - EPA 5030B											
LCS Dup (BA30514-BSD1)						Prepared: 01/10/2023 Analyzed: 01/11/2023					
Ethyl Ether	ND	0.50	ug/L				70-130			30	
Ethyl tert-butyl ether (ETBE)	10		"	10.0		99.7	70-130		2.08	30	
Hexachlorobutadiene	9.1		"	10.0		91.4	72-141		3.23	30	
Iodomethane	9.5		"	10.0		94.6	70-130		4.14	30	
Isopropylbenzene	9.5		"	10.0		94.9	76-128		3.42	30	
Methyl Methacrylate	9.9		"	10.0		99.0	70-130		2.25	30	
Methyl tert-butyl ether (MTBE)	10		"	10.0		101	64-142		1.86	30	
Methylene chloride	8.5		"	10.0		85.3	56-142		3.46	30	
Naphthalene	11		"	10.0		111	79-144		2.66	30	
n-Butylbenzene	8.2		"	10.0		81.8	74-132		5.12	30	
n-Propylbenzene	9.2		"	10.0		91.6	72-135		4.17	30	
o-Xylene	9.2		"	10.0		92.2	81-123		1.61	30	
p- & m- Xylenes	18		"	20.0		92.2	79-130		2.89	30	
p-Diethylbenzene	8.4		"	10.0		83.9	77-128		4.31	30	
p-Ethyltoluene	10		"	10.0		100	76-126		3.91	30	
p-Isopropyltoluene	9.3		"	10.0		93.3	80-127		4.50	30	
sec-Butylbenzene	9.2		"	10.0		91.9	78-127		3.84	30	
Styrene	9.4		"	10.0		93.5	82-124		2.22	30	
tert-Amyl methyl ether (TAME)	10		"	10.0		103	70-130		0.193	30	
tert-Butylbenzene	8.1		"	10.0		81.0	75-131		4.11	30	
Tetrachloroethylene	9.3		"	10.0		92.6	78-133		4.74	30	
Tetrahydrofuran	11		"	10.0		111	70-130		0.451	30	
Toluene	8.8		"	10.0		87.6	83-122		2.70	30	
trans-1,2-Dichloroethylene	9.0		"	10.0		90.1	59-145		4.34	30	
trans-1,3-Dichloropropylene	8.8		"	10.0		88.4	74-131		0.226	30	
Trichloroethylene	8.9		"	10.0		88.9	81-125		3.75	30	
Trichlorofluoromethane	11		"	10.0		110	61-144		2.86	30	
Vinyl acetate	8.4		"	10.0		84.1	32-165		7.99	30	
Vinyl Chloride	7.9		"	10.0		78.9	42-136		5.78	30	
Allyl chloride	9.5		"	10.0		94.8	70-130		5.04	30	
n-butyl acetate	ND	0.50	"				70-130			30	
Chlorodifluoromethane (Freon 22)	ND	0.50	"				70-130			30	
cis-decahydronaphthalene	ND	0.50	"				70-130			30	
trans-decahydronaphthalene	ND	0.50	"				70-130			30	
n-Decane	ND	0.50	"				70-130			30	
Ethyl Methacrylate	9.9		"	10.0		98.8	70-130		0.806	30	
Hexachloroethane	ND	0.50	"				70-130			30	
n-Hexane	ND	0.50	"				70-130			30	
Limonene	ND	0.50	"				70-130			30	
Nitrobenzene	11		"	10.0		110	70-130		15.0	30	
2-Nitropropane	8.0	0.50	"				70-130		2.27	30	
n-Nonane	ND	0.50	"				70-130			30	
n-octane	ND	0.50	"				70-130			30	
n-undecane	ND	0.50	"				70-130			30	
Surrogate: SURR: 1,2-Dichloroethane-d4	10.4		"	10.0		104	65-135				
Surrogate: SURR: Toluene-d8	9.44		"	10.0		94.4	86-118				
Surrogate: SURR: p-Bromofluorobenzene	9.86		"	10.0		98.6	81-114				



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30514 - EPA 5030B											
LCS Dup (BA30514-BSD2)						Prepared: 01/10/2023 Analyzed: 01/11/2023					
1,1,1,2-Tetrachloroethane	ND	0.50	ug/L				70-132			30	
1,1,1-Trichloroethane	ND	0.50	"				68-138			30	
1,1,2,2-Tetrachloroethane	ND	0.50	"				73-132			30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"				67-136			30	
1,1,2-Trichloroethane	ND	0.50	"				79-125			30	
1,1-Dichloroethane	ND	0.50	"				78-128			30	
1,1-Dichloroethylene	ND	0.50	"				68-134			30	
1,1-Dichloropropylene	ND	0.50	"				74-130			30	
1,2,3-Trichlorobenzene	ND	0.50	"				77-140			30	
1,2,3-Trichloropropane	ND	0.50	"				79-127			30	
1,2,4,5-Tetramethylbenzene	ND	0.50	"				76-139			30	
1,2,4-Trichlorobenzene	ND	0.50	"				75-141			30	
1,2,4-Trimethylbenzene	ND	0.50	"				78-127			30	
1,2-Dibromo-3-chloropropane	ND	0.50	"				60-150			30	
1,2-Dibromoethane	ND	0.50	"				86-123			30	
1,2-Dichlorobenzene	ND	0.50	"				79-125			30	
1,2-Dichloroethane	ND	0.50	"				69-133			30	
1,2-Dichloropropane	ND	0.50	"				76-124			30	
1,3,5-Trimethylbenzene	ND	0.50	"				78-128			30	
1,3-Dichlorobenzene	ND	0.50	"				81-124			30	
1,3-Dichloropropane	ND	0.50	"				79-125			30	
1,4-Dichlorobenzene	ND	0.50	"				82-124			30	
1,4-Dioxane	ND	80	"				10-177			30	
2,2-Dichloropropane	ND	0.50	"				61-139			30	
2-Butanone	ND	0.50	"				44-169			30	
2-Chloroethylvinyl ether	ND	20	"				10-155			30	
2-Chlorotoluene	ND	0.50	"				74-130			30	
2-Hexanone	ND	0.50	"				62-145			30	
4-Chlorotoluene	ND	0.50	"				75-127			30	
4-Methyl-2-pentanone	ND	0.50	"				67-137			30	
Acetone	ND	2.0	"				29-163			30	
Acrolein	ND	0.50	"				10-217			30	
Acrylonitrile	ND	0.50	"				47-158			30	
Benzene	ND	0.50	"				72-134			30	
Bromobenzene	ND	0.50	"				74-129			30	
Bromochloromethane	ND	0.50	"				69-134			30	
Bromodichloromethane	ND	0.50	"				76-127			30	
Bromoform	ND	0.50	"				77-137			30	
Bromomethane	ND	0.50	"				50-156			30	
Carbon disulfide	ND	0.50	"				54-154			30	
Carbon tetrachloride	ND	0.50	"				62-145			30	
Chlorobenzene	ND	0.50	"				85-119			30	
Chloroethane	ND	0.50	"				49-143			30	
Chloroform	ND	0.50	"				74-131			30	
Chloromethane	ND	0.50	"				43-134			30	
cis-1,2-Dichloroethylene	ND	0.50	"				73-134			30	
cis-1,3-Dichloropropylene	ND	0.50	"				77-128			30	
Dibromochloromethane	ND	0.50	"				79-130			30	
Dibromomethane	ND	0.50	"				78-128			30	
Dichlorodifluoromethane	ND	0.50	"				38-139			30	
Ethyl Benzene	ND	0.50	"				80-129			30	



Volatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30514 - EPA 5030B

LCS Dup (BA30514-BSD2)

Prepared: 01/10/2023 Analyzed: 01/11/2023

Ethyl Ether	1200	0.50	ug/L				70-130		0.848	30	
Ethyl tert-butyl ether (ETBE)	ND	0.80	"				70-130			30	
Hexachlorobutadiene	ND	0.50	"				72-141			30	
Iodomethane	ND	0.50	"				70-130			30	
Isopropylbenzene	ND	0.50	"				76-128			30	
Methyl Methacrylate	ND	0.50	"				70-130			30	
Methyl tert-butyl ether (MTBE)	ND	0.50	"				64-142			30	
Methylene chloride	ND	2.0	"				56-142			30	
Naphthalene	ND	2.0	"				79-144			30	
n-Butylbenzene	ND	0.50	"				74-132			30	
n-Propylbenzene	ND	0.50	"				72-135			30	
o-Xylene	ND	0.50	"				81-123			30	
p- & m- Xylenes	ND	1.0	"				79-130			30	
p-Diethylbenzene	ND	0.50	"				77-128			30	
p-Ethyltoluene	ND	0.50	"				76-126			30	
p-Isopropyltoluene	ND	0.50	"				80-127			30	
sec-Butylbenzene	ND	0.50	"				78-127			30	
Styrene	ND	0.50	"				82-124			30	
tert-Amyl methyl ether (TAME)	ND	0.80	"				70-130			30	
tert-Butylbenzene	ND	0.50	"				75-131			30	
Tetrachloroethylene	ND	0.50	"				78-133			30	
Tetrahydrofuran	ND	0.50	"				70-130			30	
Toluene	ND	0.50	"				83-122			30	
trans-1,2-Dichloroethylene	ND	0.50	"				59-145			30	
trans-1,3-Dichloropropylene	ND	0.50	"				74-131			30	
Trichloroethylene	ND	0.50	"				81-125			30	
Trichlorofluoromethane	ND	0.50	"				61-144			30	
Vinyl acetate	ND	0.50	"				32-165			30	
Vinyl Chloride	ND	0.50	"				42-136			30	
Allyl chloride	ND	0.50	"				70-130			30	
n-butyl acetate	8.4		"	10.0		84.2	70-130		1.06	30	
Chlorodifluoromethane (Freon 22)	9.5		"	10.0		94.6	70-130		6.15	30	
cis-decahydronaphthalene	21		"	10.0		211	70-130	High Bias	3.59	30	
trans-decahydronaphthalene	10		"	10.0		102	70-130		4.21	30	
n-Decane	6.7	0.50	"				70-130		8.48	30	
Ethyl Methacrylate	ND	0.50	"				70-130			30	
Hexachloroethane	ND	0.50	"				70-130			30	
n-Hexane	12		"	10.0		119	70-130		4.85	30	
Limonene	7.8		"	10.0		78.2	70-130		8.22	30	
Nitrobenzene	ND	0.50	"				70-130			30	
2-Nitropropane	ND	0.50	"				70-130			30	
n-Nonane	10		"	10.0		99.8	70-130		8.45	30	
n-octane	9.2		"	10.0		92.3	70-130		8.11	30	
n-undecane	3.1		"	10.0		31.0	70-130	Low Bias	7.75	30	
Surrogate: SURR: 1,2-Dichloroethane-d4	9.21		"	10.0		92.1	65-135				
Surrogate: SURR: Toluene-d8	10.1		"	10.0		101	86-118				
Surrogate: SURR: p-Bromofluorobenzene	10.1		"	10.0		101	81-114				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30081 - EPA 3510C

Blank (BA30081-BLK1)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Acenaphthene	ND	0.0500	ug/L								
Anthracene	ND	0.0500	"								
Benzo(a)anthracene	ND	0.0500	"								
Benzo(a)pyrene	ND	0.0500	"								
Benzo(b)fluoranthene	ND	0.0500	"								
Benzo(g,h,i)perylene	ND	0.0500	"								
Benzo(k)fluoranthene	ND	0.0500	"								
Chrysene	ND	0.0500	"								
Dibenzo(a,h)anthracene	ND	0.0500	"								
Fluoranthene	ND	0.0500	"								
Fluorene	ND	0.0500	"								
Indeno(1,2,3-cd)pyrene	ND	0.0500	"								
Phenanthrene	ND	0.0500	"								
Pyrene	ND	0.0500	"								
Surrogate: SURR: Nitrobenzene-d5	27.2		"	25.0		109	50.2-113				
Surrogate: SURR: 2-Fluorobiphenyl	21.6		"	25.0		86.4	39.9-105				
Surrogate: SURR: Terphenyl-d14	24.7		"	25.0		98.8	30.7-106				

LCS (BA30081-BS1)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Acenaphthene	18.6	0.0500	ug/L	25.0		74.5	24-114				
Anthracene	20.3	0.0500	"	25.0		81.1	35-114				
Benzo(a)anthracene	20.0	0.0500	"	25.0		80.0	38-127				
Benzo(a)pyrene	19.4	0.0500	"	25.0		77.8	30-146				
Benzo(b)fluoranthene	21.4	0.0500	"	25.0		85.5	36-145				
Benzo(g,h,i)perylene	21.3	0.0500	"	25.0		85.2	10-163				
Benzo(k)fluoranthene	21.7	0.0500	"	25.0		87.0	16-149				
Chrysene	19.9	0.0500	"	25.0		79.6	33-120				
Dibenzo(a,h)anthracene	20.8	0.0500	"	25.0		83.3	10-149				
Fluoranthene	20.6	0.0500	"	25.0		82.6	33-126				
Fluorene	19.6	0.0500	"	25.0		78.6	28-117				
Indeno(1,2,3-cd)pyrene	20.4	0.0500	"	25.0		81.4	10-150				
Phenanthrene	20.4	0.0500	"	25.0		81.4	31-112				
Pyrene	18.3	0.0500	"	25.0		73.2	42-125				
Surrogate: SURR: Nitrobenzene-d5	24.2		"	25.0		96.7	50.2-113				
Surrogate: SURR: 2-Fluorobiphenyl	19.0		"	25.0		76.1	39.9-105				
Surrogate: SURR: Terphenyl-d14	20.4		"	25.0		81.8	30.7-106				



Semivolatile Organic Compounds by GC/MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30081 - EPA 3510C

LCS Dup (BA30081-BSD1)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Acenaphthene	19.4	0.0500	ug/L	25.0		77.7	24-114		4.20	20	
Anthracene	20.8	0.0500	"	25.0		83.1	35-114		2.44	20	
Benzo(a)anthracene	20.6	0.0500	"	25.0		82.3	38-127		2.86	20	
Benzo(a)pyrene	19.7	0.0500	"	25.0		78.8	30-146		1.38	20	
Benzo(b)fluoranthene	21.7	0.0500	"	25.0		86.9	36-145		1.62	20	
Benzo(g,h,i)perylene	21.8	0.0500	"	25.0		87.1	10-163		2.18	20	
Benzo(k)fluoranthene	22.3	0.0500	"	25.0		89.2	16-149		2.54	20	
Chrysene	20.7	0.0500	"	25.0		82.7	33-120		3.85	20	
Dibenzo(a,h)anthracene	21.3	0.0500	"	25.0		85.3	10-149		2.33	20	
Fluoranthene	20.8	0.0500	"	25.0		83.2	33-126		0.724	20	
Fluorene	20.4	0.0500	"	25.0		81.8	28-117		4.04	20	
Indeno(1,2,3-cd)pyrene	20.8	0.0500	"	25.0		83.0	10-150		1.99	20	
Phenanthrene	20.8	0.0500	"	25.0		83.0	31-112		1.95	20	
Pyrene	19.0	0.0500	"	25.0		76.2	42-125		4.02	20	
Surrogate: SURR: Nitrobenzene-d5	25.2		"	25.0		101	50.2-113				
Surrogate: SURR: 2-Fluorobiphenyl	19.8		"	25.0		79.4	39.9-105				
Surrogate: SURR: Terphenyl-d14	21.5		"	25.0		86.1	30.7-106				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30171 - EPA 1633 Prep

Blank (BA30171-BLK1)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Perfluorobutanesulfonic acid (PFBS)	ND	2.00	ng/L								
Perfluorohexanoic acid (PFHxA)	ND	2.00	"								
Perfluoroheptanoic acid (PFHpA)	ND	2.00	"								
Perfluorohexanesulfonic acid (PFHxS)	ND	2.00	"								
Perfluorooctanoic acid (PFOA)	ND	2.00	"								
Perfluorooctanesulfonic acid (PFOS)	ND	2.00	"								
Perfluorononanoic acid (PFNA)	ND	2.00	"								
Perfluorodecanoic acid (PFDA)	ND	2.00	"								
Perfluoroundecanoic acid (PFUnA)	ND	2.00	"								
Perfluorododecanoic acid (PFDoA)	ND	2.00	"								
Perfluorotridecanoic acid (PFTriDA)	ND	2.00	"								
Perfluorotetradecanoic acid (PFTA)	ND	2.00	"								
N-MeFOSAA	ND	2.00	"								
N-EtFOSAA	ND	2.00	"								
Perfluoropentanoic acid (PFPeA)	ND	4.00	"								
Perfluoro-1-octanesulfonamide (FOSA)	ND	2.00	"								
Perfluoro-1-heptanesulfonic acid (PFHpS)	ND	2.00	"								
Perfluoro-1-decanesulfonic acid (PFDS)	ND	2.00	"								
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 F)	ND	8.00	"								
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 F)	ND	8.00	"								
Perfluoro-n-butanoic acid (PFBA)	ND	8.00	"								
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	4.00	"								
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	ND	4.00	"								
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	4.00	"								
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	4.00	"								
Perfluoro-1-pentanesulfonate (PFPeS)	ND	2.00	"								
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 F)	ND	8.00	"								
HFPO-DA (Gen-X)	ND	8.00	"								
11CL-PF3OUdS	ND	8.00	"								
9CL-PF3ONS	ND	8.00	"								
ADONA	ND	8.00	"								
Perfluorododecanesulfonic acid (PFDoS)	ND	2.00	"								
Perfluoro-1-nonanesulfonic acid (PFNS)	ND	2.00	"								
3-Perfluoropropyl propanoic acid (FPrPA)	ND	5.00	"								
3-Perfluoropentyl propanoic acid (FPePA)	ND	25.0	"								
3-Perfluoroheptyl propanoic acid (FHpPA)	ND	25.0	"								
N-MeFOSE	ND	20.0	"								
N-MeFOSA	ND	2.00	"								
N-EtFOSE	ND	20.0	"								
N-EtFOSA	ND	0.200	"								
Surrogate: M3PFBS	51.0		"	46.6		110	25-150				
Surrogate: M5PFHxA	55.0		"	50.0		110	25-150				
Surrogate: M4PFHpA	53.4		"	50.0		107	25-150				
Surrogate: M3PFHxS	57.9		"	47.4		122	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	53.0		"	50.0		106	25-150				
Surrogate: M6PFDA	26.7		"	25.0		107	25-150				
Surrogate: M7PFUdA	22.0		"	25.0		87.9	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	19.0		"	25.0		75.9	25-150				
Surrogate: M2PFTeDA	8.15		"	25.0		32.6	10-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30171 - EPA 1633 Prep

Blank (BA30171-BLK1)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	230		ng/L	200		115	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	57.9		"	47.9		121	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	115		"	100		115	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	46.2		"	50.0		92.4	10-150				
Surrogate: d3-N-MeFOSAA	68.9		"	100		68.9	25-150				
Surrogate: d5-N-EtFOSAA	60.9		"	100		60.9	25-150				
Surrogate: M2-6:2 FTS	82.0		"	95.1		86.2	25-200				
Surrogate: M2-8:2 FTS	77.2		"	96.0		80.5	25-200				
Surrogate: M9PFNA	28.3		"	25.0		113	25-150				
Surrogate: M2-4:2 FTS	74.0		"	93.8		78.9	25-150				
Surrogate: d-N-MeFOSA	33.0		"	50.0		66.1	25-150				
Surrogate: d-N-EtFOSA	46.4		"	50.0		92.9	25-150				
Surrogate: M3HFPO-DA	192		"	200		96.0	25-150				
Surrogate: d9-N-EtFOSE	123		"	500		24.7	25-150				
Surrogate: d7-N-MeFOSE	179		"	500		35.9	25-150				

LCS (BA30171-BS1)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Perfluorobutanesulfonic acid (PFBS)	71.8	2.00	ng/L	70.8		101	50-150				
Perfluorohexanoic acid (PFHxA)	78.5	2.00	"	80.0		98.1	50-150				
Perfluoroheptanoic acid (PFHpA)	88.2	2.00	"	80.0		110	50-150				
Perfluorohexanesulfonic acid (PFHxS)	92.3	2.00	"	73.2		126	50-150				
Perfluorooctanoic acid (PFOA)	81.7	2.00	"	80.0		102	50-150				
Perfluorooctanesulfonic acid (PFOS)	72.6	2.00	"	74.4		97.6	50-150				
Perfluorononanoic acid (PFNA)	70.0	2.00	"	80.0		87.5	50-150				
Perfluorodecanoic acid (PFDA)	83.7	2.00	"	80.0		105	50-150				
Perfluoroundecanoic acid (PFUnA)	95.9	2.00	"	80.0		120	50-150				
Perfluorododecanoic acid (PFDoA)	85.9	2.00	"	80.0		107	50-150				
Perfluorotridecanoic acid (PFTriDA)	117	2.00	"	80.0		147	50-150				
Perfluorotetradecanoic acid (PFTA)	77.8	2.00	"	80.0		97.2	50-150				
N-MeFOSAA	81.3	2.00	"	80.0		102	50-150				
N-EtFOSAA	86.4	2.00	"	80.0		108	50-150				
Perfluoropentanoic acid (PFPeA)	162	4.00	"	160		101	50-150				
Perfluoro-1-octanesulfonamide (FOSA)	89.8	2.00	"	80.0		112	50-150				
Perfluoro-1-heptanesulfonic acid (PFHpS)	80.7	2.00	"	76.4		106	50-150				
Perfluoro-1-decanesulfonic acid (PFDS)	57.3	2.00	"	77.2		74.2	50-150				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 F	304	8.00	"	304		99.9	50-150				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 F	312	8.00	"	307		101	50-150				
Perfluoro-n-butanoic acid (PFBA)	320	8.00	"	320		100	50-150				
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEESA)	158	4.00	"	142		111	50-150				
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	107	4.00	"	160		67.0	50-150				
Perfluoro-4-oxapentanoic acid (PFMPA)	172	4.00	"	160		108	50-150				
Perfluoro-5-oxahexanoic acid (PFMBA)	170	4.00	"	160		106	50-150				
Perfluoro-1-pentanesulfonate (PFPeS)	72.4	2.00	"	75.2		96.2	50-150				
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 F	294	8.00	"	300		98.1	50-150				
HFPO-DA (Gen-X)	162	8.00	"	160		102	50-150				
11CL-PF3OUdS	129	8.00	"	151		85.2	50-150				
9CL-PF3ONS	175	8.00	"	150		117	50-150				
ADONA	172	8.00	"	151		114	50-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30171 - EPA 1633 Prep

LCS (BA30171-BS1)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Perfluorododecanesulfonic acid (PFDoS)	34.6	2.00	ng/L	77.6		44.6	50-150	Low Bias			
Perfluoro-1-nonanesulfonic acid (PFNS)	83.4	2.00	"	76.8		109	50-150				
3-Perfluoropropyl propanoic acid (FPrPA)	383	5.00	"	320		120	50-150				
3-Perfluoropentyl propanoic acid (FPePA)	2150	25.0	"	1600		134	50-150				
3-Perfluoroheptyl propanoic acid (FHpPA)	2340	25.0	"	1600		146	50-150				
N-MeFOSE	799	20.0	"	800		99.9	50-150				
N-MeFOSA	91.2	2.00	"	80.0		114	50-150				
N-EtFOSE	850	20.0	"	800		106	50-150				
N-EtFOSA	64.0	0.200	"	80.0		80.0	50-150				
Surrogate: M3PFBS	49.1		"	46.6		105	25-150				
Surrogate: M5PFHxA	55.7		"	50.0		111	25-150				
Surrogate: M4PFHpA	49.4		"	50.0		98.9	25-150				
Surrogate: M3PFHxS	56.8		"	47.4		120	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	47.8		"	50.0		95.7	25-150				
Surrogate: M6PFDA	23.9		"	25.0		95.7	25-150				
Surrogate: M7PFUdA	17.9		"	25.0		71.5	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	15.0		"	25.0		60.2	25-150				
Surrogate: M2PFTeDA	7.96		"	25.0		31.9	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	219		"	200		110	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	54.0		"	47.9		113	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	110		"	100		110	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	41.3		"	50.0		82.7	10-150				
Surrogate: d3-N-MeFOSAA	68.0		"	100		68.0	25-150				
Surrogate: d5-N-EtFOSAA	60.2		"	100		60.2	25-150				
Surrogate: M2-6:2 FTS	88.5		"	95.1		93.0	25-200				
Surrogate: M2-8:2 FTS	83.0		"	96.0		86.5	25-200				
Surrogate: M9PFNA	26.7		"	25.0		107	25-150				
Surrogate: M2-4:2 FTS	77.9		"	93.8		83.0	25-150				
Surrogate: d-N-MeFOSA	29.0		"	50.0		58.0	25-150				
Surrogate: d-N-EtFOSA	45.2		"	50.0		90.4	25-150				
Surrogate: M3HFPO-DA	208		"	200		104	25-150				
Surrogate: d9-N-EtFOSE	119		"	500		23.9	25-150				
Surrogate: d7-N-MeFOSE	174		"	500		34.8	25-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BA30171 - EPA 1633 Prep											
LCS (BA30171-BS2)						Prepared: 01/05/2023 Analyzed: 01/09/2023					
Perfluorobutanesulfonic acid (PFBS)	7.40	2.00	ng/L	7.08		105	50-150				
Perfluorohexanoic acid (PFHxA)	7.50	2.00	"	8.00		93.7	50-150				
Perfluoroheptanoic acid (PFHpA)	7.72	2.00	"	8.00		96.6	50-150				
Perfluorohexanesulfonic acid (PFHxS)	9.38	2.00	"	7.32		128	50-150				
Perfluorooctanoic acid (PFOA)	7.92	2.00	"	8.00		99.1	50-150				
Perfluorooctanesulfonic acid (PFOS)	8.39	2.00	"	7.44		113	50-150				
Perfluorononanoic acid (PFNA)	6.11	2.00	"	8.00		76.4	50-150				
Perfluorodecanoic acid (PFDA)	8.30	2.00	"	8.00		104	50-150				
Perfluoroundecanoic acid (PFUnA)	8.15	2.00	"	8.00		102	50-150				
Perfluorododecanoic acid (PFDoA)	6.98	2.00	"	8.00		87.3	50-150				
Perfluorotridecanoic acid (PFTriDA)	13.4	2.00	"	8.00		167	50-150	High Bias			
Perfluorotetradecanoic acid (PFTA)	7.43	2.00	"	8.00		92.9	50-150				
N-MeFOSAA	7.13	2.00	"	8.00		89.2	50-150				
N-EtFOSAA	8.95	2.00	"	8.00		112	50-150				
Perfluoropentanoic acid (PFPeA)	16.1	4.00	"	16.0		100	50-150				
Perfluoro-1-octanesulfonamide (FOSA)	8.39	2.00	"	8.00		105	50-150				
Perfluoro-1-heptanesulfonic acid (PFHpS)	7.74	2.00	"	7.64		101	50-150				
Perfluoro-1-decanesulfonic acid (PFDS)	5.42	2.00	"	7.72		70.2	50-150				
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 F)	31.7	8.00	"	30.4		104	50-150				
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 F)	35.3	8.00	"	30.7		115	50-150				
Perfluoro-n-butanoic acid (PFBA)	30.7	8.00	"	32.0		95.8	50-150				
Perfluoro(2-ethoxyethane)sulfonic acid (PFEEA)	15.9	4.00	"	14.2		112	50-150				
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	9.56	4.00	"	16.0		59.7	50-150				
Perfluoro-4-oxapentanoic acid (PFMPA)	17.3	4.00	"	16.0		108	50-150				
Perfluoro-5-oxahexanoic acid (PFMBA)	16.8	4.00	"	16.0		105	50-150				
Perfluoro-1-pentanesulfonate (PFPeS)	7.69	2.00	"	7.52		102	50-150				
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 F)	33.6	8.00	"	30.0		112	50-150				
HFPO-DA (Gen-X)	15.6	8.00	"	16.0		97.5	50-150				
11CL-PF3OUdS	12.2	8.00	"	15.1		80.9	50-150				
9CL-PF3ONS	17.0	8.00	"	15.0		114	50-150				
ADONA	18.2	8.00	"	15.1		120	50-150				
Perfluorododecanesulfonic acid (PFDoS)	3.01	2.00	"	7.76		38.9	50-150	Low Bias			
Perfluoro-1-nonanesulfonic acid (PFNS)	9.23	2.00	"	7.68		120	50-150				
3-Perfluoropropyl propanoic acid (FPrPA)	38.2	5.00	"	32.0		119	50-150				
3-Perfluoropentyl propanoic acid (FPePA)	211	25.0	"	160		132	50-150				
3-Perfluoroheptyl propanoic acid (FHpPA)	227	25.0	"	160		142	50-150				
N-MeFOSE	70.4	20.0	"	80.0		88.1	50-150				
N-MeFOSA	8.40	2.00	"	8.00		105	50-150				
N-EtFOSE	86.0	20.0	"	80.0		108	50-150				
N-EtFOSA	27.9	0.200	"	8.00		349	50-150	High Bias			
Surrogate: M3PFBS	47.5		"	46.6		102	25-150				
Surrogate: M5PFHxA	57.9		"	50.0		116	25-150				
Surrogate: M4PFHpA	54.0		"	50.0		108	25-150				
Surrogate: M3PFHxS	53.4		"	47.4		113	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	50.9		"	50.0		102	25-150				
Surrogate: M6PFDA	26.2		"	25.0		105	25-150				
Surrogate: M7PFUdA	23.0		"	25.0		91.8	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	19.6		"	25.0		78.4	25-150				
Surrogate: M2PFTeDA	6.01		"	25.0		24.1	10-150				



PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30171 - EPA 1633 Prep

LCS (BA30171-BS2)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	222		ng/L	200		111	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	53.0		"	47.9		111	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	114		"	100		114	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	45.4		"	50.0		90.8	10-150				
Surrogate: d3-N-MeFOSAA	64.3		"	100		64.3	25-150				
Surrogate: d5-N-EtFOSAA	56.4		"	100		56.4	25-150				
Surrogate: M2-6:2 FTS	76.7		"	95.1		80.7	25-200				
Surrogate: M2-8:2 FTS	71.0		"	96.0		74.0	25-200				
Surrogate: M9PFNA	29.5		"	25.0		118	25-150				
Surrogate: M2-4:2 FTS	65.3		"	93.8		69.6	25-150				
Surrogate: d-N-MeFOSA	29.2		"	50.0		58.3	25-150				
Surrogate: d-N-EtFOSA	36.1		"	50.0		72.2	25-150				
Surrogate: M3HFPO-DA	206		"	200		103	25-150				
Surrogate: d9-N-EtFOSE	73.7		"	500		14.7	25-150				
Surrogate: d7-N-MeFOSE	122		"	500		24.4	25-150				

Duplicate (BA30171-DUP1)

*Source sample: 22L1383-02 (Duplicate)

Prepared: 01/05/2023 Analyzed: 01/09/2023

Perfluorobutanesulfonic acid (PFBS)	78.9	1.86	ng/L		84.2		6.55	30			
Perfluorohexanoic acid (PFHxA)	447	1.86	"		474		5.83	30			
Perfluoroheptanoic acid (PFHpA)	385	1.86	"		401		3.91	30			
Perfluorooctanoic acid (PFOA)	565	1.86	"		564		0.0754	30			
Perfluorononanoic acid (PFNA)	186	1.86	"		181		3.15	30			
Perfluorodecanoic acid (PFDA)	16.2	1.86	"		18.6		13.6	30			
Perfluoroundecanoic acid (PFUnA)	51.5	1.86	"		53.5		3.92	30			
Perfluorododecanoic acid (PFDoA)	ND	1.86	"		ND			30			
Perfluorotridecanoic acid (PFTriDA)	1.06	1.86	"		ND			30			
Perfluorotetradecanoic acid (PFTA)	ND	1.86	"		ND			30			
N-MeFOSAA	ND	1.86	"		ND			30			
N-EtFOSAA	ND	1.86	"		ND			30			
Perfluoropentanoic acid (PFPeA)	679	3.72	"		692		1.86	30			
Perfluoro-1-octanesulfonamide (FOSA)	8.51	1.86	"		8.03		5.78	30			
Perfluoro-1-heptanesulfonic acid (PFHpS)	78.8	1.86	"		80.6		2.28	30			
Perfluoro-1-decanesulfonic acid (PFDS)	ND	1.86	"		ND			30			
1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 F)	258	7.44	"		265		2.81	30			
1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 F)	42.5	7.44	"		37.3		13.0	30			
Perfluoro-n-butanoic acid (PFBA)	165	7.44	"		167		1.21	30			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	3.72	"		ND			30			
Perfluoro-3,6-dioxahexanoic acid (NFDHA)	ND	3.72	"		ND			30			
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	3.72	"		ND			30			
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	3.72	"		ND			30			
Perfluoro-1-pentanesulfonate (PFPeS)	171	1.86	"		188		9.45	30			
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 F)	ND	7.44	"		ND			30			
HFPO-DA (Gen-X)	ND	7.44	"		3.36			30			
11CL-PF3OUdS	ND	7.44	"		ND			30			
9CL-PF3ONS	ND	7.44	"		ND			30			
ADONA	ND	7.44	"		ND			30			
Perfluorododecanesulfonic acid (PFDoS)	ND	1.86	"		ND			30			
Perfluoro-1-nonanesulfonic acid (PFNS)	1.80	1.86	"		1.25		35.6	30			Non-dir.





PFAS Target compounds by LC/MS-MS - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30171 - EPA 1633 Prep

Duplicate (BA30171-DUP1)		*Source sample: 22L1383-02 (Duplicate)				Prepared: 01/05/2023 Analyzed: 01/09/2023					
3-Perfluoropropyl propanoic acid (FPrPA)	ND	4.65	ng/L		ND					30	
3-Perfluoropentyl propanoic acid (FPePA)	ND	23.3	"		ND					30	
3-Perfluoroheptyl propanoic acid (FHpPA)	ND	23.3	"		ND					30	
N-MeFOSE	ND	18.6	"		ND					30	
N-MeFOSA	ND	1.86	"		ND					30	
N-EtFOSE	ND	18.6	"		ND					30	
N-EtFOSA	ND	0.186	"		ND					30	
Surrogate: M3PFBS	51.0		"	43.4		118	25-150				
Surrogate: M5PFHxA	44.8		"	46.5		96.3	25-150				
Surrogate: M4PFHpA	40.2		"	46.5		86.4	25-150				
Surrogate: M3PFHxS	46.8		"	44.1		106	25-150				
Surrogate: Perfluoro-n-[13C8]octanoic acid (M8PFOA)	44.3		"	46.5		95.2	25-150				
Surrogate: M6PFDA	20.9		"	23.3		89.8	25-150				
Surrogate: M7PFUdA	16.8		"	23.3		72.2	25-150				
Surrogate: Perfluoro-n-[1,2-13C2]dodecanoic acid (MPFDoA)	13.7		"	23.3		58.8	25-150				
Surrogate: M2PFTeDA	7.92		"	23.3		34.0	10-150				
Surrogate: Perfluoro-n-[13C4]butanoic acid (MPFBA)	196		"	186		105	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonic acid (M8PFOS)	47.3		"	44.6		106	25-150				
Surrogate: Perfluoro-n-[13C5]pentanoic acid (M5PFPeA)	94.8		"	93.1		102	25-150				
Surrogate: Perfluoro-1-[13C8]octanesulfonamide (M8FOSA)	58.8		"	46.5		126	10-150				
Surrogate: d3-N-MeFOSAA	93.1		"	93.1		100	25-150				
Surrogate: d5-N-EtFOSAA	84.9		"	93.1		91.2	25-150				
Surrogate: M2-6:2 FTS	83.9		"	88.5		94.8	25-200				
Surrogate: M2-8:2 FTS	80.0		"	89.3		89.5	25-200				
Surrogate: M9PFNA	26.6		"	23.3		114	25-150				
Surrogate: M2-4:2 FTS	126		"	87.3		145	25-150				
Surrogate: d-N-MeFOSA	37.8		"	46.5		81.3	25-150				
Surrogate: d-N-EtFOSA	43.3		"	46.5		93.1	25-150				
Surrogate: M3HFPO-DA	169		"	186		91.0	25-150				
Surrogate: d9-N-EtFOSE	111		"	465		23.9	25-150				
Surrogate: d7-N-MeFOSE	187		"	465		40.3	25-150				



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30096 - EPA 3015A

Blank (BA30096-BLK1)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Arsenic	ND	0.017	mg/L
Barium	ND	0.028	"
Beryllium	ND	0.0006	"
Cadmium	ND	0.003	"
Chromium	ND	0.006	"
Copper	ND	0.022	"
Lead	ND	0.006	"
Nickel	ND	0.011	"
Selenium	ND	0.028	"
Silver	ND	0.006	"

LCS (BA30096-BS1)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Arsenic	1.68	ug/mL	2.00	84.1	80-120
Barium	1.97	"	2.00	98.6	80-120
Beryllium	0.048	"	0.0500	95.5	80-120
Cadmium	0.044	"	0.0500	87.1	80-120
Chromium	0.189	"	0.200	94.3	80-120
Copper	0.244	"	0.250	97.7	80-120
Lead	0.442	"	0.500	88.5	80-120
Nickel	0.489	"	0.500	97.9	80-120
Selenium	1.48	"	2.00	74.0	80-120 Low Bias
Silver	0.046	"	0.0500	91.1	80-120

Duplicate (BA30096-DUP1)

*Source sample: 23A0046-02 (ST_001)

Prepared: 01/04/2023 Analyzed: 01/05/2023

Arsenic	ND	0.017	mg/L	ND	20
Barium	0.031	0.028	"	0.033	5.26 20
Beryllium	ND	0.0006	"	ND	20
Cadmium	ND	0.003	"	ND	20
Chromium	ND	0.006	"	ND	20
Copper	0.099	0.022	"	0.103	4.46 20
Lead	ND	0.006	"	ND	20
Nickel	ND	0.011	"	ND	20
Selenium	ND	0.028	"	ND	20
Silver	ND	0.006	"	ND	20



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30096 - EPA 3015A

Matrix Spike (BA30096-MS1)		*Source sample: 23A0046-02 (ST_001)					Prepared: 01/04/2023 Analyzed: 01/05/2023				
Arsenic	1.91	0.017	mg/L	2.22	ND	86.1	75-125				
Barium	2.20	0.028	"	2.22	0.033	97.5	75-125				
Beryllium	0.053	0.0006	"	0.0556	ND	96.2	75-125				
Cadmium	0.047	0.003	"	0.0556	ND	85.2	75-125				
Chromium	0.209	0.006	"	0.222	ND	93.9	75-125				
Copper	0.378	0.022	"	0.278	0.103	98.8	75-125				
Lead	0.465	0.006	"	0.556	ND	83.6	75-125				
Nickel	0.536	0.011	"	0.556	ND	96.4	75-125				
Selenium	1.60	0.028	"	2.22	ND	71.8	75-125	Low Bias			
Silver	0.051	0.006	"	0.0556	ND	92.0	75-125				

Post Spike (BA30096-PS1)		*Source sample: 23A0046-02 (ST_001)					Prepared: 01/04/2023 Analyzed: 01/05/2023				
Arsenic	0.250		ug/mL	2.00	-0.003	12.5	75-125	Low Bias			
Barium	0.281		"	2.00	0.030	12.6	75-125	Low Bias			
Beryllium	0.007		"	0.0500	-0.00001	13.0	75-125	Low Bias			
Cadmium	0.007		"	0.0500	0.0004	12.6	75-125	Low Bias			
Chromium	0.027		"	0.200	0.002	12.4	75-125	Low Bias			
Copper	0.123		"	0.250	0.093	12.0	75-125	Low Bias			
Lead	0.061		"	0.500	0.004	11.6	75-125	Low Bias			
Nickel	0.072		"	0.500	0.002	13.9	75-125	Low Bias			
Selenium	0.216		"	2.00	0.021	9.78	75-125	Low Bias			
Silver	0.005		"	0.0500	-0.002	9.27	75-125	Low Bias			



Mercury by EPA 7000/200 Series Methods - Quality Control Data

York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BA30070 - EPA SW846-7470A

Blank (BA30070-BLK1)

Prepared & Analyzed: 01/03/2023

Mercury ND 0.0002 mg/L

LCS (BA30070-BS1)

Prepared & Analyzed: 01/03/2023

Mercury 0.0020643 0.0002 mg/L 0.00200 103 80-120

LCS (BA30070-BS2)

Prepared & Analyzed: 01/03/2023

Mercury 0.0021167 0.0002 mg/L 0.00200 106 80-120



Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
23A0046-01	GT_001	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
23A0046-02	ST_001	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C



Sample and Data Qualifiers Relating to This Work Order

S-08	The recovery of this surrogate was outside of QC limits.
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
M-SPKM	The spike recovery is not within acceptance windows due to sample non-homogeneity, or matrix interference.
M-BS	The recovery for this element in the batch blank spike recovered slightly outside of control limits
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL/LOD) or in the case of a TIC, the result is an estimated concentration.
EXT-EM	The sample exhibited emulsion formation during the extraction process. This may affect surrogate recoveries.
EXT-D	The sample submitted contained sediment. The aqueous portion was decanted off, the volume measured and used for the extraction. The sediment was not included in the extraction.
CCVE	The value reported is ESTIMATED. The value is estimated due to its behavior during continuing calibration verification (>20% Difference for average Rf or >20% Drift for quadratic fit).

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.



If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.



Technical Report

prepared for:

P.W. Grosser Consulting

630 Johnson Ave, Suite 7

Bohemia NY, 11716

Attention: Derek Ersbak

Report Date: 03/01/2023

Client Project ID: BRK2201 Brookhaven Calabro Airport

York Project (SDG) No.: 23B1323

CT Cert. No. PH-0723

New Jersey Cert. No. CT005 and NY037



New York Cert. Nos. 10854 and 12058

PA Cert. No. 68-04440

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STRATFORD, CT 06615
(203) 325-1371



132-02 89th AVENUE
FAX (203) 357-0166

RICHMOND HILL, NY 11418
ClientServices@yorklab.com

Report Date: 03/01/2023
Client Project ID: BRK2201 Brookhaven Calabro Airport
York Project (SDG) No.: 23B1323

P.W. Grosser Consulting
630 Johnson Ave, Suite 7
Bohemia NY, 11716
Attention: Derek Ersbak

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on February 24, 2023 and listed below. The project was identified as your project: **BRK2201 Brookhaven Calabro Airport**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

<u>York Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Collected</u>	<u>Date Received</u>
23B1323-01	LP_002	Soil	02/24/2023	02/24/2023
23B1323-02	LP_003	Soil	02/24/2023	02/24/2023

General Notes for York Project (SDG) No.: 23B1323

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Date: 03/01/2023

Cassie L. Mosher
Laboratory Manager





Sample Information

Client Sample ID: LP_002

York Sample ID: 23B1323-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23B1323

BRK2201 Brookhaven Calabro Airport

Soil

February 24, 2023 10:40 am

02/24/2023

Chromium, TCLP by EPA 6010

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3015A/1311

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	ND		mg/L	0.125	1	EPA 6010D/1311 Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	03/01/2023 08:50	03/01/2023 12:24	CW

Lead TCLP by EPA 6010

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3015A/1311

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-92-1	Lead	ND		mg/L	0.125	1	EPA 6010D/1311 Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	03/01/2023 08:50	03/01/2023 12:24	CW

TCLP Extraction for METALS EPA 1311

Log-in Notes:

Sample Notes: EXT-Temp

Sample Prepared by Method: EPA SW 846-1311 TCLP ext. for metals

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	TCLP Extraction	Completed		N/A	1.00	1	EPA 1311 Certifications: NELAC-NY10854,CTDOH-PH-0723,NJDEP,PADEP	02/27/2023 10:43	02/28/2023 10:12	TAJ

Sample Information

Client Sample ID: LP_003

York Sample ID: 23B1323-02

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23B1323

BRK2201 Brookhaven Calabro Airport

Soil

February 24, 2023 10:00 am

02/24/2023

Lead TCLP by EPA 6010

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3015A/1311

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-92-1	Lead	ND		mg/L	0.125	1	EPA 6010D/1311 Certifications: CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP	03/01/2023 08:50	03/01/2023 12:27	CW

TCLP Extraction for METALS EPA 1311

Log-in Notes:

Sample Notes: EXT-Temp

Sample Prepared by Method: EPA SW 846-1311 TCLP ext. for metals

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	TCLP Extraction	Completed		N/A	1.00	1	EPA 1311 Certifications: NELAC-NY10854,CTDOH-PH-0723,NJDEP,PADEP	02/27/2023 10:43	02/28/2023 10:12	TAJ



Analytical Batch Summary

Batch ID: BB31645 **Preparation Method:** EPA SW 846-1311 TCLP ext. for metals **Prepared By:** LC

YORK Sample ID	Client Sample ID	Preparation Date
23B1323-01	LP_002	02/27/23
23B1323-02	LP_003	02/27/23
BB31645-BLK1	Blank	02/27/23

Batch ID: BC30026 **Preparation Method:** EPA 3015A/1311 **Prepared By:** MCS

YORK Sample ID	Client Sample ID	Preparation Date
23B1323-01	LP_002	03/01/23
23B1323-02	LP_003	03/01/23
BC30026-BLK1	Blank	03/01/23
BC30026-BS1	LCS	03/01/23
BC30026-DUP1	Duplicate	03/01/23
BC30026-LBK1	Leach Fluid Blank	03/01/23
BC30026-MS1	Matrix Spike	03/01/23
BC30026-PS1	Post Spike	03/01/23



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BC30026 - EPA 3015A/1311											
Blank (BC30026-BLK1)						Prepared & Analyzed: 03/01/2023					
Chromium	ND	0.00556	mg/L								
Lead	ND	0.00556	"								
LCS (BC30026-BS1)						Prepared & Analyzed: 03/01/2023					
Chromium	0.182		ug/mL	0.200		90.8	80-120				
Lead	0.441		"	0.500		88.3	80-120				
Duplicate (BC30026-DUP1)						*Source sample: 23B1323-02 (LP_003) Prepared & Analyzed: 03/01/2023					
Chromium	ND	0.125	mg/L		ND					20	
Lead	ND	0.125	"		ND					20	
Leach Fluid Blank (BC30026-LBK1)						Prepared & Analyzed: 03/01/2023					
Chromium	ND	0.125	mg/L								
Lead	ND	0.125	"								
Matrix Spike (BC30026-MS1)						*Source sample: 23B1323-02 (LP_003) Prepared & Analyzed: 03/01/2023					
Chromium	4.55	0.125	mg/L	5.00	ND	91.0	75-125				
Lead	11.4	0.125	"	12.5	ND	90.9	75-125				
Post Spike (BC30026-PS1)						*Source sample: 23B1323-02 (LP_003) Prepared & Analyzed: 03/01/2023					
Chromium	0.197		ug/mL	0.200	0.0000466	98.4	75-125				
Lead	0.506		"	0.500	0.00109	101	75-125				



Leachate Preparations - Quality Control Data
York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag

Batch BB31645 - EPA SW 846-1311 TCLP ext. for metals

Blank (BB31645-BLK1)

Prepared: 02/27/2023 Analyzed: 02/28/2023

TCLP Extraction	Completed	1.00	N/A





Sample and Data Qualifiers Relating to This Work Order

EXT-Temp Extraction temperture slightly exceeded acceptance range.

EXT-COMP Completed

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte .
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence . This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.



Field Chain-of-Custody Record

York Analytical Laboratories, Inc. (YORK)'s Standard Terms & Conditions are listed on the back side of this document.
This document serves as your written authorization for YORK to proceed with the analyses requested below.
Your signature binds you to YORK's Standard Terms & Conditions.

YORK Project No.

73B1323

120 Research Drive Stratford, CT 06615

132-02 89th Ave Queens, NY 11418

clientservices@yorklab.com

www.yorklab.com

800-306-YORK

800-306-9675

Page 1 of 1

YOUR Information		Report To:		Invoice To:		YOUR Project Number		Turn-Around Time	
Company: PWGC	Company:	Company:		Company:		BRK2201		RUSH - Next Day	
Address: 630 Johnson Ave Bohemia, NY 11716	Address:	Address:		Address:				RUSH - Two Day	
Phone: 631-589-6353	Phone:	Phone:		Phone:		YOUR Project Name		RUSH - Three Day	X
Contact: Mike Pecoraro	Contact:	Contact:		Contact:		Brookhaven Calabro Airport		RUSH - Four Day	
E-mail: mpecoraro@progresser.com	E-mail:	E-mail:		E-mail:		YOUR PO#:		Standard (5-7 Day)	

Please print clearly and legibly. All information must be complete.
Samples will not be logged in and the turn-around-time clock will not begin until any questions by YORK are resolved.

Alex Epifanio
alexander.epifanio

Samples Collected by: (print AND sign your name)

Matrix Codes	Samples From	Report / EDD Type (circle selections)	YORK Reg. Comp.
☒ S - soil / solid	New York	☒ Summary Report	Compared to the following Regulation(s): (please fill in)
GW - groundwater	New Jersey	☒ QA Report	
DW - drinking water	Connecticut	NY ASP A Package	
WW - wastewater	Pennsylvania	NY ASP B Package	
O - Oil Other	Other:		

Sample Identification	Sample Matrix	Date/Time Sampled	Analysis Requested	Container Description
LP-003 LP-002	S	2/24/23 10:40	TCLP Chromium, TCLP Lead	Glass Jar 802
LP-003	↓	2/24/23 10:00	↓	↓

Comments:	Preservation: (check all that apply)	Special Instruction
Also email to Derek Ersbak, derek@progresser.com	HCl ___ MeOH ___ HNO3 ___ H2SO4 ___ NaOH ___ ZnAc ___ Ascorbic Acid ___ Other: ___	Field Filtered ___ Lab to Filter ___

Samples Relinquished by / Company		Date/Time		1. Samples Received by / Company		Date/Time		2. Samples Relinquished by / Company		Date/Time	
Alexander Epifanio		2/24/23 1:50 PM		RBH		2/24/23 1:50 PM		K. Sankar		2/24/23 1715	
Samples Received by / Company		Date/Time		3. Samples Relinquished by / Company		Date/Time		3. Samples Received by / Company		Date/Time	
Samples Relinquished by / Company		Date/Time		4. Samples Received by / Company		Date/Time		Samples Received in LAB by		Date/Time Temperature	
								TC/Alin		2/24/23 1715 2.8 Degrees C	



Technical Report

prepared for:

P.W. Grosser Consulting
630 Johnson Avenue, Suite 7
Bohemia NY, 11716
Attention: Michael Pecoraro

Report Date: 03/01/2023
Client Project ID: BRK2201 Brookhaven Calabro Airport
York Project (SDG) No.: 23B1401

CT Cert. No. PH-0723

New Jersey Cert. No. CT005 and NY037



New York Cert. Nos. 10854 and 12058

PA Cert. No. 68-04440

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(203) 325-1371



132-02 89th AVENUE
FAX (203) 357-0166

RICHMOND HILL, NY 11418
ClientServices@yorklab.com

Report Date: 03/01/2023
Client Project ID: BRK2201 Brookhaven Calabro Airport
York Project (SDG) No.: 23B1401

P.W. Grosser Consulting
630 Johnson Avenue, Suite 7
Bohemia NY, 11716
Attention: Michael Pecoraro

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on February 27, 2023 and listed below. The project was identified as your project: **BRK2201 Brookhaven Calabro Airport**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Sample and Analysis Qualifiers section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the Sample and Data Qualifiers Relating to This Work Order section of this report and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

<u>York Sample ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Date Collected</u>	<u>Date Received</u>
23B1401-01	LP-003	Waste Water	02/27/2023	02/27/2023

General Notes for York Project (SDG) No.: 23B1401

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All analyses conducted met method or Laboratory SOP requirements. See the Sample and Data Qualifiers Section for further information.
6. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
7. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.
8. Analyses conducted at York Analytical Laboratories, Inc. Stratford, CT are indicated by NY Cert. No. 10854; those conducted at York Analytical Laboratories, Inc., Richmond Hill, NY are indicated by NY Cert. No. 12058.

Approved By: 

Cassie L. Mosher
Laboratory Manager

Date: 03/01/2023





Sample Information

Client Sample ID: LP-003

York Sample ID: 23B1401-01

York Project (SDG) No.

Client Project ID

Matrix

Collection Date/Time

Date Received

23B1401

BRK2201 Brookhaven Calabro Airport

Waste Water

February 27, 2023 12:15 pm

02/27/2023

Copper by EPA 200.7

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 200.7

CAS No.	Parameter	Result	Flag	Units	Reported to LOQ	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-50-8	Copper	0.0572		mg/L	0.0222	1	EPA 200.7	02/28/2023 12:26	02/28/2023 17:07	CW
							Certifications:	CTDOH-PH-0723,NELAC-NY10854,NJDEP,PADEP		



Analytical Batch Summary

Batch ID: BB31731

Preparation Method: EPA 200.7

Prepared By: cw

YORK Sample ID	Client Sample ID	Preparation Date
23B1401-01	LP-003	02/28/23
BB31731-BLK1	Blank	02/28/23
BB31731-BS1	LCS	02/28/23
BB31731-DUP1	Duplicate	02/28/23
BB31731-MS1	Matrix Spike	02/28/23
BB31731-MS2	Matrix Spike	02/28/23
BB31731-PS1	Post Spike	02/28/23



Metals by ICP - Quality Control Data
York Analytical Laboratories, Inc. - Stratford

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BB31731 - EPA 200.7											
Blank (BB31731-BLK1)								Prepared & Analyzed: 02/28/2023			
Copper	ND	0.0222	mg/L								
LCS (BB31731-BS1)								Prepared & Analyzed: 02/28/2023			
Copper	0.262		ug/mL	0.250		105	85-115				
Duplicate (BB31731-DUP1)		*Source sample: 23B1401-01 (LP-003)						Prepared & Analyzed: 02/28/2023			
Copper	0.0552	0.0222	mg/L		0.0572				3.55	20	
Matrix Spike (BB31731-MS1)		*Source sample: 23B1401-01 (LP-003)						Prepared & Analyzed: 02/28/2023			
Copper	0.354	0.0222	mg/L	0.278	0.0572	107	75-125				
Matrix Spike (BB31731-MS2)		*Source sample: 23B1049-01 (Matrix Spike)						Prepared & Analyzed: 02/28/2023			
Copper	0.271	0.0222	mg/L	0.278	ND	97.6	75-125				
Post Spike (BB31731-PS1)		*Source sample: 23B1401-01 (LP-003)						Prepared & Analyzed: 02/28/2023			
Copper	0.356		ug/mL	0.250	0.0515	122	75-125				



Sample and Data Qualifiers Relating to This Work Order

Definitions and Other Explanations

*	Analyte is not certified or the state of the samples origination does not offer certification for the Analyte.
ND	NOT DETECTED - the analyte is not detected at the Reported to level (LOQ/RL or LOD/MDL)
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
LOQ	LIMIT OF QUANTITATION - the minimum concentration of a target analyte that can be reported within a specified degree of confidence. This is the lowest point in an analyte calibration curve that has been subjected to all steps of the processing/analysis and verified to meet defined criteria. This is based upon NELAC 2009 Standards and applies to all analyses.
LOD	LIMIT OF DETECTION - a verified estimate of the minimum concentration of a substance in a given matrix that an analytical process can reliably detect. This is based upon NELAC 2009 Standards and applies to all analyses conducted under the auspices of EPA SW-846.
MDL	METHOD DETECTION LIMIT - a statistically derived estimate of the minimum amount of a substance an analytical system can reliably detect with a 99% confidence that the concentration of the substance is greater than zero. This is based upon 40 CFR Part 136 Appendix B and applies only to EPA 600 and 200 series methods.
Reported to	This indicates that the data for a particular analysis is reported to either the LOD/MDL, or the LOQ/RL. In cases where the "Reported to" is located above the LOD/MDL, any value between this and the LOQ represents an estimated value which is "J" flagged accordingly. This applies to volatile and semi-volatile target compounds only.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the LOD/MDL, with values between the LOD/MDL and the LOQ being "J" flagged as estimated results.

For analyses by EPA SW-846-8270D, the Limit of Quantitation (LOQ) reported for benzidine is based upon the lowest standard used for calibration and is not a verified LOQ due to this compound's propensity for oxidative losses during extraction/concentration procedures and non-reproducible chromatographic performance.



York Analytical Laboratories, Inc. (YORK)'s Standard Terms & Conditions are listed on the back side of this document.
This document serves as your written authorization for YORK to proceed with the analyses requested below.
Your signature binds you to YORK's Standard Terms & Conditions.

23B1401

Page 1 of

2. Samples Relinquished by / Company 1300 2/27/23 13:00	1. Samples Received by / Company Patty Els York 2/27/23 13:00	3. Samples Relinquished by / Company 1300 2/27/23 13:50	4. Samples Received by / Company Patty Els York 2/27/23 13:50
3. Samples Relinquished by / Company 1500 2/27/23 15:00	2. Samples Received by / Company 1500 2-27-23 15:00	5. Samples Relinquished by / Company 1600 2-27-23 16:00	6. Samples Received by / Company 1600 2-27-23 16:00
5. Samples Relinquished by / Company 1600 2-27-23 16:00	4. Samples Received by / Company 1600 2-27-23 16:00	7. Samples Relinquished by / Company 1600 2-27-23 16:00	8. Samples Received by / Company 1600 2-27-23 16:00

APPENDIX B

Waste Acceptance Letters





Quality Treatment for Hauled-in Waste Waters

1110 Route 109 Lindenhurst, N.Y.
Phone: 631-956-7600 Fax: 631-956-7020
Website: www.ClearFlo.org

March 2, 2023

John Meehan, Commissioner
Town of Brookhaven Department of Public Safety
Town of Brookhaven
1 Independence Hill
Farmingville, New York 11738

Re: Brookhaven Calabro Airport Terminal Building
135 Dawn Drive
Shirley, New York 11967
NYSDEC Site # 152263

Clear Flo Technologies, Inc. has received and reviewed the following documents for the above reference site:

- Interim Remedial Measure Work Plan, prepared by P.W. Grosser Consulting, Inc.
- Notice To Remediate letter, Suffolk County Department of Health Services
- Analytical Reports, prepared by York Analytical Laboratories, Inc.
 - York Job ID: 23B1401 – Waste Characterization Samples
 - York Job ID: 23A0046 – Waste Characterization Samples

This letter serves as approval of up to 15,000 gallons of non-hazardous liquids represented by the samples and information listed above.

This approval is based upon material being accurately represented by all information provided to Clear Flo at this time, including, but not limited to, Waste Profiles, analysis, site diagrams, site history, and sampling plans.

Clear Flo Technologies, Inc. and its subsidiaries would like to thank you for giving us the opportunity to manage this waste stream. Should you have any questions or concerns, please do not hesitate to contact me at 631-956-7600.

Maurice Osman

Maurice Osman
Environmental Compliance Representative



PERMIT
Under the Environmental Conservation Law (ECL)

IDENTIFICATION INFORMATION

Permit Type: Solid Waste Management
Permit ID: 1-4720-02934/00001
Effective Date:

Expiration Date:

Permit Type: Air State Facility
Permit ID: 1-4720-02934/00002
Effective Date:

Expiration Date:

Permit Issued To: CLEAR FLO TECHNOLOGIES INC
1110A ST RTE 109
LINDENHURST, NY 11757

CLEAN & GREEN RECYCLING CORP
1110 A RTE 109
LINDENHURST, NY 11757

Contact: STEVEN MACCHIO
CLEAR FLO TECHNOLOGIES / CLEAN & GREEN RECYCLING INC.
1110 A ROUTE 109
LINDENHURST, NY 11757
(631) 956-7600

Facility: CLEAR FLO TECHNOLOGIES INC
1110 A ST RTE 109
NORTH LINDENHURST, NY 11757

Description:

Clean & Green Recycling will take in yellow, brown, and cake grease and also biosolids to produce a recycled soil amendment product.

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, the General Conditions specified and any Special Conditions included as part of this permit.

Permit Administrator: ROGER EVANS
NYSDEC - SUNY @ STONY BROOK
50 CIRCLE RD
STONY BROOK, NY 11790-3409

Authorized Signature: _____ Date: ____ / ____ / ____



Notification of Other State Permittee Obligations

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification

The permittee expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the compliance permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in any compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit

The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits

The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

Item D: No Right to Trespass or Interfere with Riparian Rights

This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.



LIST OF CONDITIONS

DEC GENERAL CONDITIONS

General Provisions

Facility Inspection by the Department
Relationship of this Permit to Other Department Orders and
Determinations
Applications for permit renewals, modifications and transfers
Permit modifications, suspensions or revocations by the Department

Facility Level

Submission of application for permit modification or renewal -

REGION 1 HEADQUARTERS



DEC GENERAL CONDITIONS
****** General Provisions ******
GENERAL CONDITIONS - Apply to ALL Authorized Permits.

Condition 1: Facility Inspection by the Department

Applicable State Requirement: ECL 19-0305

Item 1.1:

The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71-0301 and SAPA 401(3).

Item 1.2:

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

Item 1.3:

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

Condition 2: Relationship of this Permit to Other Department Orders and Determinations

Applicable State Requirement: ECL 3-0301 (2) (m)

Item 2.1:

Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

Condition 3: Applications for permit renewals, modifications and transfers

Applicable State Requirement: 6 NYCRR 621.11

Item 3.1:

The permittee must submit a separate written application to the Department for renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing.

Item 3.2:

The permittee must submit a renewal application at least 180 days before expiration of permits for Title V Facility Permits, or at least 30 days before expiration of permits for State Facility Permits.

Item 3.3:

Permits are transferrable with the approval of the department unless specifically prohibited by the statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.



Applicable State Requirement: 6 NYCRR 621.13

Item 4.1:

The Department reserves the right to exercise all available authority to modify, suspend, or revoke this permit in accordance with 6NYCRR Part 621. The grounds for modification, suspension or revocation include:

- a) materially false or inaccurate statements in the permit application or supporting papers;
- b) failure by the permittee to comply with any terms or conditions of the permit;
- c) exceeding the scope of the project as described in the permit application;
- d) newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;
- e) noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

****** Facility Level ******

Condition 5: Submission of application for permit modification or renewal - REGION 1 HEADQUARTERS

Applicable State Requirement: 6 NYCRR 621.6 (a)

Item 5.1:

Applications for permit modification or renewal are to be submitted to:

NYSDEC Regional Permit Administrator
Region 1 Headquarters
Division of Environmental Permits
Stony Brook University
50 Circle Road
Stony Brook, NY 11790-3409
(631) 444-0365

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



Permit Under the Environmental Conservation Law (ECL)

ARTICLE 19: AIR POLLUTION CONTROL - AIR STATE FACILITY

PERMIT

IDENTIFICATION INFORMATION

Permit Issued To: CLEAR FLO TECHNOLOGIES INC

1110A ST RTE 109
LINDENHURST, NY 11757

CLEAN & GREEN RECYCLING CORP

1110 A RTE 109
LINDENHURST, NY 11757

Facility: CLEAR FLO TECHNOLOGIES INC
1110 A ST RTE 109
NORTH LINDENHURST, NY 11757

Authorized Activity By Standard Industrial Classification Code:

4952 - SEWERAGE SYSTEMS

4953 - REFUSE SYSTEMS

5191 - FARM SUPPLIES

Permit Effective Date:

Permit Expiration Date:



LIST OF CONDITIONS

FEDERALLY ENFORCEABLE CONDITIONS

Facility Level

- 1 6 NYCRR 201-1.7: Recycling and Salvage
- 2 40CFR 82, Subpart F: Recycling and Emissions Reduction
- 3 6 NYCRR 201-7.1: Facility Permissible Emissions
- *4 6 NYCRR 201-7.1: Capping Monitoring Condition
- 5 6 NYCRR 211.1: Air pollution prohibited
- 6 6 NYCRR 225-1.2: Compliance Demonstration
- 7 6 NYCRR 225-1.2 (b): Compliance Demonstration
- 8 6 NYCRR 225-1.2 (i): Compliance Demonstration
- 9 40CFR 63, Subpart ZZZZ: Applicability

Emission Unit Level

- 10 6 NYCRR 201-7.1: Emission Unit Permissible Emissions

STATE ONLY ENFORCEABLE CONDITIONS

Facility Level

- 11 ECL 19-0301: Contaminant List
- 12 6 NYCRR 201-1.4: Malfunctions and start-up/shutdown activities
- 13 6 NYCRR Subpart 201-5: Emission Unit Definition
- 14 6 NYCRR 201-5.2 (c): Renewal deadlines for state facility permits
- 15 6 NYCRR 201-5.3 (c): Compliance Demonstration
- 16 6 NYCRR 211.2: Visible Emissions Limited
- 17 6 NYCRR 211.2: Compliance Demonstration

Emission Unit Level

- 18 6 NYCRR Subpart 201-5: Emission Point Definition By Emission Unit
- 19 6 NYCRR Subpart 201-5: Process Definition By Emission Unit

NOTE: * preceding the condition number indicates capping.



FEDERALLY ENFORCEABLE CONDITIONS

****** Facility Level ******

NOTIFICATION OF GENERAL PERMITTEE OBLIGATIONS

This section contains terms and conditions which are federally enforceable. Permittees may also have other obligations under regulations of general applicability

Item A: Sealing - 6 NYCRR 200.5

The Commissioner may seal an air contamination source to prevent its operation if compliance with 6 NYCRR Chapter III is not met within the time provided by an order of the Commissioner issued in the case of the violation.

Sealing means labeling or tagging a source to notify any person that operation of the source is prohibited, and also includes physical means of preventing the operation of an air contamination source without resulting in destruction of any equipment associated with such source, and includes, but is not limited to, bolting, chaining or wiring shut control panels, apertures or conduits associated with such source.

No person shall operate any air contamination source sealed by the Commissioner in accordance with this section unless a modification has been made which enables such source to comply with all requirements applicable to such modification.

Unless authorized by the Commissioner, no person shall remove or alter any seal affixed to any contamination source in accordance with this section.

Item B: Acceptable Ambient Air Quality - 6 NYCRR 200.6

Notwithstanding the provisions of 6 NYCRR Chapter III, Subchapter A, no person shall allow or permit any air contamination source to emit air contaminants in quantities which alone or in combination with emissions from other air contamination sources would contravene any applicable ambient air quality standard and/or cause air pollution. In such cases where contravention occurs or may occur, the Commissioner shall specify the degree and/or method of emission control required.

Item C: Maintenance of Equipment - 6 NYCRR 200.7

Any person who owns or operates an air contamination source which is equipped with an emission control device shall operate such device and keep it in a satisfactory state of maintenance and repair in accordance with ordinary and necessary practices, standards and procedures, inclusive of manufacturer's specifications,



required to operate such device effectively.

Item D: Unpermitted Emission Sources - 6 NYCRR 201-1.2

If an existing emission source was subject to the permitting requirements of 6 NYCRR Part 201 at the time of construction or modification, and the owner and/or operator failed to apply for a permit for such emission source then the following provisions apply:

(a) The owner and/or operator must apply for a permit for such emission source or register the facility in accordance with the provisions of Part 201.

(b) The emission source or facility is subject to all regulations that were applicable to it at the time of construction or modification and any subsequent requirements applicable to existing sources or facilities.

Item E: Emergency Defense - 6 NYCRR 201-1.5

An emergency constitutes an affirmative defense to an action brought for noncompliance with emissions limitations or permit conditions for all facilities in New York State.

(a) The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An emergency occurred and that the facility owner and/or operator can identify the cause(s) of the emergency;

(2) The equipment at the permitted facility causing the emergency was at the time being properly operated;

(3) During the period of the emergency the facility owner and/or operator took all reasonable steps to minimize levels of emissions that exceeded the emission standards, or other requirements in the permit; and

(4) The facility owner and/or operator notified the Department within two working days after the event occurred. This notice must contain a description of the emergency, any steps taken to mitigate emissions, and corrective actions taken.

(b) In any enforcement proceeding, the facility owner and/or operator seeking to establish the occurrence of an emergency has the burden of proof.



(c) This provision is in addition to any emergency or upset provision contained in any applicable requirement.

Item F: Recycling and Salvage - 6 NYCRR 201-1.7

Where practical, any person who owns or operates an air contamination source shall recycle or salvage air contaminants collected in an air cleaning device according to the requirements of 6 NYCRR.

Item G: Prohibition of Reintroduction of Collected Contaminants to the Air - 6 NYCRR 201-1.8

No person shall unnecessarily remove, handle, or cause to be handled, collected air contaminants from an air cleaning device for recycling, salvage or disposal in a manner that would reintroduce them to the outdoor atmosphere.

Item H: Proof of Eligibility for Sources Defined as Exempt Activities - 6 NYCRR 201-3.2 (a)

The owner and/or operator of an emission source or unit that is eligible to be exempt, may be required to certify that it operates within the specific criteria described in 6 NYCRR Subpart 201-3. The owner or operator of any such emission source must maintain all required records on-site for a period of five years and make them available to representatives of the Department upon request.

Department representatives must be granted access to any facility which contains emission sources or units subject to 6 NYCRR Subpart 201-3, during normal operating hours, for the purpose of determining compliance with this and any other state and federal air pollution control requirements, regulations, or law.

Item I: Proof of Eligibility for Sources Defined as Trivial Activities - 6 NYCRR 201-3.3 (a)

The owner and/or operator of an emission source or unit that is listed as being trivial in 6 NYCRR Part 201 may be required to certify that it operates within the specific criteria described in 6 NYCRR Subpart 201-3. The owner or operator of any such emission source must maintain all required records on-site for a period of five years and make them available to representatives of the Department upon request. Department representatives must be granted access to any facility which contains emission sources or units subject to 6 NYCRR Subpart 201-3, during normal operating hours, for the purpose of determining compliance with this and any other state and federal air pollution control requirements, regulations, or law.

Item J: Required Emission Tests - 6 NYCRR 202-1.1

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



An acceptable report of measured emissions shall be submitted, as may be required by the Commissioner, to ascertain compliance or noncompliance with any air pollution code, rule, or regulation. Failure to submit a report acceptable to the Commissioner within the time stated shall be sufficient reason for the Commissioner to suspend or deny an operating permit. Notification and acceptable procedures are specified in 6 NYCRR Subpart 202-1.

Item K: Open Fires Prohibitions - 6 NYCRR 215.2

Except as allowed by section 215.3 of 6 NYCRR Part 215, no person shall burn, cause, suffer, allow or permit the burning of any materials in an open fire.

Item L: Permit Exclusion - ECL 19-0305

The issuance of this permit by the Department and the receipt thereof by the Applicant does not and shall not be construed as barring, diminishing, adjudicating or in any way affecting any legal, administrative or equitable rights or claims, actions, suits, causes of action or demands whatsoever that the Department may have against the Applicant for violations based on facts and circumstances alleged to have occurred or existed prior to the effective date of this permit, including, but not limited to, any enforcement action authorized pursuant to the provisions of applicable federal law, the Environmental Conservation Law of the State of New York (ECL) and Chapter III of the Official Compilation of the Codes, Rules and Regulations of the State of New York (NYCRR). The issuance of this permit also shall not in any way affect pending or future enforcement actions under the Clean Air Act brought by the United States or any person.

Item M: Federally Enforceable Requirements - 40 CFR 70.6 (b)

All terms and conditions in this permit required by the Act or any applicable requirement, including any provisions designed to limit a facility's potential to emit, are enforceable by the Administrator and citizens under the Act. The Department has, in this permit, specifically designated any terms and conditions that are not required under the Act or under any of its applicable requirements as being enforceable under only state regulations.

FEDERAL APPLICABLE REQUIREMENTS
The following conditions are federally enforceable.

Condition 1: Recycling and Salvage

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



Effective for entire length of Permit

Applicable Federal Requirement:6 NYCRR 201-1.7

Item 1.1:

Where practical, the owner or operator of an air contamination source shall recycle or salvage air contaminants collected in an air cleaning device according to the requirements of the ECL.

Condition 2: Recycling and Emissions Reduction
Effective for entire length of Permit

Applicable Federal Requirement:40CFR 82, Subpart F

Item 2.1:

The permittee shall comply with all applicable provisions of 40 CFR Part 82.

Condition 3: Facility Permissible Emissions
Effective for entire length of Permit

Applicable Federal Requirement:6 NYCRR 201-7.1

Item 3.1:

The sum of emissions from the emission units specified in this permit shall not equal or exceed the following

Potential To Emit (PTE) rate for each regulated contaminant:

CAS No: 0NY210-00-0

PTE: 49,520 pounds per year

Name: OXIDES OF NITROGEN

Condition 4: Capping Monitoring Condition
Effective for entire length of Permit

Applicable Federal Requirement:6 NYCRR 201-7.1

Item 4.1:

Under the authority of 6 NYCRR Part 201-7, this condition contains an emission cap for the purpose of limiting emissions from the facility, emission unit or process to avoid being subject to the following applicable requirement(s) that the facility, emission unit or process would otherwise be subject to:

6 NYCRR 201-6.1 (b) (3) (iv)

Item 4.2:

Operation of this facility shall take place in accordance with the approved criteria, emission limits, terms, conditions and standards in this permit.

Item 4.3:

The owner or operator of the permitted facility must maintain all required records on-site for a period of five years and make them available to representatives of the Department upon request. Department representatives must be granted access to any facility regulated by this Subpart, during normal operating hours, for the purpose of determining compliance with this and any

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



other state and federal air pollution control requirements, regulations or law.

Item 4.4:

On an annual basis, unless otherwise specified below, beginning one year after the granting of an emissions cap, the responsible official shall provide a certification to the Department that the facility has operated all emission units within the limits imposed by the emission cap. This certification shall include a brief summary of the emissions subject to the cap for that time period and a comparison to the threshold levels that would require compliance with an applicable requirement.

Item 4.5:

The emission of pollutants that exceed the applicability thresholds for an applicable requirement, for which the facility has obtained an emissions cap, constitutes a violation of Part 201 and of the Act.

Item 4.6:

The Compliance Demonstration activity will be performed for the Facility.

Regulated Contaminant(s):

CAS No: 0NY210-00-0 OXIDES OF NITROGEN

Item 4.7:

Compliance Demonstration shall include the following monitoring:

Capping: Yes

Monitoring Type: WORK PRACTICE INVOLVING SPECIFIC
OPERATIONS

Monitoring Description:

Facility total emission of Oxides of Nitrogen (NO_x) will be limited to 24.76 tons per year with a federally enforceable emission cap. The facility wide 12-month rolling NO_x cap of 24.76 tons/yr includes 22.03 tons/yr from the three (3) natural gas and waste oil fired kilns.

Work Practice Type: PROCESS MATERIAL THRUPUT

Process Material: FUEL

Upper Permit Limit: 24.76 tons per year

Monitoring Frequency: MONTHLY

Averaging Method: ANNUAL MAXIMUM ROLLED MONTHLY

Reporting Requirements: ANNUALLY (CALENDAR)

Reports due 30 days after the reporting period.

Subsequent reports are due every 12 calendar month(s).

Condition 5: Air pollution prohibited
Effective for entire length of Permit

Applicable Federal Requirement: 6 NYCRR 211.1

Item 5.1:

No person shall cause or allow emissions of air contaminants to the outdoor atmosphere of such quantity, characteristic or duration which are injurious to human, plant or animal life or to property, or which unreasonably interfere with the comfortable enjoyment of life or property.

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

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Notwithstanding the existence of specific air quality standards or emission limits, this prohibition applies, but is not limited to, any particulate, fume, gas, mist, odor, smoke, vapor, pollen, toxic or deleterious emission, either alone or in combination with others.

**Condition 6: Compliance Demonstration
Effective for entire length of Permit**

Applicable Federal Requirement: 6 NYCRR 225-1.2

Item 6.1:

The Compliance Demonstration activity will be performed for the Facility.

Item 6.2:

Compliance Demonstration shall include the following monitoring:

Monitoring Type: WORK PRACTICE INVOLVING SPECIFIC
OPERATIONS

Monitoring Description:

Owners and/or operators of a stationary combustion installation that fires distillate oil other than number two heating oil are limited to the purchase of distillate oil with 0.0015 percent sulfur by weight or less on or after July 1, 2014 and are limited to the firing of distillate oil including number two heating oil with 0.0015 percent sulfur by weight or less on or after July 1, 2016.

The department will require fuel analyses, information on the quantity of fuel received, fired or sold, and results of stack sampling, stack monitoring, and other procedures to ensure compliance with the provisions of this Subpart. All records must be maintained at the facility for a minimum of five years.

Facility owners subject to this Subpart must submit a written report of the fuel sulfur content exceeding the applicable sulfur-in-fuel limitation, measured emissions exceeding the applicable sulfur-in-fuel limitation, measured emissions exceeding the applicable equivalent emission rate, and the nature and cause of such exceedances if known, for each calendar quarter, within 30 days after the end of any quarterly period in which an exceedance takes place.

Work Practice Type: PARAMETER OF PROCESS MATERIAL

Process Material: DISTILLATES - NUMBER 1 AND NUMBER 2 OIL

Parameter Monitored: SULFUR CONTENT

Upper Permit Limit: .0015 percent by weight

Monitoring Frequency: PER DELIVERY

Averaging Method: MAXIMUM - NOT TO BE EXCEEDED AT ANY
TIME (INSTANTANEOUS/DISCRETE OR GRAB)

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



Reporting Requirements: ANNUALLY (CALENDAR)
Reports due 30 days after the reporting period.
Subsequent reports are due every 12 calendar month(s).

Condition 7: Compliance Demonstration
Effective for entire length of Permit

Applicable Federal Requirement: 6 NYCRR 225-1.2 (b)

Item 7.1:

The Compliance Demonstration activity will be performed for the Facility.

Item 7.2:

Compliance Demonstration shall include the following monitoring:

Monitoring Type: MONITORING OF PROCESS OR CONTROL
DEVICE PARAMETERS AS SURROGATE

Monitoring Description:

Owners and/or operators of any stationary combustion installation that fires either solid fuels or oil in Suffolk County are limited to the firing of solid fuels or oil with a sulfur content of one percent (1%) by weight through June 30, 2014.

The department will require fuel analyses, information on the quantity of fuel received, fired or sold, and results of stack sampling, stack monitoring, and other procedures to ensure compliance with the provisions of this Subpart. All records must be maintained at the facility for a minimum of five years.

Facility owners subject to this Subpart must submit a written report of the fuel sulfur content exceeding the applicable sulfur-in-fuel limitation, measured emissions exceeding the applicable sulfur-in-fuel limitation, measured emissions exceeding the applicable equivalent emission rate, and the nature and cause of such exceedances if known, for each calendar quarter, within 30 days after the end of any quarterly period in which an exceedance takes place.

Work Practice Type: PARAMETER OF PROCESS MATERIAL

Process Material: FUEL

Parameter Monitored: SULFUR CONTENT

Upper Permit Limit: 1.0 percent by weight

Monitoring Frequency: WEEKLY

Averaging Method: MAXIMUM - NOT TO BE EXCEEDED AT ANY
TIME (INSTANTANEOUS/DISCRETE OR GRAB)

Reporting Requirements: ANNUALLY (CALENDAR)

Reports due 30 days after the reporting period.

Subsequent reports are due every 12 calendar month(s).

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



Condition 8: Compliance Demonstration
Effective for entire length of Permit

Applicable Federal Requirement: 6 NYCRR 225-1.2 (i)

Item 8.1:

The Compliance Demonstration activity will be performed for the Facility.

Item 8.2:

Compliance Demonstration shall include the following monitoring:

Monitoring Type: MONITORING OF PROCESS OR CONTROL
DEVICE PARAMETERS AS SURROGATE

Monitoring Description:

Owners and/or operators of any stationary combustion installation that fires waste oil on or after July 1, 2014 are limited to the firing of waste oil with 0.75 percent sulfur by weight or less.

The department will require fuel analyses, information on the quantity of fuel received, fired or sold, and results of stack sampling, stack monitoring, and other procedures to ensure compliance with the provisions of this Subpart. All records must be maintained at the facility for a minimum of five years.

Facility owners subject to this Subpart must submit a written report of the fuel sulfur content exceeding the applicable sulfur-in-fuel limitation, measured emissions exceeding the applicable sulfur-in-fuel limitation, measured emissions exceeding the applicable equivalent emission rate, and the nature and cause of such exceedances if known, for each calendar quarter, within 30 days after the end of any quarterly period in which an exceedance takes place.

Work Practice Type: PARAMETER OF PROCESS MATERIAL

Process Material: WASTE OIL

Parameter Monitored: SULFUR CONTENT

Upper Permit Limit: .75 percent by weight

Monitoring Frequency: WEEKLY

Averaging Method: MAXIMUM - NOT TO BE EXCEEDED AT ANY
TIME (INSTANTANEOUS/DISCRETE OR GRAB)

Reporting Requirements: ANNUALLY (CALENDAR)

Reports due 30 days after the reporting period.

Subsequent reports are due every 12 calendar month(s).

Condition 9: Applicability
Effective for entire length of Permit

Applicable Federal Requirement: 40CFR 63, Subpart ZZZZ

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



Item 9.1:

Facilities that have reciprocating internal combustion engines must comply with applicable portions of 40 CFR 63 subpart ZZZZ.

****** Emission Unit Level ******

**Condition 10: Emission Unit Permissible Emissions
Effective for entire length of Permit**

Applicable Federal Requirement: 6 NYCRR 201-7.1

Item 10.1:

The sum of emissions from all regulated processes specified in this permit for the emission unit cited

shall not exceed the following Potential to Emit (PTE) rates for each regulated contaminant:

Emission Unit: 1-CGKDS

CAS No: 0NY210-00-0

Name: OXIDES OF NITROGEN

PTE(s): 23.2 pounds per hour

44,064 pounds per year



STATE ONLY ENFORCEABLE CONDITIONS

****** Facility Level ******

NOTIFICATION OF GENERAL PERMITTEE OBLIGATIONS

This section contains terms and conditions which are not federally enforceable. Permittees may also have other obligations under regulations of general applicability

Item A: Public Access to Recordkeeping for Facilities With State Facility Permits - 6 NYCRR 201-1.10 (a)

Where facility owners and/or operators keep records pursuant to compliance with the requirements of 6 NYCRR Subpart 201-5.4, and/or the emission capping requirements of 6 NYCRR Subpart 201-7, the Department will make such records available to the public upon request in accordance with 6 NYCRR Part 616 - Public Access to Records. Facility owners and/or operators must submit the records required to comply with the request within sixty working days of written notification by the Department.

Item B: General Provisions for State Enforceable Permit Terms and Condition - 6 NYCRR Part 201-5

Any person who owns and/or operates stationary sources shall operate and maintain all emission units and any required emission control devices in compliance with all applicable Parts of this Chapter and existing laws, and shall operate the facility in accordance with all criteria, emission limits, terms, conditions, and standards in this permit. Failure of such person to properly operate and maintain the effectiveness of such emission units and emission control devices may be sufficient reason for the Department to revoke or deny a permit.

The owner or operator of the permitted facility must maintain all required records on-site for a period of five years and make them available to representatives of the Department upon request. Department representatives must be granted access to any facility regulated by this Subpart, during normal operating hours, for the purpose of determining compliance with this and any other state and federal air pollution control requirements, regulations or law.

STATE ONLY APPLICABLE REQUIREMENTS

The following conditions are state only enforceable.

