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REPORT ON THE OCCURRENCE OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) IN FLOOR STRIPPING AND REFINISHING WASTEWATER AT FOUR SCHOOLS IN NEW HAMPSHIRE

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List of Common Acronyms

AGQS – ambient groundwater quality standard

AOF – adsorbable organic fluorine

LC-MS/MS - liquid chromatography with tandem mass spectrometry

MCL – maximum contaminant level

ng L^{-1} – nanograms per liter

NHDES – New Hampshire Department of Environmental Services

PFAS – per- and polyfluoroalkyl substances

PFCA - perfluoroalkyl carboxylic acid

PFHxS - perfluorohexane sulfonic acid

PFNA – perfluorononanoic acid

PFOA – perfluorooctanoic acid

PFOS - perfluorooctane sulfonic acid

PFPrA – perfluoropropionic acid

PFSA - perfluoroalkyl sulfonic acid

ppm – parts per million

ppt – parts per trillion

PWS – public water system

SPE – solid phase extraction

TOP – total oxidizable precursor assay

USEPA - United States Environmental Protection Agency

EXECUTIVE SUMMARY

In the summer of 2022, the New Hampshire Department of Environmental Services (NHDES) conducted a study that assessed the occurrence of per- and polyfluoroalkyl substances (PFAS) in floor stripping and refinishing activities at four schools in New Hampshire. The four schools were selected for the study because they: 1) dispose their wastewater to an onsite septic system (leach field); and 2) utilize onsite drinking water supply wells that exceed one or more of the state's PFAS drinking water standards. The objective of the study was to determine if the disposal of wastewater from floor stripping and refinishing activities to groundwater could potentially contaminate underground sources of drinking water. At each school, samples of tap water (water obtained from a plumbing fixture in the building that originated from an on-site drinking water supply well), floor strippers, floor finishes, and wastewater generated from floor stripping were analyzed for 70 PFAS compounds using a targeted isotope dilution analysis. A subset of samples was also analyzed for oxidizable precursors and total organic fluorine via the total oxidizable precursor assay (TOP) and adsorbable organic fluorine (AOF) methods, respectively. NHDES conducted follow-on PFAS sampling associated with routine floor cleaning activities at two schools to assess whether routine floor cleaning activities generated substantial concentrations of PFAS, and to compare these levels to those detected in floor stripping and refinishing wastewater.

Key Findings

Wastewater generated from floor stripping activities analyzed at these four schools contained high concentrations of PFAS.

The disposal of wastewater generated from floor stripping and refinishing activities are likely to have contributed to the contamination of underground sources of drinking water with PFAS. An analysis of the occurrence of the specific PFAS analytes detected in the wastewater and drinking water shows the co-occurrence of similar analytes in both suggesting the wastewater disposal may be associated with the PFAS contamination in the drinking water obtained from the on-site drinking water supply well. However, additional hydrogeologic investigations would be required to complete this assessment.

Wastewater generated from routine floor cleaning contained PFAS at notable concentrations as well, although these levels were orders of magnitude lower than that of the wastewater associated with floor stripping.

Floor strippers, floor finishes, and other floor cleaner products contain PFAS and are therefore a significant contributor of PFAS to the floor cleaning waste stream, despite lack of disclosure in most product ingredient listings.

PFAS in wastewater derived from floor stripping may also be sourced from previous applications of floor coatings, which may include the original surface finish or other coatings applied during manufacture of the flooring. This finding is supported by the fact that PFAS in floor stripping wastewater was at a much higher concentration and of a different composition than PFAS in tap water and cleaning products used during the floor stripping process.

A comprehensive, multi-pronged analytical approach (expanded targeted analysis, TOP, and AOF) aided this study. Still, analytical limitations exist due to the complex matrices associated with the samples, and follow-on studies are warranted to supplement the results of this sampling initiative.

Actions and Recommendations

Based on the findings of this study, NHDES has launched several statewide and regional outreach initiatives to address PFAS contamination derived from floor stripping and refinishing activities. NHDES is encouraging schools across the state (particularly those that are non-sewered) to sample their floor stripping and refinishing wastewater for PFAS and is advising schools with PFAS detections in this waste stream to treat or containerize the wastewater for pickup by a waste removal company. NHDES is presenting its PFAS-related wastewater sampling findings and associated recommendations to school administrators and facility maintenance staff through annual school-facility maintenance training event(s) in coordination with New Hampshire Department of Education (NHDOE). NHDES continues to sample private drinking water wells across the state on a regular basis, and ambient groundwater quality standard (AGQS) exceedances prompt further testing and/or source investigations in the area. NHDES is also reaching out to other industries that are likely to generate similar floor cleaning waste streams (e.g. grocery stores) and coordinating with other state agencies to share information and develop guidance on this topic.

PROJECT BACKGROUND

NHDES is engaged in an ongoing study about the occurrence of PFAS in wastewater derived from surface cleaning activities such as commercial floor stripping and refinishing that is disposed of in the groundwater that is a potential underground source of drinking water. This report details the scope and findings of a sampling initiative that occurred in the summer of 2022 to test for the presence of PFAS during floor stripping and refinishing and other floor cleaning activities at four schools in New Hampshire.

PFAS are a family of thousands of synthetic chemicals that have been widely used since the 1940s in commercial, industrial, and household products and applications, including production of water-resistant materials, fire suppression foams, non-stick cookware, stain removers, and more. In commercial cleaning products such as floor strippers and finishes, PFAS may be used as emulsifiers to enhance wetting and rinse-off or for chemical stability given the caustic nature of floor strippers (Cartwright, 2004; Gluge et al., 2020). Floor stripping and refinishing activities, such as those typically performed at schools annually or semi-annually, may introduce PFAS into the environment through aerial exposure and/or wastewater discharges (Zhou et al., 2022). PFAS are highly resistant to degradation and once released into the environment they can be mobile in water, soil, and groundwater. Long-term exposure to certain PFAS may harm human health.

In 2019, New Hampshire established health-based maximum contaminant levels (MCLs) and AGQS for four PFAS that include: 12 parts per trillion (ppt) for perfluorooctanoic acid (PFOA), 15 ppt for perfluorooctane sulfonic acid (PFOS), 18 ppt for perfluorohexane sulfonic acid (PFHxS), and 11 ppt for perfluorononanoic acid (PFNA). Since October 2019, community public water systems and non-transient non-community public water systems (including schools) have completed compliance water quality sampling for PFOA, PFOS, PFNA and PFHxS.

Public water systems (PWSs) whose drinking water exceeds the PFAS MCLs are required to reduce PFAS concentrations below MCLs by installing treatment or interconnecting with another PWS, with the option to apply for financial assistance through NHDES' PFAS Remediation Loan Fund Program. Since 2019, several schools in New Hampshire that have PFAS in their water supply wells have installed PFAS treatment systems funded by NHDES' PFAS Remediation Loan Fund. By the summer of 2022, the four schools in this study had received nearly $165,000 for PFAS treatment installations or interconnection to a nearby public water system. As with nearly one-third of schools in the state, these four schools are stand-alone PWSs (or had been prior to recent interconnection) and wastewater is disposed of using an on-site septic system.

The goal of this study was to characterize the potential for wastewater generated from floor stripping, refinishing and other cleaning activities at these schools to contaminate potential underground sources of drinking water.

SAMPLING AND ANALYSIS APPROACH

Samples of floor stripping wastewater, cleaning products, and tap water were collected during floor stripping and refinishing events at four schools in New Hampshire in the summer of 2022. Samples were analyzed for 70 PFAS compounds using a targeted isotope dilution analysis, and a small subset were also analyzed for oxidizable precursors and total organic fluorine using TOP and AOF methods, respectively. The objectives of the testing were to 1) characterize PFAS in cleaning products and wastewater associated with floor stripping and refinishing, 2) identify the source of PFAS in floor stripping wastewater, whether the cleaning products or the floors being cleaned, and 3) evaluate the analytical strengths and limitations of nonstandard, expansive target PFAS test methods for samples associated with floor stripping and refinishing activities.

Sampling Locations

Sampling occurred at three schools in southeastern New Hampshire and one school in western New Hampshire (Figure 1).

School 1

School 1 is a pre-kindergarten to 8th grade elementary school with a total enrollment of approximately 120 students. The school is located in the center of a small, rural town (population 1,600 people) and shares its water supply well with an adjacent town hall building. The water supply well is a 14-foot dug well situated on the west side of the school property. Floor stripping wastewater is discharged to an onsite leach field located on the north side of the building, approximately 300 feet from the school's water supply well.

School 2

School 2 is a kindergarten to 5th grade elementary school with a total enrollment of approximately 370 students. The school is located in a midsize town (population 33,000 people) in a suburban neighborhood. Prior to recent interconnection, the school was served by a 715-foot-deep bedrock well northwest of the building. Approximately half of the school is carpeted, and the remaining floor surfaces (including the cafeteria and gymnasium) are vinyl composition flooring (or similar) that are stripped and refinished annually. The annual floor stripping event generates approximately 125 gallons of wastewater that is drained into a mop sink connected to the school's septic system which directs the wastewater to a leach field located on the northeast side of the building, approximately 300 feet from the school's water supply well.

School 3

School 3 is a kindergarten to 5th grade elementary school with a total enrollment of approximately 140 students, located in a rural town of approximately 2,500 residents. The southern border of the property abuts several homes with private wells, which have been tested for PFAS contamination. The school is served by a 425 foot deep bedrock well that is located southeast of the main building. All uncarpeted floors are refinished annually. Prior to refinishing, floors in high traffic areas including hallways and busy classrooms are stripped, while lower traffic areas are scrubbed with soap and an abrasive pad. Floor stripping wastewater is drained into a mop sink and subsequently discharged to an onsite leach field located on the east side of the building, less than 500 feet from the school's water supply well.

School 4

School 4 is a pre-kindergarten to 8th grade elementary school with a total enrollment of approximately 400 students. The school is located in a small town of 4,700 residents. The property is adjacent to a small commercial plaza (including a police department, nursing home, and car dealer) and abuts neighborhoods with private well owners to its north and west, which have also been test for PFAS contamination. The school is served by a 253-foot-deep bedrock well at the west end of the building. Floors are either stripped or burnished prior to refinishing, depending on how heavily trafficked they are. Floor stripping generates approximately 125 gallons of wastewater annually. Historically, floor stripping wastewater was discharged along with domestic wastewater to three onsite leach fields at the north end of the property. For the past several years, floor stripping wastewater has been containerized in large plastic totes and disposed of offsite by a waste removal service.