**Condition 11: Contaminant List
Effective for entire length of Permit**



Applicable State Requirement:ECL 19-0301

Item 11.1:

Emissions of the following contaminants are subject to contaminant specific requirements in this permit(emission limits, control requirements or compliance monitoring conditions).

CAS No: 0NY210-00-0

Name: OXIDES OF NITROGEN

**Condition 12: Malfunctions and start-up/shutdown activities
Effective for entire length of Permit**

Applicable State Requirement:6 NYCRR 201-1.4

Item 12.1:

(a) The facility owner or operator shall take all necessary and appropriate actions to prevent the emission of air pollutants that result in contravention of any applicable emission standard during periods of start-up, shutdown, or malfunction.

(b) The facility owner or operator shall compile and maintain records of all equipment malfunctions, maintenance, or start-up/shutdown activities when they can be expected to result in an exceedance of any applicable emission standard, and shall submit a report of such activities to the department when requested to do so, or when so required by a condition of a permit issued for the corresponding air contamination source. Such reports shall state whether any violations occurred and, if so, whether they were unavoidable, include the time, frequency and duration of the maintenance and/or start-up/shutdown activities, and an estimate of the emission rates of any air contaminants released. Such records shall be maintained for a period of at least five years and made available for review to department representatives upon request. Facility owners or operators subject to continuous stack monitoring and quarterly reporting requirements need not submit additional reports for equipment maintenance or start-up/shutdown activities for the facility to the department.

(c) In the event that emissions of air contaminants in excess of any emission standard in this Subchapter occur due to a malfunction, the facility owner or operator shall compile and maintain records of the malfunction and notify the department as soon as possible during normal working hours, but not later than two working days after becoming aware that the malfunction occurred. When requested by the department, the facility owner or operator shall submit a written report to the department describing the malfunction, the corrective action taken, identification of air contaminants, and an estimate of the emission rates.

(d) The department may also require the owner or operator to include, in reports described under Subdivisions (b) and (c) of this Section, an estimate of the maximum ground level concentration of each air contaminant emitted and the effect of such emissions.

(e) A violation of any applicable emission standard resulting from start-up, shutdown, or malfunction conditions at a permitted or registered facility may not be subject to an enforcement action by the department and/or penalty if the department determines, in its sole discretion, that such a violation was unavoidable. The actions and recordkeeping and reporting requirements listed above must be adhered to in such circumstances.

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



Condition 13: Emission Unit Definition
Effective for entire length of Permit

Applicable State Requirement:6 NYCRR Subpart 201-5

Item 13.1:

The facility is authorized to perform regulated processes under this permit for:

Emission Unit: 1-CGKDS

Emission Unit Description:

Consists of 3 rotary kiln and indirect dryer trains for combusting greasy wastes and drying sludges. Kiln flue gases heat an oil heater that transfers heat to the indirect dryers. The kiln flue gases then pass through a wet scrubber for particulate control prior to being emitted into the atmosphere. Secondary emissions from various tanks, storage areas, and transfer operations are directed to a fabric filter then used as makeup air for the kilns when operating. When the kilns are not operating, these gases go to a carbon filter for odor control prior to release to the atmosphere.

Building(s): 1110A

Condition 14: Renewal deadlines for state facility permits
Effective for entire length of Permit

Applicable State Requirement:6 NYCRR 201-5.2 (c)

Item 14.1:

The owner or operator of a facility having an issued state facility permit shall submit a complete application at least 180 days, but not more than eighteen months, prior to the date of permit expiration for permit renewal purposes.

Condition 15: Compliance Demonstration
Effective for entire length of Permit

Applicable State Requirement:6 NYCRR 201-5.3 (c)

Item 15.1:

The Compliance Demonstration activity will be performed for the Facility.

Item 15.2:

Compliance Demonstration shall include the following monitoring:

Monitoring Type: RECORD KEEPING/MAINTENANCE PROCEDURES

Monitoring Description:

Any reports or submissions required by this permit shall be submitted to the Regional Air Pollution Control Engineer (RAPCE) at the following address:

Division of Air Resources

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



NYS Dept. of Environmental Conservation
Region 1
SUNY at Stony Brook
Building 40
Stony Brook, NY 11790-2356

Reporting Requirements: AS REQUIRED - SEE MONITORING DESCRIPTION

Condition 16: Visible Emissions Limited
Effective for entire length of Permit

Applicable State Requirement:6 NYCRR 211.2

Item 16.1:

Except as permitted by a specific part of this Subchapter and for open fires for which a restricted burning permit has been issued, no person shall cause or allow any air contamination source to emit any material having an opacity equal to or greater than 20 percent (six minute average) except for one continuous six-minute period per hour of not more than 57 percent opacity.

Condition 17: Compliance Demonstration
Effective for entire length of Permit

Applicable State Requirement:6 NYCRR 211.2

Item 17.1:

The Compliance Demonstration activity will be performed for the Facility.

Item 17.2:

Compliance Demonstration shall include the following monitoring:

Monitoring Type: MONITORING OF PROCESS OR CONTROL
DEVICE PARAMETERS AS SURROGATE

Monitoring Description:

Except as permitted by a specific part of Title 6 of the NYCRR, no person shall cause or allow any air contamination source to emit any material having an opacity equal to or greater than 20 percent (six minute average) except for one continuous six-minute period per hour of not more than 57 percent opacity.

Operators of air contamination sources that are not exempt from permitting and where a continuous opacity monitor is not utilized for measuring smoke emissions, shall be required to perform the following:

1) Observe the stack(s) or vent(s) once per day for visible emissions. This observation(s) must be conducted during daylight hours except during adverse weather conditions (fog, rain, or snow).

2) The results of each observation must be recorded in a bound logbook or other format acceptable to the

New York State Department of Environmental Conservation

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Department. The following data must be recorded for each stack:

- weather condition
- was a plume observed?

This logbook must be retained at the facility for five (5) years after the date of the last entry.

3) If the operator observes any visible emissions (other than steam - see below) two consecutive days, then a Method 9 analysis (based upon a 6-minute mean) of the affected emission point(s) must be conducted within two (2) business days of such occurrence. The results of the Method 9 analysis must be recorded in the logbook. The operator must contact the Regional Air Pollution Control Engineer within one (1) business day of performing the Method 9 analysis if the opacity standard is contravened. Upon notification, any corrective actions or future compliance schedules shall be presented to the Department for acceptance.

**** NOTE **** Steam plumes generally form after leaving the top of the stack (this is known as a detached plume). The distance between the stack and the beginning of the detached plume may vary, however, there is (normally) a distinctive distance between the plume and stack. Steam plumes are white in color and have a billowy consistency. Steam plumes dissipate within a short distance of the stack (the colder the air the longer the steam plume will last) and leave no dispersion trail downwind of the stack.

Parameter Monitored: OPACITY

Upper Permit Limit: 57 percent

Monitoring Frequency: AS REQUIRED - SEE PERMIT MONITORING DESCRIPTION

Averaging Method: ONE CONTINUOUS 6-MINUTE PERIOD PER HOUR

Reporting Requirements: ANNUALLY (CALENDAR)

Reports due 30 days after the reporting period.

Subsequent reports are due every 12 calendar month(s).

****** Emission Unit Level ******

**Condition 18: Emission Point Definition By Emission Unit
Effective for entire length of Permit**

Applicable State Requirement: 6 NYCRR Subpart 201-5

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



Item 18.1:

The following emission points are included in this permit for the cited Emission Unit:

Emission Unit: 1-CGKDS

Emission Point: KD001

Height (ft.): 35

Diameter (in.): 18

NYTMN (km.): 4508.354

NYTME (km.): 635.222

Building: 1110A

Emission Point: KD002

Height (ft.): 35

Diameter (in.): 18

NYTMN (km.): 4508.353

NYTME (km.): 635.227

Building: 1110A

Emission Point: KD003

Height (ft.): 35

Diameter (in.): 18

NYTMN (km.): 4508.351

NYTME (km.): 635.232

Building: 1110A

Emission Point: KD004

Height (ft.): 21

Diameter (in.): 24

NYTMN (km.): 4508.35

NYTME (km.): 635.23

Building: 1110A

**Condition 19: Process Definition By Emission Unit
Effective for entire length of Permit**

Applicable State Requirement: 6 NYCRR Subpart 201-5

Item 19.1:

This permit authorizes the following regulated processes for the cited Emission Unit:

Emission Unit: 1-CGKDS

Process: 001

Process Description:

Greasy fuels are combusted in the kilns and the exhaust gases go to an oil heater to recover heat. Gases then go to a wet scrubber before release into the atmosphere. Recovered heat is then transferred to a non-contact indirect dryer to dry the incoming sludges to produce grade A biosolids. Three grease types will fuel the kilns in addition to natural gas.

Process 001 Fuel Type is natural gas only.

Max hours of operation per year = 7200/kiln

Max feed rate per hour = 0.019 MMscf/hr-kiln

Emission Source/Control: RK100 - Combustion

Emission Source/Control: RK200 - Combustion

Emission Source/Control: RK300 - Combustion

Item 19.2:

This permit authorizes the following regulated processes for the cited Emission Unit:

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



Emission Unit: 1-CGKDS

Process: 002

Process Description:

Identical to Process 001 except Process 002 Fuel Type is Yellow Grease.

Max hours of operation per year = 7150/kiln

Max feed rate = 1087lbs/hr-kiln

Total Thruput = 3886 Tons/year

Emission Source/Control: RK100 - Combustion

Emission Source/Control: RK200 - Combustion

Emission Source/Control: RK300 - Combustion

Item 19.3:

This permit authorizes the following regulated processes for the cited Emission Unit:

Emission Unit: 1-CGKDS

Process: 003

Process Description:

Identical to Process 001 except Process 003 Fuel Type is Brown Grease.

Max hours of operation per year = 2385/kiln

Max feed rate = 1548 lbs/hr-kiln

Total Thruput = 1846 Tons/year

Emission Source/Control: RK100 - Combustion

Emission Source/Control: RK200 - Combustion

Emission Source/Control: RK300 - Combustion

Item 19.4:

This permit authorizes the following regulated processes for the cited Emission Unit:

Emission Unit: 1-CGKDS

Process: 004

Process Description:

Identical to Process 001 except Process 004 Fuel Type is Grease Cake.

Max hours of operation per year = 1900/kiln

Max feed rate = 2151 lbs/hr-kiln

Total Thruput = 2043 Tons/year

Emission Source/Control: RK100 - Combustion

Emission Source/Control: RK200 - Combustion

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



Emission Source/Control: RK300 - Combustion

Item 19.5:

This permit authorizes the following regulated processes for the cited Emission Unit:

Emission Unit: 1-CGKDS

Process: 005

Process Description:

Wastewater sludge is dried within the indirect dryer trains. The facility will accept up to 450 Tons/day of wastewater sludges.

Total Thruput:

18.75 Tons/hr

148,500 Tons/year

Emission Source/Control: SD116 - Process

Emission Source/Control: SD216 - Process

Emission Source/Control: SD316 - Process

New York State Department of Environmental Conservation

Permit ID: 1-4720-02934/00002

Facility DEC ID: 1472002934



March 20, 2023

John Meehan, Commissioner
Town of Brookhaven Department of Public Safety
Town of Brookhaven
1 Independence Hill
Farmingville, New York 11738

Re: Brookhaven Calabro Airport Terminal Building
135 Dawn Drive
Shirley, New York 11967
NYSDEC Site # 152263
Approval No: 2023-232

Dale Transfer Corp. has received and reviewed the following documents for the above reference site:

- Interim Remedial Measure Work Plan, prepared by P.W. Grosser Consulting, Inc.
- Notice To Remediate letter, Suffolk County Department of Health Services
- Analytical Reports, prepared by York Analytical Laboratories, Inc.
 - o York Job ID: 22I0650 – Characterization Samples
 - o York Job ID: 22I0909 – Characterization Samples
 - o York Job ID: 23A0038 – Characterization Samples
 - o York Job ID: 23B1323 – Waste Characterization Samples

This letter serves as approval of up to 200 cubic yards of non-hazardous soils represented by the samples listed below:

In-Situ ID	Representative Samples	Facility Accepted [X]
GT_001	23A0038-05	X
ST_001	23A0038-06	X
LP_001	22I0650-01 23A0038-01 & 07	X
LP_002	22I0909-08 23A0038-02 23B1323-01	X
LP_003	22I0909-05 23A0038-03 23B1323-02	X
LP_004	22I0909-04 23A0038-04	X

This approval is based upon material being accurately represented by all information provided to Dale Transfer Corp. at this time, including, but not limited to, Waste Profiles, analysis, site diagrams, site history, and sampling plans.

Dale Transfer Corp. and its subsidiaries would like to thank you for giving us the opportunity to manage this waste stream. Should you have any questions or concerns, please do not hesitate to contact me at 631-393-2882.

Thank you,

Cassandra M. Dragone
Cassandra Dragone
Waste Management Administrator
(631) 393-2882

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Permits, Region 1

SUNY @ Stony Brook, 50 Circle Road, Stony Brook, NY 11790

P: (631) 444-0365 | F: (631) 444-0360

www.dec.ny.gov

February 4, 2021

Richard Spadalik
Dale Transfer Corp.
129 Dale Street
West Babylon, NY 11704

Re: Permit # 1-4720-03277/00001
Dale Transfer Corp., 129 Dale Street, West Babylon
Operate an Existing Solid Waste Management Facility

Dear Permittee:

In conformance with the requirements of the State Uniform Procedures Act (Article 70, ECL) and its implementing regulations (6NYCRR, Part 621) we are enclosing your permit identified above.

Please carefully read all permit conditions and the schedule contained in the permit to ensure compliance during the term of the permit. If you are unable to comply with any conditions, please contact us at the above address.

This permit must be kept available on the premises of the facility at all times.

Sincerely,



Claire Werner
Environmental Analyst II

cc: E. Kempey, Kempey Engineering
J. Zhao, DMM
File



Department of
Environmental
Conservation



PERMIT
Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:
DALE TRANSFER CORP
129 DALE ST
WEST BABYLON, NY 11704
(516) 351-1879

Facility:
DALE TRANSFER CORP
129 DALE ST
WEST BABYLON, NY 11704

Facility Application Contact:
EUGENE G KEMPEY
KEMPEY ENGINEERING
4 BRUNSWICK DR
EAST NORTHPORT, NY 11731
(631) 368-3324

Facility Location: in BABYLON in SUFFOLK COUNTY

Facility Principal Reference Point: NYTM-E: 635.7 NYTM-N: 4510.3
Latitude: 40°43'56.9" Longitude: 73°23'34.8"

Project Location: 129 Dale Street

Authorized Activity: Operate a solid waste management facility authorized to receive and transfer nonhazardous industrial liquid and solid waste, petroleum contaminated liquid and soil, grease trap waste, combustion residues, wastewater treatment waste, septic system cleanout waste, storm drain and catch basin cleanout waste, incidental construction and demolition debris, and other miscellaneous solid waste. Materials will be consolidated and then transferred off site for recycling or disposal at a permitted facility. Waste will not be treated at the facility.

Solid Waste Management Activity No(s):

Transfer Facility

- 52TP0329

Permit Authorizations

Solid Waste Management - Under Article 27, Title 7

Permit ID 1-4720-03277/00001

Renewal

Effective Date: 2/4/2021

Expiration Date: 2/3/2026



NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: SHERRI L AICHER, Deputy Permit Administrator

Address: NYSDEC Region 1 Headquarters
SUNY @ Stony Brook|50 Circle Rd
Stony Brook, NY 11790 -3409

Authorized Signature:

Sherri L. Aicher

Date 2/4 / 2021

Distribution List

EUGENE G KEMPEY
Materials Management
CLAIRE K WERNER

Permit Components

SOLID WASTE MANAGEMENT PERMIT CONDITIONS

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

SOLID WASTE MANAGEMENT PERMIT CONDITIONS

1. Conformance With Plans All activities authorized by this permit must be in strict conformance with the permit application, plans and materials prepared by the permittee or the permittee's consultant on the date(s) specified in Special Condition #2.



2. Terms of Operation, Approval for Changes The facility shall be operated in conformance with:

- a. Terms and conditions of this permit;
- b. Current 6 NYCRR Part 360 Solid Waste Management Facilities regulations or any revisions hereafter promulgated; and
- c. The approved Engineering Report, Operation and Maintenance Manual, and related documents prepared by Kempey Engineering, dated April 28, 2020 and updated site plan dated June 24, 2020.

Any revision to the above approved documents identified in item (c) of this condition or to the operations at this site requires prior written approval from the Department. The permittee must not add a facility component that would otherwise qualify as an exempt or registered facility, unless the permittee first receives a modified permit to incorporate the additional component of the operation.

If any of the above documents conflict with any condition of this permit, the permit condition shall prevail.

3. Authorized Activity The permittee is authorized to receive and transfer:

- a. Nonhazardous industrial liquid waste at a maximum of 12,000,000 gallons annually with no more than 77,000 gallons per day; and
- b. Nonhazardous solid waste, petroleum contaminated soil, and incidental construction and demolition debris at a maximum of 45,000 cubic yards annually with no more than 300 cubic yards per day.

Authorized wastes types are limited to following (as specified in Appendix G of the Engineering Report referenced in Permit Condition No. 2): non-hazardous petroleum contaminated soil and debris, fuel oil and gasoline tank bottom cleanout waste, storm drain and catch basin cleanout waste, septic system cleanout waste, grease trap waste, combustion residues, various water and wastewater treatment waste, incidental construction and demolition debris, and other miscellaneous waste.

4. Construction Requirements

The permittee must install the proposed dewatering pan inside the loading dock in accordance with the Engineering Report, the proposed HP-48 Carbon Filter, and modify the existing PVC piping for the two aboveground storage tanks system, in accordance with the following schedule, unless otherwise approved by the Department:

- a. Within 120 days from the effective date of this permit, the required facility modifications must be completed.
- b. Within 45 days of completing construction, the permittee must submit a Construction Certification Report prepared by a Professional Engineer licensed in New York State.



5. Unacceptable Wastes The permittee is prohibited from accepting the following type(s) of waste: hazardous waste, regulated medical waste, radioactive waste, friable asbestos waste, municipal solid waste, yard trimmings, and waste of unknown origin.

6. Waste Handling The permittee shall comply with the following requirements:

- a. All activities, including but not limited to loading, unloading, sorting, processing, and storage, shall be performed inside the enclosed building.
- b. Any waste containing free liquid must be stored inside the dewatering pan, if not contained in drums. The loading dock must always be kept free of standing water. A minimum of two feet of freeboard must be maintained within the dewatering pan.
- c. Drums containing waste must have a cover and be properly sealed to minimize leakage. Each drum must be labeled with the waste type or description, and the date of receipt.
- d. At the end of each workday the facility and tipping areas shall be cleaned of any solid waste. All overnight storage of solid waste shall be in its respective storage area.
- e. Nonhazardous liquid and solid waste, including petroleum contaminated soil, and incidental uncontaminated construction and demolition debris shall not remain at the facility for more than 30 calendar days from receipt.
- f. Recyclables recovered from uncontaminated construction and demolition debris shall not be at the facility for more than 60 calendar days from receipt.
- g. The high-speed doors, as well as the other doors, must always remain closed, except when personnel, trucks or equipment enter or exit the building.
- h. All incoming and outgoing loads must be free from leaking liquid. All transportation vehicles must be watertight, leak resistant, and, if applicable, covered at all time during transportation.

7. Maximum Quantity Onsite The permittee shall not exceed the following quantities onsite:

- a. 12,824 gallons of nonhazardous liquid waste in the two aboveground storage tanks.
- b. 5,280 gallons in maximum 96 of 55-gallon drums in the drum storage area for either liquid or solid waste.



- c. 464 cubic yards of all other nonhazardous solid waste, including petroleum contaminated soil, and incidental uncontaminated construction and demolition debris.
- d. 20 cubic yards of recyclables recovered from uncontaminated construction and demolition debris.

8. Analytical Sampling Requirements All inbound waste shall be subject to the screening and analytical sampling requirements specified in the approved Waste Acceptance Plan, Engineering Report, and Operations and Maintenance Manual.

9. Hours of Operation Hours of operation shall not conflict with any local laws or ordinances. The permittee shall limit the hours and days of operations from 5 AM to 7 PM, Monday through Saturday. The facility is authorized to operate at times outside these hours when providing emergency response services.

10. Signs The permittee shall post signs showing hours of operation, and indicating that hazardous waste, regulated medical waste, radioactive waste, municipal solid waste, yard waste, and friable asbestos waste are prohibited from being accepted at the facility. The signs shall be located so that they are visible to any vehicles and/or person approaching the facility.

11. Waste Control An attendant shall be on duty during all hours of operation. The attendant shall inspect all vehicles entering the facility, rejecting any loads containing unauthorized material.

12. Control of Nuisance Conditions Odors, dust, insects, vectors, noise, blowing litter and other potential nuisances shall be adequately controlled at all time. The permittee shall immediately implement any controls required by the Department including cessation of facility operations.

13. Fire Protection and Detection The permittee shall maintain fire protection and detection equipment in accordance with local laws and ordinances.

14. Cessation of Operations The permittee shall verbally notify the Department within 18 hours of any occurrence of any event which causes the facility to cease operation for a period of 48 hours or more. Such an event would include a fire, spill, equipment breakdown, or similar event. A written report shall be submitted to the Department within 7 days of the event.

15. Ultimate Disposal of Waste All solid waste passing through the facility must be ultimately disposed of at a facility authorized by the Department if located in New York State, or by the appropriate governmental agency or agencies if in other states, territories, or nations.

16. Unauthorized Waste In the event that any hazardous waste, medical waste, or other regulated waste not allowed under this permit is accepted at the facility, the unauthorized waste shall be contained and properly secured immediately. The permittee shall notify the Department and the Suffolk County Department of Health Services within 24 hours of the event. The waste material shall be removed by a waste transporter authorized under 6 NYCRR Part 364 to transport such waste. A written report shall be submitted to the Department within 7 days of the event.



17. Small Spill Containment The facility shall keep available at the site equipment and materials necessary to contain small quantities of chemicals or spills. These materials shall be stored in well identified accessible storage areas. As a minimum, the following must be available at all times:

- 4 - 55 gallon drums with covers and securing rings
- 400 lbs. absorbent material (e.g. Speedi-Dri)
- 50 lbs. Boric Acid
- 50 lbs. Sodium Bicarbonate
- Assorted brooms, shovels, gloves, masks, and other protective gear

18. Maintenance and Repair of Facility The permittee must maintain the facility in accordance with the following requirements:

- a. No less than on a monthly basis, the permittee must conduct self-inspections of the facility, which includes, but not limited to, tanks and accessories, dewatering pan, secondary containment, and the loading dock. Any deficiencies must be repaired as well as the loading dock must be performed no less than a monthly basis to make sure they are in a good working order.
- b. The permittee shall adequately maintain and make repairs to the facility as necessary. This includes any part of the facility, such as doors to buildings; odor and dust controls and equipment; punctures, holes, or other damage to buildings; minimizing the ponding of stormwater; any leaks to tanks, the dewatering pan, or secondary containment; and concrete and/or asphalt pavement that becomes damaged or worn.
- c. The permittee shall undertake all repairs immediately and have all work completed within one week. Repairs related to dust or odor controls must be completed within 24 hours. If the permittee is unable to complete repairs within the specified time outlined by this condition, the permittee shall provide an acceptable schedule to the Department which shall include a description of the work to be completed and any controls that will be implemented to ensure the facility remains in compliance with this permit, including the cessation of all or part of the facility operations.



19. Recordkeeping Requirements The permittee shall maintain the following records at the facility for 7 years from the date of creation and be available immediately to the Department upon request:

- a. Daily log of waste received and transported from the facility which includes:
 - i. Type, quantity, and origin of the waste received.
 - ii. Quantity and destination of all recyclables.
 - iii. Quantity and destination of all non-recyclables and residuals transported for disposal.
- b. All weight tickets, hauling receipts, disposal receipts, invoices, tracking documents, etc. to support entries made into the daily log.

20. Reporting Requirements The permittee shall submit the original copy of the annual report to the Region 1 Office located at the New York State Department of Environmental Conservation, Division of Materials Management, 50 Circle Road, SUNY @ Stony Brook, NY 11790, and a copy to the Central Office at New York State Department of Environmental Conservation, Division of Materials Management, Bureau of Permitting and Planning, 625 Broadway, 9th Floor, Albany, NY 12233-7253. The report must be submitted no later than March 1 following each year of operation on forms prescribed by or acceptable to the Department.

21. Financial Assurance The permittee shall maintain the financial assurance in the amount of \$278,000. The Department reserves the right to adjust the amount of the financial assurance in the future to account for increases in closure costs, and for non-compliance with any conditions of this permit and any requirement of 6 NYCRR Part 360.

In the event that the permittee fails to maintain financial assurance as required by this permit, the permittee must immediately cease accepting solid waste until financial assurance acceptable to the Department is in place. Within 10 days from the cessation of the required financial assurance, the permittee shall have all solid waste, including recovered recyclables, removed from the facility and the facility shall be in "broom clean" condition.

22. Environmental Monitor The environmental monitor shall be funded in accordance with the following:

- a. The permittee shall fund environmental monitoring services to be performed by or on behalf of the Department. These monitoring services will include, but not be limited to, the scope of work in an annual environmental monitoring work plan which is incorporated by reference and enforceable under this permit.



- b. The permittee shall provide to the Department on an annual basis the funds necessary to support the activities set forth in the annual environmental monitoring work plan. The sum to be provided will be based on the annual budgeted amount and is subject to annual revision. Subsequent annual payments shall be made for the duration of this permit or until the environmental monitoring services are no longer necessary, whichever comes first.
- c. The permittee shall be billed annually, prior to the start of each State Fiscal Year (SFY) (April 1). If this permit is to first become effective subsequent to April 1, the initial bill will be for an amount sufficient to meet the anticipated cost of the environmental monitoring services through the end of the current SFY.
- d. The Department may revise the required annual bill on an annual basis to include all of the Department's estimated costs associated with the environmental monitoring services. The annual revision may take into account such factors as inflation, salary increases, changes in the fringe benefits rate, changes in operating hours and procedures, changes in non-personal service costs (including travel, training, sampling and analytical, and equipment costs, etc.), an increase or decrease in the level of environmental monitoring services necessary, and an increase or decrease in the number of environmental monitors. Upon written request by the permittee, the Department shall provide the permittee with a written explanation of the basis for any revisions.
- e. Prior to making its annual payment, the permittee will receive, and have an opportunity to review and request adjustment to, an annual environmental monitoring work plan that the Department will undertake during the year. The Department will provide a final annual work plan that the Department will undertake during the year.
- f. Payments are to be made in advance of the period in which they will be expended and shall be made in full within 30 days of receiving a bill from the Department. The bill from the Department to the permittee will provide information regarding to whom payments should be made payable and the address to which payments should be sent.
- g. Failure to make the required payments shall be a violation of this permit. The Department reserves all rights to take appropriate action to enforce the above payment provisions.
- h. The environmental monitor shall, when present at any of the permittee's facilities, abide by all of the permittee's health and safety and operational requirements and policies, if such requirements and policies exist and provided they are not inconsistent with Department policies and labor management contracts, and further provided, however, that this shall not be construed as limiting the environmental monitor's powers as otherwise provided for by law and shall not result in the environmental monitor being afforded less protection than otherwise provided to the environmental monitor by State and Federal health and safety requirements.
- i. The environmental monitor shall receive from the permittee all general and site-specific safety training which is normally given to new facility/site employees for all areas of the facility or site. This training will be a supplement to the health and safety training that the environmental monitor routinely receives from the Department.



j. The permittee shall immediately furnish to the environmental monitor any facility/site health and safety and operational requirements and policies. Within five (5) days of any revision to the facility/site health and safety and operational requirements and policies, the permittee shall furnish to the environmental monitor the health and safety and operational requirements and policies.

k. The environmental monitor shall be permitted to use environmental monitoring and data collection devices (e.g., photo ionization detectors, cameras, video recording devices, computers, cell phones, etc.) deemed necessary by the Department to evaluate and document observed conditions. The permittee may request the data and images collected from areas where confidentiality is a concern be considered confidential information if appropriate. Copies of the data or images collected from areas where confidentiality has been determined to be a concern shall be provided to the permittee.

l. It will remain the responsibility of the permittee to contact the Spill Hotline or any Division within the Department regarding any required notification of any spill, release, exceedances etc. Notification to the environmental monitor will not be considered sufficient to replace any required notifications.

GENERAL CONDITIONS - Apply to ALL Authorized Permits:

1. Facility Inspection by The Department The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71- 0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.

2. Relationship of this Permit to Other Department Orders and Determinations Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.



3. Applications For Permit Renewals, Modifications or Transfers The permittee must submit a separate written application to the Department for permit renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing. Submission of applications for permit renewal, modification or transfer are to be submitted to:

Regional Permit Administrator
NYSDEC Region 1 Headquarters
SUNY @ Stony Brook|50 Circle Rd
Stony Brook, NY11790 -3409

4. Submission of Renewal Application The permittee must submit a renewal application at least 180 days before permit expiration for the following permit authorizations: Solid Waste Management.

5. Permit Modifications, Suspensions and Revocations by the Department The Department reserves the right to exercise all available authority to modify, suspend or revoke this permit. The grounds for modification, suspension or revocation include:

- a. materially false or inaccurate statements in the permit application or supporting papers;
- b. failure by the permittee to comply with any terms or conditions of the permit;
- c. exceeding the scope of the project as described in the permit application;
- d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;
- e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

6. Permit Transfer Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.



NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification

The permittee, excepting state or federal agencies, expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under Article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit

The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

Item C: Permittee Responsible for Obtaining Other Required Permits

The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

Item D: No Right to Trespass or Interfere with Riparian Rights

This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

APPENDIX C

Health and Safety Plan



Brookhaven Calabro Airport
135 Dawn Drive
Shirley, NY 11967
District 200, Section 710, Block 1, Lots 1 and 1.6
NYSDEC Site: 152263

HEALTH AND SAFETY PLAN

Submitted To:



New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233

Prepared For:



Town of Brookhaven
1 Independence Hill
Farmingville, NY 11738

Prepared By:



P.W. Grosser Consulting Inc.
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Andrew Lockwood, PG, LEP, Vice President
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PWGC Project #: BRK2005

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JUNE 2021

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FIGURES

Figure 1 Hospital Route Map

APPENDICES

Appendix A	Site Safety Plan Acceptance and Acknowledgement Form
Appendix B	Site Safety Amendment Form
Appendix C	Chemical Safety Data Sheets
Appendix D	Summary of Prohibited and Acceptable Materials
Appendix E	Heat and Cold Stress Safety
Appendix F	Field Accident Report

ACRONYMS

Acronym	Definition
AOC	Area of Concern
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AWQS	Ambient Water Quality Standards
BCP	Brownfield Cleanup Program
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
°C	degrees Celsius
COC	Contaminant of Concern
DER	Department of Environmental Remediation
EDR	Environmental Data Resources
ELAP	Environmental Laboratory Approval Program
ESA	Environmental Site Assessment
°F	Degrees Fahrenheit
FINDS	Facility Index System
FOIA	Freedom of Information Act
GIS	Geographic Information System
LTANKS	Leaking Tanks
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mg/m ³	Milligrams per cubic meter
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
µg/m ³	Micrograms per cubic meter
MSDS	Material Safety Data Sheets (now referred to as SDS)
msl	Mean sea level
NFA	No Further Action
NFRAP	No Further Remedial Action Planned
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCE	Tetrachloroethylene
Ppb	Parts per billion
ppm	Parts per million
RL	Reporting Limit
RSL	Regional Screening Level
SCDHS	Suffolk County Department of Health Services
SCO	Soil Cleanup Objective
SCWA	Suffolk County Water Authority
SDS	Safety Data Sheets

Acronym	Definition
SPDES	State Pollutant Discharge Elimination System
SVOC	Semi-volatile Organic Compound
TAGM	Technical Administrative Guidance Memo
TCE	Trichloroethylene
TOGS	Technical and Operational Guidance Series
UIC	Underground injection control
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds



STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to chemical, biological, and physical hazards during the planned Site Characterization to be performed at the site known as Brookhaven Calabro Airport located at 135 Dawn Drive, Shirley, New York. P.W. Grosser Consulting Inc.'s (PWGC's) policy is to minimize the possibility of work-related exposure through awareness and qualified supervision, health and safety training, medical monitoring, use of appropriate personal protective equipment, and the following activity specific safety protocols contained in this HASP. PWGC has established a guidance program to implement this policy in a manner that protects personnel to the maximum reasonable extent.

This HASP, which applies to persons present at the site actually or potentially exposed to safety or health hazards, describes emergency response procedures for actual and potential physical, biological, and chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy.

1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed by P.W. Grosser Consulting, Inc. (PWGC) at the request of the Town of Brookhaven for the proposed Site Characterization to be performed at the subject property to protect on-site personnel, visitors, and the public from exposure to hazardous materials or wastes. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this HASP, including the attachments, addresses safety and health hazards relating to this phase of the work described in the Site Characterization Work Plan (SCWP) and is based on the best information available. The HASP may be revised by PWGC at the request of the Town of Brookhaven upon receipt of new information regarding site conditions. Changes will be documented by written amendments.

1.1 Site Safety Plan Acceptance, Acknowledgement, and Amendments

The project manager and the site safety officer are responsible for informing personnel entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the HASP. Amendments to the HASP are acknowledged by completing forms included in **Appendix B**.

1.2 Daily Safety Meetings

Each day before work begins; the site safety officer will hold safety (tailgate or tool box) meetings to ensure that on-site personnel understand the site conditions and operating procedures and to address safety questions and concerns. Meeting minutes and attendance will be recorded. Project staff will discuss and remedy health and safety issues at these meetings.

1.3 Key Personnel – Roles and Responsibilities

The following key personnel are planned for this project:

- Project Manager (PM)
- Site Safety Officer (SSO)

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this HASP. The site safety officer will conduct daily



(tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The Site Safety Office is responsible for the following:

1. Educating personnel about information in this HASP and other safety requirements to be observed during implementation of the SCWP, including, but not limited to, designation of work zones and levels of protection and emergency procedures dealing with fire and first aid.
2. Coordinating site safety decisions with the project manager.
3. Monitoring the condition and status of known on-site hazards specified in this HASP.
4. Maintaining the work zone entry/exit log and site entry/exit log.
5. Maintaining records of safety problems, corrective measures, and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.



2.0 SITE BACKGROUND

The Site is identified as Brookhaven Calabro Airport (the Site) and is identified on the Suffolk County tax map as District 200, Section 710, Block 1, Lots 1 and 1.6. Currently, the Site consists of two runways, taxiways, asphalt parking areas for planes and for automobiles, hangars, other aircraft support buildings and storage, fueling stations, a terminal with a diner, offices, softball fields, landscaped areas, and forested areas located within a 505.2-acre site. The current buildings and runways were constructed in the 1940s or later.

Per- and polyfluoroalkyl substances (PFAS), primarily perfluoro-octane sulfonate (PFOS) and perfluoro-octanoic acid (PFOA), were detected in groundwater beneath the Site at concentrations greater than standards set by New York State Department of Environmental Conservation (NYSDEC).

3.0 POTENTIAL HAZARDS OF THE SITE

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered. Additional information can be found in **Appendix C** - Safety Data Sheets.

3.1 Chemical Hazards

Review of historical information from the Site indicates that PFAS were detected in groundwater at concentrations greater than NYSDEC standards. These compounds may present an occupational exposure hazard during site operations.

The chemicals identified above may have fetal effects and effects on breastfed children (low birth weight, accelerated puberty, skeletal variations), liver effects, immune effects, thyroid effects, and cholesterol changes. These chemicals may also be linked to testicular and kidney cancers. Acute exposure symptoms may include cough, sore throat, redness and pain on skin, redness, blurred vision, abdominal pain, nausea, and vomiting. Specific information on the chemicals identified at the Site, the PFAS chemicals, can be found on the Safety Data Sheets found in **Appendix C**. In addition, the compounds PFOA and PFOS are summarized in the table below.

Compound	PFOA	PFOS
Cas Number	355-67-1	1763-23-1
Threshold Limit Values	Not yet established	Not yet established
Routes of Exposure	Inhalation, ingestion, skin/eye	Inhalation, ingestion, skin/eye
Symptoms of Exposure	Short Term: Cough, sore throat, redness and pain on skin, redness, blurred vision, abdominal pain, nausea and vomiting. Long Term: Can affect a subject's liver, cardiovascular system, development, reproductive system, immune system and thyroid.	Short Term: Cough, sore throat, redness and pain on skin, redness, blurred vision, abdominal pain, nausea and vomiting. Long Term: Can affect a subject's liver, cardiovascular system, development, reproductive system, immune system and thyroid.
Target Organs	Respiratory tract, eyes, and skin	Respiratory tract, eyes, and skin
Physical Data	White powder	White powder

3.2 Biological Hazards

Work will be performed at an airport containing several buildings and two runways, as well as landscaped and forested areas, in Shirley, New York. During the course of the project, there is potential for workers to come into contact with biological hazards such as animals, insects, and plants.

3.2.1 *Animals*

The Site is located in a predominantly developed area; however, the Site is bordered by forests. It is possible that dogs, cats, and rodents may be present. Workers shall use discretion and avoid all contact with animals.

3.2.2 *Insects*

Insects, such as mosquitoes, ticks, bees, and wasps may be present during certain times of the year. Workers will be encouraged to wear appropriate repellents, if they don't contain PFAS compounds, and PPE, if deemed necessary, when working in areas where insects are expected to be present.

During the months of April through October, particular caution shall be exercised to minimize exposure to deer ticks and the potential for contracting Lyme disease. Given the nature of the compounds of concern, certain sampling equipment, field clothing, and PPE should be avoided, if possible. A summary of prohibited and Acceptable Materials is included in **Appendix D**. Specific precautionary work practices that are recommended include the following:

- Cover your body as much as possible. Wear long pants and long-sleeved shirts. Light color clothing makes spotting ticks easier.
- Try to eliminate possible paths by which the Deer Tick may reach unprotected skin. For example, tuck bottoms of pants into socks or boots and sleeves into gloves. Duct tape may be utilized to help seal cuffs and ankles. If heavy concentrations of ticks or insects are anticipated or encountered, Tyvek coveralls may be utilized for added protection when the potential for heat stress is not a concern.
- Conduct periodic and frequent, (e.g., hourly), surveys of your clothing for the presence of ticks. Remove any tick, save it, and report to the clinic with the tick.
- Certain types of Insect repellents may be used and are listed below.
 - Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect Repellent, Herbal Armor, California Baby Natural Bug Spray, BabyGanics.

3.2.3 *Plants*

Poison ivy, sumac, and oak may be present on site. The PM/SSO should identify susceptible individuals. Worker shall avoid all contact with these plants.

3.3 Physical Hazards

During the project, there is potential for workers to come into contact with physical hazards such as heat stress, cold stress, noise, fire, airplanes, and explosions.

3.3.1 *Temperature Extremes*

Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke.

Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, and poor judgment.

PWGC's Heat/Cold Stress Protocols are specified in **Appendix E**.

3.3.2 *Steam, Heat, and Splashing*

Exposure to steam, heat, and splashing hazards can occur during steam cleaning activities. Splashing can also occur during well development and sampling activities. Exposure to steam, heat, and splashing can result in scalding or burns, eye injury, and puncture wounds.

3.3.3 *Noise*

Noise is a potential hazard associated with the operation of heavy equipment, drill rigs, pumps, and engines. Workers will wear hearing protection while in the work zone when these types of machinery are operating.

3.3.4 *Fire and Explosion*

When conducting excavation or drilling activities, the opportunity of encountering fire and explosion hazards may exist from encountering underground utilities, from the use of diesel engine equipment, propane, liquefied petroleum gas, and other potential ignition sources. During dry periods there is an increased chance of forest and brush fires starting at the job site. No smoking will be permitted at the Site and all operations involving potential ignition sources will be monitored continuously (fire watch).

3.3.5 Manual Lifting/Material Handling

Manual lifting of heavy objects may be required. Failure to follow proper lifting technique can result in back injuries and strains. Back injuries are a serious concern as they are the most common work place injury, often resulting in lost or restricted work time, and long treatment and recovery periods.

3.3.6 Slips, Trips and Falls

Working in and around the site will pose slip, trip, and fall hazards due to slippery surfaces that may be oil covered, or from rough terrain, surfaces that are steep inclines, surfaced debris, or surfaces which are wet from rain or ice. Falls may result in twisted ankles, broken bones, head trauma, or back injuries.

3.3.7 Heavy Equipment Operation

Drilling equipment will be utilized for the installation of soil borings and groundwater monitoring wells and an excavator/backhoe may be used to excavate where required. Working with or near heavy equipment poses many potential hazards, including electrocution, fire/explosion, being struck by or against, or pinched/caught/crushed by, and can result in serious physical harm.

3.3.8 Electrocution

Encountering underground utilities may pose electrical hazards to workers. Additionally, overhead electrical lines can be a concern during drilling operations. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death.

3.3.9 Airplanes

The subject property is an active airport and will be in operation during the Site Characterization. When working near the active runways, an escort from the airport and flagging or a light will be required. The proper notifications will be made to airport personnel to inform them of the drilling locations for each day. If requested by airport personnel, the work crew will temporarily stop work when a plane is landing or taking off and stand a distance away from the runway that is deemed safe by airport personnel.

4.0 PERSONAL PROTECTIVE EQUIPMENT

PPE shall be selected in accordance with OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D through B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

For the purposes of this project, PPE shall consist of PFAS-free items when possible.

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Given the nature of the compounds of concern, certain sampling equipment, field clothing, and PPE should be avoided, if possible. A summary of prohibited and Acceptable Materials is included in **Appendix D**. Level D PPE consists of:

- standard work uniform, coveralls, or tyvek, as needed;
- steel toe work boots that do not contain Gore-Tex;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

4.2 Level C

Level C PPE shall be donned when the concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable PID, or equivalent), but are less than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Given the nature of the compounds of concern, certain sampling equipment, field clothing, and PPE should be avoided, if possible. A summary of prohibited and Acceptable Materials is included in **Appendix D**. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe work boots that do not contain Gore-Tex;
- chemical resistant over boots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.
- The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

4.3 Level B

Level B PPE shall be donned when the contaminants have not been identified and/or the concentrations of unknown measured total organic vapors in the breathing zone exceed 5 ppm (using a portable PID, or equivalent). Level B PPE shall be donned if the IDLH of a known contaminant is exceeded. If a contaminant is identified or is expected to be encountered for which NIOSH and/or OSHA recommend the use of a positive pressure self-contained breathing apparatus (SCBA) when that contaminant is present, Level B PPE shall be donned even though the total organic vapors in the breathing zone may not exceed 5 ppm. Level B shall be donned for confined space entry, and when the atmosphere is oxygen deficient (oxygen less than 19.5%) or potentially oxygen deficient. If Level B PPE is required for a task, at least three people shall be donned in Level B at any one time during that task. PPE shall only be donned at the direction of the site safety officer. Given the nature of the compounds of concern, certain sampling equipment, field clothing, and PPE should be avoided, if possible. A summary of prohibited and Acceptable Materials is included in **Appendix D**. Level B PPE consists of:

- supplied air SCBA or airline system with five-minute egress system;
- chemical resistant coveralls;
- steel-toe work boots that do not contain Gore-Tex;
- chemical resistant over boots or disposable boot covers;
- disposable inner gloves;



- disposable outer gloves;
- hard hat; and,
- ankles/wrists taped.

The exact PPE ensemble is decided on a site-by-site basis by the PWGC Health and Safety Officer with the intent to provide the most protective and efficient worker PPE.

5.0 AIR MONITORING

Air monitoring will be performed for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial investigation work) from potential airborne contaminant releases resulting from remedial activities at the site. Air monitoring will be used to help to confirm that the Site Characterization work will not spread contamination off-site through the air. The primary concerns for this site are dust particulates and VOCs. Site monitoring with a photoionization detector (PID) and particulate dust/aerosol meter will be performed during any invasive activities.

Real-time monitoring for dust and VOCs will be conducted both within the work area, and along the site perimeter, during intrusive activities such as excavation and drilling activities.

Detailed information on the types, frequency, and location of real-time monitoring and community air monitoring requirements are provided in the Community Air Monitoring Plan prepared for this project.

6.0 TRAINING AND MEDICAL SURVEILLANCE

Site workers that have the potential of coming in contact with Site contaminants will have the following training and medical surveillance.

6.1 Annual Eight-Hour Refresher Training

Annual eight-hour refresher training will be required of site field personnel directly involved with site activities whom may come in contact with site contaminants. The training will cover a review of 1910.120 requirements and related company programs and procedures.

6.2 Medical Surveillance

Site field personnel directly involved with site activities whom may come in contact with site contaminants are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f).

7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital (**Figure 1**) will be posted on-site. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment. These will be outlined in the site-specific HASP.

7.1 Emergency Equipment On-site

- Private telephones: Site personnel.
- Two-way radios: Site personnel where necessary.
- Emergency Alarms: On-site vehicle horns.*
- First aid kits: On-site, in vehicles, or office.
- Fire extinguisher: On-site, in office, or on equipment.

7.2 Emergency Telephone Number

• General Emergencies	911
• New York City Police	911
• Brookhaven Memorial Hospital	1-631-654-7100
• NYSDEC Spills Division	1-800-457-7362
• NYSDEC Hazardous Waste Division	1-718-482-4994
• Suffolk County Department of Health	1-631-854-0000
• Brookhaven Fire Department	911
• National Response Center	1-800-424-8802
• Poison Control	1-800-222-1222
• Project Manager	1-631-589-6353
• Health & Safety Officer	1-631-589-6353
• Alternate Health & Safety Officer	1-631-589-6353

7.3 Personnel Responsibilities during an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel;
- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;
- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;
- Determine the cause of incidents and make recommendations to prevent recurrence; and,
- Ensure that all required reports have been prepared.

7.4 Medical Emergencies

A person who becomes ill or injured, first aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix F**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital and information on the chemical(s) to which they may have been exposed.

7.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use firefighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

7.6 Evacuation Routes

Evacuation routes established by work area locations will be reviewed prior to commencing Site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the Site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.
- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.
- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

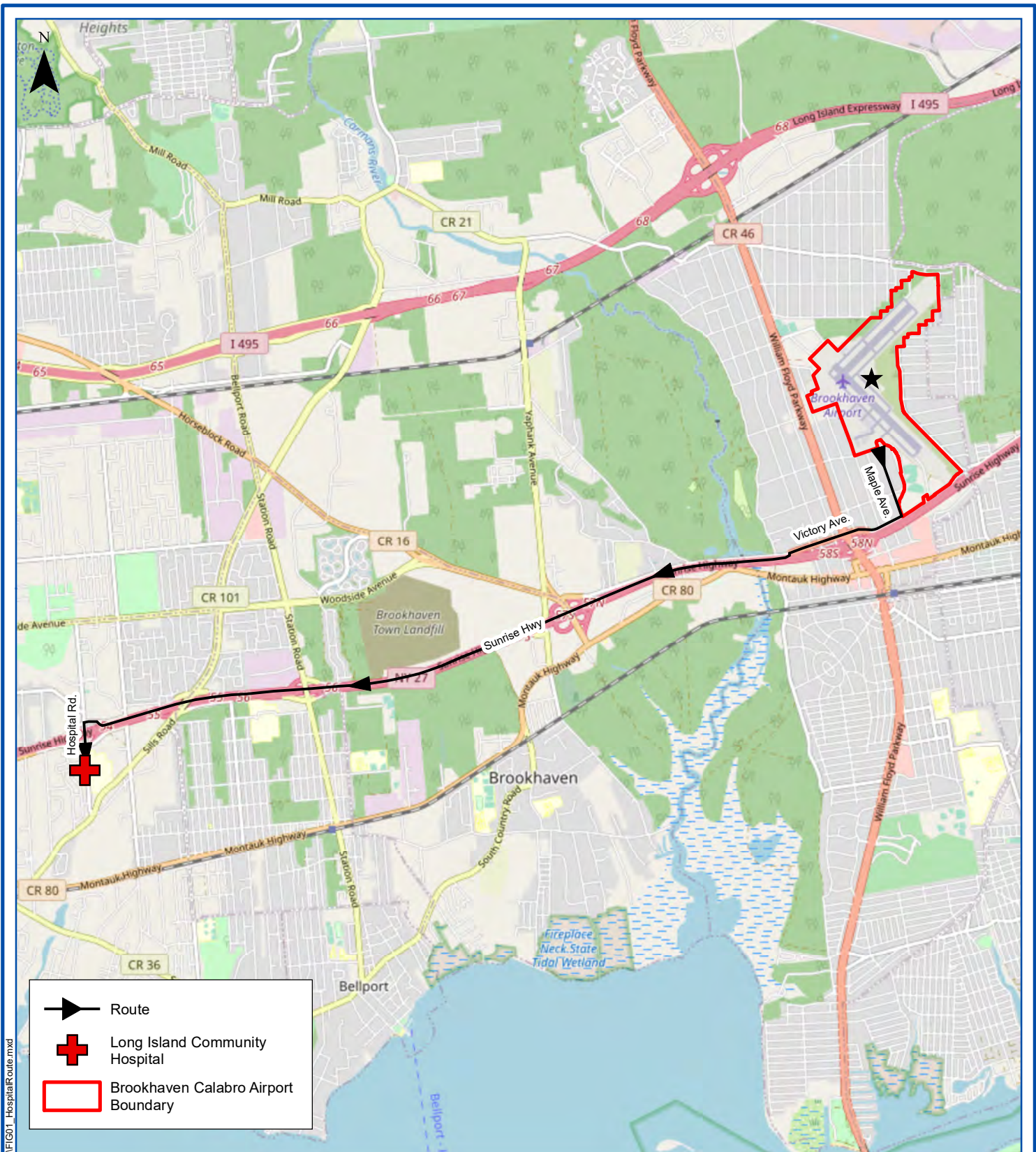
8.0 RECORDS AND REPORTING

All readings must be recorded and available for review by personnel from NYSDEC and NYSDOH. Should any of the action levels be exceeded for the duration of 30 minutes in the workzone, the NYSDEC Division of Air Resources and NYSDOH must be notified immediately (within one business day).

The notification shall include a description of the control measures implemented to prevent further exceedances.



FIGURES



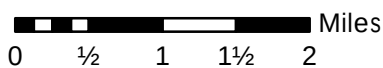
Document Path: W:\Projects\A-D\BRK2005\maps\Fig001_HospitalRoute.mxd

PWGC
CLIENT DRIVEN SOLUTIONS
P.W. GROSSER CONSULTING, INC.

630 Johnson Ave., Suite 7
Bohemia, NY 11716
Ph: 631-589-6353 • Fax: 631-589-8705
pwgc.info@pwgrosser.com

HOSPITAL ROUTE

Brookhaven Calabro Airport - 135 Dawn Dr, Shirley, NY
TO
Long Island Community Hospital - 101 Hospital Rd, Patchogue, NY



Project:	BRK2005
Date:	9/30/2020
Designed by:	SJ
Drawn by:	PH
Approved by:	SJ
Figure No:	1



APPENDIX A

Site Safety Plan Acceptance and Acknowledgement Form



This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of the HASP. It is maintained on site by the FTL/SHSO as a project record. Each field team member shall sign this section after site-specific training is completed and before being permitted to work on site.

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I will comply with the provisions contained therein.

<i>Name (Print and Sign)</i>	<i>Date</i>



APPENDIX B

Site Safety Amendment Form



SITE SAFETY PLAN AMENDMENT FORM

SITE SAFETY PLAN AMENDMENT # _____: _____

SITE NAME: _____

REASON FOR AMENDMENT: _____

ALTERNATIVE PROCEDURES: _____

REQUIRED CHANGES IN PPE: _____

PROJECT MANAGER

DATE

SITE SAFETY OFFICER

DATE



APPENDIX C

Chemical Safety Data Sheets

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/23/2019

Version Number 2

Reviewed on 03/23/2019

1 Identification

- **Product identifier**
- **Trade name:** Perfluorooctanoic Acid (PFOA)
- **Part number:** N-1588
- **CAS Number:**
335-67-1
- **EC number:**
206-397-9
- **Index number:**
607-704-00-2
- **Application of the substance / the mixture** Reagents and Standards for Analytical Chemical Laboratory Use
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051 USA
- **Information department:**
Telephone: 800-227-9770
e-mail: pdl-msds_author@agilent.com
- **Emergency telephone number:** CHEMTREC®: 1-800-424-9300

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS08 Health hazard

Carc. 2 H351 Suspected of causing cancer.
Repr. 1B H360 May damage fertility or the unborn child.
STOT RE 1 H372 Causes damage to the liver through prolonged or repeated exposure.



GHS05 Corrosion

Eye Dam. 1 H318 Causes serious eye damage.



GHS07

Acute Tox. 4 H302 Harmful if swallowed.
Acute Tox. 4 H332 Harmful if inhaled.

- **Label elements**
- **GHS label elements** The substance is classified and labeled according to the Globally Harmonized System (GHS).
(Contd. on page 2)

Safety Data Sheet acc. to OSHA HCS

Printing date 03/23/2019

Version Number 2

Reviewed on 03/23/2019

Trade name: Perfluorooctanoic Acid (PFOA)

(Contd. of page 1)

· Hazard pictograms



· Signal word Danger

· Hazard-determining components of labeling:

perfluorooctanoic acid (PFOA)

· Hazard statements

Harmful if swallowed or if inhaled.

Causes serious eye damage.

Suspected of causing cancer.

May damage fertility or the unborn child.

Causes damage to the liver through prolonged or repeated exposure.

· Precautionary statements

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Do not breathe dust/fume/gas/mist/vapors/spray.

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Wear protective gloves/protective clothing/eye protection/face protection.

If swallowed: Call a poison center/doctor if you feel unwell.

Rinse mouth.

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing.

Immediately call a poison center/doctor.

IF exposed or concerned: Get medical advice/attention.

Get medical advice/attention if you feel unwell.

Store locked up.

Dispose of contents/container in accordance with local/regional/national/international regulations.

· Classification system:

· NFPA ratings (scale 0 - 4)



Health = 3

Fire = 0

Reactivity = 0

· HMIS-ratings (scale 0 - 4)



Health = *3

Fire = 0

Reactivity = 0

· Other hazards

· Results of PBT and vPvB assessment

· PBT: Not applicable.

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/23/2019

Version Number 2

Reviewed on 03/23/2019

Trade name: Perfluorooctanoic Acid (PFOA)· **vPvB:** Not applicable.

(Contd. of page 2)

3 Composition/information on ingredients

- **Chemical characterization: Substances**
- **CAS No. Description**
335-67-1 perfluorooctanoic acid (PFOA)
- **Identification number(s)**
- **EC number:** 206-397-9
- **Index number:** 607-704-00-2

4 First-aid measures

- **Description of first aid measures**
- **General information:**
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
- **After inhalation:**
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist. In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:** Generally the product does not irritate the skin.
- **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
- **After swallowing:** Immediately call a doctor.
- **Information for doctor:**
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:** Use fire fighting measures that suit the environment.
- **Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
- **Advice for firefighters**
- **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.

(Contd. on page 4)

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/23/2019

Version Number 2

Reviewed on 03/23/2019

Trade name: Perfluorooctanoic Acid (PFOA)

(Contd. of page 3)

- **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
- **Protective Action Criteria for Chemicals**

· **PAC-1:**1.1 mg/m³· **PAC-2:**12 mg/m³· **PAC-3:**75 mg/m³**7 Handling and storage**

- **Handling:**
- **Precautions for safe handling**
Thorough dedusting.
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
- **Information about protection against explosions and fires:** Keep respiratory protective device available.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:** No special requirements.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:** Keep receptacle tightly sealed.
- **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.
- **Control parameters**
- **Components with limit values that require monitoring at the workplace:** Not required.
- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
- **Breathing equipment:**
When used as intended with Agilent instruments, the use of the product under normal laboratory conditions and with standard practices does not result in significant airborne exposures and therefore respiratory protection is not needed.
Under an emergency condition where a respirator is deemed necessary, use a NIOSH or equivalent approved device/equipment with appropriate organic or acid gas cartridge.

(Contd. on page 5)

Safety Data Sheet

acc. to OSHA HCS

Printing date 03/23/2019

Version Number 2

Reviewed on 03/23/2019

Trade name: Perfluorooctanoic Acid (PFOA)

(Contd. of page 4)

· Protection of hands:

Although not recommended for constant contact with the chemicals or for clean-up, nitrile gloves 11-13 mil thickness are recommended for normal use. The breakthrough time is 1 hr. For cleaning a spill where there is direct contact of the chemical, butyl rubber gloves are recommended 12-15 mil thickness with breakthrough times exceeding 4 hrs. Supplier recommendations should be followed.

· Material of gloves

For normal use: nitrile rubber, 11-13 mil thickness

For direct contact with the chemical: butyl rubber, 12-15 mil thickness

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· Penetration time of glove material

For normal use: nitrile rubber: 1 hour

For direct contact with the chemical: butyl rubber: >4 hours

· Eye protection:


Tightly sealed goggles

9 Physical and chemical properties

· Information on basic physical and chemical properties
· General Information
· Appearance:

Form:	Solid
Color:	Not determined.
Odor:	Characteristic
Odor threshold:	Not determined.

· pH-value: Not applicable.

· Change in condition

Melting point/Melting range:	55-56 °C (131-132.8 °F)
Boiling point/Boiling range:	190 °C (374 °F)

· Flash point: Not applicable.

· Flammability (solid, gaseous): Product is not flammable.

· Decomposition temperature: Not determined.

· Auto igniting: Not determined.

· Danger of explosion: Product does not present an explosion hazard.

· Explosion limits:

Lower:	Not determined.
Upper:	Not determined.

· Vapor pressure at 20 °C (68 °F): 0.69 hPa (0.5 mm Hg)

· Density at 20 °C (68 °F): 0.9 g/cm³ (7.5105 lbs/gal)

· Relative density Not determined.

· Vapor density Not applicable.

(Contd. on page 6)

Safety Data Sheet acc. to OSHA HCS

Printing date 03/23/2019

Version Number 2

Reviewed on 03/23/2019

Trade name: Perfluorooctanoic Acid (PFOA)

(Contd. of page 5)

· Evaporation rate	Not applicable.
· Solubility in / Miscibility with Water at 20 °C (68 °F):	3.4 g/l
· Partition coefficient (n-octanol/water):	Not determined.
· Viscosity:	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
Solids content:	100.0 %
· Other information	No further relevant information available.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· Information on toxicological effects

· Acute toxicity:

· LD/LC50 values that are relevant for classification:

ATE (Acute Toxicity Estimate)

Oral	LD50	500 mg/kg
Inhalative	LC50/4 h	1.5 mg/L

· Primary irritant effect:

- **on the skin:** No irritant effect.
- **on the eye:** Strong irritant with the danger of severe eye injury.
- **Sensitization:** No sensitizing effects known.

· Additional toxicological information:

· Carcinogenic categories

· IARC (International Agency for Research on Cancer)

2B

· NTP (National Toxicology Program)

Substance is not listed.

(Contd. on page 7)

Safety Data Sheet acc. to OSHA HCS

Printing date 03/23/2019

Version Number 2

Reviewed on 03/23/2019

Trade name: Perfluorooctanoic Acid (PFOA)

(Contd. of page 6)

· **OSHA-Ca (Occupational Safety & Health Administration)**

Substance is not listed.

12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
Water hazard class 2 (Assessment by list): hazardous for water
Do not allow product to reach ground water, water course or sewage system.
Must not reach bodies of water or drainage ditch undiluted or unneutralized.
Danger to drinking water if even small quantities leak into the ground.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· UN-Number	
· DOT, IMDG, IATA	UN3261
· UN proper shipping name	
· DOT	Corrosive solid, acidic, organic, n.o.s. (perfluorooctanoic acid (PFOA))
· IMDG, IATA	CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S. (perfluorooctanoic acid (PFOA))

(Contd. on page 8)

US

Safety Data Sheet acc. to OSHA HCS

Printing date 03/23/2019

Version Number 2

Reviewed on 03/23/2019

Trade name: Perfluorooctanoic Acid (PFOA)

(Contd. of page 7)

· **Transport hazard class(es)**

· **IATA**

· **Class**

8 Corrosive substances

· **Label**

8

· **Environmental hazards:**

Not applicable.

· **Special precautions for user**

Warning: Corrosive substances

· **Danger code (Kemler):**

80

· **EMS Number:**

F-A,S-B

· **Segregation groups**

Acids

· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

Not applicable.

· **Transport/Additional information:**

· **DOT**

· **Quantity limitations**

On passenger aircraft/rail: 25 kg

On cargo aircraft only: 100 kg

· **IMDG**

· **Limited quantities (LQ)**

5 kg

· **Excepted quantities (EQ)**

Code: E1

Maximum net quantity per inner packaging: 30 g

Maximum net quantity per outer packaging: 1000 g

· **UN "Model Regulation":**

UN 3261 CORROSIVE SOLID, ACIDIC, ORGANIC, N.O.S.
(PERFLUOROOCTANOIC ACID (PFOA)), 8, III

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Sara**

· **Section 355 (extremely hazardous substances):**

Substance is not listed.

· **Section 313 (Specific toxic chemical listings):**

Substance is not listed.

· **TSCA (Toxic Substances Control Act):**

Substance is listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

Substance is not listed.

· **Chemicals known to cause reproductive toxicity for females:**

Substance is not listed.

(Contd. on page 9)

Safety Data Sheet

acc. to OSHA HCS

Printing date 03/23/2019

Version Number 2

Reviewed on 03/23/2019

Trade name: Perfluorooctanoic Acid (PFOA)

(Contd. of page 8)

· Chemicals known to cause reproductive toxicity for males:

Substance is not listed.

· Chemicals known to cause developmental toxicity:

Substance is listed.

· Carcinogenic categories
· EPA (Environmental Protection Agency)

Substance is not listed.

· TLV (Threshold Limit Value established by ACGIH)

Substance is not listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

Substance is not listed.

· Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

· Date of preparation / last revision 03/23/2019 / 1

· Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

Acute Tox. 4: Acute toxicity – Category 4

Eye Dam. 1: Serious eye damage/eye irritation – Category 1

Carc. 2: Carcinogenicity – Category 2

Repr. 1B: Reproductive toxicity – Category 1B

STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1

· * Data compared to the previous version altered.

Safety Data Sheet acc. to OSHA HCS

Printing date 12/13/2016

Reviewed on 12/13/2016

1 Identification

- **Product identifier**
- **Product Name:** Perfluoro-n-octane Sulfonate (PFOS)
- **Part Number:** LCS-4951
- **Application of the substance / the mixture** Certified Reference Material
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
SPEX CertiPrep, LLC.
203 Norcross Ave, Metuchen,
NJ 08840 USA
- **Information department:** product safety department
- **Emergency telephone number:**
Emergency Phone Number (24 hours)
CHEMTREC (800-424-9300)
Outside US: 703-527-3887

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.



GHS06 Skull and crossbones

Acute Tox. 3 H331 Toxic if inhaled.



GHS08 Health hazard

Carc. 2 H351 Suspected of causing cancer.

Repr. 1 H360-H362 May damage fertility or the unborn child. May cause harm to breast-fed children.

STOT SE 1 H370 Causes damage to organs.

- **Label elements**

· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).

- **Hazard pictograms**



GHS02



GHS06



GHS08

- **Signal word** Danger

- **Hazard-determining components of labeling:**

methanol

perfluorooctane sulfonic acid

- **Hazard statements**

H225 Highly flammable liquid and vapor.

H331 Toxic if inhaled.

H351 Suspected of causing cancer.

H360-H362 May damage fertility or the unborn child. May cause harm to breast-fed children.

H370 Causes damage to organs.

- **Precautionary statements**

Avoid contact during pregnancy/while nursing.

Keep away from heat/sparks/open flames/hot surfaces. No smoking.

Use explosion-proof electrical/ventilating/lighting/equipment.

If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

Store locked up.

Dispose of contents/container in accordance with local/regional/national/international regulations.

(Contd. on page 2)

US

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2016

Reviewed on 12/13/2016

Product Name: Perfluoro-n-octane Sulfonate (PFOS)

(Contd. of page 1)

- **Classification system:**
- **NFPA ratings (scale 0 - 4)**



Health = 3
Fire = 3
Reactivity = 0

- **HMS-ratings (scale 0 - 4)**



Health = *3
Fire = 3
Reactivity = 0

- **Other hazards**
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.

3 Composition/information on ingredients

- **Chemical characterization: Mixtures**
- **Description:** Mixture of the substances listed below with nonhazardous additions.

- **Dangerous components:**

67-56-1	methanol	99.9%
1763-23-1	perfluorooctane sulfonic acid	0.1%

4 First-aid measures

- **Description of first aid measures**
- **General information:**
Immediately remove any clothing soiled by the product.
Remove breathing apparatus only after contaminated clothing have been completely removed.
In case of irregular breathing or respiratory arrest provide artificial respiration.
- **After inhalation:**
Supply fresh air or oxygen; call for doctor.
In case of unconsciousness place patient stably in side position for transportation.
- **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
- **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
- **After swallowing:** Do not induce vomiting; immediately call for medical help.
- **Information for Doctor:**
- **Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **Indication of any immediate medical attention and special treatment needed** No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:** CO₂, sand, extinguishing powder. Do not use water.
- **For safety reasons unsuitable extinguishing agents:** Water with full jet
- **Special hazards arising from the substance or mixture** No further relevant information available.
- **Advice for firefighters**
- **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures** Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:**
Do not allow product to reach sewage system or any water course.
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents

(Contd. on page 3)

Safety Data Sheet acc. to OSHA HCS

Printing date 12/13/2016

Reviewed on 12/13/2016

Product Name: Perfluoro-n-octane Sulfonate (PFOS)

(Contd. of page 2)

Reference to other sections

See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

Handling:
Precautions for safe handling

Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Prevent formation of aerosols.

Information about protection against explosions and fires:

Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Keep respiratory protective device available.

Conditions for safe storage, including any incompatibilities
Storage:
Requirements to be met by storerooms and receptacles: Store in a cool location.

Information about storage in one common storage facility: Not required.

Further information about storage conditions:

Keep receptacle tightly sealed.
Store in cool, dry conditions in well sealed receptacles.

Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems: No further data; see item 7.

Control parameters
Components with limit values that require monitoring at the workplace:

The following constituent is the only constituent of the product which has a PEL, TLV or other recommended exposure limit.
At this time, the remaining constituent has no known exposure limits.

67-56-1 methanol

PEL Long-term value: 260 mg/m³, 200 ppm

REL Short-term value: 325 mg/m³, 250 ppm

Long-term value: 260 mg/m³, 200 ppm

Skin

TLV Short-term value: 328 mg/m³, 250 ppm

Long-term value: 262 mg/m³, 200 ppm

Skin; BEI

Ingredients with biological limit values:
67-56-1 methanol

BEI 15 mg/L

Medium: urine

Time: end of shift

Parameter: Methanol (background, nonspecific)

Additional information: The lists that were valid during the creation were used as basis.

Exposure controls
Personal protective equipment:
General protective and hygienic measures:

Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.

Breathing equipment:

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.

Protection of hands:


Protective gloves

(Contd. on page 4)

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2016

Reviewed on 12/13/2016

Product Name: Perfluoro-n-octane Sulfonate (PFOS)

(Contd. of page 3)

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

· **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

· **Penetration time of glove material**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· **Eye protection:**



Tightly sealed goggles

9 Physical and chemical properties

· **Information on basic physical and chemical properties**

· **General Information**

· **Appearance:**

Form:	Liquid
Color:	According to product specification
Odor:	Characteristic
Odour Threshold:	Not applicable.

· **pH-value:** Not applicable.

· **Change in condition**

Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	64 °C (147 °F)

· **Flash point:** 11 °C (52 °F)

· **Flammability (solid, gaseous):** Not applicable.

· **Ignition temperature:** 455 °C (851 °F)

· **Decomposition temperature:** Not applicable.

· **Auto igniting:** Product is not selfigniting.

· **Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures are possible.

· **Explosion limits:**

Lower:	5.5 Vol %
Upper:	44.0 Vol %

· **Vapor pressure at 20 °C (68 °F):** 128 hPa (96 mm Hg)

· **Density at 20 °C (68 °F)** 0.79 g/cm³ (6.593 lbs/gal)

· **Relative density** Not applicable.

· **Vapor density** Not applicable.

· **Evaporation rate** Not applicable.

· **Solubility in / Miscibility with**

Water: Not miscible or difficult to mix.

· **Partition coefficient (n-octanol/water):** Not applicable.

· **Viscosity:**

Dynamic:	Not applicable.
Kinematic:	Not applicable.

· **Solvent content:**

Organic solvents:	99.9 %
VOC content:	99.9 %

· **Solids content:** 0.1 %

· **Other information** No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.

(Contd. on page 5)

Safety Data Sheet

acc. to OSHA HCS

Printing date 12/13/2016

Reviewed on 12/13/2016

Product Name: Perfluoro-n-octane Sulfonate (PFOS)

(Contd. of page 4)

- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.
- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**

67-56-1 methanol

Oral	LD50	5628 mg/kg (rat)
Dermal	LD50	15800 mg/kg (rabbit)

- **Primary irritant effect:**
- **on the skin:** No irritant effect.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Toxic

- **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**

None of the ingredients is listed.

· **NTP (National Toxicology Program)**

None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients is listed.

12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
Water hazard class 1 (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:** Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

- **UN-Number**
- **DOT, ADR, IMDG, IATA** UN1230
- **UN proper shipping name**
- **DOT** Methanol

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Safety Data Sheet
acc. to OSHA HCS

Printing date 12/13/2016

Reviewed on 12/13/2016

Product Name: Perfluoro-n-octane Sulfonate (PFOS)

(Contd. of page 5)

· ADR · IMDG, IATA	1230 Methanol METHANOL
· Transport hazard class(es) · DOT	
	
· Class · Label	3 Flammable liquids 3, 6.1
· ADR	
	
· Class · Label	3 Flammable liquids 3+6.1
· IMDG	
	
· Class · Label	3 Flammable liquids 3/6.1
· IATA	
	
· Class · Label	3 Flammable liquids 3 (6.1)
· Packing group · DOT, ADR, IMDG, IATA	II
· Environmental hazards:	Not applicable.
· Special precautions for user · Danger code (Kemler): · EMS Number: · Stowage Category · Stowage Code	Warning: Flammable liquids 336 F-E,S-D B SW2 Clear of living quarters.
· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
· Transport/Additional information:	
· ADR · Excepted quantities (EQ)	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· IMDG · Limited quantities (LQ) · Excepted quantities (EQ)	1L Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· UN "Model Regulation":	UN 1230 METHANOL, 3 (6.1), II

US

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acc. to OSHA HCS

Printing date 12/13/2016

Reviewed on 12/13/2016

Product Name: Perfluoro-n-octane Sulfonate (PFOS)

(Contd. of page 6)

15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
- Sara

· Section 355 (extremely hazardous substances):

None of the ingredients is listed.

· Section 313 (Specific toxic chemical listings):

67-56-1 methanol

· TSCA (Toxic Substances Control Act):

All ingredients are listed.

· Proposition 65

· Chemicals known to cause cancer:

None of the ingredients is listed.

· Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed.

· Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed.

· Chemicals known to cause developmental toxicity:

67-56-1 methanol

· Carcinogenic categories

· EPA (Environmental Protection Agency)

None of the ingredients is listed.

· TLV (Threshold Limit Value established by ACGIH)

None of the ingredients is listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients is listed.

· Protective Action Criteria for Chemicals

· PAC-1:

67-56-1 methanol

530 ppm

· PAC-2:

67-56-1 methanol

2,100 ppm

· PAC-3:

67-56-1 methanol

7200* ppm

- GHS label elements The product is classified and labeled according to the Globally Harmonized System (GHS).

· Hazard pictograms



GHS02



GHS06



GHS08

- Signal word Danger

· Hazard-determining components of labeling:

methanol

perfluorooctane sulfonic acid

· Hazard statements

H225 Highly flammable liquid and vapor.

H331 Toxic if inhaled.

H351 Suspected of causing cancer.

H360-H362 May damage fertility or the unborn child. May cause harm to breast-fed children.

H370 Causes damage to organs.

· Precautionary statements

Avoid contact during pregnancy/while nursing.

Keep away from heat/sparks/open flames/hot surfaces. No smoking.

Use explosion-proof electrical/ventilating/lighting/equipment.

If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

Store locked up.

Dispose of contents/container in accordance with local/regional/national/international regulations.

(Contd. on page 8)

Safety Data Sheet
acc. to OSHA HCS

Printing date 12/13/2016

Reviewed on 12/13/2016

Product Name: Perfluoro-n-octane Sulfonate (PFOS)

(Contd. of page 7)

· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing SDS:** product safety department

· **Contact:**

SPEX CertiPrep, LLC.

1-732-549-7144

· **Date of preparation / last revision** 12/13/2016 / -

· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

BEI: Biological Exposure Limit

Flam. Liq. 2: Flammable liquids – Category 2

Acute Tox. 3: Acute toxicity – Category 3

Carc. 2: Carcinogenicity – Category 2

Repr. 1: Reproductive toxicity – Category 1

STOT SE 1: Specific target organ toxicity (single exposure) – Category 1

US

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

Wellington Laboratories Inc.

Version No: 6.7

Safety Data Sheet according to WHMIS 2015 requirements

Chemwatch Hazard Alert Code: 4

Issue Date: 13/09/2019

Print Date: 13/09/2019

S.GHS CAN EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)
Synonyms	Methyl alcohol (methanol), Methyl hydrate (methanol), Methylol (methanol)
Proper shipping name	METHANOL
Other means of identification	Not Available

Recommended use of the chemical and restrictions on use

Relevant identified uses	This product is a solution of organic compound(s) in methanol for laboratory use only (see section 3). This material should only be used by those persons trained in the safe handling of hazardous chemicals. Please refer to the Certificate of Analysis (CoA) for further product information. Wellington Laboratories Inc.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	Wellington Laboratories Inc.
Address	345 Southgate Drive Guelph Ontario N1G 3M5 Canada
Telephone	+1 519 822 2436
Fax	+1 519 822 2849
Website	www.well-labs.com
Email	MSDS@well-labs.com

Emergency phone number

Association / Organisation	Wellington Laboratories Inc.
Emergency telephone numbers	1-888-CANUTEC (226-8832) (North American)
Other emergency telephone numbers	1-613-996-6666 (International)

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

NFPA 704 diamond



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

Classification	Eye Irritation Category 2A, Acute Toxicity (Dermal) Category 3, Specific target organ toxicity - single exposure Category 1, Flammable Liquid Category 2, Acute Toxicity (Inhalation) Category 3, Reproductive Toxicity Category 1B, Acute Toxicity (Oral) Category 3

Label elements

Hazard pictogram(s)	

SIGNAL WORD **DANGER**

Hazard statement(s)

H319	Causes serious eye irritation.
H311	Toxic in contact with skin.

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

H370	Causes damage to organs.
H225	Highly flammable liquid and vapour.
H331	Toxic if inhaled.
H360	May damage fertility or the unborn child.
H301	Toxic if swallowed.

Physical and Health hazard(s) not otherwise classified

Not Applicable

Supplementary statement(s)

Not Applicable

CLP classification (additional)

Not Applicable

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P270	Do not eat, drink or smoke when using this product.

Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.
P308+P311	IF exposed or concerned: Call a POISON CENTER/doctor/physician/first aider.
P321	Specific treatment (see advice on this label).
P330	Rinse mouth.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
67-56-1	98.994	<u>methanol</u>
2991-50-6*	0.006	<u>N-ethylperfluoro-1-octanesulfonamidoacetic acid</u>
7732-18-5	0.99	<u>water</u>
1310-73-2	<0.01	<u>sodium hydroxide</u>

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: - Immediately hold eyelids apart and flush the eye continuously with running water. - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. - Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. - Transport to hospital or doctor without delay. - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: - Immediately flush body and clothes with large amounts of water, using safety shower if available. - Quickly remove all contaminated clothing, including footwear. - Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. - Transport to hospital, or doctor.
Inhalation	- If fumes or combustion products are inhaled remove from contaminated area. - Lay patient down. Keep warm and rested. - Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. - Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. - Transport to hospital, or doctor, without delay.

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

Ingestion

- ▶ Immediately give a glass of water.
- ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.
- ▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

For acute and short term repeated exposures to methanol:

- ▶ Toxicity results from accumulation of formaldehyde/formic acid.
- ▶ Clinical signs are usually limited to CNS, eyes and GI tract. Severe metabolic acidosis may produce dyspnea and profound systemic effects which may become intractable. All symptomatic patients should have arterial pH measured. Evaluate airway, breathing and circulation.
- ▶ Stabilise obtunded patients by giving naloxone, glucose and thiamine.
- ▶ Decontaminate with Ipecac or lavage for patients presenting 2 hours post-ingestion. Charcoal does not absorb well; the usefulness of cathartics is not established.
- ▶ Forced diuresis is not effective; haemodialysis is recommended where peak methanol levels exceed 50 mg/dL (this correlates with serum bicarbonate levels below 18 meq/L).
- ▶ Ethanol, maintained at levels between 100 and 150 mg/dL, inhibits formation of toxic metabolites and may be indicated when peak methanol levels exceed 20 mg/dL. An intravenous solution of ethanol in D5W is optimal.
- ▶ Folate, as leucovorin, may increase the oxidative removal of formic acid. 4-methylpyrazole may be an effective adjunct in the treatment. 8-Phenytoin may be preferable to diazepam for controlling seizure.

[Ellenhorn Barceloux: Medical Toxicology]

BIOLOGICAL EXPOSURE INDEX - BEI

Determinant	Index	Sampling Time	Comment
1. Methanol in urine	15 mg/l	End of shift	B, NS
2. Formic acid in urine	80 mg/gm creatinine	Before the shift at end of workweek	B, NS

B: Background levels occur in specimens collected from subjects **NOT** exposed.

NS: Non-specific determinant - observed following exposure to other materials.

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

Water may be an ineffective extinguishing media for methanol fires; static explosions are reported for aqueous solutions as dilute as 30%. Water may be used to cool containers.

- ▶ Alcohol stable foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).
- ▶ Carbon dioxide.

Special hazards arising from the substrate or mixture

Fire Incompatibility

- ▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Special protective equipment and precautions for fire-fighters

Fire Fighting

- ▶ Alert Fire Brigade and tell them location and nature of hazard.
- ▶ May be violently or explosively reactive.
- ▶ Wear full body protective clothing with breathing apparatus.
- ▶ Prevent, by any means available, spillage from entering drains or water course.

Fire/Explosion Hazard

- ▶ Liquid and vapour are highly flammable.
 - ▶ Severe fire hazard when exposed to heat, flame and/or oxidisers.
 - ▶ Vapour may travel a considerable distance to source of ignition.
 - ▶ Heating may cause expansion or decomposition leading to violent rupture of containers.
- Combustion products include:
carbon dioxide (CO₂)
formaldehyde
other pyrolysis products typical of burning organic material.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills

- ▶ Remove all ignition sources.
- ▶ Clean up all spills immediately.
- ▶ Avoid breathing vapours and contact with skin and eyes.
- ▶ Control personal contact with the substance, by using protective equipment.

Major Spills

- ▶ Clear area of personnel and move upwind.
- ▶ Alert Fire Brigade and tell them location and nature of hazard.
- ▶ May be violently or explosively reactive.
- ▶ Wear full body protective clothing with breathing apparatus.

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	- Containers, even those that have been emptied, may contain explosive vapours. - Do NOT cut, drill, grind, weld or perform similar operations on or near containers. - Avoid all personal contact, including inhalation. - Wear protective clothing when risk of exposure occurs. - Use in a well-ventilated area. - Prevent concentration in hollows and sumps. DO NOT allow clothing wet with material to stay in contact with skin
Other information	- Store in original containers in approved flame-proof area. - No smoking, naked lights, heat or ignition sources. DO NOT store in pits, depressions, basements or areas where vapours may be trapped - Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	- Glass container is suitable for laboratory quantities - Packing as supplied by manufacturer. - Plastic containers may only be used if approved for flammable liquid. - Check that containers are clearly labelled and free from leaks. - For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure. - For materials with a viscosity of at least 2680 cSt. (23 deg. C) - For manufactured product having a viscosity of at least 250 cSt.
Storage incompatibility	Methanol: - reacts violently with strong oxidisers, acetyl bromide, alkyl aluminium salts, beryllium dihydride, bromine, chromic acid, 1-chloro-3,3-difluoro-2-methoxycyclopropane, cyanuric chloride, diethylzinc, isophthaloyl chloride, nitric acid, perchloric acid, potassium-tert-butoxide, potassium sulfur diimide, Raney nickel catalysts, 2,4,6-trichlorotriazine, triethylaluminium, 1,3,3-trifluoro-2-methoxycyclopropane - is incompatible with strong acids, strong caustics, alkaline earth and alkali metals, aliphatic amines, acetaldehyde, benzoyl peroxide, 1,3-bis(di-n-cyclopentadienyl iron)-2-propen-1-one, calcium carbide, chloroform, chromic anhydride, chromium trioxide, dialkylzinc, dichlorine oxide, dichloromethane, ethylene oxide, hypochlorous acid, isocyanates, isopropyl chlorocarbonate, lithium tetrahydroaluminate, magnesium, methyl azide, nitrogen dioxide, palladium, pentafluoroguanidine, perchloryl fluoride, phosphorus pentasulfide, phosphorus trioxide, potassium, tangerine oil, triisobutylaluminium - mixtures with lead perchlorate, sodium hypochlorite are explosive - may react with metallic aluminium at high temperatures - slowly corrodes lead and aluminium - may generate electrostatic charges, due to low conductivity, on flow or agitation - attacks some plastics, rubber and coatings. Static induced flash fires have happened when filling plastic containers with methanol / water solutions with as low as 30% methanol content Alcohols - are incompatible with strong acids, acid chlorides, acid anhydrides, oxidising and reducing agents. - reacts, possibly violently, with alkaline metals and alkaline earth metals to produce hydrogen - react with strong acids, strong caustics, aliphatic amines, isocyanates, acetaldehyde, benzoyl peroxide, chromic acid, chromium oxide, dialkylzinc, dichlorine oxide, ethylene oxide, hypochlorous acid, isopropyl chlorocarbonate, lithium tetrahydroaluminate, nitrogen dioxide, pentafluoroguanidine, phosphorus halides, phosphorus pentasulfide, tangerine oil, triethylaluminium, triisobutylaluminium - should not be heated above 49 deg. C. when in contact with aluminium equipment - Avoid storage with reducing agents.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	methanol	Methyl alcohol (methanol) - Skin	200 ppm / 260 mg/m3	310 mg/m3 / 250 ppm	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	methanol	Methanol	200 ppm	250 ppm	Not Available	TLV Basis: headache; eye damage. BEI
Canada - Alberta Occupational Exposure Limits	methanol	Methanol (Methyl alcohol)	200 ppm / 262 mg/m3	328 mg/m3 / 250 ppm	Not Available	Not Available
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	methanol	Methyl alcohol (methanol)	200 ppm	250 ppm	Not Available	Skin
Canada - Manitoba Occupational Exposure Limits	methanol	Not Available	200 ppm	250 ppm	Not Available	TLV® Basis: Headache; eye dam; dizziness; nausea; BEI
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	methanol	Methyl alcohol	200 ppm / 262 mg/m3	328 mg/m3 / 250 ppm	Not Available	Not Available
Canada - Northwest Territories Occupational Exposure Limits (English)	methanol	Methyl alcohol (methanol)	200 ppm	250 ppm	Not Available	Skin

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

Canada - British Columbia Occupational Exposure Limits	methanol	Methanol	200 ppm	250 ppm	Not Available	Not Available
Canada - Prince Edward Island Occupational Exposure Limits	methanol	Methanol	200 ppm	250 ppm	Not Available	TLV® Basis: Headache, eye dam; dizziness; nausea; BEI
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	sodium hydroxide	Sodium hydroxide	2 mg/m3	Not Available	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	TLV Basis: upper respiratory tract, eye & skin irritation
Canada - Alberta Occupational Exposure Limits	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	Not Available
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	Not Available
Canada - Manitoba Occupational Exposure Limits	sodium hydroxide	Not Available	Not Available	Not Available	2 mg/m3	TLV® Basis: URT, eye, & skin irr
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	Not Available
Canada - Northwest Territories Occupational Exposure Limits (English)	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	Not Available
Canada - British Columbia Occupational Exposure Limits	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	Not Available
Canada - Prince Edward Island Occupational Exposure Limits	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	TLV® Basis: URT, eye, & skin irr

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
methanol	Methyl alcohol; (Methanol)	Not Available	Not Available	Not Available
sodium hydroxide	Sodium hydroxide	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
methanol	6,000 ppm	Not Available
N-ethylperfluoro-1-octanesulfonamidoacetic acid	Not Available	Not Available
water	Not Available	Not Available
sodium hydroxide	10 mg/m3	Not Available

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Personal protection	
Eye and face protection	▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care.
Body protection	See Other protection below
Other protection	▶ Overalls. ▶ PVC Apron. ▶ PVC protective suit may be required if exposure severe. ▶ Eyewash unit.