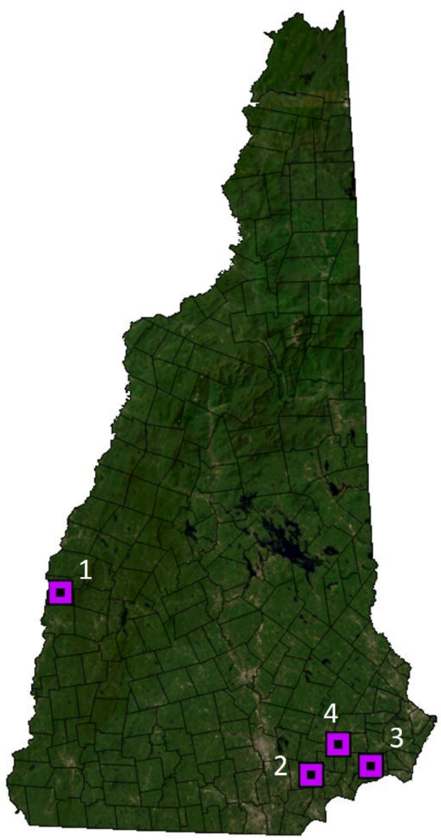

Figure 1. Locations of the four schools included in this study.

Floor Stripping/Refinishing Sample Descriptions

Floor Stripping/Refinishing Procedure

Facility directors at each school follow similar procedures for floor stripping and refinishing. The stripper product is mixed with untreated tap water at a specified ratio, and the stripping solution is applied liberally to swept floors with a mop (Figure 2A). After 10 to 15 minutes of contact time, a floor buffer (rotary floor machine) is used to scrub floors and extract old finish (Figure 2B). Wastewater is removed using a commercial floor scrubber machine (Figure 2C) and drained into a utility/mop sink or an intermediate bulk container (Figure 2D). In some cases, floors are rinsed with water to remove residual stripping solution, and up to four coats of finish are applied with a mop once the floors have dried (Figure 2E).

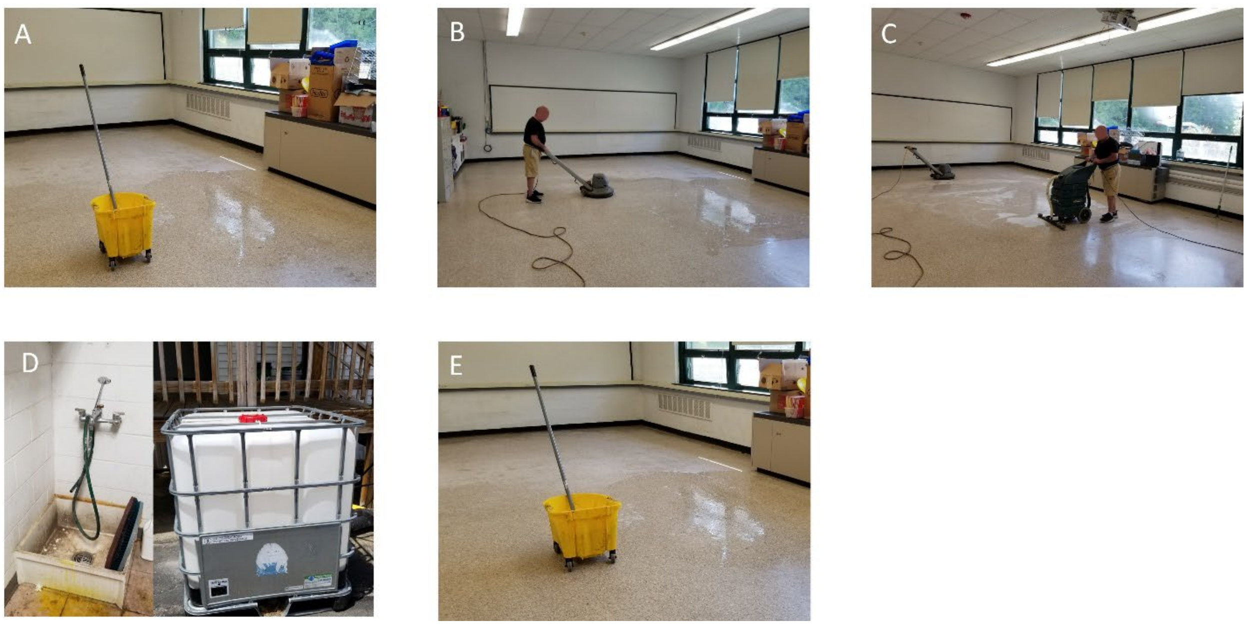

Figure 2. Steps involved in the floor stripping and refinishing procedure, including application of the stripping solution (A), scrubbing to extract old finish (B), removing stripping wastewater from floors (C), disposing of stripping wastewater (D), and applying floor finish (E).

Sample Types

At each school, three types of samples were collected: cleaning products (i.e. strippers and finishes), wastewater, and tap water.

Cleaning products: Each school used different brands of strippers and finishes (Table 1). With the exception of school 4, schools used one stripper and one finish product. School 4 used two strippers equally, and both were sampled. Fluorinated ingredients were not disclosed on safety data sheets for any of the cleaning products sampled. Only one product (Hillyard Industries Top Shape, HTS) had "fluorosurfactant" listed as an ingredient on the manufacturer's website. For sampling, cleaning products were poured directly from the product container/bottle into 250-mL high-density polyethylene (HDPE) bottles.

Wastewater: Wastewater was generally a milky white-brown solution that consisted of spent stripping solution (a mix of stripper and tap water) and old finish that had been removed during the stripping process. Wastewater samples were collected directly from the floor machine holding tank into 250-mL

HDPE bottles using either a drain hose or dipping bottles into the holding tank chamber just below the surface.

Tap water: Untreated tap water was also sampled at each school because it was used to generate the stripping solution and was therefore a component of the wastewater stream. Tap water samples were collected in 250-mL HDPE bottles from the same faucet used in preparing stripping solutions, typically located in the utility closet.

Table 1. Floor cleaning products tested in this study.

School	Product type	Manufacturer/Supplier	Product name	Sample Abbreviation
1	Stripper	Charlotte Products Ltd.	Enviro Solutions ES90 Clean Cut Concentrated Stripper	ECC
	Finish	Swish Maintenance Limited	Eternity Floor Finish	EFF
	Spray buff	Swish Maintenance Limited	Sun Up Spray Buff Solution	SUN
	All Purpose Cleaner	National Chemical Laboratories of PA, Inc.	Earth Sense Dual-Blend #4 pH Neutral All Purpose Cleaner	DB4
2	Stripper	Buckeye International, Inc.	Buckeye Ripsaw	BUR
	Finish	Buckeye International, Inc.	Buckeye Clarion 25	BEC
3	Stripper	Hillyard Industries	Power-Strip	HPS
	Finish	Hillyard Industries	Top Shape	HTS
4	Stripper	National Chemical Laboratories of PA, Inc.	Super Purge Floor Finish Solubilizer	SUP
	Stripper	National Chemical Laboratories of PA, Inc.	Bare Bones No Rinse/No Scrub Liquifying Stripper	BAB
	Finish	National Chemical Laboratories of PA, Inc.	Brite Eyes Wet Look Premium Grade Floor Finish	BRE
	Cleaner and protectant	Pollet S.A. / Genesan	Poltech Linpol Gloss	PLG

Supplementary Sampling

In addition to the above-mentioned floor stripping and refinishing sampling program, NHDES conducted two related supplementary sampling initiatives: routine floor cleaning and neighboring private well testing.

Routine Floor Cleaning

The purpose of this sampling effort was to assess whether routine floor cleaning activities generated substantial concentrations of PFAS in the wastewater produced by this activity, and to compare these levels to those detected from floor stripping and refinishing activities. Samples were collected following routine/daily floor cleaning operations at two schools (1 and 4). Similar to the floor stripping and refinishing sampling program, three types of samples were collected, including cleaning product(s), wastewater, and tap water used in preparing cleaning solutions. At school 1, classrooms and hallways are cleaned daily by applying an all-purpose cleaner solution (cleaning product and treated tap water) to the floors with a commercial floor scrubbing machine. Approximately 25 gallons of routine floor cleaning wastewater are generated per day, and wastewater is discharged to the onsite leach field. At school 4, hallways are rinsed periodically during the day with water (no cleaning products) using a commercial floor scrubbing machine, generating approximately 40-50 gallons of water-only floor cleaning wastewater per day. At night, a floor cleaner/protectant solution (cleaning product mixed with treated tap water at a ratio of 1:128) is applied to floors with the commercial floor scrubbing machine. All routine floor cleaning wastewater is discharged to the onsite leach field.

Neighboring Private Well Testing

Schools 3 and 4 abut neighborhoods with homeowners that have private wells. Based on proximity to school leach fields and area hydrogeology, four homes adjacent to each school property were selected for follow-on private well testing to identify whether abutting properties had been impacted by discharge of PFAS-containing wastewater at these schools.

Analytical Methods

70 PFAS Method

Unless otherwise noted, all samples in this study were analyzed for an expanded targeted list of 70 PFAS compounds in order to comprehensively characterize the PFAS profile of these samples and understand the extent to which lesser studied precursors may contribute to the PFAS load.

All samples were stored at 4 °C and shipped to laboratories overnight on ice within one week of collection. For neighboring private well testing, two samples of well water at each school were analyzed using United States Environmental Protection Agency (USEPA) Method 533 for PFAS in drinking water (US Environmental Protection Agency, 2019). All other samples described herein were analyzed using Eurofins Lancaster Laboratories Environment Testing, LLC. (Eurofins)' Extended List which analyzes for 70 PFAS compounds – including 14 perfluoroalkyl carboxylic acids (PFCAs), 9 perfluoroalkyl sulfonic acids (PFSAs), and 47 other precursor compounds – in a single injection (Appendix A). Analytical procedures for the 70 PFAS method follow procedures described in Pelch et al (2023). Briefly, samples were extracted using a solid phase extraction (SPE) cartridge, eluted with an ammonium hydroxide/methanol solution, and analyzed by liquid chromatography with tandem mass spectrometry (LC-MS/MS) in electrospray (ESI) negative ion mode. Quantification was achieved using isotope dilution with 30 isotope dilution analytes.

Total Oxidizable Precursor Assay

In addition to analyzing samples using the 70 PFAS method, a limited number of samples were analyzed by Eurofins using the TOP technique as developed by Houtz and Sedlak (2012). Samples for TOP were divided into two aliquots. The first aliquot (PreTOP) was analyzed as described in the previous section. The second aliquot (PostTOP) was subjected to a six-hour oxidation with potassium persulfate and sodium hydroxide prior to SPE and analysis by LC-MS/MS.

Adsorbable Organic Fluorine

Samples that were analyzed using the TOP technique were also analyzed by Eurofins for AOF by combustion ion chromatography. Procedures followed a modified version of USEPA Method 1621: Screening Method for the Determination of Adsorbable Organic Fluorine (AOF) in Aqueous Matrices by Combustion Ion Chromatography (CIC) (US Environmental Protection Agency, 2024a). Samples were passed through a mixed-mode weak anion exchange SPE cartridge, eluted with sodium hydroxide in methanol, and organic fluorine was determined by CIC.

Quality Control

Measures were taken to ensure quality control (QC) during sample collection and laboratory analysis. A field blank, collected alongside samples, was non-detect for all PFAS compounds included in the 70 PFAS test. A field duplicate wastewater sample was also collected, with a relative percent difference of 12% (averaged across 12 compounds detected in both samples) and a 3.3% difference for the sum of 70 compounds. Four additional compounds were detected in just one of the duplicate samples, three of which were less than the reporting limit.

Standard laboratory analytical QC procedures were followed, including calibration verification and routine quality control batch analysis. Quality control batches included method blanks (MB), laboratory control samples (LCS), and laboratory control sample duplicates (LCSD). Samples, LCSs, LCSDs, and MBs were re-extracted as needed (i.e. when recoveries of labelled isotopes in samples were outside of QC acceptance limits, or when target analytes were detected in the MB). Reporting limits and method detection limits were raised for many samples due to interference from the sample matrix (Appendix A).

Data Analysis and Calculations

PFAS detections above the method detection limit were included in data analysis for all samples and analytical methods in this study (targeted methods, TOP, and AOF). All data qualifiers were evaluated on an individual basis prior to inclusion in analysis.

The quantity of PFAS was compared across samples by summing PFAS concentrations in nanograms per liter (ng L^{-1}) included in the 70 PFAS method (∑70). The composition of PFAS was compared across samples by converting concentrations to mole fractions and assessing relative mole fractions of individual PFAS as well as mole fractions of PFCAs, PFSAs, and other precursor compounds.

In order to obtain molar-based PFAS composition profiles and compare LC-MS/MS-derived PFAS concentrations (C_{PFAS}, ng PFAS L^{-1}) with CIC-derived AOF measurements, PFAS concentrations were converted to fluorine equivalents in a similar manner to Schultes et al (2019), using the following equation:

$$C_{F\_PFAS} = \frac{n_F \times A_F \times C_{PFAS}}{MW_{PFAS}}$$

where C_{F_PFAS} (ng F L^{-1}) is the fluorine concentration of a given PFAS, n_F is the number of fluorine atoms in the molecule, MW_{PFAS} is the molecular weight of the PFAS compound, and A_F is the atomic weight of fluorine.

RESULTS AND DISCUSSION

Floor Stripping and Refinishing Activities

PFAS Concentration and Composition

Floor stripping wastewater was highly concentrated with PFAS, with the sum of concentrations included in the 70 PFAS method (∑70) ranging from 46,179 to 229,300 ng L^{-1} (Figure 3; Table 2). PFCAs and precursor compounds comprised the majority of PFAS in stripping wastewater, at 31-52% and 34-61%, respectively, whereas PFSAs comprised only 1-29% of PFAS. N-ethyl perfluorooctane sulfonamido acetic acid (NEtFOSAA) and perfluorohexanoic acid (PFHxA) were the largest contributors to the mass load, although a wide array of PFAS (17 to 25 compounds) were detected in each sample, including all four regulated PFAS compounds (PFOA, PFOS, PFNA, and PFHxS) at concentrations far exceeding state AGQS.

PFAS concentrations in floor strippers ranged from below the detection limit to 39,000 ng L^{-1}, and concentrations in floor finishes ranged from 6,100 to 29,800 ng L^{-1}. In contrast to floor stripping wastewater, each floor stripper or finish was comprised of only a small number of PFAS compounds (five or fewer), and the molar composition varied substantially depending on the specific product. For example, floor stripper 1-ECC was comprised of 78% PFCAs (perfluoropropionic acid, PFPrA; and perfluorobutanoic acid, PFBA) and 22% precursors (2H,2H-perfluorooctanoic acid, 6:2 FTCA) with no PFSA contribution, while floor stripper 3-HPS was comprised of 62% PFSAs (PFHxS), 38% PFCAs (perfluorooctadecanoic acid, PFODA), and no PFCA contribution. PFAS in floor finish sample 1-EFF used at school 1 was attributed entirely to a PFCA (PFPrA), while that of floor finish sample BRE used at school 4 was attributed to a fluorotelomer sulfonic acid (1H,1H,2H,2H-Perfluorooctane sulfonic acid, 6:2 FTS).

PFAS concentrations in untreated tap water ranged from 14 to 240 ng L^{-1}, primarily attributed to PFCAs (53-92%), and specifically PFOA and PFHxA. Eight to sixteen PFAS compounds were detected in these tap water samples. At three of the four schools (i.e. all schools served by an onsite well), there were exceedances of at least one of the four regulated PFAS compounds. Note that these samples were taken at faucets designated as non-potable and PFAS treatment has been installed elsewhere for drinking water.

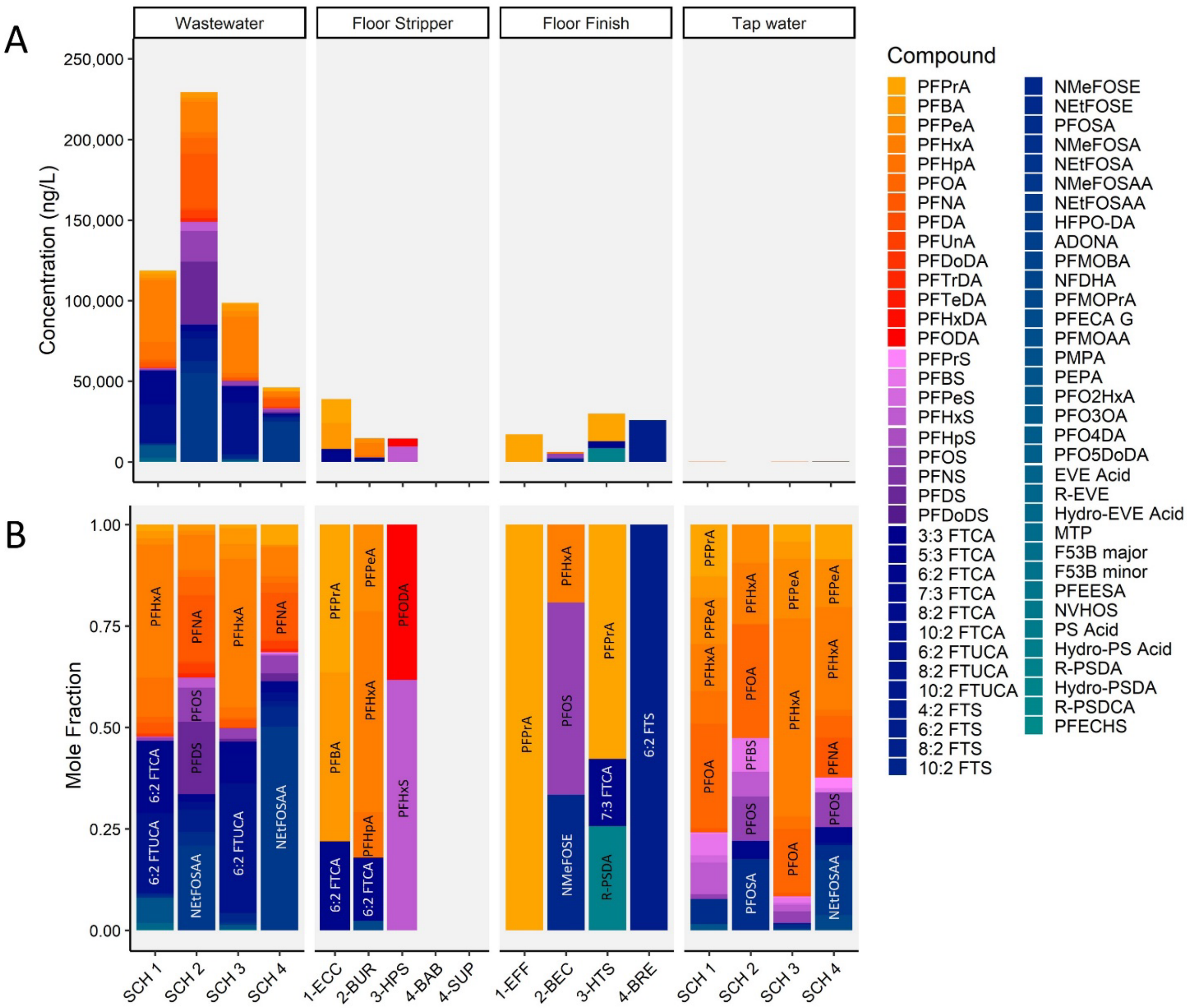

Figure 3. PFAS concentrations (ng L^{-1}) (A) and mole fraction (B) in floor stripping wastewater, floor strippers, floor finish, and untreated tap water.

Table 2. Ranges of 1) mole percent (%) of PFCAs, PFSAs, and precursors, 2) concentrations (sum of 70 PFAS, ng L^{-1}), and 3) number of PFAS compounds detected for each sample type associated with floor stripping and refinishing activities.

Sample Type	PFCAs (%)	PFSAs (%)	Precursors (%)	∑70 PFAS (ng L^{-1})	PFAS detected (#)
Wastewater	31 - 52	1 - 29	34 - 61	46,179 - 229,300	17 – 25
Floor stripper	0 - 82	0 - 62	0 – 22	< MDL – 39,000	0 - 5
Floor finish	0 - 100	0 - 47	0 – 100	6,100 – 29,800	1 - 3
Tap water (untreated)	53 - 92	7 – 25	2 - 25	14 - 240	8 - 16

Surface Extraction

The magnitude and composition of PFAS in floor stripping wastewater relative to that of the cleaning products and untreated tap water suggests that PFAS are being extracted off the floors that are being cleaned. That is, both the applied cleaning products and the floors themselves (including historically applied finishes, sealants, treatments, residual routine cleaners and the floor material itself) are sources of PFAS in the floor stripping wastewater. The following observations support this conclusion:

- PFAS concentrations are orders of magnitude higher in floor stripping wastewater than in concentrated cleaning products or tap water used in generating stripping solutions.
- Stripping wastewater consists of a much more diverse profile of PFAS compounds than that of cleaning products.
- Tap water composition does not match that of stripping wastewater (e.g. precursors are much more prevalent in wastewater than tap water) and concentrations are much too low to account for PFAS in stripping wastewater.
- Floor strippers are harsh chemicals that are designed to remove old applications of floor finishes. Since these chemicals are non-discriminatory, any floor treatment – whether applied after installation or during manufacture – may be subject to extraction by a floor stripper. Repeated exposure to caustic strippers may make the floor material itself more vulnerable to chemical degeneration. If PFAS were used in the production of the floor tiles, the floor may become a more significant source of PFAS to the stripping waste stream over time.

Routine Cleaning Activities

PFAS Concentration and Composition

Wastewater derived from routine floor cleaning was orders of magnitude less concentrated with PFAS than that of floor stripping wastewater (Figure 4; Table 3). The highest PFAS concentration (∑70) in this wastewater was 9,489 ng L^{-1}, nearly five times less than the lowest concentration in floor stripping wastewater. PFAS were detected in floor cleaning wastewater even when cleaning products were not used (treated tap water rinse only) at 358 ng L^{-1}, attributed to perfluorodecanesulfonic acid (PFDS) and PFPrA. Note however that while the floor scrubbing machine used in collecting the rinse-only sample was rinsed with treated water prior to use, the same machine is typically also used for routine floor cleaning with cleaning products, so residual PFAS carryover from the equipment cannot be ruled out.

PFAS concentrations (∑70) in routine floor cleaning products were quite variable, ranging from 276 to 28,057 ng L^{-1}. The all-purpose cleaners (samples 1-DB4 and 4-PLG) had similar compositions (approximately 60% PFPrA and 40% N-methyl perfluorooctanesulfonamidoethanol, NMeFOSE or perfluorooctanesulfonamide, PFOSA). The spray buff (sample 1-SUN) contained PFPrA and NMeFOSE at similar ratios as well but also included PFSAs and other precursors.