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).
- Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot an shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

Material	CPI
BUTYL	A
NEOPRENE	B
BUTYL/NEOPRENE	C
NAT+NEOPR+NITRILE	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
PVDC/PE/PVDC	C
SARANEX-23	C
SARANEX-23 2-PLY	C
TEFLON	C
VITON	C
VITON/CHLOROBUTYL	C
VITON/NEOPRENE	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AX-AUS	-	AX-PAPR-AUS / Class 1
up to 50 x ES	-	AX-AUS / Class 1	-
up to 100 x ES	-	AX-2	AX-PAPR-2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Not Available		
Physical state	Liquid	Relative density (Water = 1)	0.791
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	455
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	-98	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	64.7	Molecular weight (g/mol)	32.04
Flash point (°C)	12	Taste	Not Available
Evaporation rate	4.1 BuAC = 1	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE	Oxidising properties	Not Available
Upper Explosive Limit (%)	31	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	6	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	13	Gas group	Not Available

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

Solubility in water	Immiscible	pH as a solution (1%)	Not Applicable
Vapour density (Air = 1)	1.11	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	- Static induced flash fires have happened when filling plastic containers with methanol / water solutions with as low as 30% methanol content. - Unstable in the presence of incompatible materials. - Product is considered stable. - Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	There is strong evidence to suggest that this material can cause, if inhaled once, very serious, irreversible damage of organs. The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Minor but regular methanol exposures may effect the central nervous system, optic nerves and retinae. Symptoms may be delayed, with headache, fatigue, nausea, blurring of vision and double vision. Continued or severe exposures may cause damage to optic nerves, which may become severe with permanent visual impairment even blindness resulting. WARNING Methanol is only slowly eliminated from the body and should be regarded as a cumulative poison which cannot be made non-harmful [CCINFO] Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects.	
Ingestion	There is strong evidence to suggest that this material can cause, if swallowed once, very serious, irreversible damage of organs. The material is not thought to produce adverse health effects following ingestion (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum. Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual. Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733)	
Skin Contact	Skin contact with the material may produce toxic effects; systemic effects may result following absorption. There is strong evidence to suggest that this material, on a single contact with skin, can cause very serious, irreversible damage of organs. Open cuts, abraded or irritated skin should not be exposed to this material. Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. There is strong evidence to suggest that this material, on a single contact with skin, can cause serious, irreversible damage of organs.	
Eye	510meth There is some evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Moderate inflammation may be expected with redness; conjunctivitis may occur with prolonged exposure.	
Chronic	Ample evidence exists, from results in experimentation, that developmental disorders are directly caused by human exposure to the material. Long-term exposure to methanol vapour, at concentrations exceeding 3000 ppm, may produce cumulative effects characterised by gastrointestinal disturbances (nausea, vomiting), headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, conjunctivitis and clouded or double vision. Liver and/or kidney injury may also result.	
N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)	TOXICITY	IRRITATION
	Not Available	Not Available
methanol	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 15800 mg/kg ^[2]	Eye (rabbit): 100 mg/24h-moderate
	Inhalation (rat) LC50: 36208.63875 mg/l/1H ^[2]	Eye (rabbit): 40 mg-moderate
	Oral (rat) LD50: =5300 mg/kg ^[2]	Eye: no adverse effect observed (not irritating) ^[1]
		Skin (rabbit): 20 mg/24 h-moderate
N-ethylperfluoro-1-octanesulfonamidoacetic acid	TOXICITY	IRRITATION
	Not Available	Not Available
water	TOXICITY	IRRITATION
	Oral (rat) LD50: >90000 mg/kg ^[2]	Not Available

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

sodium hydroxide	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 1350 mg/kg ^[2]	Eye (rabbit): 0.05 mg/24h SEVERE
		Eye (rabbit): 1 mg/24h SEVERE
		Eye (rabbit): 1 mg/30s rinsed-SEVERE
		Eye: adverse effect observed (irritating) ^[1]
		Skin (rabbit): 500 mg/24h SEVERE
		Skin: adverse effect observed (corrosive) ^[1]
Legend: 1 Value obtained from Europe ECHA Registered Substances - Acute toxicity 2 * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances		

METHANOL	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.	
WATER	No significant acute toxicological data identified in literature search.	
SODIUM HYDROXIDE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.	
Acute Toxicity	✓	Carcinogenicity ✗
Skin Irritation/Corrosion	✗	Reproductivity ✓
Serious Eye Damage/Irritation	✓	STOT - Single Exposure ✓
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure ✗
Mutagenicity	✗	Aspiration Hazard ✗

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
methanol	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	11-850mg/L	2
	EC50	48	Crustacea	>10-mg/L	2
	EC50	96	Algae or other aquatic plants	16.912mg/L	4
	BCF	24	Algae or other aquatic plants	0.05mg/L	4
	EC0	48	Crustacea	>10-mg/L	2
N-ethylperfluoro-1-octanesulfonamidoacetic acid	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
water	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	897.520mg/L	3
	EC50	96	Algae or other aquatic plants	8768.874mg/L	3
sodium hydroxide	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	125mg/L	4
	EC50	48	Crustacea	40.4mg/L	2
	EC50	96	Algae or other aquatic plants	3180000mg/L	3
	NOEC	96	Fish	56mg/L	4
Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA. Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data					

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

For Methanol: Log Kow: -0.82 to -0.66; Koc: 1; Henry's Law Constant: 4.55x10⁻⁶ atm-cu m/mole; Vapor Pressure: 127 mm Hg; BCF: < 10.

Atmospheric Fate: Methanol is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase methanol is broken down in the atmosphere by reactions with hydroxyl radicals; the half-life for this reaction in air is estimated to be 17 days.

Terrestrial Fate: Methanol is expected to have very high mobility in soil.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
methanol	LOW	LOW
water	LOW	LOW
sodium hydroxide	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
methanol	LOW (BCF = 10)
water	LOW (LogKOW = -1.38)
sodium hydroxide	LOW (LogKOW = -3.8796)

Mobility in soil

Ingredient	Mobility
methanol	HIGH (KOC = 1)
water	LOW (KOC = 14.3)
sodium hydroxide	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	- Containers may still present a chemical hazard/ danger when empty. - Return to supplier for reuse/ recycling if possible.
	Otherwise: - If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. - Where possible retain label warnings and SDS and observe all notices pertaining to the product. Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: - Reduction - Reuse - Recycling - Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. DO NOT allow wash water from cleaning or process equipment to enter drains. - It may be necessary to collect all wash water for treatment before disposal. - In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. - Where in doubt contact the responsible authority. - Recycle wherever possible. - Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. - Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material). - Decontaminate empty containers.

SECTION 14 TRANSPORT INFORMATION

Labels Required

	 
Marine Pollutant	NO

Land transport (TDG)

UN number	1230
UN proper shipping name	METHANOL
Transport hazard class(es)	Class : 3
	Subrisk : 6.1
Packing group	II

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	43
	Explosive Limit and Limited Quantity Index	1 L
	ERAP Index	Not Applicable

Air transport (ICAO-IATA / DGR)

UN number	1230	
UN proper shipping name	Methanol	
Transport hazard class(es)	ICAO/IATA Class	3
	ICAO / IATA Subrisk	6.1
	ERG Code	3L
Packing group	II	
Environmental hazard	Not Applicable	
Special precautions for user	Special provisions	A113
	Cargo Only Packing Instructions	364
	Cargo Only Maximum Qty / Pack	60 L
	Passenger and Cargo Packing Instructions	352
	Passenger and Cargo Maximum Qty / Pack	1 L
	Passenger and Cargo Limited Quantity Packing Instructions	Y341
	Passenger and Cargo Limited Maximum Qty / Pack	1 L

Sea transport (IMDG-Code / GGVSee)

UN number	1230	
UN proper shipping name	METHANOL	
Transport hazard class(es)	IMDG Class	3
	IMDG Subrisk	6.1
Packing group	II	
Environmental hazard	Not Applicable	
Special precautions for user	EMS Number	F-E , S-D
	Special provisions	279
	Limited Quantities	1 L

Transport in bulk according to Annex II of MARPOL and the IBC code

SOURCE	PRODUCT NAME	POLLUTION CATEGORY	SHIP TYPE
	Methyl alcohol	Y	3

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

METHANOL IS FOUND ON THE FOLLOWING REGULATORY LISTS

Canada - Alberta Occupational Exposure Limits
 Canada - British Columbia Occupational Exposure Limits
 Canada - Manitoba Occupational Exposure Limits
 Canada - Northwest Territories Occupational Exposure Limits
 Canada - Nova Scotia Occupational Exposure Limits
 Canada - Prince Edward Island Occupational Exposure Limits
 Canada - Quebec Permissible Exposure Values for Airborne Contaminants
 Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
 Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances
 Canada Categorization decisions for all DSL substances
 Canada Domestic Substances List (DSL)
 Canada Forensic Identification Services Chemical Carcinogenicity Evaluation - Table 1 - Chemicals Considered for Assessment

Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS (English)
 Canada Transport Dangerous Goods - Schedule 1
 Canada Transport Dangerous Goods - Schedule 3
 GESAMP/EHS Composite List - GESAMP Hazard Profiles
 IMDG Code - Medical First Aid Guide for use in accidents involving Dangerous Goods (MFAG) - Appendix 15 List Of Substances
 IMO IBC Code Chapter 17: Summary of minimum requirements
 IMO MARPOL (Annex II) - List of Noxious Liquid Substances Carried in Bulk
 IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances
 IMO Provisional Categorization of Liquid Substances - List 2: Pollutant only mixtures containing at least 99% by weight of components already assessed by IMO
 International Air Transport Association (IATA) Dangerous Goods Regulations
 International Maritime Dangerous Goods Requirements (IMDG Code)
 United Nations Recommendations on the Transport of Dangerous Goods Model Regulations

N-ETHYLPERFLUORO-1-OCTANESULFONAMIDOACETIC ACID IS FOUND ON THE FOLLOWING REGULATORY LISTS

Not Applicable

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

WATER IS FOUND ON THE FOLLOWING REGULATORY LISTS

Canada Categorization decisions for all DSL substances
Canada Domestic Substances List (DSL)

Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS (English)
IMO IBC Code Chapter 18: List of products to which the Code does not apply

SODIUM HYDROXIDE IS FOUND ON THE FOLLOWING REGULATORY LISTS

Canada - Alberta Occupational Exposure Limits
Canada - British Columbia Occupational Exposure Limits
Canada - Manitoba Occupational Exposure Limits
Canada - Northwest Territories Occupational Exposure Limits
Canada - Nova Scotia Occupational Exposure Limits
Canada - Prince Edward Island Occupational Exposure Limits
Canada - Quebec Permissible Exposure Values for Airborne Contaminants
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances
Canada Categorization decisions for all DSL substances
Canada Domestic Substances List (DSL)

Canada Forensic Identification Services Chemical Carcinogenicity Evaluation - Table 1 - Chemicals Considered for Assessment
Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS (English)
Canada Transport Dangerous Goods - Schedule 1
Canada Transport Dangerous Goods - Schedule 3
GESAMP/EHS Composite List - GESAMP Hazard Profiles
IMO IBC Code Chapter 17: Summary of minimum requirements
IMO Provisional Categorization of Liquid Substances - List 3: (Trade-named) mixtures containing at least 99% by weight of components already assessed by IMO, presenting safety hazards
International Air Transport Association (IATA) Dangerous Goods Regulations
International Maritime Dangerous Goods Requirements (IMDG Code)
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations

National Inventory Status

National Inventory	Status
Australia - AICS	No (N-ethylperfluoro-1-octanesulfonamidoacetic acid)
Canada - DSL	No (N-ethylperfluoro-1-octanesulfonamidoacetic acid)
Canada - NDSL	No (methanol; water; sodium hydroxide; N-ethylperfluoro-1-octanesulfonamidoacetic acid)
China - IECSC	No (N-ethylperfluoro-1-octanesulfonamidoacetic acid)
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	No (N-ethylperfluoro-1-octanesulfonamidoacetic acid)
New Zealand - NZIoC	No (N-ethylperfluoro-1-octanesulfonamidoacetic acid)
Philippines - PICCS	No (N-ethylperfluoro-1-octanesulfonamidoacetic acid)
USA - TSCA	Yes
Taiwan - TCSI	No (N-ethylperfluoro-1-octanesulfonamidoacetic acid)
Mexico - INSQ	No (N-ethylperfluoro-1-octanesulfonamidoacetic acid)
Vietnam - NCI	No (N-ethylperfluoro-1-octanesulfonamidoacetic acid)
Russia - ARIPS	No (N-ethylperfluoro-1-octanesulfonamidoacetic acid)
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets)

SECTION 16 OTHER INFORMATION

Revision Date	13/09/2019
Initial Date	05/10/2016

SDS Version Summary

Version	Issue Date	Sections Updated
5.7.1.1.1	13/09/2019	Chronic Health, Classification, Exposure Standard, Ingredients

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC — TWA: Permissible Concentration-Time Weighted Average
PC — STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL: No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

Continued...

N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)

Powered by AuthorTe, from Chemwatch.

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

Wellington Laboratories Inc.

Version No: 6.7

Safety Data Sheet according to WHMIS 2015 requirements

Chemwatch Hazard Alert Code: 4

Issue Date: 13/09/2019

Print Date: 13/09/2019

S GHS CAN EN

SECTION 1 IDENTIFICATION

Product Identifier

Product name	N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)
Synonyms	Methyl alcohol (methanol), Methyl hydrate (methanol), Methylol (methanol)
Proper shipping name	METHANOL
Other means of identification	Not Available

Recommended use of the chemical and restrictions on use

Relevant identified uses	This product is a solution of organic compound(s) in methanol for laboratory use only (see section 3). This material should only be used by those persons trained in the safe handling of hazardous chemicals. Please refer to the Certificate of Analysis (CoA) for further product information. Wellington Laboratories Inc.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	Wellington Laboratories Inc.
Address	345 Southgate Drive Guelph Ontario N1G 3M5 Canada
Telephone	+1 519 822 2436
Fax	+1 519 822 2849
Website	www.well-labs.com
Email	MSDS@well-labs.com

Emergency phone number

Association / Organisation	Wellington Laboratories Inc.
Emergency telephone numbers	1-888-CANUTEC (226-8832) (North American)
Other emergency telephone numbers	1-613-996-6666 (International)

SECTION 2 HAZARD(S) IDENTIFICATION

Classification of the substance or mixture

NFPA 704 diamond



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

Classification	Eye Irritation Category 2A, Acute Toxicity (Dermal) Category 3, Specific target organ toxicity - single exposure Category 1, Flammable Liquid Category 2, Acute Toxicity (Inhalation) Category 3, Reproductive Toxicity Category 1B, Acute Toxicity (Oral) Category 3

Label elements

Hazard pictogram(s)	

SIGNAL WORD **DANGER**

Hazard statement(s)

H319	Causes serious eye irritation.
H311	Toxic in contact with skin.

Continued...

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

H370	Causes damage to organs.
H225	Highly flammable liquid and vapour.
H331	Toxic if inhaled.
H360	May damage fertility or the unborn child.
H301	Toxic if swallowed.

Physical and Health hazard(s) not otherwise classified

Not Applicable

Supplementary statement(s)

Not Applicable

CLP classification (additional)

Not Applicable

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P270	Do not eat, drink or smoke when using this product.

Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider.
P308+P311	IF exposed or concerned: Call a POISON CENTER/doctor/physician/first aider.
P321	Specific treatment (see advice on this label).
P330	Rinse mouth.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
67-56-1	98.994	<u>methanol</u>
2355-31-9*	0.006	<u>N-methylperfluoro-1-octanesulfonamidoacetic acid</u>
7732-18-5	0.99	<u>water</u>
1310-73-2	<0.01	<u>sodium hydroxide</u>

SECTION 4 FIRST-AID MEASURES

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin or hair contact occurs: ▶ Immediately flush body and clothes with large amounts of water, using safety shower if available. ▶ Quickly remove all contaminated clothing, including footwear. ▶ Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre. ▶ Transport to hospital, or doctor.
Inhalation	▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay.

Continued...

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

Ingestion

- ▶ Immediately give a glass of water.
- ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.
- ▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

For acute and short term repeated exposures to methanol:

- ▶ Toxicity results from accumulation of formaldehyde/formic acid.
- ▶ Clinical signs are usually limited to CNS, eyes and GI tract. Severe metabolic acidosis may produce dyspnea and profound systemic effects which may become intractable. All symptomatic patients should have arterial pH measured. Evaluate airway, breathing and circulation.
- ▶ Stabilise obtunded patients by giving naloxone, glucose and thiamine.
- ▶ Decontaminate with Ipecac or lavage for patients presenting 2 hours post-ingestion. Charcoal does not absorb well; the usefulness of cathartic is not established.
- ▶ Forced diuresis is not effective; haemodialysis is recommended where peak methanol levels exceed 50 mg/dL (this correlates with serum bicarbonate levels below 18 meq/L).
- ▶ Ethanol, maintained at levels between 100 and 150 mg/dL, inhibits formation of toxic metabolites and may be indicated when peak methanol levels exceed 20 mg/dL. An intravenous solution of ethanol in D5W is optimal.
- ▶ Folate, as leucovorin, may increase the oxidative removal of formic acid. 4-methylpyrazole may be an effective adjunct in the treatment. 8-Phenytoin may be preferable to diazepam for controlling seizure.

[Ellenhorn Barceloux: Medical Toxicology]

BIOLOGICAL EXPOSURE INDEX - BEI

Determinant	Index	Sampling Time	Comment
1. Methanol in urine	15 mg/l	End of shift	B, NS
2. Formic acid in urine	80 mg/gm creatinine	Before the shift at end of workweek	B, NS

B: Background levels occur in specimens collected from subjects **NOT** exposed.

NS: Non-specific determinant - observed following exposure to other materials.

SECTION 5 FIRE-FIGHTING MEASURES

Extinguishing media

Water may be an ineffective extinguishing media for methanol fires; static explosions are reported for aqueous solutions as dilute as 30%. Water may be used to cool containers.

- ▶ Alcohol stable foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).
- ▶ Carbon dioxide.

Special hazards arising from the substrate or mixture

Fire Incompatibility

- ▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Special protective equipment and precautions for fire-fighters

Fire Fighting

- ▶ Alert Fire Brigade and tell them location and nature of hazard.
- ▶ May be violently or explosively reactive.
- ▶ Wear full body protective clothing with breathing apparatus.
- ▶ Prevent, by any means available, spillage from entering drains or water course.

Fire/Explosion Hazard

- ▶ Liquid and vapour are highly flammable.
 - ▶ Severe fire hazard when exposed to heat, flame and/or oxidisers.
 - ▶ Vapour may travel a considerable distance to source of ignition.
 - ▶ Heating may cause expansion or decomposition leading to violent rupture of containers.
- Combustion products include:
carbon dioxide (CO₂)
formaldehyde
other pyrolysis products typical of burning organic material.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills

- ▶ Remove all ignition sources.
- ▶ Clean up all spills immediately.
- ▶ Avoid breathing vapours and contact with skin and eyes.
- ▶ Control personal contact with the substance, by using protective equipment.

Major Spills

- ▶ Clear area of personnel and move upwind.
- ▶ Alert Fire Brigade and tell them location and nature of hazard.
- ▶ May be violently or explosively reactive.
- ▶ Wear full body protective clothing with breathing apparatus.

Continued...

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	- Containers, even those that have been emptied, may contain explosive vapours. - Do NOT cut, drill, grind, weld or perform similar operations on or near containers. - Avoid all personal contact, including inhalation. - Wear protective clothing when risk of exposure occurs. - Use in a well-ventilated area. - Prevent concentration in hollows and sumps. DO NOT allow clothing wet with material to stay in contact with skin
Other information	- Store in original containers in approved flame-proof area. - No smoking, naked lights, heat or ignition sources. DO NOT store in pits, depressions, basements or areas where vapours may be trapped. - Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	- Glass container is suitable for laboratory quantities - Packing as supplied by manufacturer. - Plastic containers may only be used if approved for flammable liquid. - Check that containers are clearly labelled and free from leaks. - For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type. (ii) : Where a can is to be used as an inner package, the can must have a screwed enclosure. - For materials with a viscosity of at least 2680 cSt. (23 deg. C) - For manufactured product having a viscosity of at least 250 cSt.
Storage incompatibility	Methanol: - reacts violently with strong oxidisers, acetyl bromide, alkyl aluminium salts, beryllium dihydride, bromine, chromic acid, 1-chloro-3,3-difluoro-2-methoxycyclopropane, cyanuric chloride, diethylzinc, isophthaloyl chloride, nitric acid, perchloric acid, potassium-tert-butoxide, potassium sulfur diimide, Raney nickel catalysts, 2,4,6-trichlorotriazine, triethylaluminium, 1,3,3-trifluoro-2-methoxycyclopropane - is incompatible with strong acids, strong caustics, alkaline earth and alkali metals, aliphatic amines, acetaldehyde, benzoyl peroxide, 1,3-bis(di-n-cyclopentadienyl iron)-2-propen-1-one, calcium carbide, chloroform, chromic anhydride, chromium trioxide, dialkylzinc, dichlorine oxide, dichloromethane, ethylene oxide, hypochlorous acid, isocyanates, isopropyl chlorocarbonate, lithium tetrahydroaluminate, magnesium, methyl azide, nitrogen dioxide, palladium, pentafluoroguanidine, perchloryl fluoride, phosphorus pentasulfide, phosphorus trioxide, potassium, tangerine oil, triisobutylaluminium - mixtures with lead perchlorate, sodium hypochlorite are explosive - may react with metallic aluminium at high temperatures - slowly corrodes lead and aluminium - may generate electrostatic charges, due to low conductivity, on flow or agitation - attacks some plastics, rubber and coatings. Static induced flash fires have happened when filling plastic containers with methanol / water solutions with as low as 30% methanol content Alcohols - are incompatible with strong acids, acid chlorides, acid anhydrides, oxidising and reducing agents. - reacts, possibly violently, with alkaline metals and alkaline earth metals to produce hydrogen - react with strong acids, strong caustics, aliphatic amines, isocyanates, acetaldehyde, benzoyl peroxide, chromic acid, chromium oxide, dialkylzinc, dichlorine oxide, ethylene oxide, hypochlorous acid, isopropyl chlorocarbonate, lithium tetrahydroaluminate, nitrogen dioxide, pentafluoroguanidine, phosphorus halides, phosphorus pentasulfide, tangerine oil, triethylaluminium, triisobutylaluminium - should not be heated above 49 deg. C, when in contact with aluminium equipment - Avoid storage with reducing agents.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	methanol	Methyl alcohol (methanol) - Skin	200 ppm / 260 mg/m3	310 mg/m3 / 250 ppm	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	methanol	Methanol	200 ppm	250 ppm	Not Available	TLV Basis: headache; eye damage. BEI
Canada - Alberta Occupational Exposure Limits	methanol	Methanol (Methyl alcohol)	200 ppm / 262 mg/m3	328 mg/m3 / 250 ppm	Not Available	Not Available
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	methanol	Methyl alcohol (methanol)	200 ppm	250 ppm	Not Available	Skin
Canada - Manitoba Occupational Exposure Limits	methanol	Not Available	200 ppm	250 ppm	Not Available	TLV® Basis: Headache; eye dam; dizziness; nausea; BEI
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	methanol	Methyl alcohol	200 ppm / 262 mg/m3	328 mg/m3 / 250 ppm	Not Available	Not Available
Canada - Northwest Territories Occupational Exposure Limits (English)	methanol	Methyl alcohol (methanol)	200 ppm	250 ppm	Not Available	Skin

Continued...

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

Canada - British Columbia Occupational Exposure Limits	methanol	Methanol	200 ppm	250 ppm	Not Available	Not Available
Canada - Prince Edward Island Occupational Exposure Limits	methanol	Methanol	200 ppm	250 ppm	Not Available	TLV® Basis: Headache; eye dam; dizziness; nausea; BEI
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	sodium hydroxide	Sodium hydroxide	2 mg/m3	Not Available	Not Available	Not Available
Canada - Nova Scotia Occupational Exposure Limits	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	TLV Basis: upper respiratory tract, eye & skin irritation
Canada - Alberta Occupational Exposure Limits	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	Not Available
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	Not Available
Canada - Manitoba Occupational Exposure Limits	sodium hydroxide	Not Available	Not Available	Not Available	2 mg/m3	TLV® Basis: URT, eye, & skin irr
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	Not Available
Canada - Northwest Territories Occupational Exposure Limits (English)	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	Not Available
Canada - British Columbia Occupational Exposure Limits	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	Not Available
Canada - Prince Edward Island Occupational Exposure Limits	sodium hydroxide	Sodium hydroxide	Not Available	Not Available	2 mg/m3	TLV® Basis: URT, eye, & skin irr

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
methanol	Methyl alcohol; (Methanol)	Not Available	Not Available	Not Available
sodium hydroxide	Sodium hydroxide	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
methanol	6,000 ppm	Not Available
N-methylperfluoro-1-octanesulfonamidoacetic acid	Not Available	Not Available
water	Not Available	Not Available
sodium hydroxide	10 mg/m3	Not Available

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Personal protection	
Eye and face protection	▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	▶ Wear chemical protective gloves, e.g. PVC. ▶ Wear safety footwear or safety gumboots, e.g. Rubber The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care.
Body protection	See Other protection below
Other protection	▶ Overalls. ▶ PVC Apron. ▶ PVC protective suit may be required if exposure severe. ▶ Eyewash unit.

Continued...

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

- ▶ Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- ▶ For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets).
- ▶ Non sparking safety or conductive footwear should be considered. Conductive footwear describes a boot or shoe with a sole made from a conductive compound chemically bound to the bottom components, for permanent control to electrically ground the foot and shall dissipate static electricity from the body to reduce the possibility of ignition of volatile compounds.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

Material	CPI
BUTYL	A
NEOPRENE	B
BUTYL/NEOPRENE	C
NAT+NEOPR+NITRILE	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
PVDC/PE/PVDC	C
SARANEX-23	C
SARANEX-23 2-PLY	C
TEFLON	C
VITON	C
VITON/CHLOROBUTYL	C
VITON/NEOPRENE	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type AX Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AX-AUS	-	AX-PAPR-AUS / Class 1
up to 50 x ES	-	AX-AUS / Class 1	-
up to 100 x ES	-	AX-2	AX-PAPR-2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- ▶ Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- ▶ The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- ▶ Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Not Available		
Physical state	Liquid	Relative density (Water = 1)	0.791
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	455
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	-98	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	64.7	Molecular weight (g/mol)	32.04
Flash point (°C)	12	Taste	Not Available
Evaporation rate	4.1 BuAC = 1	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	31	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	6	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	13	Gas group	Not Available

Continued...

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

Solubility in water	Immiscible	pH as a solution (1%)	Not Applicable
Vapour density (Air = 1)	1.11	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	▶ Static induced flash fires have happened when filling plastic containers with methanol / water solutions with as low as 30% methanol content. ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	There is strong evidence to suggest that this material can cause, if inhaled once, very serious, irreversible damage of organs. The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Minor but regular methanol exposures may effect the central nervous system, optic nerves and retinae. Symptoms may be delayed, with headache, fatigue, nausea, blurring of vision and double vision. Continued or severe exposures may cause damage to optic nerves, which may become severe with permanent visual impairment even blindness resulting. WARNING Methanol is only slowly eliminated from the body and should be regarded as a cumulative poison which cannot be made non-harmful [CC/INFO] Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects.
Ingestion	There is strong evidence to suggest that this material can cause, if swallowed once, very serious, irreversible damage of organs. The material is not thought to produce adverse health effects following ingestion (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum. Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual. Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733)
Skin Contact	Skin contact with the material may produce toxic effects; systemic effects may result following absorption. There is strong evidence to suggest that this material, on a single contact with skin, can cause very serious, irreversible damage of organs. Open cuts, abraded or irritated skin should not be exposed to this material. Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. There is strong evidence to suggest that this material, on a single contact with skin, can cause serious, irreversible damage of organs.
Eye	510meth There is some evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Moderate inflammation may be expected with redness; conjunctivitis may occur with prolonged exposure.
Chronic	Ample evidence exists, from results in experimentation, that developmental disorders are directly caused by human exposure to the material. Long-term exposure to methanol vapour, at concentrations exceeding 3000 ppm, may produce cumulative effects characterised by gastrointestinal disturbances (nausea, vomiting), headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, conjunctivitis and clouded or double vision. Liver and/or kidney injury may also result.

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)	TOXICITY	IRRITATION
	Not Available	Not Available
methanol	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 15800 mg/kg ^[2]	Eye (rabbit): 100 mg/24h-moderate
	Inhalation (rat) LC50: 36208.63875 mg/l/1H ^[2]	Eye (rabbit): 40 mg-moderate
	Oral (rat) LD50: =5300 mg/kg ^[2]	Eye: no adverse effect observed (not irritating) ^[1]
		Skin (rabbit): 20 mg/24 h-moderate
		Skin: no adverse effect observed (not irritating) ^[1]
N-methylperfluoro-1-octanesulfonamidoacetic acid	TOXICITY	IRRITATION
	Not Available	Not Available
water	TOXICITY	IRRITATION
	Oral (rat) LD50: >90000 mg/kg ^[2]	Not Available

Continued...

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

sodium hydroxide	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 1350 mg/kg ^[2]	Eye (rabbit): 0.05 mg/24h SEVERE
		Eye (rabbit): 1 mg/24h SEVERE
		Eye (rabbit): 1 mg/30s rinsed-SEVERE
		Eye: adverse effect observed (irritating) ^[1]
		Skin (rabbit): 500 mg/24h SEVERE
		Skin: adverse effect observed (corrosive) ^[1]
Legend: 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances		

METHANOL	The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.		
WATER	No significant acute toxicological data identified in literature search.		
SODIUM HYDROXIDE	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.		
Acute Toxicity	✓	Carcinogenicity	✗
Skin Irritation/Corrosion	✗	Reproductivity	✓
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✓
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

Legend: ✗ - Data either not available or does not fill the criteria for classification
 ✓ - Data available to make classification

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
methanol	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	11-850mg/L	2
	EC50	48	Crustacea	>10-mg/L	2
	EC50	96	Algae or other aquatic plants	16.912mg/L	4
	BCF	24	Algae or other aquatic plants	0.05mg/L	4
	EC0	48	Crustacea	>10-mg/L	2
	NOEC	72	Crustacea	0.1mg/L	4
N-methylperfluoro-1-octanesulfonamidoacetic acid	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	Not Available	Not Available	Not Available	Not Available	Not Available
water	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	897.520mg/L	3
	EC50	96	Algae or other aquatic plants	8768.874mg/L	3
sodium hydroxide	ENDPOINT	TEST DURATION (HR)	SPECIES	VALUE	SOURCE
	LC50	96	Fish	125mg/L	4
	EC50	48	Crustacea	40.4mg/L	2
	EC50	96	Algae or other aquatic plants	3180000mg/L	3
	NOEC	96	Fish	56mg/L	4
Legend: Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data					

Continued...

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

For Methanol: Log Kow: -0.82 to -0.66; Koc: 1; Henry's Law Constant: 4.55×10^{-6} atm-cu m/mole; Vapor Pressure: 127 mm Hg; BCF: < 10.

Atmospheric Fate: Methanol is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase methanol is broken down in the atmosphere by reactions with hydroxyl radicals; the half-life for this reaction in air is estimated to be 17 days.

Terrestrial Fate: Methanol is expected to have very high mobility in soil.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
methanol	LOW	LOW
water	LOW	LOW
sodium hydroxide	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
methanol	LOW (BCF = 10)
water	LOW (LogKOW = -1.38)
sodium hydroxide	LOW (LogKOW = -3.8796)

Mobility in soil

Ingredient	Mobility
methanol	HIGH (KOC = 1)
water	LOW (KOC = 14.3)
sodium hydroxide	LOW (KOC = 14.3)

SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	- Containers may still present a chemical hazard/ danger when empty. - Return to supplier for reuse/ recycling if possible. Otherwise: - If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. - Where possible retain label warnings and SDS and observe all notices pertaining to the product. Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: - Reduction - Reuse - Recycling - Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. DO NOT allow wash water from cleaning or process equipment to enter drains. - It may be necessary to collect all wash water for treatment before disposal. - In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. - Where in doubt contact the responsible authority. - Recycle wherever possible. - Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. - Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or Incineration in a licensed apparatus (after admixture with suitable combustible material). - Decontaminate empty containers.

SECTION 14 TRANSPORT INFORMATION

Labels Required

	 
Marine Pollutant	NO

Land transport (TDG)

UN number	1230
UN proper shipping name	METHANOL
Transport hazard class(es)	Class 3 Subrisk 6.1
Packing group	II

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

Environmental hazard	Not Applicable		
Special precautions for user	Special provisions		43
	Explosive Limit and Limited Quantity Index		1 L
	ERAP Index		Not Applicable

Air transport (ICAO-IATA / DGR)

UN number	1230		
UN proper shipping name	Methanol		
Transport hazard class(es)	ICAO/IATA Class		3
	ICAO / IATA Subrisk		6.1
	ERG Code		3L
Packing group	II		
Environmental hazard	Not Applicable		
Special precautions for user	Special provisions		A113
	Cargo Only Packing Instructions		364
	Cargo Only Maximum Qty / Pack		60 L
	Passenger and Cargo Packing Instructions		352
	Passenger and Cargo Maximum Qty / Pack		1 L
	Passenger and Cargo Limited Quantity Packing Instructions		Y341
	Passenger and Cargo Limited Maximum Qty / Pack		1 L

Sea transport (IMDG-Code / GGVSee)

UN number	1230		
UN proper shipping name	METHANOL		
Transport hazard class(es)	IMDG Class		3
	IMDG Subrisk		6.1
Packing group	II		
Environmental hazard	Not Applicable		
Special precautions for user	EMS Number	F-E , S-D	
	Special provisions		279
	Limited Quantities		1 L

Transport in bulk according to Annex II of MARPOL and the IBC code

SOURCE	PRODUCT NAME	POLLUTION CATEGORY	SHIP TYPE
	Methyl alcohol	Y	3

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

METHANOL IS FOUND ON THE FOLLOWING REGULATORY LISTS

Canada - Alberta Occupational Exposure Limits
 Canada - British Columbia Occupational Exposure Limits
 Canada - Manitoba Occupational Exposure Limits
 Canada - Northwest Territories Occupational Exposure Limits
 Canada - Nova Scotia Occupational Exposure Limits
 Canada - Prince Edward Island Occupational Exposure Limits
 Canada - Quebec Permissible Exposure Values for Airborne Contaminants
 Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
 Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances
 Canada Categorization decisions for all DSL substances
 Canada Domestic Substances List (DSL)
 Canada Forensic Identification Services Chemical Carcinogenicity Evaluation - Table 1 - Chemicals Considered for Assessment

Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS (English)
 Canada Transport Dangerous Goods - Schedule 1
 Canada Transport Dangerous Goods - Schedule 3
 GESAMP/EHS Composite List - GESAMP Hazard Profiles
 IMDG Code - Medical First Aid Guide for use in accidents involving Dangerous Goods (MFAG) - Appendix 15 List Of Substances
 IMO IBC Code Chapter 17: Summary of minimum requirements
 IMO MARPOL (Annex II) - List of Noxious Liquid Substances Carried in Bulk
 IMO MARPOL 73/78 (Annex II) - List of Other Liquid Substances
 IMO Provisional Categorization of Liquid Substances - List 2: Pollutant only mixtures containing at least 99% by weight of components already assessed by IMO
 International Air Transport Association (IATA) Dangerous Goods Regulations
 International Maritime Dangerous Goods Requirements (IMDG Code)
 United Nations Recommendations on the Transport of Dangerous Goods Model Regulations

N-METHYLPERFLUORO-1-OCTANESULFONAMIDOACETIC ACID IS FOUND ON THE FOLLOWING REGULATORY LISTS

Not Applicable

Continued...

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

WATER IS FOUND ON THE FOLLOWING REGULATORY LISTS

Canada Categorization decisions for all DSL substances
Canada Domestic Substances List (DSL)

Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS (English)
IMO IBC Code Chapter 18: List of products to which the Code does not apply

SODIUM HYDROXIDE IS FOUND ON THE FOLLOWING REGULATORY LISTS

Canada - Alberta Occupational Exposure Limits
Canada - British Columbia Occupational Exposure Limits
Canada - Manitoba Occupational Exposure Limits
Canada - Northwest Territories Occupational Exposure Limits
Canada - Nova Scotia Occupational Exposure Limits
Canada - Prince Edward Island Occupational Exposure Limits
Canada - Quebec Permissible Exposure Values for Airborne Contaminants
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances
Canada Categorization decisions for all DSL substances
Canada Domestic Substances List (DSL)

Canada Forensic Identification Services Chemical Carcinogenicity Evaluation - Table 1 - Chemicals Considered for Assessment
Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS GHS (English)
Canada Transport Dangerous Goods - Schedule 1
Canada Transport Dangerous Goods - Schedule 3
GESAMP/EHS Composite List - GESAMP Hazard Profiles
IMO IBC Code Chapter 17: Summary of minimum requirements
IMO Provisional Categorization of Liquid Substances - List 3: (Trade-named) mixtures containing at least 99% by weight of components already assessed by IMO, presenting safety hazards
International Air Transport Association (IATA) Dangerous Goods Regulations
International Maritime Dangerous Goods Requirements (IMDG Code)
United Nations Recommendations on the Transport of Dangerous Goods Model Regulations

National Inventory Status

National Inventory	Status
Australia - AICS	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Canada - DSL	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Canada - NDSL	No (methanol; water; N-methylperfluoro-1-octanesulfonamidoacetic acid; sodium hydroxide)
China - IECSC	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Europe - EINEC / ELINCS / NLP	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Japan - ENCS	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Korea - KECI	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
New Zealand - NZIoC	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Philippines - PICCS	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
USA - TSCA	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Taiwan - TCSI	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Mexico - INSQ	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Vietnam - NCI	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Russia - ARIPS	No (N-methylperfluoro-1-octanesulfonamidoacetic acid)
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets)

SECTION 16 OTHER INFORMATION

Revision Date	13/09/2019
Initial Date	05/10/2016

SDS Version Summary

Version	Issue Date	Sections Updated
5.7.1.1.1	13/09/2019	Chronic Health, Classification, Exposure Standard, Ingredients

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC – TWA: Permissible Concentration-Time Weighted Average
PC – STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL: No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

Powered by AuthorTe, from Chemwatch.

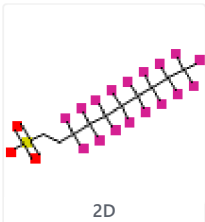
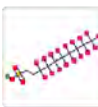
COMPOUND SUMMARY

3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-Heptadecafluorodecane-1-sulfonate

Cite



Download

PubChem CID	20734545
Structure	 2D Find Similar Structures
Molecular Formula	C ₁₀ H ₄ F ₁₇ O ₃ S ⁻
Synonyms	8:2 Fluorotelomer sulfonate DTXSID80873416 3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluorodecane-1-sulfonate 481071-78-7
Molecular Weight	527.18
Parent Compound	 CID 3016044 (3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-Heptadecafluorodecanesulphonic acid)
Dates	Modify 2021-05-22 Create 2007-12-05

Contents

1 Structures

2 Names and Identifiers

3 Chemical and Physical Properties

4 Related Records

5 Patents

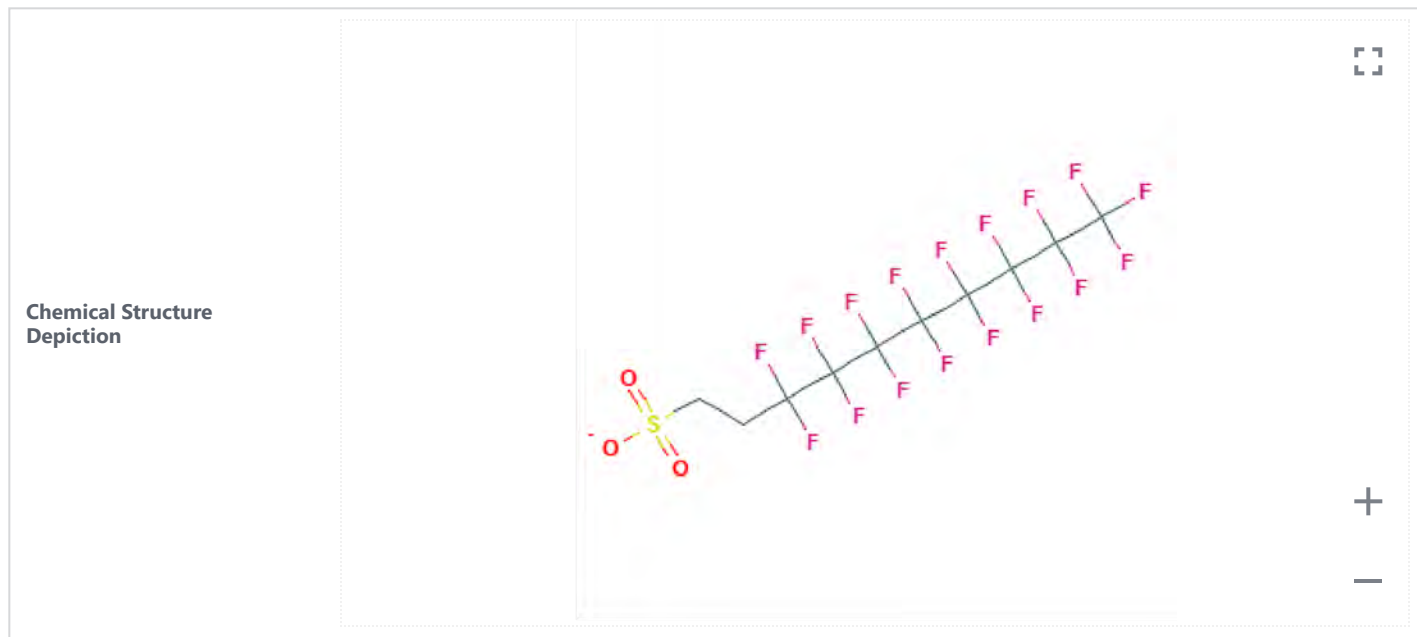
6 Classification

7 Information Sources

1 Structures



1.1 2D Structure



► PubChem

1.2 3D Status



Conformer generation failed at clustering step

► PubChem

2 Names and Identifiers



2.1 Computed Descriptors



2.1.1 IUPAC Name



3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluorodecane-1-sulfonate

Computed by LexiChem 2.6.6 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.2 InChI



InChI=1S/C10H5F17O3S/c11-3(12,1-2-31(28,29)30)4(13,14)5(15,16)6(17,18)7(19,20)8(21,22)9(23,24)10(25,26)27/h1-2H2,(H,28,29,30)/p-1

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.3 InChI Key



ALVYVCQIFHTIRD-UHFFFAOYSA-M

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.4 Canonical SMILES



C(CS(=O)(=O)[O-])C(C(C(C(C(C(C(F)(F)F)(F)F)(F)F)(F)F)(F)F)(F)F)(F)F)(F)F

Computed by OEChem 2.1.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.2 Molecular Formula



C10H4F17O3S-

Computed by PubChem 2.1 (PubChem release 2019.06.18)

► [PubChem](#)

2.3 Other Identifiers



2.3.1 Wikipedia



[8:2 Fluorotelomer sulfonate](#)

► [Wikipedia](#)

2.4 Synonyms





2.4.1 Depositor-Supplied Synonyms

8:2 Fluorotelomer sulfonate

DTXSID80873416

3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluorodecane-1-sulfonate

481071-78-7

► [PubChem](#)

3 Chemical and Physical Properties



3.1 Computed Properties



Property Name	Property Value	Reference
Molecular Weight	527.18	Computed by PubChem 2.1 (PubChem release 2021.05.07)
XLogP3-AA	5.2	Computed by XLogP3 3.0 (PubChem release 2019.06.18)
Hydrogen Bond Donor Count	0	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Hydrogen Bond Acceptor Count	20	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Rotatable Bond Count	8	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Exact Mass	526.9609689	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Monoisotopic Mass	526.9609689	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Topological Polar Surface Area	65.6 Å ²	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Heavy Atom Count	31	Computed by PubChem
Formal Charge	-1	Computed by PubChem
Complexity	747	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Isotope Atom Count	0	Computed by PubChem
Defined Atom Stereocenter Count	0	Computed by PubChem
Undefined Atom Stereocenter Count	0	Computed by PubChem
Defined Bond Stereocenter Count	0	Computed by PubChem
Undefined Bond Stereocenter Count	0	Computed by PubChem
Covalently-Bonded Unit Count	1	Computed by PubChem
Compound Is Canonicalized	Yes	Computed by PubChem (release 2010.01.29)

► PubChem

4 Related Records



4.1 Related Compounds with Annotation



► PubChem

4.2 Parent Compound



CID 3016044 (3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-Heptadecafluorodecanesulphonic acid)

► PubChem

4.3 Related Compounds



Same Parent, Exact	11 Records
Mixtures, Components, and Neutralized Forms	1 Record
Similar Compounds	545 Records

► PubChem

4.4 Substances



4.4.1 Related Substances



Same	5 Records

► PubChem

4.4.2 Substances by Category



► PubChem

5 Patents



5.1 Depositor-Supplied Patent Identifiers



► PubChem

[Link to all deposited patent identifiers](#)

► PubChem

5.2 WIPO PATENTSCOPE



Patents are available for this chemical structure:

<https://patentscope.wipo.int/search/en/result.jsf?inchikey=ALVYVCQIFHTIRD-UHFFFAOYSA-M>

► PATENTSCOPE (WIPO)

6 Classification



6.1 Ontologies



6.1.1 EPA DSSTox Classification



► EPA DSSTox

7 Information Sources



FILTER BY SOURCE

ALL SOURCES



1. **Wikipedia**

8:2 Fluorotelomer sulfonate

<https://www.wikidata.org/wiki/Q81978900>

2. **PubChem**

<https://pubchem.ncbi.nlm.nih.gov>

3. **EPA DSSTox**

CompTox Chemicals Dashboard Chemical Lists

https://comptox.epa.gov/dashboard/chemical_lists/

4. **PATENTSCOPE (WIPO)**

SID 390138071

<https://pubchem.ncbi.nlm.nih.gov/substance/390138071>

6:2 Fluorotelomer Sulfonate (6:2 FTS)

TOXICOLOGY AT A GLANCE



6:2 FTS

- In 2012-2015, the U.S. metal plating industry transitioned from PFOS to short-chain fluorotelomers (e.g., 6:2) FTS in their chromium electroplating processes.
- The standard suite of tests conducted for regulatory approval of industry manufacture and use is available for 6:2 FTS.
- Based on currently available data, 6:2 FTS is less toxic and less persistent in the environment compared to PFOS and does not bioaccumulate.

Mammalian Toxicology

- ✓ Several short duration studies show that 6:2 FTS can cause kidney and liver damage in rodent models.
- ✓ 6:2 FTS does not cause DNA damage.
- ✓ 6:2 FTS does not cause damage to the reproductive system or to the developing fetus in available rodent models.
- ✓ No chronic studies are currently available.
- ✓ No studies have been conducted to assess cancer, immune system toxicity, or endocrine disruption following 6:2 FTS exposure.

Ecological Toxicology

- ✓ 6:2 FTS is less toxic than PFOS in studies with fish, algae, water fleas (*Daphnia*), and earthworms.
- ✓ 6:2 FTS does not bioaccumulate in fish.
- ✓ A peer-reviewed aquatic hazard assessment concluded that 6:2 FTS presents little risk to aquatic organisms.

Human Exposure

- ✓ Human exposure is assessed by analyzing blood for the presence of 6:2 FTS; so far, only 4 studies have looked for 6:2 FTS in human blood.
- ✓ Available data indicate that the general population's exposure to 6:2 FTS is low and infrequent.
- ✓ 6:2 FTS has been detected at low levels in some consumer products, drinking water, air, and fish; human exposure may occur through any of these sources.

Environmental Occurrence

- ✓ 6:2 FTS has been found in air, snow, soil, groundwater, and surface water.
- ✓ 6:2 FTS has been detected at sites associated with fluorochemical manufacture or use of certain fire-fighting foams.
- ✓ 6:2 FTS is less persistent than PFOS.
- ✓ 6:2 FTS can degrade to short-chain perfluorinated compounds, but does not degrade to PFOS.
- ✓ Perfluorohexanoic and perfluoropentanoic acids are the primary degradation products, however, not all degradation products have been identified or well-studied.

Historically, the metal plating industry has used, and continues to use, per- and polyfluoroalkyl substances (PFAS) in some metal plating applications. Most notably, beginning in the 1980s, perfluorooctanesulfonic acid (PFOS) was used as a mist suppressant in hard and decorative chromium plating, chromic acid anodizing, and chromium etch for plating on plastic processes. Due to concerns relating to toxicity and environmental persistence, the chrome plating industry transitioned from using PFOS to using a newer formulation, primarily using 6:2 fluorotelomer sulfonate (6:2 FTS), between 2012-2015. Compared to PFOS, 6:2 FTS has an improved toxicity profile in both rodent and ecological models, and is less persistent than PFOS in the environment and is not bioaccumulative. Further, available studies indicate that human exposure to 6:2 FTS is low and infrequent; comparatively, PFOS is detected in the blood of >99% of Americans. Collectively, available toxicology studies indicate that 6:2 FTS is a safer alternative to PFOS. However, significant data gaps do exist.

1. Mammalian Toxicology of 6:2 FTS

Hundreds of studies have been conducted on PFAS, such as PFOS, in laboratory animals including mice, rats, and primates. Furthermore, over 100 human epidemiology studies have been published on PFOS. Comparatively, the toxicology database for 6:2 FTS can be considered “limited”, however, standard testing for regulatory approval of industry manufacture and use have been completed. Toxicology studies that have been completed for 6:2 FTS include (1) six DNA damage studies; (2) three skin irritation and/or sensitization studies; (3) two acute toxicity studies (i.e., single exposure studies); (4) two systemic toxicity studies (i.e., studies investigating multi-organ toxicity following repeated exposure); (5) one liver toxicity study; and (6) one reproductive and developmental toxicity study. Toxicity data following chronic exposure is currently not available. No human epidemiology studies investigating the relationship between exposure to 6:2 FTS and associated health effects have been conducted. 6:2 FTS has not been assessed for its ability to cause cancer, immune system effects, or endocrine (i.e., hormone) disruption, which are all health effects that have been associated with exposure to some PFAS.

6:2 FTS Toxicology Database

- DNA damage studies x 6
- Skin irritation/sensitization studies x 3
- Acute toxicity studies x 2
- Systemic toxicity studies x 2
- Liver toxicity study x 1
- Reproductive/developmental toxicity study x 1

Collectively, results from toxicology studies indicate that 6:2 FTS does not (1) cause damage to DNA; (2) does not act as a skin sensitizer (i.e., cause allergic skin reactions); and (3) does not cause toxicity to reproductive organs or to the developing fetus. In contrast, several studies have shown that PFOS can cause developmental toxicity. Furthermore, several acute toxicity studies (i.e., single dose studies testing for lethality) have demonstrated that 6:2 FTS is less acutely toxic than PFOS in laboratory animals. 6:2 FTS has been shown to cause skin irritation; however, this effect is unlikely to be relevant for the general population as it requires dermal contact with high concentrations of 6:2 FTS that is likely to only occur in settings with concentrated and specific use. Finally, rodent studies have demonstrated that exposure to 6:2 FTS can cause kidney and liver toxicity; comparatively, PFOS is not typically associated with kidney toxicity, but has been shown to

6:2 FTS does not cause:

- Skin sensitization
- DNA damage
- Reproductive or developmental toxicity

6:2 FTS does cause:

- Skin irritation
- Kidney and liver toxicity

cause adverse liver effects in numerous studies. Although results from these studies indicate that 6:2 FTS can cause kidney and liver toxicity, these results occur at higher exposure levels than typically seen in environmental settings. Laboratory studies of longer duration, multiple exposure levels, and with additional endpoints are still needed.

2. Human Exposure to 6:2 FTS

Human exposure to 6:2 FTS (and other PFAS) can be assessed by collecting and analyzing human blood samples for the presence of 6:2 FTS. Exposure of the general U.S. population to PFAS, such as PFOS, has been closely tracked via several large-scale studies, including the Center for Disease Control's National Health and Nutrition Examination Survey (NHANES); however, 6:2 FTS has not been included in NHANES. Four studies have measured human exposure to 6:2 FTS in populations from Australia, China, Hong Kong, and the United States. All four studies consistently demonstrate that human exposure to 6:2 FTS is low and infrequent, and that the average human blood level of 6:2 FTS is approximately 1000 times lower than that of PFOS. However, results from these studies are nearly a decade old, and it is unknown if trends in human exposure to 6:2 FTS have changed over time. Furthermore, no exposure data is available for workers exposed in occupational settings. More human exposure studies are needed.

Many PFAS, including PFOS, have been measured in both maternal and umbilical cord blood, which indicates that PFAS can cross the placenta, resulting in exposure to the developing fetus.

One study has demonstrated that 6:2 FTS can also cross the placenta, although available toxicity data indicate that 6:2 FTS does not cause toxicity to the developing fetus in animal models.

Detection of 6:2 FTS in human blood demonstrates that human exposure occurs; however, the routes by which the general population may be exposed to 6:2 FTS are poorly understood. Exposure may occur through consumption of contaminated drinking water or food products, through inhalation of contaminated air, or through contact with certain consumer products. It is likely that human exposure to 6:2 FTS occurs through a combination of all of these routes, as 6:2 FTS has been detected in consumer products (i.e., polishes, carpets, circuit boards), drinking water, air, and in certain species of edible fish. Finally, there is evidence that certain PFAS used in food packaging products may breakdown to 6:2 FTS, and thus exposure to these "precursor" compounds may also indirectly contribute to human exposure.

Human Exposure to 6:2 FTS

- Human exposure to 6:2 FTS appears to be low and infrequent
- Humans may be exposed to 6:2 FTS through contaminated air, water, food products, or consumer products

3. Ecological Toxicology of 6:2 FTS

Several laboratory studies have been conducted to investigate the toxicity of 6:2 FTS to aquatic organisms such as rainbow trout, *Daphnia magna* (aquatic invertebrates), and green algae following both short-term (i.e., acute) and long-term (i.e., chronic) exposure. For both acute and chronic studies, 6:2 FTS was less toxic than PFOS to aquatic organisms. Further, a peer-reviewed aquatic hazard assessment concluded that 6:2 FTS "*presents little risk to aquatic organisms*¹."

¹ Hoke et al. 2015. Aquatic hazard, bioaccumulation and screening risk assessment for 6: 2 fluorotelomer sulfonate. *Chemosphere*, 128, pp.258-265.

The toxicity of 6:2 FTS to terrestrial organisms has been assessed in one species, the earthworm. In short-term acute studies, 6:2 FTS and PFOS caused toxicity at similar exposure levels. Alternatively, in long-term chronic studies, 6:2 FTS was less toxic than PFOS to earthworms. There is uncertainty surrounding the effects that 6:2 FTS may have on terrestrial organisms – more studies are needed.

Bioaccumulation is the accumulation of a chemical in an organism, and occurs when exposure exceeds the rate at which an organism can metabolize and/or excrete a chemical from the body. Bioaccumulation can be problematic, as it can result in the accumulation of a chemical in an organism to a level that may lead to adverse effect on organismal health. Both laboratory and field-based studies indicate that 6:2 FTS is unlikely to be bioaccumulative.

6:2 FTS is not bioaccumulative

- Available laboratory and field-based studies indicate that 6:2 FTS is unlikely to be bioaccumulative.

4. Environmental Occurrence and Fate of 6:2 FTS

PFAS can enter the environment through a variety of routes, including through waste streams (i.e., landfill leachate, wastewater treatment plant effluent), through production and manufacturing processes, or through consumer use. Environmental monitoring studies have reported detection of 6:2 FTS in a variety of environmental media, including air, snow, rain, groundwater, surface water (i.e., rivers, lakes, estuaries, oceans), sediment, and in biota such as amphipods, birds, bird eggs, earthworms, and fish. Environmental monitoring studies indicate that 6:2 FTS occurs at low-levels in the environment at most sites; however, higher levels of 6:2 FTS have been detected in environmental media at sites associated with point-sources of contamination such as fluorochemical manufacturing facilities or fire fighter training sites where PFAS-containing aqueous film forming foam (AFFF) has been used. For example, the highest level of 6:2 FTS reported in surface water not associated with point-sources of contamination is 36 ng/L (parts per trillion, ppt), whereas detection levels of up to 28,700 ng/L (ppt) 6:2 FTS have been detected in surface water in close proximity to sites where AFFF has been used.

Once in the environment, some PFAS such as PFOS are highly persistent and do not degrade. Alternatively, studies have demonstrated that 6:2 FTS can be degraded by bacteria in the environment under certain conditions. Studies have consistently demonstrated that degradation of 6:2 FTS leads to the formation of the short-chain perfluorocarboxylic acids (PFCAs) perfluorohexanoic acid (PFHxA) and perfluoropentanoic acid (PFPeA); however, over a dozen additional intermediate PFAS may also be formed during the degradation process. Although PFHxA has been shown to pose minimal risk to human health², very little information on the toxicity of the other PFAS formed during 6:2 FTS degradation is available, and the effects of these PFAS on ecological and human health need to be better understood.

Additional Detailed Information on 6:2 FTS Toxicology – See Appendix 1

² Luz et al. 2019. Perfluorohexanoic acid toxicity, part I: Development of a chronic human health toxicity value for use in risk assessment. *Regulatory Toxicology and Pharmacology*, 103, pp.41-55.

² Anderson et al. 2019. Perfluorohexanoic acid toxicity, part II: Application of human health toxicity value for risk characterization. *Regulatory Toxicology and Pharmacology*, 103, pp.10-20.

Appendix 1. Technical Support Document: 6:2 Fluorotelomer Sulfonate (6:2 FTS)



1. Overview of 6:2 FTS Toxicology

Compared to per- and polyfluoroalkyl substances (PFAS) such as perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), the toxicology database for 6:2 fluorotelomer sulfonate (6:2 FTS) may be considered “limited” even though the standard testing for regulatory approval for industry manufacture and use have been done. These data are available on the European Union (EU)’s REACH dossier and consists of industry-conducted guideline studies that do not appear to have undergone independent expert peer-review (ECHA 2018).

Between the EU dossier and available peer-reviewed publications, the toxicology database for 6:2 FTS consists of:

- (1) six genotoxicity studies;
- (2) three studies designed to test for skin sensitization and/or irritation;
- (3) two acute toxicity studies;
- (4) one reproductive/developmental toxicity study;
- (5) two sub-chronic systemic toxicity studies; and
- (6) one liver toxicity study.

Chronic (2-year) systemic toxicity or carcinogenicity studies, two-generational reproductive toxicity studies, or studies specifically designed to test for immunotoxicity, developmental neurotoxicity, or endocrine disruption have not yet been conducted for 6:2 FTS.

Additionally, several studies have been conducted to assess the ecological toxicity of 6:2 FTS, and include acute toxicity tests conducted with fish, invertebrates (*Daphnia magna*), algae, and earthworms; and chronic toxicity studies conducted with fish and earthworms.

A summary of toxicity studies and the main conclusions, as presented by the study authors, are provided in Table 1.

Appendix 1. Technical Support Document: 6:2 Fluorotelomer Sulfonate (6:2 FTS)



Table 1. Summary of 6:2 FTS Toxicology Studies.

Study	Main conclusion	Reference
Genotoxicity Studies		
OECD 471 - Bacterial reverse mutation assay	• 6:2 FTS is not mutagenic	ECHA
OECD 473 - In vitro mammalian chromosome aberration test in CHO cells	• 6:2 FTS-related chromosomal aberrations were not observed	ECHA
OECD 474 - Mammalian erythrocyte micronucleus test	• 6:2 FTS did not induce micronucleus formation	ECHA
OECD 475 - Mammalian bone marrow chromosome aberration test	• 6:2 FTS did not induce chromosomal aberrations	ECHA
OECD 486 - Unscheduled DNA synthesis (UDS) test with mammalian liver cells in vivo	• 6:2 FTS did not induce unscheduled DNA synthesis	ECHA
OECD 489 - In vivo mammalian alkaline comet assay	• 6:2 FTS did not induce DNA damage in vivo	ECHA
Mammalian Toxicology Studies¹		
OECD 429 - Skin sensitization (local lymph node assay) - conducted with mice	• 6:2 FTS is not a dermal sensitizer	ECHA
OECD 435 - In vitro membrane barrier test method for skin corrosion	• 6:2 FTS is irritating to skin • 6:2 FTS is classified as skin corrosive Category 1A with the accompanying hazard statement (H314) "Causes severe skin burns and eye damage."	ECHA
In vivo (rabbit) skin irritation test	• 6:2 FTS is not irritating to the skin	Buck, 2015
OECD 402 - Acute (single dose) dermal toxicity - conducted with Sprague Dawley rats	• 6:2 FTS is not acutely toxic via the dermal exposure route	ECHA
OECD 420 - Acute (single dose) oral toxicity - fixed dose procedure - conducted with Wistar rats	• The oral LD50 is >300, but less than 2,000 mg/kg 6:2 FTS • 6:2 FTS is classified as GHS Category 4, with the hazard statement (H302) "Harmful if swallowed."	ECHA
14-Day oral dose range finding study with Wistar rats	• Kidney toxicity observed (i.e., increased kidney weight, altered creatinine and urea levels)	ECHA
OECD 422 - Combined repeated dose (90-day) toxicity study with the reproduction/developmental toxicity screening test - conducted with Wistar rats	• 6:2 FTS is not a reproductive or developmental toxicant • Kidney toxicity observed (i.e., elevated urea levels, increased incidence of multi-focal tubular dilation in male and female kidneys)	ECHA
28-Day subchronic study with CD1 mice (only 1 dose used; 5 mg/kg-day)	• Exposure to 6:2 FTS (ammonium salt) was associated with liver toxicity (i.e., increased liver weight, increased incidence of necrosis, hepatocellular hypertrophy)	Sheng et al. (2017)
Aquatic Toxicology Studies		
OECD 201 - Freshwater alga and cyanobacteria, growth inhibition test with green alga (<i>P. subcapitata</i>)	• The 72-hour EC50 ranges from >96 mg/L (potassium salt of 6:2 FTS) to >125 mg/L (6:2 FTS)	ECHA; Hoke et al., 2015
OECD 202 - Daphnia sp. acute immobilization test	• The 48-hour EC50 ranges from >109 mg/L (potassium salt of 6:2 FTS) to >112 mg/L (6:2 FTS)	ECHA; Hoke et al., 2015
OECD 203 - Acute toxicity test - conducted with rainbow trout	• The 96-hour LC50 ranges from >107 mg/L (potassium salt of 6:2 FTS) to >108 mg/L (6:2 FTS)	ECHA; Hoke et al., 2015
OECD 210 - Fish early-life stage toxicity test (90-day) - conducted with rainbow trout	• The 90-day NOEC is 2.62 mg/L 6:2 FTS (potassium salt)	ECHA; Hoke et al., 2015
Conclusions by Hoke et al. (2015)	• 6:2 FTS is not expected to pose a risk to aquatic organisms	Hoke et al., 2015
¹ Results from several unpublished toxicology and bioaccumulation studies for 6:2 FTS were presented at the Society of Environmental Toxicology and Chemistry Meeting (SETAC; Buck, 2018). Unpublished toxicology studies included 28-day oral and 4-hour inhalation studies, both conducted with rats. Further, a bioaccumulation study was conducted in rats in which 6:2 FTS was not found to be bioaccumulative.		
Abbreviations: EC50 = effective concentration that elicits 50% of the response; LC50 = lethal concentration that elicits 50% of the response; LD50 = lethal dose that elicits 50% of the response; NOEC = No observable effect concentration		

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2. Mammalian Toxicology

6:2 FTS is less acutely toxic than PFOS. Results from two acute toxicity studies are listed in the REACH registration dossier for 6:2 FTS (ECHA, 2018), and include oral and dermal exposure studies. 6:2 FTS was not found to be acutely toxic via the dermal route of exposure at doses of up to 2000 mg/kg in an Organization for Economic Cooperation and Development (OECD) Guideline 402 study (OECD 2017; Acute Dermal Toxicity). Alternatively, 6:2 FTS was found to have moderate acute toxicity via the oral exposure route in an OECD Guideline 420 study (OECD, 2002; Acute Oral Toxicity), with an LD₅₀¹ value of between 300 to 2,000 mg/kg. Based on this result, 6:2 FTS was GHS (Globally Harmonized System) classified category 4 for acute oral toxicity, which has the accompanying hazard statement “H302: Harmful if swallowed.” Additionally, Field & Seow (2017) report the acute oral LD₅₀ for rats to be 1,871 mg/kg; however, the study authors did not provide a complete reference and this LD₅₀ could not be verified. Comparatively, the acute oral LD₅₀ value for PFOS has been reported to be 251 mg/kg in rats (Dean et al., 1978). These results demonstrate that 6:2 FTS is less acutely toxic than PFOS via the oral exposure route.

6:2 FTS is not genotoxic. No chronic toxicity studies investigating the carcinogenicity of 6:2 FTS have been conducted. However, a variety of *in vitro* and *in vivo* studies investigating the genotoxic and/or mutagenic potential of 6:2 FTS have been conducted and are reported in the REACH registration dossier for 6:2 FTS (ECHA, 2018). Results from these studies indicate that 6:2 FTS is:

- not mutagenic in the bacterial reverse mutation assay (Guideline 471; OECD, 1997a);
- does not cause DNA damage in an *in vivo* mammalian comet assay (Guideline 489; OECD, 2016a);
- does not induce micronuclei formation (indication of chromosomal damage) in a *in vivo* bone marrow assay (Guideline 474; OECD, 2016b);
- does not induce chromosomal aberrations *in vivo* (Guideline 475; OECD, 1997b) or *in vitro* (Guideline 473; OECD, 1997c) test systems;
- does not causes unscheduled DNA synthesis (Guideline 486; OECD, 1997d).

Collectively, these results indicate that 6:2 FTS is not genotoxic or mutagenic. Similarly, numerous studies have demonstrated that PFOS is not genotoxic [reviewed in USEPA, 2016].

6:2 FTS can cause kidney and liver toxicity. Three studies have been conducted that evaluate the toxicity of 6:2 FTS following repeat exposure. These studies include a 14-day dose-range finding study in rats (ECHA, 2018), a 28-day subchronic study in mice (Sheng et al., 2017), and a 90-day subchronic toxicity study in rats (ECHA, 2018). In the 14-day study, male and female

¹ The LD₅₀ is the lethal dose that causes 50% mortality.

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rats were orally exposed to 10, 50, or 100 mg/kg-day 6:2 FTS. No mortality or clinical signs of toxicity were reported in either sex at any dose. Signs of toxicity included reduced body weight gains and reduced food consumption in male (50 and 100 mg/kg-day treatment groups) and female (100 mg/kg-day group only) rats. Signs of kidney toxicity were observed, and included alterations in serum levels of creatinine and urea, and increased kidney weight in male (50 and 100 mg/kg-day treatment groups) and female (100 mg/kg-day group only) rats (ECHA, 2018).

In the 90-day OECD Guideline 422 study (OECD 1996; combined repeated dose toxicity study with the reproduction/developmental toxicity screening test) male and female rats were orally exposed to 5, 15, or 45 mg/kg-day 6:2 FTS. 6:2 FTS treatment had no effect on mortality, food consumption, or animal behavior, and no gross pathological or neoplastic histopathological findings were reported for either sex at any dose. Treatment-related reduced body weight gains were detected in both sexes in the highest treatment group (45 mg/kg-day). Several clinical signs of toxicity were observed, and included effects related to the skin (sparse hair, encrustations), eye (blepharospasm in one low-dose male rat), and respiratory system (sniffing respiration in two high-dose male rats); however, due to low-incidence and distribution, these effects were not considered treatment-related by the study authors. Hematological findings were reported, including reduced monocytes in male rats (5 mg/kg-day only); however, these effects were not considered treatment-related, as they did not occur in a dose-dependent manner. Mean total protein and albumin serum levels were slightly reduced in male rats (5 and 45 mg/kg-day, but not 15 mg/kg-day group); these effects did not occur in a dose-dependent manner and were not considered treatment-related. Alternatively, a dose-dependent increase in urea levels was reported for high-dose male rats, and was considered treatment related. Additional signs of kidney toxicity were also reported, and these effects were more pronounced in male rats. These effects included increased kidney weight in low- and high-dose male rats, and mild to moderate multifocal tubular dilation in the kidneys of high-dose male (5/12) and female (1/12) rats (ECHA, 2018).

In the 28-day study conducted by Sheng et al. (2017), male CD1 mice were orally exposed to 5.0 mg/kg-day 6:2 FTS, and liver toxicity was investigated. Exposure to 6:2 FTS resulted in increased liver weight, increased serum levels of aspartate transaminase and albumin, and signs of hepatocellular hypertrophy and necrosis. Collectively, these results indicate that 6:2 FTS is hepatotoxic. However, this study has limitations, including the small number of endpoints measured (kidney toxicity not investigated), and only a single exposure group was included in the study, which prevents any dose-response analysis.

Collectively, results from Sheng et al. (2017) and ECHA (2018) indicate that 6:2 FTS can cause kidney and liver toxicity in highly exposed rodent models. Comparatively, the majority of rodent toxicology studies conducted with PFOS do not report kidney toxicity [reviewed in USEPA, 2016], while subchronic and chronic toxicology studies have consistently demonstrated PFOS-induced liver toxicity [reviewed in USEPA, 2016].

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6:2 FTS is not a reproductive or developmental toxicant. One study investigating the reproductive and developmental effects of 6:2 FTS has been conducted (ECHA, 2018). The study adhered to OECD Guideline 422 (OECD, 1996; Combined Repeated Dose Toxicity Study with the Reproduction/Developmental Toxicity Screening Test) in which male and female rats were orally exposed to 6:2 FTS (5, 15, or 45 mg/kg-day) prior to mating, during mating, and throughout gestation and lactation for a total of approximately 90-days. For parental rats, no treatment-related changes were reported for any reproductive parameter, such as reproductive organ weight, estrous cyclicity, serum T4 hormone levels, or reproductive performance. Similarly, no clinical signs of toxicity, or treatment-related effects on survival, body weight, sexual maturation, organ weight, gross pathology or hormone levels were reported for pups. Collectively, these results indicate that 6:2 FTS is not a reproductive or developmental toxicant at doses of up to 45 mg/kg-day.

Alternatively, numerous studies have reported developmental effects associated with PFOS exposure in rats, mice, and rabbits [for a comprehensive review of PFOS-related developmental and reproductive effects see USEPA, 2016], and these effects have been reported as exposure levels as low as 1.6 – 10 mg/kg-day (Luebker et al., 2005a,b; Thibodeaux et al., 2003).

6:2 FTS can cause skin irritation, but not sensitization. One study has been conducted with mice to investigate the ability of 6:2 FTS to act as a skin sensitizer (i.e., cause allergic skin reactions). Results from the OECD Guideline 429 study (OECD 2010; Local Lymph Node Assay) indicate that 6:2 FTS is not a skin sensitizer (ECHA, 2018). Alternatively, 6:2 FTS is GHS classified category 1 for skin corrosivity, which has the following hazard statement “H314: Causes severe skin burns and eye damage.” The GHS classification is based on results from an *in vitro* OECD Guideline 435 study (OECD, 2006; In Vitro Membrane Barrier Test Method for Skin Corrosion) that indicated 6:2 FTS is corrosive to skin (ECHA, 2018). 6:2 FTS was reported to be not irritating to the skin of rabbits in a non-peer-reviewed book chapter (Buck, 2015); however, no additional study details were provided. The reason for the discrepancies are unclear, but may related to the chemical form of 6:2 FTS administered. 6:2 FTS acid, which was used in the *in vitro* study, is expected to be more irritating/corrosive than non-acidic 6:2 FTS salts, which may have been used in the *in vivo* rabbit study; however, the form of 6:2 FTS used was not reported in Buck (2015).

6:2 FTS is classified as an eye irritant. No formal studies have been conducted to test if 6:2 FTS is an eye irritant. However, based on Regulation No. 1272/2008 skin corrosive chemicals are to be classified as serious eye damage category 1, which has the accompanying hazard statement H318: Causes serious eye damage” (ECHA, 2018). Comparatively, *in vivo* studies have demonstrated that PFOS can also cause severe eye irritation (Riker Laboratories, Inc., 1981).

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3. Ecological Toxicology

The acute and chronic toxicity of 6:2 FTS has been investigated in several aquatic (fish, *Daphnia*, algae) and terrestrial (earthworms) species. In general, and as discussed in more detail below, 6:2 FTS is less toxic to aquatic and terrestrial organisms than PFOS (Table 2).

Table 2. Comparison of 6:2 FTS and PFOS ecotoxicity.

	6:2 FTS	PFOS
96-Hour Rainbow Trout LC ₅₀ (mg/L)	>107 ^a	7.8 – 22 ^b
48-Hour <i>Daphnia magna</i> Immobilization EC ₅₀ (mg/L)	>109 ^a	67.2 ^b
72-Hour <i>Pseudokirchneriella subcapitata</i> Growth Rate (ErC ₅₀ ; mg/L)	>96 ^a	48.2 ^b
72-Hour <i>Pseudokirchneriella subcapitata</i> NOEC _r (mg/L)	47.6 ^a	42 ^b
90-Day Rainbow Trout NOEC (mg/L)	2.62 ^a	0.29 ^{b,c}
14-Day Earthworm LC ₅₀ (mg/kg)	373 ^d	365 ^e
56-Day Earthworm EC ₅₀ (mg/kg) - # of cocoons	566 ^f	103 ^f
56-Day Earthworm EC ₅₀ (mg/kg) - juvenile weight	253 ^f	29 ^f
^a Hoke et al., 2015 ^b Beach et al., 2006 ^c NOEC is for a 47-d test with fathead minnows, not rainbow trout ^d 3M, 2003 ^e Juong et al. (2010) ^f Stubberud (2006) Acronyms: EC ₅₀ = effective concentration that gives half-maximal response; ErC ₅₀ = EC ₅₀ in terms of reduced growth rate; LC ₅₀ = lethal concentration that causes 50% mortality; NOEC = no observable effect concentration; NOEC _r = NOEC for growth rate		

3.1 Aquatic Toxicology

6:2 FTS is less acutely toxic to aquatic organisms than PFOS. The acute toxicity of 6:2 FTS has been investigated in several species, including *Oncorhynchus mykiss* (rainbow trout), *Daphnia magna* (aquatic invertebrate), and *Pseudokirchneriella subcapitata* (green algae). Compared to PFOS, 6:2 FTS is less acutely toxic to rainbow trout, with a 96-hour LC₅₀ value of >107 mg/L (Hoke et al., 2015), while the 96-hour LC₅₀ value for PFOS ranges from 7.8 to 22 mg/L (Beach et al., 2006). Similarly, *Daphnia* are less sensitive to 6:2 FTS than to PFOS, with EC₅₀ values of >109 mg/L 6:2 FTS (Hoke et al., 2015) and 67.2 mg/L PFOS (Beach et al., 2006). Alternatively, 6:2 FTS and PFOS inhibit green algae growth at similar concentrations, with no observable effect concentrations (NOECs) of 47.6 mg/L for 6:2 FTS (Hoke et al., 2015) and 42 mg/L for PFOS (Beach et al., 2006). However, the concentration at which 6:2 FTS inhibited green algae growth by 50% (EC₅₀) is >96 mg/L (Hoke et al., 2015), while the EC₅₀ for PFOS is 48.2 mg/L (Beach et al., 2006). These results indicate that the slope of the PFOS dose-response curve is steeper than that of 6:2 FTS, which indicates that 6:2 FTS is less toxic to green algae than PFOS.

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6:2 FTS is less chronically toxic to fish than PFOS. One study investigating the chronic, 90-day, toxicity of 6:2 FTS in early-life stage rainbow trout has been conducted (Hoke et al., 2015). In this study, the most sensitive toxicological endpoint was embryo hatching, with a NOEC of 2.62 mg/L. No 90-day early-life stage studies with rainbow trout were identified for PFOS. However, results from a 47-day PFOS chronic toxicity study conducted with Fathead minnows is available (Beach et al., 2006). The lowest NOEC identified in this study was 0.29 mg/L. Although the studies were conducted in different species of fish, both were early-life stage chronic toxicity studies. Further, the PFOS NOEC is nearly 10-fold lower than the 6:2 FTS NOEC. This result indicates that fish are more sensitive to chronic PFOS exposure than to chronic 6:2 FTS exposure.

3.2 Terrestrial Toxicology

6:2 FTS and PFOS display similar acute toxicity to earthworms. One study investigating the acute toxicity of 6:2 FTS to terrestrial organisms has been conducted. In a study conducted by 3M (2003), the 14-day LC50 of 6:2 FTS for earthworms was determined to be 373 mg/kg soil (3M, 2003). Similarly, Juong et al. (2010) determined the 14-day LC50 value of PFOS to be 365 mg/kg soil. Both studies were conducted under similar experimental conditions. Thus, these results indicate 6:2 FTS and PFOS are similarly acutely toxic to earthworms.

6:2 FTS is less chronically toxic than PFOS to earthworms. A study by Stubberud (2006) reports results from an earthworm reproduction test in which the number of cocoons laid, hatching success, and juvenile worm weight was reported. The EC50 values for number of cocoons laid and juvenile weight were calculated to be 566 and 253 mg/kg soil, respectively, for 6:2 FTS. Alternatively, EC50 values for PFOS were 103 (cocoons laid) and 29 mg/kg soil (juvenile weight). These results indicate that 6:2 FTS is less chronically toxic to earthworms than PFOS.

More research on the potential terrestrial and mammalian toxicity of 6:2 FTS is needed.

4. Toxicokinetics and Bioaccumulation

6:2 FTS is eliminated more rapidly than PFOS. Toxicokinetics is the study of how the body handles a chemical, and includes analysis of a chemical's rate of adsorption, tissue distribution, metabolism, and excretion. Limited information is available on the toxicokinetics of 6:2 FTS. One *in vivo* toxicokinetics study and one *in vitro* metabolism study are reported in the REACH registration dossier for 6:2 FTS; however, minimal study details are provided (ECHA, 2018). For the toxicokinetic study, two single doses (dosing levels not provided) of 6:2 FTS were administered (species tested was not reported) and then fat, liver, plasma, and urine samples were collected to investigate the distribution and excretion of 6:2 FTS. Fat-to-plasma ratios could not be calculated for females, while ratios were <0.1 (low dose) to 0.1 (high dose) for

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males indicating 6:2 FTS does not accumulate in fat. Similarly, liver-to-plasma ratios could not be determined for females, while ratios were 3.0 (low dose) to 3.1 (high dose) for males, indicating partitioning of 6:2 FTS to the liver. 65-68% of the administered dose of 6:2 FTS was recovered in urine 96-hours after dosing, and elimination half-lives ranged from 20.9 to 23.8 hours. Comparatively, the elimination half-life of PFOS following oral administration has been reported to range from 30.5 to 42.8 days for mice and 39.8 to 66.7 days for rats (Chang et al. 2012). These results indicate that 6:2 FTS will be eliminated more rapidly than PFOS.

In vitro studies indicate 6:2 FTS may not be readily metabolized. Two *in vitro* studies investigating the metabolism of 6:2 FTS have been conducted. In the first, 6:2 FTS was incubated with male rat liver S9 microsomes for 2-hours, which is a common *in vitro* method employed to estimate *in vivo* metabolism. No metabolism of 6:2 FTS was detected (ECHA, 2018). In a second study, 6:2 FTS was incubated with rainbow trout hepatocytes for 2-hours; no metabolism of 6:2 FTS was detected (Hoke et al., 2015). However, *in vitro* test systems do not completely replicate *in vivo* metabolism, thus, *in vivo* studies should be conducted to confirm *in vitro* results. Numerous studies have demonstrated that PFOS is recalcitrant to metabolism *in vitro* and *in vivo* [reviewed in USEPA, 2016].

6:2 FTS is not bioaccumulative. Bioaccumulation is the accumulation of a chemical in an organism, and occurs when exposure and adsorption of a chemical occurs at a faster rate than metabolism and/or excretion. Bioaccumulation factors (BAFs) and bioconcentration factors (BCFs) are the ratio of a chemical in an organism to the concentration in the surrounding environment. According to the U.S. EPA, chemicals with BCFs >1000 are considered bioaccumulative, while other regulatory agencies in Canada, the European Union, and the United Nations consider chemicals with BAFs/BCFs of 2,000 to 5,000 to be bioaccumulative (Arnot and Gobas, 2006).

Laboratory- and field-based BCFs/BAFs for 6:2 FTS have been calculated for fish (rainbow trout, white sucker), earthworms, midge, and biofilm. As can be seen in Table 3, all estimated BCFs are below 1000 indicating that 6:2 FTS is not classifiable as bioaccumulative by the most conservative regulatory standard.

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Table 3. Summary of 6:2 FTS BCFs and BAFs

Species	Exposure Details	BCF/BAF	Reference
<i>Oncorhynchus mykiss</i> (rainbow trout)	Aqueous exposure to 6:2 FTS	3 - 36	Hoke et al., 2015
	Dietary exposure to 6:2 FTS. ¹	0.3	
<i>Oncorhynchus mykiss</i> (rainbow trout)	Aqueous exposure to 6:2 FTS containing AFFF	ND	Yeung & Mabury, 2013
<i>Chironomus riparius</i> (midge)	Exposure to 6:2 FTS contaminated environmental sediments.	0.018	Bertin et al., 2014
<i>Gammarus</i> spp. (Crustacea)	Exposure to 6:2 FTS contaminated environmental sediments.	0.88	Bertin et al., 2016
<i>Catostomus commersonii</i> (white sucker)	Field-based estimates	0.23 - 0.95	Munoz et al., 2017
Biofilm ²	Field-based estimates	148	Munoz et al., 2018
<i>Eisenia fetida</i> (earthworms)	Exposure to 6:2 FTS contaminated soil from fire training facilities.	2.4	NPCA, 2008

¹ Dietary biomagnification factors are estimated for dietary exposures.