As expected, PFAS concentrations in treated tap were very low (∑70 between 7 and 11 ng L^{-1}) with no single PFAS compound higher than 5 ng L^{-1}. Detections were attributed primarily to short-chain PFCAs.

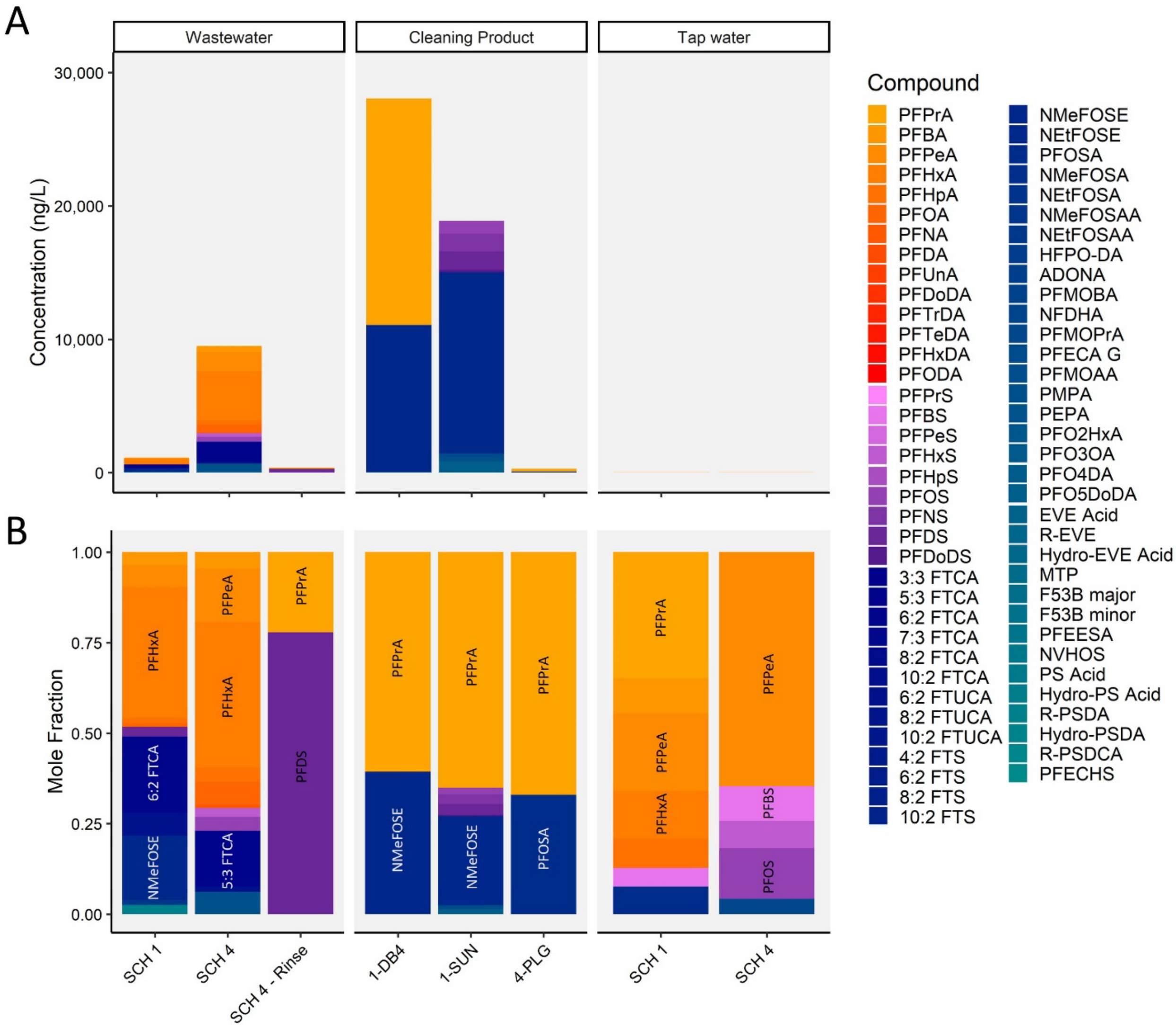

Figure 4. PFAS concentrations (ng L^{-1}) (A) and mole fraction (B) in routine floor cleaning wastewater, cleaning products, and treated tap water.

Table 3. Ranges of 1) mole percent (%) of PFCAs, PFSAs, and precursors, 2) concentrations (sum of 70 PFAS, ng L^{-1}), and 3) number of PFAS compounds detected for each sample type associated with routine floor cleaning activities.

Sample Type	PFCAs (%)	PFSAs (%)	Precursors (%)	∑70 PFAS (ng L^{-1})	PFAS detected (#)
Wastewater	22 - 71	1 - 78	0 - 49	358 – 9,489	2 – 15
Floor cleaner	61 - 67	0 - 8	27 – 39	276 – 28,057	2 – 10
Tap water (treated)	65 - 87	5 - 31	4 - 8	7 – 11	5 - 7

Surface Extraction

As with floor stripping and refinishing wastewater, surface extraction is also likely to contribute to PFAS in routine cleaning wastewater, though to a much lesser degree given the magnitude of concentrations in this wastewater relative to that of the routine cleaning products. Some PFAS compounds that were detected in wastewater were absent in cleaning products, suggesting that even routine floor cleaners can interact with floor surfaces in such a way to extract PFAS from the original manufacturer-applied flooring finish, or historically applied re-finishing products. The presence of PFAS in the rinse-only wastewater (without cleaning products) highlights either or both of the following: 1) surfaces may be a source of PFAS even without chemical intervention, and/or 2) residual PFAS in floor cleaning equipment may contaminate otherwise uncontaminated waste streams. Further investigation is warranted to determine the relative importance of these observations.

Drinking Water Impacts

The disposal of wastewater generated from floor stripping and refinishing activities at these four schools are likely to have contributed to the contamination of underground sources of drinking water with PFAS. This scenario is supported by the fact that 1) floor stripping wastewater at all four schools is highly concentrated with PFAS, with concentrations that are three to five orders of magnitude higher than drinking water MCLs and 2) leach fields discharge into the overburden and can recharge bedrock or shallow overburden aquifers that supply drinking water wells. Compared to floor stripping and refinishing, routine floor cleaning activities generate a much larger, more consistent waste stream (albeit at much lower PFAS concentrations) and therefore may also contribute to PFAS contamination in underground sources of drinking water.

The PFAS composition of floor cleaning wastewater (from either stripping or routine floor cleaning) generally did not match the corresponding (untreated) well water for a given school. Dissimilarity may be attributed to 1) elevated reporting limits for wastewater matrices (see 'Limitations' below), 2) other PFAS inputs to the septic system (e.g. personal care products, kitchen detergents, or other cleaning products) or 3) environmental fate and transport processes. Indeed, several precursor compounds – including fluorotelomers, sulfonamides, and other larger molecular weight compounds – were often more prevalent in wastewater than well water samples and may be sequestered during septic tank solids settling or soil sorption, or may undergo environmental transformations.

Given that schools are often located in neighborhoods, schools that dispose of their floor stripping wastewater via on-site septic systems may also impact neighboring properties depending on proximity and hydrogeology. Private well sampling was conducted at properties abutting schools 3 and 4, and two of the four private wells abutting school 4 exceeded drinking water MCLs for regulated PFAS. Homeowners of these impacted wells were notified, informed of their eligibility for PFAS treatment rebate programs, and offered bottled potable water as an interim measure.

PFAS Analytical Considerations

Targeted PFAS Methods: 70 PFAS Method, USEPA Methods 537.1, 533, and 1633

Twenty-nine PFAS compounds are routinely tested in aqueous matrices due to the broad availability of two USEPA validated potable water methods: USEPA Method 537.1 (US Environmental Protection Agency, 2018) and USEPA Method 533 (US Environmental Protection Agency, 2019). With the recent publication of USEPA Method 1633 (US Environmental Protection Agency, 2024b), 40 PFAS compounds can now be tested routinely in wastewater and other media. This study took advantage of a unique expansive targeted list of 70 PFAS compounds in order to characterize PFAS in cleaning products and floor stripping wastewater as comprehensively as possible.

Twenty-seven of the 70 PFAS compounds were detected in more than 10% of floor cleaning wastewater, products, and tap water samples analyzed in this study (Figure 5). Among those, several compounds were frequently detected that are not included in USEPA Methods 537.1, 533, or 1633, including PFPrA in 52% of samples, 6:2 FTCA in 44% of samples, 2H-perfluoro-2-octenoic acid (6:2 FTUCA) in 30% of samples, perfluoro-2-ethoxypropanoic acid (PEPA) in 26% of samples, perfluoro-4-(2-sulfoethoxy)pentanoic acid (R-PSDA) in 19% of samples, perfluoropropanesulfonic acid (PFPrS) in 15% of samples, and perfluoro-2-methoxypropanoic acid (PMPA) in 11% of samples. Other compounds were frequently detected that are included in USEPA Method 1633 but not USEPA Method 537.1 or 533, including NMeFOSE and PFOSA, detected in 33% of samples each, 2H,2H,3H,3H-perfluorooctanoic acid (5:3 FTCA) and PFDS detected in 22% of samples each, and perfluorododecanesulfonic acid (PFDoDS) detected in 11% of samples. Notably, 26 of the 70 PFAS compounds were not detected in any of the samples, 16 of which are included only in the 70 PFAS method (excluded from USEPA Methods 537.1, 533, or 1633).

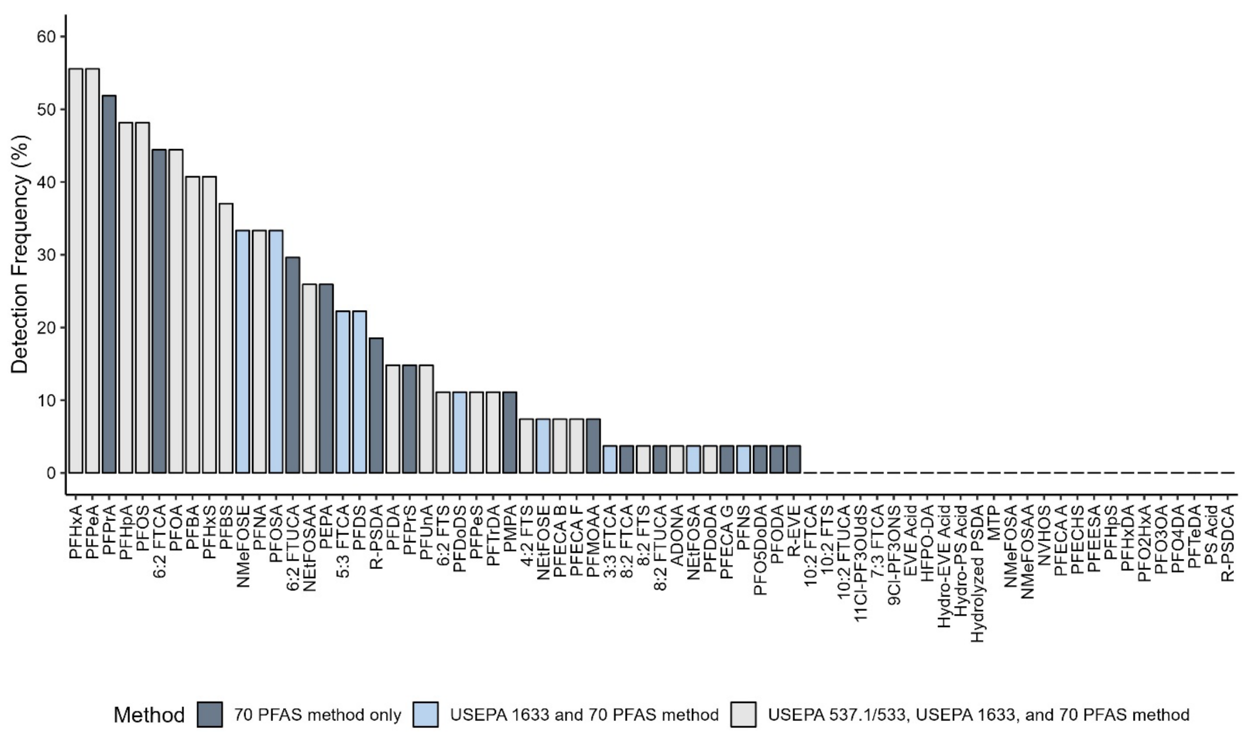

Figure 5. Detection frequencies (%) of PFAS compounds included in USEPA Methods 537.1/533, 1633, and/or the 70 PFAS method across all floor stripping wastewater, floor strippers, floor finish, and tap water samples (n = 27).

At the time of sample collection (summer 2022), the 70 PFAS method offered by Eurofins was one of the only commercially available methods to offer an analyte list of that magnitude. With continually improving analytical capabilities and broader access to PFAS standards, more laboratories are now expanding their targeted analyte methods to include lesser-known precursor compounds. Results herein suggest that several PFAS compounds are missed when analyzing samples for a shorter list of 29 or even 40 PFAS compounds. However, costs for expanded analyte lists remain high, and consideration should be given on a sample-by-sample basis of the value added by analyzing using an expanded list.

TOP and AOF

A subset of samples was analyzed by two additional PFAS techniques – TOP and AOF – with the goal of better understanding the extent to which the 70 PFAS method captures total detectable PFAS in these samples. The subset included four samples from floor stripping and refinishing activities (2 wastewater samples, 1 floor stripper, and 1 floor finish) and four samples from routine floor cleaning activities (2 wastewater samples and 2 floor cleaning products).

For floor stripping and refinishing activities, TOP substantially increased PFAS concentrations in all four samples, indicating considerable contributions of unidentified precursors not captured by the 70 PFAS method (Figure 6). PFAS concentrations in wastewater following oxidation (postTOP) ranged from 2 to 15 parts per million (ppm) – 47 and 128 times greater than preTOP concentrations – and were attributed primarily to perfluoropentanoic acid (PFPeA) and PFHxA. For the floor stripper (sample 1-ECC), TOP only modestly increased PFAS concentrations from 39,000 ppt in the preTOP sample to 93,000 ppt post-TOP, but for the floor finish (sample 1-EFF) PFAS concentrations were substantially elevated from 17,000 ppt in the preTOP sample to 41.5 ppm postTOP.

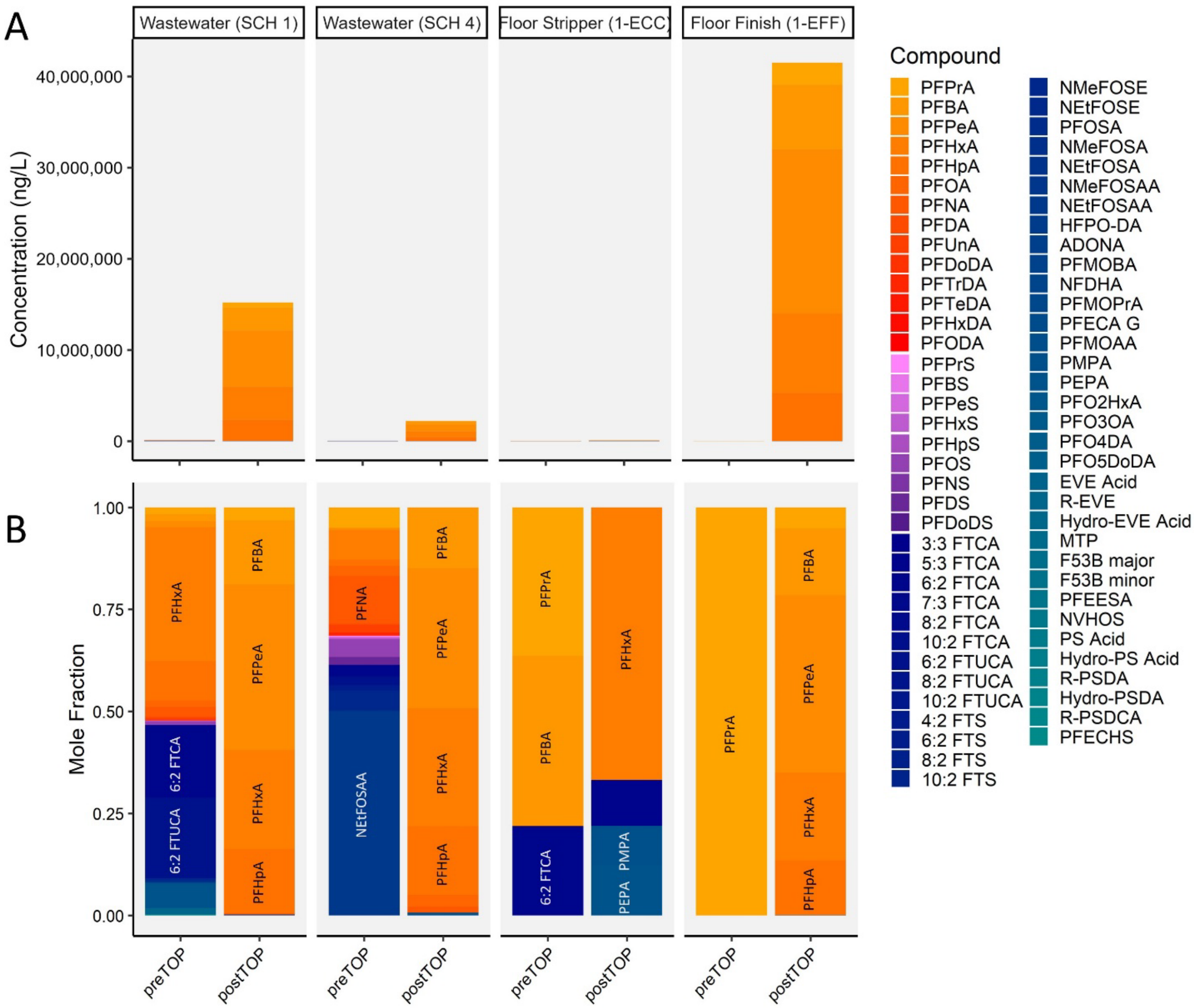

Figure 6. Pre- and post-TOP PFAS concentrations (ng L^{-1}) (A) and mole fraction (B) in a subset of samples of floor stripping wastewater, floor stripper, and floor finish.

For routine cleaning activities, TOP generated inconsistent results, in some cases leading to a substantial increase in PFAS concentrations relative to preTOP concentrations (up to 9 times increase for floor cleaner sample DB4) and in other cases leading to a substantial decrease (up to 9 times decrease for routine floor cleaning wastewater from school 4) (Figure 7). TOP is generally expected to increase detectable PFAS mass, converting unidentified precursors to detectable PFAAs, so the decrease in postTOP PFAS concentrations, along with the emergence of precursors in post-TOP samples, is indicative that oxidation may have been incomplete for these samples (see further discussion in "Limitations" below).

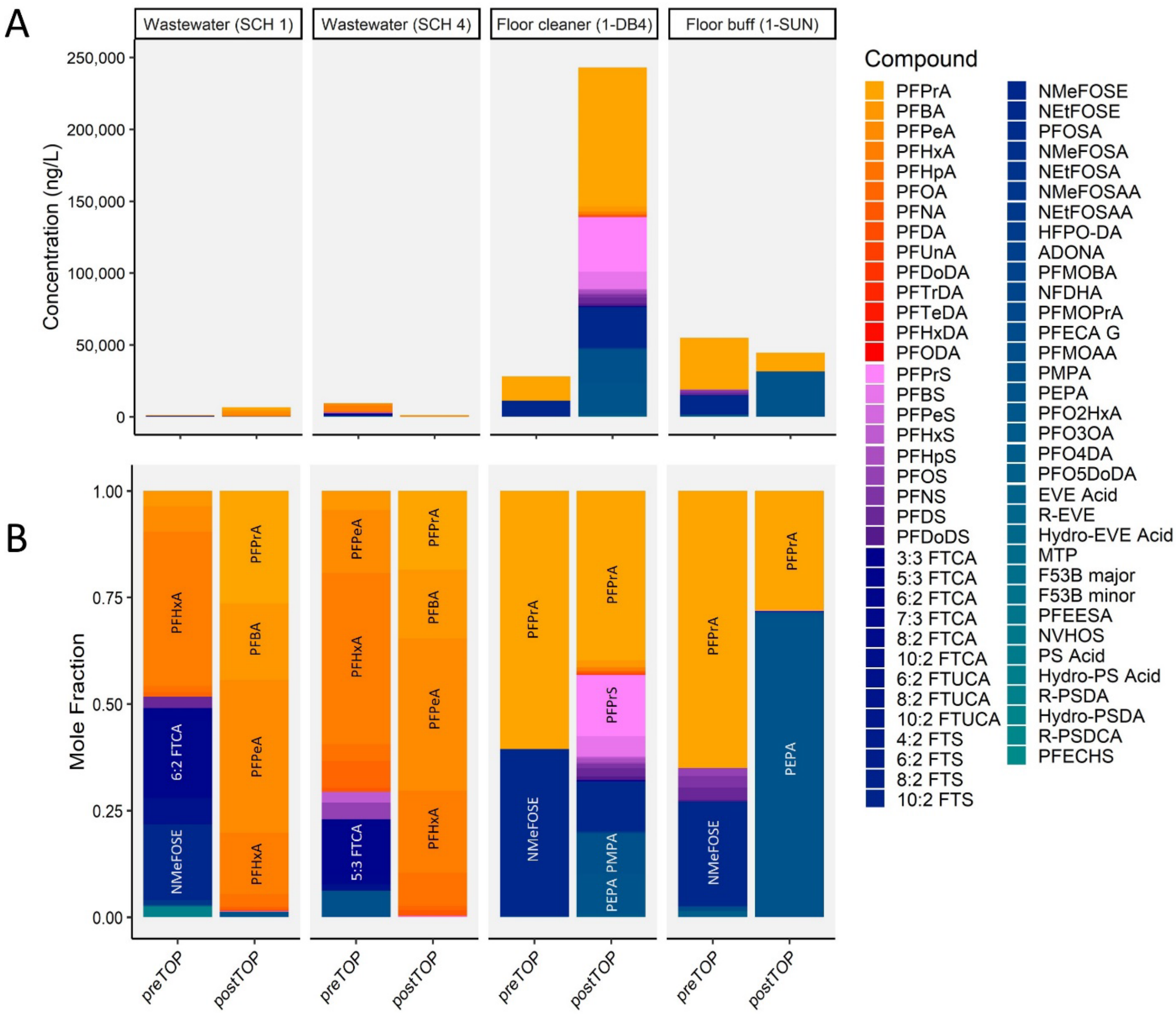

Figure 7. Pre- and post-TOP PFAS concentrations (ng L^{-1}) (A) and mole fraction (B) in a subset of samples of routine floor cleaning wastewater and cleaning products.