² Log BCF values were estimated to be 1.4, 1.5, and 3.6 from three different locations for a mean value of 2.17, which is equivalent to a BCF of 148.

ND = Not determined; accumulation was not sufficient for BCFs to be estimated.

Compared to PFOS, 6:2 FTS has reduced binding affinity to some proteins. In contrast to most bioaccumulative chemicals, which are lipophilic and accumulate in fat, PFOS bioaccumulation is associated with binding to proteins such as serum albumin, fatty acid binding protein in the liver, and organic anion transporters in the kidney. One study investigating 6:2 FTS protein binding has been published (Sheng et al. 2018). In this study, a fluorescent displacement assay was used to investigate PFOS and 6:2 FTS binding to human liver FABP (hL-FABP). The concentrations required to cause a 50% fluorescent displacement (IC₅₀) were 1.34 and 78.97 µM for PFOS and 6:2 FTS, respectively, indicating that 6:2 FTS has reduced binding affinity to hL-FABP. Furthermore, Sheng et al. (2018) used molecular docking software to investigate the molecular interactions of PFAS with the hL-FABP binding pocket. Using this approach, no binding of 6:2 FTS to the hL-FABP was observed, whereas PFOS binding could be modelled.

5. Human Exposure to 6:2 FTS

Human exposure to 6:2 FTS appears to be low and infrequent. 6:2 FTS has been detected in human serum, thus demonstrating that exposure to 6:2 FTS can occur (Table 4). However, compared to PFOS, 6:2 FTS human biomonitoring data is limited, and only four studies reporting human serum levels of 6:2 FTS are available. In contrast, 100s of studies investigating

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human exposure to PFOS have been conducted. Additionally, results from all 6:2 FTS biomonitoring studies are based on small sample sizes, and were conducted nearly a decade ago. Thus, it is unclear how human exposure to 6:2 FTS has changed over the past decade, or how occupational exposure levels compares to that of the general population. Additional research on the potential sources of 6:2 FTS and extent of human exposure are needed.

Table 4. Summary of 6:2 FTS Biomonitoring Data

Location	Sampling Year	Sample/ gender/ age	N	FOD	LOD (ng/L)	Min (ng/L)	Median (ng/L)	Arithmetic Mean (ng/L)	Max (ng/L)	Reference
U.S.	2009	Serum, M	20	42%	5	<LOD	--	5.91	18.39	Lee & Mabury (2011) ¹
		Serum, F	20	65%	5	<LOD	--	9.28	29.54	
China	2009	Maternal serum	50	64%	3	<LOD	11.55	13.39	48.24	Yang et al. (2016) ²
		Cord serum	50	68%	3	<LOD	13.53	20.99	90.21	
Hong Kong	--	Blood, M + F	20	100%	--	0.34	1.17	2.19	7.89	Loi et al. (2013) ⁴
Australia	2011	Serum, Age: 0-4	4	50%	--	<LOD	--	10	20	Eriksson et al. (2017) ^{1,3}
		Serum, Age: 5-15	4	0%	--	--	--	--	--	
		Serum, Age: 16-30	4	25%	--	<LOD	--	10	50	
		Serum, Age: 31-45	4	25%	--	<LOD	--	10	30	
		Serum, Age: 46-60	4	0%	--	--	--	--	--	
		Serum, Age: >60	4	0%	--	--	--	--	--	

¹ For purposes for calculating the mean, samples with 6:2 FTS levels below the LOD were substituted with a value of zero.
² For puposes of calculating the mean, samples with 6:2 FTS levels below the LOD were substituted with a value of the LOD divided by the square root of two.
³ N = 4 pooled serum samples; each sample consisted of 100 individual pooled serum samples.
⁴ Serum data is reported in units of pg/g, which is equivalent to parts per trillion (ppt); ng/L is also equivalent to ppt
 "--" = Value not provided; "FOD" = frequency of detection; "LOD" = limit of detection

One biomonitoring study was conducted in the United States in 2009 (Lee & Mabury, 2011). In this study, 6:2 FTS was detected in the serum of 42% of male participants and 65% of female participants with arithmetic mean serum levels ranging from 5.9 ng/L (males) to 9.3 ng/L (females). These serum levels are significantly lower than the arithmetic mean serum levels of PFOS reported in the general U.S. population. During the 2009-2010 NHANES survey period, PFOS was detected in the serum of >99% of participants with median levels ranging from 7,800 ng/L (females) to 11,800 ng/L (males) (CDC, 2018). These findings indicate that human exposure to 6:2 FTS is lower than that of PFOS.

6:2 FTS can cross the placenta resulting in fetal exposure. One study has demonstrated that 6:2 FTS can cross the placental resulting in exposure to the developing fetus (Yang et al., 2016). In this study, 6:2 FTS was measured in paired maternal and cord serum from 50 Chinese mothers. The frequency of detection and mean serum levels of 6:2 FTS were similar for maternal and cord serum, and the median placental transfer ratio was 1.2:1 indicating that 6:2 FTS can freely cross the placenta. This finding is similar to PFOS, which has also been shown to cross the placenta.

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6. Exposure Routes

Human exposure to 6:2 FTS may occur via a variety of routes, including consumption of contaminated drinking water or food products, through inhaling 6:2 FTS in the air, or through contact with consumer products that may contain 6:2 FTS. Field and Seow (2017) recently reviewed available monitoring data, and demonstrated that exposure to 6:2 FTS through these routes is possible, as 6:2 FTS has been detected in (1) consumer products including circuit boards, carpets, and polishes; (2) in drinking water in Spain, Germany, and France; (3) in air; and (4) in certain species of fish (see Field and Seow (2017) for a complete review).

Although, it is apparent that human exposure to 6:2 FTS occurs, it remains unknown whether humans are exposed directly to 6:2 FTS or to PFAS precursors that can degrade to 6:2 FTS. Lee & Mabury (2011) suggest that indirect exposure to 6:2 FTS may occur first through exposure to disubstituted thioether phosphates (S-diPAPS; also known as fluorotelomer mercaptoalkyl phosphate esters or FTMAPs), which are used in food packaging products (Trier et al., 2011), and can be metabolized to 6:2 FTS. A wide variety of additional 6:2 FTS precursors have been proposed based on chemical structures (See Table 12 of Field & Seow, 2017), many of which are constituents of firefighting foams (i.e., AFFF); however, little empirical data exists to directly link degradation of these compounds to 6:2 FTS. It is likely that direct exposure to 6:2 FTS and precursors both contribute to human exposure.

7. Environmental Occurrence & Persistence

7.1 Environmental Occurrence

6:2 FTS is detected at low levels and frequencies at sites associated with non-point-sources of contamination. Several studies have monitored the environmental occurrence of 6:2 FTS at both sites associated with non-point sources and with point sources (i.e., firefighting training facilities or fluoropolymer facilities) of contamination [reviewed in Field and Seow, 2017]. 6:2 FTS has been detected in (1) landfill leachate and sediment in Sweden, Norway, Germany, and the U.S.; (2) in wastewater treatment plant influent, effluent, and sludge; (3) in rain and snow; (4) in surface waters including rivers, lakes, estuaries, and oceans; and (5) in organisms including amphipods, birds, bird eggs, worms, and fish. In general, 6:2 FTS is detected at low levels and frequencies in environmental samples collected from sites with non-point sources of contamination, while higher detection frequencies and levels are often reported at sites with known point sources of contamination (Field and Seow, 2017). For example, the highest level of 6:2 FTS reported in surface waters not associated with point sources of contamination is 36 ng/L (Nguyen et al, 2011), while the highest level of 6:2 FTS reported in surface water with known point sources of contaminate (fire-fighting foam) is 28,700 ng/L (Boiteux et al., 2016).

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7.2 Environmental Persistence

Biodegradation of 6:2 FTS occurs under aerobic, sulfur-limiting, conditions.

Several studies have been conducted to investigate biodegradation of 6:2 FTS under varying conditions. An OECD Guideline 301B (CO₂ Evolution Test; OECD 1992) study was conducted to test whether 6:2 FTS could be utilized as a carbon source by bacteria. Over 28-days a maximum loss of 42% was observed; based on test guidelines this result indicates that 6:2 FTS is not readily biodegradable (ECHA, 2018). Similarly, several studies have demonstrated that 6:2 FTS is not readily biodegradable under anaerobic conditions (Zhang et al. 2016), or in activated sludge from WWTPs under anaerobic or aerobic conditions (Ochoa-Herrera et al., 2016; Wang et al., 2011). Alternatively, several studies have demonstrated that 6:2 FTS can be utilized as a sulfur source by bacteria under aerobic, sulfur-limiting conditions (Key et al., 1998; Shaw et al., 2019; Van Hamme et al., 2013; Zhang et al., 2016). Zhang et al. (2016) report that 6:2 FTS undergoes rapid biodegradation in aerobic sediment, with a biodegradation half-life of less than five days. Biodegradation pathways of 6:2 FTS have also been proposed in several publications, and PFHxA (PFCA with 5 fluorinated carbons), PFPeA (PFCA with 4 fluorinated carbons) and the 5:3 fluorotelomer acid are consistently

reported to be the primary terminal degradation products (Shaw et al., 2019; Van Hamme et al., 2013; Wang et al., 2011; Zhang et al., 2016). However, numerous intermediary PFAS are formed throughout the biodegradation process. Shaw et al. (2019) identified 16 intermediary metabolites, many of which are shown in the proposed major degradation pathway for 6:2 FTS (Figure 1). Major metabolites identified by Shaw et al. (2019) include: 6:2 fluorotelomer (6:2 FT) alcohol (6:2

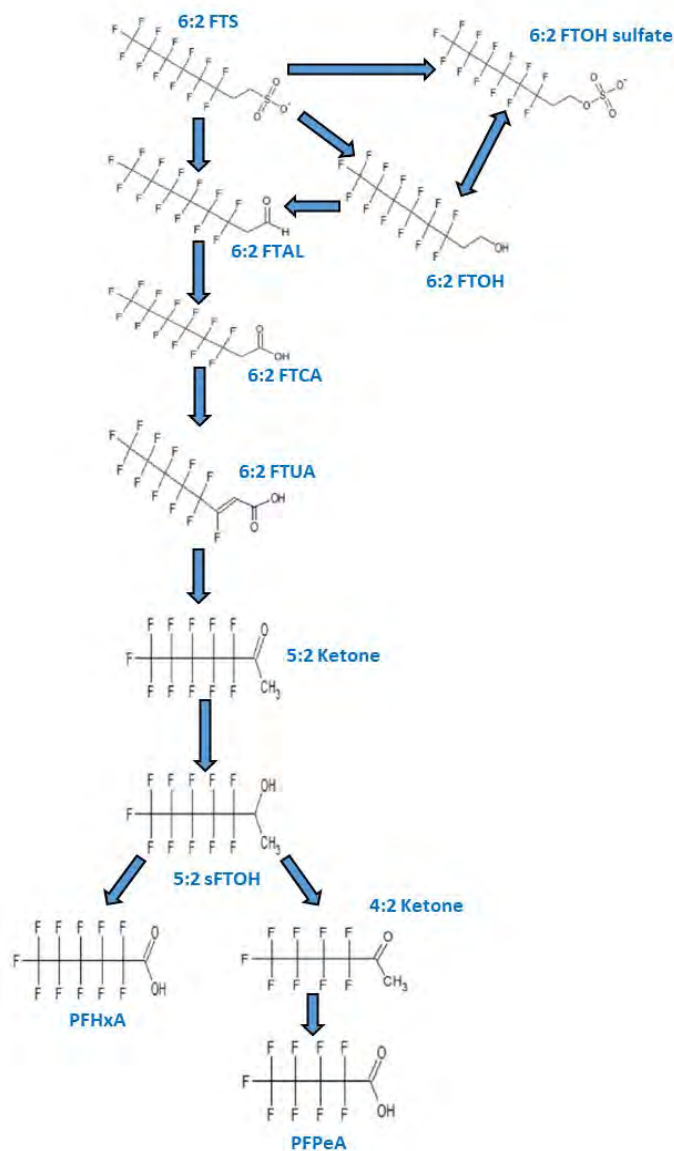


Figure 1. Proposed major degradation pathway for 6:2 FTS. Adapted from Shaw et al. (2019).

Appendix 1. Technical Support Document: 6:2 Fluorotelomer Sulfonate (6:2 FTS)



FTOH), 6:2 FT alcohol sulfate (6:2 FTOH sulfate), 6:2 FT aldehyde (6:2 FTAL), 6:2 FT acid (6:2 FTAC), 6:2 FT unsaturated acid (6:2 FTUA), 5:2 FT ketone, 5:2 FT secondary alcohol (5:2 sFTOH), 4:2 FT ketone, and the short-chain PFCAs PFHxA and PFPeA. Although, the terminal degradation product PFHxA has been shown to pose minimal risk to human health (Anderson et al., 2019), very little toxicological information is available for the other metabolites formed during 6:2 FTS biodegradation, or the proposed terminal degradation products formed through proposed minor degradation pathways, such as PFBA and 4:2 FTUA (Shaw et al., 2019).

Significant and important data gaps related to the environmental and *in vivo* degradation of 6:2 FTS remain.

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Nonafluorobutane-1-sulfonic acid

sc-236187

Material Safety Data Sheet



Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Nonafluorobutane-1-sulfonic acid

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY:

ChemWatch

Within the US & Canada: 877-715-9305

Outside the US & Canada: +800 2436 2255

(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

C4F9O3HS, "perfluorobutanesulfonic acid (PFBS)", "nonafluorobutane-1-sulfonic acid", "1-butanefluoronic acid, nonafluoro-", "nonafluorobutanesulfonic acid", "pentyl perfluorononabutanoate sulfonate", "1-perfluorobutanesulfonic acid", "1-butanefluoronic acid, 1, 1, 2, 2, 3, 3, 4, 4, 4-nonafluoro-", "C4 sulfonate"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	2		
Body Contact:	3		
Reactivity:	2		
Chronic:	2		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Reacts violently with water.

Harmful if swallowed.

Causes burns.

Risk of serious damage to eyes.

Toxic to bees.

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

! Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

! The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

! Ingestion of acidic corrosives may produce burns around and in the mouth.
the throat and esophagus.

EYE

! The material can produce chemical burns to the eye following direct contact.

Vapors or mists may be extremely irritating.

! If applied to the eyes, this material causes severe eye damage.

! Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns.

Mild burns of the epithelia generally recover rapidly and completely.

SKIN

! The material can produce chemical burns following direct contact with the skin.

! Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.

! Skin contact is not thought to produce harmful health effects (as classified using animal models).

Systemic harm, however, has been identified following exposure of animals by at least one other route and the material may still produce health damage following entry through wounds, lesions or abrasions.

! Open cuts, abraded or irritated skin should not be exposed to this material.

! Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.

Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

! The material can cause respiratory irritation in some persons.

The body's response to such irritation can cause further lung damage.

! Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.

There may be dizziness, headache, nausea and weakness.

CHRONIC HEALTH EFFECTS

! Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.

Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Perfluoroalkylsulfonate fluoride-based products have included surfactants, paper and packaging treatments, surface protectants (e.g., for carpet, upholstery, textile) and are found in specialised fire-fighting foams (AFFF for example). Depending on the specific functional derivatisation or degree of polymerisation, such products may degrade or metabolize, to an undetermined degree, to perfluoroalkylsulfonates (such as perfluorooctanesulfonate - PFOS), which are stable and persistent end products that have the potential to bioaccumulate. Salts of PFOS are known to cause significant toxic effects, including mortality, in Cynomolgus monkeys (oral doses of 0.75 mg/ kg/ day), 12 rabbits (oral doses of 3.75 mg kg/ day), rats (oral doses of 1.6 mg/ kg/day) and zooplankton (10 mg/l)

PFOS is persistent, bioaccumulative and toxic to mammalian species. There are species differences in the elimination half-life of PFOS; the half-life is 100 days in rats, 200 days in monkeys, and years in humans. The toxicity profile of PFOS is similar among rats and monkeys. Repeated exposure results in hepatotoxicity and mortality; the dose-response curve is very steep for mortality. This occurs in animals of all ages, although the neonate may be more sensitive. In addition, a 2-year bioassay in rats has shown that exposure to PFOS results in hepatocellular adenomas and thyroid follicular cell adenomas; the hepatocellular adenomas do not appear to be related to peroxisome proliferation.

In one study which followed exposed workers for 37 years there was a statistically significant risk of death from bladder cancer. Neoplasms of the male reproductive system, of the gastrointestinal tract also appeared to be elevated. Risk ratios were highest in

workers with highest and longest exposure to fluorochemicals. PFOS has not been shown to be genotoxic in a variety of assay systems. Lower molecular weight homologues such as perfluorobutanesulfonate (PFBS) do not exhibit the levels of toxicity or bioaccumulation of the higher homologues. Studies show PFBS is highly bound to human albumin with indications of a saturated binding to albumin in serum and negligible binding to the other liver-manufactured proteins gamma globulin, alpha globulin, fibrinogen, alpha-2-macroglobulin, transferrin and beta lipoproteins. The results of two in vitro studies and a chromosomal aberration test show no evidence of mutagenicity due to potassium PFBS. Animal data to date does not indicate potassium PFBS is a developmental toxin nor a substance toxic to reproduction, fertility or lactation. In humans PFBS has a much shorter half-life than PFOS (just over one month vs 5.5 years).

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
perfluorobutanesulfonic acid	375-73-5	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

" For advice, contact a Poisons Information Center or a doctor at once. " Urgent hospital treatment is likely to be needed.

EYE

! If this product comes in contact with the eyes: " Immediately hold eyelids apart and flush the eye continuously with running water. " Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

! If skin or hair contact occurs: " Immediately flush body and clothes with large amounts of water, using safety shower if available. " Quickly remove all contaminated clothing, including footwear.

INHALED

" If fumes or combustion products are inhaled remove from contaminated area. " Lay patient down. Keep warm and rested. Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g.

NOTES TO PHYSICIAN

! For acute or short term repeated exposures to strong acids:

" Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.

" Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not Available
Upper Explosive Limit (%):	Not Available
Specific Gravity (water=1):	Not Available
Lower Explosive Limit (%):	Not Available

EXTINGUISHING MEDIA

" Foam.

" Dry chemical powder.

FIRE FIGHTING

" Alert Emergency Responders and tell them location and nature of hazard.

" Wear full body protective clothing with breathing apparatus.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

" Combustible.

" Slight fire hazard when exposed to heat or flame.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO₂), hydrogen fluoride, sulfur oxides (SO_x), other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

! Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:

Full face- shield.

Gloves:

Respirator:

Type AB-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

! Environmental hazard - contain spillage.

" Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.

" Check regularly for spills and leaks.

" Clean up all spills immediately.

" Avoid breathing vapors and contact with skin and eyes.

MAJOR SPILLS

! Environmental hazard - contain spillage.

" Clear area of personnel and move upwind.

" Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

" DO NOT allow clothing wet with material to stay in contact with skin.

" Avoid all personal contact, including inhalation.

" Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

! DO NOT use aluminum or galvanized containers.

Check regularly for spills and leaks.

" Lined metal can, Lined metal pail/drum

" Plastic pail.

For low viscosity materials

" Drums and jerricans must be of the non-removable head type.

" Where a can is to be used as an inner package, the can must have a screwed enclosure.

STORAGE REQUIREMENTS

" Store in original containers.

" Keep containers securely sealed.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

• perfluorobutanesulfonic acid: CAS:375-73-5

PERSONAL PROTECTION



RESPIRATOR

• Type AB-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE

" Chemical goggles.

" Full face shield.

HANDS/FEET

! Elbow length PVC gloves.

" When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

" frequency and duration of contact,

" chemical resistance of glove material,

" glove thickness and

" dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

" When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

" When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

" Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

" Overalls.

" PVC Apron.

ENGINEERING CONTROLS

! Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Corrosive.

Acid.

Reacts violently with water.

State	LIQUID	Molecular Weight	300.1
Melting Range (°F)	Not Available	Viscosity	Not Available
Boiling Range (°F)	234- 237 (14 mm Hg)	Solubility in water (g/L)	Reacts violently
Flash Point (°F)	Not Available	pH (1% solution)	Not Available
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not Available
Autoignition Temp (°F)	Not Available	Vapour Pressure (mmHG)	Not Available
Upper Explosive Limit (%)	Not Available	Specific Gravity (water=1)	Not Available
Lower Explosive Limit (%)	Not Available	Relative Vapor Density (air=1)	Not Available
Volatile Component (%vol)	Not Available	Evaporation Rate	Not Available

APPEARANCE

Liquid; reacts violently with water.

PFOS has a solubility of approximately 550 mg/l in pure water - the solubility decreases with increased salt content. For example the potassium salt of PFOS has a solubility of 370 mg/l in pure water. Due to surface active properties of PFOS, the log Kow cannot be measured. The potassium salt of PFOS has a low vapour pressure, 3.31×10^{-4} Pa at 20 C.

Material	Value

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

" Contact with alkaline material liberates heat.

" Presence of incompatible materials.

" Product is considered stable.

STORAGE INCOMPATIBILITY

! Reacts with mild steel, galvanized steel / zinc producing hydrogen gas which may form an explosive mixture with air.

Segregate from alcohol, water.

Segregate from alkalis, oxidizing agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.

" Avoid strong bases.

" NOTE: May develop pressure in containers; open carefully. Vent periodically.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

perfluorobutanesulfonic acid

TOXICITY AND IRRITATION

PERFLUOROBUTANESULFONIC ACID:

! unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY**IRRITATION**

Oral (Rat) LD50: 430 mg/kg

! Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

for perfluorinated sulfonates:

Toxicology studies of the C4 fluoroalkyl sulfonate (PFBS), the C8 fluoroalkyl sulfonate (PFOS) and the C8 fluorocarboxylic acid (PFOA) indicate that chain length is an important factor in toxicity, perhaps partially due to pharmacokinetic factors; toxicity and persistence appears to increase with increasing chain length. Human biomonitoring studies have shown that the C6 perfluorosulfonate, PFOS and PFOA are present in the serum of the general US population, and that the levels of the C6 perfluorosulfonate are quite high in children. Other chain lengths have not yet been monitored in the general population. Environmental monitoring studies have demonstrated the presence of the entire series of perfluorinated compounds, as well as some higher homologs. Current hazard and risk assessments have addressed individual chemicals. If there is a common mode of action for these chemicals the latter efforts are likely to underestimate potential hazard and risk to exposed populations.

Extensive pharmacokinetic information is available for PFOS (perfluorooctanesulfonate) and PFOA (perfluorooctanoic acid) and more limited information is available for PFBS (perfluorobutanesulfonate). The existing information for PFOS and PFOA suggest the following issues may be critical determinants of pharmacokinetics and blood dosimetry for other members of the class:

" These compounds are well absorbed.

" The carboxylic acids and sulfonates are cleared by urinary and biliary elimination in rodents with no evidence of metabolism, while the telomer alcohols are metabolised apparently to carboxylic acid derivatives. Extensive enterohepatic recirculation has been demonstrated for both PFOA and PFOS.

" Species and sex differences in clearance are most dramatic for PFOA (female rat (hrs)>>male rat (days)>mouse>monkey (weeks)>human (years)). PFOS demonstrates higher blood levels in female rats than males following repeated exposures and the clearance during week 105 was faster than older intravenous and oral studies would predict. PFBS is rapidly eliminated in several hours in rats. The mechanism(s) for species and sex variation in clearance is ill-defined but may in part be related to differential expression of renal transport proteins.

" Serum protein binding (generally albumin) is extensive resulting in high concentrations in serum. Liver has very high concentrations as well, followed by kidney. Other tissues have generally low concentrations (and the fluorination make this a non-lipophilic compound), but account for a significant fraction of the mass in the body.

There is extensive toxicology information available on PFBS, PFOS and PFOA. Studies of PFOS and PFOA have shown that the developing organism is a primary target. A two generation reproductive toxicity study of PFOS in rats, and several subsequent studies in rats and mice, have shown a very high incidence of mortality in the F1 offspring in the first few days following birth. A two-generation reproductive toxicity study of PFOA in rats has demonstrated mortality in the F1 offspring in the first few days following weaning, as well as a delay in sexual maturation. Preliminary studies of PFOA in mice have shown a mortality pattern very similar to that observed following exposure to PFOS in that mortality occurs in the first few days after birth.

In contrast, these effects were not noted in a two-generation reproductive toxicity study of PFBS in rats or a limited one-generation toxicity study of C6 perfluorosulfonate in rats. To date, there is no information on developmental effects following exposure to chain lengths greater than C8.

In addition, several of the compounds in the perfluorinated series are peroxisome proliferators, and PFOS and PFOA have been shown to be carcinogenic in rats. Chronic studies of PFOA in rats have shown the presence of hepatocellular, Leydig cell and pancreatic acinar cell tumors. PFOA is a demonstrated PPAR-alpha (peroxisome proliferator-activated receptor) agonist and this has been hypothesised to be the mode of action for the hepatocellular adenomas. Chronic exposure of PFOS in rats is also associated with hepatocellular adenomas. PFOS is also a peroxisome proliferator, but studies have not been conducted to firmly establish the role of PPAR-alpha agonism in the induction of the liver adenomas. Chronic exposure studies of PFBS have not yet been conducted. Although preliminary studies indicate that PFBS is a weak peroxisome proliferator at comparatively high doses, only very limited liver toxicity has been noted in a two-generation reproductive toxicity study, and no liver toxicity was noted in 28-day and 90-day studies at comparable doses.

Limited studies of the C9 and C10 perfluorocarboxylic acids indicate that both compounds are peroxisome proliferators. Thus, it is likely that liver adenomas may be expected following chronic exposures to many of the compounds in the proposed series. However, several scientific groups have concluded that PPAR-a agonist induced liver tumors in adult rodents are of questionable relevance to humans. Others have questioned whether chronic exposure to peroxisome proliferators would result in a different outcome if exposures were initiated prenatally rather than in adulthood.

Section 12 - ECOLOGICAL INFORMATION

Toxic to bees.

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
perfluorobutanesulfonic acid	HIGH	No Data Available	LOW	MED

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

#Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

" Reduction

" Reuse

" Recycling

" Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

" Recycle wherever possible.

" Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols: None Hazard class or Division: 8

Identification Numbers: UN3265 PG: II

Label Codes: 8 Special provisions: B2, IB2,

T11, TP2,

TP27

Packaging: Exceptions: 154 Packaging: Non- bulk: 202

Packaging: Exceptions: 154 Quantity limitations: 1 L

Passenger aircraft/rail:

Quantity Limitations: Cargo 30 L Vessel stowage: Location: B

aircraft only:

Vessel stowage: Other: 40

Hazardous materials descriptions and proper shipping names:

Corrosive liquid, acidic, organic, n.o.s.

Air Transport IATA:

UN/ID Number: 3265 Packing Group: II

Special provisions: A3

Cargo Only

Packing Instructions: 855 Maximum Qty/Pack: 30 L

Passenger and Cargo Passenger and Cargo

Packing Instructions: Y840 Maximum Qty/Pack: 1 L

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 851 Maximum Qty/Pack: 0.5 L

Shipping Name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.

*(CONTAINS PERFLUOROBUTANESULFONIC ACID)

Maritime Transport IMDG:

IMDG Class: 8 IMDG Subrisk: None

UN Number: 3265 Packing Group: II

EMS Number: F-A,S-B Special provisions: 274

Limited Quantities: 1 L

Shipping Name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.(contains perfluorobutanesulfonic acid)

Section 15 - REGULATORY INFORMATION

perfluorobutanesulfonic acid (CAS: 375-73-5) is found on the following regulatory lists;

"Canada Non-Domestic Substances List (NDSL)", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

! Cumulative effects may result following exposure*.

! Limited evidence of a carcinogenic effect*.

* (limited evidence).

Denmark Advisory list for selfclassification of dangerous substances

Substance CAS Suggested codes perfluorobutanesulfonic acid 375- 73- 5 Xn; R22

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! Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

! The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Issue Date: May-24-2009

Print Date: Jul-15-2011



Safety data sheet
according to 1907/2006/EC, Article 31

Printing date 11.09.2020

Version number 2

Revision: 11.09.2020

SECTION 1: Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Product name:** Perfluorobutanoic acid

· **Part number:** DRE-C15986520

· **CAS Number:**

375-22-4

· **EC number:**

206-786-3

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**

No further relevant information available.

· **Application of the substance / the mixture** Reference material for laboratory use only

· **1.3 Details of the supplier of the safety data sheet**

· **Manufacturer/Supplier:**

LGC Limited

Queens Road

Teddington

Middlesex TW11 0LY

UNITED KINGDOM

Tel : +44 (0) 20 8943 7000

Fax : +44 (0) 20 8943 2767

eMail : gb@lgcstandards.com

Web : www.lgcstandards.com

· **Further information obtainable from:**

Product safety department

eMail : sds-request@lgcgroup.com

· **1.4 Emergency telephone number:**

For Hazardous Materials or Dangerous Goods Incident

Spill, Leak, Fire Exposure, or Accident

Call CHEMTREC:

USA & Canada 1-800-424-9300

Rest of the world +1 703-741-5970

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**

· **Classification according to Regulation (EC) No 1272/2008**



GHS05 corrosion

Skin Corr. 1A H314 Causes severe skin burns and eye damage.

Eye Dam. 1 H318 Causes serious eye damage.

· **2.2 Label elements**

· **Labelling according to Regulation (EC) No 1272/2008**

The substance is classified and labelled according to the CLP regulation.

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Product name: Perfluorobutanoic acid

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· Hazard pictograms

GHS05

· Signal word *Danger***· Hazard statements***H314 Causes severe skin burns and eye damage.***· Precautionary statements***P280 Wear protective gloves/protective clothing/eye protection/face protection.**P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].**P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.**P310 Immediately call a POISON CENTER/doctor.**P405 Store locked up.**P501 Dispose of contents/container in accordance with local/regional/national/international regulations.***· 2.3 Other hazards****· Results of PBT and vPvB assessment****· PBT:** Not applicable.**· vPvB:** Not applicable.

SECTION 3: Composition/information on ingredients

· 3.1 Chemical characterisation: Substances**· CAS No. Description***375-22-4 Heptafluorobutyric acid***· Identification number(s)** *None***· EC number:** 206-786-3**· RTECS:** ET4025000**· Additional information:** *For the wording of the listed hazard phrases refer to section 16.*

SECTION 4: First aid measures

· 4.1 Description of first aid measures**· General information:** *Immediately remove any clothing soiled by the product.***· After inhalation:** *Supply fresh air; consult doctor in case of complaints.***· After skin contact:***Immediately wash with water and soap and rinse thoroughly.**Seek immediate medical advice.***· After eye contact:** *Rinse opened eye for several minutes under running water. Then consult a doctor.***· After swallowing:** *Rinse mouth. Do not induce vomiting.***· 4.2 Most important symptoms and effects, both acute and delayed** *No further relevant information available.*

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- **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

- **5.1 Extinguishing media**
- **Suitable extinguishing agents:** Use fire extinguishing methods suitable for surrounding conditions.
- **5.2 Special hazards arising from the substance or mixture**
Formation of toxic gases is possible during heating or in case of fire.
- **5.3 Advice for firefighters**
- **Protective equipment:** Wear self-contained respiratory protective device.

SECTION 6: Accidental release measures

- **6.1 Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
- **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
- **6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose of contaminated material as waste according to item 13.
Ensure adequate ventilation.
- **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

- **7.1 Precautions for safe handling** Store in cool, dry place in tightly closed receptacles.
- **Information about fire - and explosion protection:** No special measures required.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
Please refer to the manufacturer's certificate for specific storage and transport temperature conditions.
Store only in the original receptacle unless other advice is given on the CoA.
Keep container in a well-ventilated place. Keep away from sources of ignition and heat.
- **Information about storage in one common storage facility:** Store away from foodstuffs.
- **Further information about storage conditions:** Keep container tightly sealed.
- **7.3 Specific end use(s)** No further relevant information available.

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SECTION 8: Exposure controls/personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.
- **8.1 Control parameters**
- **Ingredients with limit values that require monitoring at the workplace:** Not required.
- **Additional information:** Lists used were valid at the time of SDS preparation.
- **8.2 Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
 - Keep away from foodstuffs, beverages and feed.
 - Immediately remove all soiled and contaminated clothing
 - Wash hands before breaks and at the end of work.
 - Avoid contact with the eyes.
 - Avoid contact with the eyes and skin.
- **Respiratory protection:**
 - Not required.
 - Use suitable respiratory protective device in case of insufficient ventilation.
- **Protection of hands:**
 - The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
 - Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
 - The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374



Protective gloves

- **Material of gloves** Fluorocarbon rubber (Viton)
- **Penetration time of glove material**
 - The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
- **Eye protection:**



Tightly sealed goggles

SECTION 9: Physical and chemical properties

- **9.1 Information on basic physical and chemical properties**
- **General Information**
- **Appearance:**

Form:	Liquid
Colour:	Colourless

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· Odour:	Odourless
· Odour threshold:	Not determined.
· pH-value:	Not determined.
· Change in condition	
Melting point/freezing point:	Not determined.
Initial boiling point and boiling range:	Not determined. 121 °C
· Flash point:	Not applicable.
· Flammability (solid, gas):	Not determined.
· Ignition temperature:	Not determined
· Decomposition temperature:	Not determined.
· Auto-ignition temperature:	Not determined.
· Explosive properties:	Not determined.
· Explosion limits:	
Lower:	Not determined.
Upper:	Not determined.
· Vapour pressure at 25 °C:	13 hPa
· Density at 20 °C:	1.645 g/cm ³
· Relative density	Not determined.
· Vapour density	Not determined.
· Evaporation rate	Not determined.
· Solubility in / Miscibility with water:	Not determined.
· Partition coefficient: n-octanol/water:	Not determined.
· Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
· 9.2 Other information	No further relevant information available.

SECTION 10: Stability and reactivity

- **10.1 Reactivity**
Stable under normal conditions.
No further relevant information available.
- **10.2 Chemical stability** Stable under normal conditions.
- **Thermal decomposition / conditions to be avoided:**
Formation of toxic gases is possible during heating or in case of fire.
- **10.3 Possibility of hazardous reactions** No dangerous reactions known.
- **10.4 Conditions to avoid Heat.**

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- **10.5 Incompatible materials:** Strong oxidizing agents.
- **10.6 Hazardous decomposition products:**
Formation of toxic gases is possible during heating or in case of fire.

SECTION 11: Toxicological information

- **11.1 Information on toxicological effects**
- **Acute toxicity** Based on available data, the classification criteria are not met.
- **Primary irritant effect:**
- **Skin corrosion/irritation**
Causes severe skin burns and eye damage.
- **Serious eye damage/irritation**
Causes serious eye damage.
- **Respiratory or skin sensitisation** Based on available data, the classification criteria are not met.
- **CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)**
- **Germ cell mutagenicity** Based on available data, the classification criteria are not met.
- **Carcinogenicity** Based on available data, the classification criteria are not met.
- **Reproductive toxicity** Based on available data, the classification criteria are not met.
- **STOT-single exposure** Based on available data, the classification criteria are not met.
- **STOT-repeated exposure** Based on available data, the classification criteria are not met.
- **Aspiration hazard** Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

- **12.1 Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **12.2 Persistence and degradability** No further relevant information available.
- **12.3 Bioaccumulative potential** No further relevant information available.
- **12.4 Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product to reach ground water, water course or sewage system.
Must not reach sewage water or drainage ditch undiluted or unneutralised.
- **12.5 Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

- **13.1 Waste treatment methods**
- **Recommendation**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

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- **European waste catalogue**
Waste disposal key numbers from EWC have to be assigned depending on origin and processing.
- **Uncleaned packaging:**
- **Recommendation:** Dispose of in accordance with national regulations.

SECTION 14: Transport information

· 14.1 UN-Number	UN3265
· ADR, IMDG, IATA	3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Heptafluorobutyric acid)
· ADR	CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (Heptafluorobutyric acid)
· IMDG, IATA	
-
· 14.3 Transport hazard class(es)	
· ADR, IMDG, IATA	
	
· Class	8 Corrosive substances.
· Label	8
-
· 14.4 Packing group	
· ADR, IMDG, IATA	I
-
· 14.5 Environmental hazards:	Not applicable.
-
· 14.6 Special precautions for user	Warning: Corrosive substances.
· Danger code (Kemler):	88
· EMS Number:	F-A,S-B
· Segregation groups	Acids
· Stowage Category	B
· Stowage Code	SW2 Clear of living quarters.
-
· 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code	Not applicable.
-
· Transport/Additional information:	

· ADR	
· Limited quantities (LQ)	0
· Excepted quantities (EQ)	Code: E0 Not permitted as Excepted Quantity
· Transport category	1
· Tunnel restriction code	E

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Product name: Perfluorobutanoic acid

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· **UN "Model Regulation":** UN 3265 CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (HEPTAFLUOROBUTYRIC ACID), 8, 1

SECTION 15: Regulatory information

- **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **Directive 2012/18/EU**
- **Named dangerous substances - ANNEX I** Substance is not listed.
- **REGULATION (EC) No 1907/2006 ANNEX XVII** Conditions of restriction: 3
- **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

The information in this safety data sheet (SDS) has been prepared with due care and is true and accurate to the best of our knowledge. The user must determine the suitability of the information for its particular purpose, ensure compliance with existing laws and regulations, and be aware that other or additional safety or performance considerations may arise when using, handling and/ or storing the material. The information in this SDS does not purport to be all inclusive or a guarantee as to the properties of the material supplied, and should be used only as a guide. LGC makes no warranties or representations as to the accuracy and completeness of the information contained herein, shall not be held responsible for the suitability of this information for the user's intended purposes or the consequences of such use, and shall not be liable for any damage or loss, howsoever arising, direct or otherwise.

· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

IATA: International Air Transport Association

GHS: Globally Harmonised System of Classification and Labelling of Chemicals

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

Skin Corr. 1A: Skin corrosion/irritation – Category 1A

Eye Dam. 1: Serious eye damage/eye irritation – Category 1

· **Sources**

Tables 3.1 and 3.2 from Annex 6 of EC 1272/2008, EC 1907/2006, EH40/2005 as amended 2011, Registry of Toxic Effects of Chemical Substances (RTECS), The Dictionary of Substances and their Effects, 1st Edition, IUCLID.

- **Data compared to the previous version altered.** All sections have been updated.

SAFETY DATA SHEET

Revision Date 14-Feb-2020

Revision Number 3

1. Identification

Product Name Perfluorodecanoic acid

Cat No. : B22292

CAS-No 335-76-2

Synonyms Decanoic acid, nonadecafluoro-; Ndfda; Nonadecafluoro-n-decanoic acid

Recommended Use Laboratory chemicals.

Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Emergency Telephone Number

During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660.
After normal business hours, call Carechem 24 at (866) 928-0789.

2. Hazard(s) identification**Classification**

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Carcinogenicity	Category 2
Reproductive Toxicity	Category 1A
Effects on or via lactation	

Label Elements**Signal Word**

Danger

Hazard Statements

Suspected of causing cancer
May damage the unborn child. Suspected of damaging fertility
May cause harm to breast-fed children

**Precautionary Statements****Prevention**

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Do not breathe dust/fume/gas/mist/vapors/spray
Avoid contact during pregnancy/while nursing
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product

Response

IF exposed or concerned: Get medical attention/advice

Storage

Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Decanoic acid, nonadecafluoro-	335-76-2	96

4. First-aid measures

General Advice

Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact

Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation

Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion

Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects

None reasonably foreseeable.

Notes to Physician

Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray. Carbon dioxide (CO ₂). Dry chemical. Alcohol resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	Not applicable
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Carbon monoxide (CO). Carbon dioxide (CO₂). Gaseous hydrogen fluoride (HF).

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health
3

Flammability
0

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.
Environmental Precautions	Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling	Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Use only under a chemical fume hood. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance.
Storage	Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed.

8. Exposure controls / personal protection

<u>Exposure Guidelines</u>	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
Engineering Measures	Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.
<u>Personal Protective Equipment</u>	
Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard

EN166.

Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	77 - 83 °C / 170.6 - 181.4 °F
Boiling Point/Range	218 °C / 424.4 °F @ 740 mmHg
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C10 H F19 O2
Molecular Weight	514.08

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Bases, Reducing Agent
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂), Gaseous hydrogen fluoride (HF)
Hazardous Polymerization	No information available.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Decanoic acid, nonadecafluoro-	LD50 = 57 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic	No information available

Products**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Decanoic acid, nonadecafluoro-	335-76-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN2811
 Proper Shipping Name TOXIC SOLIDS, ORGANIC, N.O.S.
 Technical Name Decanoic acid, nonadecafluoro-
 Hazard Class 6.1
 Packing Group II

TDG

UN-No UN2811
 Proper Shipping Name Toxic solid, organic, n.o.s.
 Hazard Class 6.1
 Packing Group II

IATA

UN-No UN2811
 Proper Shipping Name Toxic solid, organic, n.o.s.
 Hazard Class 6.1
 Packing Group II

IMDG/IMO

UN-No UN2811
 Proper Shipping Name Toxic solid, organic, n.o.s.
 Hazard Class 6.1
 Packing Group II

15. Regulatory information**United States of America Inventory**

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Decanoic acid, nonadecafluoro-	335-76-2	X	ACTIVE	S

Legend:

TSCA - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

' ' - Not Listed

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule.

TSCA 12(b) - Notices of Export

Component	CAS-No	TSCA 12(b) - Notices of Export
Decanoic acid, nonadecafluoro-	335-76-2	Section 5

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Decanoic acid, nonadecafluoro-	335-76-2	-	-	206-400-3	-	X	-	-	-

U.S. Federal Regulations**SARA 313** Not applicable**SARA 311/312 Hazard Categories** See section 2 for more information**CWA (Clean Water Act)** Not applicable**Clean Air Act** Not applicable**OSHA - Occupational Safety and Health Administration** Not applicable**CERCLA** Not applicable**California Proposition 65** This product does not contain any Proposition 65 chemicals.**U.S. State Right-to-Know Regulations** Not applicable**U.S. Department of Transportation**

Reportable Quantity (RQ): N

DOT Marine Pollutant N

DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations**Mexico - Grade**

No information available

16. Other information**Prepared By**Health, Safety and Environmental Department
Email: tech@alfa.com
www.alfa.com**Revision Date**

14-Feb-2020

Print Date

14-Feb-2020

Revision Summary

SDS authoring systems update, replaces ChemGes SDS No. 335-76-2.

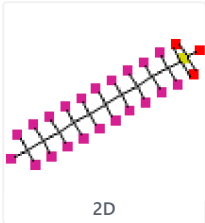
Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

COMPOUND SUMMARY

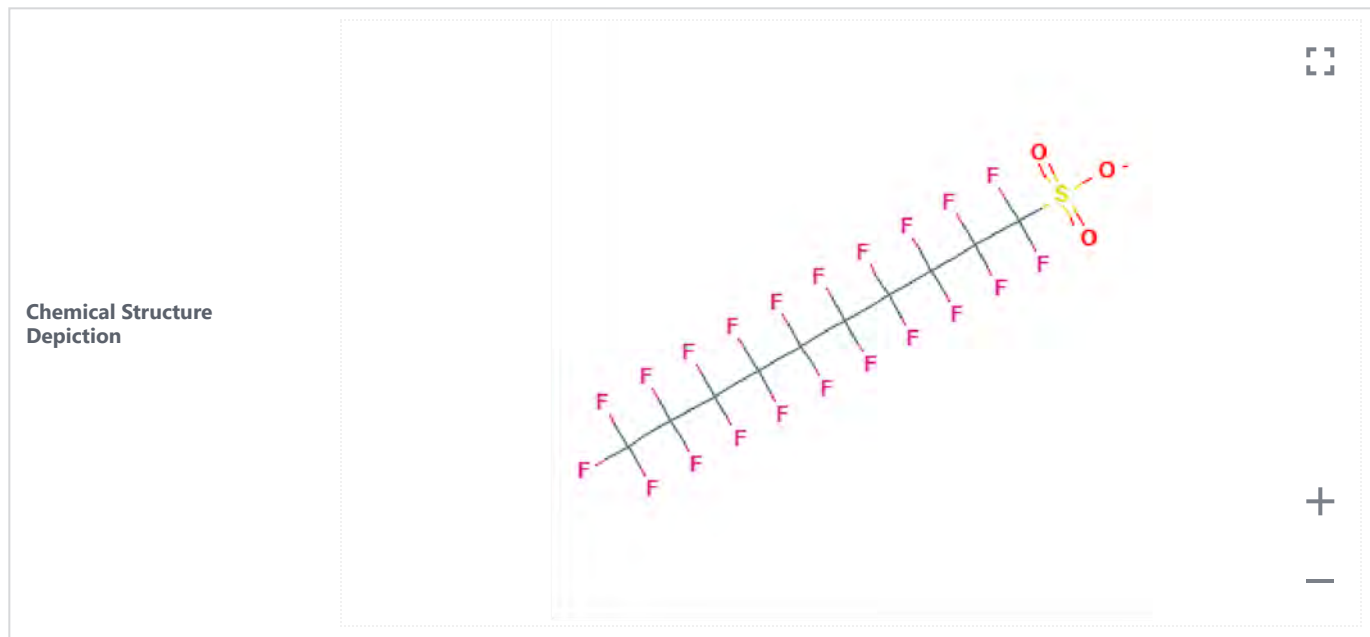
1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-Henicosafuorodecane-1-sulfonate

PubChem CID	3446488
Structure	 Find Similar Structures
Molecular Formula	C ₁₀ F ₂₁ O ₃ S ⁻
Synonyms	perfluorodecanesulfonate 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-henicosafuorodecane-1-sulfonate DTXSID00873014 Henicosafuoro-1-decanesulfonic acid anion 126105-34-8
Molecular Weight	599.14
Parent Compound	 CID 67636 (Perfluorodecane sulfonic acid)
Dates	Modify 2021-05-22 Create 2005-09-08

1 Structures



1.1 2D Structure



► [PubChem](#)

1.2 3D Status



Conformer generation failed at clustering step

► [PubChem](#)

2 Names and Identifiers



2.1 Computed Descriptors



2.1.1 IUPAC Name



1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-henicosafuorodecane-1-sulfonate

Computed by LexiChem 2.6.6 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.2 InChI



InChI=1S/C10HF21O3S/c11-

1(12,3(15,16)5(19,20)7(23,24)9(27,28)29)2(13,14)4(17,18)6(21,22)8(25,26)10(30,31)35(32,33)34/h(H,32,33,34)/p-1

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.3 InChI Key



HYWZIAVPBSTISZ-UHFFFAOYSA-M

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.4 Canonical SMILES



C(C(C(C(C(C(F)(F)S(=O)(=O)[O-])(F)(F)(F)(F)(F)(F)(F)(F)(C(C(C(C(C(F)(F)(F)(F)(F)(F)(F)(F)(F)(F)F

Computed by OEChem 2.1.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.2 Molecular Formula



C10F21O3S-

Computed by PubChem 2.1 (PubChem release 2019.06.18)

► [PubChem](#)

2.3 Other Identifiers



2.3.1 CAS



126105-34-8

► [EPA DSSTox](#)

2.3.2 DSSTox Substance ID



DTXSID00873014

► EPA DSSTox

2.3.3 Wikipedia



Perfluorodecanesulfonate

► Wikipedia

2.4 Synonyms



2.4.1 Depositor-Supplied Synonyms



perfluorodecanesulfonate

1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-henicosafuorodecane-1-sulfonate

DTXSID00873014

Henicosafuoro-1-decanesulfonic acid anion

126105-34-8

► PubChem

3 Chemical and Physical Properties

3.1 Computed Properties

Property Name	Property Value	Reference
Molecular Weight	599.14	Computed by PubChem 2.1 (PubChem release 2021.05.07)
XLogP3-AA	6.3	Computed by XLogP3 3.0 (PubChem release 2019.06.18)
Hydrogen Bond Donor Count	0	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Hydrogen Bond Acceptor Count	24	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Rotatable Bond Count	8	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Exact Mass	598.9232814	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Monoisotopic Mass	598.9232814	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Topological Polar Surface Area	65.6 Å²	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Heavy Atom Count	35	Computed by PubChem
Formal Charge	-1	Computed by PubChem
Complexity	893	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Isotope Atom Count	0	Computed by PubChem
Defined Atom Stereocenter Count	0	Computed by PubChem
Undefined Atom Stereocenter Count	0	Computed by PubChem
Defined Bond Stereocenter Count	0	Computed by PubChem
Undefined Bond Stereocenter Count	0	Computed by PubChem
Covalently-Bonded Unit Count	1	Computed by PubChem
Compound Is Canonicalized	Yes	Computed by PubChem (release 2011.04.04)

► PubChem

4 Related Records



4.1 Related Compounds with Annotation



► PubChem

4.2 Parent Compound



CID 67636 (Perfluorodecane sulfonic acid)

► PubChem

4.3 Related Compounds



Same Parent, Exact	20 Records
Mixtures, Components, and Neutralized Forms	1 Record
Similar Compounds	84 Records

► PubChem

4.4 Substances



4.4.1 Related Substances



Same	9 Records

► PubChem

4.4.2 Substances by Category



► PubChem

5 Literature



5.1 Chemical Co-Occurrences in Literature



► PubChem

5.2 Chemical-Gene Co-Occurrences in Literature



► PubChem

5.3 Chemical-Disease Co-Occurrences in Literature



► PubChem

6 Patents



6.1 Depositor-Supplied Patent Identifiers



► PubChem

[Link to all deposited patent identifiers](#)

► PubChem

7 Classification



7.1 Ontologies



7.1.1 NORMAN Suspect List Exchange Classification



► NORMAN Suspect List Exchange

7.1.2 EPA DSSTox Classification



► EPA DSSTox

8 Information Sources



FILTER BY SOURCE

ALL SOURCES



1. EPA DSSTox

LICENSE

<https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources>

Perfluorodecanesulfonate

<https://comptox.epa.gov/dashboard/DTXSID00873014>

CompTox Chemicals Dashboard Chemical Lists

https://comptox.epa.gov/dashboard/chemical_lists/

2. Wikipedia

Perfluorodecanesulfonate

<https://www.wikidata.org/wiki/Q81978598>

3. PubChem

<https://pubchem.ncbi.nlm.nih.gov>

4. NORMAN Suspect List Exchange

NORMAN Suspect List Exchange Classification

<https://www.norman-network.com/nds/SLE/>

**COVID-19 Information**[Public health information \(CDC\)](#) [Research information \(NIH\)](#) [SARS-CoV-2 data \(NCBI\)](#)[Prevention and treatment information \(HHS\)](#) [Español](#)

COMPOUND SUMMARY

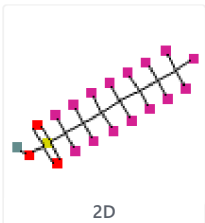
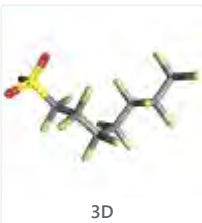
Perfluoroheptanesulfonic acid



Cite



Download

PubChem CID	67820
Structure	  2D 3D Find Similar Structures
Chemical Safety	  Corrosive Irritant Laboratory Chemical Safety Summary (LCSS) Datasheet
Molecular Formula	C ₇ HF ₁₅ O ₃ S
Synonyms	perfluoroheptanesulfonic acid 375-92-8 1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoroheptane-1-sulfonic acid perfluoroheptane sulfonic acid 1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-Pentadecafluoroheptane-1-sulphonic acid More...
Molecular Weight	450.12
Dates	Modify Create 2021-05-22 2005-08-08

Contents

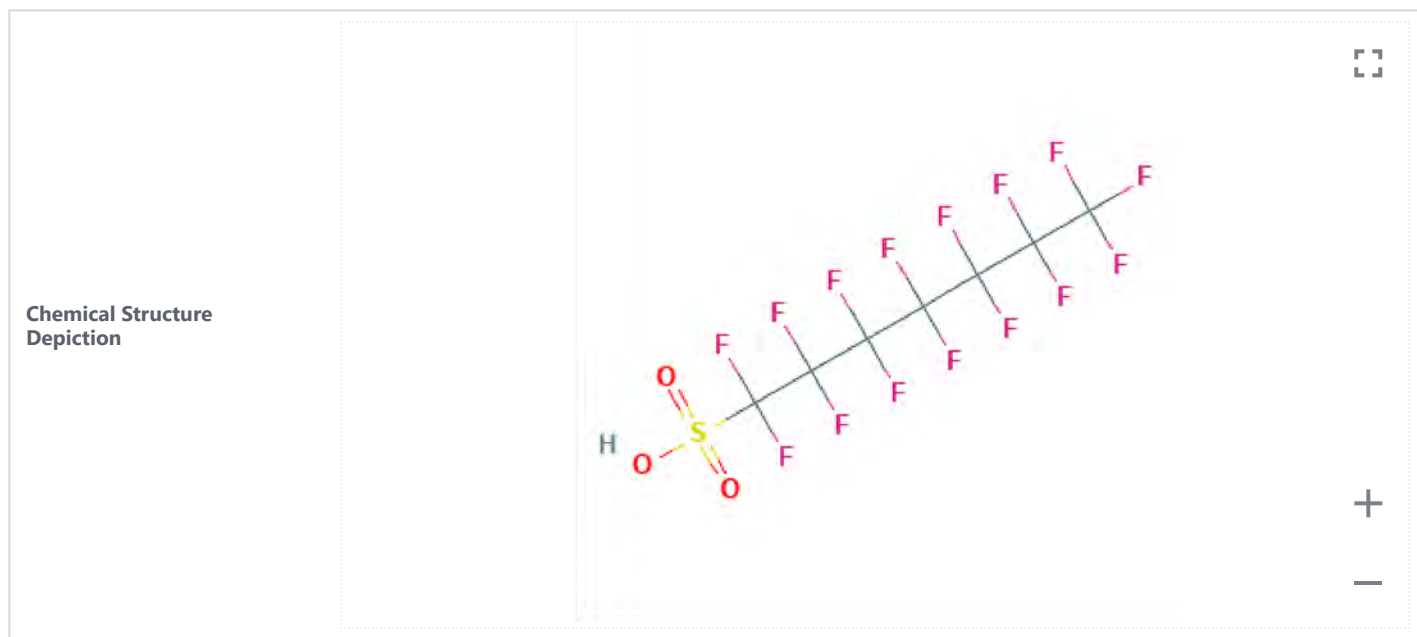
[1 Structures](#)[2 Names and Identifiers](#)[3 Chemical and Physical Properties](#)[4 Spectral Information](#)[5 Related Records](#)

6 Chemical Vendors	
7 Use and Manufacturing	▼
8 Safety and Hazards	▼
9 Literature	▼
10 Patents	▼
11 Classification	▼
12 Information Sources	

1 Structures



1.1 2D Structure



► PubChem

1.2 3D Conformer



► PubChem

2 Names and Identifiers



2.1 Computed Descriptors



2.1.1 IUPAC Name



1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoroheptane-1-sulfonic acid

Computed by LexiChem 2.6.6 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.2 InChI



InChI=1S/C7HF15O3S/c8-1(9,2(10,11)4(14,15)6(18,19)20)3(12,13)5(16,17)7(21,22)26(23,24)25/h(H,23,24,25)

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.3 InChI Key



OYGQVDSRYXATEL-UHFFFAOYSA-N

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.4 Canonical SMILES



C(C(C(C(F)(F)(F)F)(F)F)(C(C(C(F)(F)S(=O)(=O)O)(F)F)(F)F)(F)F

Computed by OEChem 2.1.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.2 Molecular Formula



C7HF15O3S

Computed by PubChem 2.1 (PubChem release 2019.06.18)

► [PubChem](#)

2.3 Other Identifiers



2.3.1 CAS



375-92-8

► [CAS Common Chemistry](#); [ChemIDplus](#); [EPA Chemicals under the TSCA](#); [EPA DSSTox](#); [European Chemicals Agency \(ECHA\)](#)

2.3.2 European Community (EC) Number



206-800-8

► [European Chemicals Agency \(ECHA\)](#)

2.3.3 DSSTox Substance ID



DTXSID8059920

► [EPA DSSTox](#)

2.4 Synonyms



2.4.1 Depositor-Supplied Synonyms



perfluoroheptanesulfonic acid	AKOS030255152
375-92-8	ZINC100424529
1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoroheptane-1-sulfonic acid	Perfluoroheptane sulfonic acid (PFHpS)
perfluoroheptane sulfonic acid	Perfluoroheptanesulfonic acid 100 microg/mL in Acetonitrile
1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-Pentadecafluoroheptane-1-sulphonic acid	
1-Heptanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoro-	
Pentadecafluoro-1-heptanesulfonic acid	
EINECS 206-800-8	
SCHEMBL466749	
DTXSID8059920	
CS-B0913	
MFCD28015666	
1-Heptanesulfonic acid,1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoro-	

► [PubChem](#)

3 Chemical and Physical Properties



3.1 Computed Properties



Property Name	Property Value	Reference
Molecular Weight	450.12	Computed by PubChem 2.1 (PubChem release 2021.05.07)
XLogP3-AA	4.3	Computed by XLogP3 3.0 (PubChem release 2019.06.18)
Hydrogen Bond Donor Count	1	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Hydrogen Bond Acceptor Count	18	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Rotatable Bond Count	6	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Exact Mass	449.9406875	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Monoisotopic Mass	449.9406875	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Topological Polar Surface Area	62.8 Å ²	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Heavy Atom Count	26	Computed by PubChem
Formal Charge	0	Computed by PubChem
Complexity	639	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Isotope Atom Count	0	Computed by PubChem
Defined Atom Stereocenter Count	0	Computed by PubChem
Undefined Atom Stereocenter Count	0	Computed by PubChem
Defined Bond Stereocenter Count	0	Computed by PubChem
Undefined Bond Stereocenter Count	0	Computed by PubChem
Covalently-Bonded Unit Count	1	Computed by PubChem
Compound Is Canonicalized	Yes	Computed by PubChem (release 2019.01.04)

► PubChem

4 Spectral Information



4.1 Mass Spectrometry



4.1.1 LC-MS



Showing 2 of 3 View More

MoNA ID	AU595851
MS Category	Experimental
MS Type	LC-MS
MS Level	MS2
Precursor Type	[M-H]-
precursor m/z	448.9334
Instrument	Bruker maXis Impact
Instrument Type	LC-ESI-QTOF
Ionization	ESI
Ionization Mode	negative
Collision Energy	20 eV
Retention Time	9.686 min
Splash	splash10-0002-0000900000-b1b456309cf71a49e08b
Thumbnail	
Submitter	Nikolaos Thomaidis, University of Athens

► MassBank of North America (MoNA)

MoNA ID	AU595852
MS Category	Experimental
MS Type	LC-MS
MS Level	MS2
Precursor Type	[M-H]-
precursor m/z	448.9334

Instrument	Bruker maXis Impact
Instrument Type	LC-ESI-QTOF
Ionization	ESI
Ionization Mode	negative
Collision Energy	30 eV
Retention Time	9.688 min
Splash	splash10-0002-0000900000-6d7d70ed96726bc23786
Thumbnail	
Submitter	Nikolaos Thomaidis, University of Athens

► [MassBank of North America \(MoNA\)](#)

4.1.2 Other MS

MoNA ID	MoNA024593
MS Category	Experimental
Precursor Type	[M-H]-
precursor m/z	448.9334129
Ionization Mode	negative
Splash	splash10-018b-9400200000-d38b5d1b7a909adacd7d
Thumbnail	

Submitter	Arpana Vaniya, UC DAVIS

► [MassBank of North America \(MoNA\)](#)

5 Related Records



5.1 Related Compounds with Annotation



► PubChem

5.2 Related Compounds



Same Parent, Exact	20 Records
Mixtures, Components, and Neutralized Forms	25 Records
Similar Compounds	38 Records
Similar Conformers	344 Records

► PubChem

5.3 Substances



5.3.1 Related Substances



All	147 Records
Same	47 Records
Mixture	100 Records

► PubChem

5.3.2 Substances by Category



► PubChem

5.4 Entrez Crosslinks



PubMed	4 Records

► PubChem

6 Chemical Vendors



► PubChem

7 Use and Manufacturing



7.1 Use Classification



PFAS (per- and polyfluoroalkyl substances) -> OECD Category

S25 | OECD PFAS | List of PFAS from the OECD | [DOI:10.5281/zenodo.2648775](https://doi.org/10.5281/zenodo.2648775)

► [NORMAN Suspect List Exchange](#)

7.2 General Manufacturing Information



EPA TSCA Commercial Activity Status

1-Heptanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoro-: INACTIVE

<https://www.epa.gov/tsca-inventory>

► [EPA Chemicals under the TSCA](#)

EPA TSCA Regulatory Flag

S - indicates a substance that is identified in a final Significant New Use Rule.

<https://www.epa.gov/tsca-inventory>

► [EPA Chemicals under the TSCA](#)

8 Safety and Hazards



8.1 Hazards Identification



8.1.1 GHS Classification



Pictogram(s)	  Corrosive Irritant
Signal	<u>Danger</u>
GHS Hazard Statements	H302 (100%): Harmful if swallowed [Warning Acute toxicity, oral] H312 (100%): Harmful in contact with skin [Warning Acute toxicity, dermal] H314 (100%): Causes severe skin burns and eye damage [Danger Skin corrosion/irritation] H332 (100%): Harmful if inhaled [Warning Acute toxicity, inhalation]
Precautionary Statement Codes	P260, P261, P264, P270, P271, P280, P301+P312, P301+P330+P331, P302+P352, P303+P361+P353, P304+P312, P304+P340, P305+P351+P338, P310, P312, P321, P322, P330, P363, P405, and P501 (The corresponding statement to each P-code can be found at the GHS Classification page.)
ECHA C&L Notifications Summary	<i>The GHS information provided by 1 company from 1 notification to the ECHA C&L Inventory.</i>

► [European Chemicals Agency \(ECHA\)](#)

8.1.2 Hazard Classes and Categories



Acute Tox. 4 (100%)

Acute Tox. 4 (100%)

Skin Corr. 1B (100%)

Acute Tox. 4 (100%)

► [European Chemicals Agency \(ECHA\)](#)

9 Literature



9.1 Springer Nature References



► Springer Nature

9.2 Depositor Provided PubMed Citations



► PubChem

9.3 Chemical Co-Occurrences in Literature



► PubChem

9.4 Chemical-Gene Co-Occurrences in Literature



► PubChem

9.5 Chemical-Disease Co-Occurrences in Literature



► [PubChem](#)

10 Patents



10.1 Depositor-Supplied Patent Identifiers



► PubChem

[Link to all deposited patent identifiers](#)

► PubChem

10.2 WIPO PATENTSCOPE



Patents are available for this chemical structure:

<https://patentscope.wipo.int/search/en/result.jsf?inchikey=OYGQVDSRYXATEL-UHFFFAOYSA-N>

► PATENTSCOPE (WIPO)

11 Classification



11.1 Ontologies



11.1.1 ChemIDplus



► [ChemIDplus](#)

11.1.2 UN GHS Classification



► [UN Globally Harmonized System of Classification and Labelling of Chemicals \(GHS\)](#)

11.1.3 NORMAN Suspect List Exchange Classification



► NORMAN Suspect List Exchange

11.1.4 EPA DSSTox Classification



► EPA DSSTox

12 Information Sources



FILTER BY SOURCE

ALL SOURCES



1. CAS Common Chemistry

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<https://creativecommons.org/licenses/by-nc/4.0/>

Perfluoroheptanesulfonic acid

https://commonchemistry.cas.org/detail?cas_rn=375-92-8

2. ChemIDplus

LICENSE

<https://www.nlm.nih.gov/copyright.html>

1-Heptanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoro-

<https://chem.nlm.nih.gov/chemidplus/sid/0000375928>

ChemIDplus Chemical Information Classification

<https://chem.nlm.nih.gov/chemidplus/>

3. EPA Chemicals under the TSCA

LICENSE

<https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources>

1-Heptanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoro-

<https://www.epa.gov/chemicals-under-tsca>

4. EPA DSSTox

LICENSE

<https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources>

1-Heptanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoro-

<https://comptox.epa.gov/dashboard/DTXSID8059920>

CompTox Chemicals Dashboard Chemical Lists

https://comptox.epa.gov/dashboard/chemical_lists/

5. European Chemicals Agency (ECHA)

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<https://echa.europa.eu/web/guest/legal-notice>

1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoroheptane-1-sulphonic acid

<https://echa.europa.eu/substance-information/-/substanceinfo/100.006.183>

1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoroheptane-1-sulphonic acid

<https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/31812>

6. MassBank of North America (MoNA)

LICENSE

The content of the MoNA database is licensed under CC BY 4.0.

<https://mona.fiehnlab.ucdavis.edu/documentation/license>

Perfluoroheptane sulfonic acid (PFHpS)

<http://mona.fiehnlab.ucdavis.edu/spectra/browse?inchikey=OYGVDSRYXATEL-UHFFFAOYSA-N>

7. NORMAN Suspect List Exchange

LICENSE

Data: CC-BY 4.0; Code (hosted by ECI, LCSB): Artistic-2.0

<https://creativecommons.org/licenses/by/4.0/>

1-Heptanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,7,7,7-pentadecafluoro-

NORMAN Suspect List Exchange Classification

<https://www.norman-network.com/nds/SLE/>

8. **Springer Nature**

<https://pubchem.ncbi.nlm.nih.gov/substance/341183449>

9. **PubChem**

<https://pubchem.ncbi.nlm.nih.gov>

10. **UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS)**

GHS Classification Tree

http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html

11. **PATENTSCOPE (WIPO)**

SID 388347599

<https://pubchem.ncbi.nlm.nih.gov/substance/388347599>

SAFETY DATA SHEET

Creation Date 06-Mar-2007

Revision Date 19-Jan-2018

Revision Number 4

1. Identification

Product Name Perfluoroheptanoic acid

Cat No. : AC277270000; AC277270050; AC277270100

CAS-No 375-85-9

Synonyms 2,2,3,3,4,4,5,5,6,6,7,7,7-Tridecafluoroheptanoic acid

Recommended Use Laboratory chemicals.

Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number

For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11

Emergency Number **US**:001-201-796-7100 / **Europe**: +32 14 57 52 99

CHEMTREC Tel. No.**US**:001-800-424-9300 / **Europe**:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Skin Corrosion/Irritation	Category 1 B
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word

Danger

Hazard Statements

Harmful if swallowed

Causes severe skin burns and eye damage

May cause respiratory irritation

**Precautionary Statements****Prevention**

Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area

Response

Immediately call a POISON CENTER or doctor/physician

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

Ingestion

Rinse mouth
Do NOT induce vomiting

Storage

Store locked up
Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Heptanoic acid, tridecafluoro-	375-85-9	96

4. First-aid measures

Eye Contact	Immediate medical attention is required. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Skin Contact	Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Immediate medical attention is required.
Inhalation	Remove from exposure, lie down. Remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Immediate medical attention is required.
Ingestion	Do NOT induce vomiting. Call a physician immediately.
Most important symptoms and effects	Causes burns by all exposure routes. . Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue

Notes to Physician and danger of perforation
Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Carbon dioxide (CO₂). Dry chemical. Chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point > 110 °C / > 230 °F

Method - No information available

Autoignition Temperature No information available

Explosion Limits

Upper No data available

Lower No data available

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Carbon monoxide (CO). Carbon dioxide (CO₂). Gaseous hydrogen fluoride (HF).

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
3

Flammability
1

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required.

Environmental Precautions See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Do not let this chemical enter the environment.

7. Handling and storage

Handling Do not breathe dust. Do not get in eyes, on skin, or on clothing. Do not ingest. If swallowed then seek immediate medical assistance. Handle product only in closed system or provide appropriate exhaust ventilation.

Storage Keep in a dry, cool and well-ventilated place. Refer product specification and/or product label for specific storage temperature requirement. Keep container tightly closed.
Corrosives area.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limit established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Light yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	30 °C / 86 °F
Boiling Point/Range	175 °C / 347 °F @ 760 mmHg
Flash Point	> 110 °C / > 230 °F
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	1.790
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C7 H F13 O2
Molecular Weight	364.05

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Strong oxidizing agents, Acids
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO ₂), Gaseous hydrogen fluoride (HF)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information**Acute Toxicity**

Product Information**Component Information****Toxicologically Synergistic** No information available**Products****Delayed and immediate effects as well as chronic effects from short and long-term exposure****Irritation** Causes burns by all exposure routes**Sensitization** No information available**Carcinogenicity** The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Heptanoic acid, tridecafluoro-	375-85-9	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available**Reproductive Effects** No information available.**Developmental Effects** No information available.**Teratogenicity** No information available.**STOT - single exposure** Respiratory system**STOT - repeated exposure** None known**Aspiration hazard** No information available

Symptoms / effects, both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Endocrine Disruptor Information No information available**Other Adverse Effects** The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Persistence and Degradability No information available**Bioaccumulation/ Accumulation** No information available.**Mobility** No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN3261
Proper Shipping Name	Corrosive solid, acidic, organic, n.o.s.
Technical Name	Heptanoic acid, tridecafluoro-
Hazard Class	8
Packing Group	II

TDG

UN-No UN3261
Proper Shipping Name Corrosive solid, acidic, organic, n.o.s.
Hazard Class 8
Packing Group II

IATA

UN-No UN3261
Proper Shipping Name Corrosive solid, acidic, organic, n.o.s.
Hazard Class 8
Packing Group II

IMDG/IMO

UN-No UN3261
Proper Shipping Name Corrosive solid, acidic, organic, n.o.s.
Hazard Class 8
Packing Group II

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Heptanoic acid, tridecafluoro-	375-85-9	X	ACTIVE	-

Legend:

TSCA - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Heptanoic acid, tridecafluoro-	375-85-9	-	X	206-798-9	-	X	X	-	KE-28149

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations Not applicable

U.S. Department of Transportation

Reportable Quantity (RQ): N
 DOT Marine Pollutant N
 DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations**Mexico - Grade**

No information available

16. Other information**Prepared By**Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com**Creation Date**

06-Mar-2007

Revision Date

19-Jan-2018

Print Date

19-Jan-2018

Revision Summary

This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

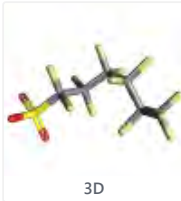
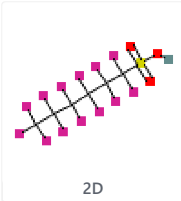
**COVID-19 Information**

[Public health information \(CDC\)](#) [Research information \(NIH\)](#) [SARS-CoV-2 data \(NCBI\)](#) [Prevention and treatment information \(HHS\)](#)
[Español](#)



COMPOUND SUMMARY

Perfluorohexanesulfonic acid

PubChem CID	67734				
Structure	 2D 3D Find Similar Structures				
Chemical Safety	 Corrosive Irritant Laboratory Chemical Safety Summary (LCSS) Datasheet				
Molecular Formula	C ₆ HF ₁₃ O ₃ S				
Synonyms	Perfluorohexanesulfonic acid 355-46-4 1,1,2,2,3,3,4,4,5,5,6,6,6-Tridecafluorohexane-1-sulfonic acid Perfluorohexane-1-sulphonic acid perfluorohexane sulfonic acid More...				
Molecular Weight	400.12				
Dates	<table><tr><td>Modify</td><td>Create</td></tr><tr><td>2021-05-22</td><td>2005-08-08</td></tr></table>	Modify	Create	2021-05-22	2005-08-08
Modify	Create				
2021-05-22	2005-08-08				
Perfluorohexanesulfonic acid is a perfluoroalkanesulfonic acid that is hexane-1-sulfonic acid in which all thirteen of the hydrogens that are attached to carbons have been replaced by fluorines. ChEBI					

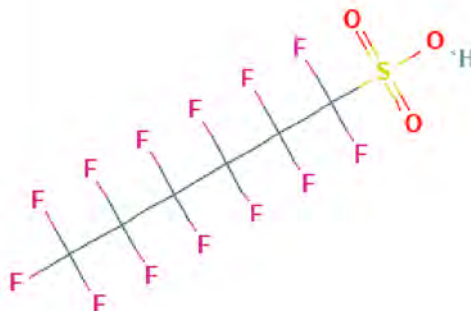
1 Structures



1.1 2D Structure



Chemical Structure
Depiction



+

-

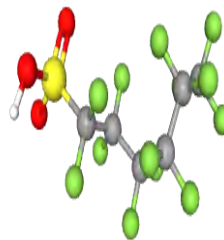
► PubChem

1.2 3D Conformer



Interactive Chemical
Structure Model

- ☒ Ball and Stick
- ☐ Sticks
- ☐ Wire-Frame
- ☐ Space-Filling
- ☒ Show Hydrogens
- ☐ Animate



+

-

► PubChem

2 Names and Identifiers



2.1 Computed Descriptors



2.1.1 IUPAC Name



1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluorohexane-1-sulfonic acid

Computed by LexiChem 2.6.6 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.2 InChI



InChI=1S/C6HF13O3S/c7-1(8,3(11,12)5(15,16)17)2(9,10)4(13,14)6(18,19)23(20,21)22/h(H,20,21,22)

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.3 InChI Key



QZHDEAJFRJCDMF-UHFFFAOYSA-N

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.4 Canonical SMILES



C(C(C(C(F)(F)S(=O)(=O)O)(F)F)(F)F)(C(C(F)(F)F)(F)F)(F)F

Computed by OEChem 2.1.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.2 Molecular Formula



C6HF13O3S

Computed by PubChem 2.1 (PubChem release 2019.06.18)

► [PubChem](#)

2.3 Other Identifiers



2.3.1 CAS



355-46-4

► [CAS Common Chemistry](#); [ChemIDplus](#); [EPA Chemicals under the TSCA](#); [EPA DSSTox](#); [European Chemicals Agency \(ECHA\)](#); [Hazardous Substances Data Bank \(HSDB\)](#)

2.3.2 European Community (EC) Number



206-587-1

► [European Chemicals Agency \(ECHA\)](#)

2.3.3 UNII



ZU6Y1E592S

▶ FDA/SPL Indexing Data

2.3.4 DSSTox Substance ID

DTXSID7040150

▶ EPA DSSTox

2.3.5 Wikipedia

Perfluorohexanesulphonic acid

▶ Wikipedia

Perfluorohexanesulfonate

▶ Wikipedia

2.4 Synonyms

2.4.1 MeSH Entry Terms

perfluorohexanesulfonate
perfluorohexanesulfonic acid
PFHS cpd

▶ Medical Subject Headings (MeSH)

2.4.2 Depositor-Supplied Synonyms

Perfluorohexanesulfonic acid	C6HF13O3S	AKOS016005064
355-46-4	EINECS 206-587-1	Perfluorohexane sulfonic acid (PFHxS)
1,1,2,2,3,3,4,4,5,5,6,6,6-Tridecafluorohexane-1-sulfonic acid	SCHEMBL332726	LS41238
Perfluorohexane-1-sulphonic acid	CHEMBL1906987	Z-1469
perfluorohexane sulfonic acid	DTXSID7040150	Q26833878
perfluorohexanesulphonic acid	HSDB 8274	Perfluorohexanesulfonic acid 100 microg/mL in Acetonitrile
UNII-ZU6Y1E592S	AMY7161	Perfluorohexanesulfonic acid 50 microg/mL in Methanol:Water
1-Hexanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluoro-	CHEBI:132448	
perfluorohexanesulfonate	CS-B0907	
ZU6Y1E592S	4434AB	
Perfluorohexane-1-sulfonic acid	ANW-65167	
tridecafluorohexane-1-sulfonic acid	MFCD00042453	
PFHxS	ZINC38141431	

▶ PubChem

3 Chemical and Physical Properties



3.1 Computed Properties



Property Name	Property Value	Reference
Molecular Weight	400.12	Computed by PubChem 2.1 (PubChem release 2021.05.07)
XLogP3-AA	3.7	Computed by XLogP3 3.0 (PubChem release 2019.06.18)
Hydrogen Bond Donor Count	1	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Hydrogen Bond Acceptor Count	16	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Rotatable Bond Count	5	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Exact Mass	399.9438812	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Monoisotopic Mass	399.9438812	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Topological Polar Surface Area	62.8 Å ²	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Heavy Atom Count	23	Computed by PubChem
Formal Charge	0	Computed by PubChem
Complexity	553	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Isotope Atom Count	0	Computed by PubChem
Defined Atom Stereocenter Count	0	Computed by PubChem
Undefined Atom Stereocenter Count	0	Computed by PubChem
Defined Bond Stereocenter Count	0	Computed by PubChem
Undefined Bond Stereocenter Count	0	Computed by PubChem
Covalently-Bonded Unit Count	1	Computed by PubChem
Compound Is Canonicalized	Yes	Computed by PubChem (release 2019.01.04)

► PubChem

3.2 Experimental Properties



3.2.1 Boiling Point



238.5 °C

► EPA DSSTox

238-239 °C

Kosswig K; Sulfonic Acids, Aliphatic. Ullmann's Encyclopedia of Industrial Chemistry. 7th ed. (1999-2015). New York, NY: John Wiley & Sons. Online Posting Date: Jun 15, 2000.

► Hazardous Substances Data Bank (HSDB)

3.2.2 Solubility



In water, 6.2 mg/L at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.11. Nov, 2012. Available from, as of Oct 6, 2015: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

► Hazardous Substances Data Bank (HSDB)

3.2.3 Density



1.841 g/cu cm

ChemIndex; Perfluorohexane-1-sulphonic Acid. Available from, as of Oct 6, 2015: <http://www.chemindex.com/355-46-4-cas.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

3.2.4 Vapor Pressure



0.0046 mm Hg at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.11. Nov, 2012. Available from, as of Oct 6, 2015: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

3.2.5 LogP



log Kow = 3.16 (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.11. Nov, 2012. Available from, as of Oct 6, 2015: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

3.2.6 Stability/Shelf Life



Chemical stability: Stable under recommended storage conditions. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

3.2.7 Refractive Index



Index of refraction: 1.309

ChemIndex; Perfluorohexane-1-sulphonic Acid. Available from, as of Oct 6, 2015: <http://www.chemindex.com/355-46-4-cas.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

3.2.8 Dissociation Constants



pKa = 0.14 (est)

ATSDR; Draft Toxicological Profile for Perfluoroalkyls. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

► [Hazardous Substances Data Bank \(HSDB\)](#)

3.2.9 Collision Cross Section



150.81 Å² [M-H]⁻

228.66 Å² [2M-H]⁻

S79 | UACCSCEC | Collision Cross Section (CCS) Library from UAntwerp | [DOI:10.5281/zenodo.4704648](https://doi.org/10.5281/zenodo.4704648)

► [NORMAN Suspect List Exchange](#)

3.2.10 Other Experimental Properties



Beige crystals /[Perfluorohexanesulfonic acid potassium salt](#)/

Sigma-Aldrich; Product Search. Tridecafluorohexane-1-sulfonic acid potassium salt. (3871-99-6). Available from, as of Oct 9, 2015: <http://www.sigmaaldrich.com/united-states.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

Henry's Law constant: 4.0X10⁻⁴ atm cu m/mol at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.11. Nov, 2012. Available from, as of Oct 6, 2015: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

Hydroxyl radical reaction rate constant: 1.4×10^{-13} cu cm/molecule-sec at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.11. Nov, 2012. Available from, as of Oct 6, 2015: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

4 Spectral Information

4.1 Mass Spectrometry

4.1.1 LC-MS

Showing 2 of 4 [View More](#) 

MoNA ID	AU595750
MS Category	Experimental
MS Type	LC-MS
MS Level	MS2
Precursor Type	[M-H]-
precursor m/z	398.9366
Instrument	Bruker maXis Impact
Instrument Type	LC-ESI-QTOF
Ionization	ESI
Ionization Mode	negative
Collision Energy	10 eV
Retention Time	8.837 min
Splash	splash10-0002-0009000000-032b155c5aad417d734a
Thumbnail	
Submitter	Nikolaos Thomaidis, University of Athens

 [MassBank of North America \(MoNA\)](#)

MoNA ID	AU595751
MS Category	Experimental
MS Type	LC-MS
MS Level	MS2
Precursor Type	[M-H]-
precursor m/z	398.9366
Instrument	Bruker maXis Impact
Instrument Type	LC-ESI-QTOF
Ionization	ESI
Ionization Mode	negative

Collision Energy	20 eV
Retention Time	8.846 min
Splash	splash10-0002-0009000000-10401c65f3ead0881273
Thumbnail	
Submitter	Nikolaos Thomaidis, University of Athens

► [MassBank of North America \(MoNA\)](#)

4.1.2 Other MS

MoNA ID	MoNA024592
MS Category	Experimental
Precursor Type	[M-H]-
precursor m/z	398.9366065
Ionization Mode	negative
Splash	splash10-018b-9402000000-9465cdba153ac41e8185
Thumbnail	
Submitter	Arpana Vaniya, UC DAVIS

► [MassBank of North America \(MoNA\)](#)

5 Related Records



5.1 Related Compounds with Annotation



► PubChem

5.2 Related Compounds



Same Parent, Exact	50 Records
Mixtures, Components, and Neutralized Forms	97 Records
Similar Compounds	31 Records
Similar Conformers	743 Records

► PubChem

5.3 Substances



5.3.1 Related Substances



All	309 Records
Same	72 Records
Mixture	237 Records

► PubChem

5.3.2 Substances by Category



► PubChem

5.4 Entrez Crosslinks



PubMed	196 Records
Taxonomy	5 Records
OMIM	14 Records
Gene	207 Records

► PubChem

5.5 Associated Chemicals



Tridecafluorohexane-1-sulfonic acid potassium salt; 3871-99-6

► Hazardous Substances Data Bank (HSDB)

Perfluorohexanesulfonate; 355-46-4

► Hazardous Substances Data Bank (HSDB)

6 Chemical Vendors



► [PubChem](#)

7 Pharmacology and Biochemistry



7.1 Absorption, Distribution and Excretion



/MILK/ The widespread presence of **perfluorooctanesulfonate** (PFOS), **perfluorooctanoate** (PFOA), and **perfluorohexanesulfonate** (PFHxS) in human general populations and their slow elimination profiles have led to renewed interest in understanding the potential human neonatal exposures of perfluoroalkyls (PFAs) from consumption of human milk. The objective of this study was to evaluate the concentrations of **PFOS**, **PFHxS**, and **PFOA** in pooled human milk samples obtained in Sweden between 1972 and 2008 (a period representing the most significant period of PFA production) and to see whether the time trend of these analytes parallels that indicated in human serum. Chemical analysis of **PFOS**, **PFHxS**, and **PFOA** was performed on pooled Swedish human milk samples from 1972 to 2008 after methodological refinements. The 20 samples which formed the 2007 pool were also analyzed individually to evaluate sample variations. Analyses were performed by HPLC-MS/MS. Due to the complexities of the human milk matrix and the requirement to accurately quantitate low pg/mL concentrations, meticulous attention must be paid to background contamination if accurate results are to be obtained. **PFOS** was the predominant analyte present in the pools and all three analytes showed statistically significant increasing trends from 1972 to 2000, with concentrations reaching a plateau in the 1990s. **PFOA** and **PFOS** showed statistically significant decreasing trends during 2001-2008. At the end of the study, in 2008, the measured concentrations of **PFOS**, **PFHxS**, and **PFOA** in pooled human milk were 75 pg/mL, 14 pg/mL, and 74 pg/mL, respectively. The temporal concentration trends of **PFOS**, **PFHxS**, and **PFOA** observed in human milk are parallel to those reported in the general population serum concentrations.