Across all stripping/refinishing and routine floor cleaning samples, the 70 PFAS method detected 6% or less of the total concentration of the AOF (Figure 8), inferring that the vast majority of PFAS mass remains undetected when relying on targeted analyses – even when using the 70 PFAS method. In most cases, TOP increased the proportion of AOF detected. This was most apparent for samples associated with floor stripping and refinishing activities, where in one sample (stripping wastewater from school 4), TOP-derived fluorine was more than double that derived from AOF (Figure 8A). For samples associated with routine floor cleaning activities, only up to 5% of AOF was detected using TOP, though for one sample (routine wastewater from school 4), AOF was less than the method detection limit (Figure 8B).

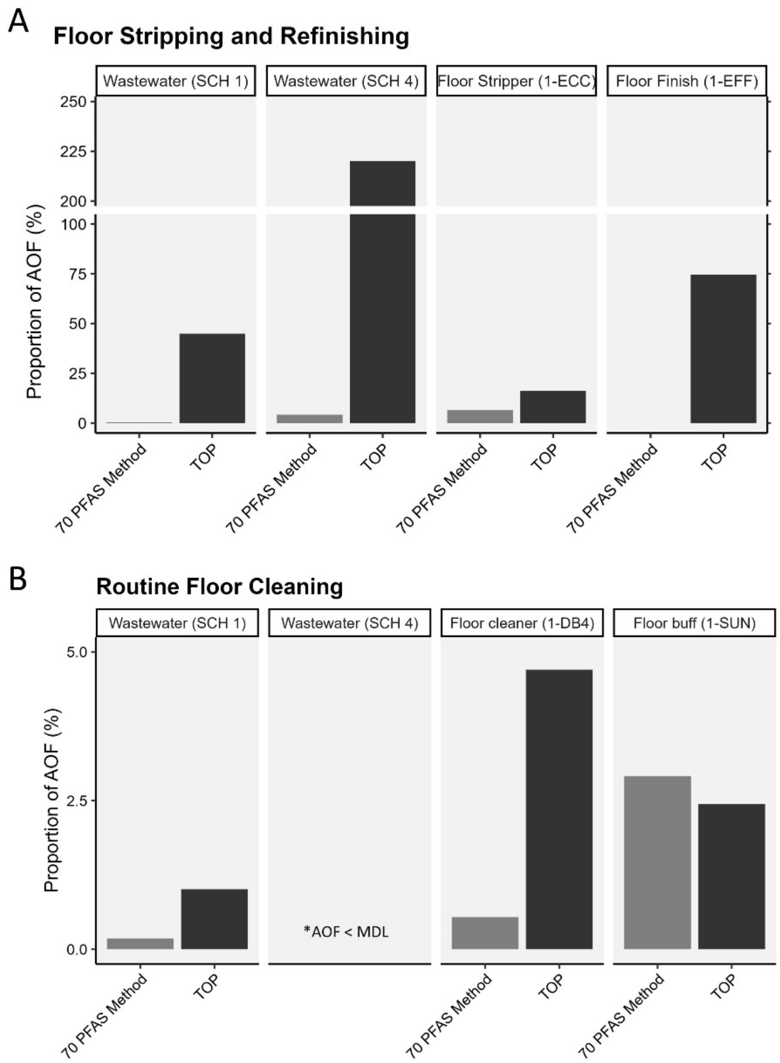

Figure 8. Proportion (%) of AOF detected by the 70 PFAS method and TOP in a subset of samples associated with floor stripping and refinishing (A) and routine floor cleaning (B).

Limitations

In this study, analytical depth was valued over sample size breadth, considering both resource limitations and the study's primary objective: to characterize the extent to which floor stripping and refinishing activities at four schools may have contributed to PFAS contamination in their drinking water. While we expect that the conclusions drawn from samples collected at these four schools are reflective of floor cleaning activities in general, follow-on sampling initiatives are ongoing at other schools in the state.

Several analytical challenges arise when expanding PFAS testing beyond typical matrices (e.g. drinking water) and methods (e.g. USEPA Methods 537.1 or 533). For targeted analyses, isotopically labelled analogues are not available for many of the PFAS compounds included in the 70 PFAS method, necessitating use of non-analogues that are structurally similar but may complicate quantification. Additionally, ultra-short chain PFAS such as PFPrA are inherently challenging to analyze due to high polarity leading to low column retention (Björnsdotter et al., 2020), and in this study PFPrA was often detected in method blanks. At the other extreme, the hydrophobicity of very long-chain PFAS such as perfluorohexadecanoic acid (PFHxDA) and PFODA can result in poor elution of these compounds. In contrast to drinking water samples, wastewater and cleaning product samples have varying densities and viscosities and complex chemical compositions that can mask PFAS signals (Bangma et al., 2023) and raise reporting limits and detection limits. Consequently, many of the detections in these samples were qualified by the laboratory, most often to indicate detections less than the reporting limit but greater than the detection limit (J), values reported as estimated maximum possible concentration (I), laboratory control samples outside of the acceptance limits (*-/*+), or compounds found in the method blank (B). We chose to include all qualified data given the limited sample size of the study, recognizing that qualified detections are unlikely to impact the overall conclusions of the study.

The benefit of PFAS techniques such as TOP and AOF is their ability to capture more of the total PFAS mass in a sample than traditional targeted methods. In theory, total fluorine concentration should increase from a targeted analysis to TOP (post oxidation), and from the TOP analysis to AOF. While most of the samples that were analyzed for TOP and AOF in this study followed this pattern, some samples did not (e.g. stripping wastewater at school 4, where TOP-derived fluorine was more than double that of AOF). Inconsistencies may be attributed to analytical limitations, including elevated detection limits inherent in AOF methods, as well as matrix interferences in TOP, since other organics present in the sample can substantially influence the type and quantity of PFAS oxidized (McDonough et al., 2019).

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are drawn from NHDES' floor stripping/refinishing PFAS sampling initiative:

- PFAS concentration and composition: Floor stripping wastewater sampled at the four schools is highly concentrated with PFAS, at levels well above AGQS. Routine floor cleaning wastewater contains PFAS exceeding AGQS as well, albeit at lower concentrations than floor stripping wastewater.
- Surface extraction: PFAS in floor stripping wastewater is likely sourced from both strippers/finishes and the floors that are being stripped. Further testing is warranted regarding the importance of surface extraction in routine floor cleaning activities.
- Drinking water impacts: Schools on septic systems may potentially contaminate their own water supply and/or neighboring wells by disposing of floor cleaning wastewater onsite, depending on a number of factors, including site geology, well construction, and the proximity of wells to the septic system leach field.
- PFAS method comparison: Expanded PFAS analyte lists such as the 70 PFAS method provide modest additional information regarding PFAS concentrations than would be detected by standard targeted analyses. However, even expanded PFAS analytes characterize only a fraction of AOF.
- Analytical limitations: Samples derived from floor stripping/refinishing and routine cleaning activities have complex matrices that can interfere with laboratory quantification and impact data analysis. Follow-on studies are warranted to supplement the results of this sampling initiative.

Based on the above conclusions, NHDES has taken the following actions:

- All four schools received a letter from NHDES with the PFAS results associated with floor stripping activities at their school. The letter included an interpretation of results and recommendations to address PFAS levels in their discharged wastewater. Recommendations were as follows:
    1. Cease the discharge of wastewater derived from floor stripping into the school's septic system and contain this wastewater for follow-on disposal at a local or regional municipal wastewater treatment facility. NHDES can provide guidance information on the appropriate contacts and facilities that accept the wastewater because coordination with the receiving facility will be needed prior to disposal. Or,
    2. Install treatment for the floor stripping wastewater to reduce PFAS concentrations below applicable standards prior to its discharge to the school's septic system. Although high in PFAS concentration, the volume of wastewater generated by the floor stripping process is generally less than a few hundred gallons and therefore may not require a treatment system with a large footprint. NHDES encourages the school to contract with a firm that specializes in wastewater treatment design/installation if it decides to take this approach. Additionally, if treatment for removal of PFAS from its floor stripping wastewater is installed, NHDES is required to be notified because additional permitting requirements may apply.
- NHDES has launched several statewide and regional outreach initiatives to address PFAS contamination derived from floor stripping and refinishing activities. These include:
    1. A letter to all school superintendents and principals recommending that schools (particularly those with septic systems) test their floor stripping wastewater for PFAS.
    2. Presentations to key stakeholders, including school facility directors, trade groups of other industries likely to generate similar floor cleaning waste streams (e.g. grocery stores), and other state agencies.
    3. Continued communication with school staff and opportunistic follow-on sampling associated with floor cleaning activities at schools.