PMID:20880590

Sundstrom M et al; *Environ Int* 37(1):178-83 (2011).

► [Hazardous Substances Data Bank \(HSDB\)](#)

/MILK/ The presence of perfluoroalkyl acids (PFAAs) in breast milk has been documented, but their lactational transfer has been rarely studied. Determination of the elimination rates of these chemicals during breastfeeding is important and critical for assessing exposure in mothers and infants. We aimed to investigate the association between breastfeeding and maternal serum concentrations of **perfluorooctanoic acid** (PFOA), **perfluorooctane sulfonate** (PFOS), **perfluorononanoic acid** (PFNA), and **perfluorohexane sulfonate** (PFHxS). For a subset of the population, for whom we also have their infants' measurements, we investigated associations of breastfeeding with infant serum PFAA concentrations. The present analysis included 633 women from the C8 Science Panel Study who had a child < 3.5 years of age and who provided blood samples and reported detailed information on breastfeeding at the time of survey. PFAA serum concentrations were available for all mothers and 8% (n = 49) of the infants. Maternal and infant serum concentrations were regressed on duration of breastfeeding. Each month of breastfeeding was associated with lower maternal serum concentrations of PFOA (-3%; 95% CI: -5, -2%), PFOS (-3%; 95% CI: -3, -2%), PFNA (-2%; 95% CI: -2, -1%), and PFHxS (-1%; 95% CI: -2, 0%). The infant PFOA and PFOS serum concentrations were 6% (95% CI: 1, 10%) and 4% (95% CI: 1, 7%) higher per month of breastfeeding. Breast milk is the optimal food for infants, but is also a PFAA excretion route for lactating mothers and exposure route for nursing infants.

PMID:24280536

Full text: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3915259>

Mondal D et al; *Environ Health Perspect* 122(2):187-92 (2014).

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluorooctane sulfonate (PFOS) and **perfluorooctanoate** (PFOA) are normally the dominant perfluoroalkyl substances (PFASs) in human serum, but here a Canadian family of seven was identified with particularly high exposure to **perfluorohexanesulfonate** (PFHxS). Disproportionately high serum PFHxS concentrations (range 27.5-423 ng/mL) and moderately high **PFOS** (range 15.2-108 ng/mL) and **PFOA** (range 2.40-9.23 ng/mL) concentrations were detected in the family members, with all three chemicals being highest in the youngest children. We therefore sought to identify the source(s) and pathway(s) of this unusual exposure, and to study the excretion of PFASs for this family. Serum, urine, and stool were sampled from family members, carpet, dust, and air were sampled in the home, and a questionnaire was administered. Over 15 years, the family's household carpets were treated 8 times with Scotchgard formulations. Elevated concentrations of PFHxS were detected in household dust (2780 ng/g dust) and in family room carpet (2880 ng/g carpet), and the primary mode of excretion for the major PFASs was through urine. The high PFHxS and moderately high **PFOS** concentrations in serum and household samples are consistent with the known PFAS content of certain Scotchgard formulations, and exposure was likely through dust ingestion and/or inhalation.

PMID:23102093

Beesoon S et al; *Environ Sci Technol* 46(23): 12960-7 (2012).

► [Hazardous Substances Data Bank \(HSDB\)](#)

A total of 100 serum samples from 50 new couples (none of the females in this study has ever been pregnant) in Tianjin, North China, were analyzed for eleven perfluoroalkyl acids (PFAAs) with isomer-specific method. Among all samples, total **perfluorooctanesulfonate** (PFOS, mean 11.3 ng/mL) was predominant followed by total **perfluorooctanoate** (PFOA, 2.95 ng/mL), **perfluorodecanoate** (PFDA, 1.17 ng/mL), **perfluorononanoate** (PFNA, 0.93 ng/mL) and **perfluorohexanesulfonate** (PFHxS, 0.67 ng/mL). The mean concentrations of **PFOS** and **PFHxS** in males (14.2 and 0.89 ng/mL) were significantly higher (p=0.001) than in females (8.36 and 0.45 ng/mL). No statistical difference between

genders was observed for the other PFAAs. This suggests that menstruation is one important elimination pathway for **PFOS** and PFHxS in females. Linear **PFOA** was the dominant isomer with mean proportion of 99.7%, suggesting that telomeric **PFOA** (and its precursors), which contains almost pure linear isomer, might be the dominant exposure source of **PFOA** in Tianjin. On average, the proportion of linear **PFOS** (n-**PFOS**) was 59.2% of **PFOS**, which was lower than that in technical **PFOS** products (ca. 70% linear). Except perfluoroisopropyl **PFOS**, all the other monomethyl branched **PFOS** isomers were enriched in human serum compared to the commercial products, suggesting the monomethyl branched **PFOS** precursors were preferentially biotransformed in humans /SRP: or a differential clearance occurred/.

PMID:24747327

Zhang Y et al; *Environ Int* 68:185-91 (2014).

► [Hazardous Substances Data Bank \(HSDB\)](#)

For more Absorption, Distribution and Excretion (Complete) data for Perfluorohexanesulfonic acid (6 total), please visit the [HSDB record page](#).

► [Hazardous Substances Data Bank \(HSDB\)](#)

7.2 Biological Half-Life



Perfluorohexanesulfonate (PFHxS) has been found in biological samples from wildlife and humans. The human geometric mean serum PFHxS elimination half-life has been estimated to be 2665 days. A series of studies was undertaken to establish pharmacokinetic parameters for PFHxS in rats, mice, and monkeys after single administration with pharmacokinetic parameters determined by WinNonlin software. Rats and mice appeared to be more effective at eliminating PFHxS than monkeys. With the exception of female rats, which had serum PFHxS elimination half-life of approximately 2 days, the serum elimination half-lives in the rodent species and monkeys approximated 1 month and 4 months, respectively, when followed over extended time periods (10-24 weeks). Collectively, these studies provide valuable insight for human health risk assessment regarding the potential for accumulation of PFHxS in humans.

PMID:21856411

Sundstrom M et al; *Reprod Toxicol* 33(4): 441-51 (2012).

► [Hazardous Substances Data Bank \(HSDB\)](#)

7.3 Mechanism of Action



Perfluorohexanesulfonate (PFHxS) is one of the most widely distributed perfluoroalkyl compounds (PFCs) and its possible neurotoxicity has been suggested. However, the effects of PFHxS on neuronal function remain to be elucidated. In this study, the effects of PFHxS on neuronal cell death and the underlying mechanisms were examined. Cerebellar granule cells (CGCs) were isolated from 7-day old rat pups and maintained in culture for additional 7d. The apoptotic effects of PFHxS were determined by caspase-3 activity and TUNEL staining. PFHxS increased the apoptotic death of CGC in concentration-dependent manner. It also increased the activation of ERK1/2, JNK and p38 MAPK with different temporal activation. **PD98059**, an inhibitor of ERK1/2 pathway, completely blocked PFHxS-induced apoptosis whereas **SP600125**, a JNK inhibitor, significantly increased the apoptosis, showing their opposite roles in the apoptosis of CGCs. Treatment of antioxidants, **Trolox** or **N-acetylcysteine** (NAC), completely blocked ROS generation by PFHxS but neither of these antioxidants prevented PFHxS-induced apoptosis, suggesting that ROS may not play a key role in the process of apoptosis. **PD98059** prevented ROS accumulation by PFHxS but the ERK1/2 activation was not affected by **Trolox** or NAC. These results indicate that ROS is one of downstream targets of ERK1/2, not vice versa. Taken together, PFHxS increased apoptosis of CGC in ERK1/2-dependent manner, where downstream pathway other than ROS may play a major role.

...

PMID:24125707

Lee YJ et al; *Chemosphere* 94:121-7 (2014).

► [Hazardous Substances Data Bank \(HSDB\)](#)

8 Use and Manufacturing



8.1 Overview



IDENTIFICATION: The **potassium** salt of perfluorohexanesulfonic acid is a beige crystal. Perfluorohexanesulfonic acid is moderately soluble in **water**. **USE:** Perfluorohexanesulfonic acid is used to make other organic chemicals containing **fluorine**. It was previously used in firefighting foam and to make **water** and stain coatings for carpets, paper and cloth. **EXPOSURE:** Perfluoroalkyls, which include perfluorohexanesulfonic acid, occur everywhere including the Arctic and open oceans. Workers that use perfluorohexanesulfonic acid may breathe in mists or have direct skin contact. The general population may be exposed from various consumer products, by breathing in air, breathing in indoor dust, eating food and drinking **water**. Perfluorinated compounds, including **perfluorohexanesulfonate**, have been found in human blood, serum and breast milk. If perfluorohexanesulfonic acid is released to the environment it can travel long distances. It will also be in or on particles that eventually fall to the ground. It is not expected to be broken down by light. It will not move into air from moist soil and **water** surfaces. It is expected to move easily through soil and not be degraded by microorganisms. It is expected to build up in aquatic organisms. **RISK:** Increased risk of asthma and behavioral and learning problems (including attention deficit hyperactive deficit disorder) have been observed in some children with high blood levels of perfluorinated compounds, including perfluorohexanesulfonic acid. Mild liver damage, altered human **cholesterol** and triglyceride levels, and immune system impairments may occur with exposure to perfluorinated compounds (including perfluorohexanesulfonic acid); however, human study results vary widely making it difficult to identify potential health effects. Adverse effects on male and female reproductive health and fetal growth have been associated with exposure to some perfluorinated compounds in several human studies, but very little evidence links perfluorohexanesulfonic acid exposure to adverse reproductive effects or impaired fetal growth. Infertility, abortion, and birth defects were not observed in laboratory animals orally exposed to perfluorohexanesulfonic acid. Altered behavior (decreased activity) was observed in offspring of laboratory animals exposed to perfluorohexanesulfonic acid during pregnancy. Perfluorohexanesulfonic acid levels in the blood have not been associated with incidence of prostate cancer in humans. No other data on the potential for perfluorohexanesulfonic acid to cause cancer in humans or laboratory animals were available. The potential for perfluorohexanesulfonic acid to cause cancer in humans has not been assessed by the U.S. EPA IRIS program, the International Agency for Research on Cancer, or the U.S. National Toxicology Program 13th Report on Carcinogens. (SRC)

FOR MORE INFORMATION: (1) National Library of Medicine Hazardous Substances Data Bank. Available from, as of Oct 9, 2015: <http://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm> (2) ATSDR Toxicological Profile for Perfluoroalkyls. Draft for Public Comment. 2015. Available from, as of Oct 9, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp> (3) IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man. Available from, as of Oct 9, 2015: <http://monographs.iarc.fr/ENG/Classification/index.php> (4) National Toxicology Program. Testing Status of Agents at NTP. RTP No. PFHXS N040005-NTP. Available from, as of Oct 9, 2015: <http://ntp.niehs.nih.gov/> (5) National Toxicology Program. Thirteenth Report on Carcinogens. Available from, as of Oct 9, 2015: <http://ntp.niehs.nih.gov/pubhealth/roc/index.html> (6) USEPA/IRIS Integrated Risk Information System. Available from, as of Oct 9, 2015: <http://www.epa.gov/iris/>

► [Hazardous Substances Data Bank \(HSDB\)](#)

8.2 Use Classification



PFAS (per- and polyfluoroalkyl substances) -> OECD Category

S25 | [OECDPFAS](#) | [List of PFAS from the OECD](#) | [DOI:10.5281/zenodo.2648775](https://doi.org/10.5281/zenodo.2648775)

► [NORMAN Suspect List Exchange](#)

8.3 Uses



EPA CPDat Chemical and Product Categories

► [EPA Chemical and Products Database \(CPDat\)](#)

Used mainly as a raw material or precursor for production of PFAS /perfluoroalkyl sulfonate/ based products.

OECD; PFCS: Outcome of the 2009 survey. Survey on the production, use and release of PFOS, PFAS, PFOA PFCA, their related substances and products/mixtures containing these substances. Series on risk management No.24 (Jan 7, 2011). Available from, as of Oct 6, 2015: [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono\(2011\)1&doclanguage=en](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2011)1&doclanguage=en)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Laboratory applications, manufacture of substances. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluorohexane sulfonate (PFHxS) is a six-carbon compound in the perfluoroalkyl family of chemicals. **Perfluorohexane sulfonate** was once used in firefighting foam and carpet treatment solutions. It was once widely used by 3M as a stain and water repellent but was phased out due to U.S. Environmental Protection Agency regulations.

Garcia J. S. et al; Perfluoroalkyl Compounds, Hamilton & Hardy's Industrial Toxicology 69 (2015). <http://onlinelibrary.wiley.com/advanced/search>

► [Hazardous Substances Data Bank \(HSDB\)](#)

8.4 Methods of Manufacturing



Perfluoroalkanesulfonyl fluorides are usually made by the Simons electrochemical fluorination process ... in which a hydrocarbon **sulfonyl fluoride** is electrolyzed in anhydrous **hydrogen fluoride** at **nickel** electrodes. The electrochemical yield is excellent for the first member of the series and decreases progressively with the increasing length of the **carbon** chain; the yield for **octanesulfonyl fluoride** is ca. 40%. Alkaline hydrolysis of perfluoroalkanesulfonyl fluorides gives the corresponding salts, which when acidified and distilled from concentrated **sulfuric acid** yield the anhydrous sulfonic acids.

Siegemund G et al; Fluorine Compounds, Organic. Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (1999-2015). NY, NY: John Wiley & Sons. Online Posting Date: June 15, 2000

► [Hazardous Substances Data Bank \(HSDB\)](#)

... The commercially important methods of preparations of perfluorinated sulfonic acid derivatives are electrochemical fluorination and **sulfur trioxide** addition to **tetrafluoroethylene** with subsequent ring opening.

Savu P; Fluorine-Containing Polymers, Perfluoroalkanesulfonic Acids. Kirk-Othmer Encyclopedia of Chemical Technology (1999-2015). John Wiley & Sons, Inc. Online Posting Date: December 4, 2000

► [Hazardous Substances Data Bank \(HSDB\)](#)

8.5 General Manufacturing Information



EPA TSCA Commercial Activity Status

1-Hexanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluoro-: ACTIVE

<https://www.epa.gov/tsca-inventory>

► [EPA Chemicals under the TSCA](#)

EPA TSCA Regulatory Flag

S - indicates a substance that is identified in a final Significant New Use Rule.

<https://www.epa.gov/tsca-inventory>

► [EPA Chemicals under the TSCA](#)

9 Identification



9.1 Analytic Laboratory Methods



Method: EPA-ORD/EPA-OST 537; Procedure: liquid chromatography/tandem mass spectrometry; Analyte: perfluorohexanesulfonic acid; Matrix: drinking water; Detection Limit: 1.6 nanogram/L.

National Environmental Methods Index; Analytical, Test and Sampling Methods. Perfluorohexanesulfonic Acid (355-46-4). Available from, as of September 16, 2015: <http://www.nemi.gov>

► [Hazardous Substances Data Bank \(HSDB\)](#)

9.2 Clinical Laboratory Methods



Perfluorooctane sulfonic acid (PFOS) and **perfluorooctanoic acid**, two of the most widely studied polyfluoroalkyl chemicals (PFCs), can cross the placenta. Therefore, data on the exposure to PFCs of the very young are needed to evaluate the potential health effects associated with such exposure. Human serum, especially serum collected from pregnant women and cord serum, may contain endogenous components that can interfere in the separation by high performance liquid chromatography (HPLC) of **PFOS** and another PFC of interest, perfluorohexane sulfonic acid (PFHxS), from other serum biomolecules. The presence of such interferences may prevent the adequate quantification of **PFOS** and PFHxS in cord serum or serum collected from pregnant women, and potentially hinder the assessment of gestational exposure to these important PFCs using biomonitoring. We have modified our on-line solid phase extraction-HPLC-isotope dilution-tandem mass spectrometry analytical method for measuring PFCs in serum and developed an approach that allows for the elimination of these potential interferences without compromising analytical sensitivity and throughput. The combination of **acetonitrile** as the HPLC mobile phase organic solvent and a Betasil C8 HPLC column provided the best separation of **PFOS** and PFHxS from interferent peaks. In addition to eliminating these interferences, the **acetonitrile** method has a shorter runtime and is more sensitive for most PFCs (limits of detection were 0.1 ng/mL except for **PFOS** (0.2 ng/mL)) than our previous method that used **methanol** for the HPLC separation. The present method should improve the precise and selective analysis of maternal and cord serum for PFCs.

PMID:21084089

Kato K et al; J Chromatogr A. 1218(15): 2133-7 (2011).

► [Hazardous Substances Data Bank \(HSDB\)](#)

The aim of this study is to evaluate the presence of perfluoroalkyl substances (PFASs) in the blood of 46 residents from Barcelona and to study the factors that affect exposure. Compounds analysed included **perfluorooctane sulfonate (PFOS)**, **perfluorohexane sulfonate (PFHxS)**, **perfluorobutane sulfonate (PFBS)**, **perfluorooctanoate acid (PFOA)** and perfluorononanoate acid (**PFNA**). Blood was liquid-liquid extracted and PFASs were determined by liquid chromatography coupled to tandem mass spectrometry. Good recoveries (between 97 +/- 14 and 105 +/- 13 %) were obtained and method detection limits were from 0.03 to 0.07 ng mL⁻¹. Sum of PFASs ranged from 0.11 to 4.37 ng mL⁻¹. **PFOS** was the main compound detected at 0.09-3.35 ng mL⁻¹, followed by **PFOA** and PFHxS. **PFBS** and **PFNA** were seldom detected. Working conditions, smoking and gender did not cause any significant differences among sums of PFASs levels in the blood while age and parity produced decreased concentrations. On the other hand, laboratory working conditions produced significant higher **PFOA** levels compared to the general population. Compared to other studies, the PFASs levels in blood from Barcelona residents is low (mean sum of PFASs of 1.67 +/- 0.88 ng mL⁻¹) and with little variation among the studied population.

PMID:25163560

Gomez-Canela C et al; Environ Sci Pollut Res Int 22(2): 1480-6 (2015).

► [Hazardous Substances Data Bank \(HSDB\)](#)

Fluorinated surfactant-based aqueous film-forming foams (AFFFs) are made up of per- and polyfluorinated alkyl substances (PFAS) and are used to extinguish fires involving highly flammable liquids. The use of **perfluorooctanesulfonic acid (PFOS)** and other perfluoroalkyl acids (PFAAs) in some AFFF formulations has been linked to substantial environmental contamination. Recent studies have identified a large number of novel and infrequently reported fluorinated surfactants in different AFFF formulations. In this study, a strategy based on a case-control approach using quadrupole time-of-flight tandem mass spectrometry (QTOF-MS/MS) and advanced statistical methods has been used to extract and identify known and unknown PFAS in human serum associated with AFFF-exposed firefighters. Two target sulfonic acids [**PFOS** and perfluorohexanesulfonic acid (PFHxS)], three non-target acids [**perfluoropentanesulfonic acid (PFPeS)**, **perfluoroheptanesulfonic acid (PFHpS)**, and **perfluorononanesulfonic acid (PFNS)**], and four unknown sulfonic acids (CI-**PFOS**, ketone-**PFOS**, ether-PFHxS, and CI-PFHxS) were exclusively or significantly more frequently detected at higher levels in firefighters compared to controls. The application of this strategy has allowed for identification of previously unreported fluorinated chemicals in a timely and cost-efficient way.

PMID:25611076

Rotander A et al; Environ Sci Technol 49(4): 2434-42.

► [Hazardous Substances Data Bank \(HSDB\)](#)

10 Safety and Hazards



10.1 Hazards Identification



10.1.1 GHS Classification



Showing 1 of 2 [View More](#)

Pictogram(s)	  Corrosive Irritant
Signal	<u>Danger</u>
GHS Hazard Statements	H302 (100%): Harmful if swallowed [<u>Warning</u> Acute toxicity, oral] H312 (100%): Harmful in contact with skin [<u>Warning</u> Acute toxicity, dermal] H314 (100%): Causes severe skin burns and eye damage [<u>Danger</u> Skin corrosion/irritation] H332 (100%): Harmful if inhaled [<u>Warning</u> Acute toxicity, inhalation]
Precautionary Statement Codes	P260, P261, P264, P270, P271, P280, P301+P312, P301+P330+P331, P302+P352, P303+P361+P353, P304+P312, P304+P340, P305+P351+P338, P310, P312, P321, P322, P330, P363, P405, and P501 (The corresponding statement to each P-code can be found at the GHS Classification page.)
ECHA C&L Notifications Summary	<i>The GHS information provided by 1 company from 1 notification to the ECHA C&L Inventory.</i>

► [European Chemicals Agency \(ECHA\)](#)

10.1.2 Hazard Classes and Categories



Acute Tox. 4 (100%)

Acute Tox. 4 (100%)

Skin Corr. 1B (100%)

Acute Tox. 4 (100%)

► [European Chemicals Agency \(ECHA\)](#)

10.2 Fire Fighting



10.2.1 Fire Fighting Procedures



Advice for firefighters: Wear self-contained breathing apparatus for firefighting if necessary. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

Suitable extinguishing media: Use **water** spray, alcohol-resistant foam, dry chemical or **carbon dioxide**. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.3 Accidental Release Measures



10.3.1 Cleanup Methods



Methods and materials for containment and cleaning up: Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.3.2 Disposal Methods



SRP: Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier. Ultimate disposal of the chemical must consider: the material's impact on air quality; potential migration in air, soil or [water](#); effects on animal, aquatic and plant life; and conformance with environmental and public health regulations. If it is possible or reasonable use an alternative chemical product with less inherent propensity for occupational harm/injury/toxicity or environmental contamination.

► [Hazardous Substances Data Bank \(HSDB\)](#)

Product: Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Contaminated packaging: Dispose of as unused product. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.3.3 Preventive Measures



Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

Personal precautions, protective equipment and emergency procedures: Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.4 Handling and Storage



10.4.1 Storage Conditions



Conditions for safe storage, including any incompatibilities: Keep container tightly closed in a dry and well-ventilated place.

/[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

Precautions for safe handling: Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.5 Exposure Control and Personal Protection



10.5.1 Personal Protective Equipment (PPE)



Respiratory protection: For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

Body Protection: Impervious clothing, the type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

Skin protection: Handle with gloves. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

Eye/face protection: Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.6 Stability and Reactivity



10.6.1 Hazardous Reactivities and Incompatibilities



Incompatible materials: Strong oxidizing agents. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.7 Other Safety Information



10.7.1 Toxic Combustion Products



Special hazards arising from the substance or mixture: Carbon oxides, Sulphur oxides, [Hydrogen fluoride](#), Potassium oxides. /[Tridecafluorohexane-1-sulfonic acid potassium salt](#)/

Sigma-Aldrich; Material Safety Data Sheet for Tridecafluorohexane-1-sulfonic acid potassium salt, Product Number: 50929, Version 3.6 (Revision Date 12/22/2014). Available from, as of August 18, 2015: <http://www.sigmaaldrich.com/safety-center.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.7.2 History and Incidents



In summer 2008, an accidental release of aqueous film forming foam (AFFF) took place at Schiphol Amsterdam Airport (The Netherlands). After the release, [water](#), fish, and sediment samples were collected and analyzed for perfluoroalkyl sulfonates (PFASs). In situ [perfluorooctane sulfonate](#) (PFOS) sediment-[water](#) distribution factor (KD) values, bioaccumulation factor (BAF) values, and biota-sediment accumulation factor (BSAF) values showed a remarkable agreement among reference and impacted sites, 10 weeks after the incident as well as after 3 years.

[PMID:24729487](#)

Kwadijk CJ et al; Environ Toxicol Chem 33(8): 1761-5 (2014).

► [Hazardous Substances Data Bank \(HSDB\)](#)

11 Toxicity



11.1 Toxicological Information



11.1.1 Toxicity Summary



IDENTIFICATION AND USE: [Perfluorohexane sulfonate](#) (PFHxS) is a six-carbon compound in the perfluoroalkyl family of chemicals. [Perfluorohexane sulfonate](#) was once used in firefighting foam and carpet treatment solutions. It was once widely used as a stain and [water](#) repellent but was phased out due to U.S. Environmental Protection Agency regulations. HUMAN EXPOSURE AND TOXICITY: An epidemiological study evaluated the associations between serum levels of PFHxS and diagnosis of attention deficit/hyperactivity disorder (ADHD). In another study, the associations of prenatal serum concentrations (PFHxS) with fetal and postnatal growth in girls was examined. Serum samples were obtained from mothers during pregnancy. PFHxS (median, 1.6 ng/mL) was detected in 100% of samples. On average, girls born to mothers with prenatal concentrations of PFHxS in the upper tertile weighed 108 g less at birth than girls born to mothers with concentrations in the lower tertile in adjusted models. In another study, the association between levels of PFHxS and semen volume, sperm concentration, total sperm count, motility and morphology were assessed. The proportion of morphologically normal cells was 35% lower for the third tertile of PFHxS exposure as compared with the first. In a surveillance study, the serum concentrations of perfluoroalkyl acids (PFAAs) in firefighters was evaluated, and serum concentration of PFHxS was statistically higher in firefighters. Another study reported evidence of a significant association between PFHxS and total [cholesterol](#) (TC), low-density lipoprotein [cholesterol](#) (LDL), total [cholesterol](#)/high density lipoprotein [cholesterol](#) ratio (TC/HDL) and non-HDL [cholesterol](#) as well as an elevated odds of high [cholesterol](#). In another study, which evaluated the relationship between serum PFCs and thyroid function, increase in natural log-PFHxS was associated with an increase of total T4 by 0.26 ug/mL and total T3 by 4.074 ng/dL in women and a decrease of natural log-free T4 by 0.016 (ng/dL) in men. ANIMAL STUDIES: A subchronic study investigated the mechanism underlying the effect of PFAS surfactants on lipoprotein metabolism. Mice were fed a Western-type diet with PFHxS, (6 mg/kg/day) for 4-6 weeks. PFHxS markedly reduced TG, non-HDL-C, and HDL-C. The decrease in very low-density lipoprotein (VLDL) was caused by enhanced lipoprotein lipase-mediated VLDL-TG clearance and by decreased production of VLDL-TG and VLDL-apolipoprotein B. Reduced HDL production, related to decreased apolipoprotein AI synthesis, resulted in decreased HDL. PFHxS increased liver weight and hepatic TG content. Hepatic gene expression profiling data indicated that these effects were the combined result of peroxisome proliferator-activated receptor alpha and [pregnane](#) X receptor activation. Another study showed that neonatal exposure to PFHxS can alter neuroprotein levels, e.g. CaMKII, GAP-43, synaptophysin and tau, which are essential for normal brain development in mice. This was measured for both males and females, in hippocampus and cerebral cortex. The results suggest that PFHxS may act as a developmental neurotoxicant and the effects are similar to that of [PFOS](#) and [PFOA](#), but also to other substances such as PCBs, PBDEs and [bisphenol A](#). In another study, in ovo effects of PFHxS exposure (maximum dose = 38,000 ng/g egg) on embryonic death, developmental endpoints, tissue accumulation, mRNA expression in liver and cerebral cortex, and plasma TH levels were evaluated. Pipping success was reduced to 63% at the highest dose of PFHxS; additional effects included decreased tarsus length and embryo mass. Plasma TH levels were reduced in a concentration-dependent manner following PFHxS exposure. A subsequent study evaluated the relationship between PFHxS exposure and TH-dependent neurodevelopmental pathways. PFHxS significantly altered the expression of 11 transcripts at the low dose (890 ng/g) and 101 transcripts at the high dose (38,000 ng/g). Functional enrichment analysis showed that PFHxS affected the genes involved in tissue development and morphology, cellular assembly and organization, and cell-to-cell signaling. In another study, the effects of PFHxS on the neuronal cell death and the underlying mechanisms were examined using PC12 cells as a model of dopaminergic neuron. The treatment with PFHxS reduced cell viability in a dose-dependent manner. PFHxS increased cell apoptosis, increased the activations of ERK1/2, JNK and p38 MAPK with different temporal activations. PFHxS exposure also increased ROS formation.

► [Hazardous Substances Data Bank \(HSDB\)](#)

11.1.2 Antidote and Emergency Treatment



/SRP:/ Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR if necessary. Immediately flush contaminated eyes with gently flowing [water](#). Do not induce vomiting. If vomiting occurs, lean patient forward or place on the left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Poisons A and B/

Currence, P.L. Clements, B., Bronstein, A.C. (Eds.); *Emergency Care For Hazardous Materials Exposure*. 3rd revised edition, Elsevier Mosby, St. Louis, MO 2007, p. 160

► [Hazardous Substances Data Bank \(HSDB\)](#)

/SRP:/ Basic treatment: Establish a patent airway (oropharyngeal or nasopharyngeal airway, if needed). Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if needed. Administer [oxygen](#) by nonrebreather mask at 10 to 15 L/min. Monitor for pulmonary edema and treat if necessary Monitor for shock and treat if necessary Anticipate seizures and treat if necessary For eye contamination, flush eyes immediately with [water](#). Irrigate each eye continuously with 0.9% saline (NS) during transport Do not use emetics. For ingestion,

rinse mouth and administer 5 mL/kg up to 200 mL of [water](#) for dilution if the patient can swallow, has a strong gag reflex, and does not drool ...
 . Cover skin burns with dry sterile dressings after decontamination /Poisons A and B/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds.); *Emergency Care For Hazardous Materials Exposure*. 3rd revised edition, Elsevier Mosby, St. Louis, MO 2007, p. 160

► [Hazardous Substances Data Bank \(HSDB\)](#)

/SRP:/ Advanced treatment: Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious, has severe pulmonary edema, or is in severe respiratory distress. Positive-pressure ventilation techniques with a bag valve mask device may be beneficial. Consider drug therapy for pulmonary edema Consider administering a beta agonist such as [albuterol](#) for severe bronchospasm Monitor cardiac rhythm and treat arrhythmias as necessary Start IV administration of D5W TKO /SRP: "To keep open", minimal flow rate/. Use 0.9% saline (NS) or lactated Ringer's (LR) if signs of hypovolemia are present. For hypotension with signs of hypovolemia, administer fluid cautiously. Watch for signs of fluid overload Treat seizures with [diazepam](#) or [lorazepam](#) Use [proparacaine hydrochloride](#) to assist eye irrigation /Poisons A and B/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds.); *Emergency Care For Hazardous Materials Exposure*. 3rd revised edition, Elsevier Mosby, St. Louis, MO 2007, p. 160-1

► [Hazardous Substances Data Bank \(HSDB\)](#)

11.1.3 Human Toxicity Excerpts



/EPIDEMIOLOGY STUDIES/ Our limited understanding of how polyfluoroalkyl chemicals (PFCs) may impact on human health suggests the potential for a protective impact on brain health. This study was designed to explore the association between PFCs and cognitive ability in older adults. We assessed the association between four PFCs, [perfluorooctanoic acid \(PFOA\)](#), [perfluorooctane sulfonic acid \(PFOS\)](#), [perfluorononanoic acid \(PFNA\)](#) and perfluorohexane sulfonic acid (PFHxS), and self-reported limitation due to difficulty remembering or periods of confusion using data from participants aged 60-85 years from the 1999-2000 and 2003-2008 National Health and Nutrition Examination Surveys. We also considered whether diabetic status or diabetic medication use modifies this association in light of in vitro evidence that PFCs may act on the same receptors as some diabetic medications. In multivariable adjusted models, point estimates suggest a protective association between PFCs and self-reported cognitive limitation (odds ratio, OR; 95% confidence interval, CI) for a doubling in PFC concentration: [PFOS](#) (OR, 0.90; 95% CI, 0.78, 1.03), [PFOA](#) (OR, 0.92; 95% CI, 0.78, 1.09), [PFNA](#) (OR, 0.91; 95% CI, 0.79, 1.04) and PFHxS (OR, 0.93; 95% CI, 0.82, 1.06). The protective association was concentrated in diabetics, with strong, significant protective associations in non-medicated diabetics. This cross-sectional study suggests that there may be a protective association between exposure to PFCs and cognition in older adults, particularly diabetics.

PMID:23095808

Full text: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3658136>

Power MC et al; *Neuroepidemiology* 40(2): 125-32 (2013).

► [Hazardous Substances Data Bank \(HSDB\)](#)

/EPIDEMIOLOGY STUDIES/ Associations between perfluoroalkyl acids (PFASs) and human thyroid hormone levels remain unclear, especially during early pregnancy when small changes in maternal thyroid hormones can affect fetal brain development. The objective of this study was to examine associations between maternal serum PFAS levels and maternal thyroid hormone levels in the early 2nd trimester of pregnancy. Participants were euthyroid pregnant women (n=152) enrolled in the Chemicals, Health and Pregnancy (CHiP) study based in Vancouver, Canada. Associations between maternal serum PFASs, including [perfluorohexanesulfonate](#) (PFHxS), [perfluorononanoate \(PFNA\)](#), [perfluorooctanoate \(PFOA\)](#) and [perfluorooctanesulfonate \(PFOS\)](#) and repeated measures of maternal thyroid hormones, including free [thyroxine](#) (fT4), total [thyroxine](#) (TT4) and thyroid stimulating hormone (TSH) were examined using mixed effects linear models. Associations were considered in all women, then separately in women with high (greater than or equal to 9 IU/mL) vs normal (<9 IU/mL) levels of thyroid peroxidase antibody (TPOAb), a marker of autoimmune hypothyroidism (Hashimoto's disease). Median PFAS concentrations (ng/mL) in maternal sera were 1.0 (PFHxS), 0.6 (PFNA), 1.7 (PFOA) and 4.8 (PFOS). PFASs were not associated with fT4, TT4 or TSH among women with normal TPOAb. However, among the 9% of women with high TPOAb (n=14), interquartile range (IQR) increases of PFASs were associated with a 46-69% increase in maternal TSH (95% CIs ranging from 8% to 123%) (PFNA, PFOA and PFOS only), and with a 3% to 7% decrease in maternal fT4 (95% CIs ranging from -18% to 5%) (all 4 PFASs). PFNA was also associated with higher maternal TSH in the whole sample. PFASs were positively associated with TSH, and weakly negatively associated with fT4 in the subset of pregnant women with high TPOAb, which occurs in 6-10% of pregnancies. PFASs may exacerbate the already high TSH and low fT4 levels in these women during early pregnancy, which is a critical time of thyroid hormone-mediated fetal brain development. The clinical significance of these findings is not clear. We propose a "multiple hit hypothesis" to explain these findings; this hypothesis deserves evaluation in larger, more representative study samples. /perfluoroalkyl acids/

PMID:25019470

Webster GM et al; *Environ Res* 133: 338-47 (2014).

► [Hazardous Substances Data Bank \(HSDB\)](#)

/EPIDEMIOLOGY STUDIES/ Polyfluoroalkyl chemicals (PFCs) have been widely used in consumer products. Exposures in the United States and in world populations are widespread. PFC exposures have been linked to various health impacts, and data in animals suggest that PFCs may be

potential developmental neurotoxicants. We evaluated the associations between exposures to four PFCs and parental report of diagnosis of attention deficit/hyperactivity disorder (ADHD). Data were obtained from the National Health and Nutrition Examination Survey (NHANES) 1999-2000 and 2003-2004 for children 12-15 years of age. Parental report of a previous diagnosis by a doctor or health care professional of ADHD in the child was the primary outcome measure. **Perfluorooctane sulfonic acid (PFOS)**, **perfluorooctanoic acid (PFOA)**, **perfluorononanoic acid (PFNA)**, and perfluorohexane sulfonic acid (PFHxS) levels were measured in serum samples from each child. Parents reported that 48 of 571 children included in the analysis had been diagnosed with ADHD. The adjusted odds ratio (OR) for parentally reported ADHD in association with a 1-ug/L increase in serum **PFOS** (modeled as a continuous predictor) was 1.03 [95% confidence interval (CI), 1.01-1.05]. Adjusted ORs for 1-ug/L increases in **PFOA** and PFHxS were also statistically significant (**PFOA**: OR = 1.12; 95% CI, 1.01-1.23; PFHxS: OR = 1.06; 95% CI, 1.02-1.11), and we observed a nonsignificant positive association with **PFNA** (OR = 1.32; 95% CI, 0.86-2.02). Our results, using cross-sectional data, are consistent with increased odds of ADHD in children with higher serum PFC levels. Given the extremely prevalent exposure to PFCs, follow-up of these data with cohort studies is needed.

PMID:20551004

Full text: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3002197>

Hoffman K et al; *Environ Health Perspect* 118(12): 1762-7 (2010).

► [Hazardous Substances Data Bank \(HSDB\)](#)

/EPIDEMIOLOGY STUDIES/ Prenatal exposures to polyfluoroalkyl compounds (PFCs) may be associated with adverse changes in fetal and postnatal growth. We explored associations of prenatal serum concentrations of **perfluorooctane sulfonate (PFOS)**, **perfluorooctanoate (PFOA)**, and **perfluorohexane sulfonate (PFHxS)** with fetal and postnatal growth in girls. We studied a sample of 447 singleton girls and their mothers participating in the Avon Longitudinal Study of Parents and Children (ALSPAC). Data on weight and length were obtained at birth and at 2, 9, and 20 months. Serum samples were obtained in 1991-1992, from mothers during pregnancy. We explored associations between prenatal PFC concentrations and weight at birth as well as longitudinal changes in weight-for-age SD scores between birth and 20 months. **PFOS** (median, 19.6 ng/mL), **PFOA** (median, 3.7 ng/mL), and PFHxS (median, 1.6 ng/mL) were detected in 100% of samples. On average, girls born to mothers with prenatal concentrations of **PFOS** in the upper tertile weighed 140 g less [95% confidence interval (CI): -238, -42] at birth than girls born to mothers with concentrations in the lower tertile in adjusted models. Similar patterns were seen for **PFOA** (-133 g; 95% CI: -237, -30) and PFHxS (-108 g; 95% CI: -206, -10). At 20 months, however, girls born to mothers with prenatal concentrations of **PFOS** in the upper tertile weighed 580 g more (95% CI: 301, 858) when compared with those in the lower tertile. No differences in weight were found for **PFOA** and PFHxS. Girls with higher prenatal exposure to each of the PFCs examined were smaller at birth than those with lower exposure. In addition, those with higher exposure to **PFOS** were larger at 20 months.

PMID:22935244

Full text: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3491920>

Maisonnet M et al; *Environ Health Perspect* 120(10): 1432-7 (2012).

► [Hazardous Substances Data Bank \(HSDB\)](#)

For more Human Toxicity Excerpts (Complete) data for Perfluorohexanesulfonic acid (17 total), please visit the [HSDB record page](#).

► [Hazardous Substances Data Bank \(HSDB\)](#)

11.1.4 Non-Human Toxicity Excerpts



/LABORATORY ANIMALS: Subchronic or Prechronic Exposure/ **Perfluorobutane sulfonate (PFBS)**, **perfluorohexane sulfonate (PFHxS)**, and **perfluorooctane sulfonate (PFOS)** are stable perfluoroalkyl sulfonate (PFAS) surfactants, and PFHxS and **PFOS** are frequently detected in human biomonitoring studies. Some epidemiological studies have shown modest positive correlations of serum **PFOS** with non-high-density lipoprotein (HDL)-**cholesterol (C)**. This study investigated the mechanism underlying the effect of PFAS surfactants on lipoprotein metabolism. CETP mice were fed a Western-type diet with **PFBS**, PFHxS, or **PFOS** (30, 6, and 3 mg/kg/day, respectively) for 4-6 weeks. Whereas **PFBS** modestly reduced only plasma triglycerides (TG), PFHxS and **PFOS** markedly reduced TG, non-HDL-C, and HDL-C. The decrease in very low-density lipoprotein (VLDL) was caused by enhanced lipoprotein lipase-mediated VLDL-TG clearance and by decreased production of VLDL-TG and VLDL-apolipoprotein B. Reduced HDL production, related to decreased apolipoprotein AI synthesis, resulted in decreased HDL. PFHxS and **PFOS** increased liver weight and hepatic TG content. Hepatic gene expression profiling data indicated that these effects were the combined result of peroxisome proliferator-activated receptor alpha and **pregnane X** receptor activation. In conclusion, the potency of PFAS to affect lipoprotein metabolism increased with increasing alkyl chain length. PFHxS and **PFOS** reduce plasma TG and total **cholesterol** mainly by impairing lipoprotein production, implying that the reported positive correlations of serum **PFOS** and non-HDL-C are associative rather than causal.

PMID:21705711

Bijland S et al; *Toxicol Sci* 123(1):290-303 (2011).

► [Hazardous Substances Data Bank \(HSDB\)](#)

/LABORATORY ANIMALS: Developmental or Reproductive Toxicity/ In a recent egg injection study, we showed that in ovo exposure to [perfluorohexane sulfonate](#) (PFHxS) affects the pipping success of developing chicken (*Gallus gallus domesticus*) embryos. We also found evidence of thyroid hormone (TH) pathway interference at multiple levels of biological organization (i.e., somatic growth, messenger RNA expression, and circulating free [thyroxine](#) levels). Based on these findings, we hypothesize that PFHxS exposure interferes with TH-dependent neurodevelopmental pathways. This study investigates global transcriptional profiles in cerebral hemispheres of chicken embryos following exposure to a solvent control, 890 or 38,000 ng PFHxS/g egg (n = 4-5 per group); doses that lead to the adverse effects indicated above. PFHxS significantly alters the expression (greater than or equal to 1.5-fold, p less than or equal to 0.001) of 11 transcripts at the low dose (890 ng/g) and 101 transcripts at the high dose (38,000 ng/g). Functional enrichment analysis shows that PFHxS affects genes involved in tissue development and morphology, cellular assembly and organization, and cell-to-cell signaling. Pathway and interactome analyses suggest that genes may be affected through several potential regulatory molecules, including integrin receptors, myelocytomatosis viral oncogene, and CCAAT/enhancer-binding protein. This study identifies key functional and regulatory modes of PFHxS action involving TH-dependent and -independent neurodevelopmental pathways. Some of these TH-dependent mechanisms that occur during embryonic development include tight junction formation, signal transduction, and integrin signaling, whereas TH-independent mechanisms include gap junction intercellular communication.

PMID:22790973

Cassone CG et al; *Toxicol Sci* 129(2):380-91 (2012).

► [Hazardous Substances Data Bank \(HSDB\)](#)

/DEVELOPMENTAL NEUROTOXICITY/ [Perfluorohexane sulfonate](#) (PFHxS) is an industrial chemical and belongs to the group of perfluorinated compounds (PFCs). It has recently been shown to cause developmental neurobehavioral defects in mammals. These compounds are commonly used in products such as surfactant and protective coating due to their ability to repel [water](#)- and oil stains. PFCs are globally found in the environment as well as in human umbilical cord blood, serum and breast milk. In a previous study on other well-known PFCs, i.e. [PFOS](#) and [PFOA](#), it was shown that neonatal exposure caused altered neuroprotein levels in the hippocampus and cerebral cortex in neonatal male mice. The present study show that neonatal exposure to PFHxS, during the peak of the brain growth spurt, can alter neuroprotein levels, e.g. CaMKII, GAP-43, synaptophysin and tau, which are essential for normal brain development in mice. This was measured for both males and females, in hippocampus and cerebral cortex. The results suggest that PFHxS may act as a developmental neurotoxicant and the effects are similar to that of [PFOS](#) and [PFOA](#), but also to other substances such as PCBs, PBDEs and [bisphenol A](#).

PMID:23701969

Lee I et al; *Neurotoxicology* 37:190-6 (2013).

► [Hazardous Substances Data Bank \(HSDB\)](#)

/ENDOCRINE MODULATION/ Perfluoroalkyl acids (PFAAs), specifically perfluorinated sulfonates and carboxylates, are synthetic substances known for their chemical stability, resistance to degradation, and potential to biomagnify in food chains. The toxicological and biological effects of PFAAs in avian species are not well characterized, although there is some evidence to suggest that they can impact neurodevelopment and hatching success. Our laboratory recently reported significant effects of [perfluorohexane sulfonate](#) (PFHxS) and [perfluorohexanoate](#) (PFHxA) on messenger RNA (mRNA) levels of thyroid hormone (TH)-responsive genes in chicken embryonic neuronal cells. In this study, we determined in ovo effects of PFHxS and PFHxA exposure (maximum dose = 38,000 and 9700 ng/g egg, respectively) on embryonic death, developmental endpoints, tissue accumulation, mRNA expression in liver and cerebral cortex, and plasma TH levels. Pipping success was reduced to 63% at the highest dose of PFHxS; no effects were observed for PFHxA. PFHxS exposure (38,000 ng/g) decreased tarsus length and embryo mass. PFHxS and PFHxA accumulated in the three tissue compartments analyzed as follows: yolk sac > liver > cerebral cortex. Type II and type III 5'-deiodinases (D2 and D3) and cytochrome P450 3A37 mRNA levels were induced in liver tissue of chicken embryos exposed to PFHxS, whereas D2, neurogranin (RC3), and octamer motif binding factor 1 mRNA levels were upregulated in cerebral cortex. Plasma TH levels were reduced in a concentration-dependent manner following PFHxS exposure; PFHxA had no effect. This in ovo study successfully validated previous in vitro results concerning the modulation of TH-responsive genes and identified adverse effects associated with TH homeostasis in response to PFHxS treatment.

PMID:22302310

Cassone CG et al; *Toxicol Sci* 127(1): 216-24 (2012).

► [Hazardous Substances Data Bank \(HSDB\)](#)

/ALTERNATIVE and IN VITRO TESTS/ [Perfluorohexanesulfonate](#) (PFHxS) is one of the major perfluoroalkyl compounds (PFCs) found in human blood and its possible neurotoxicity has been suggested. However, the neuronal responses to PFHxS are not much known. Many studies have demonstrated that the early exposure to environmental chemicals increases the risk of neurodegenerative diseases such as Parkinson's disease in later life. In this study, the effects of PFHxS on the neuronal cell death and the underlying mechanisms were examined using PC12 cells as a model of dopaminergic neuron. The treatment with PFHxS reduced cell viability in a dose-dependent manner. PFHxS increased cell apoptosis which was measured by caspase-3 activity and TUNEL staining. [MK801](#), a [NMDA](#) receptor antagonist reduced PFHxS-induced apoptosis. PFHxS increased the activations of ERK1/2, JNK and p38 MAPK with different temporal activations. The treatment with [PD98059](#), an ERK inhibitor, significantly reduced apoptosis, whereas [SB203580](#), a p38 MAPK inhibitor, had no effect. JNK inhibition by [SP600125](#) significantly increased apoptosis. PFHxS exposure also increased ROS formation, which was completely blocked by antioxidants, [Trolox](#) or [N-acetylcysteine](#) (NAC).

However, neither Trolox nor NAC reduced PFHxS-induced apoptosis, suggesting that ROS may not be a critical mediator for PFHxS-induced apoptosis of cells. Moreover, ERK activation induced by PFHxS was blocked by MK801 but not antioxidants. Taken together, these results have demonstrated that PFHxS induces the apoptosis of dopaminergic neuronal cells, where NMDA receptor-mediated ERK pathway plays a pro-apoptotic role and JNK plays an anti-apoptotic role. Our results may contribute to understanding cellular mechanisms for PFHxS-induced neurotoxicity.

PMID:24534200

Lee YJ et al; Sci Total Environ 491-492: 227-34 (2014).

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11.1.5 Ecotoxicity Excerpts



/BIRDS and MAMMALS/ This study is aimed to evaluate the presence and distribution of Perfluorinated Compounds (PFCs) in Yellow-legged gull eggs (*Larus michahellis*) collected from 8 National or Natural Parks from the Iberian Peninsula. In each colony, 12 eggs were randomly collected and pooled from 3 areas of the colony and analyzed using liquid-solid extraction and liquid chromatography coupled to tandem mass spectrometry. Perfluorooctanate sulfonate (PFOS) was the only compound detected in the eggs and its presence was higher in the colonies situated in NE Iberian Peninsula due to the more industrial and mass urbanization in this area compared to the SW Mediterranean or Atlantic colonies. Accordingly, the Medes site, followed by the Ebro Delta and Columbretes, all situated in the NW Mediterranean coast, contained the highest PFOS levels (40.5-54.0ng/g-ww). In all other colonies, PFOS was detected at levels of 10.1-18.6ng/g-ww. Egg shell biometry was studied and it was found that the presence of PFOS did not affect the development of the egg. /perfluorinated Compounds (PFCs)/

PMID:22209369

Vicente J et al; Sci Total Environ 416: 468-75 (2012).

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11.2 Ecological Information



11.2.1 Environmental Fate/Exposure Summary



Perfluorohexanesulfonic acid's production and use as a raw material or precursor for production of PFAS (perfluoroalkyl sulfonate) based products and use as surfactants may result in its release to the environment through various waste streams. Its former use in firefighting foam and carpet treatment solutions resulted in its release to the environment through various waste streams. Degradation of commercial N-alkyl perfluoroalkyl sulfonamides to yield perfluorosulfonic acids (such as perfluorohexanesulfonic acid) may occur in the atmosphere via reaction with OH radicals. Perfluoroalkyl sulfonamides are degraded to perfluoroalkyl sulfonic acids in water and can be considered a source of the latter in the environment. If released to air, an estimated vapor pressure of 0.0046 mm Hg at 25 °C indicates perfluorohexanesulfonic acid will exist solely as a vapor in the atmosphere. However, monitoring data indicate the compound exists in both vapor and particulate phases in the atmosphere. Vapor-phase perfluorohexanesulfonic acid will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 115 days. Particulate-phase perfluorohexanesulfonic acid will be removed from the atmosphere by wet and dry deposition. Perfluorohexanesulfonic acid is not expected to be susceptible to direct photolysis by sunlight. Detection of perfluorohexanesulfonic acid in remote Arctic and marine air samples indicates the compound can be transported over long global distances. If released to soil, perfluorohexanesulfonic acid is expected to have very high mobility based upon a Koc of 9.3. The estimated pKa of perfluorohexanesulfonic is 0.14, indicating that this compound will exist almost entirely in the anion form in the environment and anions generally do not adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts. Volatilization from moist soil surfaces is not expected to be an important fate process based upon analogy to the PFOS (perfluorooctane sulfonic acid) and because the compound exists as an anion and anions do not volatilize. Perfluorohexanesulfonic acid is not expected to volatilize from dry soil surfaces based upon its vapor pressure. Biodegradation data in soil or water were not available. If released into water, perfluorohexanesulfonic acid is not expected to adsorb to suspended solids and sediment based upon the estimated Koc. A pKa of 0.14 indicates perfluorohexanesulfonic acid will exist almost entirely in the anion form at pH values of 5 to 9 and, therefore, volatilization from water surfaces is not expected to be an important fate process. However, due to the surfactant nature of the perfluoroalkyl compounds (such as perfluorohexanesulfonic acid), some of the amount released to water may form micelles and exist in the associated form despite the low pKa values of these substances. Perfluoroalkyl compounds that associate on water surfaces may volatilize into the atmosphere. A BCF value of 10 and a BAF of 70 suggests bioconcentration in aquatic organisms is low to moderate. Hydrolysis is not expected to be an important environmental fate process based on hydrolysis results for the analogous PFOS. Occupational exposure to perfluorohexanesulfonic acid may occur through inhalation and dermal contact with this compound at workplaces where perfluorohexanesulfonic acid is produced or used. Monitoring data indicate that the general population may be exposed to perfluorohexanesulfonic acid via inhalation of ambient air, dust, ingestion of food and drinking water, and dermal contact with consumer products containing perfluorohexanesulfonic acid. (SRC)

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11.2.2 Artificial Pollution Sources



Perfluorohexanesulfonic acid's production and use as a raw material or precursor for production of PFAS (perfluoroalkyl sulfonate) based products(1,2) and use as surfactants(2) may result in its release to the environment through various waste streams(SRC). Its former use in firefighting foam and carpet treatment solutions (once widely used by 3M as a stain and [water](#) repellent)(3) resulted in its release to the environment through various waste streams(SRC). A 2009 survey of manufacturers reported that more than 80% of the releases of PFAS chemicals were to local waterways and very little to air(1); [perfluorohexane sulfonate](#) (PFHS) contributed the most to PFAS release(1); lesser amounts of the chemicals were transferred off-site, mostly for incineration(1).

(1) OECD; *PFOS: Outcome of the 2009 survey. Survey on the production, use and release of PFOS, PFAS, PFOA PFCA, their related substances and products/mixtures containing these substances. Series on risk management No.24* (Jan 7, 2011). Available from, as of Oct 6, 2015: [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono\(2011\)1&doclanguage=en](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2011)1&doclanguage=en) (2) NTP; *Perfluorohexane sulfonate, PFHXS - M040005* (CAS 355-46-4), National Institute of Environmental Health Sciences. Available from, as of Oct 6, 2015: <http://ntp.niehs.nih.gov/testing/status/agents/ts-m040005.html> (3) Garcia J. S. et al; *Perfluoroalkyl Compounds*, Hamilton & Hardy's Industrial Toxicology 69 (2015). <http://onlinelibrary.wiley.com/advanced/search>

► [Hazardous Substances Data Bank \(HSDB\)](#)

11.2.3 Environmental Fate



TERRESTRIAL FATE: Based on a classification scheme(1), a Koc value of 9.3(2), determined from field-based monitoring data(2), indicates that perfluorohexanesulfonic acid is expected to have very high mobility in soil(SRC). The estimated pKa of perfluorohexanesulfonic acid is 0.14(3), indicating that this compound will exist almost entirely in anion form in the environment and anions generally do not adsorb more strongly to soils containing organic [carbon](#) and clay than their neutral counterparts(4). The analogous compound [PFOS \(perfluorooctanesulfonic acid\)](#) is reported to be essentially nonvolatile from moist soil surfaces(5), and the same is expected for perfluorohexanesulfonic acid(SRC). Perfluorohexanesulfonic acid is not expected to volatilize from dry soil surfaces(SRC) based upon an estimated vapor pressure of 0.0046 mm Hg at 25 °C(SRC), determined from a fragment constant method(6). Biodegradation data in soil were not available(SRC, 2015). However, available screening test results indicate that perfluoroalkyl compounds are resistant to biodegradation(3).

(1) Swann RL et al; *Res Rev* 85: 17-28 (1983) (2) Awad E et al; *Environ Sci Technol* 45: 8081-89 (2011) (3) ATSDR; *Draft Toxicological Profile for Perfluoroalkyls*. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp> (4) Doucette WJ; pp. 141-188 in *Handbook of Property Estimation Methods for Chemicals*. Boethling RS, Mackay D, eds. Boca Raton, FL: Lewis Publ (2000) (5) Giesy JP, Kannan K; *Environ Sci Technol* 36: 147A-152A (2002) (6) US EPA; *Estimation Program Interface (EPI) Suite*. Ver. 4.11. Nov, 2012. Available from, as of Oct 6, 2015: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

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AQUATIC FATE: Based on a classification scheme(1), a Koc value of 9.3(SRC), determined from field-based monitoring data(2), indicates that perfluorohexanesulfonic acid is not expected to adsorb to suspended solids and sediment(SRC). An estimated pKa of 0.14(2) indicates perfluorohexanesulfonic acid will exist almost entirely in the anion form at pH values of 5 to 9 and, therefore, volatilization from [water](#) surfaces is not expected to be an important fate process(SRC). However, due to the surfactant nature of the perfluoroalkyl compounds (such as perfluorohexanesulfonic acid), some of the amount released to [water](#) may form micelles and exist in the associated form despite the low pKa values of these substances(3). Perfluoroalkyl compounds that associate on [water](#) surfaces may volatilize into the atmosphere(3). According to a classification scheme(4), a BCF of 10(5) and a field-based BAF of 70(2) suggest the potential for bioconcentration in aquatic organisms is low to moderate(SRC). Biodegradation data in soil were not available(SRC, 2015). However, available screening test results indicate that perfluoroalkyl compounds are resistant to biodegradation(3). Hydrolysis is not expected to be an important environmental fate process based on hydrolysis results for the analogous [PFOS](#)(3).

(1) Swann RL et al; *Res Rev* 85: 17-28 (1983) (2) Awad E et al; *Environ Sci Technol* 45: 8081-8089 (2011) (3) ATSDR; *Draft Toxicological Profile for Perfluoroalkyls*. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp> (4) Franke C et al; *Chemosphere* 29: 1501-14 (1994) (5) Conder JM et al; *Environ Sci Technol* 42: 995-1003 (2008)

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ATMOSPHERIC FATE: According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere(1), perfluorohexanesulfonic acid, which has an estimated vapor pressure of 0.0046 mm Hg at 25 °C(SRC), determined from a fragment constant method(2), is expected to exist solely as a vapor in the ambient atmosphere. However, monitoring data indicate the compound exists in both vapor and particulate phases in the atmosphere(3,4). Vapor-phase perfluorohexanesulfonic acid is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals(SRC); the half-life for this reaction in air is estimated to be 115 days(SRC), calculated from its rate constant of 1.4X10⁻¹³ cu cm/molecule-sec at 25 °C(SRC) that was derived using a structure estimation method(2). Particulate-phase perfluorohexanesulfonic acid may be removed from the air by wet and dry deposition(SRC). Perfluoroalkyl sulfonic acids are not expected to undergo direct photolysis(5). Detection of perfluorohexanesulfonic acid in remote Arctic and marine air samples(4,5) indicates the compound can be transported over long global distances(SRC).

(1) Bidleman TF; *Environ Sci Technol* 22: 361-367 (1988) (2) US EPA; *Estimation Program Interface (EPI) Suite*. Ver. 4.11. Nov, 2012. Available from, as of Oct 6, 2015: <http://www.epa.gov/oppt/exposure/pubs/episuite.html> (3) Kim SK, Kannan K; *Environ Sci Technol* 41: 8328-34 (2007) (4) Dreyer A et al; *Environ Sci Technol* 43: 6507-14 (2009) (5) ATSDR; *Draft Toxicological Profile for Perfluoroalkyls*. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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11.2.4 Environmental Biodegradation



Biodegradation data specific to perfluorohexanesulfonic acid were not available(SRC, 2015). However, available screening test results indicate that perfluoroalkyl compounds are resistant to biodegradation(1).

(1) ATSDR; Draft Toxicological Profile for Perfluoroalkyls. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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11.2.5 Environmental Abiotic Degradation



The rate constant for the vapor-phase reaction of perfluorohexanesulfonic acid with photochemically-produced hydroxyl radicals has been estimated as 1.4×10^{-13} cu cm/molecule-sec at 25 °C(SRC) using a structure estimation method(1). This corresponds to an atmospheric half-life of about 115 days at an atmospheric concentration of 5×10^{-5} hydroxyl radicals per cu cm(1). As a class, perfluorinated organic compounds are resistant to hydrolysis and photolysis(2,3). Based on test results for PFOS (perfluorooctanesulfonic acid), perfluoroalkyl sulfonic acids are not expected to undergo direct photolysis(4). The analogous PFOS is also stable to environmental hydrolysis with a half-life of 41 years calculated from measured hydrolysis tests at pHs of 5, 7 and 9(4).

(1) US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.11. Nov, 2012. Available from, as of Oct 6, 2015: <http://www.epa.gov/oppt/exposure/pubs/episuite.html> (2) Giesy JP, Kannan K; Environ Sci Technol 36: 147A-152A (2002) (3) Beach SA et al; Rev Environ Contam Toxicol 186: 133-74 (2005) (4) ATSDR; Draft Toxicological Profile for Perfluoroalkyls. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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11.2.6 Environmental Bioconcentration



A BCF of 10 has been reported for perfluorohexanesulfonic acid(1). Using monitoring data from creek and pond locations in Toronto, Ontario, Canada, a field-based BAF (bioaccumulation factor) of 70 was determined for perfluorohexanesulfonic acid in fish(2). According to a classification scheme(3), these BCF and BAF values suggests the potential for bioconcentration in aquatic organisms is low to moderate(SRC). In living organisms, perfluoroalkyls bind to protein albumin in blood, liver, and eggs and do not accumulate in fat tissue, which may explain why bioconcentration factors (BCFs) are lower than expected in aquatic organisms(4).

(1) Conder JM et al; Environ Sci Technol 42: 995-1003 (2008) (2) Awad E et al; Environ Sci Technol 45: 8081-89 (2011) (3) Franke C et al; Chemosphere 29: 1501-14 (1994) (4) ATSDR; Draft Toxicological Profile for Perfluoroalkyls. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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11.2.7 Soil Adsorption/Mobility



Using monitoring data from creek and pond locations in Toronto, Ontario, Canada, a field-based Koc of 9.3 was determined for perfluorohexanesulfonic acid(1). According to a classification scheme(2), this estimated Koc value suggests that perfluorohexanesulfonic acid is expected to have very high mobility in soil. The estimated pKa of perfluorohexanesulfonic acid is 0.14(3), indicating that this compound will exist almost entirely in anion form in the environment and anions generally do not adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(4). However, it has been suggested that compounds like the analogous PFOS (perfluorooctanesulfonic acid) may form strong bonds via a chemisorption mechanism(5).

(1) Awad E et al; Environ Sci Technol 45: 8081-89 (2011) (2) Swann RL et al; Res Rev 85: 17-28 (1983) (3) ATSDR; Draft Toxicological Profile for Perfluoroalkyls. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp> (4) Doucette WJ; pp. 141-188 in Handbook of Property Estimation Methods for Chemicals. Boethling RS, Mackay D, eds. Boca Raton, FL: Lewis Publ (2000) (5) Beach SA et al; Rev Environ Contam Toxicol 186: 133-74 (2005)

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11.2.8 Volatilization from Water/Soil



The estimated pKa of perfluorohexanesulfonic acid is 0.14(1), indicating that this compound will exist almost entirely in the anion form in the environment(SRC). Therefore, volatilization from water surfaces is not expected to be an important fate process(SRC). The analogous compound PFOS (perfluorooctanesulfonic acid) is essentially nonvolatile from water and moist soil surfaces(2), and the same is expected for perfluorohexanesulfonic acid(SRC). Perfluorohexanesulfonic acid is not expected to volatilize from dry soil surfaces(SRC) based upon an

estimated vapor pressure of 0.0046 mm Hg(SRC), determined from a fragment constant method(3). However, due to the surfactant nature of the perfluoroalkyl compounds (such as perfluorohexanesulfonic acid), some of the amount released to **water** may form micelles and exist in the associated form despite the low pKa values of these substances(1). Perfluoroalkyl compounds that associate on **water** and soil surfaces may volatilize into the atmosphere(1).

(1) ATSDR; Draft Toxicological Profile for Perfluoroalkyls. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp> (2) Giesy JP, Kannan K; Environ Sci Technol 36: 147A-152A (2002) (3) US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.11. Nov, 2012. Available from, as of Oct 6, 2015: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

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11.2.9 Environmental Water Concentrations



GROUNDWATER: Well **water** sampled from a 3M facility in Minnesota contained perfluorohexanesulfonic acid concentrations of 6.47-40.0 ug/L(1).

(1) ATSDR; Draft Toxicological Profile for Perfluoroalkyls. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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DRINKING **WATER**: Finished drinking **water** and tap **water** samples collected from Amsterdam, Netherlands in January and September 2010 contained mean perfluorohexanesulfonic acid concentrations of 0.6 and 1.3 ng/L, respectively(1). Tap **water** samples collected from Amsterdam, Netherlands between February and April 2011 contained an average perfluorohexanesulfonic acid concentration of 0.55 ng/L(2). Perfluorohexanesulfonic acid concentrations of 0.045-0.15 ng/L were detected in drinking **water** samples collected from Oslo, Norway between October 2008 and January 2009(3). Perfluorohexanesulfonic acid was detected at 21 of 34 drinking **water** sampling sites in Australia between August and November 2010 at levels ranging from <0.92 to 9.98 ng/L(4).

(1) Eschauzier C et al; Environ Sci Technol 46(3): 1708-15 (2011) (2) Eschauzier C et al; Chemosphere 90: 36-41 (2013) (3) Haug LS et al; Chemosphere 80: 1137-43 (2010) (4) Thompson J et al; Chemosphere 83: 1320-25 (2011)

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SURFACE **WATER**: **Water** samples collected from 23 sites along 3 rivers in Tianjin, China in Dec 2008 contained perfluorohexanesulfonic acid concentrations of 0.14-1.28 ng/L(1). **Water** samples collected from Resolute Lake and Meretta Lake in the Canadian Arctic in 2003 and 2004 contained perfluorohexanesulfonic acid concentrations of 1.5-24 ng/L(2). Perfluorohexanesulfonic acid concentrations of <0.25 (detection limit) to 4.05 ng/L were detected in lake water samples collected near Albany, NY in 2006(3). Water samples collected from New York State in July 2004 detected perfluorohexanesulfonic acid in Onondaga Lake (4.2-8.5 ng/L), the Erie Canal (2.5-5.6 ng/L) and other lakes and rivers (0.9-2.8)(4).

(1) Pan Y et al; Bull Environ Contam Toxicol 87(2): 152-57 (2011) (2) Stock NL et al; Environ Sci Technol 41: 3529-36 (2007) (3) Kim SK, Kannan K; Environ Sci Technol 41: 8328-34 (2007) (4) Sinclair E et al; Arch Environ Contam Toxicol 50: 398-410 (2006)

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SEAWATER: International research cruises undertaken during 2002-2004 detected perfluorohexanesulfonic acid in open seawater at the following concentrations (in pg/L)(1): North Atlantic Ocean (4.1-6.1), Middle Atlantic Ocean (2.6-12), West Pacific Ocean (2.1-2.8), Central to East Pacific Ocean (0.1-1.6). Perfluorohexanesulfonic acid concentrations ranging from <0.2 to 5,600 pg/L have been detected in coastal and ocean waters from Toyko Bay, Hong Kong, Korea and the South China Sea(2).

(1) Yamashita N et al; Mar Poll Bull 51: 658-68 (2005) (2) ATSDR; Draft Toxicological Profile for Perfluoroalkyls. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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RAIN/SNOW: Perfluorohexanesulfonic acid concentrations of <0.25 (detection limit) to 0.36 ng/L were detected in rain and snow samples collected in Albany, NY during 2006-2007(1).

(1) Kim SK, Kannan K; Environ Sci Technol 41: 8328-34 (2007)

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11.2.10 Effluent Concentrations



In 2010, effluents from 90 European wastewater treatment plants were analyzed for 156 organic contaminants(1); perfluorohexanesulfonic acid was detected in 71% of the effluents at average and maximum concentrations of 48.6 and 922 ng/L, respectively(1). Analysis of influent and effluent waters from 10 WWTPs nationwide in US detected perfluorohexanesulfonic acid concentrations ranging from 2.3-12 ng/L in the influents and 2.4-17 ng/L in the effluents(2). Effluent waters from 6 WWTPs in New York State contained perfluorohexanesulfonic acid concentrations ranging from <2.5 to 39 ng/L(3).

(1) Loos R et al; *Water Research* 47: 6475-87 (2013) (2) Schultz MM et al; *Environ Sci Technol* 40: 289-95 (2006) (3) Sinclair E, Kannan K; *Environ Sci Technol* 40(5): 1408-14 (2006)

► [Hazardous Substances Data Bank \(HSDB\)](#)

11.2.11 Sediment/Soil Concentrations



SEDIMENT: Sediment core samples collected from three Canadian Arctic lakes in 2003 and 2005 contained perfluorohexanesulfonic acid concentrations ranging from about 1 to 10 ng/g dry weight(1). Perfluorohexanesulfonic acid was detected in 28% of 84-92 sediment samples collected from the Mississippi shoreline at a maximum concentration of 11.5 ng/g(2).

(1) Stock NL et al; *Environ Sci Technol* 41: 3529-36 (2007) (2) ATSDR; *Draft Toxicological Profile for Perfluoroalkyls*. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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SOIL: Soil samples collected from 4 suburban sites in Tianjin, China in Dec 2008 contained mean perfluorohexanesulfonic acid concentrations of 0.12-0.36 ng/g dry wt (maximum of 5.86 ng/g(1)). Soil samples from a 3M facility in Minnesota contained a maximum perfluorohexanesulfonic acid concentration of 3,470 ng/g(2).

(1) Pan Y et al; *Bull Environ Contam Toxicol* 87: 152-57 (2011) (2) ATSDR; *Draft Toxicological Profile for Perfluoroalkyls*. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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11.2.12 Atmospheric Concentrations



URBAN/SUBURBAN: Perfluorohexanesulfonic acid concentrations of 0.13-0.44 pg/cu m (mean of 0.31 pg/cu m) were detected in gas-phase air samples collected in Albany, NY during May-July 2006(1); particle-phase air contained concentration of <0.12 pg/cu m(1). Mean perfluorohexanesulfonic acid concentrations of 0.1 and 1.0 pg/cu m were found in air samples from Manchester UK during two sampling sessions(2).

(1) Kim SK, Kannan K; *Environ Sci Technol* 41: 8328-34 (2007) (2) ATSDR; *Draft Toxicological Profile for Perfluoroalkyls*. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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INDOOR: Indoor air samples (67 samples) collected in Ottawa, Canada contained a mean perfluorohexanesulfonic acid concentration of 391.96 pg/cu m. 112 Indoor air samples collected from North Carolina and Ohio contained a mean perfluorohexanesulfonic acid concentration of 874 pg/cu m(1).

(1) ATSDR; *Draft Toxicological Profile for Perfluoroalkyls*. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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RURAL/REMOTE: Perfluorohexanesulfonic acid was detected in particle-phase air samples collected from research ships in the Atlantic Ocean, Southern Ocean and Baltic Sea in 2007 and 2008 (concentration not reported)(1). Air samples collected on Cornwallis Island in the Canadian Arctic in the summer of 2004 contained a perfluorohexanesulfonic acid concentration of about 2 pg/cu m(2). Mean perfluorohexanesulfonic acid concentrations of 0.05, 0.07 and 0.04 pg/cu m were detected in air samples from Kjeller Norway, Mace Head Ireland and Hazelrigg UK, respectively(3). Marine air samples collected near the east coast of Africa contained a mean level of 0.013 pg/cu m(3).

(1) Dreyer A et al; *Environ Sci Technol* 43: 6507-14 (2009) (2) Stock NL et al; *Environ Sci Technol* 41: 3529-36 (2007) (3) ATSDR; *Draft Toxicological Profile for Perfluoroalkyls*. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

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11.2.13 Food Survey Values



Food items collected from grocery stores in Oslo, Norway between October 2008 and January 2009 contained the following concentrations of perfluorohexanesulfonic acid in pg/g fresh weight: margarine (1.3), bread (1.7), pork meat (1.2) and egg (3.5)(1).

(1) Haug LS et al; *Chemosphere* 80: 1137-43 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

11.2.14 Fish/Seafood Concentrations



Fish liver from various Japanese fish contained perfluorohexanesulfonic acid concentrations of <8.5 to 11 ng/g wet wt(1). Fish collected from grocery stores in Oslo, Norway between October 2008 and January 2009 contained the following concentrations of perfluorohexanesulfonic acid in pg/g fresh weight: fish sticks (1.6), salmon (5.5), and cod (2.8)(2).

(1) Senthikumar K et al; *Bull Environ Contam Toxicol* 79: 427-431 (2007) (2) Haug LS et al; *Chemosphere* 80: 1137-1143 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

11.2.15 Animal Concentrations



Wildlife samples collected from Japan contained the following concentrations of perfluorohexanesulfonic acid in ng/g wet weight: cormorants (<0.06-0.27), racoon dog (0.14-0.16), eagle (0.01-0.40) and large-bill crow (<0.03-0.10)(1).

(1) Senthikumar K et al; *Bull Environ Contam Toxicol* 79: 427-31 (2007)

► [Hazardous Substances Data Bank \(HSDB\)](#)

11.2.16 Milk Concentrations



ENVIRONMENTAL: Perfluorohexanesulfonic acid was detected in 100% of 48 breast milk samples collected from women in France at mean, median, minimum and maximum concentrations of 0.049, 0.050, 0.04 and 0.066 ug/L, respectively(1). Pooled human milk samples from 2009/2010 in Canada were reported to have an average perfluorohexane sulfonic acid concentration of 0.015 ng/mL(2).

(1) Antignac JP et al; *Chemosphere* 91: 802-8 (2013) (2) Kubwabo C et al; *Chemosphere* 91: 771-7 (2013)

► [Hazardous Substances Data Bank \(HSDB\)](#)

11.2.17 Other Environmental Concentrations



Indoor dust samples collected from a rural site near Toronto, Canada in 2007 contained a perfluorohexanesulfonic acid level of nearly 1 pg/cm(1).

(1) Gerwurtz SB et al; *Environ Sci Technol* 43: 7317-23 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoroalkyl chemicals (PFCs) have been used as surfactants and stain repellants in a variety of consumer products for more than 50 years and there is growing concern regarding their persistence and toxicity. Human exposure to these chemicals is essentially universal in North America and researchers have linked them to a variety of health problems ranging from higher rates of cancer, to developmental and reproductive problems, and higher [cholesterol](#) levels. Major exposure pathways are food and [water](#) ingestion, dust ingestion via hand to mouth transfer. In an effort to assess residential exposure, the Wisconsin Department of Health Services tested vacuum cleaner contents from thirty-nine homes for 16 perfluoroalkyl chemicals. [PFOS](#), [PFOA](#), PFHxS, PFHpA and [PFNA](#) were found in all of the vacuum dust samples and dust from eight homes contained all 16 PFCs included in our analysis. The most commonly detected compounds were [perfluorooctanesulfonate \(PFOS\)](#), [perfluorohexanesulfonate \(PFHxS\)](#) and [perfluorooctanoic acid \(PFOA\)](#) which together made up 70% of the total PFC residues in dust from these homes. Summed PFC concentrations in these dust samples ranged from 70 to 2513 ng/g (median 280 ng/g). Our investigation suggests that these chemicals may be ubiquitous contaminants in US homes.

[PMID:22542201](#)

Knobeloch L et al; *Chemosphere* 88(7): 779-83 (2012)

► [Hazardous Substances Data Bank \(HSDB\)](#)

11.2.18 Probable Routes of Human Exposure



Occupational exposure to perfluorohexanesulfonic acid may occur through inhalation and dermal contact with this compound at workplaces where perfluorohexanesulfonic acid is produced or used. Monitoring data indicate that the general population may be exposed to perfluorohexanesulfonic acid via inhalation of ambient air, dust, ingestion of food and drinking [water](#), and dermal contact with consumer products containing perfluorohexanesulfonic acid(1).

(1) ATSDR; *Draft Toxicological Profile for Perfluoroalkyls*. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

► [Hazardous Substances Data Bank \(HSDB\)](#)



11.2.19 Body Burden

In the Fourth National Report on Human Exposure to Environmental Chemicals (Fourth Report), CDC scientists measured 12 PFCs (perfluorochemicals) in the blood serum (the clear portion of blood) of 2,094 participants aged 12 years and older who took part in the National Health and Nutrition Examination Survey (NHANES) during 2003-2004(1). By measuring PFCs in serum, scientists can estimate the amount of PFCs that have entered people's bodies. CDC scientists found four PFCs (PFOS, PFOA, PFHxS or perfluorohexanesulfonic acid, and PFNA or perfluorononanoic acid) in the serum of nearly all of the people tested, indicating widespread exposure to these PFCs in the U.S. population(1). Mean concentration of perfluorohexane sulfonic acid declined by 10-30% in the 2003-2004 survey compared to a 1999-2000 survey(2).

(1) CDC; Perfluorochemicals (PFCs) Fact Sheet, November 2009. Available from, as of Oct 6, 2015: http://www.cdc.gov/biomonitoring/pdf/PFCs_FactSheet.pdf (2) ATSDR; Draft Toxicological Profile for Perfluoroalkyls. Atlanta, GA: Agency for Toxic Substances and Disease Registry, US Public Health Service (2015). Available from, as of Oct 5, 2015: <http://www.atsdr.cdc.gov/toxprofiles/index.asp>

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluorohexanesulfonic acid was detected in 100% of 48 breast milk samples collected from women in France at mean, median, minimum and maximum concentrations of 0.049, 0.050, 0.04 and 0.066 ug/L, respectively(1). Pooled human milk samples from 2009/2010 in Canada were reported to have an average perfluorohexanesulfonic acid concentration of 0.015 ng/mL(2).

(1) Antignac JP et al; Chemosphere 91: 802-8 (2013) (2) Kubwabo C et al; Chemosphere 91: 771-7 (2013)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluorohexanesulfonic acid concentration in the blood plasma of 105 fisherman from the Lake Mohne area of Germany (2006-2008) ranged from 0.4-17 ug/L(1). Analysis of blood serum collected from 20 adults in Atlanta, GA in July 2003 detected perfluorohexanesulfonic acid concentrations ranging from 0.4-11.2 ug/L(2).

(1) Holzer J et al; Environ Sci Technol 45(19): 8046-52 (2011) (2) Kuklenyik A et al; Environ Sci Technol 38: 3698-704 (2004)

► [Hazardous Substances Data Bank \(HSDB\)](#)

12 Associated Disorders and Diseases



► [Comparative Toxicogenomics Database \(CTD\)](#)

13 Literature



13.1 NLM Curated PubMed Citations



► PubChem

13.2 Springer Nature References



► Springer Nature

13.3 Depositor Provided PubMed Citations



► PubChem

13.4 Metabolite References



► Human Metabolome Database (HMDB)

13.5 Chemical Co-Occurrences in Literature



► PubChem

13.6 Chemical-Gene Co-Occurrences in Literature



► PubChem

13.7 Chemical-Disease Co-Occurrences in Literature



► PubChem

14 Patents



14.1 Depositor-Supplied Patent Identifiers



► PubChem

[Link to all deposited patent identifiers](#)

► PubChem

14.2 WIPO PATENTSCOPE



Patents are available for this chemical structure:

<https://patentscope.wipo.int/search/en/result.jsf?inchikey=QZHDEAJFRJCDMF-UHFFFAOYSA-N>

► PATENTSCOPE (WIPO)

15 Biomolecular Interactions and Pathways



15.1 Chemical-Gene Interactions



15.1.1 CTD Chemical-Gene Interactions



► [Comparative Toxicogenomics Database \(CTD\)](#)

16 Classification



16.1 Ontologies



16.1.1 MeSH Tree



► Medical Subject Headings (MeSH)

16.1.2 ChEBI Ontology



► ChEBI

16.1.3 ChemIDplus



► ChemIDplus

16.1.4 UN GHS Classification



► UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

16.1.5 EPA CPDat Classification



► EPA Chemical and Products Database (CPDat)

16.1.6 NORMAN Suspect List Exchange Classification



► [NORMAN Suspect List Exchange](#)

16.1.7 EPA DSSTox Classification



► [EPA DSSTox](#)

17 Information Sources



FILTER BY SOURCE

ALL SOURCES



1. CAS Common Chemistry

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Perfluorohexanesulfonic acid

https://commonchemistry.cas.org/detail?cas_rn=355-46-4

2. ChemIDplus

LICENSE

<https://www.nlm.nih.gov/copyright.html>

Perfluorohexanesulfonic acid

<https://chem.nlm.nih.gov/chemidplus/sid/0000355464>

ChemIDplus Chemical Information Classification

<https://chem.nlm.nih.gov/chemidplus/>

3. EPA Chemicals under the TSCA

LICENSE

<https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources>

1-Hexanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6,6-tridecafluoro-

<https://www.epa.gov/chemicals-under-tsca>

4. EPA DSSTox

LICENSE

<https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources>

PFHxS

<https://comptox.epa.gov/dashboard/DTXSID7040150>

CompTox Chemicals Dashboard Chemical Lists

https://comptox.epa.gov/dashboard/chemical_lists/

5. European Chemicals Agency (ECHA)

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<https://echa.europa.eu/web/guest/legal-notice>

Perfluorohexane-1-sulphonic acid

<https://echa.europa.eu/substance-information/-/substanceinfo/100.005.989>

Perfluorohexane-1-sulphonic acid

<https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/10265>

6. Hazardous Substances Data Bank (HSDB)

Perfluorohexanesulfonic acid

<https://pubchem.ncbi.nlm.nih.gov/source/hsdb/8274>

7. ChEBI

Perfluorohexanesulfonic acid

<http://www.ebi.ac.uk/chebi/searchId.do?chebiId=CHEBI:132448>

ChEBI Ontology

<http://www.ebi.ac.uk/chebi/userManualForward.do#ChEBI%20Ontology>

8. Comparative Toxicogenomics Database (CTD)

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<http://ctdbase.org/about/legal.jsp>

<http://ctdbase.org/detail.go?type=chem&acc=C471071>

9. EPA Chemical and Products Database (CPDat)

LICENSE

<https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources>

perfluorohexane-1-sulphonic acid

<https://comptox.epa.gov/dashboard/DTXSID7040150#exposure>

EPA CPDat Classification

<https://www.epa.gov/chemical-research/chemical-and-products-database-cpdatt>

10. FDA/SPL Indexing Data

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<https://www.fda.gov/about-fda/about-website/website-policies#linking>

ZU6Y1E592S

<https://www.fda.gov/ForIndustry/DataStandards/SubstanceRegistrationSystem-UniqueIngredientIdentifierUNII/>

11. Human Metabolome Database (HMDB)

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<http://www.hmdb.ca/citing>

Perfluorohexane sulfonic acid

<http://www.hmdb.ca/metabolites/HMDB0094700>

12. MassBank of North America (MoNA)

LICENSE

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<https://mona.fiehnlab.ucdavis.edu/documentation/license>

Perfluorohexane sulfonic acid (PFHxS)

<http://mona.fiehnlab.ucdavis.edu/spectra/browse?inchikey=QZHDEAJFRJCDMF-UHFFFAOYSA-N>

13. NORMAN Suspect List Exchange

LICENSE

Data: CC-BY 4.0; Code (hosted by ECI, LCSB): Artistic-2.0

<https://creativecommons.org/licenses/by/4.0/>

1-Hexanesulfonic acid, 1,1,2,2,3,3,4,4,5,5,6,6-tridecafluoro-

NORMAN Suspect List Exchange Classification

<https://www.norman-network.com/nds/SLE/>

14. Springer Nature

<https://pubchem.ncbi.nlm.nih.gov/substance/341186423>

15. Wikipedia

perfluorohexanesulphonic acid

https://commons.wikimedia.org/wiki/Category:Perfluorohexanesulfonic_acid

Perfluorohexanesulfonate

<https://www.wikidata.org/wiki/Q81978596>

16. PubChem

<https://pubchem.ncbi.nlm.nih.gov>

17. Medical Subject Headings (MeSH)

perfluorohexanesulfonic acid

<https://www.ncbi.nlm.nih.gov/mesh/67471071>

MeSH Tree

<http://www.nlm.nih.gov/mesh/meshhome.html>

18. UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

GHS Classification Tree

http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html

19. PATENTSCOPE (WIPO)

SID 403404669

<https://pubchem.ncbi.nlm.nih.gov/substance/403404669>

Perfluorohexanoic acid

Safety Data Sheet 2121339

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 11/18/2015

Revision date: 12/06/2018

Version: 1.1

SECTION 1: Identification

1.1. Identification

Product form : Substance
 Substance name : Perfluorohexanoic acid
 CAS No : 307-24-4
 Product code : 2121-3-39
 Formula : C₆HF₁₁O₂
 Synonyms : Undecafluorohexanoic acid
 Other means of identification : 2121-3-39

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Laboratory chemicals
 Manufacture of substances
 Scientific research and development

1.3. Details of the supplier of the safety data sheet

SynQuest Laboratories, Inc.
 P.O. Box 309
 Alachua, FL 32615 - United States of America
 T (386) 462-0788 - F (386) 462-7097
info@synquestlabs.com - www.synquestlabs.com

1.4. Emergency telephone number

Emergency number : (844) 523-4086 (3E Company - Account 10069)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Skin Corr. 1B H314 - Causes severe skin burns and eye damage

Eye Dam. 1 H318 - Causes serious eye damage

STOT SE 3 H335 - May cause respiratory irritation

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :



GHS05

GHS07

Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H314 - Causes severe skin burns and eye damage

H335 - May cause respiratory irritation

Precautionary statements (GHS-US) :

P260 - Do not breathe fumes, mist, spray, vapors
 P264 - Wash skin thoroughly after handling
 P271 - Use only outdoors or in a well-ventilated area
 P280 - Wear protective gloves/protective clothing/eye protection/face protection
 P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting
 P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
 P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
 P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 P310 - Immediately call a POISON CENTER or doctor/ physician
 P321 - Specific treatment (see supplemental first aid instructions on this label)
 P363 - Wash contaminated clothing before reuse
 P403+P233 - Store in a well-ventilated place. Keep container tightly closed
 P405 - Store locked up
 P501 - Dispose of contents/container to an approved waste disposal plant

Perfluorohexanoic acid

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2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Substance type : Mono-constituent

Name	Product identifier	%	Classification (GHS-US)
Perfluorohexanoic acid (Main constituent)	(CAS No) 307-24-4	<= 100	Skin Corr. 1B, H314 Eye Dam. 1, H318 STOT SE 3, H335

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- First-aid measures general : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move the affected personnel away from the contaminated area.
- First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Get immediate medical advice/attention.
- First-aid measures after skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Get immediate medical advice/attention.
- First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.
- First-aid measures after ingestion : Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get immediate medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed

- Symptoms/injuries : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.
- Symptoms/injuries after inhalation : Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Alcohol resistant foam. Carbon dioxide. Dry powder. Water spray. Use extinguishing media appropriate for surrounding fire.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : Thermal decomposition generates: Carbon oxides. Hydrogen fluoride.
- Explosion hazard : Risk of explosion if heated under confinement. Use water spray or fog for cooling exposed containers.

5.3. Advice for firefighters

- Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.
- Protection during firefighting : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

No additional information available

Perfluorohexanoic acid

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6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	: Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Do not breathe fumes, mist, spray, vapors. Wear personal protective equipment. Avoid contact with skin and eyes.
Hygiene measures	: Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	: Comply with applicable regulations.
Storage conditions	: Keep container closed when not in use.
Incompatible materials	: Refer to Section 10 on Incompatible Materials.
Storage area	: Store in dry, cool, well-ventilated area.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Exposure controls

Appropriate engineering controls	: Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Hand protection	: Protective gloves. 29 CFR 1910.138: Hand Protection.
Eye protection	: Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection.
Skin and body protection	: Wear suitable protective clothing.
Respiratory protection	: In case of inadequate ventilation wear respiratory protection. 29 CFR 1910.134: Respiratory Protection.
Other information	: Safety shoes. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Low melting solid.
Color	: No data available
Odor	: No data available
Odor threshold	: No data available
pH	: No data available
Melting point	: 12 - 14 °C
Freezing point	: No data available
Boiling point	: 157 °C
Flash point	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: No data available
Explosion limits	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available
Vapor pressure	: No data available
Relative density	: No data available
Relative vapor density at 20 °C	: No data available
Specific gravity / density	: 1.762 g/ml (@ 20 °C)
Molecular mass	: 314.05 g/mol

Perfluorohexanoic acid

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Solubility	: No data available
Log Pow	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available

9.2. Other information

Refractive index	: 1.298 (@ 20 °C)

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

No additional information available

10.5. Incompatible materials

Bases. Oxidizing agents. Reducing agents.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products in case of fire, see Section 5.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: Not classified
Skin corrosion/irritation	: Causes severe skin burns and eye damage.
Serious eye damage/irritation	: Causes serious eye damage.
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: May cause respiratory irritation.
Specific target organ toxicity (repeated exposure)	: Not classified
Aspiration hazard	: Not classified
Symptoms/injuries after inhalation	: Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea.

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

Perfluorohexanoic acid

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according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

- Waste treatment methods : Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.
- Waste disposal recommendations : Dispose of contents/container in accordance with licensed collector's sorting instructions.
- Additional information : Recycle the material as far as possible.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN3265 Corrosive liquid, acidic, organic, n.o.s., 8, II

UN-No.(DOT) : UN3265

Proper Shipping Name (DOT) : Corrosive liquid, acidic, organic, n.o.s.

Transport hazard class(es) (DOT) : 8 - Class 8 - Corrosive material 49 CFR 173.136

Hazard labels (DOT) : 8 - Corrosive



Packing group (DOT) : II - Medium Danger

DOT Packaging Non Bulk (49 CFR 173.xxx) : 202

DOT Packaging Bulk (49 CFR 173.xxx) : 242

DOT Symbols : G - Identifies PSN requiring a technical name

DOT Special Provisions (49 CFR 172.102) : B2 - MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks are not authorized.

IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized.

T11 - 6 178.274(d)(2) Normal..... 178.275(d)(3)

TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: t_r is the maximum mean bulk temperature during transport, t_f is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (t_f) and the maximum mean bulk temperature during transportation (t_r) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d_{15} and d_{50} are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.

TP27 - A portable tank having a minimum test pressure of 4 bar (400 kPa) may be used provided the calculated test pressure is 4 bar or less based on the MAWP of the hazardous material, as defined in 178.275 of this subchapter, where the test pressure is 1.5 times the MAWP.

DOT Packaging Exceptions (49 CFR 173.xxx) : 154

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 1 L

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 30 L

DOT Vessel Stowage Location : B - (i) The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) "On deck only" on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

Other information : No supplementary information available.

TDG

No additional information available

Perfluorohexanoic acid

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Transport by sea

UN-No. (IMDG)	: 3265
Proper Shipping Name (IMDG)	: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.
Class (IMDG)	: 8 - Corrosive substances
Packing group (IMDG)	: II - substances presenting medium danger

Air transport

UN-No. (IATA)	: 3265
Proper Shipping Name (IATA)	: Corrosive liquid, acidic, organic, n.o.s.
Class (IATA)	: 8 - Corrosives
Packing group (IATA)	: II - Medium Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

Perfluorohexanoic acid (307-24-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

15.2. International regulations

CANADA

Perfluorohexanoic acid (307-24-4)

Listed on the Canadian NDSL (Non-Domestic Substances List)

EU-Regulations

No additional information available

National regulations

Perfluorohexanoic acid (307-24-4)

Listed on the AICS (Australian Inventory of Chemical Substances)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Korean ECL (Existing Chemicals List)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm

SECTION 16: Other information

Revision date : 12/06/2018

Full text of H-phrases:

Eye Dam. 1	Serious eye damage/eye irritation Category 1
Skin Corr. 1B	Skin corrosion/irritation Category 1B
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H335	May cause respiratory irritation

Perfluorohexanoic acid

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

NFPA health hazard

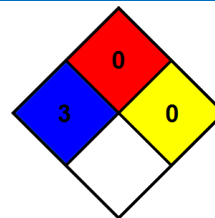
: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard

: 0 - Materials that will not burn.

NFPA reactivity

: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health

: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given

Flammability

: 0 Minimal Hazard - Materials that will not burn

Physical

: 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

SDS US (GHS HazCom 2012)

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is offered solely for your consideration, investigation, and verification. It does not represent any guarantee of the properties of the product nor that the hazard precautions or procedures described are the only ones which exist. SynQuest shall not be held liable for any damage resulting from handling or from contact with the above product.

**COVID-19 Information**

[Public health information \(CDC\)](#) [Research information \(NIH\)](#) [SARS-CoV-2 data \(NCBI\)](#) [Prevention and treatment information \(HHS\)](#)
[Español](#)



COMPOUND SUMMARY

Perfluorononanoic acid



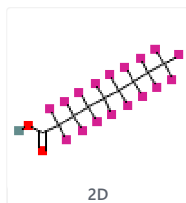
Cite



Download

PubChem CID

67821

Structure[Find Similar Structures](#)**Chemical Safety**

Corrosive



Irritant

[Laboratory Chemical Safety Summary \(LCSS\) Datasheet](#)**Molecular Formula**C₉HF₁₇O₂**Synonyms**

Perfluorononanoic acid
 375-95-1
 heptadecafluorononanoic acid
 Perfluoro-n-nonanoic acid
 PFNA

[More...](#)**Molecular Weight**

464.08

Dates

Modify	Create
2021-05-22	2005-03-26

Perfluorononanoic acid is a fluoroalkanoic acid that is **nonanoic acid** in which all of the hydrogens in the alkyl chain are replaced by fluorines. It has a role as a persistent organic pollutant, a xenobiotic and a surfactant. It derives from a **nonanoic acid**.

[ChEBI](#)

Contents

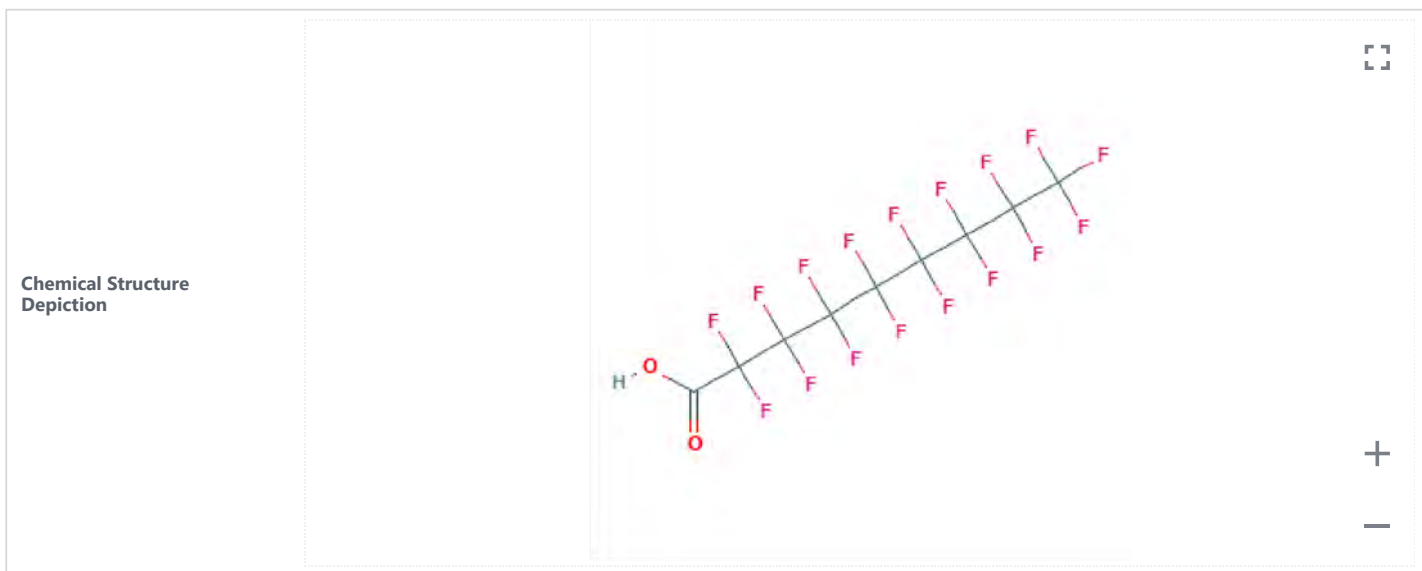
[1 Structures](#)[2 Names and Identifiers](#)[3 Chemical and Physical Properties](#)[4 Spectral Information](#)[5 Related Records](#)

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7 Pharmacology and Biochemistry	▼
8 Use and Manufacturing	▼
9 Safety and Hazards	▼
10 Toxicity	▼
11 Associated Disorders and Diseases	
12 Literature	▼
13 Patents	▼
14 Biomolecular Interactions and Pathways	▼
15 Biological Test Results	▼
16 Classification	▼
17 Information Sources	

1 Structures



1.1 2D Structure



► PubChem

1.2 3D Conformer



► PubChem

2 Names and Identifiers



2.1 Computed Descriptors



2.1.1 IUPAC Name



2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9-heptadecafluorononanoic acid

Computed by LexiChem 2.6.6 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.2 InChI



InChI=1S/C9HF17O2/c10-2(11,1(27)28)3(12,13)4(14,15)5(16,17)6(18,19)7(20,21)8(22,23)9(24,25)26/h(H,27,28)

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.3 InChI Key



UZUFPBIDKMEQEQ-UHFFFAOYSA-N

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.1.4 Canonical SMILES



C(=O)(C(C(C(C(C(C(C(F)(F)F)(F)F)(F)F)(F)F)(F)F)(F)F)(F)F)O

Computed by OEChem 2.1.5 (PubChem release 2019.06.18)

► [PubChem](#)

2.2 Molecular Formula



C9HF17O2

Computed by PubChem 2.1 (PubChem release 2019.06.18)

► [PubChem](#)

2.3 Other Identifiers



2.3.1 CAS



375-95-1

► [CAS Common Chemistry](#); [ChemIDplus](#); [EPA Chemicals under the TSCA](#); [EPA DSSTox](#); [European Chemicals Agency \(ECHA\)](#); [Hazardous Substances Data Bank \(HSDB\)](#)

2.3.2 Related CAS



4149-60-4 (ammonium salt)

► [ChemIDplus](#)

2.3.3 European Community (EC) Number



206-801-3

▶ [European Chemicals Agency \(ECHA\)](#)

2.3.4 UNII



5830Z6S63M

▶ [FDA/SPL Indexing Data](#)

2.3.5 DSSTox Substance ID



DTXSID8031863

▶ [EPA DSSTox](#)

2.3.6 Wikipedia



[Perfluorononanoic acid](#)

▶ [Wikipedia](#)

2.4 Synonyms



2.4.1 MeSH Entry Terms



C9-PFA
perfluoro-n-nonanoic acid
perfluoro-n-nonanoic acid, ammonium salt
perfluoro-n-nonanoic acid, lithium salt
perfluoro-n-nonanoic acid, potassium salt
perfluoro-n-nonanoic acid, sodium salt

▶ [Medical Subject Headings \(MeSH\)](#)

2.4.2 Depositor-Supplied Synonyms



Perfluorononanoic acid	Heptadecafluoronansaeure	ACMC-209iu9
375-95-1	Heptadecafluoronansaeure	C8F17COOH
heptadecafluoronanoic acid	CHEBI:38397	DSSTox_CID_11863
Perfluoro-n-nonanoic acid	MFCD00039605	DSSTox_RID_78893
PFNA	5830Z6S63M	DSSTox_GSID_31863
Perfluorononan-1-oic acid	Nonanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,9-heptadecafluoro-	SCHEMBL23557
Nonanoic acid, heptadecafluoro-	NSC676910	Perfluorononanoic acid, 97%
2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,9-Heptadecafluoronanoic acid	EINECS 206-801-3	CHEMBL426404
Heptadecafluoropelargonic Acid	PERFLUORONONANOICACID	DTXSID8031863
Perfluoronansaeure	Perfluorononanoic acid (PFNA)	Tox21_300380
n-Heptadecafluoronanoic acid	HSDB 8040	ANW-28687
UNII-5830Z6S63M	Perfluoropelargonic Acid	ZINC38141429

▶ [PubChem](#)

3 Chemical and Physical Properties



3.1 Computed Properties



Property Name	Property Value	Reference
Molecular Weight	464.08	Computed by PubChem 2.1 (PubChem release 2021.05.07)
XLogP3-AA	5.6	Computed by XLogP3 3.0 (PubChem release 2019.06.18)
Hydrogen Bond Donor Count	1	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Hydrogen Bond Acceptor Count	19	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Rotatable Bond Count	7	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Exact Mass	463.9705080	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Monoisotopic Mass	463.9705080	Computed by PubChem 2.1 (PubChem release 2021.05.07)
Topological Polar Surface Area	37.3 Å ²	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Heavy Atom Count	28	Computed by PubChem
Formal Charge	0	Computed by PubChem
Complexity	615	Computed by Cactvs 3.4.6.11 (PubChem release 2019.06.18)
Isotope Atom Count	0	Computed by PubChem
Defined Atom Stereocenter Count	0	Computed by PubChem
Undefined Atom Stereocenter Count	0	Computed by PubChem
Defined Bond Stereocenter Count	0	Computed by PubChem
Undefined Bond Stereocenter Count	0	Computed by PubChem
Covalently-Bonded Unit Count	1	Computed by PubChem
Compound Is Canonicalized	Yes	Computed by PubChem (release 2019.01.04)

► PubChem

3.2 Experimental Properties



3.2.1 Solubility



In **water**, 6.25X10⁻² mg/L at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2011. Available from, as of Jul 26, 2012: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

► Hazardous Substances Data Bank (HSDB)

3.2.2 Vapor Pressure



8.3X10⁻² mm Hg at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2011. Available from, as of Jul 26, 2012: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

► Hazardous Substances Data Bank (HSDB)

3.2.3 LogP



log Kow = 5.48 (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2011. Available from, as of Jul 26, 2012: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

► Hazardous Substances Data Bank (HSDB)

3.2.4 Dissociation Constants



pKa = -0.21

SPARC; pKa/property server. Ver 3. Jan, 2006. Available from, as of July 9, 2012: <http://archemcalc.com/sparc/>

► [Hazardous Substances Data Bank \(HSDB\)](#)

3.2.5 Collision Cross Section



165.06 Å² [M-H]⁻

240.71 Å² [2M-H]⁻

147.05 Å² [M-H-CO2]⁻

579 | UACCSCEC | Collision Cross Section (CCS) Library from UAntwerp | [DOI:10.5281/zenodo.4704648](https://doi.org/10.5281/zenodo.4704648)

► [NORMAN Suspect List Exchange](#)

3.2.6 Kovats Retention Index



Semi-standard non-polar	1091

► [NIST Mass Spectrometry Data Center](#)

3.2.7 Other Experimental Properties



Hydroxyl radical reaction rate constant = 5.2X10⁻¹¹ cu cm/molec-sec at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2011. Available from, as of Jul 26, 2012: <http://www.epa.gov/oppt/exposure/pubs/episuite.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

4 Spectral Information



4.1 Mass Spectrometry



Showing 2 of 4 [View More](#)

Source of Spectrum	NP-19-337-0
Copyright	Copyright © 2020 John Wiley & Sons, Inc. All Rights Reserved.
Thumbnail	

► [SpectraBase](#)

Source of Spectrum	NP-15-4322-0
Copyright	Copyright © 2020 John Wiley & Sons, Inc. All Rights Reserved.
Thumbnail	

► [SpectraBase](#)

4.1.1 GC-MS



Showing 2 of 3 [View More](#)

NIST Number	375808
Library	Main library
Total Peaks	110

5/28/2021	Perfluorononanoic acid C9HF17O2 - PubChem
m/z Top Peak	131
m/z 2nd Highest	69
m/z 3rd Highest	45
Thumbnail	

► NIST Mass Spectrometry Data Center

NIST Number	237633
Library	Replicate library
Total Peaks	111
m/z Top Peak	131
m/z 2nd Highest	69
m/z 3rd Highest	45
Thumbnail	

► NIST Mass Spectrometry Data Center

4.1.2 MS-MS		?
MS-MS	MS-MS Spectrum 435959 - Perfluorononanoic acid (HMDB0061739) MS-MS Spectrum 435960 - Perfluorononanoic acid (HMDB0061739) MS-MS Spectrum 435961 - Perfluorononanoic acid (HMDB0061739) MS-MS Spectrum 435962 - Perfluorononanoic acid (HMDB0061739) MS-MS Spectrum 435963 - Perfluorononanoic acid (HMDB0061739) MS-MS Spectrum 435964 - Perfluorononanoic acid (HMDB0061739)	

► [Human Metabolome Database \(HMDB\)](#)

4.1.3 LC-MS

Showing 2 of 5 [View More](#) 

MoNA ID	EA271851
MS Category	Experimental
MS Type	LC-MS
MS Level	MS2
Precursor Type	[M-H]-
precursor m/z	462.9632
Instrument	LTQ Orbitrap XL Thermo Scientific
Instrument Type	LC-ESI-ITFT
Ionization	ESI
Ionization Mode	negative
Collision Energy	35 % (nominal)
Retention Time	13.9 min
Splash	splash10-014i-0000900000-7a30a5904591700ff4a1
Thumbnail	
Submitter	Eawag Team, Eawag - Swiss Federal Institute of Aquatic Science and Technology

► [MassBank of North America \(MoNA\)](#)

MoNA ID	EA271852
MS Category	Experimental
MS Type	LC-MS
MS Level	MS2
Precursor Type	[M-H]-
precursor m/z	462.9632
Instrument	LTQ Orbitrap XL Thermo Scientific
Instrument Type	LC-ESI-ITFT
Ionization	ESI
Ionization Mode	negative

5/28/2021Perfluorononanoic acid | C9HF17O2 - PubChem

Collision Energy	15 % (nominal)
Retention Time	13.9 min
Splash	splash10-014i-0020900000-3a30d00e24e965e23f97
Thumbnail	
SubmitterEawag Team, Eawag - Swiss Federal Institute of Aquatic Science and Technology	

► [MassBank of North America \(MoNA\)](#)

4.1.4 Other MS



MoNA ID	MoNA024628
MS Category	Experimental
Precursor Type	[M-H]-
precursor m/z	462.963234
Ionization Mode	negative
Splash	splash10-014i-0994900000-944aefc1a791dd7e806f
Thumbnail	
SubmitterArpana Vaniya, UC DAVIS	

► [MassBank of North America \(MoNA\)](#)

4.2 IR Spectra



4.2.1 ATR-IR Spectra



Source of Sample	Aldrich
Catalog Number	394459
Copyright	Copyright © 2018-2020 Sigma-Aldrich Co. LLC. - Database Compilation Copyright © 2018-2020 John Wiley & Sons, Inc. All Rights Reserved.
Thumbnail	

► [SpectraBase](#)

4.3 Other Spectra



In [water](#), 6.25X10⁻² mg/L at 25 °C (est)

US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2011. Available from, as of Jul 26, 2012: <http://www.epa.gov/oppt/exposure/pubs/episutedl.htm>

► [Hazardous Substances Data Bank \(HSDB\)](#)

5 Related Records



5.1 Related Compounds with Annotation



► PubChem

5.2 Related Compounds



Same Connectivity	4 Records
Same Parent, Connectivity	40 Records
Same Parent, Exact	37 Records
Mixtures, Components, and Neutralized Forms	50 Records
Similar Compounds	175 Records
Similar Conformers	155 Records

► PubChem

5.3 Substances



5.3.1 Related Substances



All	247 Records
Same	99 Records
Mixture	148 Records

► PubChem

5.3.2 Substances by Category



► PubChem

5.4 Entrez Crosslinks



PubMed	217 Records
Taxonomy	7 Records
OMIM	8 Records
Gene	1,248 Records

► PubChem

6 Chemical Vendors



► PubChem

7 Pharmacology and Biochemistry



7.1 Absorption, Distribution and Excretion



Using nuclear magnetic resonance (NMR) spectroscopy, we investigated the importance of **carbon** chain length with regard to the hepatic effects associated with perfluoro-n-carboxylic acids. Male F-344 rats were administered a single intraperitoneal dose of either **perfluoro-n-heptanoic acid** (C7-PFA), perfluoro-n-nonanoic acid (C9-PFA), or **perfluoro-n-undecanoic acid** (C11-PFA). Data from previous studies involving **perfluoro-n-octanoic acid** (C8-PFA) and **perfluoro-n-decanoic acid** (C10-PFA) are included for comparison. Food consumption/body weight was monitored daily for all groups. C9- and C11-PFA treatment yields a prolonged hypophagic response while C7-PFA shows a more acute response. Fluorine-19 NMR spectra of urine and bile samples show no evidence of fluorometabolites and suggest that the distribution of perfluorocarbons into urine or bile is dependent upon **carbon** chain length. The aqueous solubility of C7-PFA appears to facilitate rapid urinary excretion, similar to that observed for C8-PFA. The relative hydrophobicity of C9- and C11-PFA appears to favor biliary enterohepatic recirculation, yielding a more protracted toxicity, similar to C10-PFA. **Phosphorus-31** NMR studies of liver in vivo and liver extracts show that perfluorocarbons of > or = C9 carbons produce a significant increase in liver **phosphocholine** concentration. These data are discussed with regard to the impact of these chemicals on hepatic phospholipid metabolism. Hepatic peroxisomal fatty acyl **CoA**-oxidase activity (FAO) was measured to determine if C7-, C9-, and C11-PFA are peroxisome proliferators. Data indicate that the induction of peroxisomal enzyme activity by perfluorocarbons requires a chain length greater than seven carbons. In general, these results demonstrate the significance of **carbon** chain length in the hepatotoxic response and provide clues toward understanding the processes involved in the biological activities associated with exposure to these compounds.

PMID:8831811

Goecke-Flora CM, Reo NV; *Chem Res Toxicol.* 9 (4): 689-95 (1996)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluorononanoic acid (PFNA) is a fluorinated organic chemical found at low levels in the environment, but is detectable in humans and wildlife. The present study compared the pharmacokinetic properties of PFNA in two laboratory rodent species. ... CD-1 mice were given a single oral dose of PFNA of 1 or 10mg/kg, and 4 males and 4 females were killed at /1, 2, 3, 4, 7, 16, 21, 28, 35, 42 and 50 days after treatment;/ trunk blood, liver and kidney were collected. Serum and tissue concentrations of PFNA were determined by LC-MS/MS. ... In the mouse, the rates of PFNA serum elimination are non-linear with exposure dose and are slightly faster in females than males, with terminal estimated serum half-life of 25.8-68.4 days and 34.3-68.9 days, respectively. PFNA is also stored preferentially in the mouse liver but not in the kidneys. Hepatic uptake appears to be more efficient and storage capacity greater in male mice than in females. These data suggest that (1) PFNA is more persistent in the mouse than in the rat; (2) there is a major sex difference in the serum elimination of PFNA in the rat, but much less so in the mouse; and (3) there is a significantly higher hepatic accumulation of PFNA in male mice than in females.

PMID:21237237

Tatum-Gibbs K et al; *Toxicology.* 281 (1-3): 48-55 (2011)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluorononanoic acid (PFNA) is a fluorinated organic chemical found at low levels in the environment, but is detectable in humans and wildlife. The present study compared the pharmacokinetic properties of PFNA in two laboratory rodent species. Male and female Sprague-Dawley rats were given a single dose of PFNA by oral gavage at 1, 3, or 10mg/kg, and blood was collected from the tail vein at 1, 2, 3, 4, 7, 16, 21, 28, 35, 42 and 50 days after treatment. In addition, livers and kidneys were collected for PFNA analysis at the terminal time point. ... Serum and tissue concentrations of PFNA were determined by LC-MS/MS. Serum elimination of PFNA is by and large linear with exposure doses in the rat; however, like **PFOA**, a major sex difference in the rate of elimination is observed, with an estimated half-life of 30.6 days for males and 1.4 days for females. PFNA is stored preferentially in the liver but not in the kidneys. ... These data suggest that (1) PFNA is more persistent in the mouse than in the rat; (2) there is a major sex difference in the serum elimination of PFNA in the rat, but much less so in the mouse; and (3) there is a significantly higher hepatic accumulation of PFNA in male mice than in females.

PMID:21237237

Tatum-Gibbs K et al; *Toxicology.* 281 (1-3): 48-55 (2011)

► [Hazardous Substances Data Bank \(HSDB\)](#)

7.2 Biological Half-Life



CD-1 mice were given a single oral dose of perfluorononanoic acid (PFNA) of 1 or 10mg/kg, and 4 males and 4 females were killed at /1, 2, 3, 4, 7, 16, 21, 28, 35, 42 and 50 days after treatment./ ... In the mouse, the rates of PFNA serum elimination are non-linear with exposure dose and are slightly faster in females than males, with terminal estimated serum half-life of 25.8-68.4 days and 34.3-68.9 days,

PMID:21237237

Tatum-Gibbs K et al; *Toxicology.* 281 (1-3): 48-55 (2011)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Male and female Sprague-Dawley rats were given a single dose of perfluorononanoic acid (PFNA) by oral gavage at 1, 3, or 10mg/kg, and blood was collected from the tail vein at 1, 2, 3, 4, 7, 16, 21, 28, 35, 42 and 50 days after treatment. ... Serum elimination of PFNA is by and large linear with exposure doses in the rat ... with an estimated half-life of 30.6 days for males and 1.4 days for females.

[PMID:21237237](#)

Tatum-Gibbs K et al; *Toxicology*. 281 (1-3): 48-55 (2011)

► [Hazardous Substances Data Bank \(HSDB\)](#)

7.3 Mechanism of Action



The potency of the induction of peroxisomal beta-oxidation was compared between perfluorinated fatty acids (PFCAs) with different **carbon** chain lengths in the liver of male and female rats. In male rats, **perfluoroheptanoic acid** (PFHA) has little effect, although **perfluorooctanoic acid** (PFOA), perfluorononanoic acid (PFNA) and **perfluorodecanoic acid** (PFDA) potentially induced the activity. By contrast, PFHA and PFOA did not induce the activity of peroxisomal beta-oxidation in the liver of female rats while PFNA and PFDA effectively induced the activity. The induction of the activity by these PFCAs was in a dose-dependent manner, and there is a highly significant correlation between the induction and hepatic concentrations of PFCAs in the liver regardless of their **carbon** chain lengths. These results strongly suggest that the difference in their chemical structure is not the cause of the difference in the potency of the induction. Hepatic concentrations of PFOA and PFNA was markedly higher in male compared with female rats. Castration of male rats reduced the concentration of PFNA in the liver and treatment with **testosterone** entirely restored the reduction. In contrast to the results obtained from the in vivo experiments, the activity of peroxisomal beta-oxidation was induced by PFDA and PFOA to the same extent in cultured hepatocytes prepared from both male and female rats. These results, taken together, indicate that difference in accumulation between PFCAs in the liver was responsible for the different potency of the induction of peroxisomal beta-oxidation between PFCAs with different **carbon** chain lengths and between sexes.

[PMID:10670823](#)

Kudo N et al; *Chem Biol Interact*. 124 (2): 119-32 (2000)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluorononanoate (PFNA), a perfluorinated alkyl acid containing nine **carbon** chains, has been detected in abiotic and biotic matrices worldwide. Although a few studies have reported toxic effects of PFNA, little information of the mechanism has been offered. In this study, the effects of PFNA exposure on thymus and the related mechanisms were investigated. Male rats were orally dosed with 0, 1, 3, or 5 mg PFNA/kg/day for 14 days. A significant decrease of body weight and thymus weight were observed in the rats receiving 3 or 5 mg PFNA/kg/day. Histopathological examination revealed dose-dependent increases in thymocyte apoptosis. Rats receiving 3 or 5 mg PFNA/kg/day exhibited increased interleukin (IL)-1 and decreased IL-2 concentrations in sera, whereas elevated IL-4 and **cortisol** levels only occurred in the highest dose group. Quantitative real-time PCR indicated that expression of peroxisome proliferator-activated receptor alpha (PPAR-alpha) was increased in the thymi of all dosed rats, and a similar trend occurred for PPAR-gamma in the two highest dose groups. The mRNA levels of c-Jun NH(2)-terminal kinase (JNK), nuclear factor-kappa B, p65 subunit, and inhibitory protein I kappa B alpha were unchanged; however, increased and decreased mRNA levels of p38 kinase were found in rats exposed to 3 or 5 mg PFNA/kg/day, respectively. Decreased Bcl-2 mRNA levels were observed in rats receiving 5 mg PFNA/kg/day. A significant increase in protein levels of phospho-JNK was found in all PFNA-treated rats. Phospho-p38 was significantly enhanced in 1 and 3 mg PFNA/kg/day groups, whereas phospho-I kappa B alpha remained consistent in all rats studied. Together, these data suggested that apart from the activation of PPARs, PFNA exposure in rats lead to the alteration of serum cytokines, which subsequently activated mitogen-activated protein kinase signaling pathways and potentially modulated the immune system. Additionally, increased serum **cortisol** and decreased expression of Bcl-2 in thymus likely contributed to the PFNA-induced thymocyte apoptosis.

[PMID:19196829](#)

Fang X et al; *Toxicol Sci*. 108 (2): 367-76 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

... This study explored the possible involvement of apoptotic signaling pathways in a nine-**carbon**-chain length PFAA-perfluorononanoic acid (PFNA)-induced splenocyte apoptosis. After a 14-day exposure to PFNA, rat spleens showed dose-dependent levels of apoptosis. The production of pro-inflammatory and anti-inflammatory cytokines was significantly increased and decreased, respectively. However, protein levels of tumor necrosis factor receptor 1 (TNFR1), fas-associated protein with death domain (FADD), caspase 8 and caspase 3, which are involved in inflammation-related and caspase-dependent apoptosis, were discordant. Peroxisome proliferator-activated receptors alpha (PPARalpha) and PPARgamma genes expression was up-regulated in rats treated with 3 or 5 mg/kg/day of PFNA, and the level of **hydrogen peroxide** (H2O2) increased concurrently in rats treated with the highest dose. Moreover, superoxide dismutase (SOD) activity and Bcl-2 protein levels were dramatically decreased in spleens after treatment with 3 and 5 mg/kg/day of PFNA. However, protein levels of Bax were unchanged. Apoptosis-inducing factor (AIF), an initiator of caspase-independent apoptosis, was significantly increased in all PFNA-dosed rats. Thus, oxidative stress and the activation of a caspase-independent apoptotic signaling pathway contributed to PFNA-induced apoptosis in rat splenocytes.

[PMID:19878704](#)

Fang X et al; *Toxicology*. 267 (1-3): 54-9 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

8 Use and Manufacturing



8.1 Use Classification



PFAS (per- and polyfluoroalkyl substances) -> OECD Category

S25 | OECD PFAS | List of PFAS from the OECD | DOI:10.5281/zenodo.2648775

► NORMAN Suspect List Exchange

8.2 Uses



EPA CPDat Chemical and Product Categories

► EPA Chemical and Products Database (CPDat)

Long-chain perfluoroalkancarboxylic acids and their salts are surface-active chemicals (surfactants), which greatly reduce the surface tension (surface energy) of [water](#), aqueous solutions, and organic liquids even at low concentrations. These acids (C6- C12) and derivatives are used as wetting, dispersing, emulsifying, and foaming agents. /Long-chain perfluoroalkancarboxylic acids/

Siegemund G et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (1999-2012). NY, NY: John Wiley & Sons; Fluorine Compounds, Organic. Online Posting Date: June 15, 2000

► Hazardous Substances Data Bank (HSDB)

8.3 Methods of Manufacturing



Long-chain perfluorocarboxylic acids are prepared by the Simons electrochemical fluorination of the corresponding acyl halide ... The acids are obtained by hydrolysis of the perfluoroacyl fluoride, followed by distillation. Some [carbon-carbon](#) bond scission occurs to form lower homologous acids along with inert fluorocarbons and cyclic ethers. The acid yield decreases with increasing chain length. /Long-chain perfluorocarboxylic acids/

Siegemund G et al; Ullmann's Encyclopedia of Industrial Chemistry 7th ed. (1999-2012). NY, NY: John Wiley & Sons; Fluorine Compounds, Organic. Online Posting Date: June 15, 2000

► Hazardous Substances Data Bank (HSDB)

8.4 General Manufacturing Information



EPA TSCA Commercial Activity Status

Nonanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,9-heptafluoro-: ACTIVE

<https://www.epa.gov/tsc-a-inventory>

► EPA Chemicals under the TSCA

EPA TSCA Regulatory Flag

S - indicates a substance that is identified in a final Significant New Use Rule.

<https://www.epa.gov/tsca-inventory>

► [EPA Chemicals under the TSCA](#)

9 Safety and Hazards



9.1 Hazards Identification



9.1.1 GHS Classification



Showing 1 of 3 [View More](#)

Pictogram(s)	  Corrosive Irritant
Signal	<u>Danger</u>
GHS Hazard Statements	H314 (12.5%): Causes severe skin burns and eye damage [<u>Danger</u> Skin corrosion/irritation] H315 (87.5%): Causes skin irritation [<u>Warning</u> Skin corrosion/irritation] H319 (87.5%): Causes serious eye irritation [<u>Warning</u> Serious eye damage/eye irritation] H335 (87.5%): May cause respiratory irritation [<u>Warning</u> Specific target organ toxicity, single exposure; Respiratory tract irritation]
Precautionary Statement Codes	P260, P261, P264, P271, P280, P301+P330+P331, P302+P352, P303+P361+P353, P304+P340, P305+P351+P338, P310, P312, P321, P332+P313, P337+P313, P362, P363, P403+P233, P405, and P501 (The corresponding statement to each P-code can be found at the GHS Classification page.)
ECHA C&L Notifications Summary	<i>Aggregated GHS information provided by 48 companies from 6 notifications to the ECHA C&L Inventory. Each notification may be associated with multiple companies.</i> <i>Information may vary between notifications depending on impurities, additives, and other factors. The percentage value in parenthesis indicates the notified classification ratio from companies that provide hazard codes. Only hazard codes with percentage values above 10% are shown.</i>

► [European Chemicals Agency \(ECHA\)](#)

9.1.2 Hazard Classes and Categories



Showing 2 of 3 [View More](#)

Skin Corr. 1C (12.5%)

Skin Irrit. 2 (87.5%)

Eye Irrit. 2 (87.5%)

STOT SE 3 (87.5%)

► [European Chemicals Agency \(ECHA\)](#)

Carcinogenicity - category 2

Reproductive toxicity - category 1B

Reproductive toxicity - effects on or via lactation

Acute toxicity - category 4

Acute toxicity - category 4

Specific target organ toxicity (repeated exposure) - category 1

Eye damage - category 1

► [Hazardous Chemical Information System \(HCIS\), Safe Work Australia](#)

9.1.3 Substance of Very High Concern (SVHC)



REACH SVHC Substance

Substance: Perfluorononan-1-oic-acid

Reason: Toxic for reproduction (Article 57c), PBT (Article 57d)

Decision Document: [PDF Link](#)

► [European Chemicals Agency \(ECHA\)](#)

9.2 Accidental Release Measures



9.2.1 Disposal Methods



SRP: The most favorable course of action is to use an alternative chemical product with less inherent propensity for occupational harm/injury/toxicity or environmental contamination. Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier. Ultimate disposal of the chemical must consider: the material's impact on air quality; potential migration in soil or [water](#); effects on animal and plant life; and conformance with environmental and public health regulations.

► [Hazardous Substances Data Bank \(HSDB\)](#)

9.3 Regulatory Information



9.3.1 Clean Water Act Requirements



Monitoring requirements for unregulated contaminants. This section specifies the monitoring and quality control requirements that must be followed if you own or operate a public [water](#) system (PWS) that is subject to the Unregulated Contaminant Monitoring Regulation (UCMR), as specified in paragraphs (a)(1) and (2) of this section. Perfluorononanoic acid (PFNA) is included on this list.

40 CFR 141.40 (USEPA); U.S. National Archives and Records Administration's Electronic Code of Federal Regulations. Available from, as of June 8, 2012: <http://www.ecfr.gov>

► [Hazardous Substances Data Bank \(HSDB\)](#)

10 Toxicity



10.1 Toxicological Information



10.1.1 Antidote and Emergency Treatment



/SRP:/ Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR if necessary. Immediately flush contaminated eyes with gently flowing [water](#). Do not induce vomiting. If vomiting occurs, lean patient forward or place on the left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Poisons A and B/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds.); *Emergency Care For Hazardous Materials Exposure*. 3Rd edition, Elsevier Mosby, St. Louis, MO 2005, p. 160

► [Hazardous Substances Data Bank \(HSDB\)](#)

/SRP:/ Basic treatment: Establish a patent airway (oropharyngeal or nasopharyngeal airway, if needed). Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if needed. Administer [oxygen](#) by nonrebreather mask at 10 to 15 L/min. Monitor for pulmonary edema and treat if necessary Monitor for shock and treat if necessary Anticipate seizures and treat if necessary For eye contamination, flush eyes immediately with [water](#). Irrigate each eye continuously with 0.9% saline (NS) during transport Do not use emetics. For ingestion, rinse mouth and administer 5 mL/kg up to 200 mL of [water](#) for dilution if the patient can swallow, has a strong gag reflex, and does not drool Cover skin burns with dry sterile dressings after decontamination /Poisons A and B/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds.); *Emergency Care For Hazardous Materials Exposure*. 3Rd edition, Elsevier Mosby, St. Louis, MO 2005, p. 160

► [Hazardous Substances Data Bank \(HSDB\)](#)

/SRP:/ Advanced treatment: Consider orotracheal or nasotracheal intubation for airway control in the patient who is unconscious, has severe pulmonary edema, or is in severe respiratory distress. Positive-pressure ventilation techniques with a bag valve mask device may be beneficial. Consider drug therapy for pulmonary edema Consider administering a beta agonist such as [albuterol](#) for severe bronchospasm Monitor cardiac rhythm and treat arrhythmias as necessary Start IV administration of D5W /SRP: "To keep open", minimal flow rate/. Use 0.9% saline (NS) or lactated Ringer's if signs of hypovolemia are present. For hypotension with signs of hypovolemia, administer fluid cautiously. Watch for signs of fluid overload Treat seizures with [diazepam](#) or [lorazepam](#) Use [proparacaine hydrochloride](#) to assist eye irrigation /Poisons A and B/

Currance, P.L. Clements, B., Bronstein, A.C. (Eds.); *Emergency Care For Hazardous Materials Exposure*. 3Rd edition, Elsevier Mosby, St. Louis, MO 2005, p. 160-1

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.1.2 Human Toxicity Excerpts



/EPIDEMIOLOGY STUDIES/ /The investigators/ analyzed 458 plasma samples of New York State (NYS) employees and National Guard personnel assigned to work in the vicinity of the WTC between September 11 and December 23, 2001, to assess exposure to perfluorochemicals released in dust and smoke. The plasma samples collected from NYS WTC responders were grouped based on estimated levels of exposure to dust and smoke, as follows: more dust exposure (MDE), less dust exposure (LDE), more smoke exposure (MSE), and less smoke exposure (LSE). Furthermore, samples were grouped, based on self-reported symptoms at the time of sampling, as symptomatic and asymptomatic. Eight perfluorochemicals were measured in 458 plasma samples. [PFOS](#), [PFOA](#), [perfluorohexanesulfonate](#) (PFHxS), and perfluorononanoic acid (PFNA), were consistently detected in almost all samples. ... Concentrations of PFNA were significantly higher in the MSE group than in the LSE group. ... A significant negative correlation existed between plasma lipid content and concentrations of certain perfluorochemicals. ...

PMID:18522136

Tao L et al; *Environ Sci Technol*. 42 (9): 3472-8 (2008)

► [Hazardous Substances Data Bank \(HSDB\)](#)

/BIOMONITORING/ /Reaserchers/ studied occurrence and levels of PFCs in human milk in relation to maternal serum together with the temporal trend in milk levels between 1996 and 2004 in Sweden. Matched, individual human milk and serum samples from 12 primiparous women in Sweden were analyzed together with composite milk samples (25-90 women/year) from 1996 to 2004. Eight PFCs were detected in the serum samples, and five of them were also above the detection limits in the milk samples. [Perfluorooctanesulfonate](#) (PFOS) and [perfluorohexanesulfonate](#) (PFHxS) were detected in all milk samples at mean concentrations of 0.201 ng/mL and 0.085 ng/mL, respectively. [Perfluorooctanesulfonamide](#) (PFOSA), [perfluorooctanoic acid](#) (PFOA), and perfluorononanoic acid (PFNA) were detected less frequently. The total PFC concentration in maternal serum was 32 ng/mL, and the corresponding milk concentration was 0.34 ng/mL. The [PFOS](#) milk level was on average 1% of the corresponding serum level. There was a strong association between increasing serum concentration and increasing milk concentration for [PFOS](#) ($r(2) = 0.7$) and [PFHxS](#) ($r(2) = 0.8$). [PFOS](#) and [PFHxS](#) levels in composite milk samples were relatively unchanged between 1996 and 2004, with a total variation of 20 and 32%

coefficient of variation, respectively. The calculated total amount of PFCs transferred by lactation to a breast-fed infant in this study was approximately 200 ng/day. Lactation is a considerable source of exposure for infants, and reference concentrations for hazard assessments are needed.

PMID:17384769

Full text: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1831521>

Karrman A et al; *Environ Health Perspect.* 115 (2): 226-30 (2007)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.1.3 Non-Human Toxicity Excerpts



/LABORATORY ANIMALS: Developmental or Reproductive Toxicity/ Male rats were orally dosed for 1, 3 and 5 mg/kg/day PFNA or with vehicle for 14 days. In the present study, serum [testosterone](#) levels were decreased, while [estradiol](#) levels were increased dramatically in rats receiving 5 mg PFNA/kg/day. Spermatogenic cells from rats that received 5 mg PFNA/kg/day exhibited apoptotic features including crescent chromatin condensation and chromatin margination. Flow cytometric analysis and TUNEL assays revealed a dose-dependent increase of apoptotic cell numbers. In addition, expression of Fas and Bax mRNA levels were upregulated significantly, and Bcl-2 mRNA levels were downregulated markedly in the 3 and 5 mg/kg/day groups. A dose-dependent increase in levels of active caspase-8 and no significant changes of active caspase-9 were observed. ...PFNA exposure can lead to cell apoptosis in rat testis, and this apoptosis was probably associated with the Fas death receptor-dependent apoptotic pathway.

PMID:19646514

Feng Y et al; *Toxicol Lett* 190 (2): 224-30 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

/ENDOCRINE MODULATION/ In this study, male rats were exposed to 0, 0.2, 1 or 5 mg/kg/day PFNA for 14 days to explore the specific effect of PFNA on hepatic glycometabolism and its underlying mechanisms. The results showed that administration of 5 mg/kg/day PFNA significantly increased serum [glucose](#) and hepatic [glycogen](#) in rats. Quantitative real-time PCR analysis showed that PFNA exposure changed the expression levels of several genes related to hepatic [glucose](#) metabolism, such as the [glucose](#)-6-phosphatase (G6PC) gene and the [glucose](#) transporter 2 (GLUT2) gene, which were upregulated, and the glucokinase (GCK) gene and the phosphoinositide-3-kinase, catalytic, alpha polypeptide (PI3Kc) gene, which were decreased. The protein expression levels of phospho-insulin receptor 1 (IRS1), phospho-PI3K, phospho-AKT and phospho-phosphoinositide-dependent kinase 1 (PDK1) were decreased in the livers of rats that received 5 mg/kg/day PFNA. The expression of phospho-[glycogen](#) synthase kinase-3 beta (GSK3beta, Ser 9) was increased, which explains the augment of hepatic [glycogen](#). Significant increases in [hydrogen peroxide](#) (H₂O₂) and [malondialdehyde](#) (MDA) were found in the livers of 5 mg/kg/day PFNA-treated rats. Thus, exposure to PFNA disordered [glucose](#) metabolism via inhibiting hepatic insulin signal pathway, accelerating the output of [glucose](#) and increasing [glycogen](#) synthesis in the rat liver. Furthermore, the oxidative stress induced by PFNA may be involved in this process.

PMID:22387981

Fang X et al; *Toxicology* 294 (2-3): 109-15 (2012)

► [Hazardous Substances Data Bank \(HSDB\)](#)

/ALTERNATIVE and IN VITRO TESTS/ The aim of this study was to investigate the effects of PFNA exposure on cell junction molecules and factors specifically secreted by Sertoli cells. Primary Sertoli cells from 20- to 21-day-old rats were exposed to increasing PFNA concentrations (0, 1, 10, 25, 50, or 75 uM) for 24 hr. No significant changes in the expression of cytoskeleton-associated molecules were noted, although the mRNA levels of vimentin were upregulated dramatically in cells exposed to 50 and 75 uM PFNA. Meanwhile, the mRNA levels of Sertoli cell-specific secretions, such as Mullerian inhibiting substance (MIS), androgen binding protein (ABP), inhibin B, transferrin, and follicle-stimulating hormone receptor (FSH-R) changed significantly in experimental groups. Wilms' tumor gene (WT1), a transcription factor, was upregulated significantly in cells exposed to 1-75 uM PFNA. In additional studies, male rats were exposed to 0, 1, 3, or 5 mg/kg/day PFNA for 14 days. Vacuoles in the cytoplasm of Sertoli cells were observed in the ultrastructure of testis. Furthermore, the changes in the concentrations of MIS and inhibin B in serum and the protein levels of WT1 and transferrin in testis were similar to the mRNA expression levels of those observed after in vitro treatment. In conclusion, these findings demonstrated that PFNA treatment led to the damage of specific secretory functions of Sertoli cells and that these effects might be an underlying cause of the male-specific reproductive toxicity of PFNA.

PMID:20580666

Feng Y et al; *Reprod Toxicol* 30 (3): 429-37 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.1.4 Ecotoxicity Excerpts



/AQUATIC SPECIES/ Perfluorinated surfactants (PFSs) in Asian freshwater fish species were analyzed to investigate tissue distribution, temporal trends, extent of pollution, and level of PFS exposure through food intake. Freshwater fish species, namely carp, snakehead, and catfish, were

collected in Japan, Vietnam, India, Malaysia, and Thailand, and 10 PFSS, including [perfluorooctanesulfonate \(PFOS\)](#) and [perfluorooctanoate](#), were analyzed by liquid chromatography-tandem mass spectrometry. PFSSs in carp in Tokyo were more concentrated in kidneys (sum of 10 PFSSs = 257 +/- 95 ng/g wet weight [ww]) and livers (119 +/- 36 ng/g ww) than in ovaries (43 +/- 2 ng/g ww) and muscles (24 +/- 17 ng/g ww). Concentrations of [PFOS](#) and its precursor, [perfluorooctane sulfonamide](#), in livers of carp and in waters in Tokyo showed a dramatic decrease during the last decade, probably because of 3 M's phasing-out of the manufacture of perfluorooctanesulfonyl-fluoride-based products in 2000. In contrast, continuing contamination by long-chain perfluorocarboxylates (PFCAs) with > or =9 fluorinated carbons was seen in multiple media, suggesting that these compounds continue to be emitted. PFS concentrations in freshwater fish species in tropical Asian countries were generally lower than those in developed countries, such as Japan, e.g., for [PFOS](#) in muscle, Vietnam < 0.05-0.3 ng/g ww; India < 0.05-0.2 ng/g ww; Malaysia < 0.05-0.2 ng/g ww; Thailand < 0.05 ng/g ww; and Japan (Tokyo) = 5.1-22 ng/g ww. Daily intake of short-chain PFCAs with < or =8 fluorinated carbons from freshwater fish species in Japan was approximately one order of magnitude lower than that from drinking water, whereas daily intake of PFOS and long-chain PFCAs with > or =9 fluorinated carbons from freshwater fish species was comparable with or greater than that from drinking [water](#). Because the risk posed by exposure to these compounds through intake of fish species is a matter of concern, we recommend the continued monitoring of PFS levels in Asian developing countries. /Perfluorinated surfactants/

PMID:21424221

Murakami M et al; Arch Environ Contam Toxicol 61 (4): 631-41 (2011)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.1.5 Ongoing Test Status



The following link will take the user to the National Toxicology Program (NTP) Test Agent Search Results page, which tabulates all of the "Standard Toxicology & Carcinogenesis Studies", "Developmental Studies", and "Genetic Toxicity Studies" performed with this chemical. Clicking on the "Testing Status" link will take the user to the status (i.e., in review, in progress, in preparation, on test, completed, etc.) and results of all the studies that the NTP has done on this chemical.[Available from, as of June 21, 2012: http://ntp-apps.niehs.nih.gov/ntp_tox/index.cfm?fuseaction=ntpsearch.searchresults&searchterm=375-95-1]

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2 Ecological Information



10.2.1 Environmental Fate/Exposure Summary



Perfluorochemicals like perfluoro-n-nonanoic acid have been widely used since the 1950s in many industrial and consumer products, including protective coatings for fabrics and carpet, paper coatings, insecticide formulations, and surfactants. Perfluoro-n-nonanoic acid's production and use may result in its release to the environment through various waste streams. If released to air, an estimated vapor pressure of 8.3X10⁻² mm Hg at 25 °C indicates perfluoro-n-nonanoic acid will exist solely as a vapor in the atmosphere. Vapor-phase perfluoro-n-nonanoic acid will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 31 days. Perfluoro-n-nonanoic acid does not contain chromophores that absorb at wavelengths >290 nm and, therefore, is not expected to be susceptible to direct photolysis by sunlight. If released to soil, perfluoro-n-nonanoic acid is expected to have no mobility based upon an estimated K_{oc} of 1.2X10⁺⁵. The pK_a of perfluoro-n-nonanoic acid is -0.21, indicating that this compound will exist entirely in anion form in the environment and anions generally do not adsorb more strongly to soils containing organic [carbon](#) and clay than their neutral counterparts. Volatilization from moist soil is not expected because the acid exists as an anion and anions do not volatilize. Perfluoro-n-nonanoic acid is not expected to volatilize from dry soil surfaces based upon its estimated vapor pressure. Organic fluorochemical compounds, such as perfluoro-n-nonanoic acid, are expected to be resistant to biodegradation in soil and [water](#). If released into [water](#), perfluoro-n-nonanoic acid is expected to adsorb to suspended solids and sediment based upon the estimated K_{oc}. Volatilization from [water](#) surfaces is not expected to be an important fate process based upon this compound's estimated pK_a. An estimated BCF of 9100 suggests the potential for bioconcentration in aquatic organisms is very high, provided the compound is not metabolized by the organism. Hydrolysis is not expected to be an important environmental fate process since this compound lacks functional groups that hydrolyze under environmental conditions. Occupational exposure to perfluoro-n-nonanoic acid may occur through inhalation and dermal contact with this compound at workplaces where perfluoro-n-nonanoic acid is produced or used. Monitoring data indicate that the general population may be exposed to perfluoro-n-nonanoic acid via inhalation of ambient air, ingestion of food and drinking [water](#), and dermal contact with products containing perfluoro-n-nonanoic acid. (SRC)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.2 Artificial Pollution Sources



Perfluorochemicals like perfluoro-n-nonanoic acid have been widely used since the 1950s in many industrial and consumer products, including protective coatings for fabrics and carpet, paper coatings, insecticide formulations, and surfactants(1). Perfluoro-n-nonanoic acid's production and use may result in its release to the environment through various waste streams(SRC).

(1) Calafat AM et al; *Environ Sci Technol* 40: 2128-34 (2006)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.3 Environmental Fate



TERRESTRIAL FATE: Based on a classification scheme(1), an estimated Koc value of 1.2×10^5 (SRC), determined from a structure estimation method(2), indicates that perfluoro-n-nonanoic acid is expected to be immobile in soil(SRC). The pKa of perfluoro-n-nonanoic acid is -0.21(3), indicating that this compound will exist entirely in anion form in the environment and anions generally do not adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(4). Volatilization of perfluoro-n-nonanoic acid from moist soil surfaces is not expected to be an important fate process(SRC) based on the pKa(3). Perfluoro-n-nonanoic acid is not expected to volatilize from dry soil surfaces(SRC) based upon an estimated vapor pressure of 8.3×10^{-2} mm Hg at 25 °C(SRC), determined from a fragment constant method(5). Organic fluorochemical compounds, such as perfluoro-n-nonanoic acid, are expected to be resistant to biodegradation(6).

(1) Swann RL et al; *Res Rev* 85: 17-28 (1983) (2) US EPA; *Estimation Program Interface (EPI) Suite*. Ver. 4.1. Jan, 2011. Available from, as of July 9, 2012: <http://www.epa.gov/oppt/exposure/pubs/episuite.html> (3) SPARC; pKa/property server. Ver 3. Jan, 2006. Available from, as of July 9, 2012: <http://archemcalc.com/sparc/> (4) Doucette WJ; pp. 141-188 in *Handbook of Property Estimation Methods for Chemicals*. Boethling RS, Mackay D, eds. Boca Raton, FL: Lewis Publ (2000) (5) Lyman WJ; p. 31 in *Environmental Exposure From Chemicals Vol I*, Neely WB, Blau GE, eds, Boca Raton, FL: CRC Press (1985) (6) Hanson KJ et al; *Environ Sci Technol* 35: 766-70 (2001)

► [Hazardous Substances Data Bank \(HSDB\)](#)

AQUATIC FATE: Based on a classification scheme(1), an estimated Koc value of 1.2×10^5 (SRC), determined from a structure estimation method(2), indicates that perfluoro-n-nonanoic acid is expected to adsorb to suspended solids and sediment(SRC). A pKa of -0.21(3) indicates perfluoro-n-nonanoic acid will exist entirely in the anion form at pH values of 5 to 9 and therefore volatilization from water surfaces is not expected to be an important fate process(SRC). According to a classification scheme(4), an estimated BCF of 9100(SRC), from an estimated log Kow of 5.48(5) and a regression-derived equation(6), suggests the potential for bioconcentration in aquatic organisms is very high(SRC). Perfluoro-n-nonanoic acid is not expected to undergo hydrolysis in the environment due to the lack of functional groups that hydrolyze under environmental conditions(7). Organic fluorochemical compounds, such as perfluoro-n-nonanoic acid, are expected to be resistant to biodegradation(8).

(1) Swann RL et al; *Res Rev* 85: 17-28 (1983) (2) US EPA; *Estimation Program Interface (EPI) Suite*. Ver. 4.1. Jan, 2011. Available from, as of July 9, 2012: <http://www.epa.gov/oppt/exposure/pubs/episuite.html> (3) SPARC; pKa/property server. Ver 3. Jan, 2006. Available from, as of July 9, 2012: <http://archemcalc.com/sparc/> (4) Franke C et al; *Chemosphere* 29: 1501-14 (1994) (5) Meylan WM, Howard PH; *J Pharm Sci* 84: 83-92 (1995) (6) Meylan WM et al; *Environ Toxicol Chem* 18: 664-72 (1999) (7) Lyman WJ et al; *Handbook of Chemical Property Estimation Methods*. Washington, DC: Amer Chem Soc pp. 7-4, 7-5 (1990) (8) Hanson KJ et al; *Environ Sci Technol* 35: 766-70 (2001)

► [Hazardous Substances Data Bank \(HSDB\)](#)

ATMOSPHERIC FATE: According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere(1), perfluoro-n-nonanoic acid, which has an estimated vapor pressure of 8.3×10^{-2} mm Hg at 25 °C(SRC), determined from a fragment constant method(2), is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase perfluoro-n-nonanoic acid is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals(SRC); the half-life for this reaction in air is estimated to be 31 days(SRC), calculated from its rate constant of 5.2×10^{-11} cu cm/molecule-sec at 25 °C(SRC) that was derived using a structure estimation method(3). Perfluoro-n-nonanoic acid does not contain chromophores that absorb at wavelengths >290 nm(4) and, therefore, is not expected to be susceptible to direct photolysis by sunlight(SRC).

(1) Bidleman TF; *Environ Sci Technol* 22: 361-367 (1988) (2) Lyman WJ; p. 31 in *Environmental Exposure From Chemicals Vol I*, Neely WB, Blau GE, eds, Boca Raton, FL: CRC Press (1985) (3) Meylan WM, Howard PH; *Chemosphere* 26: 2293-99 (1993) (4) Lyman WJ et al; *Handbook of Chemical Property Estimation Methods*. Washington, DC: Amer Chem Soc pp. 8-12 (1990)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.4 Environmental Biodegradation



AEROBIC: Organic fluorochemical compounds, such as perfluoro-n-nonanoic acid, are expected to be resistant to biodegradation(1). A related compound, perfluorooctanoic acid, present at 100 mg/L, reached 5% of its theoretical BOD in 4 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test(2), indicating perfluoro-n-nonanoic acid will also not biodegrade(SRC).

(1) Hanson KJ et al; *Environ Sci Technol* 35: 766-70 (2001) (2) NITE; *Chemical Risk Information Platform (CHRIP)*. Biodegradation and Bioconcentration. Tokyo, Japan: Natl Inst Tech Eval. Available from, as of July 9, 2012: <http://www.safe.nite.go.jp/english/db.html>

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.5 Environmental Abiotic Degradation



The rate constant for the vapor-phase reaction of perfluoro-n-nonanoic acid with photochemically-produced hydroxyl radicals has been estimated as 5.2×10^{-11} cu cm/molecule-sec at 25 °C(SRC) using a structure estimation method(1). This corresponds to an atmospheric half-life of about 31

days at an atmospheric concentration of 5×10^5 hydroxyl radicals per cm^3 (1). Perfluoro-n-nonanoic acid is not expected to undergo hydrolysis in the environment due to the lack of functional groups that hydrolyze under environmental conditions(2). Perfluoro-n-nonanoic acid does not contain chromophores that absorb at wavelengths $>290 \text{ nm}$ (2) and, therefore, is not expected to be susceptible to direct photolysis by sunlight(SRC).

(1) Meylan WM, Howard PH; *Chemosphere* 26: 2293-99 (1993) (2) Lyman WJ et al; *Handbook of Chemical Property Estimation Methods*. Washington, DC: Amer Chem Soc pp. 7-4, 7-5, 8-12 (1990)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.6 Environmental Bioconcentration



An estimated BCF of 9100 was calculated in fish for perfluoro-n-nonanoic acid(SRC), using an estimated log Kow of 5.48(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is very high(SRC). The log bioaccumulation factors (BAF) for perfluoro-n-nonanoic acid in lake trout from Lake Superior, Lake Huron, Lake Erie and Lake Ontario were 3.7, 3.6, 3.8 and 3.1, respectively, the average log BAF was 3.6(4). The average Log BAF in eel (*A. anguilla*) from 23 locations in The Netherlands was 2.52 with a range of 2.02 to 3.14(5). The steady state biota sediment accumulation factor for perfluoro-n-nonanoic acid in *Lumbriculus variegatus* was found to be 55(6). Bioaccumulation factors of lake trout in Lake Ontario samples were 5.3, 0.62 and 0.13 based on prey of alewife, smelt and sculpin, respectively, the diet weighted BAF was 2.3 based on all prey(7). Trophic level biomagnification factors were reported as: ringed seal:cod 1.2, beluga:cod 12.9, beluga:herring 5.8, beluga:Arctic cisco 2.9, cod:Calanus hyperboreus 0.7, cod:Themisto libellula 0.3(8).

(1) Meylan WM, Howard PH; *J Pharm Sci* 84: 83-92 (1995) (2) Meylan WM et al; *Environ Toxicol Chem* 18: 664-72 (1999) (3) Franke C et al; *Chemosphere* 29: 1501-14 (1994) (4) Furdul VI; *Environ Sci Technol* 42: 4739-44 (2008) (5) Kwadijk CJAF et al; *Environ Sci Technol* 44: 3746-51 (2010) (6) Higgins CP et al; *Environ Sci Technol* 41: 4600-6 (2007) (7) Martin JW et al; *Environ Sci Technol* 38: 5379-85 (2004) (8) Tomy GT et al; *Environ Sci Technol* 43: 4076-81 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.7 Soil Adsorption/Mobility



Using a structure estimation method based on molecular connectivity indices(1), the Koc of perfluoro-n-nonanoic acid can be estimated to be 1.2×10^5 (SRC). According to a classification scheme(2), this estimated Koc value suggests that perfluoro-n-nonanoic acid is expected to be immobile in soil. The pKa of perfluoro-n-nonanoic acid is -0.21(3), indicating that this compound will exist in anion form in the environment and anions generally do not adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(4). The log Koc for perfluoro-n-nonanoic acid in three sediments was reported as 2.4(5) and 3.69 in 23 sediments(6).

(1) US EPA; Estimation Program Interface (EPI) Suite. Ver. 4.1. Jan, 2011. Available from, as of July 9, 2012: <http://www.epa.gov/oppt/exposure/pubs/episuite.html> (2) Swann RL et al; *Res Rev* 85: 17-28 (1983) (3) SPARC; pKa/property server. Ver 3. Jan, 2006. Available from, as of July 9, 2012: <http://archemcalc.com/sparc/> (4) Doucette WJ; pp. 141-188 in *Handbook of Property Estimation Methods for Chemicals*. Boethling RS, Mackay D, eds. Boca Raton, FL: Lewis Publ (2000) (5) Higgins CP, Luthy RG; *Environ Sci Technol* 40: 7251-6 (2006) (6) Kwadijk CJAF et al; *Environ Sci Technol* 44:3746-51 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.8 Volatilization from Water/Soil



A pKa of -0.21(1) indicates perfluoro-n-nonanoic acid will exist entirely in the anion form at pH values of 5 to 9 and therefore volatilization from water and moist soil surfaces is not expected to be an important fate process(SRC). Perfluoro-n-nonanoic acid is not expected to volatilize from dry soil surfaces(SRC) based upon an estimated vapor pressure of $8.3 \times 10^{-2} \text{ mm Hg}$ (SRC), determined from a fragment constant method(2).

(1) SPARC; pKa/property server. Ver 3. Jan, 2006. Available from, as of July 9, 2012: <http://archemcalc.com/sparc/> (2) Lyman WJ; p. 31 in *Environmental Exposure From Chemicals Vol I*, Neely WB, Blau GE, eds, Boca Raton, FL: CRC Press (1985)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.9 Environmental Water Concentrations



GROUND WATER: Perfluoro-n-nonanoic acid was detected in one of 19 well water samples at 25.7 ng/L, samples were taken around Decatur, AL, from area farms that have a history of being treated with fluorochemical industry impacted biosolids(1). Perfluoro-n-nonanoic acid was detected in groundwater samples from the Highland Creek watershed, Canada, taken Feb to March 2010 at 0.071 to 0.54 ng/L(2). Perfluoro-n-nonanoic acid was detected in 15 ground water samples taken in the city of Tokyo, Japan, Sept to Nov 2006; concentrations were 0.1 to 94 ng/L(3).

(1) Lindstrom AM et al; *Environ Sci Technol* 45: 8015-21 (2011) (2) Meyer T et al; *Environ Sci Technol* 45: 8113-9 (2011) (3) Murakami M et al; *Environ Sci Technol* 43: 3480-6 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

DRINKING WATER: Drinking water samples from seven waste water treatment plants throughout the US tested positive in four for perfluoro-n-nonanoic acid at 1.0-9.7 ng/L(1). Perfluoro-n-nonanoic acid was not detected (detection limit 10 ng/L) in the finish water from four wastewater

treatment plants in New York State, but was detected in two others at 4 to 376 ng/L(2). Perfluoro-n-nonanoic acid was not detected (detection limit 0.22 ng/L) in drinking [water](#) samples collected in three homes that receive [water](#) from different [water](#) works in Oslo, Norway, samples were collected between Oct 2008 and Jan 2009(3). Perfluoro-n-nonanoic acid was detected in 79% of 43 tap [water](#) samples taken from homes, schools, offices, restaurants, commercial centers, hotels and an airport in 2006 and 2008 from 10 cities in China(4).

(1) Quinones O, Snyder SA; *Environ Sci Technol* 43: 9089-95 (2009) (2) Sinclair E, Kannan K; *Environ Sci Technol* 40: 1408-14 (2006) (3) Haug LS et al; *Chemosphere* 80: 1137-43 (2010) (4) Mak YL et al; *Environ Sci Technol* 43: 4824-9 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

SURFACE WATER: Surface [water](#) samples taken from US streams in the Great Lakes basin tested positive for perfluoro-n-nonanoic acid in 38% of 8 samples taken 1994 to 2000 at concentrations of 0.00003 to 0.0004 ug/L(1). Perfluoro-n-nonanoic acid was detected in creek and river samples collected throughout Canada at concentrations of <125 to 3000 pg/L(2). Perfluoro-n-nonanoic acid was detected in nine of 32 surface water samples at 12.4 to 286 ng/L, samples were taken around Decatur, AL, from area ponds and streams near farms that have a history of being treated with fluorochemical industry impacted biosolids(3). Perfluoro-n-nonanoic acid was detected in surface water samples from the Highland Creek watershed, Canada, collected Feb to March 2010 at 0.80 to 2.4 ng/L(4). Out of 100 samples taken from 80 sites in the Cape Fear River Basin, North Carolina, the 11 samples with the highest total perfluorinated organic compound concentrations had perfluoro-n-nonanoic acid concentrations of 2.24-194 ng/L, samples were collected in the spring of 2006(5).

(1) Klecka G et al; *Rev Environ Contam Toxicol* 207: 1-93 (2010) (2) D'eon JC et al; *Environ Toxicol Chem* 28: 2101-7 (2009) (3) Lindstrom AB et al; *Environ Sci Technol* 45: 8015-21 (2011) (4) Meyer T et al; *Environ Sci Technol* 45: 8113-9 (2011) (5) Nakayama S et al; *Environ Sci Technol* 41: 5271-6 (2007)

► [Hazardous Substances Data Bank \(HSDB\)](#)

SURFACE WATER: Lake [water](#) samples from four lakes on Cornwallis Island, Nunavut, Canada were tested for perfluoro-n-nonanoic acid(1).

Location	Sample Date	Mean (ng/L)	Range (ng/L)
Amituk Lake	Aug 2003	0.3	0.2-0.4
Char Lake	Aug 2003	0.5	not detected-1.4
	July 2005	1.5	0.3-2.5
Resolute Lake	Aug 2003	2.0	not detected-6.1
	July 2005	1.7	1.2-2.3
	Aug 1, 2005	2.8	2.5-3.0
	Aug 8, 2005	1.7	0.9-2.9
Meretta Lake	July 2005	4.1	3.8-4.4
Outflow from Meretta	July 2005	3.5	3.0-4.2

(1) Stock NL et al; *Environ Sci Technol* 41: 3529-36 (2007)

► [Hazardous Substances Data Bank \(HSDB\)](#)

SURFACE WATER: Perfluoro-n-nonanoic acid was detected in open ocean [water](#) at <5.1-107, <5.1-35 and <5.1 pg/L in 40 samples from the North Atlantic, 10 samples from the Middle Atlantic and 10 samples from the South Atlantic Ocean, respectively, samples were collected April, Oct and Nov of 2007(1). Perfluoro-n-nonanoic acid was detected in seawater samples taken from Finland, Denmark and Iceland, and in lake water from Norway, concentrations were not reported(2). Perfluoro-n-nonanoic acid was not detected (detection limit 1.6 ng/L) in river water samples collected from the Glatt River at Schwerzenbach, Oberrglatt and Rheinsfelden, Switzerland(3). Perfluoro-n-nonanoic acid was detected in all 20 rivers studied throughout Japan from Nov 8 to Dec 12, 2005 at concentrations of 0.25 to 53 ng/L(4). Five streams flowing into Lake Shihwa, Korea had perfluoro-n-nonanoic acid concentrations of 0.83 to 6.95 ng/L, concentrations in Lake Shihwa were 0.63 to 10.86 ng/L and in Gyeonggi Bay were 0.94 to 3.29 ng/L, all samples were collected in Dec of 2004(5). Water samples taken from tributaries of the Pearl River in Guangzhou and along the Yangtze River had perfluoro-n-nonanoic acid concentrations of <0.13-3.1 and <0.005-10 ng/L, respectively(6). Perfluoro-n-nonanoic acid was detected in sea water samples from six locations around Hong Kong, eight locations from the Pearl River Delta and South China Sea at <0.02-0.69 pg/mL, samples were collected July and Sept 2003 and Jan 2004(7). Water samples collected from 11 locations along the west and south coasts of South Korea contained perfluoro-n-nonanoic acid at 0.24-320 pg/mL(7).

(1) Ahrens L et al; *Environ Sci Technol* 43: 3122-7 (2009) (2) Berger U et al; *Organohalogen Compounds* 66: 4046-52 (2004) (3) Huset CA et al; *Environ Sci Technol* 42: 6369-77 (2008) (4) Murakami M et al; *Environ Sci Technol* 42: 6566-72 (2008) (5) Rostkowski P et al; *Environ Toxicol Chem* 25: 2374-80 (2006) (6) So MK et al; *Chemosphere* 68: 2085-95 (2007) (7) So MK et al; *Environ Sci Technol* 38: 4056-63 (2004)

► [Hazardous Substances Data Bank \(HSDB\)](#)

RAIN/SNOW/FOG: Perfluoro-n-nonanoic acid was detected in 81.8% of 11 urban rain [water](#) samples and 71.4% of 21 snow samples at <0.25-3.48 and <0.25-4.94 ng/L, samples were taken Aug 2006 to March 2007 and Feb 2006, Jan to March 2007, respectively(1). Perfluoro-n-nonanoic acid was detected in bulk snow samples from the Highland Creek watershed, Canada, taken Feb to March 2010 at 0.079 to 0.99 ng/L(2).

(1) Kim S, Kannan K; *Environ Sci Technol* 41: 8328-34 (2007) (2) Meyer T et al; *Environ Sci Technol* 45: 8113-9 (2011)

► [Hazardous Substances Data Bank \(HSDB\)](#)

RAIN/SNOW/FOG: Summary range of perfluoro-n-nonanoic acid from precipitation samples(1).

Location	Site	Date Sampled	No. Samples	Concentration (ng/L)
Japan	Tsukuba	June 2006-April 2008	15	0.91-17.5
	Kawaguchi	June 2006-June 2008	16	0.16-6.77
USA	Slingerlands (NY)	June 2006-June 2007	6	0.21-4.81
	Albany	June 2006-June 2007	6	0.24-5.39
China	Hong Kong	May 2007	5	0.13-0.44
India	Patna	Sept 2008	2	<0.06-0.16
France	Toulouse	Oct 2008	2	0.18-0.24

(1) Kwok KY et al; *Environ Sci Technol* 44: 7043-9 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

RAIN/SNOW/FOG: Precipitation samples from nine North American locations were tested for perfluoro-n-nonanoic acid(1).

Location	Category	Year	Concentration (ng/L)
Smith Island, MD	near urban	1998	0.1-20
		1999	<0.1-2.6
Lewes, DE	near urban	1998	0.1-77
		1999	<0.1-4.9
Ithaca, NY	rural	1998	0.1-3.2
		1999	<0.1-2.6
Underhill, VT	rural	1999	<0.1-1.9
Kejimikujik, Nova Scotia	remote	2002	<0.1-3.3
Algoma, Ontario	remote	2002	<0.1-7.6
Saturna Island, British Columbia	rural	2002	<0.1-2.8
Egbertt, Ontario	near urban	2003-4	0.4-4.1
North Toronto, Ontario	urban	2003-4	0.5-9.7

(1) Scott BF et al; *Environ Sci Technol* 40: 7167-74 (2006)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.10 Effluent Concentrations



Perfluoro-n-nonanoic acid was detected in sewage effluent samples from Norway and the Faeroe Islands and in landfill effluent samples taken from Finland and Norway, concentrations were not reported(1). Perfluoro-n-nonanoic acid was detected in waste [water](#) treatment sludge from six plants located across Ontario, Canada, collected in 2002, at <0.0625-0.61 ng/g(2). Perfluoro-n-nonanoic acid concentration was reported in influent, effluent and digested sludge from a waste water treatment plant as 1.1 ng/L, 3.4 ng/L and 9.9 ug/kg, respectively(3). Perfluoro-n-nonanoic acid was not detected (detection limit 1.6 ng/L) in the influent or effluent of the waste water treatment plants along the Glatt Valley Watershed, Switzerland, in Faelianden, Bassersdorf, Niederglatt, Buelach or Glattfelden(4). However, perfluoro-n-nonanoic acid was detected in the influent of Duebendorf at 2.6 to 26 ng/L and in the effluent of Duebendorf and Kloten-Opfikon at <1.6-2.6 and <1.6-5.6 ng/L, respectively, all samples were collected Feb to March 2006(4). Two municipal waste water treatment plants in Taipei had perfluoro-n-nonanoic acid concentrations of 10.6 and 0.4 ng/L in their influent samples and <0.1 and 0.3 ng/L in their effluent samples(5). Perfluoro-n-nonanoic acid was also measured at 10.4 ng/L in the effluent of an industrial waste water treatment plant located in Hsinchu Science Park, Taiwan(5).

(1) Berger U et al; *Organohalogen Compounds* 66: 4046-52 (2004) (2) D'eon JC et al; *Environ Sci Technol* 43: 4589-94 (2009) (3) Heidler J, Halden RU; *Environ Sci Technol* 42: 6324-32 (2008) (4) Huset CA et al; *Environ Sci Technol* 42: 6369-77 (2008) (5) Lin AC et al; *Chemosphere* 80: 1167-74 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.11 Sediment/Soil Concentrations



SEDIMENT: Perfluoro-n-nonanoic acid was not detected (detection limit 0.10 ng/g) in sediment samples from 11 sites in the Daliao River system of northeast China, samples were collected in April 2008(1). Perfluoro-n-nonanoic acid was not detected in 13 sediment samples from the Zhujiang River in Guangzhou and nine sediment samples from the Huangpu River in Shanghai, China, samples were collected March 2009(2). Sediment samples, collected from the Hudson Bay region of northeastern Canada May to Sept 1999 to 2003, had perfluoro-n-nonanoic acid concentrations in 33% of <0.06-0.14 ng/g dry weight(3). Perfluoro-n-nonanoic acid was detected at 0.33-0.55 ng/g dry weight in five sediment samples taken from the Ariake Sea in Jan 2004(4).

(1) Bao J et al; *Chemosphere* 77: 652-7 (2009) (2) Bao J et al; *Chemosphere* 80: 123-30 (2010) (3) Kelly BC et al; *Environ Sci Technol* 43: 4037-43 (2009) (4) Nakata H et al; *Environ Sci Technol* 40: 4916-21 (2006)

► [Hazardous Substances Data Bank \(HSDB\)](#)

SEDIMENT: Perfluoro-n-nonanoic acid was analyzed at different depths in sediment samples from four lakes on Cornwallis Island, Nunavut, Canada(1).

Depth	Location	Concentration (ng/g dry weight)
0-1 cm	Resolute Lake	3.2
1-2 cm		<3.1
2-3 cm		<2.55
0-1 cm	Char Lake	<0.55
1-2 cm		not detected
2-3 cm		<0.55
0-1.5 cm	Amituk Lake	0.35
1.5-2.5 cm		0.23
2.5-3.5 cm		<0.059

(1) Stock NL et al; *Environ Sci Technol* 41: 3529-36 (2007)

► [Hazardous Substances Data Bank \(HSDB\)](#)

SEDIMENT: Perfluoro-n-nonanoic acid was detected in a sediment core sample from Tokyo Bay, Japan, sample was taken May 2008(1).

Depth (cm)	Time Interval	Concn (pg/g dry weight)	Est Flux (pg/sq m/yr)
0-3	2006-2008	14	3.4
3-6	2004-2006	9.3	2.7
6-9	2002-2004	4.6	1.6
9-11	2001-2002	3.4	1.3
13-15	1998-1999	3.7	1.4
17-19	1995-1997	<1	<0.6
21-23	1993-1994	1.1	0.6
25-27	1990-1991	0.7	0.3
29-35	1985-1989	<1	<0.5
37-47	1978-1983	<1	<0.6
49-59	1969-1975	<1	<0.7
61-75	1959-1967	<1	<0.8
77-79	1956-1958	<1	<0.7

(1) Ahrens L et al; *Environ Sci Technol* 43: 6959-75 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.12 Atmospheric Concentrations



URBAN/SUBURBAN: Perfluoro-n-nonanoic acid was detected in 3% of atmospheric samples from Barsbüttel, Germany at a maximum concentration of 0.1 pg/cu m, the study was run April 2007 to June 2008(1). Perfluoro-n-nonanoic acid was detected in atmospheric samples from a location in Albany, NY at 0.16-0.31 pg/cu m, samples were taken May to July 2006(2). Perfluoro-n-nonanoic acid was not detected (detection limit 0.02 pg/cu m) in outdoor air samples from six homes in Vancouver, Canada, samples were collected 2007 to 2008(3).

(1) Dreyer A et al; Environ Sci Technol 43: 6507-14 (2009) (2) Kim S, Kannan K; Environ Sci Technol 41: 8328-34 (2007) (3) Shoeib M et al; Environ Sci Technol 45: 7999-8005 (2011)

► [Hazardous Substances Data Bank \(HSDB\)](#)

RURAL/REMOTE: Perfluoro-n-nonanoic acid had an average concentration of 0.3 pg/cu m in 8% of 141 atmospheric samples from the Atlantic and Southern Oceans and coastal areas of the Baltic sea, the study was run April 2007 to Jan 2009(1).

(1) Dreyer A et al; Environ Sci Technol 43: 6507-14 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

INDOOR: Perfluoro-n-nonanoic acid was not detected in 40 indoor air samples from Oslo, Norway households(1). Perfluoro-n-nonanoic acid was detected at <0.02 to 2.166 pg/cu m in indoor air samples from 59 homes in Vancouver, Canada, samples were collected 2007 to 2008(2).

(1) Haug LS et al; Environ Sci Technol 45: 7991-8 (2011) (2) Shoeib M et al; Environ Sci Technol 45: 7999-8005 (2011)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.13 Food Survey Values



Seven types of seafood were purchased from local markets in Zhoushan and Guangzhou, China in 2004, perfluoro-n-nonanoic acid was only detected in sand swimming crab and swimming crab at 0.28 and 0.61 ng/g wet weight, respectively(1). Perfluoro-n-nonanoic acid was sampled in food, tea and milk purchased in grocery stores in Oslo, Norway between Oct 2008 and Jan 2009, concentrations were (pg/g fresh weight): cheese (16), bread (9.5), strawberry jam (3.7), pork meat (5.5), beef (15), chicken meat (6.8), salmon (10), cod (5.9) and cod liver (14)(2). All other products (lettuce, carrot, potato, margarine, milk, egg, fish sticks, canned mackerel) were listed at less than detection limit (detection limits varied)(2). In Nov 2009, food products of 15 food categories were randomly purchased in several Dutch retail stores, perfluoro-n-nonanoic acid was detected as follows (pg/g product); fatty fish (5), lean fish (77), crustaceans (58), butter (2), cheese (7), milk (<1), eggs (6), pork (2), beef (4), chicken/poultry (1), bakery products (1), vegetables/fruit (1), flour (15), vegetable oil (<0.1), industrial oil (<0.3)(3). Concentrations of perfluoro-n-nonanoic acid in food products sampled for the 2004 Canadian Total Diet Study were 3.75 and 1.72 ng/g wet weight in cold cuts and cookies, <0.75, <0.79, <1.43, <0.74, <0.74 and <0.78 ng/g wet weight in processed cheese, peppers, canned lunch meats, pizza, cheese and beef frozen dinner, respectively(4). Perfluoro-n-nonanoic acid was detected in one of three popcorn packaging paper before and after cooking at 2.1 and 2.5 ng/sq cm, respectively(5).

(1) Gulkowska A et al; Environ Sci Technol 40: 3736-41 (2006) (2) Haug LS et al; Chemosphere 80:1137-43 (2010) (3) Noorlandr Cwet al; J Agric Food Chem 59: 7496-505 (2011) (4) Ostertag SK et al; J Agric Food Chem 57: 8534-44 (2009) (5) Sinclair E et al; Environ Sci Technol 41: 1180-5 (2007)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Concentration of perfluoro-n-nonanoic acid in aquatic traditional Inuit foods collected between 1997 and 1999 in Nunavut, Canada(1).