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Appendix A:

PFAS Analytes

Appendix A: PFAS Analytes

Abbreviation	Chemical Name	CAS Number	Molecular Formula	Category	Regulated in NH	USEPA Method 533	USEPA Method 537.1	USEPA Draft Method 1633	70 PFAS Test Method	Isotope Dilution Analog for 70 PFAS test	Range of RL for 70 PFAS test (ng L^{-1})			Range of MDL for 70 PFAS test (ng L^{-1})		
											Tap Water	Product	Wastewater	Tap water	Product	Wastewater
PFPrA	Perfluoropropanoic acid	422-64-0	C3HF5O2	PFCA	NO	NO	NO	NO	YES	13C4-PFBA	1.7-4.7	1.7-25,000	20-5,000	0.69-2.6	0.67-15,000	8-3,000
PFBA	Perfluorobutanoic acid	375-22-4	C4HF7O2	PFCA	NO	YES	NO	YES	YES	13C4-PFBA	1.7-4.7	1.7-25,000	20-5,000	0.87-10.9	0.84-10,000	10-2,000
PFPeA	Perfluoropentanoic acid	2706-90-3	C5HF9O2	PFCA	NO	YES	NO	YES	YES	13C5-PFPeA	1.7-1.9	1.7-10,000	20-2,000	0.26-0.47	0.25-2,500	3-500
PFHxA	Perfluorohexanoic acid	307-24-4	C6HF11O2	PFCA	NO	YES	YES	YES	YES	13C5-PFHxA	1.7-1.9	1.7-10,000	20-2,000	0.17-0.47	0.17-2,500	2-500
PFHpA	Perfluoroheptanoic acid	375-85-9	C7HF13O2	PFCA	NO	YES	YES	YES	YES	13C4-PFHpA	1.7-1.9	1.7-10,000	20-2,000	0.26-0.47	0.25-2,500	3-500
PFOA	Perfluorooctanoic acid	335-67-1	C8HF15O2	PFCA	YES	YES	YES	YES	YES	13C8-PFOA	1.7-4.7	1.7-10,000	20-2,000	0.26-0.47	0.25-2,500	3-500
PFNA	Perfluorononanoic acid	375-95-1	C9HF17O2	PFCA	YES	YES	YES	YES	YES	13C9-PFNA	1.7-1.9	1.7-10,000	20-2,000	0.17-0.47	0.17-2,500	2-500
PFDA	Perfluorodecanoic acid	335-76-2	C10HF19O2	PFCA	NO	YES	YES	YES	YES	13C6-PFDA	1.7-1.9	1.7-10,000	20-2,000	0.26-0.47	0.25-2,500	3-500
PFUnA	Perfluoroundecanoic acid	2058-94-8	C11HF21O2	PFCA	NO	YES	YES	YES	YES	13C7-PFUnDA	1.7-1.9	1.7-10,000	20-2,000	0.26-0.47	0.25-2,500	3-500
PFDoDA	Perfluorododecanoic acid	307-55-1	C12HF23O2	PFCA	NO	YES	YES	YES	YES	13C2-PFDoDA	1.7-1.9	1.7-10,000	20-2,000	0.35-0.47	0.34-2,500	4-500
PFTrDA	Perfluorotridecanoic acid	72629-94-8	C13HF25O2	PFCA	NO	NO	YES	YES	YES	13C2-PFDoDA	1.7-1.9	1.7-10,000	20-2,000	0.35-0.47	0.34-2,500	4-500
PFTeDA	Perfluorotetradecanoic acid	376-06-7	C14HF27O2	PFCA	NO	NO	YES	YES	YES	13C2-PFTeDA	1.7-1.9	1.7-10,000	20-2,000	0.35-0.47	0.34-2,500	4-500
PFHxDA	Perfluorohexadecanoic acid	67905-19-5	C16HF31O2	PFCA	NO	NO	NO	NO	YES	13C2-PFTeDA	1.7-2.8	1.7-15,000	20-3,000	0.43-0.94	0.42-5,000	5-500
PFODA	Perfluorooctadecanoic acid	16517-11-6	C18HF35O2	PFCA	NO	NO	NO	NO	YES	13C2-PFTeDA	1.7-2.8	1.7-25,000	20-3,000	0.43-0.94	0.42-5,000	5-1,000
PFPrS	Perfluoropropanesulfonic acid	423-41-6	C3HF7O3S	PFSA	NO	NO	NO	NO	YES	13C4-PFBA	1.7-1.9	1.7-10,000	20-2,000	0.17-0.19	0.34-1,000	4-200
PFBS	Perfluorobutanesulfonic acid	375-73-5	C4HF9O3S	PFSA	NO	YES	YES	YES	YES	13C3-PFBS	1.7-4.7	1.7-10,000	20-2,000	0.26-0.47	0.25-2,500	3-500
PFPeS	Perfluoropentanesulfonic acid	2706-91-4	C5HF11O3S	PFSA	NO	YES	NO	YES	YES	13C3-PFBS	1.7-1.9	1.7-10,000	20-2,000	0.26-0.47	0.25-2,500	3-500
PFHxS	Perfluorohexanesulfonic acid	355-46-4	C6HF13O3S	PFSA	YES	YES	YES	YES	YES	13C3-PFHxS	1.7-1.9	1.7-10,000	20-2,000	0.17-0.47	0.17-2,500	2-500
PFHpS	Perfluoroheptanesulfonic acid	375-92-8	C7HF15O3S	PFSA	NO	YES	NO	YES	YES	13C3-PFHxS	1.7-1.9	1.7-10,000	20-2,000	0.26-0.47	0.25-2,500	3-500
PFOS	Perfluorooctanesulfonic acid	1763-23-1	C8HF17O3S	PFSA	YES	YES	YES	YES	YES	13C8-PFOS	1.7-1.9	1.7-10,000	20-2,000	0.43-0.47	0.25-2,500	5-500
PFNS	Perfluorononanesulfonic acid	68259-12-1	C9HF19O3S	PFSA	NO	NO	NO	YES	YES	13C8-PFOS	1.7-1.9	1.7-10,000	20-2,000	0.26-0.47	0.25-2,500	3-500
PFDS	Perfluorodecanesulfonic acid	335-77-3	C10HF21O3S	PFSA	NO	NO	NO	YES	YES	13C8-PFOS	1.7-1.9	1.7-10,000	20-2,000	0.26-0.47	0.25-2,500	3-500
PFDoDS	Perfluorododecanesulfonic acid	79780-39-5	C12HF25O3S	PFSA	NO	NO	NO	YES	YES	13C8-PFOS	1.7-2.7	1.7-15,000	20-3,000	0.26-0.47	0.25-2,500	3-500
3:3 FTCA	3:3 Fluorotelomer carboxylic acid	356-02-5	C6H5F7O2	Precursor	NO	NO	NO	YES	YES	13C5-PFPeA	1.7-1.9	1.7-10,000	20-2,000	0.26-0.28	0.42-1,500	5-300
5:3 FTCA	2H,2H,3H,3H-Perfluorooctanoic acid	914637-49-3	C8H5F11O2	Precursor	NO	NO	NO	YES	YES	13C4-PFHpA	1.7-1.9	1.7-10,000	20-2,000	0.17-0.19	0.42-1,000	2-200
6:2 FTCA	2-(Perfluorohexyl)ethanoic acid	53826-12-3	C8H3F13O2	Precursor	NO	NO	NO	NO	YES	13C2-6:2-FTCA	1.7-1.9	1.7-10,000	20-2,000	0.26-0.38	0.25-2,000	3-400
7:3 FTCA	3-(Perfluoroheptyl)propanoic acid	812-70-4	C10H5F15O2	Precursor	NO	NO	NO	YES	YES	13C2-6:2-FTCA	1.7-1.9	1.7-10,000	20-2,000	0.24-0.28	0.92-1,500	3-2,000
8:2 FTCA	2-(Perfluorooctyl)ethanoic acid	27854-31-5	C10H3F17O2	Precursor	NO	NO	NO	NO	YES	13C2-8:2-FTS	1.7-1.9	1.7-10,000	20-2,000	0.34-0.38	0.34-2,000	4-2,000
10:2 FTCA	2-(Perfluorodecyl)ethanoic acid	53826-13-4	C12H3F21O2	Precursor	NO	NO	NO	NO	YES	13C2-10:2-FTCA	1.7-1.9	1.7-10,000	20-2,000	0.43-0.47	0.42-2,500	5-500
6:2 FTUCA	2H-Perfluoro-2-octenoic acid	70887-88-6	C8H2F12O2	Precursor	NO	NO	NO	NO	YES	13C2-6:2-FTUCA	1.7-1.9	1.7-10,000	20-2,000	0.35-0.47	0.34-2,500	4-500
8:2 FTUCA	2H-Perfluoro-2-decenoic acid	70887-84-2	C10H2F16O2	Precursor	NO	NO	NO	NO	YES	13C2-8:2-FTUCA	1.7-1.9	1.7-10,000	20-2,000	0.35-0.47	0.5-5,000	4-1,000
10:2 FTUCA	2H-Perfluoro-2-dodecenoate	70887-94-4	C12H2F20O2	Precursor	NO	NO	NO	NO	YES	13C2-10:2-FTUCA	1.7-1.9	1.7-25,000	20-2,000	0.35-0.66	0.34-3,500	4-700
4:2 FTS	2-(Perfluorobutyl)-1-ethanesulfonic acid	757124-72-4	C6H5F9O3S	Precursor	NO	YES	NO	YES	YES	13C2-4:2-FTS	1.7-1.9	1.7-10,000	20-2,000	0.43-0.47	0.42-2,500	5-500
6:2 FTS	6:2 Fluorotelomer sulfonic acid	27619-97-2	C8H5F13O3S	Precursor	NO	YES	NO	YES	YES	13C2-6:2-FTS	1.7-4.7	1.7-25,000	20-5,000	0.43-3.6	0.5-10,000	5-4,200
8:2 FTS	8:2 Fluorotelomer sulfonic acid	39108-34-4	C10H5F17O3S	Precursor	NO	YES	NO	YES	YES	13C2-8:2-FTS	1.7-2.8	1.7-15,000	20-2,000	0.52-0.94	0.34-2,500	6-500
10:2 FTS	10:2 Fluorotelomer sulfonic acid	120226-60-0	C12H5F21O3S	Precursor	NO	NO	NO	NO	YES	13C3-8:2-FTS	1.7-4.7	1.7-10,000	20-5,000	0.86-0.94	0.67-5,000	8-1,000
NMeFOSE	N-Methyl-N-(2-hydroxyethyl)perfluorooctanesulfonamide	24448-09-7	C11H8F17NO3S	Precursor	NO	NO	NO	YES	YES	d7-NMeFOSAE	1.7-2.8	1.7-15,000	20-3,000	0.35-0.94	0.34-5,000	4-1,000
NEtFOSE	N-Ethyl-N-(2-hydroxyethyl)perfluorooctane sulfonamide	1691-99-2	C12H10F17NO3S	Precursor	NO	NO	NO	YES	YES	d9-NEtPFOSAE	1.7-2.8	1.7-15,000	20-3,000	0.35-0.94	0.34-5,000	4-1,000
PFOSA	Perfluorooctanesulfonamide	754-91-6	C8H2F17NO2S	Precursor	NO	NO	NO	YES	YES	13C8-PFOSA	1.7-1.9	1.7-10,000	20-2,000	0.26-0.47	0.42-2,500	3-500
NMeFOSA	N-Methylperfluorooctanesulfonamide	31506-32-8	C9H4F17NO2S	Precursor	NO	NO	NO	YES	YES	d3-NMePFOSA	1.7-2.8	1.7-15,000	20-3,000	0.61-0.94	0.59-5,000	7-1,000
NEtFOSA	N-Ethylperfluorooctanesulfonamide	4151-50-2	C10H6F17NO2S	Precursor	NO	NO	NO	YES	YES	d5-NEtPFOSA	1.7-4.7	1.7-25,000	20-5,000	0.35-0.94	0.34-5,000	4-1,000
NMeFOSAA	2-(N-Methylperfluorooctanesulfonamido)acetic acid	2355-31-9	C11H6F17NO4S	Precursor	NO	NO	YES	YES	YES	d3-NMeFOSAA	1.7-1.9	1.7-10,000	20-2,000	0.35-0.56	0.34-3,000	4-600
NEtFOSAA	2-(N-Ethylperfluorooctanesulfonamido)acetic acid	2991-50-6	C12H8F17NO4S	Precursor	NO	NO	YES	YES	YES	d5-NEtFOSAA	1.7-2.8	1.7-15,000	20-3,000	0.43-0.47	0.42-2,500	5-500
HFPO-DA	Perfluoro-2-methyl-3-oxahexanoic acid	13252-13-6	C6HF11O3	Precursor	NO	YES	YES	YES	YES	13C3-HFPO-DA	1.7-300	1.7-15,000	20-3,000	0.35-0.94	0.34-5,000	4-1,000
DONA	4,8-Dioxa-3H-perfluorononanoic acid	919005-14-4	C7H2F12O4	Precursor	NO	YES	YES	YES	YES	13C4-PFHpA	1.7-200	1.7-10,000	20-2,000	0.43-0.47	0.42-2,500	5-500
PFECA A	Perfluoro(4-methoxybutanoic acid)	863090-89-5	C5HF9O3	Precursor	NO	YES	NO	YES	YES	13C3-PFBS	1.7-200	1.7-10,000	20-2,000	0.17-0.26	0.25-1,000	2-200
PFECA B	Perfluoro-3,6-dioxaheptanoic acid	151772-58-6	C5HF9O4	Precursor	NO	YES	NO	YES	YES	13C3-PFBS	1.7-200	1.7-10,000	20-2,000	0.17-0.26	0.25-1,000	2-200
PFECA F	Perfluoro-3-methoxypropanoic acid	377-73-1	C4HF7O3	Precursor	NO	YES	NO	YES	YES	13C4-PFBA	1.7-200	1.7-10,000	20-2,000	0.17-0.26	0.25-1,000	2-200
PFECA G	Perfluoro-4-isopropoxybutanoic acid	801212-59-9	C7HF13O3	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-200	1.7-10,000	20-2,000	0.17-0.43	0.42-1,000	2-200
PFMOAA	Perfluoro-2-methoxyaceticacid	674-13-5	C3HF5O3	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-200	1.7-10,000	20-2,000	0.17-0.26	0.25-1,000	2-1,000
PMPA	Perfluoro-2-(perfluoromethoxy)propanoic acid	13140-29-9	C4HF7O3	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-200	1.7-10,000	20-2,000	0.17-0.52	0.5-1,000	2-200
PEPA	Perfluoro-2-ethoxypropanoic acid	267239-61-2	C5HF9O3	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-1.9	1.7-10,000	20-2,000	0.17-0.52	0.5-1,000	2-200
PFO2HxA	Perfluoro-3,5-dioxahexanoic acid	39492-88-1	C4HF7O4	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-1.9	1.7-10,000	20-2,000	0.17-0.26	0.25-1,000	2-200
PFO3OA	Perfluoro-3,5,7-trioxaoctanoic acid	39492-89-2	C5HF9O5	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-1.9	1.7-10,000	20-2,000	0.17-0.26	0.25-1,000	2-200
PFO4DA	Perfluoro-3,5,7,9-butaoxadecanoic acid	39492-90-5	C6HF11O6	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-1.9	1.7-10,000	20-2,000	0.26-0.66	0.25-3,500	3-700
PFO5DoDA	Perfluoro-3,5,7,9,11-pentaoxadodecanoic acid	39492-91-6	C7HF13O7	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-4.7	1.7-25,000	20-5,000	0.43-10.9	0.42-10,000	5-2,000
EVE Acid	Perfluoro-3-{[1-(ethenyloxy)propan-2-yl]oxy}propanoic acid	69087-46-3	C8HF13O4	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-9.4	1.7-50,000	20-2,000	0.43-2.8	0.42-15,000	5-3,000