Food	Part	Preparation	Concn (ng/g)
Ringed Seal	liver	raw	1.9-2.1
		blood	1.2
	meat	boiled	0.5
		raw	0.9
	blubber	raw	<=0.2
Polar Bear	meat	frozen	0.8
Beluga	blubber	raw	0.4
	meat	dried	0.6-0.9
		muktuk	<0.4
Narwhal	blubber	raw	<0.1
	muktuk	raw	0.5
		frozen	<0.4
Bearded Seal	intestine	boiled	0.3-1.2
	meat	boiled	<0.3
Walrus	blubber	aged	0.4
	kauk	raw	0.6
	meat	raw	0.6-0.8
		aged	<0.3

Food	Part	Preparation	Concn (ng/g)
Eider duck	whole	boiled	<0.1
Black duck	meat	boiled	<0.3
Arctic char	whole	raw	0.2
Lake trout	whole	raw	<0.3
Seaweed	whole	raw	<0.3
Clams	whole	raw	0.5

(1) Ostertag SK et al; Chemosphere 75: 1165-72 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Concentration of perfluoro-n-nonanoic acid in terrestrial traditional Inuit foods collected between 1997 and 1999 in Nunavut, Canada(1).

Food	Part	Preparation	Concn (ng/g)
Caribou	liver	baked	1.6
		raw	2.0
	meat	boiled	<0.1-0.8
		dried	<0.9-1.0
		raw	0.3
		roasted	1.0
	bone marrow	boiled	0.6
	heart blood	raw	0.8
	fat	raw	<0.3
	kidneys	raw	0.2
		boiled	<0.3
	stomach	raw	0.1
	tongue	raw	0.6
Ptarmigan	whole	raw	<0.6
Arctic hare	meat	raw	<0.3
Snow goose	meat	raw	1.2
Berries	whole	raw	<0.3

(1) Ostertag SK et al; Chemosphere 75: 1165-72 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.14 Fish/Seafood Concentrations



Perfluoro-n-nonanoic acid was detected in whole body homogenates of lake trout from Lake Superior, Lake Michigan, Lake Huron, Lake Erie and Lake Ontario at mean concentrations of 1.0, 0.57, 2.8, 2.9 and 1.1 ng/g wet weight, respectively, samples were collected in 2001(1). Fish samples, collected from the Hudson Bay region of northeastern Canada May to Sept 1999 to 2003, had the following perfluoro-n-nonanoic acid concentrations: 71% of capelin (whole body) at 0.01-0.73 ng/g, 100% of cod (muscle) at <0.09-1.3 ng/g and 67% of salmon (muscle) at 0.05-8.0 ng/g(2).

(1) Furdul VI et al Environ Sci Technol 41: 1554-9 (2007) (2) Kelly BC et al; Environ Sci Technol 43: 4037-43 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid was detected in freshwater fish (pike, perch, trout) samples taken from Finland, Sweden and Norway, but not in burbot samples taken from Norway(1). Perfluoro-n-nonanoic acid was also detected in all marine [water](#) fish (cod, flounder, eelpout, herring, long rough dab) samples from Sweden, Denmark and Iceland, but not in sculpin, dab, and Arctic char samples from Iceland and the Faeroe Islands(1). Blood samples from 18 cod (*Gadus morhua*), collected from the Gulf of Gdansk in Feb 2003, contained perfluoro-n-nonanoic acid at 100-2100 pg/mL(2). Seven types of seafood were purchased from local markets in Zhoushan and Guangzhou, China in 2004, perfluoro-n-nonanoic acid was only detected in sand swimming crab and swimming crab at 0.28 and 0.61 ng/g wet weight, respectively(3). Ten herring, about the size a common guillemot would eat, sampled from Landsort, Baltic Sea in 2005 contained perfluoro-n-nonanoic acid at concentrations of 0.34 to 0.74 ng/g wet

weight(4). Perfluoro-n-nonanoic acid was detected at one of five sites at <1.06-24.6 ng/g wet weight(detection limit 1.06 ng/g wet weight) in brown mussels from Guanabara Bay, Brazil(5). Perfluoro-n-nonanoic acid was not detected in liver (detection limit 0.49 ng/g wet weight) or muscle (detection limit 1.41 ng/g wet weight) samples of scabbardfish, croaker and mullet from Paraiba do Sul River and Guanavara Bay, Brazil(5).

(1) Berger U et al; *Organohalogen Compounds* 66:4046-52 (2004) (2) Falandysz J et al; *Environ Sci Technol* 40: 748-51 (2006) (3) Gulkowska A et al; *Environ Sci Technol* 40: 3736-41 (2006) (4) Holmstrom KE, Berger U; *Environ Sci Technol* 42: 5879-84 (2008) (5) Quinete N et al; *Chemosphere* 77: 863-9 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

The concentration of perfluoro-n-nonanoic acid was reported in fish sampled from Lake Vattern, Sweden and the Baltic Sea in 2001 with the following results in ng/g fresh weight(1).

Fish	Lake Vattern	Baltic Sea
Perch	0.22-0.51	0.14-0.22
Burbot	0.33-1.0	0.14-0.47
Whitefish	<0.08-0.71	0.18-0.38
Salmon	0.12-0.20	0.10-0.19
Brown trout	0.08-0.26	<0.08-0.18

(1) Berger U et al; *Chemosphere* 76: 799-804 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid in aquatic organisms from the Ariake Sea, Japan, 2000-2003(1).

Location	Species/speciman	No. Sampled	Concn (ng/g wet weight)
Shallow water	filefish	5	<1.5
	sea bream	5	<1.5
	red sea bream	5	<1.5
	right eye flounder	5	<1.5
	hammerhead shark	1	<1.5
Tidal Flat	oyster	5	<1.5
	mussel	5	<1.5
	clam	6	<1.5
	lugworm	5	<1.5
	crab	2	<1.5
	mudskipper	10	<1.5

(1) Nakata H et al; *Environ Sci Technol* 40: 4916-21 (2006)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.15 Animal Concentrations



The mean concentration of perfluoro-n-nonanoic acid in herring gull eggs collected in 2007 from 15 colonies in the Laurentian Great Lakes (Granite, Big Sister, Gull, Channel-Shelter, Double, Chantry, Fighting, Middle, Snake and Strachan Islands, Agawa Rocks, Port Colborne, Niagara River, Hamilton and Toronto Harbor) was 0.64-9.6 ng/g wet weight(1). Archived liver samples for northern sea otters (*Enhydra lutris kenyoni*) from south-central Alaska had perfluoro-n-nonanoic acid concentrations of 1.3, <0.9, 8.0, 3.4, 2.8, 2.1, 1.9, 2.3, 6.0, 5.6, 5.9, <2.0, 3.9, 4.3 and 9.4 ng/g wet weight in 1992, 1993, 1994, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006 and 2007, respectively(2). An average concentration of 2.1 ng/g wet weight (range <1-16 ng/g wet weight) of perfluoro-n-nonanoic acid was found in 80 female sea otters from the California coast samples from 1992 to 2002(3). Perfluoro-n-nonanoic acid was detected at 0.07-3.0 ng/g wet weight in little brown bats (*Myotis lucifugus*) that had signs of white nose syndrome, collected from caves in eastern New York State from Feb to March 2008(4). Perfluoro-n-nonanoic acid was detected in serum samples from 58 of 73 loggerhead turtles at <100-4420 pg/mL and in all six Kemp's ridley sea turtles at 258-6500 pg/mL, turtles were caught off the US southeastern coast(5). Eider duck and white winged scoter liver samples, collected from the Hudson Bay region of northeastern Canada, May to Sept 1999 to 2003, contain perfluoro-n-nonanoic acid at <0.02-1.1 and 0.24-27.3 ng/g wet weight, respectively(6). Perfluoro-n-nonanoic acid was detected in 26 of 27 beluga whale liver samples at <0.502-5.67 ng/g, collected from Cook Inlet, AK from 1992 to 2006 and in 38 of 41 beluga whale liver samples at <0.180-5.46 ng/g, collected from Chukchi Sea, AK from 1989 to 2000(7).

(1) Gebbink WA et al; *Environ Sci Technol* 43: 7443-9 (2009) (2) Hart K et al; *Arch Environ Contam Toxicol* 56: 607-14 (2009) (3) Kennan K et al; *Environ Sci Technol* 40: 4943-8 (2006) (4) Kannan K et al; *Chemosphere* 80: 613-8 (2010) (5) Keller JM et al; *Environ Sci Technol* 39: 9101-8 (2005) (6) Kelly BC et al; *Environ Sci Technol* 43: 4037-43 (2009) (7) Reiner JL et al; *Environ Sci Technol* 45: 8129-36 (2011)

[► Hazardous Substances Data Bank \(HSDB\)](#)

Reported perfluoro-n-nonanoic acid concentrations in beluga whales collected from the Hudson Bay region of northeastern Canada, May to Sept 1999 to 2003(1).

	Tissue	No. collected	% Positive	Concn (ng/g wet weight)
Female	blood	9	89	0.29-2.4
	muscle	9	0	<0.02
	liver	9	100	0.69-6.58
	milk	6	50	0.26-5.16
	fetus	2	50	<0.04-0.58
Male	blood	9	100	0.27-5.81
	muscle	9	0	<0.02
	liver	13	100	0.81-5.20
	blubber	6	0	<0.9

(1) Kelly BC et al; *Environ Sci Technol* 43: 4037-43 (2009)

[► Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid concentrations in plasma of free-range bottlenose dolphins from the Gulf of Mexico and the Atlantic Ocean were studied June to Sept 2003(1).

Location	Number Samples	Concentration (ng/g wet weight)	Arithmetic Mean (ng/g wet weight)	Geometric Mean (ng/g wet weight)
Sarasota Bay	13	5.3-74	25	19
Bermuda	2	12-21	17	16
Indian River Lagoon	42	3-51	13	11
Charleston	47	11-214	63	51
Delaware Bay	5	211-547	326	305

(1) Houde M et al; *Environ Sci Technol* 45: 7962-73 (2011)

[► Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid was detected in all the marine mammal (grey seal, minke whale, pilot whale) samples taken from Sweden, Denmark, Iceland and the Faeroe Islands(1). Perfluoro-n-nonanoic acid was detected in thick-billed murre collected 1975 (5 samples), 1993 (10 samples) and 2004 (10 samples) at 0.02-0.16, 0.01-0.24 and 0.07-0.60 ng/g wet weight, respectively, and in northern fulmars collected 1975 (9 samples), 1987 (8 samples), 1993 (10 samples) and 2003 (9 samples) at concentrations of <0.19, 0.02-0.97, 0.03-0.44 and 0.01-0.09 ng/g wet weight, respectively, all waterfowl were from Prince Leopold Island, Nunavut, Canada(2). Perfluoro-n-nonanoic acid was not detected (detection limit 7.6 ng/g dry weight) in liver samples of Tucuxi dolphins (*Sotalia guianensis*), samples were taken from 23 dolphins from Guanabara Bay and six were collected off the coast of Rio de Janeiro state, Brazil at other locations(3). Blood samples from 16 eider duck (*Somateria mollissima*), collected from the Gulf of Gdansk in Feb 2003, contained perfluoro-n-nonanoic acid at 300-900 pg/mL(4). The concentration of perfluoro-n-nonanoic acid in melon headed whales stranded along the Japanese coast was <1.1 ng/g wet weight in 1982, 5.2-15.5 ng/g wet weight in 2001/2002 and 9.5-20.5 ng/g wet weight in 2006(5). Perfluoro-n-nonanoic acid was not detected in 10 guillemot egg samples collected from Vestmannaeyjar, Iceland, Sandoy Faroe, Islands, Sklinna and Hjelmsøy, Norway but was detected in five of 10 egg samples collected from Stora Karlso, Sweden at <32 to 120 ng/g wet weight, samples were collected in 2005(6). Dolphin samples from Paraíba do Sul River, Brazil had perfluoro-n-nonanoic acid concentrations of <0.49-1.70, <1.46-1.60 and <1.76 ng/g wet weight in liver, muscle and kidney tissue, respectively(7). Liver samples from 29 polar bear captured in eastern Greenland contained a mean concentration of 236 ng/g wet weight of perfluoro-n-nonanoic acid(8). The mean concentration of perfluoro-n-nonanoic acid was 12.2 to 540 ng/g wet weight in liver tissue from polar bears collected at seven locations in the North American and European Arctic(9). Harbor porpoises from the Black Sea coast, collected 1997 and 1998, contained perfluoro-n-nonanoic acid at 1.4-7.2 ng/g wet weight(10). Perfluoro-n-nonanoic acid was detected in the egg yolks of 17 little ringed plover at 6.4-106.7 ng/g wet weight, seven parrot bill at 5.7-97.3 and 20 little egret at 3.9-68.6 ng/g wet weight, samples were collected around Lake Shihwa, Korea in May 2006(11).

(1) Berger U et al; *Organohalogen Compounds* 66: 4046-52 (2004) (2) Butt CM et al; *Environ Sci Technol* 41: 3521-8 (2007) (3) Dorneles PR et al; *Environ Sci Technol* 42: 5368-73 (2008) (4) Falandysz J et al; *Environ Sci Technol* 40: 748-51 (2006) (5) Hart K et al; *Environ Sci Technol* 42:7132-7 (2008) (6) Lofstrand K et al; *Chemosphere* 72: 1475-80 (2008) (7) Quinete N et al; *Chemosphere* 77: 863-9 (2009) (8) Smithwick M et al; *Environ Toxicol Chem* 24: 981-6 (2005) (9) Smithwick M et al; *Environ Sci Technol* 39: 5517-23 (2005) (10) van de Vijver KI et al; *Environ Sci Technol* 41: 315-320 (2007) (11) Yoo H et al; *Environ Sci Technol* 42: 5821-7 (2008)

[► Hazardous Substances Data Bank \(HSDB\)](#)

Average concentration and ranges of perfluoro-n-nonanoic acid in liver tissue of harbor seals (*Phoca vitulina*) collected from the German Bight(1).

Year	No. Collected	Concn (ng/g wet weight)
1988	2	4.1-5.2
1996	2	4.8-12
1999	5	1.0-23
2000	6	2.5-27
2001	7	1.0-27
2002	6	3.2-17
2003	5	1.6-19
2004	1	9.3
2005	5	2.6-18
2006	8	0.3-19
2007	13	5.1-21
2008	3	6.2-9.7

(1) Ahrens L et al; *Chemosphere* 76: 151-8 (2009)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid was studied in ringed seal (*Phoca hispida*) liver tissue from the east and west sides of Greenland(1).

Location	Year	% Detected	Concn (ng/g wet weight)
Ittoqqortoormit	1986	0	<1.4
	1994	40	3.1-4
	1999	90	1.9-7.5
	2003	100	2.8-6.4
Qeqertarsuaq	1982	20	2.1-2.4
	1994	10	2.1-2.1
	1999	40	1.4-2.3
	2003	60	1.5-3.0

(1) Bossi R et al; *Environ Sci Technol* 39: 7416-22 (2005)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid was studied in ringed seal (*Phoca hispida*) liver tissue from the Canadian Arctic(1).

Location	Year	No. Sampled	Concn (ng/g wet weight)
Arvait	1992	6	1.2-2.5
	1998	10	2.0-8.1
	2003	10	3.0-12.0
	2005	10	1.4-9.1
Resolute Bay	1972	2	0.15-0.51
	1993	9	0.8-3.2
	2000	9	1.6-8.7
	2004	9	2.0-9.3
	2005	9	2.4-10.9

(1) Butt CM et al; *Environ Sci Technol* 41: 42-9 (2007)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid was detected in common guillemot (*Uria aalge*) samples from Stora Karlsö Island in the Baltic Sea collected in 1989(1).

Tissue	No. Sampled	Concn (ng/g wet weight)

Tissue	No. Sampled	Concn (ng/g wet weight)
Muscle	8	0.17-0.42
Kidney	10	1.2-5.7
Adult Liver	13	1.3-5.8
Chick Liver	10	0.96-4.7
Egg	8	0.76-1.8

(1) Holmstrom KE, Berger U; *Environ Sci Technol* 42: 5879-84 (2008)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Harbor seals collected in 2002 from the Dutch coasts and analyzed for perfluoro-n-nonanoic acid; LOD (limit of detection) not specified(1).

Tissue	No. Analyzed	Concn (ng/g wet weight)
kidney	18	<LOD-60.41
liver	24	<LOD-14
blubber	17	<LOD
muscle	17	<LOD-11.99
tracheo-branchial muscle	1	69.82
spleen	4	<LOD-22.77

(1) Van de Vijver et al; *Environ Sci Technol* 39: 6978-84 (2005)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid in organisms from the Ariake Sea area, Japan(1).

Species/speciman	Sample Date	No. Sampled	Concn (ng/g wet weight)
finless porpoise	1999-2002	5	8.3-44
mallard	2000-2001	11	<1.5
blackheaded gull	2001	2	<1.5

(1) Nakata H et al; *Environ Sci Technol* 40: 4916-21 (2006)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid concentrations in waterbird eggs from South China, Quanzhou and Xiamen samples were collected March to May 2004 and Hong Kong samples were collected March to May 2006(1).

Species	Location	Concn (ng/g wet weight)	Mean (ng/g wet weight)
little egret	Quanzhou	2.03-4.13	3.08
	Xiamen	1.16-1.50	1.33
night heron	Quanzhou	0.552-0.643	0.597
	Xiamen	0.956-1.66	1.37
	Hong Kong	0.0720-1.31	0.447
great egret	Hong Kong	0.225-0.427	0.313

(1) Wang Y et al; *Environ Sci Technol* 42: 8146-51 (2008)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.16 Milk Concentrations



Perfluoro-n-nonanoic acid was not detected (detection limit 2.1 pg/g) in milk samples purchased at grocery stores in Oslo, Norway between Oct 2008 and Jan 2009(1). In Nov 2009, milk samples randomly purchased in several Dutch retail stores did not contain perfluoro-n-nonanoic acid (detection limit <1 pg/g)(2). Perfluoro-n-nonanoic acid was not detected (detection limit 2.20 pg/mL) in 21 infant formula samples purchased from retail stores in Washington, DC and Boston, MA in 2007, or in 12 dairy milk samples purchased from retail stores and local farms in Albany, NY in 2008(3).

(1) Haug LS et al; *Chemosphere* 80: 1137-43 (2010) (2) Noorlander CW et al; *J Agric Food Chem* 59: 7496-505 (2011) (3) Tao L et al; *Environ Sci Technol* 42: 8597-602 (2008)

► [Hazardous Substances Data Bank \(HSDB\)](#)

In 12 sets of maternal serum, cord serum and milk samples from mothers that gave birth at the National Hospital in Torshavn, Faroe Islands, perfluoro-n-nonanoic acid was not detected in transitional milk samples taken 3-5 days after delivery(1).

(1) Needham LL et al; *Environ Sci Technol* 45: 1121-6 (2011)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid concentrations in breast milk samples from seven Asian Countries, samples, collected 1999 to 2005, primarily from women living in major cities(1).

County	No. Samples	% Positive	Concn pg/mL
Japan	24	13	<8.82-23.9
Malaysia	13	8	<8.82-14.9
Philippines	24	17	<8.82-25.0
Indonesia	20	5	<8.62-135
Vietnam	40	5	<8.82-10.9
Cambodia	24	13	<8.82-12.3
India	39	0	<8.82

(1) Tao L et al; *Environ Sci Technol* 42: 8597-602 (2008)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.17 Other Environmental Concentrations



Perfluoro-n-nonanoic acid was detected in paper fiber from three paper mills in Ontario, Canada at 2.0-3.0 ng/g, samples were collected 2002, 2003 and 2008(1). Perfluoro-n-nonanoic acid concentrations on window film in a suburban area was greatest on a sheltered window in the summer followed by a sheltered window in the winter, a lower concentration was found on an unsheltered window in the winter (13 mm precipitation), and the lowest concentration was found on an unsheltered window in the summer (47 mm precipitation)(2). Perfluoro-n-nonanoic acid was detected at <0.06 to 680 ng/g in dust samples from 140 homes in Vancouver, Canada, samples were collected 2007 to 2008(3). Perfluoro-n-nonanoic acid was detected in 41 dust samples from Norwegian households at 3.9 to 92 ng/g(4). Dust samples were collected in 2000 to 2001 from vacuum cleaner bags during the US Environmental Protection Agency's Children's Total Exposure to Persistent Pesticides and Other Persistent Organic Pollutants study, 102 homes and 10 daycare centers in North Carolina and Ohio were sampled, perfluoro-n-nonanoic acid was detected in 42.9% of the samples at a mean concentration of 22.1 ng/g and a maximum of 263 ng/g(5). Perfluoro-n-nonanoic acid was found in indoor dust samples with a mean value of 3.43 ng/g dry weight and a range of 0.66 to 7.32 ng/g dry weight, samples were collected from homes in Nanchang, Shanghai, Beijing and Tianjin, China(6).

(1) D'eon JC et al; *Environ Sci Technol* 43: 4589-94 (2009) (2) Gewurtz SB et al; *Environ Sci Technol* 43: 7317-23 (2009) (3) Shoeib M et al; *Environ Sci Technol* 45: 7999-8005 (2011) (4) Haug LS et al; *Environ Sci Technol* 45: 7991-8 (2011) (5) Strynar MJ, Lindstrom AB; *Environ Sci Technol* 42: 3751-6 (2008) (6) Zhang T et al; *Environ Sci Technol* 44: 3572-9 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.18 Probable Routes of Human Exposure



Occupational exposure to perfluoro-n-nonanoic acid may occur through inhalation and dermal contact with this compound at workplaces where perfluoro-n-nonanoic acid is produced or used. Monitoring data indicate that the general population may be exposed to perfluoro-n-nonanoic acid via inhalation of ambient air, ingestion of food and drinking [water](#), and dermal contact with products containing perfluoro-n-nonanoic acid. (SRC)

► [Hazardous Substances Data Bank \(HSDB\)](#)

10.2.19 Average Daily Intake



The average daily intake of perfluoro-n-nonanoic acid in Canadians in the late 1990s ranged from 0.5 to 1.2 ng/kg of body weight/day, in 2004 the estimated value was 1.1 ng/kg of body weight/day(1).

(1) Ostertag SK et al; *J Agric Food Chem* 57: 8534-44 (2009)

[► Hazardous Substances Data Bank \(HSDB\)](#)



10.2.20 Body Burden

Perfluoro-n-nonanoic acid was detected in all serum samples from the US population (1562 participants) as studied in the National Health and Nutrition Examination Survey (NHANES) conducted 1999 thru 2000, with a mean concentration of 0.5 ng/mL and concentration range of 0.5-0.7 ng/mL(1). In the NHANES survey conducted 2003 thru 2004 perfluoro-n-nonanoic acid was detected at a mean concentration of 1.0 ng/mL and concentration range of 0.8-1.1 ng/mL in 100% of the 2094 serum samples analyzed(2). Perfluoro-n-nonanoic acid was detected in 20 pooled blood samples (at least 10 individual donors per sample) at concentrations of 0.34 to 1.8 ug/L, samples were obtained from donors across the Midwestern US in 2004, 2005 and 2008(3). Pooled serum samples from participants of NHANES 2001 to 2002, based on age and demographics had perfluoro-n-nonanoic acid concentrations of 0.7-15.2 and 0.6-1.4 ng/mL in 3-5 and 6-11 year olds, respectively(4). The concentration of perfluoro-n-nonanoic acid in the serum of 20 Atlanta, GA residents was 1.3 to 4.4 ng/mL, samples were collected July 2003(6). Perfluoro-n-nonanoic acid was not detected (detection limit 1.0 ng/mL) in two human milk samples, collection information was not provided(6).

(1) Calafat AM et al; *Environ Sci technol* 41: 2237-42 (2007) (2) Calafat AM et al; *Environ Health Perspect* 115: 1596-1602 (2007) (3) D'eon JC et al; *Environ Sci Technol* 43: 4589-94 (2009) (4) Kato K et al; *Environ Sci Technol* 45: 8037-45 (2011) (6) Kuklenyik Z et al; *Environ Sci Technol* 38: 3698-704 (2004)

[► Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid levels in New York State infants using Newborn Screening Programs dried blood spots analysis(1).

Sample date	Mean concn (ng/mL)	Range (ng/mL)
01/02/97	0.31	0.1-0.58
06/28/97	0.37	0.16-0.56
12/30/97	0.37	0.17-0.64
12/29/99	0.35	0.13-0.77
06/29/01	0.43	0.29-0.63
12/29/01	0.43	0.23-0.93
12/30/02	0.51	0.15-0.73
12/29/04	0.33	0.25-0.42
06/27/05	0.27	0.14-0.41
06/26/06	0.39	0.26-0.62
01/08/07	0.39	0.13-0.93

(1) Spliethoff HM et al; *Environ Sci Technol* 42: 5361-7 (2008)

[► Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid concentration was <0.050 ng/mL (1977), increased to 1.7 ng/mL (1986), and then stabilized at 0.55 to 1.2 ng/mL (1988-2006) in 24 pooled serum samples from men, age 40 to 50 years, representing 1977 to 2006(1). Perfluoro-n-nonanoic acid was found in 40 pooled serum samples collected from 3802 Australian residents collected Nov 2002 to April 2003 at 0.4 to 2.0 ng/mL(2). Perfluoro-n-nonanoic acid was detected in 61 of 66 human blood samples collected from 11 counties in Sweden during the period of 1997 to 2000, concentrations were <0.1-1.9 ng/mL(3). From March to Sept 2008, 138 human blood samples were taken from donors from seven cities in Liaoning province, China, perfluoro-n-nonanoic acid was detected as follows - city (ng/mL): Fuxin (0.24-2.2), Jinzhou (<0.013-1.8), Shenyang (<0.013-1.75), Anshan (0.16-1.02), Yingkou (0.17-2.88), Dalian (0.16-1.44) and Huludao (0.16-1.58)(4). In 12 sets of maternal serum, cord serum and milk samples from mothers that gave birth at the National Hospital in Torshavn, Faroe Islands, the average concentrations of perfluoro-n-nonanoic acid were 0.76 and 0.37 ng/mL in maternal and cord serum, it was not detected in transitional milk samples taken 3-5 days after delivery(5). From 2006 to 2008, 233 human blood samples were taken from donors from the capital cities of 12 provinces or districts of China, perfluoro-n-nonanoic acid was detected as follows - city (ng/mL): Harbin (0.522), Hohhot (0.429), Lanzhou (0.545), Taiyuan (0.221), Shijiazhuang (0.852), Qingdao (0.657), Ningbo (0.984), Changsha (0.295), Chengdu (0.430), Chongqing (0.564), Kuming (3.39) and Guizhou (2.29)(6). Perfluoro-n-nonanoic acid was detected in 100% of 84 pools of human blood serum taken from 2420 Queensland, Australia donors in 2006 to 2007, concentrations reported were 0.1-1.4 ng/mL(7). Human blood samples from volunteer donors from five Chinese cities (Shenyang, Beijing, Gulyang, Jintan, Nanjing) collected in 2004 had perfluoro-n-nonanoic acid concentrations of 0.0630 to 1.34 ng/mL(8).

(1) Haug LS et al; *Environ Sci Technol* 43: 2131-6 (2009) (2) Karrman A et al; *Environ Sci Technol* 40: 3742-8 (2006) (3) Karrman A et al; *Chemosphere* 64: 1582-91 (2006) (4) Liu H et al; *Environ Sci Technol* 43: 4044-8 (2009) (5) Needham LL et al; *Environ Sci Technol* 45: 1121-6 (2011) (6) Pan Y et al; *Environ Toxicol Chem* 29: 2695-701 (2010) (7) Toms LL et al; *Environ Sci Technol* 43: 4194-9 (2009) (8) Yeung LWY et al; *Environ Sci Technol* 42: 8140-5 (2008)

[► Hazardous Substances Data Bank \(HSDB\)](#)

Concentration of perfluoro-n-nonanoic acid in adult (age 19-62) human blood, 15 samples from each category, taken from citizens of Gdansk, Poland and nearby villages. Blood donations were all collected July 2003(1).

Parameter	Dockers	Farmers	Fish-dish fanciers	Reference Group
mean (pg/mL)	400	560	1700	610
median (pg/mL)	360	590	1600	490
range (pg/mL)	160-820	300-810	410-3800	300-1500

(1) Falandysz J et al; *Environ Sci Technol* 40: 748-51 (2006)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Fifty-three pregnant women participated in a serum study for perfluoro-n-nonanoic acid in Munich, Germany, the study was run Dec 2007 to Oct 2009(1).

Table: Mother

Parameter	Pregnancy (34-37 weeks)	At delivery	6 mo after delivery
N (%> limit of quantitation)	44 (86)	38 (83)	47 (83)
Mean (ug/L)	0.8	0.8	0.7
Median (ug/L)	0.6	0.6	0.5
95th percentile	2.8	3.0	2.0

(1) Fromme H et al; *Environ Sci Technol* 44: 7123-9 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Fifty-three pregnant women participated in a serum study for perfluoro-n-nonanoic acid in Munich, Germany, the study was run Dec 2007 to Oct 2009. Fetus data was reported(1).

Table: Fetus/Infant

Parameter	cord blood	6 mo after birth	19 mo after birth
N (%> limit of quantitation)	33 (30)	40 (90)	24 (83)
Mean (ug/L)	0.4	1.1	0.7
Median (ug/L)	<0.4	1.0	0.6
95th percentile	1.5	2.3	1.4

(1) Fromme H et al; *Environ Sci Technol* 44: 7123-9 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Perfluoro-n-nonanoic acid was studied in wax technicians employed by the Swedish and US national cross-country ski teams. Whole blood samples were taken pre-season (pre) Sept 2007, during the World Cup season (during) Dec 2007 to Mar 2008 and post-season (post) April to Aug 2008. Number of years (years) working as a wax technician and occupations for the off season (April to Nov) are given, one technician is a full-time employee at Swedish Ski Association; NP- sample not provided(1).

Occupation	Years	pre (ng/mL)	during (ng/mL)	post (ng/mL)
student	3	0.86	0.76-2.2	1.7-2.8
carpenter	6	3.8	3.5-5.7	6.1-7.1
full-time w/ Ski Assoc	6	14	15-18	15-20
gardener	10	21	18-21	17-19
fire fighter	5	1.7	2.0-3.7	NP
carpenter	15	NP	56-65	45-57
carpenter	7	NP	10-12	NP
engineer	12	145	133-163	104-128

(1) Nilsson H et al; 44: 2150-5 (2010)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Concentration of perfluoro-n-nonanoic acid in serum of Farese children(1).

Age	Sample Date	% Detections	Mean (ng/mL)	Range (ng/mL)
7 years	1993-1994	99	0.9	<0.1-4.8
14 years	2000-2001	100	0.9	0.4-4.8

(1) Weihe P et al; Environ Sci Technol 42: 6291-5 (2008)

► [Hazardous Substances Data Bank \(HSDB\)](#)

Concentration of perfluoro-n-nonanoic acid in serum of 12 Faroese mothers and their five year old children(1).

	Sample date	% Detections	Mean (ng/mL)	Range (ng/mL)
mothers	2000	100	0.6	0.1-1.2
children	2005	100	1.4	0.6-3.0

(1) Weihe P et al; Environ Sci Technol 42: 6291-5 (2008)

► [Hazardous Substances Data Bank \(HSDB\)](#)

11 Associated Disorders and Diseases



► [Comparative Toxicogenomics Database \(CTD\)](#)

12 Literature



12.1 NLM Curated PubMed Citations



► PubChem

12.2 Springer Nature References



► Springer Nature

12.3 Wiley References



► Wiley

12.4 Depositor Provided PubMed Citations



► PubChem

12.5 Chemical Co-Occurrences in Literature



► PubChem

12.6 Chemical-Gene Co-Occurrences in Literature



► PubChem

12.7 Chemical-Disease Co-Occurrences in Literature



► PubChem

13 Patents



13.1 Depositor-Supplied Patent Identifiers



► PubChem

[Link to all deposited patent identifiers](#)

► PubChem

13.2 WIPO PATENTSCOPE



Patents are available for this chemical structure:

<https://patentscope.wipo.int/search/en/result.jsf?inchikey=UZUFPBIDKMEQEQ-UHFFFAOYSA-N>

► PATENTSCOPE (WIPO)

14 Biomolecular Interactions and Pathways



14.1 Drug-Gene Interactions



► [Drug Gene Interaction database \(DGIdb\)](#)

14.2 Chemical-Gene Interactions



14.2.1 CTD Chemical-Gene Interactions



► [Comparative Toxicogenomics Database \(CTD\)](#)

15 Biological Test Results



15.1 BioAssay Results



► PubChem

16 Classification



16.1 Ontologies



16.1.1 MeSH Tree



► Medical Subject Headings (MeSH)

16.1.2 ChEBI Ontology



► ChEBI

16.1.3 ChemIDplus



► ChemIDplus

16.1.4 UN GHS Classification



► UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

16.1.5 EPA CPDat Classification



► EPA Chemical and Products Database (CPDat)

16.1.6 NORMAN Suspect List Exchange Classification



► [NORMAN Suspect List Exchange](#)

16.1.7 EPA DSSTox Classification



► [EPA DSSTox](#)

17 Information Sources



FILTER BY SOURCE

ALL SOURCES



1. CAS Common Chemistry

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Perfluorononanoic acid

https://commonchemistry.cas.org/detail?cas_rn=375-95-1

2. ChemIDplus

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<https://www.nlm.nih.gov/copyright.html>

Perfluoro-n-nonanoic acid

<https://chem.nlm.nih.gov/chemidplus/sid/0000375951>

ChemIDplus Chemical Information Classification

<https://chem.nlm.nih.gov/chemidplus/>

3. EPA Chemicals under the TSCA

LICENSE

<https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources>

Nonanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9-heptafluoro-

<https://www.epa.gov/chemicals-under-tsca>

4. EPA DSSTox

LICENSE

<https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources>

PFNA

<https://comptox.epa.gov/dashboard/DTXSID8031863>

CompTox Chemicals Dashboard Chemical Lists

https://comptox.epa.gov/dashboard/chemical_lists/

5. European Chemicals Agency (ECHA)

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<https://echa.europa.eu/web/guest/legal-notice>

Perfluorononan-1-oic acid

<https://echa.europa.eu/substance-information/-/substanceinfo/100.006.184>

Perfluorononan-1-oic acid

<https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/31321>

Perfluorononan-1-oic-acid

<https://www.echa.europa.eu/candidate-list-table>

6. Hazardous Substances Data Bank (HSDB)

Perfluoro-n-nonanoic acid

<https://pubchem.ncbi.nlm.nih.gov/source/hsdb/8040>

7. ChEBI

Perfluorononanoic acid

<http://www.ebi.ac.uk/chebi/searchId.do?chebiId=ChEBI:38397>

ChEBI Ontology

<http://www.ebi.ac.uk/chebi/userManualForward.do#ChEBI%20Ontology>

8. Comparative Toxicogenomics Database (CTD)

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<http://ctdbase.org/about/legal.jsp>

<http://ctdbase.org/detail.go?type=chem&acc=C101816>
<http://ctdbase.org/detail.go?type=chem&acc=C584865>

9. Drug Gene Interaction database (DGIdb)

LICENSE

The data used in DGIdb is all open access and where possible made available as raw data dumps in the downloads section.

<http://www.dgldb.org/downloads>

<https://www.dgldb.org/drugs/CHEMBL426404>

10. EPA Chemical and Products Database (CPDat)

LICENSE

<https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources>

perfluorononanoic acid

<https://comptox.epa.gov/dashboard/DTXSID8031863#exposure>

EPA CPDat Classification

<https://www.epa.gov/chemical-research/chemical-and-products-database-cpdatt>

11. Hazardous Chemical Information System (HCIS), Safe Work Australia

perfluorononanoic acid

<http://hcis.safeworkaustralia.gov.au/HazardousChemical/Details?chemicalID=5697>

12. NITE-CMC

Perfluorononanoic acid - FY2016

<https://www.nite.go.jp/chem/english/ghs/16-mhlw-0011e.html>

13. FDA/SPL Indexing Data

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<https://www.fda.gov/about-fda/about-website/website-policies#linking>

5830Z6S63M

<https://www.fda.gov/ForIndustry/DataStandards/SubstanceRegistrationSystem-UniqueIngredientIdentifierUNII/>

14. Human Metabolome Database (HMDB)

LICENSE

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<http://www.hmdb.ca/citing>

Perfluorononanoic acid

<http://www.hmdb.ca/metabolites/HMDB0061739>

15. MassBank of North America (MoNA)

LICENSE

The content of the MoNA database is licensed under CC BY 4.0.

<https://mona.fiehnlab.ucdavis.edu/documentation/license>

Perfluorononanoic acid

<http://mona.fiehnlab.ucdavis.edu/spectra/browse?inchikey=UZUFPBIDKMEQEQ-UHFFFAOYSA-N>

16. NIST Mass Spectrometry Data Center

Perfluorononanoic acid

<http://www.nist.gov/srd/nist1a.cfm>

17. NORMAN Suspect List Exchange

LICENSE

Data: CC-BY 4.0; Code (hosted by ECI, LCSB): Artistic-2.0

<https://creativecommons.org/licenses/by/4.0/>

Nonanoic acid, 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,9-heptafluoro-

NORMAN Suspect List Exchange Classification

<https://www.norman-network.com/nds/SLE/>

18. SpectraBase

Perfluoronanoic acid

<https://spectrabase.com/spectrum/4ErOuFkbHl2>

Perfluoronanoic acid

<https://spectrabase.com/spectrum/8yUkleIkZeD>

Perfluorononanoic acid

<https://spectrabase.com/spectrum/KCO52uduRF2>

Perfluorononanoic acid

<https://spectrabase.com/spectrum/9aMiDt3spM>

Perfluorononanoic acid

<https://spectrabase.com/spectrum/ImfyIufB4VD>

19. **Springer Nature**

20. **Wikipedia**

perfluorononanoic acid

https://en.wikipedia.org/wiki/Perfluorononanoic_acid

21. **Wiley**

<https://pubchem.ncbi.nlm.nih.gov/substance/?source=wiley&sourceid=114372>

22. **PubChem**

<https://pubchem.ncbi.nlm.nih.gov>

23. **Medical Subject Headings (MeSH)**

perfluoro-*n*-nonanoic acid

<https://www.ncbi.nlm.nih.gov/mesh/67101816>

MeSH Tree

<http://www.nlm.nih.gov/mesh/meshhome.html>

24. **UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS)**

GHS Classification Tree

http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html

25. **PATENTSCOPE (WIPO)**

SID 403400333

<https://pubchem.ncbi.nlm.nih.gov/substance/403400333>

SAFETY DATA SHEET

Creation Date 02-Jul-2015

Revision Date 18-Aug-2020

Revision Number 4

1. Identification

Product Name Perfluorooctanesulfonamide

Cat No. : AC459640000; AC459640010; AC459640050

CAS-No 754-91-6

Synonyms No information available

Recommended Use Laboratory chemicals.

Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number

For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US**:001-201-796-7100 / **Europe**: +32 14 57 52 99
CHEMTREC Tel. No.**US**:001-800-424-9300 / **Europe**:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word

Warning

Hazard Statements

Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation

**Precautionary Statements****Prevention**

Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell

Skin

IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention

Storage

Store in a well-ventilated place. Keep container tightly closed
Store locked up

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Heptadecafluorooctanesulphonamide	754-91-6	<100

4. First-aid measures

General Advice	If symptoms persist, call a physician.
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.
Most important symptoms and effects	None reasonably foreseeable.
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray, carbon dioxide (CO₂), dry chemical, alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits

Upper No data available

Lower No data available

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products

None known.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health
3

Flammability
1

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.

Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Ensure adequate ventilation. Avoid ingestion and inhalation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	No information available
Odor	No information available
Odor Threshold	No information available
pH	No information available
Melting Point/Range	154 - 155 °C / 309.2 - 311 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C ₈ H ₂ F ₁₇ N O ₂ S
Molecular Weight	499.15

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products. Excess heat.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	None under normal use conditions
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Heptadecafluorooctanesulphonamide	LD50 > 172 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic	No information available

Products**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Heptadecafluorooctanesulphonamide	754-91-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects, both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags

Heptadecafluorooctanesulphonamide	754-91-6	-	-	-

Legend:

TSCA - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TSCA 12(b) - Notices of Export

Component	CAS-No	TSCA 12(b) - Notices of Export
Heptadecafluorooctanesulphonamide	754-91-6	Section 5

International Inventories

Canada (DSL/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Heptadecafluorooctanesulphonamide	754-91-6	-	-	212-046-0	X	-	-	X	-

U.S. Federal Regulations**SARA 313** Not applicable**SARA 311/312 Hazard Categories** See section 2 for more information**CWA (Clean Water Act)** Not applicable**Clean Air Act** Not applicable**OSHA - Occupational Safety and Health Administration** Not applicable**CERCLA** Not applicable**California Proposition 65** This product does not contain any Proposition 65 chemicals.**U.S. State Right-to-Know Regulations** Not applicable**U.S. Department of Transportation**

Reportable Quantity (RQ): N

DOT Marine Pollutant N

DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.**Other International Regulations****Mexico - Grade** No information available**16. Other information**

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 02-Jul-2015

Revision Date 18-Aug-2020**Print Date** 18-Aug-2020**Revision Summary** This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).**Disclaimer**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Perfluoropentanoic acid

sc-250679



Material Safety Data Sheet

Hazard Alert Code
Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Perfluoropentanoic acid

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY

ChemWatch

Within the US & Canada: 877-715-9305

Outside the US & Canada: +800 2436 2255

(1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

C5HF9O2, CF3(CF2)3CO2H

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max	
Flammability:	1			
Toxicity:	0			
Body Contact:	4			Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4
Reactivity:	1			
Chronic:	2			

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Causes severe burns.
Risk of serious damage to eyes.
Harmful to aquatic organisms.
Vapours potentially cause drowsiness and dizziness*.
Cumulative effects may result following exposure*.
Limited evidence of a carcinogenic effect*.
* (limited evidence).

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

! Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus.
Immediate pain and difficulties in swallowing and speaking may also be evident.
! The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion".
This is because of the lack of corroborating animal or human evidence.

EYE

! The material can produce severe chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.
! If applied to the eyes, this material causes severe eye damage.
! Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns.
Mild burns of the epithelia generally recover rapidly and completely.

SKIN

! The material can produce severe chemical burns following direct contact with the skin.
! Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.
! Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.
! Open cuts, abraded or irritated skin should not be exposed to this material.
! Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

! The material can cause respiratory irritation in some persons.
The body's response to such irritation can cause further lung damage.
! Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage.
There may be dizziness, headache, nausea and weakness.
! Inhalation of vapours may cause drowsiness and dizziness.
This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.
! Inhalation hazard is increased at higher temperatures.
! The material has NOT been classified by EC Directives or other classification systems as "harmful by inhalation".
This is because of the lack of corroborating animal or human evidence.
! Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.

CHRONIC HEALTH EFFECTS

! Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs. Chronic exposure may inflame the skin or conjunctiva.
Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.
Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.
Long chain PCFAs are present in the environment of most developed countries, and have the potential to adversely affect animal and human health. In tests on laboratory animals, one PFCA (perfluorooctanoic acid, PFOA) has been shown to cause tumours and damage the immune system, and cause moderate to high toxicity in the medium term if given by mouth. Because they are cleared more slowly and have more potential to accumulate in the body, longer chain PFCAs are expected to be of greater concern than PFOA.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
nonafluoropentanoic acid	2706-90-3	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

EYE

If this product comes in contact with the eyes:

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.

SKIN

If skin or hair contact occurs:

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
- Transport to hospital, or doctor.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Inhalation of vapours or aerosols (mists, fumes) may cause lung oedema.
- Corrosive substances may cause lung damage (e.g. lung oedema, fluid in the lungs).
- As this reaction may be delayed up to 24 hours after exposure, affected individuals need complete rest (preferably in semi-recumbent posture) and must be kept under medical observation even if no symptoms are (yet) manifested.
- Before any such manifestation, the administration of a spray containing a dexamethasone derivative or beclomethasone derivative may be considered.

NOTES TO PHYSICIAN

! Treat symptomatically.

For acute or short term repeated exposures to strong acids:

- Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.
- Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not Available
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	1.713
Lower Explosive Limit (%):	Not available

EXTINGUISHING MEDIA

- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible.
- Slight fire hazard when exposed to heat or flame.
- Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
- Heating may cause expansion or decomposition leading to violent rupture of containers.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO₂), hydrogen fluoride, other pyrolysis products typical of burning organic material.

FIRE INCOMPATIBILITY

- Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- DO NOT allow clothing wet with material to stay in contact with skin
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.

RECOMMENDED STORAGE METHODS

- DO NOT use aluminium or galvanised containers
- Check regularly for spills and leaks
- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.
- Packing as recommended by manufacturer.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

<.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m!	STEL ppm	STEL mg/m!	Peak ppm	Peak mg/m!	TWA F/CC	Notes
US ACGIH Threshold Limit Values (TLV)	nonafluoropentanoic acid (Fluorides, as F)		2.5						TLV® Basis: Bone dam; fluorosis ; BEI

PERSONAL PROTECTION



RESPIRATOR

- Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure
- Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted
- Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection.
- Alternatively a gas mask may replace splash goggles and face shields.

HANDS/FEET

- Elbow length PVC gloves
 - When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.
- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity
- Neoprene gloves

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.

ENGINEERING CONTROLS

! Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

The basic types of engineering controls are:

Process controls which involve changing the way a job activity or process is done to reduce the risk.

Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Does not mix with water.

Sinks in water.

Corrosive.

Acid.

State	LIQUID	Molecular Weight	264.05
Melting Range (°F)	Not available	Viscosity	Not Available
Boiling Range (°F)	284	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	None	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Not Available
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	1.713
Lower Explosive Limit (%)	Not available	Relative Vapour Density (air=1)	>1
Volatile Component (%vol)	Not Available	Evaporation Rate	Not applicable

APPEARANCE

Liquid; does not mix well with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Contact with alkaline material liberates heat
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

STORAGE INCOMPATIBILITY

- Avoid strong bases.
- Segregate from alkalies, oxidising agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.
- Reacts with mild steel, galvanised steel / zinc producing hydrogen gas which may form an explosive mixture with air.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

nonafluoropentanoic acid

TOXICITY AND IRRITATION

! Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound.

No significant acute toxicological data identified in literature search.

CARCINOGEN

Fluorides, as F	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A4

Section 12 - ECOLOGICAL INFORMATION

Harmful to aquatic organisms.

This material and its container must be disposed of as hazardous waste.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
nonafluoropentanoic acid	HIGH	No Data Available	LOW	MED

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information

Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Treat and neutralise at an approved treatment plant. Treatment should involve: Neutralisation with soda-ash or soda-lime followed by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus
- Decontaminate empty containers with 5% aqueous sodium hydroxide or soda ash, followed by water. Observe all label safeguards until containers are cleaned and destroyed.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	8
Identification Numbers:	UN3265	PG:	II
Label Codes:	8	Special provisions:	B2, IB2, T11, TP2, TP27
Packaging: Exceptions:	154	Packaging: Non-bulk:	202
Packaging: Exceptions:	154	Quantity limitations: Passenger aircraft/rail:	1 L
Quantity Limitations: Cargo aircraft only:	30 L	Vessel stowage: Location:	B
Vessel stowage: Other:	40		

Hazardous materials descriptions and proper shipping names:

Corrosive liquid, acidic, organic, n.o.s.

Air Transport IATA:

ICAO/IATA Class:	8	ICAO/IATA Subrisk:	None
UN/ID Number:	3265	Packing Group:	II
Special provisions:	A3		
Cargo Only			
Packing Instructions:	855	Maximum Qty/Pack:	30 L
Passenger and Cargo		Passenger and Cargo	
Packing Instructions:	851	Maximum Qty/Pack:	1 L
Passenger and Cargo Limited Quantity		Passenger and Cargo Limited Quantity	
Packing Instructions:	Y840	Maximum Qty/Pack:	0.5 L

Shipping name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (contains nonafluoropentanoic acid)

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	None
UN Number:	3265	Packing Group:	II
EMS Number:	F-A,S-B	Special provisions:	274
Limited Quantities:	1 L		

Shipping name: CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S. (contains nonafluoropentanoic acid)

Section 15 - REGULATORY INFORMATION



nonafluoropentanoic acid (CAS: 2706-90-3) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Guidelines", "Canada - Alberta Ambient Air Quality Objectives", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada List of Prohibited and Restricted Cosmetic Ingredients (The Cosmetic Ingredient 'Hotlist')", "Canada Non-Domestic Substances List (NDSL)", "International Maritime Dangerous Goods Requirements (IMDG Code) - Substance Index", "US - California Air Toxics 'Hot Spots' List (Assembly Bill 2588) Substances for Which Emissions Must Be Quantified", "US - Georgia Primary Maximum Contaminant Levels for Drinking Water - Inorganics", "US - Hawaii Air Contaminant Limits", "US - Massachusetts Drinking Water - Inorganic Maximum Contaminant Levels (MCLs)", "US - Massachusetts Drinking Water - Secondary Contaminants Maximum Contaminant Levels (MCLs)", "US - North Dakota Air Pollutants - Guideline Concentrations", "US - South Dakota Drinking Water Standards - Inorganic Chemicals", "US - Utah Primary Drinking Water Standards - Inorganic Contaminants", "US - Utah Secondary Drinking Water Standards - Inorganic Contaminants", "US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

! Cumulative effects may result following exposure*.
! Limited evidence of a carcinogenic effect*.
! Vapours potentially cause drowsiness and dizziness*.
* (limited evidence).

Denmark Advisory list for selfclassification of dangerous substances

Substance	CAS	Suggested codes
nonafluoropentanoic acid	2706- 90- 3	Xn; R22

! Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

! The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings.

! For detailed advice on Personal Protective Equipment, refer to the following U.S. Regulations and Standards:

OSHA Standards - 29 CFR:

1910.132 - Personal Protective Equipment - General requirements

1910.133 - Eye and face protection

1910.134 - Respiratory Protection

1910.136 - Occupational foot protection

1910.138 - Hand Protection

Eye and face protection - ANSI Z87.1

Foot protection - ANSI Z41

Respirators must be NIOSH approved.

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www.Chemwatch.net

Issue Date: Jan-28-2009

Print Date:Mar-20-2012

Perfluorotetradecanoic acid

Safety Data Sheet 2121331

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 01/16/2017

Version: 1.0

SECTION 1: Identification

1.1. Identification

Product form	: Substance
Substance name	: Perfluorotetradecanoic acid
CAS No	: 376-06-7
Product code	: 2121-3-31
Formula	: C14HF27O2
Synonyms	: Perfluoromyristic acid
Other means of identification	: MFCD00153263

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	: Laboratory chemicals Manufacture of substances Scientific research and development

1.3. Details of the supplier of the safety data sheet

SynQuest Laboratories, Inc.
P.O. Box 309
Alachua, FL 32615 - United States of America
T (386) 462-0788 - F (386) 462-7097
info@synquestlabs.com - www.synquestlabs.com

1.4. Emergency telephone number

Emergency number	: (844) 523-4086 (3E Company - Account 10069)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Acute Tox. 4 (Oral)	H302 - Harmful if swallowed
Skin Irrit. 2	H315 - Causes skin irritation
Eye Irrit. 2A	H319 - Causes serious eye irritation
STOT SE 3	H335 - May cause respiratory irritation

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US)



GHS07

Signal word (GHS-US)

: Warning

Hazard statements (GHS-US)

: H302 - Harmful if swallowed
H315 - Causes skin irritation
H319 - Causes serious eye irritation
H335 - May cause respiratory irritation

Precautionary statements (GHS-US)

: P261 - Avoid breathing dust, mist, spray
P264 - Wash skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301+P312 - If swallowed: Call a POISON CENTER or doctor/ physician if you feel unwell
P302+P352 - If on skin: Wash with plenty of soap and water
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P312 - Call a POISON CENTER or doctor/physician if you feel unwell
P321 - Specific treatment (see supplemental first aid instructions on this label)
P330 - Rinse mouth
P332+P313 - If skin irritation occurs: Get medical advice/attention

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P337+P313 - If eye irritation persists: Get medical advice/attention
P362+P364 - Take off contaminated clothing and wash it before reuse
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/container to an approved waste disposal plant

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Substance type : Mono-constituent

Name	Product identifier	%	Classification (GHS-US)
Perfluorotetradecanoic acid (Main constituent)	(CAS No) 376-06-7	<= 100	Acute Tox. 4 (Oral), H302 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 STOT SE 3, H335

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move the affected personnel away from the contaminated area.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Get immediate medical advice/attention.

First-aid measures after skin contact : Wash with plenty of soap and water. Get immediate medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

First-aid measures after ingestion : Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get immediate medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Alcohol resistant foam. Carbon dioxide. Dry powder. Water spray. Use extinguishing media appropriate for surrounding fire.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Thermal decomposition generates: Carbon oxides. Hydrogen fluoride.

5.3. Advice for firefighters

Firefighting instructions : In case of fire: Evacuate area.

Protection during firefighting : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate unnecessary personnel. Ensure adequate air ventilation. Do not breathe dust.

6.1.1. For non-emergency personnel

Emergency procedures : Only qualified personnel equipped with suitable protective equipment may intervene.

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6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Avoid release to the environment. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment : Stop leak if safe to do so.
Methods for cleaning up : Sweep or shovel spills into appropriate container for disposal. Minimize generation of dust.
Other information : For disposal of solid materials or residues refer to section 13 : "Disposal considerations".

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Do not breathe dust, mist, spray. Wear personal protective equipment. Avoid contact with skin and eyes.
Hygiene measures : Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.
Storage conditions : Keep container closed when not in use.
Incompatible materials : Refer to Section 10 on Incompatible Materials.
Storage area : Store in dry, cool, well-ventilated area.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Exposure controls

Appropriate engineering controls : Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Hand protection : Protective gloves. 29 CFR 1910.138: Hand Protection.
Eye protection : Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection.
Skin and body protection : Wear suitable protective clothing.
Respiratory protection : In case of inadequate ventilation wear respiratory protection. 29 CFR 1910.134: Respiratory Protection.
Other information : Safety shoes. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Solid
Color : No data available
Odor : No data available
Odor threshold : No data available
pH : No data available
Melting point : 130 - 131 °C
Freezing point : No data available
Boiling point : 192 °C (@ 60 mm Hg)
Flash point : No data available
Relative evaporation rate (butyl acetate=1) : No data available
Flammability (solid, gas) : No data available
Explosion limits : No data available
Explosive properties : No data available

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Oxidizing properties	: No data available
Vapor pressure	: 0 mm Hg (@ 20 °C)
Relative density	: No data available
Relative vapor density at 20 °C	: No data available
Molecular mass	: 714.11 g/mol
Solubility	: No data available
Log Pow	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

Keep away from heat, sparks and flame.

10.5. Incompatible materials

Strong bases. Strong oxidizing agents.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products in case of fire, see Section 5.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: Oral: Harmful if swallowed.
Skin corrosion/irritation	: Causes skin irritation.
Serious eye damage/irritation	: Causes serious eye irritation.
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: May cause respiratory irritation.
Specific target organ toxicity (repeated exposure)	: Not classified
Aspiration hazard	: Not classified

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

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12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

- Waste treatment methods : Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.
- Waste disposal recommendations : Dispose of contents/container in accordance with licensed collector's sorting instructions.
- Additional information : Recycle the material as far as possible.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT
Not regulated for transport

TDG

No additional information available

Transport by sea

No additional information available

Air transport

No additional information available

SECTION 15: Regulatory information

15.1. US Federal regulations

Perfluorotetradecanoic acid (376-06-7)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

EPA TSCA Regulatory Flag

S - S - indicates a substance that is identified in a proposed or final Significant New Uses Rule.

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

15.2. International regulations

CANADA

Perfluorotetradecanoic acid (376-06-7)

Listed on the Canadian NDSL (Non-Domestic Substances List)

EU-Regulations

No additional information available

National regulations

Perfluorotetradecanoic acid (376-06-7)

Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm

SECTION 16: Other information

Perfluorotetradecanoic acid

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Full text of H-phrases:

Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Skin Irrit. 2	Skin corrosion/irritation Category 2
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H302	Harmful if swallowed
H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation

NFPA health hazard

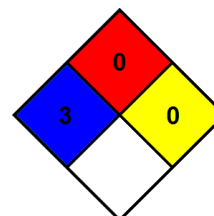
: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.

NFPA fire hazard

: 0 - Materials that will not burn.

NFPA reactivity

: 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health

: 2 Moderate Hazard - Temporary or minor injury may occur

Flammability

: 0 Minimal Hazard - Materials that will not burn

Physical

: 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

SDS US (GHS HazCom 2012)

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is offered solely for your consideration, investigation, and verification. It does not represent any guarantee of the properties of the product nor that the hazard precautions or procedures described are the only ones which exist. SynQuest shall not be held liable for any damage resulting from handling or from contact with the above product.

Safety Data Sheet

according to Regulation (EC) No 1907/2006 (REACH)
Classifications according to Regulation (EC) No 1272/2008.
Printdate May 28, 2021

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product name:

Perfluorotridecanoic acid

1.1. Catalog No.:

676954

1.2. Relevant identified uses of the substance or mixture

Identified: Laboratory chemical
uses: R&D

1.3. Uses advised against:

HPC Standards GmbH
Am Wieseneck 7

04451 Cunnersdorf
Deutschland

Tel. +49 34291 3372-36
Fax. +49 34291 3372-39
contact@hpc-standards.com

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
Not a hazardous substance or mixture according to Regulation (EC) No. 1272/2008.
This substance is not classified as dangerous according to Directive 67/548/EEC.

2.2. Label elements

2.2.1. Pictogram

2.2.2.

2.2 Label elements
The product does not need to be labelled in accordance with EC directives or respective national laws.
2.3 Other hazards - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Formula : C13HF25O2
Molecular Weight : 664,11 g/mol

3.1.1. Formula

C13HF25O2

3.1.2. Molecular Weight (g/mol)

664.11

3.1.3. CAS-No.

72629-94-8

4. FIRST AID MEASURES

4.1 Description of first aid measures

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact

Wash off with soap and plenty of water.

In case of eye contact

Flush eyes with water as a precaution. If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

4.3 Indication of any immediate medical attention and special treatment needed

no data available

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen fluoride

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid dust formation. Avoid breathing vapors, mist or gas.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

no data available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

8.2 Exposure controls

Appropriate engineering controls

General industrial hygiene practice.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices.

Wash and dry hands. Body Protection

Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- a) Appearance Form: solid
 - b) Odour no data available
 - c) Odour Threshold no data available
 - d) pH no data available
 - e) Melting point/freezing point
Melting point/range: 112 - 123 °C - lit.
 - f) Initial boiling point and boiling range
no data available
 - g) Flash point no data available
 - h) Evaporation rate no data available
 - i) Flammability (solid, gas) no data available
 - j) Upper/lower flammability or explosive limits
no data available
 - k) Vapour pressure no data available
 - l) Vapour density no data available
 - m) Relative density no data available
 - n) Water solubility no data available
 - o) Partition coefficient: noctanol/water
no data available
 - p) Auto-ignition temperature
no data available
 - q) Decomposition temperature
no data available
 - r) Viscosity no data available
 - s) Explosive properties no data available
 - t) Oxidizing properties no data available
- 9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

- 10.1 Reactivity
no data available
- 10.2 Chemical stability
no data available
- 10.3 Possibility of hazardous reactions
no data available
- 10.4 Conditions to avoid
no data available
- 10.5 Incompatible materials
Strong oxidizing agents
- 10.6 Hazardous decomposition products
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

- 11.1 Information on toxicological effects
 - Acute toxicity
no data available
 - Skin corrosion/irritation
no data available
 - Serious eye damage/eye irritation
no data available
 - Respiratory or skin sensitization
no data available
 - Germ cell mutagenicity

no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

Reproductive toxicity

no data available

Specific target organ toxicity - single exposure

no data available

Specific target organ toxicity - repeated exposure

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.

Ingestion May be harmful if swallowed.

Skin May be harmful if absorbed through skin. May cause skin irritation.

Eyes May cause eye irritation.

Signs and Symptoms of Exposure

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Additional Information

RTECS: Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity

no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

no data available

12.4 Mobility in soil

no data available

12.5 Results of PBT and vPvB assessment

no data available

12.6 Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

14.1 UN number

ADR/RID: - IMDG: - IATA: -

14.2 UN proper shipping name

ADR/RID: Not dangerous goods

IMDG: Not dangerous goods

IATA: Not dangerous goods

14.3 Transport hazard class(es)

ADR/RID: - IMDG: - IATA: -

14.4 Packaging group

ADR/RID: - IMDG: - IATA: -

14.5 Environmental hazards

ADR/RID: no IMDG Marine Pollutant: no IATA: no

14.6 Special precautions for user

no data available

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

no data available

15.2 Chemical Safety Assessment

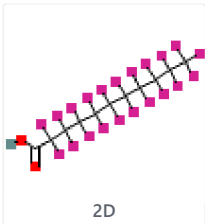
no data available

16. OTHER INFORMATION

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. For lab use only!

**COVID-19 Information**[Public health information \(CDC\)](#) [Research information \(NIH\)](#) [SARS-CoV-2 data \(NCBI\)](#)[Prevention and treatment information \(HHS\)](#) [Español](#)[COMPOUND SUMMARY](#) > [LABORATORY CHEMICAL SAFETY SUMMARY \(LCSS\)](#)

Perfluoroundecanoic acid

PubChem CID	77222
Structure	 2D Find Similar Structures
Synonyms	Perfluoroundecanoic acid 2058-94-8 Henicosafuoroundecanoic acid Perfluoro-n-undecanoic acid 2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,11-henicosafuoroundecanoic acid More...
Molecular Formula	C ₁₁ HF ₂₁ O ₂
Molecular Weight	564.09

[Learn More About LCSS Project](#) >

1 GHS Classification



Pictogram(s)	 Irritant
Signal	Warning
GHS Hazard Statements	H302 (95.12%): Harmful if swallowed [Warning] Acute toxicity, oral] H312 (95.12%): Harmful in contact with skin [Warning] Acute toxicity, dermal] H315 (100%): Causes skin irritation [Warning] Skin corrosion/irritation] H319 (100%): Causes serious eye irritation [Warning] Serious eye damage/eye irritation] H332 (95.12%): Harmful if inhaled [Warning] Acute toxicity, inhalation]
Precautionary Statement Codes	P261, P264, P270, P271, P280, P301+P312, P302+P352, P304+P312, P304+P340, P305+P351+P338, P312, P321, P322, P330, P332+P313, P337+P313, P362, P363, and P501 (The corresponding statement to each P-code can be found at the GHS Classification page.)
ECHA C&L Notifications Summary	<i>Aggregated GHS information provided by 44 companies from 4 notifications to the ECHA C&L Inventory. Each notification may be associated with multiple companies.</i> <i>Reported as not meeting GHS hazard criteria by 3 of 44 companies. For more detailed information, please visit ECHA C&L website.</i> <i>Of the 3 notification(s) provided by 41 of 44 companies with hazard statement code(s).</i> <i>Information may vary between notifications depending on impurities, additives, and other factors. The percentage value in parenthesis indicates the notified classification ratio from companies that provide hazard codes. Only hazard codes with percentage values above 10% are shown.</i>

► [European Chemicals Agency \(ECHA\)](#)

2 Identifiers

2.1 CAS

2058-94-8

► CAS Common Chemistry; ChemIDplus; EPA DSSTox; European Chemicals Agency (ECHA)

2.2 InChI

InChI=1S/C11HF21O2/c12-2(13,1(33)34)3(14,15)4(16,17)5(18,19)6(20,21)7(22,23)8(24,25)9(26,27)10(28,29)11(30,31)32/h(H,33,34)

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► PubChem

2.3 InChI Key

SIDINRCMMRKXGQ-UHFFFAOYSA-N

Computed by InChI 1.0.5 (PubChem release 2019.06.18)

► PubChem

3 Additional Considerations



3.1 Substance of Very High Concern (SVHC)



REACH SVHC Substance

Substance: Henicosafuoroundecanoic acid

Reason: vPvB (Article 57e)

Decision Document: [PDF Link](#)

► [European Chemicals Agency \(ECHA\)](#)

4 Information Sources



FILTER BY SOURCE

ALL SOURCES



1. CAS Common Chemistry

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Perfluoroundecanoic acid

https://commonchemistry.cas.org/detail?cas_rn=2058-94-8

2. ChemIDplus

LICENSE

<https://www.nlm.nih.gov/copyright.html>

Perfluoro-n-undecanoic acid

<https://chem.nlm.nih.gov/chemidplus/sid/0002058948>

3. EPA DSSTox

LICENSE

<https://www.epa.gov/privacy/privacy-act-laws-policies-and-resources>

Perfluoroundecanoic acid

<https://comptox.epa.gov/dashboard/DTXSID8047553>

4. European Chemicals Agency (ECHA)

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<https://echa.europa.eu/web/guest/legal-notice>

Henicosafluoroundecanoic acid

<https://echa.europa.eu/substance-information/-/substanceinfo/100.016.515>

Henicosafluoroundecanoic acid

<https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/86728>

Henicosafluoroundecanoic acid

<https://www.echa.europa.eu/candidate-list-table>

5. PubChem

<https://pubchem.ncbi.nlm.nih.gov>



APPENDIX D

Summary of Prohibited and Acceptable Materials

SAMPLING CONSIDERATIONS WHEN ANALYZING FOR PFCS	
Summary of Prohibited and Acceptable Materials	
Field Equipment	
Fluoropolymer tubing, valves and other parts in pumps (Teflon®)	High density polyethylene (HDPE) and silicon materials
Fluoropolymer bailers or pump bladders	Disposable Equipment / Dedicated Equipment (no PTFE parts)
Aluminum foil	Thin HDPE sheeting
Blue (chemical) ice*	Ice contained in plastic (polyethylene) bags (double bagged), secured to avoid meltwater from contacting sample containers, overnight shipping
Post-it notes, sharpies, waterproof fieldbook	Ball point pens, Loose paper on aluminum clipboard, non weatherproof fieldbook, pre-printed labels
Glass containers (due to potential loss of analyte through adsorption)	Polypropylene or HDPE sample bottles fitted with an unlined (no PTFE), polypropylene or HDPE screw cap
Decon 90	Alconox and Liquinox soap for decontamination, if needed
Decontamination water from the site	Water used for the decontamination of sampling equipment will be laboratory certified "PFAS-free" water
Field Clothing and Personal Protective Equipment (PPE)	
New clothing or water resistant, waterproof, or stain-treated clothing, clothing containing Gore-Tex	Well-laundered clothing, defined as clothing that has been washed 6 times or more after purchase, made of synthetic or natural fibers.
Clothing laundered using fabric softener	No fabric softener
Boots containing Gore-Tex	Boots made with polyurethane and polyvinyl chloride
No cosmetics, moisturizers, hand cream or other related products as part of personal cleaning/showering routine on the morning of sampling	Sunscreens - Alba Organics Natural Sunscreen, Yes to Cucumbers, Aubrey Organics, Jason Natural Sun Block, Kiss my face, Baby sunscreens that are "free" or "natural"
	Inspect Repellents: Jason Natural Quit Bugging Me, Repel Lemon Eucalyptus Insect repellent, Herbal Armor, BabyGanics
Handling or prepackaged food products	Do not have at sampling location, wash hands well after handling wear powderless nitrile gloves



APPENDIX E

Heat and Cold Stress Safety

HEAT STRESS

Heat Stress (Hyperthermia)

Heat stress is the body's inability to regulate the core temperature. A worker's susceptibility to heat stress can vary according to his/her physical fitness, degree of acclimation to heat, humidity, age and diet.

1. Prior to site activity, the field team leader may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature, and body water loss) during actual site work if conditions warrant. In addition, the FTL is to ensure that each team member has been acclimatized to the prevailing environmental conditions, that personnel are aware of the signs and symptoms of heat sickness, that they have been adequately trained in first aid procedures, and that there are enough personnel on-site to rotate work assignments and schedule work during hours of reduced temperatures. Personnel should not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.
2. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, some indicators are tobacco or medication use, dietary habits, body weight, and chronic conditions such as high blood pressure or diabetes.
3. *Heat cramps*, caused by profuse perspiration with inadequate fluid intake and salt replacement, most often afflict people in good physical condition who work in high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress rapidly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and replace lost fluids with water.
4. Thirst is not an adequate indicator of heat exposure. Drinking fluid by itself does not indicate sufficient water replacement during heat exposure. A general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every half pound of water lost, 8 ounces of water should be ingested. Water should be replaced by drinking 2 – 4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink split 50/50 with water.

5. *Heat exhaustion* results from salt and water loss along with peripheral pooling of blood. Like heat cramps, heat exhaustion tends to occur in persons in good physical health who are working in high temperatures and humidity. Heat exhaustion may come on suddenly as dizziness and collapse. Untreated, heat exhaustion may progress to heat stroke.
6. *Treatment for heat exhaustion:* Move the victim to a cool environment (e.g. air-conditioned room/car), lay victim down and fan him/her. If the air-conditioning is not available, remove the victim to a shaded area, remove shirt, and fan. If symptoms do not subside within an hour, notify 911 to transport to hospital.
7. *Heat stroke* results from the body's inability to dissipate excess heat. A true medical emergency that requires immediate care, it usually occurs when one ignores the signs of heat exhaustion and continues strenuous activities. Working when the relative humidity exceeds 60% is a particular problem. Workers in the early phase of heat stress may not be coherent of they will be confused, delirious or comatose. Changes in behavior, irritability and combativeness are useful early signs of heat stroke.
8. *Treatment of heat stroke:* Move the victim to a cool, air-conditioned environment. Place victim in a semi-reclined position with head elevated and strip to underclothing. Cool victim as rapidly as possible, applying ice packs to the arms and legs and massaging the neck and torso. Spray victim with tepid water and constantly fan to promote evaporation. Notify 911 to transport to hospital as soon as possible.

TABLE 1

SYMPTOMS OF HEAT STRESS

Heat cramps are caused by heavy sweating with inadequate fluid intake. Symptoms include;

- Muscle cramps
- Cramps in the hands, legs, feet and abdomen

Heat exhaustion occurs when body organs attempt to keep the body cool. Symptoms include;

• Pale, cool moist skin	• Rapid heart rate
• Core temperature elevated 1-2°	• Heavy sweating
• Thirst	• Dizziness
• Anxiety	• Nausea

Heat stroke is the most serious form of heat stress. Immediate action must be taken to cool the body before serious injury and death occur. Symptoms are;

- Red, hot, dry skin
- Lack of perspiration
- Seizures
- Dizziness and confusion
- Strong, rapid pulse
- Core temperature of 104° or above
- Coma

TABLE 2**HEAT STRESS INDICATORS**

Heat stress indicator	When to measure	If Exceeds...	Action
Heart rate (pulse)	Beginning of rest period	110 beats per minute	Shorten next work period by 33%
Oral temperature	Beginning of rest period	99°F (after thermometer is under tongue for 3 minutes)	Shorten next work period by 33%
		100.6°F	Prohibit work in impermeable clothing
Body weight	1. Before workday begins (a.m.) 2. After workday ends (p.m.)		Increase fluid intake

COLD STRESS

Cold stress (Hypothermia)

In hypothermia the core body temperature drops below 95°F. Hypothermia can be attributed to a decrease in heat production, increased heat loss or both.

Prevention

Institute the following steps to prevent overexposure of workers to cold:

1. Maintain body core temperature at 98.6°F or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing that can keep the body warm even when the clothing is wet.
2. Avoid frostbite by adequately covering hands, feet and other extremities. Clothing such as insulated gloves or mittens, earmuffs and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20°F), workers should wear gloves. Tool handles should be covered with insulating material.
3. Adjust work schedules to provide adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide heated shelter. Workers should remove their outer layer(s) of clothing while in the shelter to allow sweat to evaporate.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the buildup of toxic or explosive gases or vapors. Care must be taken to keep a heat source away from flammable substances.
6. Using a wind chill chart such as the one in Table 3, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT of 20°F. For exposed skin, continuous exposure should not be permitted at or below an ECT of -25°F.

Frostbite

Personnel should be aware of symptoms of frostbite/hypothermia. If the following symptoms are noticed in any worker, he/she should immediately go to a warm shelter.

Condition	Skin Surface	Tissue Under Skin	Skin Color
Frostnip	Soft	Soft	Initially red, then white
Frostbite	Hard	Soft	White and waxy
Freezing	Hard	Hard	Blotchy, white to yellow-gray to gray

1. *Frostnip* is the incipient stage of frostbite, brought about by direct contact with a cold object or exposure of a body part to cool/cold air. Wind chill or cold water also can be major factors. This condition is not serious. Tissue damage is minor and the response to care is good. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostnip.
2. *Treatment of frostnip*: Care for frostnip by warming affected areas. Usually the worker can apply warmth from his/her bare hands, blow warm air on the site, or, if the fingers are involved, hold them in the armpits. During recovery, the worker may complain of tingling or burning sensation, which is normal. If the condition does not respond to this simple care, begin treatment for frostbite.
3. *Frostbite*: The skin and subcutaneous layers become involved. If frostnip goes untreated, it becomes superficial frostbite. This condition is serious. Tissue damage may be serious. The worker must be transported to a medical facility for evaluation. The tip of the nose, tips of ears, upper cheeks and fingers (all areas generally exposed) are most susceptible to frostbite. The affected area will feel frozen, but only on the surface. The tissue below the surface must still be soft and have normal response to touch. **DO NOT** squeeze or poke the tissue. The condition of the deeper tissues can be determined by gently palpating the affected area. The skin will turn mottled or blotchy. It may also be white and then turn grayish-yellow.
4. *Treatment of frostbite*: When practical, transport victim as soon as possible. Get the worker inside and keep him/her warm. Do not allow any smoking or alcohol consumption. Thaw frozen parts by immersion, re-warming in a 100°F to 106°F water bath. Water temperature will drop rapidly, requiring additional warm water throughout the process. Cover the thawed part with a dry sterile dressing. Do not puncture or drain any blisters.

NOTE: Never listen to myths and folk tales about the care of frostbite. *Never* rub a frostbitten or frozen area. *Never* rub snow on a frostbitten or frozen area. Rubbing the area may cause

serious damage to already injured tissues. Do not attempt to thaw a frozen area if there is any chance it will be re-frozen.

5. *General cooling/Hypothermia:* General cooling of the body is known as systemic hypothermia. This condition is not a common problem unless workers are exposed to cold for prolonged periods of time without any shelter.

Body Temperature	°C	Symptoms
99-96	37-35.5	Intense, uncontrollable shivering
95-91	35.5-32.7	Violent shivering persists. If victim is conscious, he has difficulty speaking.
90-86	32-30	Shivering decreases and is replaced by strong muscular rigidity. Muscle coordination is affected. Erratic or jerkey movements are produced. Thinking is less clear. General comprehension is dulled. There may be total amnesia. The worker is generally still able to maintain the appearance of psychological contact with his surroundings.
85-81	29.4-27.2	Victim becomes irrational, loses contact with his environment, and drifts into a stuporous state. Muscular rigidity continues. Pulse and respirations are slow and the worker may develop cardiac arrhythmias.
80-78	26.6-18.5	Victim becomes unconscious. He does not respond to the spoken word. Most reflexes cease to function. Heartbeat becomes erratic
Below 78	25.5	Cardiac and respiratory centers of the brain fail. Ventricular fibrillation occurs; probably edema and hemorrhage in the lungs; death.

6. *Treatment of hypothermia:* Keep worker dry. Remove any wet clothing and replace with dry clothes, or wrap person in dry blankets. Keep person at rest. Do not allow him/her to move around. Transport the victim to a medical facility as soon as possible.

TABLE 3⁽¹⁾
COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED
AS AN EQUIVALENT TEMPERATURE (UNDER CALM CONDITIONS)

Estimated wind Speed (in mph)	Actual Temperature Reading (°F)P												
	50	40	30	20	10	0	10	20	30	40	50	60	
	Equivalent Chill Temperature (°F)												
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60	
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68	
10	40	28	15	4	-9	-24	-33	-46	-58	-70	-83	-95	
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112	
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121	
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133	
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140	
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145	
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-146	
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER in < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute			GREAT DANGER may freeze within 30 seconds.					Flesh
	Trench foot and imersion foot may occur at any point on this chart												

Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.

(1) Reproduced from American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1985-1986, p.01.



APPENDIX F

Field Accident Report



FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME: _____ PROJECT. NO.: _____

Date of Accident: _____ Time: _____ Report By: _____

Type of Accident (Check One):

() Vehicular () Personal () Property

Name of Injured: _____ DOB or Age _____

How Long Employed: _____

Names of Witnesses: _____

Description of Accident: _____

Action Taken: _____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

(If not, it is the EMPLOYEE'S sole responsibility to process his/her claims through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

APPENDIX D

Community Air Monitoring Plan



BROOKHAVEN CALABRO AIRPORT
135 DAWN DRIVE
SHIRLEY, NY 11967
DISTRICT 200, SECTION 710, BLOCK 1, LOTS 1 AND 1.6
NYSDEC SITE: 152263

COMMUNITY AIR MONITORING PLAN

Submitted To:



New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233



Suffolk County Department of Health Services
Office of Pollution Control
15 Horseblock Place
Farmingville, New York 11738

Prepared For:



Town of Brookhaven
1 Independence Hill
Farmingville, NY 11738

Prepared By:



P.W. Grosser Consulting Inc.
630 Johnson Avenue, Suite 7
Bohemia, NY 11716
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mpecoraro@pwgrossex.com

PWGC Project #: BRK2301

APRIL 2023



**COMMUNITY AIR MONITORING PLAN
BROOKHAVEN CALABRO AIRPORT
135 DAWN DRIVE, SHIRLEY, NEW YORK**

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TABLES

Table 1	Frequency and Location of Air Monitoring
Table 2	Real-Time Air Monitoring Action Levels

APPENDICES

Appendix A	NYSDOH Generic CAMP
Appendix B	Fugitive Dust and Particulate Monitoring from DER-10



ACRONYMS

Acronym	Definition
AOC	Area of Concern
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AWQS	Ambient Water Quality Standards
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
°C	degrees Celsius
COC	Contaminant of Concern
DER	Department of Environmental Remediation
°F	Degrees Fahrenheit
IRM	Interim Remedial Measure
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mg/m ³	Milligrams per cubic meter
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
µg/m ³	Micrograms per cubic meter
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ppb	Parts per billion
ppm	Parts per million
SCDHS	Suffolk County Department of Health Services
SCO	Soil Cleanup Objective
SCWA	Suffolk County Water Authority
SDS	Safety Data Sheets
SPDES	State Pollutant Discharge Elimination System
SVOC	Semi-volatile Organic Compound
TAGM	Technical Administrative Guidance Memo
TOGS	Technical and Operational Guidance Series
UIC	Underground injection control
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) provides measures for protection for on-site workers and the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial measure) from potential airborne contaminant releases resulting from the Interim Remedial Measure (IRM) at 135 Dawn Drive in Shirley, New York.

The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that the remedial work did not spread contamination off-site through the air.

The primary chemicals of potential concern (COPC) to be encountered at the Site are per- and polyfluoroalkyl substances (PFAS) related to the historical use of firefighting foam. In addition, other COPC may be present from the historical use and storage of petroleum liquids, use of on-site sanitary and storm water systems, or the presence of up gradient off-site sources of volatile organic compounds (VOCs) in groundwater. On-site soil contamination could also be spread by dust particulates generated during site activities.

1.1. Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- 29 CFR 1910.120(h): This regulation specifies that air shall be monitored to identify and quantify levels of airborne hazardous substances and health hazards and to determine the appropriate level of protection for workers.
- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan (**Appendix A**): This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air.
- New York State Department of Environmental Conservation's (NYSDEC's) Fugitive Dust and Particulate Monitoring from DER-10 Technical Guidance for Site Investigation and Remediation (**Appendix B**) - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites: This guidance



provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.



2.0 AIR MONITORING

The following sections contain information describing the types, frequency, and location of real-time monitoring.

2.1. Real-Time Monitoring

This section addresses the real-time monitoring that will be conducted within the work area, and along the site's downwind perimeter during all ground intrusive activities, such as waste removal from UIC structures.

2.2. Work Area

The following instruments will be used for work area monitoring:

- Photoionization Detector (PID)
- Dust Monitor

Table 1 presents a breakdown of each main activity and provides the instrumentation, frequency, and location of the real-time monitoring for the site. **Table 2** lists the Real-Time Air Monitoring Action Levels to be used in all work areas.

2.3. Community Air Monitoring Requirements

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before investigation activities begin. These points will be monitored periodically in series during the site work.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor or equivalent, which is capable of measuring particulate matter less than 10 micrometers in size (PM-10). Air will be monitored for VOCs with a portable Photovac MicroTip PID or equivalent. All air monitoring data is documented in a site logbook by the designated site safety officer. PWGC's site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. All instruments will be zeroed daily and checked for accuracy. A daily log

will be kept. If additional monitoring is required, the protocols will be developed and appended to this plan.

Table 1
Frequency and Location of Air Monitoring

ACTIVITY	AIR MONITORING INSTRUMENT	FREQUENCY AND LOCATION
UIC Remediation, Sampling	PID	Continuous at the downwind perimeter of the Work Zone during intrusive activities.
UIC Remediation, Sampling	Particulate (Dust, Mist or Aerosol) Meter	Continuous at the downwind perimeter of the Work Zone during intrusive activities

Table 2
Real-Time Air Monitoring Action Levels

AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON FOR SITE ACTION
PID	Work Area Perimeter (20-foot radius)	< 5 ppm	None	Exposure below established exposure limits.
PID	Work Area Perimeter (20-foot radius)	> 5 ppm	Stop work and implement vapor release response plan until readings return to acceptable levels, Notify Site Safety Officer.	Increased exposure to site contaminants, potential for vapor release to public areas.
Particulate (Dust, Mist or Aerosol) Meter	Work Area Perimeter (20-foot radius)	>100 but <150 $\mu\text{g}/\text{m}^3$	Institute dust suppression measures, notify the Site Safety Officer. Work may continue if particulate concentrations remain below 150 $\mu\text{g}/\text{m}^3$.	Increased exposure to site contaminants, potential for vapor release to public areas.

AIR MONITORING INSTRUMENT	MONITORING LOCATION	ACTION LEVEL	SITE ACTION	REASON FOR SITE ACTION
Particulate (Dust, Mist or Aerosol) Meter	Work Area Perimeter (20-foot radius)	>150 $\mu\text{g}/\text{m}^3$	Don ASR or SCBA, Institute dust suppression measures. Stop work and implement dust suppression techniques until readings return to acceptable levels, Notify Site Safety Officer.	Increased exposure to site contaminants, potential for vapor release to public areas.

3.0 VAPOR EMISSION RESPONSE PLAN

This section is excerpted from the NYSDOH guidance for Community Air Monitoring Plan – Ground Intrusive Activities.

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Site Safety Officer will be implemented to ensure that vapor emission levels decrease.



4.0 VAPOR SUPPRESSION TECHNIQUES

Vapor suppression techniques must be employed when action levels warrant the use of these techniques.

The techniques to be implemented for control of VOCs from stockpiled soil or from the open excavation will include one or more of the following:

- Cover with plastic,
- Cover with “clean soil,”
- Application of hydro-mulch material or encapsulating foam,
- Limit working hours to favorable wind and temperature conditions.



5.0 DUST SUPPRESSION TECHNIQUES

Reasonable dust-suppression techniques must be employed during all work that may generate dust, such as drilling, excavation, and placement of clean fill. The following techniques were shown to be effective for controlling the generation and migration of dust during remedial activities:

- Wetting equipment and excavation faces,
- Spraying water on buckets during excavation and dumping,
- Hauling materials in properly covered containers, and
- Restricting vehicle speeds to 10 mph.

It is imperative that utilizing water for suppressing dust does not create surface runoff.

6.0 DATA QUALITY ASSURANCE

6.1. Calibration

Instrument calibration shall be documented in the designated field logbook. All instruments shall be calibrated in accordance with manufacturer's instructions and specifications before each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

6.2. Operations

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operation manual for each piece of monitoring equipment will be maintained on-site by the Site Safety Officer for reference.

6.3. Data Review

The Project Manager will interpret all monitoring data based on **Table 2** and his/her professional judgment. The Project Manager shall review the data with the Site Safety Officer to evaluate the potential for worker and community exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation, will be periodically reviewed by the Site Safety Officer.



7.0 RECORDS AND REPORTING

All readings must be recorded and available for review by personnel from NYSDEC and NYSDOH. Should any of the action levels be exceeded for the duration of 15 minutes at the downwind Work Zone perimeter, the NYSDEC Division of Environmental Remediation (DER) project manager and NYSDOH must be notified immediately (within one business day).

The notification shall include a description of the control measures implemented to prevent further exceedances.

Air monitoring data shall be provided to the DER project manager and NYSDOH on a weekly basis.





COMMUNITY AIR MONITORING PLAN

APPENDIX A NYSDOH Generic CAMP



Appendix 1A

New York State Department of Health

Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \text{ mcg}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009



COMMUNITY AIR MONITORING PLAN

APPENDIX B Fugitive Dust and Particulate Monitoring From DER-10



Appendix 1B

Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.
2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.
3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM₁₀) with the following minimum performance standards:
 - (a) Objects to be measured: Dust, mists or aerosols;
 - (b) Measurement Ranges: 0.001 to 400 mg/m³ (1 to 400,000 :ug/m³);
 - (c) Precision (2-sigma) at constant temperature: +/- 10 :g/m³ for one second averaging; and +/- 1.5 g/m³ for sixty second averaging;
 - (d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mm_d= 2 to 3 :m, g= 2.5, as aerosolized);
 - (e) Resolution: 0.1% of reading or 1g/m³, whichever is larger;
 - (f) Particle Size Range of Maximum Response: 0.1-10;
 - (g) Total Number of Data Points in Memory: 10,000;
 - (h) Logged Data: Each data point with average concentration, time/date and data point number
 - (i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
 - (j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
 - (k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
 - (l) Operating Temperature: -10 to 50° C (14 to 122° F);
 - (m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.
4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.
5. The action level will be established at 150 ug/m³ (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m³, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m³ above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m³ continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM₁₀ at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

- (a) Applying water on haul roads;
- (b) Wetting equipment and excavation faces;
- (c) Spraying water on buckets during excavation and dumping;
- (d) Hauling materials in properly tarped or watertight containers;
- (e) Restricting vehicle speeds to 10 mph;
- (f) Covering excavated areas and material after excavation activity ceases; and
- (g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m³ action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

APPENDIX E

Laboratory Data Consultants Resumes

Project Team Resumes





LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760/827-1100 Fax: 760/827-1099

P.W. Grosser
630 Johnson Avenue
Bohemia, NY 11716
Attn: Mr. Derek Ersbak, PG | Vice President

February 9, 2023

Subject: Data Validation Services for NYSDEC Brookhaven Calabro Airport Site Remediation Sampling

Dear Ms. Ersbak:

Thank you for inviting Laboratory Data Consultants, Inc. (LDC) to bid on the above noted project. We look forward to supporting your data validation needs and are pleased to submit our response.

We would like to highlight the following points regarding our submittal:

- LDC has an extensive history of providing data validation and data management services for numerous DoD, USACE, Navy, USEPA (all regions), state & local agency programs for over 30 years.
- LDC is a small business entity under NAICS code 541380, meeting the size standard of less than 15 Million USD, and is self-certified with the SBA.
- LDC is a data validation, quality assurance, and data management subcontractor with an impeccable track record for timeliness, quality, technical expertise, and the ability to mitigate complex data quality issues. Our clients will confirm our current and past performance under DoD (including USACE), DoE, and commercial programs. We have experience and a proven track record commensurate with the requirements of this RFP.

Our technical proposal will demonstrate how LDC's qualifications meet and exceed the critical technical and capacity requirements for this data validation subcontract.

Capacity

- LDC has the ability to support a project of this size with a staff of over thirty (30) chemistry professionals. This level of support will allow for appropriate primary and secondary QA/QC review within the critical schedule. Additionally, LDC's capacity allows for flexibility if expedited review is required.

Past Performance

- LDC has performed data validation on a wide variety of projects in our 30+ years in business including Various Passaic NJ sites, NYSDEC programs, more than 200 Army Corps sites, over 180 AFCEE/AFCEC sites, more than 50 EPA and Superfund sites, in support of multiple Navy CLEAN and RAC contracts and commercial client programs. This experience reflects a thorough understanding of multiple validation guidelines including NYSDEC ASP, EPA NFG, DoD QSM and EPA Region-specific and state-specific protocols.



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PFAS Experience

- LDC's largest PFAS project to date for data validation is for a Confidential Project Location. The data validation is performed per Level 3 and Level 4 equivalent PFAS in water samples for EPA Method 537 and Laboratory Method. Total billing to date for this project is over \$32,000.00.
- LDC's SOP for Table B15 Validation of PFAS is AFCEC and USACE approved.
- LDC has also performed PFAS data validation for other projects including but not limited to Anchor project City of Everett, Arcadis project Joint Base McGuire-Dixon-Lakehurst, Anchor project Duwamish-King County, CAPE project Mather AFB, USACE Seattle project Moses Lake, EA Engineering project Fairchild AFB, and MWH project City of San Diego project. Since March 1, 2018, LDC has validated over 1800 SDGs for PFAS.

ADR Deliverables

- LDC is the software developer and expert in the use of the Automated Data Review (ADR) software. LDC uses the most current version of ADR meeting USACE and current DoD QSM requirements and has performed over 1000 ADR projects in the past 10 years, worth over \$2,000,000 in revenue. LDC will provide technical support to the Client as needed for e-QAPP generation or EDD troubleshooting.

EDD Formats

- LDC is able to work with a variety of EDD formats including but not limited to Navy NEDD, USACE SEDD, EQulS, FUDSChem, and ERPIMS. Any EDD format can be populated with data qualifiers.

LDC Advantage

- LDC Advantage is a 24/7 secure cloud-based portal designed for upload, notification, retrieval, and long term storage of project documents, including lab data packages, emails, validation reports, validated EDD, QCSR/DVSRs, project planning documents (QAPP, FSP, SOPs, etc.), and many others. LDC Advantage is compatible with both desktop and mobile devices. LDC Advantage provides quick and easy access to project status and a convenient way to upload and download project files.

EDMSi Database Hosting (Documents and Data)

- LDC can provide hosting of its EDMSi database for posting, retrieval, reporting and download of both data and documents. The monthly fee includes 99.99% uptime, 24/7 along with distributed site availability and daily backups. Multiple users can all access the EDMSi database without conflict from anywhere in the world via the internet. The monthly hosting fee also includes general maintenance and phone, email or web-conference support via LDC's Technical Support Group.

Subcontractors

- No subcontractors will be used for this project. This will allow for better quality control of the work product. LDC has sufficient staff and resources to handle this project without using subcontractors.



LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760/827-1100 Fax: 760/827-1099

LDC Company Information

- Primary NAICS Code 541380 (also 541690 and 541620)
- TIN# 33-0492643
- DUNS# 789643863
- Cage Code 04XK8, UEI# PEK5K6KMDYV1
- MBE (CPUC Certified)
- SBE (Port of Long Beach, California eProcure, and LAUSD Certified) Less than 50 Employees
- Registered in ORCA and SAM
- CA PWCR Registration # 1000047894
- LAUSD Vendor ID# 1000018015
- South Florida Water Management District SBE Vendor 105004
- New York State Vendor ID number 1100182981
- New York City PIP Vendor number VS00046623
- New Jersey State Vendor ID number V00026481

Project Management

- LDC will dedicate Ms. Stella Cuenco, Principal Chemist, as the overall program manager and Ms. Pei Geng as the project manager.

We appreciate the opportunity to support your company on this project and we look forward to working together in the future. Please feel free to call me at (760) 827-1100 if you have any questions after your review.

Sincerely,

Laura Soeten
Executive Administrator
Lsoeten@lab-data.com



LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760/827-1100 Fax: 760/827-1099

Submittal for:

**Data Validation Services for
NYSDEC Brookhaven Calabro Airport Site
Remediation Sampling**

SUBMITTED TO:

**P.W. Grosser
630 Johnson Avenue
Bohemia, NY 11716
Attn: Mr. Derek Ersbak, PG | Vice President**

PRESENTED BY:

**Laboratory Data Consultants, Inc.
2701 Loker Ave. West, Suite 220
Carlsbad, CA 92010**

February 9, 2023



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LDC Company Profile

LDC is a small, minority-owned (SBE/MBE) quality assurance and environmental chemistry company focused on data validation, data quality assessment, database implementation, and data usability. Our primary services include data validation, electronic transfer of data, oversight of quality assurance/quality control (QA/QC) programs, laboratory and field audits, technical support for litigation, and database management. Our corporate office located in Carlsbad, California is directed by Mr. Scott Denzer and Ms. Stella Cuenco, principal chemists with over 50 years of experience between them in the environmental laboratory and data validation industries

LDC is recognized as one of the leaders in the data validation industry through participation on major DoD and commercial projects such as:

- Army Corps of Engineers, DuPont Chambers (Baltimore District)
- Army Corps of Engineers, DuPont Chambers (Philadelphia District)
- Army Corps of Engineers, Various projects (New Mexico)
- Army Corps of Engineers, Camp Navajo (Tetra Tech)
- Army Corps of Engineers, Various projects, 8a Contract (Sacramento District)
- Army Corps of Engineers, Fort Ord (Shaw E&I)
- Las Vegas Wash Henderson Site (ERM)
- DOE NPR-1 Elk Hills (DOE direct and Ahnta)
- Nevada Environmental Response Trust (NERT) Henderson Site (Ramboll Environ)
- NOAA MDRA Mississippi Site (Entrix)
- Stringfellow Superfund Site (DTSC)
- BKK Landfill (Ramboll Environ)
- EPA Region IX ESAT QA Program (ICF)
- AFCEE/AFCEC, Andersen AFB (EA/Shaw)
- AFCEE/AFCEC, Loring/Pease AFB (Bechtel/MWH)
- AFCEE/AFCEC, Mather AFB (MWH)
- AFCEE/AFCEC, Army Corps of Engineers, Travis AFB (CH2M Hill)
- AFCEE/AFCEC, McClellan and Castle AFB (Jacobs Engineering Group)
- AFCEE/AFCEC, Beale AFB (Law/Crandall, Inc.)
- AFCEE/AFCEC, Andrews AFB (URS)
- Navy CLEAN Atlantic Division (EA Engineering)
- Navy CLEAN IV Southwest DIV (AECOM)
- Navy RAC Southwest Division (OHM Remediation/IT Group/Shaw)

LDC has successfully performed thousands of data validation projects worth over 20 million dollars for prime contractors servicing Air Force (AFCEE/AFCEC), Army Corps, Navy, and industrial activities.

LDC has developed well-documented procedures which support all facets of the data validation process. This includes critical steps such as:

- Project tracking
- Peer review for all data validation activities
- Internal training programs
- Internal and external audits
- Strict documentation
- Electronic deliverables



LDC as the "Best Value" Contractor

LDC is a data validation subcontractor with an impeccable track record for timeliness, quality, technical expertise, and the ability to mitigate complex data quality issues. Our clients will confirm our current and past performance under DoD (including USACE), DoE, and commercial programs. We have experience and a proven track record commensurate with the requirements of this RFP as demonstrated by the following:

- **LDC is the software developer and expert in the use of the Automated Data Review (ADR) software.** LDC has been using ADR.NET and has the current version in full implementation which meets USACE and current DoD QSM requirements. LDC has performed over 1000 ADR projects in the past 10 years, worth over \$2,000,000 in revenue. LDC will provide technical support to the Client as needed for e-QAPP generation or EDD troubleshooting.
- Data validation experience as a subcontractor for more than 100 Army Corps sites, over 140 AFCEE/AFCEC sites, several EPA sites, and under 6 Navy CLEAN and RAC contracts and 150 Navy sites. This experience includes 15 years of data validation work under USACE direction and thorough understanding of the USACE Baltimore, EPA Region 2 and 3 validation guidelines, and the DoD QSM.
- Successful completion of USACE data validation activities since 1992 under subcontracts to various Districts including New England, Baltimore, Philadelphia, Omaha, Albuquerque, Seattle, Sacramento, and Jacksonville.
- Recent project experience in the Eastern region including support to four separate contractors on the Passaic River for varied projects and programs with revenues of 200K, and Gowanus Canal with GEI, revenues of 33K.
- **On-time delivery record of greater than 99%** with the ability to expedite turnaround as needed due to our large experienced staff as noted above.
- Successful completion of five DoD and two DoE audits to approve LDC's internal data validation procedures, QA program and documentation systems. (prior to 2000)
- Thorough secondary QA review program and **the capacity (30 full time chemistry staff) to handle a project of this magnitude and importance.** This significantly reduces additional work the consultant might otherwise need to do upon receipt of LDC reports.



Data Validation Capacity

LDC is continually evaluating and monitoring its capacity to meet client needs. It is company policy to not accept a project unless the service can be completed on-time with our expected quality of performance. This policy has proved very successful in meeting past project deadlines. Our client references will confirm our performance of on-time delivery.

Due to the versatile capabilities of our staff, personnel can also support multiple areas which are high in backlog. Our training program documents personnel approvals for all data review activities. All of our staff actively participate in the LDC training program.

LDC has met its contractual turnaround time requirement on over 99% of the projects completed. LDC has successfully completed projects which required data review capacity of as many as 2000 samples in one month.

Technical / Management Approach

LDC has established data validation and data management procedures which enable the thorough, consistent, timely, and efficient review of analytical data. Ms. Stella Cuenco, principal chemist, is responsible for all data validation related activities and has final authority for the company. The designated Project Manager will coordinate the day to day data validation activities and interface with the Client project chemist or PM as necessary. For day to day data review activities, data validators report directly to the senior chemist in the section of the review. Senior chemists report to the technical project manager. Data validation will be performed following the Client project specific requirements as stated in the Scope of Work (SOW).

As the Client alerts LDC of in-coming SDGs and associated ADR EDDs, the LDC project manager will log the order into the up-coming project list identified as the "LDC Project Backlog" form. This is now considered a booked order and is reserved a place in the schedule. The project manager will allocate and schedule staff resources for the project. He will generate a project specific summary which will detail the expected receipt date of the order, the due date, special method or QC requirements, and the data quality objectives (DQOs) of the project.

Once the data packages arrive, the packages are logged in according to LDC SOP 6.0.0 "Standard Operating Procedure for Sample Data Log-in". Computer generated worksheets for each SDG along with the "LDC SDG Table" and "LDC Sample Validation" spreadsheet are distributed to all project staff.

The "LDC SDG Table" spreadsheet is specific to each order and provides the project manager with an overview of individual SDGs and their associated analyses. Progress of projects is indicated daily on the spreadsheet. The "LDC Sample Validation" spreadsheet identifies individual analysis requested for all samples and supports the data reviewer in verifying that appropriate samples have been reviewed in each data package. The previously discussed tools and processes have been used to successfully meet deadlines and estimate project completion dates. Meetings are held routinely to assess the status of each project.

Throughout the data review process, the project manager monitors project status as stated above. If any scheduling or technical complications arise such that the quality of the review will be impacted, data review staff notify the project manager immediately for resolution. The project manager will keep the Client chemist current on the progress of all validation activities on a



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routine basis via e-mail and telephone. Once the data review worksheets have been completed and approved by a secondary review, the final technical reports are written. All final technical reports are reviewed by at least two senior staff. This may include the Technical Project Manager, QA Director, or Lead Chemist. Upon shipping the final report, the Client project chemist will be contacted by phone.



Data Review/Validation Process

The data review and validation level of effort required for the Scope of Work outlined for this project will encompass several activities. The steps can be categorized in the following manner:

1) Sample Log-in

All samples submitted for data validation are entered into the LDC Log-in system. The system generates various spreadsheets for sample tracking, listings of laboratory and client identifications, sampling dates, analysis requested, matrix, and project due date. These tracking documents are distributed to all data validation, QA and project management staff.

2) Pre-screening of Data Packages

The pre-screening is performed concurrently with the sample log-in process. This task verifies sample chain-of-custody, data package completeness, and concurrence with the authorized delivery order.

3) Data Validation

The execution of the data review task requires the highest level of effort. The review process will be handled in a stepwise fashion including manual and automated data review. The validator will use manual review to document each finding on a Validation Findings form. Along with the finding, the reviewer will document the date of the occurrence, the lab reference identification, the validation criteria, the associated samples, and the qualification of the data. A Validation Checklist form is marked noting if validation criteria was met or exceeded. A Validation Checklist is enclosed for review (Exhibit A). These checklists are used as an inventory sheet to assure all samples were reviewed for each criteria. The findings documented on the Validation Findings form will be transcribed into the final summary report. Examples of recalculation and findings worksheets used for Level 4 validation are available for review upon request.

All initial validation performed by LDC has a secondary peer review. All final reports will be reviewed by a Senior Chemist or Principal Chemist.

4) First Report Review

The first review of the data validation report verifies that all findings and data qualification has been accurately transferred from the data validation worksheets. All sample identifications, methods, formatting, and general text are reviewed.

5) Senior Report Review

The senior review of the data validation report verifies that all findings, data qualification, and professional judgments previously integrated into the reports reflect the overall quality of the data. Any additional comments required to enhance the usability of the report will be inserted at this time.



6) QA Report Review

A QA check of selected data validation reports within an individual delivery order will be reviewed by the QA department. A formal nonconformance report will be generated for any identified deficiencies. The deficiency will be addressed with the appropriate staff and corrected prior to submittal to senior management for final review and signature.

7) Senior Management Review

The program/technical manager will perform an overall review of the final reports. He will sign the report cover letter and submit the report to the sample custodian for shipment to the client.

8) Electronic Data Deliverables (EDD)

This process will be initiated at step 1 with the receipt of files from the client or loading EDDs to LDC's secured Internet portal. After automated verification of the EDD format, content, and fields, the EDD will be populated with the manual review for importing of the final data qualifiers. The final approval of qualifiers will occur after step 5.

LDC will self-perform the above tasks to maintain quality and control of the work product.



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Exhibit A

VALIDATION COMPLETENESS WORKSHEET

EPA Level IV

LDC #: _____

SDG #: _____

Laboratory: _____

Date: _____

Page: _____ of _____

Reviewer: _____

2nd Reviewer: _____

METHOD: GC/MS VOA (EPA SW 846 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	/	
II.	GC/MS Instrument performance check		
III.	Initial calibration/ICV	/	
IV.	Continuing calibration		
V.	Laboratory Blanks		
VI.	Field blanks		
VII.	Surrogate spikes		
VIII.	Matrix spike/Matrix spike duplicates		
IX.	Laboratory control samples		
X.	Field duplicates		
XI.	Internal standards		
XII.	Compound quantitation RL/LOQ/LODs		
XIII.	Target compound identification		
XIV.	System performance		
XV.	Overall assessment of data		

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1				
2				
3				
4				
5				

Notes:



LDC Corporate Resources

LDC personnel have experience and formal training in the areas of data validation, electronic data deliverables and laboratory QA/QC. LDC personnel have performed data validation in all analytical disciplines. These include, but are not limited to, GC/MS volatiles, GC volatiles, GC/MS semivolatiles, GC pesticides, ICP metals, ICP/MS metals, GFAA metals, GC petroleum hydrocarbons, GC/MS dioxins, explosives, radiochemistry, and wet chemistry. This versatility allows our organization to adapt to workload changes and allows for an excellent secondary review system. Our organization is structured to allow direct communication between project managers, data validators, and clerical staff which occurs on a daily basis.

With LDC's 30+ years as a national leader in the data validation industry and extensive experience supporting projects with multiple EPA regions, DoD and DOE facilities, LDC is confident our data validation services will successfully meet all project requirements. The validation group is managed by Ms. Stella Cuenco, principal chemist, who has over 30 years of experience, the software products and services group is managed by Mr. Scott Denzer, who has over 40 years of experience, and the overall operations are directed by Mr. Michael Takaki, president.

The validation group is divided into chemists by discipline, organics (GC/MS, GC and HPLC) and inorganics (wet chemistry, IC, ICP, ICP/MS). All chemists report to senior group leads. A separate group performs data package log-in to the LDC tracking system. Another group performs the EDD population and verification. Judy Ecklund leads this group and has over 13 years of experience in EDD population, preparation, and uploading to various databases.

The majority of the data validation staff at LDC have been employed for over 10 years with some senior staff over 20 years as noted in the attached resumes. This level of stability and experience will ensure project stability and consistency.

In addressing LDC's financial status, LDC has an excellent Dun & Bradstreet report and has been profitable for the past 15 years. LDC has grown at approximately 10% in each of the past 5 years and continues to be a leader in our environmental sector of the data quality business. References are available from our vendors and clients to confirm our business success. Our annual revenue of approximately \$4,000,000 per year in data validation work makes LDC one of the largest independent data validation firms in the nation.

LDC will commit the resources and materials to successfully complete this project with the required time period and with a high level of quality.



Project Team Summary

LDC personnel have hands-on experience in the areas of data validation, laboratory QA/QC, CLP SOWs, and environmental laboratory analyses. As documented in the resumes of our staff, the project team has significant experience with USACE and DoD protocols, current technology, SW-846, and all methods stated in the SOW.

LDC is presenting the following staff to perform key roles for this contract. The key staff of the project team and their experience are as follows:

- **Stella Cuenco, Principal Chemist/Operations Manager**
Project Role: Principal Chemist/Program Manager
Data Validation Experience: 26 years
Overall Laboratory and Data Validation Experience: 32 years
B.S. Chemistry, University of the Philippines, 1991

Ms. Cuenco has over 32 years of environmental laboratory and data validation experience under DoD and EPA guidelines. Her experience includes performance of data validation in gas chromatography/mass spectrometry for volatile and semivolatile organics and extensive Navy and EPA data review and data verification for all organic and inorganic analyses. Her laboratory experience includes hands-on CLP and SW-846 GC/MS methods.

- **Pei Geng, Senior Chemist/Project Manager**
Project Role: Senior Organic Data Validator/Project Manager
Data Validation Experience: 25 years
Overall Laboratory and Data Validation Experience: 32 years
M.S. Chemistry, Sam Houston University, 1989

Ms. Geng will perform the role of day to day Project Manager for this project. She will monitor schedules, compliance of validation to the Required Guidelines, perform routine surveillance activities such as generation of non-conformance reports, validator training and QA reports to management.

Ms. Geng will perform the role of organic data validator for this project. She will perform data validation for GC/MS and gas chromatography analyses and serve as a peer reviewer in the initial validation review process.

Ms. Geng has over 31 years of environmental laboratory and data validation experience. Her experience includes performance of data validation in the gas chromatography area for volatile and semivolatile organics and extensive DoD data review and data verification for all organic analyses. Her laboratory experience includes hands-on CLP and SW-846 GC/MS methods.

- **Michael Giangjordano, Chemist/Project Manager**
Project Role: Project Management Assistance
Data Validation Experience: 8 years
Overall Laboratory and Data Validation Experience: 22 years
B.S. Kinesiology, pending, San Diego State University, San Diego, CA



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Mr. Giangiordano has 8 years of experience at LDC and specializes in supporting the company's custom software products. Mr. Giangiordano has a thorough knowledge and understanding of the company's branded software and has led numerous workshops and training sessions for clients ranging from laboratory personnel to consulting firms to USACE. He has extensive experience in electronic data deliverables and electronic data deliverable review and provides database support and management solutions for clients using LDC's custom environmental database management system (EDMSi).

Mr. Giangiordano has 14 years of environmental laboratory. His experience includes Project Manager at EnviroMatrix Analytical, Inc., an accredited full service environmental analytical chemistry facility, Mr. Giangiordano oversaw projects that provided analytical services and support to clients ranging from environmental consulting firms to marine biology firms, in addition to waste and wastewater treatment and disposal firms and municipalities. Mr. Giangiordano was also the Supervisor of the WET Chemistry and Microbiology Departments at EnviroMatrix Analytical, Inc. where he was responsible for all department functions which included overseeing daily operations, training staff, final reporting of analytical data, compliance with method requirements, as well as introducing and developing new methods for additional accreditation.

An Le, Inorganic Chemist

Project Role: Inorganic Data Validator

Data Validation Experience: 5 years

Overall Laboratory and Data Validation Experience: 23 years

B.S. Biological Science, 2000, University of California, Irvine

Ms. Le has over 23 years combined environmental laboratory and data validation experience. Her experience includes performance of data validation using USEPA National Functional Guidelines, client Quality Assurance Program documents, and the Department of Defense QSM depending on the project requirements for the clients.

Ms. Le was a Wet Chemistry Analyst at TestAmerica Laboratories, Ms. Le performed analysis of an extensive list of wet chemistry analyses. Ms. Le also performed volatile organic compounds analysis according and was also responsible for training new analyst employees and performing second level review of data.

Judy Ecklund, EDD Specialist

Project Role: Electronic Data Entry (EDD)

EDD Experience: 14 years

Ms. Ecklund specializes in Electronic Data Deliverables and is familiar with a variety of deliverable formats, including but not limited to NEDD, EQUIS, and SEDD. Ms. Ecklund is also an expert in submitting data to NIRIS the Navy database.

Ms. Ecklund has over 31 years combined environmental laboratory and validation related experience. Her experience includes working with electronic data deliverables (EDDs) as well as performing database uploads.

- **Tony Rommelfanger, Data Control Manager**
Project Role: Data Custodian



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Mr. Rommelfanger will perform the role of data custodian for this project. He will perform the log-in of all data packages into the LDC tracking system. This system will generate spreadsheets for identifying all samples, their collection date, analysis performed, matrix, and report due date. Upon the completion of each delivery order, he will archive and catalog all reports and data in a secured storage area.

Mr. Rommelfanger has over 31 years of experience in laboratory and data management experience. He has experience in organizing, logging in, and tracking data packages for technical staff.



Resumes of Key Staff

- Stella Cuenco, Senior Chemist
- Pei Geng, Senior Chemist
- Michael Giangjordano, Chemist
- An Le, Inorganic Chemist



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RESUME STELLA S. CUENCO

EDUCATION

B.S. Chemistry, 1991
University of the Philippines (UP)

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.
Senior Chemist
1996 to present

Ceimic Corporation
GC/MS Chemist
1996

Analytical Technologies, Inc.
GC/MS VOA Group Leader
1992 to 1996

Analytical Technologies, Inc.
GC/MS Chemist
1991 to 1992

Natural Products Research, UP
Research Assistant
1990 to 1991

REPRESENTATIVE EXPERIENCE

Ms. Cuenco has over 32 years combined environmental laboratory and data validation experience. Her experience includes performance of data validation in the GC and GC/MS areas for major Federal projects. She has performed large validation projects under Boeing, Navy Southwest, Northwest and Pacific Division, EPA Region IX ESAT, USACE and AFCEE/AFCEC programs. Her laboratory experience includes hands-on CLP and EPA analysis of GC and GC/MS volatile organic compounds.

Specifically, Ms. Cuenco has over 26 years organic data validation experience using USEPA (including Region III) functional guidelines and other applicable documents.

- As senior chemist with LDC, Ms. Cuenco specializes in the data validation and contract compliance screening of gas chromatography-mass spectrometry analyses as well as gas chromatography analyses. She has a thorough knowledge and understanding of gas chromatography and gas chromatography-mass spectrometry (GCMS) and high resolution GCMS methods referenced in EPA CLP, SW-846, EPA 500, 600 and 1600 series documents. She has performed large data validation under Boeing, Navy Southwest and Pacific Divisions and EPA Region IX ESAT, USACE and AFCEE/AFCEC projects.



Ms. Cuenco has over 6 years experience in an environmental laboratory performing the analysis of organic parameters.

- As GC/MS chemist at Ceimic Corporation, a full service environmental analytical chemistry facility, Ms. Cuenco performed GC and GC/MS volatile analyses. She was responsible for the final reporting of analytical data for this section.
- As GC/MS VOA Group Leader at Analytical Technologies Inc., a full service environmental analytical chemistry facility, Ms. Cuenco was responsible for all GC/MS functions which included overseeing daily operations, training staff, final reporting of analytical data, and compliance with method requirements.
- As research assistant at Natural Products Research, UP, Ms. Cuenco researched chemical literature for plants with known medicinal properties as well as performed microbiological and pharmacological tests on plant extracts.



RESUME
PEI GENG

EDUCATION

M.S. Organic Chemistry, 1989
Sam Houston State University

B.S. Environmental Chemistry, 1983
Nankai University

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.
Senior Chemist
1997 to present

Ceimic Corporation
GC/MS and GC Chemist
1996 to 1997

PACE Analytical Service Inc.
GC/MS and GC Chemist
1990 to 1996

REPRESENTATIVE EXPERIENCE

Ms. Geng has over 32 years combined environmental laboratory and data validation experience. Her experience includes performance of data validation in the GC and GC/MS areas for major Federal projects. She has performed large validation projects under Boeing, Navy Southwest, Northwest and Pacific Division, EPA Region IX ESAT, USACE and AFCEE/AFCEC programs. Her laboratory experience includes hands-on CLP and EPA analysis of GC and GC/MS volatile organic compounds.

Specifically, Ms. Geng has over 25 years organic data validation experience using USEPA CLP (including Region III) functional guidelines and other applicable documents.

- As chemist with LDC, Ms. Geng specializes in the data validation and contract compliance screening of gas chromatography-mass spectrometry analyses as well as gas chromatography analyses. She has a thorough knowledge and understanding of gas chromatography and gas chromatography-mass spectrometry (GCMS) and high resolution GCMS methods referenced in EPA CLP, SW-846, EPA 500, 600 and 1600 series documents. She has performed large data validation under Boeing, Navy Southwest and Pacific Divisions and EPA Region IX ESAT, USACE and AFCEE/AFCEC projects.



Ms. Geng has over 7 years of experience in an environmental laboratory performing the analysis of organic parameters.

- As both a GC and GC/MS chemist at Ceimic Corporation, a full service environmental analytical chemistry facility, Ms. Geng performed GC and GC/MS volatile and semivolatile analyses.
- As both a GC and GC/MS chemist at PACE Analytical Service Inc., a full service environmental analytical chemistry facility, Ms. Geng performed GC and GC/MS volatile and semivolatile analyses as well as overseeing the final reporting of analytical data, and compliance with method requirements.



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RESUME MICHAEL D. GIANGIORDANO

EDUCATION

B.S. Kinesiology, pending
San Diego State University, San Diego, CA

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.
Sr. Environmental Informatics & Software Support Specialist
2016 to present

EnviroMatrix Analytical, Inc.
Project Manager
2005-2015

Laboratory Supervisor
2003 to 2015

Laboratory Technician
2001 to 2003

REPRESENTATIVE EXPERIENCE

Mr. Giangiordano has over 22 years combined environmental laboratory and data management experience and possesses certifications as a Project Management Professional (PMP) and Scrum Master as well as a Laboratory Analyst. Mr. Giangiordano came to Laboratory Data Consultants, Inc. with over 14 years of hands-on environmental laboratory experience at an accredited full service environmental analytical chemistry facility and now specializes in supporting the company's custom software products.

- As Senior Environmental Informatics & Software Support Specialist with LDC, Mr. Giangiordano has a thorough knowledge and understanding of the company's branded software and has led numerous workshops and training sessions for clients ranging from laboratory personnel to consulting firms to USACE. Mr. Giangiordano specializes in tending to client software and electronic data deliverable needs and provides technical support throughout the life of LDC's various custom software products. He has extensive experience in electronic data deliverables and electronic data deliverable review and provides database support and management solutions for clients using LDC's custom environmental database management system (EDMSi).
- As a Project Manager at EnviroMatrix Analytical, Inc., an accredited full service environmental analytical chemistry facility, Mr. Giangiordano oversaw projects that provided analytical services and support to clients ranging from environmental consulting firms to marine biology firms, in addition to waste and wastewater treatment and disposal firms and municipalities. During this time, Mr. Giangiordano also served as liaison to US military in designing a wastewater compliance infrastructure that decreased analytical reporting limits and increased equipment capabilities



- As Supervisor of the WET Chemistry and Microbiology Departments at EnviroMatrix Analytical, Inc., Mr. Giangiordano was responsible for all department functions which included overseeing daily operations, training staff, final reporting of analytical data, compliance with method requirements, as well as introducing and developing new methods for additional accreditation.
- As an analytical chemist and microbiologist, Mr. Giangiordano performed the analysis of inorganic constituents and bacteriological contamination in drinking water, wastewater, soil, tissue, and sediment and was responsible for the final reporting of analytical data for these sections.



RESUME
AN LE

EDUCATION

B.S. Biological Science, 2000
University of California, Irvine

PROFESSIONAL HISTORY

Laboratory Data Consultants, Inc.
Senior Chemist
Feb 2017 to present

TestAmerica Analytical Inc., Irvine, CA
GCMS Analyst
2007 to 2017

EMSL Analytical Inc.
Industrial Hygiene Analyst
2006 to 2007

TestAmerica Analytical Inc., Irvine, CA
Wet Chemistry Analyst
2000 to 2006

REPRESENTATIVE EXPERIENCE

Ms. Le has 6 years of data validation experience.

- As a chemist at LDC, Ms. Le has performed data validation using USEPA National Functional Guidelines, client Quality Assurance Program documents, and the Department of Defense QSM depending on the project requirements for the clients.

Ms. Le has over 17 years of experience working in the lab and performing secondary data review in environmental testing field.

- As a Wet Chemistry Analyst at TestAmerica Laboratories, Ms. Le performed an extensive list of wet chemistry analyses including but not limited to Total Organic Carbon, pH, Conductivity, Biological Oxygen Demand, Total Dissolved Solids, Total Suspend Solids, Alkalinity, and Carbon Dioxide. Ms. Le has also performed Ion Chromatography analysis for Nitrite, Nitrate, Phosphate, Perchlorate, Chromium VI, and used the Spectrophotometer to analyze for Sulfide, Phenol, Chromium VI, Chemical Oxygen Demand (COD), Sulfactants (MBAS), Phosphorous, and Cyanide. As a Gas Chromatography Mass Spectrometry (GCMS) analyst, Ms. Le performed volatile organic compounds analysis according to methods 8260, 5030, 5035, and 624. Ms. Le was also responsible for training new analyst employees and performing second level review of data.
- At EMSL Analytical Inc., Ms. Le performed sample extraction and analysis of samples for metals using inductively coupled plasma (ICP) and flame atomic absorption (GFAA).



Relevant Project Experience

LDC has performed data validation and Quality Assurance services for contaminated sites overseen by AFCEE/AFCEC, Navy Southwest Division, DoE, DoD, EPA Superfund projects overseen by EPA Regions II, III, IV, IX, X, Brown Fields Cleanup for NY Sites, USACE projects reviewed by the Alaska, Baltimore, Louisville, Albuquerque, Seattle, Philadelphia, and Sacramento Districts, and Navy projects reviewed by NFESC.

LDC is the software developer and expert in the use of the Automated Data Review (ADR) software. LDC has been using the ADR.NET version and has the current Version in full implementation. LDC has performed over 1000 ADR projects in the past 10 years' worth over \$2,000,000 in revenue. ADR clients include, but are not limited to: Tetra Tech EC, Sealaska, AMEC, EPA, California DTSC, MWH, Trevet, Brown & Caldwell, AECOM, Shaw, ITSI, CDM, Weston Solutions and the San Gabriel Watermaster.

LDC has validated over 1,000,000 samples for analyses such as volatile organics (CLP, EPA Method 8240/8260), semivolatile organics (CLP, EPA Method 8270), organochlorine pesticides/PCBs (CLP, EPA Method 8081/8082), chlorinated herbicides (EPA Method 8151), purgeable halocarbons and aromatics (EPA Method 8021), trace metals (CLP, EPA Method 6010/6020/7000), PAHs by EPA 8310 and 8270, TOC analyses, hexavalent chromium, total petroleum hydrocarbons (EPA Method 8015/CDOHS LUFT), radiochemical constituents including gross alpha/beta, alpha spec, gamma spec, tritium, and uranium, and general minerals.

LDC has met their contractual turnaround time and quality requirements on over 99% of the projects completed.



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Project References/Experience

Name and Address, Contact Person, Telephone	Work Description and Location	Requested Deliverables	Number of samples/ Matrix	Value (\$)	Start/Stop
SESI Consulting Engineers 12A Maple Avenue Pine Brook, NJ 07058 ATTN: Mr. Steven Gustems Office: 862-702-5728 Mobile: 973-518-8547 Email: ssg@sesi.org	Huguenot Street Development, 33 Centre Avenue, New Rochelle, NY NYSDEC sites LDC performed Category B equivalent data validation Analyses included: VOC, SVOC, Pesticide, PCBs, PFAs, Metals, Wet Chemistry	Category B data validation, EDD Population, and NYSDEC DUSR reports	>1,000 Soil, Water, and Air	\$38872.24	12/2019-present
AECOM 1001 Bishop Street Suite 1600 Honolulu, HI 96813 ATTN: Ms. Alethea Ramos Office: 1-808-529-7283 Mobile: 1-808-389-5383 Email: alethea.ramos@aecom.com	Red Hill Bulk Storage Facility, CTO 18F0126 Data validation per Stage 2B and Stage 4 guidelines for volatile organic, semivolatile organic, pesticides/PCBs, herbicides, phenols, phosphorus pesticides, dioxin, trace metal, and wet chemistry analyses in soil, water, and tissue matrices. (Navy CLEAN IV, Honolulu, HI)	Stage 2B and 4 data validation reports, EDD, and DQAR reports	>2,000 samples Soil and Water	\$72,283.89	9/2018-present
EA Engineering 225 Schilling Circle Hunt Valley, MD 21031 ATTN: Ms. Tara Office: 410-584-7000 ext. 5172 Direct Dial: 410-329-5172 Email: Lamondtlamond@eaest.com	6332103 Off-Base Drinking Water Site Inspection, USACE Omaha PFAS Mitigation Various AFBs Data validation per Stage 2B and Stage 4 guidelines for PFAs analyses in soil and water, and tissue matrices.	Stage 2B and 4 data validation reports and EDD	>500 samples Soil and Water	\$10,787.60	4/2020-present



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Name and Address, Contact Person, Telephone	Work Description and Location	Requested Deliverables	Number of samples/ Matrix	Value (\$)	Start/Stop
EA Engineering 225 Schilling Circle Hunt Valley, MD 21031 Project Manager ATTN: Ms. Brenda 615 Piikoi Street, Honolulu, HI 96814 Office: (808) 589-1455, x102 Fax: (808) 589-1575 Mobile: (808) 256-8268 E-mail: bnuding@eaest.com Nudingbnuding@eaest.com	Fairchild AFB LDC performed Stage2B and 4 data validation for PFAs and Wet Chemistry analyses and EDD population.	Stage 2B and 4 data validation reports. Work conducted under Working Copy Quality Assurance Project Plan for Environmental Remediation Services FAFB and PFAS Fairchild Air Force Base, Spokane County, Washington (July 2019) and the USEPA Data Review and Validation Guidelines for Perfluoroalkyl Substances (PFAS) Analyzed Using EPA Method 537 (November 2018).	>400 Water	\$6,727	08/2019-present
Cape Inc. 500 Pinnacle Court, Suite 100 Atlanta, GA 30071 ATTN: Mr. Wayne Vermeychuk wvermeychuk@cape-inc.com Office: 727.940.4713 Mobile: 678.492.9384	Mather AFB LDC performed Level II and IV data validation for a full suite of analyses including GCMS, GC, Metals, and Wet Chemistry analyses and ERPIMS EDD Upload.	Level II and IV data validation reports. Work conducted under Draft Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) for Environmental Services for Western Region Base Realignment and Closure (BRAC) Bases, Mather Air Force Base (AFB), California (February 2017), the DoD QSM 5.2 (2018), and a modified outline of the USEPA NFG.	>1700 Water and Air	\$55,142	02/2017-present



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Name and Address, Contact Person, Telephone	Work Description and Location	Requested Deliverables	Number of samples/ Matrix	Value (\$)	Start/Stop
Ayuda Companies 410 Acoma Street Denver, CO 80204 ATTN: Susan Royse Office: 303.999.2146 Fax: 303.999.2099 sroyse@ayudacompanies.com	Various Omaha AFB Sites LDC performed Level III and IV data validation for a PFAs analyses and ADR and SEDD population, and ERPIMS EDD Upload.	Level III and IV data validation reports. Work conducted under Addendum 3 to the Final Uniform Federal Policy – Quality Assurance Project Plan for Site Inspection of Aqueous Film-Forming Foam Areas, United State Air Force Academy (July 2018), the DoD QSM) 5.1 (2017), and the DoD General Validation Guidelines (February 2018).	>360 Water and Soil	\$8434	02/2017-present
Washington State Department of Transportation Environmental Services Office P.O. Box 47332 Olympia, WA 98504 ATTN: Mr. Brad Archbold ArchboB@wsdot.wa.gov 360-570-6636	WSDOT NPDES Stormwater Monitoring LDC performed Stage2A, 2B and 4 data validation for a full suite of analyses including GCMS, GC, Metals, and Wet Chemistry analyses.	Stage 2A, 2B, and 4 data validation reports. Work conducted under Washington State Department of Transportation Stormwater Monitoring	>3,800 Soil and Water	\$48,332	04/2013-07/2016
Leighton Consulting, Inc. 17781 Cowan Irvine, CA 92614 ATTN: Mr. Mark Withrow mwithrow@leightongroup.com cell: 949-394-2194 office: 949-681-4211	San Onofre Nuclear Generating Station (SONGS) Mesa Facility LDC performed EPA Level III and IV equivalent data validation for a full suite of analyses. Analyses included GCMS, GC, Metals, and Wet Chemistry analyses.	EPA Level III and IV data validation reports. Work conducted under USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG).	>3,600 Soil, Water, and Air	\$149,714	09/2015-present
Leighton Consulting, Inc. 17781 Cowan Irvine, CA 92614 ATTN: Ms. Julie Harriman jharriman@leightongroup.com Direct : (949) 681-4264 Cell: (949) 572-8129	Aliso Canyon LDC performed EPA Level II equivalent data validation. Analyses included VOA, SVOA, Total Hydrocarbons, Isopropyl Alcohol, Total Dust, and Sulfur Compounds.	EPA Level II data validation reports and PARCC summary report. Work conducted under USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG).	>1,200 Air, Wipe, and Disk	\$15,749	07/2016-08/2016



LABORATORY DATA CONSULTANTS, INC.

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Name and Address, Contact Person, Telephone	Work Description and Location	Requested Deliverables	Number of samples/ Matrix	Value (\$)	Start/Stop
Tetra Tech, EM Inc. 1999 Harrison Street, Suite 500 Oakland, CA 94612 ATTN: Ms. Sara Woolley Sara.Woolley@tetrattech.com Direct: 510.302.6311 Main: 510.302.6300	Subcontract 161408 For Various project sites including: EAGLE NEST INVESTIGATION FORT IRWIN GOLD BEACH MILL HPNS MARE ISLAND MOTCO LITIGATION NAF EL CENTRO NWS CONCORD LDC performed Cursory and Full data validation for a full suite of analyses using specified EPA Guidelines, DoD QSM Version 4.2, and Tetra Tech EMI, Inc. validation documents.	TTEMI Format data validation reports and EDD using Tetra Tech's validate program.	>3000 Soil and Water	\$39,785	10/2011 – 10/2013
GEI Consultants, Inc. 455 Winding Brook Drive Glastonbury, CT 06033 (860) 368-5342 direct (860) 368-5300 main Jaimie Wargo JWargo@geiconsultants.com	Various NYSDEC sites LDC performed Category B equivalent data validation Analyses included: VOC, SVOC, Pesticide, PCB, Herbicide, Steroids, Metals, Wet Chemistry	Category B data validation and NYSDEC DUSR reports	>1,700 Soil and Water	\$72,000	2010-present
TetraTech EC 17885 Von Karman Ave, Suite 500 Irvine, CA 92614 Attn: Lisa Bienkowski (949) 809-5028 Lisa.Bienkowski@tetrattech.com	Tetra Tech Hunter's Point CA LDC performed EPA Level III and IV equivalent data validation for a full suite of analyses on more than 50,000 soil and water samples. Analyses included tritium, isotopic thorium, uranium and plutonium, and gross alpha/beta. Expedited turnaround times were included (5 day TAT)	EPA Level III and IV data validation reports. Work conducted under US Navy RAC program, Southwest Div.	>50,000 Soil and Water	\$645,733	02/2001-present
AECOM (Earth Tech) 700 Bishop Street Honolulu, HI 96813 Contact: Scott Lewis (808) 523-8874 Scott.Lewis@aecom.com	Data validation per EPA level "3/C" and "4/D" guidelines for volatile organic, semivolatile organic, pesticides/PCBs, herbicides, phenols, phosphorus pesticides, dioxin, radiochemical, and trace metal analyses in soil, water, and tissue matrices. (Navy PACDIV CLEAN, Honolulu, HI)	LDC worksheets and validation reports	>10,000 samples Water/Soil/Air	\$750,000	4/98-present



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Name and Address, Contact Person, Telephone	Work Description and Location	Requested Deliverables	Number of samples/ Matrix	Value (\$)	Start/Stop
CBI (formerly Shaw E&I) 3347 Michelson Drive, Ste 200 Irvine, CA 92612 Contact: Mr. Dwayne Ishida Phone: (949) 660-7561 Dwayne.Ishida@CBIFederalService.com	Data validation per EPA level "3" and "4" and AFCEE/AFCEC guidelines for volatile organic, semivolatile organic, pesticides/PCBs, herbicides, phenols, phosphorus pesticides, dioxin, radiochemical, and trace metal analyses in soil, water, and tissue matrices. (Navy Southwest Division RAC, San Diego, CA and various AFCEE/AFCEC projects)	LDC worksheets and validation reports	>5000 samples Water/Soil/Air	\$350,000	6/06-present
Santa Clara Pueblo Office of Environmental Affairs 578 Kee Street Española, New Mexico, 87532 Ms. Ernestine Naranjo 505-692-6270 phone 505-747-2728 fax enaranjo@santaclarapueblo.org	Data validation per EPA level "III" SCP-OEA-DEPO, Data Validation using ADR For full suite of Organic, Inorganic, and Radiochemical analyses. Radiochemical analyses including Gross alpha & beta, Gamma Spectroscopy, Iodine, Radium-226/228, Strontium-90, Isotopic Pu, Th, and U, Tritium, and Americium by various EPA and GA methods.	Level III validation using ADR	>2000 Soil, Water, and Air	\$78621	12/2015 - present
Anchor Environmental, LLC 720 Olive Way, Suite 1900 Seattle, WA 98101 Ms. Joy Dunay 206.287.9130, jdunay@anchorage.com	Data validation per Level "C" Newtown Creek Phase 2: Third Party Data Validation of laboratory results, EDD population, and Data Quality Assessment Reports (DQAR) for various methods Subcontractor	LDC worksheets and validation reports	>63,000 Soil and Water	\$743,793.88	6/14-1/16
P.W.Grosser Consulting 630 Johnson Ave, Suite 7 Bohemia, NY 11716 Attn: Mr. Derek Ersbak w. 631.589.6353 f. 631.589.8705 dereke@pwgrosser.com	Former Arkansas Chemical Co.Site and Former Ronkonkoma Wallpaper Site 203 Jay St. LDC performed Category B equivalent data validation Analyses included: VOC, SVOC, Pesticide, PCB, Metals, Wet Chemistry	Category B data validation and NYSDEC DUSR reports	>200 Soil and Water	\$3,024.00	11/2014-present
Amec Foster Wheeler Environment and Infrastructure, Inc. 9210 Sky Park Court, Suite 200 San Diego, CA 92123 Attn: Mr. Rolf Schottle rolf.schottle@amecfw.com Tel +1 (858) 300 4300, Fax +1 (858) 300 4301, Direct +1 (858) 300 4323	Regional Harbor Monitoring Program (RHMP), San Diego, California Third party validation of LDC performed EPA Level III and IV equivalent data validation for a full suite of analyses.	LDC worksheets and validation reports	>200 Water	\$9,011.40	3/15-6/16

Note: All above projects were 100% self-performed by LDC



Andrew Lockwood, PG, LEP •

SR. VICE PRESIDENT

PROFESSIONAL EXPERIENCE

PWGC: 16 years

PRIOR: 17 years

AREAS OF EXPERTISE

Phase I and Phase II Environmental Site Assessments
PFAS and other emerging contaminants
Petroleum Spill site investigation/remediation
CERCLA sites
NYSDEC Brownfield Cleanup Program/Environmental Restoration Program
Environmental/Regulatory Compliance (Investigation/Remediation Mgmt)
Radiological Characterization & Remediation
Chemical, Radiological/Mixed Waste Management & Disposal
Groundwater Treatment System (Planning, Design, O&M)
Client Representation & Regulatory Liaison
Environmental Program Mgmt (Planning, Monitoring, Safety)

EDUCATION & TRAINING/CERTIFICATION

BA Geology, SUNY Potsdam, NY
Licensed Professional Geologist - NYS
Licensed Environmental Professional (LEP), State of Connecticut
“D&D of Research Reactors & Other Small Nuclear Facilities” Certificate (Argonne Nat’l Laboratory, 11/2001)
DOE Radiological Worker I & III
OSHA Health & Safety 40-hr, Supervision 8-hr
30-hr OSHA Construction Safety Training, 2009
Advanced Radioactive Material Shipper Certification Training, 2004
Advanced Hazardous Waste Shipper Certification Training, 2004
ISOCs Measurements Using the Inspector, Canberra Industries, Inc, 1999
Groundwater Pollution & Hydrogeology, Princeton University, 1990
Project Leadership Course, PCI Global Inc., 2001



PROFILE

Mr. Lockwood specializes in planning and managing CERCLA/NYSDEC remedial investigations/Feasibility Studies, Phase I and Phase II ESAs, Brownfields Cleanup Program (BCP) projects, and nuclear facility decontamination & decommissioning (D&D). He has worked at numerous DOE and DOD facilities in more than a dozen states across the country managing remedial investigation/feasibility study projects involving the generation of radiological, hazardous and mixed waste. They include multi-year projects that involved complex investigations, remediation and waste management issues. Mr. Lockwood manages PWGC's environmental group, overseeing a staff of more than 15 professionals.

Mr. Lockwood has over 30 years of experience managing environmental investigation and remediation projects including CERCLA RI/FS sites, NYSDEC BCP sites, NYCDEP “E” sites, Municipal Landfill permitting and closure, and environmental investigations for real estate transactions. Mr. Lockwood's clients range from large governmental agencies to small real estate developers. He has performed work across the eastern United States under numerous federal, state, and local regulatory agencies.

NOTABLE PROJECTS

Suffolk County Fire Training Facility - Yaphank, NY—RI/FS

Mr. Lockwood manages the ongoing RI/FS for the Suffolk County fire training facility in Yaphank, NY. The 28-acre site is in the NYSDEC's inactive hazardous waste site program. The site was listed as a NYS Class 2 Inactive Hazardous Waste Disposal Site in August 2017. The primary contaminants of concern are in a class of chemicals referred to as per and poly fluoroalkyl substances (PFAS). The specific PFAS of interest are primarily perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). The presence of these compounds is the result of the use of the Aqueous Film Forming Foam (AFFF) at the site. Mr. Lockwood

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P.W. GROSSER CONSULTING ENGINEER & HYDROGEOLOGIST, P.C.

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was responsible for the preparation of the Citizens Participation Plan, Records Search Report, RI Work Plan, Quality Assurance Project Plan and Health and Safety Plan. The RI field work included delineation of PFAS in soil on-site and in groundwater both on and off site. In addition, site specific protection of groundwater soil cleanup objectives were calculated (no soil cleanup standards are available in NYS). PWGC is currently preparing a feasibility study with alternatives to address both soil and groundwater contamination at the site.

Wertheim National Wildlife Refuge - Shirley, NY—POET System Design and O&M

Three Point of Entry Treatment (POET) Systems were designed and installed at the refuge, one in a maintenance garage and two in residential buildings located within the refuge. The POET Systems were designed to remove per and poly fluoroalkyl substances (PFAS) that were detected in the groundwater supply wells servicing the three structures. Mr. Lockwood was responsible for the preparation of an Engineering Report and Operations and Maintenance Manuals for the systems. PWGC oversaw the installation and start up testing of the systems and is performing the scheduled system sampling to ensure that the systems are functioning as designed.

Carmans River - Shirley, NY—Surface Water and Biota Monitoring

Mr. Lockwood managed the investigation of per and poly fluoroalkyl substances (PFAS) in surface water and biota within the Carmans River and other water bodies within Suffolk County. Mr. Lockwood prepared a Biota Monitoring Work Plan/QAPP that included the collection of surface water and biota samples (eels, blue crabs, white perch, and clams) for PFAS analysis. He prepared a Biota Monitoring Report detailing the results of the investigation.

Gabreski Airport – Westhampton Beach, NY

Mr. Lockwood managed a field investigation to investigate the presence of per and poly fluoroalkyl substances (PFAS) in groundwater discovered during routine O&M monitoring of a NYSDEC BCP site. Vertical profile wells were installed upgradient and downgradient of the site. The Investigation is ongoing.

Brookhaven National Laboratory - Upton, NY

Mr. Lockwood served over 10 years as Project Manager on various CERCLA projects for BNL Environmental Restoration Division (ERD). He has managed diverse projects for BNL's Groundwater, Surface, and Reactor Groups. On his most recent projects for the Reactor Group, Mr. Lockwood provided project management services on four remediation projects over a 3-year period with budgets totaling more than 15 million dollars. In addition, he has prepared or assisted in the preparation of site-specific project documents such as work plans, sampling and analysis plans, quality assurance project plans, health and safety plans, records of decision (ROD), completion reports, final status surveys, remedial investigations (RI) and feasibility studies (FS). He has prepared contract documents, including request for proposals (RFP's), scopes of work (SOWs), and contract specifications for both large- and small-scale procurements and has acted as the technical representative on multiple contracts, ensuring the contract scope is being completed.

Mr. Lockwood combines his technical background with his in-depth knowledge of BNL's protocols and procedures to prepare schedules and cost estimates for baseline and fiscal year budgeting and tracking, provide short-term assistance to help BNL complete Baseline Change Proposals, and long-term assistance to manage remedial projects.

Project Manager- Fan Houses and Stack Silencer D&D, Underground Utilities Removal, Perimeter Area Soil Remediation Projects – Mr. Lockwood managed multiple remediation projects at BNL between 2008 and 2011. Project involved overseeing demolition of radiologically contaminated above ground and below ground structures, preparation of project documents including Remedial Action Work Plans, Sampling and Analysis Plans, and Completion Reports. The projects involved the disposition of complex waste streams. He was the primary interface with regulatory agencies and DOE. Mr. Lockwood was responsible for completing the projects on schedule and within the allocated budget. All projects were successfully completed.

Project Manager- Building 650 Demolition – Mr. Lockwood managed multiple remediation projects at BNL between 2008 and 2011. Project involved overseeing demolition of radiologically contaminated above ground and below ground structures, preparation of project documents including Remedial Action Work Plans, Sampling and Analysis Plans, and Completion Reports. The projects involved the disposition of complex waste streams. He was the primary interface with regulatory agencies and DOE. Mr. Lockwood was responsible for completing the projects on schedule and within the allocated budget. All projects were successfully completed.

Project Manager- Fan Houses and Stack Silencer D&D, Underground Utilities Removal, Perimeter Area Soil Remediation Projects – Mr. Lockwood managed multiple remediation projects at BNL between 2008 and 2011. Project involved overseeing demolition of radiologically contaminated above ground and below ground structures, preparation of project documents including Remedial Action Work Plans, Sampling and Analysis Plans, and Completion Reports. The projects involved the disposition of complex waste streams. He was the primary interface with regulatory agencies and DOE. Mr. Lockwood was responsible for completing the projects on schedule and within the allocated budget. All projects were successfully completed.

Project Manager - Chemical Holes Remediation Project - Mr. Lockwood was involved with the Chemical Holes project since 1995. He served as the project Field Engineer performing and/or overseeing the characterization of the site including soil and groundwater sampling as well as geophysical surveys using EM-51, EM-61, Rapid Geophysical Surveyor (RGS) and multiple GPR surveys to locate the 55 individual waste pits. Pilot Testing for selected remedies was conducted and included in-situ vitrification, excavation, and containment using cement/polymer injection. He participated in the selected remedy, large-scale excavation and disposal, overseeing excavations of the waste pits at the site. He served as the Project Manager for the post-excavation characterization and disposal, wastes generated included mixed, waste, cylinders, liquid mixed waste, and mixed waste soil (mercury). More than 15,000 yd³ of waste was successfully



transported for disposal and the site released with no radiological controls, he was responsible for the characterization, management, treatment, transport, and disposal of complex waste streams.

Project Manager - Former Hazardous Waste Management Facility Project - Utilizing his knowledge of chemical and radiological characterization, CERCLA, and DOE procedures and protocols, Mr. Lockwood managed the characterization, and implementation, of a remedial design at a 12-acre site formerly used as the primary facility for the storage, treatment, and packaging of hazardous, radioactive, and mixed waste at BNL. His responsibilities included the development of project plans, project scope and detailed schedule, resource needs and budget estimates. The project involved the characterization of buildings with both hazardous and radiological contamination, their D&D and transport and disposal to permitted facilities. In addition, characterization of the 12-acre facility was performed which included soil, groundwater and sediment sampling, at NYS delineated wetland located within the facility, for chemical and radiological contamination. A remedial design was prepared which included the excavation of approximately 11,000 yd³ of radiologically contaminated soil and sediment and the restoration of the site. As project manager, Mr. Lockwood was responsible for the daily management of this project including preparation of contract specifications, procurement documents and budget forecasting and management. He was responsible for the preparation or approval of all project documents from characterization, contracting, through implementation of the remedial action. Mr. Lockwood coordinated the successful completion of the project tasks overseeing subcontractors and support from other BNL divisions.

Project Engineer OU III Strontium-90 Pilot Study Design – Mr. Lockwood prepared a Pre-Design Characterization Work Plan to support the preparation of a Pilot Study Design for the remediation of Strontium-90 (sr-90) contaminated groundwater at BNL. Groundwater south of the former Chemical/Animal Pits had been impacted with sr-90 at concentrations exceeding NYSDEC groundwater standards. The purpose of the investigation was to delineate the concentrations within and extent of the sr-90 plume. Mr. Lockwood implemented the plan prepared the Pre-Design Characterization Report, and participated in the successful completion of the Pilot Study, which led to the installation of a permanent remedy using resin vessels to remove sr-90 from the groundwater.

Special Projects Manager BNL Waste Management Facility - Mr. Lockwood provided technical services support to the BNL Environmental and Waste Management Services Division. His responsibilities included project planning and implementation of the characterization, packaging, and disposal unknown radioactive sources (including TRU Waste). Mr. Lockwood prepared technical work documents (TWDs) for the D&D of radiologically contaminated equipment including the Building 801 D-Tanks Pipe Removal project and the Building 865 Compactor Repair. He also prepared TWDs for the sampling of low level radioactive liquid wastes in the Bldg. 810/811 storage tanks. Mr. Lockwood prepared maintenance procedures for the facilities infrastructure. Mr. Lockwood prepared and implemented a TWD for the Central Steam Plant Outfall Soil Excavation, Transportation, and Disposal, including preparation of sampling plans, delineation of lead impacted soils, review of contractor deliverables and oversight of the excavation and performance of confirmatory sampling and reporting.

Field Engineer Brookhaven Linear Isotope Producer (BLIP) Investigation - The BLIP facility is used for the production of radio-isotopes used in the medical field. Targets are introduced into the beam line produced by a linear accelerator. The facility was constructed with an earthen beam stop. Mr. Lockwood participated in the preparation of a work plan to characterize the nature and extent of soil and groundwater contamination associated with the operation of the facility. Sodium-22 and tritium were identified as the primary contaminants of concern. The extent of the radiological contaminants was identified and a report detailing the results of the investigation prepared.

Field Engineer OU I Western South Boundary Groundwater Remediation System Design - Mr. Lockwood oversaw the implementation of the Characterization Work Plan installing temporary and permanent groundwater monitoring well points to delineate the extent of contamination within the Western South Boundary groundwater contamination plume at the BNL site. Mr. Lockwood oversaw the preparation of the Remedial Design Documents and construction of the groundwater treatment system identified in the design.

Field Engineer Magothy Characterization Project - Mr. Lockwood oversaw the implementation of the Characterization Work Plan installing temporary and permanent groundwater monitoring well points to delineate the extent of contamination within the Magothy aquifer beneath the BNL site.

Brownfield Cleanup (BCP)/Environmental Restoration Program (ERP)

Mr. Lockwood manages BCP and ERP projects for both private and municipal clients. He prepares applications, technical documents, and interfaces with NYSDEC project managers to ensure project schedule and scope meet NYSDEC's requirements for approval of incentives/reimbursements. These sites require preparation of BCP and ERP applications, technical work plans, RI reports, human health and ecological assessments, remedial alternatives reports (FS), citizens participation plans, public meetings and completion reports. Under contract with the Suffolk County department of Health Services (SCDHS) and the Department of Public Works (DPW), Mr. Lockwood assists the County in managing the technical aspects of County owned sites in the NYSDEC Brownfields Cleanup and Environmental Restoration Programs. These sites include former United State Air Force Disposal Sites and former industrial and gasoline service station sites which are currently vacant or unused because the redevelopment of the sites are hampered by historical site uses which have contaminated soil and groundwater.



Derek Ersbak, PG • VICE PRESIDENT

PROFESSIONAL EXPERIENCE

PWGC: 15 years

PRIOR: 4 years

AREAS OF EXPERTISE

Environmental Due Diligence
Petroleum Bulk Storage Regulations
ASTM Standards for Phase I and II Environmental Site Assessments
Preparation of Investigative and Remedial Plans and Reports
Preparation of Remedial Cost Estimates and Remedial Alternatives
Health & Safety Protocols
Air Monitoring Protocols
Environmental Compliance
Landfill Operations, Compliance, and Monitoring
State and Federal Remedial Programs (BCP, VCP, ERP, Hazardous Waste Sites, RCRA)
Wetland Delineation
Fish and Wildlife Resource Impact Assessments
PFAS and Other Emerging Contaminants
Client Representation & Regulatory Liaison



EDUCATION & TRAINING/CERTIFICATION

BS, Biology (Concentration: Ecological/Environmental Study), SUNY Binghamton, NY
Licensed New York State Professional Geologist
OSHA Supervisor 8-hr; HazWoper 40-hr; Construction Safety & Health 10-hr
Completed a course for Radon Measurement Operators
Introduction to Wetland Identification Course (Rutgers)
QN Fit Tested for Respirator Use
ASTM Training on Phase I and Phase II Environmental Site Assessments for Commercial Real Estate
Erosion and Sediment Control Training

PROFILE

Mr. Ersbak has extensive experience in environmental due diligence, state and federal remedial programs, and landfill operations. He coordinates field activities, subcontractors, and personnel to satisfy client and regulatory agency project objectives. Mr. Ersbak prepares work plans, field reports, laboratory analysis summaries, and provides recommendations to integrate his findings into client's environmental strategies and business goals.

NOTABLE PROJECTS

Garvies Point Waterfront Revitalization Project (GPWRP)

RXR-Glen-Isle Partners, LLC

The GPWRP is a \$1 billion, 56-acre mixed-use development on Glen Cove's waterfront. Representing one of the most significant site redevelopments on Long Island, the efforts at Garvies Point have been years in the making and has involved the remediation and repositioning of several parcels on and in proximity to the northern side of Glen Cove Creek. Most of the parcels required significant environmental assessment, remediation and regulatory reporting based on their past, heavy industrial uses; most notably the Li Tungsten Federal superfund site and the Captain Cove State superfund site.

The Garvies Point redevelopment is slated for the construction of 555 rental apartments, 555 for-sale condominiums, and approximately 75,000 square feet of retail and office space. In addition, 28 acres of the development will consist of waterfront esplanades and parks.

PWGC has played a lead role in assisting RXR with the environmental assessment, remediation and reporting of the assembly of parcels that make up the Garvies Point project. Mr. Ersbak has held an active role through various stages of the GPWRP since 2012. He now acts as the senior project manager overseeing numerous environmental consulting programs for this major waterfront redevelopment project in the City of Glen Cove.

Project Stages and Milestones

Investigation of Development Area – Mr. Ersbak implemented subsurface investigations designed to establish existing conditions throughout the project area. To accomplish this goal, Mr. Ersbak developed a workplan to address data gaps and establish existing conditions throughout the development area. This subsurface investigation included more than 200 soil and groundwater borings to fully characterize the site. Mr. Ersbak prepared and coordinated a full spectrum of environmental documents including health and safety plans, community air monitoring plans, radiological monitoring plan, MARSSIM survey

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P.W. GROSSER CONSULTING ENGINEER & HYDROGEOLOGIST, P.C.

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support, geotechnical support services, TOGS sampling and waste characterization and disposal oversight. With this information, Mr. Erbak worked closely with the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) evaluating site data and preparing and implementing a pre-development remediation plan that has been completed to the satisfaction of these agencies. As part of the evaluation, Mr. Erbak performed and coordinated Synthetic Precipitation Leachate (SP/LP) sampling and analysis. The results of this investigation and in conjunction with the NYSDEC and USEPA established site specific cleanup objectives protective of the public health and environment.

Remedial Program - The completion of the investigation lead to Amended Records of Decisions (ARODS) for both the Li Tungsten and Captain Cove sites, which established the remedial objectives for the sites. With this information, Mr. Erbak prepared pre-construction/closing remedial action workplans designed to remediate the site so they can be developed for their intended use. Once approved, Mr. Erbak managed the remedial program on both sites which included extensive excavation on multiple parcels while coordinating the appropriate monitoring, endpoint sampling and waste disposal aspects of the project following completion RXR received No Further Action notices from the agencies indicating remediation was complete.

Lead Environmental Monitor - Given our extensive knowledge, PWGC was retained as the environmental monitor for the construction portion of the project by RXR and the City of Glen Cove. As part of the role, Mr. Erbak has been tasked with finalizing multiple Site Management Plans (SMP) and the preparation of Excavation Work Plans (EWP) that describe specific procedures and protocols that are designed to implement the appropriate engineering/environmental controls needed for construction. Mr. Erbak continues to manage the monitoring activities and works with the NYSDEC and USEPA on a daily basis documenting that the appropriate plans are being followed, including the collection of confirmation samples, re-use samples, and overseeing the appropriate engineering control installation which includes a composite cap with multiple demarcation barriers and sub-slab depressurization systems (SSDS).

Brownfield Cleanup Program (BCP)/Environmental Restoration Program (ERP)

Bellport Gas Station Site - ERP- He performed a remedial investigation to determine the extent of contamination present. Developed several remedial alternatives and presented them to Suffolk County for preferred remedial selection. Assisted NYSDEC in the preparation of PRAP and ROD for the site. Developed Remedial Design Work Plan, Final Engineering Report, and Site Management Plan which resulted in issuance of Certificate of Completion. He currently oversees implementation of operation, maintenance, and monitoring at the site and prepares Periodic Review Reports.

Ronkonkoma Wallpaper Site - ERP - He performed field investigations to determine the extent of historical site usage to on-site drainage and sanitary systems as well as delineate the extents of a historical contamination. Specifically, performed a fish and wildlife resource impact assessment, oversaw the excavation and exposure of underground leaching structures, collection of soil and groundwater samples, coordination with SCDHS officials, and preparation of reports and data management.

Arkansas Chemical Company Site - BCP- He managed all aspects of the project. Specifically, he prepared all work plans and reports, coordinated with regulatory agencies, developers, and contractors, managed field activities and construction schedules. The site was successfully remediated and a Certificate of Completion was issued.

355 Exterior Street Site - BCP- He managed all aspects of the project. Specifically, he prepared all work plans and reports, coordinated with regulatory agencies, developers, and contractors, managed field activities and construction schedules. The site is currently in the remedial action phase.

Landfills

Town of Brookhaven Landfill - Landfill Air Monitoring - In the wake of Hurricane Sandy, The Town of Brookhaven accepted vegetative debris at the Town of Brookhaven Municipal Landfill where the debris was burned to reduce the sheer volume. In response to air pollution complaints, PWGC was retained to performed perimeter air monitoring at the landfill for airborne particulates. In order to monitor the air quality surrounding the burn area, three Beta Mass Monitors (EBAM) were set up near the burn area, one in the prevailing upwind direction, one in the prevailing downwind direction, and one in the local community where complaints have been filed. PWGC maintained the monitors and analyzed the data, preparing daily reports for SCDPW.

Town of Ronkonkoma and Town of Southampton - Post Closure Operation and Maintenance - He currently manages the towns post closure OM&M requirements for the landfills in accordance with Part 360 requirements. He coordinates directly with the towns and regulators, schedules field activities, reviews collected data, prepares reports and provides recommendations for maintenance of the landfills.

NYCOER "E" Designation & NYCOER VCP Projects

30-17 40th Avenue (LIC Taxi Site)- Provided services for all phases of the "E" Designation Program including, Phase I Environmental Site Assessment, development of site specific Subsurface Investigation Work Plan and Health and Safety Plan, management of Subsurface Investigation, development of Subsurface Investigation Report, coordination with petroleum spill investigation, remediation and closure, development of Remedial Action Plan and Construction Health and Safety Plan, and management of remedial action.

100 Varick Street (SOHO Tower Site)- Provided services for all phases of the "E" Designation Program including, Phase I Environmental Site Assessment, property acquisition support, development of site specific Subsurface Investigation Work Plan and Health and Safety Plan, management of Subsurface Investigation, development of Subsurface Investigation Report, management of waste characterization and construction contract support.

2211 Third Avenue (HAP Site)- Provided services for the remedial phase of the VCP site including assistance with establishment of new BCP Agreement, preparation and implementation of waste characterization / beneficial reuse analysis for soils to be excavated at the site, management of remedial construction activities, and coordination with NYSDEC for petroleum spill identification and remediation.



State and Federal Superfund Sites

MATTEO Superfund Site - Mr. Ersbak performed environmental oversight associated with remedial investigation services, including sonic drilling, well development, subsurface sampling, and GPS surveying oversight and support.

Lead Sampling Analysis - New York, NY

Mr. Ersbak performed water sampling to test for lead in accordance with the Lead and Copper Rule (LCR). Mr. Ersbak coordinated with the building staff to access the sites and assess the building to determine which plumbing fixtures were to be sampled. He accessed the building, after school hours, to create site plan layouts of each floor and the fixtures to be sampled. Samples were drawn within a specific time frame in accordance with clients requests.



Michael Pecoraro • SENIOR HYDROGEOLOGIST

PROFESSIONAL EXPERIENCE

PWGC: 5 years

AREAS OF EXPERTISE

Project Coordination
Water, Soil, Air Sampling
Field Work (Protocol, Oversight, Documentation)
Site Investigation/Analysis
Health & Safety Monitoring
Report Preparation

EDUCATION & TRAINING/CERTIFICATION

MA, Geological and Environmental Sciences, CUNY Queens College
BA, Earth Science/Education, University of Delaware
AS, Liberal Sciences, Nassau Community College
8 Hour HAZWOPER Refresher
40 Hour HAZWOPER Certification
30 Hour Construction Certification
10 Hour Construction Certification
NYC Site Safety Training Certification
NYSDEC Erosion and Sediment Control Training 4 Hour
Transportation Worker Identification Credential (TWIC)



PROFILE

Mr. Pecoraro is a member of PWGC's Environmental Team where he applies his skills as a Senior Hydrogeologist. His project experience is focused on projects that include groundwater remediation, soil sampling, air quality sampling and Phase I/II environmental site assessments. He has an excellent record in timely completion and maintenance of project coordination, monitoring, and document preparation, while successfully maintaining communication between clients, government regulatory agencies, and other interested parties.

NOTABLE PROJECTS

Glen Isle Waterfront Redevelopment, Glen Cove, NY

Over the past year, Mr. Pecoraro performed air monitoring during intrusive earth work to assure air quality was in accordance with the Community Air Monitoring Program approved by the NYSDEC and USEPA. He prepared Remedial Action Completion Reports and EDD data submittals to the NYSDEC. He conducted soil sampling in accordance with NYSDEC TOGS at Garvies Point. He was responsible for overseeing the on-site contracts perform drilling, impacted soil excavations, hazardous and non-hazardous soil trucking and the importation of acceptable materials to the site. Mr. Pecoraro collected confirmation endpoint samples within remedial excavations and prevented on-site contaminants from migrating off-site. Mr. Pecoraro was responsible for keeping a detailed field log and coordinating daily work on-site with the numerous contractors.

NYCOER E-Designation/VCP Sites – Mr. Pecoraro has provided management services for sites which are included in the NYCOER E-Designation Program. The services included on-site services performed in accordance with the NYCOER approved Remedial Action Work Plan (RAWP) and Health & Safety Plan (HASP), reporting to the NYCOER, coordinating field efforts, and coordinating with contractors and disposal facilities for the removal of impacted soils to obtain site specific cleanup objectives.

NYSDEC Brownfield Cleanup Program Services – Mr. Pecoraro has performed investigations and remediations for sites under the NYSDEC Brownfield Cleanup Program. He has performed Remedial Investigations that included soil, groundwater, and soil vapor sampling, geophysical surveys, and based on those findings assisted in developing an appropriate Remedial Action Plan for the site.

Phase I/II Environmental Site Assessments – Mr. Pecoraro has performed various aspects of Phase I/II ESA scopes of work for commercial and industrial properties, including: historical research; FOIL requests, EDR records, initial site inspections; field work; sampling of soil, groundwater and air; subcontractor oversight, coordinating with assigned laboratories, and general project coordination and management.

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Residential/ Commercial Fuel Oil Spills Oversight and Reporting – Mr. Pecoraro has overseen fieldwork for projects such as petroleum spill remediation. He completes spill reports, and coordinates with contractors and the NYSDEC to ensure that the project stays on schedule, is compliant with regulatory guidelines, and meets the client's goals.

UIC Remediation Oversight – Mr. Pecoraro has overseen remediation activities of dry wells (Class V wells) at multiple sites for various clients throughout Suffolk County. He ensures proper soil and sediment removal during VacTruck operations, performs endpoint sampling of storm drains and sanitary systems, coordinates and performs sampling in conjunction with the SCDHS, and prepares reports documenting the remediation and endpoint sampling so a No Further Action letter can be obtained.

Drilling Oversight – Mr. Pecoraro has performed various aspects of the installation of monitoring and injection wells, including: completion of boring logs; USCS soil classification, soil screening, processing logs using Strater; soil and groundwater sampling, health and safety monitoring, conduction of NYSDEC static, pumping, and recovery tests using data loggers, subcontractor oversight, coordinating with assigned laboratories, and general project coordination and management.

Dredged Materials Management Implementation – Mr. Pecoraro has implemented Sediment Sampling and Analysis Plans (SSAPs) for proposed dredge sites to determine the appropriate dredge protocols and materials management. He oversees soil borings collected by the assigned subcontractors, completes boring logs with proper USCS soil classification, processes logs on Strater, and coordinates with the assigned analytical laboratories.



Michael Scanlon, PE • Project Manager

PROFESSIONAL EXPERIENCE

PWGC: 5.5 years

Prior: 3 years

AREAS OF EXPERTISE

NYSDEC Brownfield Cleanup Site Management & Engineering Controls
NYCOER Brownfield and "E" Designation Site Management & Engineering Controls
United States Environmental Protection Agency Superfund Redevelopment
Property and Construction Remedial Systems Design & Implementation
Living Shorelines & Drainage Improvements
Soil Vapor Mitigation System Design & Implementation
Site Management Plan Inspection Services
Existing Remedial/Soil Vapor System Troubleshooting and Remedies
Construction Administration & Oversight Services
Property Condition Site Assessments
Value Engineering
Stormwater Mitigation & Site Drainage
Site Planning & Development
Geothermal Energy for Residential & Commercial Structures
Stormwater Pollution Prevention Planning (SWPPP)

EDUCATION & TRAINING/CERTIFICATION

BS, Environmental Engineering, University at Buffalo
NYS Licensed Professional Engineer
OSHA 10-Hour Construction Training, OSHA 40-Hour HAZWOPER
ASTM Training for Property Condition Assessments, ASTM E 2187-08
NYS DEC's Stormwater Pollution Prevention Program Training

PROFILE

Mr. Scanlon is a member of PWGC's Engineering Team as a Project Manager. He is experienced in the design and site management of institutional and engineering controls for properties in the New York State (NYS) Brownfield Cleanup Program and the New York City (NYC) E-designation Program/Voluntary Cleanup Program. Mr. Scanlon is responsible for design, permitting, specifications, reports, inspections, and construction services for the projects he assists. He is able to efficiently implement environmental systems throughout the design process while coordinating with various consultants and trades. Value engineering is at the forefront of his designs as well as open and excellent communication with project team members. Additional areas of proficiency include site planning and development, stormwater mitigation and site drainage, and geothermal designing for heating and cooling of residential, commercial and industrial structures.

NOTABLE PROJECTS

NYCDEP/NYCOER "E" Designation Sites - New York City, NY

722 Metropolitan Ave – Mr. Scanlon helped develop and direct installation of the engineering controls for the site including a soil vapor mitigation measures including a sub-slab depressurization system and vapor barrier.

3261 Westchester Ave – Mr. Scanlon has successfully aided in the Site Management phase of the property previously remediated. This effort has included the evaluation of the site's engineering and institution controls including an active sub-slab depressurization system to ensure continued operation of the system and to determine if the system can be converted from active to passive.

Brownfield Redevelopment Sites

1045 Atlantic Ave - NYSDEC BCP Site – Mr. Scanlon aided in preparing the Remedial Action Work Plan that includes excavation, a sub-slab depressurization system, and a soil vapor extraction system to integrate the planned mixed-use with affordable housing redevelopment of the property with the remediation of the property with extensive coordination between the development team and the regulatory agencies.

737 4th Ave - NYSDEC BCP Site – Mr. Scanlon helped prepare the Remedial Action Work Plan that includes excavation, a sub-slab depressurization system, and in-situ chemical injections to integrate the planned mixed-use with affordable housing redevelopment of the property with the remediation of the





property with extensive coordination between the development team and the regulatory agencies. This site is also an “E” designation site that resulted in the preparation of an Air and Noise Remedial Action Work Plan which Mr. Scanlon provided guidance on.

USEPA’s Superfund Sites:

Gravie’s Point Waterfront Redevelopment – Multiple Sites Including USEPA’s Li Tungsten Superfund Site

Mr. Scanlon developed & implemented environmental specifications for the handling of contaminated soil (contaminants of concern included metals, VOCs, radioactivity, PCBs) and water during the USEPA’s Superfund the redevelopment of the Li Tungsten Superfund site as well as multiple properties along Glen Cove Creek. In addition to designing a treatment system for handling construction waters contaminated with metals, VOCs, and potential radioactivity, he managed field staff and maintained sampling and installation documentation and progress plans during construction as well as additional construction administration tasks such as answering RFIs, issuing bid addendums, and holding toolbox safety talks.

BEB Capital

Mr. Scanlon was responsible for development of environmental plans and specifications for multiple environmental remediations and soil vapor mitigation projects. He led design, bidding, and construction aspects of the systems effectively implementing systems to mitigate soil vapor intrusion for existing mixed commercial and industrial structures. Design aspects included designs for motor sizing, wire and conduit sizing, and piping and duct layouts and sizing.

Piece Management, Inc.

Mr. Scanlon was responsible for design, bidding, and implementation of an efficient soil vapor mitigation system for a 45,000 square foot existing construction industrial warehouse with a single 5.0 horse power blower. Construction M&L costs were below \$125,000.

Town of Brookhaven

Mr. Scanlon developed stormwater mitigation plans for multiple sites across the Town of Brookhaven to prevent direct run-off to adjacent estuaries. Utilizing green building techniques including living shorelines, drainage swales/rain gardens, permeable pavers, and erosion control for shorelines, he has helped mitigate excess nutrient loading and petroleum’s from flowing directly into adjacent water bodies. He helped develop the plans and a report to further the Town’s Climate Smart South Shore Communities plan inline with the NYSDEC’s 2017 Climate Smart Grant Awards.

Alzheimer’s Foundation of America (AFA)

Mr. Scanlon was responsible for preparing the Site Design Plans for a zoning change from an existing residential use to commercial use in a mainly residential area. Design plans included zoning analysis, parking analysis, grading and drainage design, water and fire service, sewer connection, utility coordination, site lighting design, landscaping plans, and stormwater pollution prevention plans.

Port Authority of New York and New Jersey (PANYNJ)

Mr. Scanlon was the lead energy engineer for the design of lighting, lighting control, and track heating control upgrades for John F. Kennedy (JFK) Airport’s Air Train Stations, Hangar 19, and Building 208. Additionally, he was the construction manager for the implementation of lighting and lighting controls upgrades for the Port Authority’s upgrades to Jamaica Station.

New York State Department of Corrections and Community Supervision (DOCCS)

Mr. Scanlon conducted ASHRAE Level II energy audits to identify and quantify energy efficiency opportunities including providing technical calculations to estimate expected energy savings, cost savings, and emission reductions. Following design, he prepared Bid Documents, solicited to contractors for bidding, held pre-bid conferences and bid-walkthroughs, evaluated bids, and pre-qualified bidders for energy projects moving into implementation.

New York Power Authority (NYPA)

Mr. Scanlon compiled detailed work plans for multiple New York City agencies through the New York Power Authority’s Energy Efficiency Program as an implementation contractor which include lighting design packages, mechanical controls and energy management system upgrades, and water conservation measures.

Amneal Pharmaceuticals

Mr. Scanlon provided support for the well development of supply and diffusion wells of the facility’s geothermal system. This consisted of field over-site during well development and surging, and sampling of water quality parameters.

Southside Hospital

Mr. Scanlon provided field support for a storm water drainage analysis of the healthcare facility including locating and documenting the site’s stormwater systems.

Property Condition Assessments & Reporting

Mr. Scanlon provided Property Condition Assessments and the writing of Property Condition Reports according to the ASTM E 2018-08 guideline as well additional guidelines as required by insurers and lenders of commercial buildings and multi-unit residential structures.



Cornell University

Mr. Scanlon assisted in the drafting of plans for the geothermal system to be installed at the proposed Cornell NYC Tech facility. In addition, he assisted in the data processing and review of annulus pumping effects on energy diffusion in geology in the borefield at the project site.

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