Appendix A: PFAS Analytes (cont'd)

Abbreviation	Chemical Name	CAS Number	Molecular Formula	Category	Regulated in NH	USEPA Method 533	USEPA Method 537.1	USEPA Draft Method 1633	70 PFAS Test Method	Isotope Dilution Analog for 70 PFAS test	Range of RL for 70 PFAS test (ng L^{-1})			Range of MDL for 70 PFAS test (ng L^{-1})		
											Tap Water	Product	Wastewater	Tap water	Product	Wastewater
R-EVE	4-(2-Carboxy-1,1,2,2-tetrafluoroethoxy)-perfluoropentanoic acid	2416366-22-6	C8H2F12O5	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-1.9	1.7-10,000	20-2,000	0.43-0.38	0.42-2,000	4-400
Hydro-EVE Acid	2,2,3,3-Tetrafluoro-3-{[1,1,1,2,3,3-hexafluoro-3-(1,2,2,2-tetrafluoroethoxy)propan-2-yl]oxy}propanoic acid	773804-62-9	C8H2F14O4	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-1.9	1.7-10,000	20-10,000	0.17-0.43	0.42-1,000	2-200
MTP	2,2,3,3-Tetrafluoro-3-methoxypropanoic acid	93449-21-9	C4H4F4O3	Precursor	NO	NO	NO	NO	YES	13C4-PFBA	1.7-4.7	1.7-25,000	20-5,000	0.52-1.9	0.5-10,000	6-200
9Cl-PF3ONS	Perfluoro(2-((6-chlorohexyl)oxy)ethanesulfonic acid)	756426-58-1	C8HClF16O4S	Precursor	NO	YES	YES	YES	YES	13C8-PFOS	1.7-1.9	1.7-10,000	20-2,000	0.43-0.47	0.42-2,500	5-500
11Cl-PF3OUdS	11-Chloroperfluoro-3-oxaundecanesulfonic acid	763051-92-9	C10ClF20O4S	Precursor	NO	YES	YES	YES	YES	13C8-PFOS	1.7-1.9	1.7-10,000	20-2,000	0.43-0.47	0.42-2,500	5-500
PFEESA	Perfluoro-2-ethoxyethanesulfonic acid	113507-82-7	C4HF9O4S	Precursor	NO	YES	NO	YES	YES	13C3-PFBS	1.7-1.9	1.7-10,000	20-2,000	0.17-0.26	0.25-1,000	2-200
NVHOS	2-(1,2,2,2-Tetrafluoroethoxy)perfluoroethanesulfonic acid	801209-99-4	C4H2F8O4S	Precursor	NO	NO	NO	NO	YES	13C3-PFBS	1.7-1.9	1.7-10,000	20-2,000	0.17-0.35	0.34-1,000	2-200
PS Acid	Perfluoro-3,6-dioxa-4-methyl-7-octene-1-sulfonic acid	29311-67-9	C7HF13O5S	Precursor	NO	NO	NO	NO	YES	13C3-PFBS	1.7-9.4	1.7-50,000	20-10,000	0.26-0.52	0.5-15,000	6-3,000
Hydro-PS Acid	5-(1,2,2,2-Tetrafluoro)ethoxy-perfluoro-3-oxa-4-methylpentanesulfonic acid	749836-20-2	C7H2F14O5S	Precursor	NO	NO	NO	NO	YES	13C3-PFBS	1.7-1.9	1.7-10,000	20-2,000	0.17-0.43	0.42-1,000	2-200
R-PSDA	Perfluoro-4-(2-sulfoethoxy)pentanoic acid	2416366-18-0	C7H2F12O6S	Precursor	NO	NO	NO	NO	YES	13C3-PFBS	1.7-1.9	1.7-10,000	20-2,000	0.43-0.61	0.59-2,500	5-500
Hydrolyzed PSDA	Fluoro[perfluoro-2-(perfluoro-2-sulfoethoxy)propoxy]acetic acid	2416366-19-1	C7H3F11O7S	Precursor	NO	NO	NO	NO	YES	13C3-PFBS	1.7-1.9	1.7-10,000	20-2,000	0.77-0.85	0.34-4,500	4-900
R-PSDCA	1,1,2,2-Tetrafluoro-2-[(1,1,1,2,3,3,4,4-octafluorobutan-2-yl)oxy]ethane-1-sulfonic acid	2416366-21-5	C6H2F12O4S	Precursor	NO	NO	NO	NO	YES	13C3-PFBS	1.7-1.9	1.7-10,000	20-2,000	0.17-0.26	0.25-1,000	2-200
PFECHS	Perfluoro(perfluoroethyl)cyclohexanesulfonic acid	133201-07-7	C8HF15O3S	Precursor	NO	NO	NO	NO	YES	13C3-PFHxS	1.7-1.9	1.7-10,000	20-2,000	0.17-0.26	0.25-1,000	2-200

Appendix B:

PFAS Data for All Samples

Appendix B-1A: PFAS Data - School 1, Floor Stripping and Refinishing

Abbreviation	CAS Number	SCH 1 - Wastewater (preTOP)				SCH 1 - Wastewater (postTOP)				1-ECC (preTOP)				1-ECC (postTOP)				1-EFF (preTOP)				1-EFF (postTOP)				SCH 1 - Unfiltered Tap Water			
		Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.
PFPrA	422-64-0	2,200	500	200		550,000	250,000	100,000	*-	15,000	25,000	10,000	J	ND	250,000	100,000	*-	17,000	25,000	10,000	J	2,400,000	250,000	100,000	*-	9.5	4.3	1.7	
PFBA	375-22-4	2,200	500	200		2,500,000	250,000	100,000		16,000	25,000	10,000	J	ND	250,000	100,000		ND	25,000	10,000		7,100,000	250,000	100,000		3.6	4.3	1.7	J
PFPeA	2706-90-3	1,800	200	50		6,200,000	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		18,000,000	100,000	25,000		7.6	1.7	0.43	
PFHxA	307-24-4	38,000	2,000	500		3,600,000	100,000	25,000	I B	ND	10,000	2,500		60,000	100,000	25,000	J I B	ND	10,000	2,500		8,700,000	100,000	25,000	I B	7.5	1.7	0.43	
PFHpA	375-85-9	11,000	200	50		2,300,000	100,000	25,000	I	ND	10,000	2,500		ND	100,000	25,000	I	ND	10,000	2,500		5,300,000	100,000	25,000		5.1	1.7	0.43	
PFOA	335-67-1	1,700	200	50		41,000	100,000	25,000	J I B	ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		16	1.7	0.43	
PFNA	375-95-1	2,700	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		0.62	1.7	0.43	J
PFDA	335-76-2	280	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
PFUnA	2058-94-8	480	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
PFDoDA	307-55-1	100	200	50	J	ND	100,000	25,000		ND	10,000	2,500		ND	150,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
PFTrDA	72629-94-8	120	200	50	J	ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
PFTeDA	376-06-7	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
PFHxDA	67905-19-5	ND	300	100		ND	150,000	50,000	*- *1	ND	15,000	5,000		ND	150,000	50,000	*- *1	ND	15,000	5,000		ND	100,000	25,000	*- *1	ND	2.6	0.86	
PFODA	16517-11-6	ND	300	100		ND	150,000	50,000	*- *1	ND	15,000	5,000		ND	150,000	50,000	*- *1	ND	15,000	5,000		ND	150,000	50,000	*- *1	ND	2.6	0.86	
PFPrS	423-41-6	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	25,000		0.27	1.7	0.17	J
PFBS	375-73-5	130	200	50	J	ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		4.0	1.7	0.43	
PFPeS	2706-91-4	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		1.3	1.7	0.43	J
PFHxS	355-46-4	140	200	50	J	ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		5.4	1.7	0.43	
PFHpS	375-92-8	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
PFOS	1763-23-1	1,000	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		0.78	1.7	0.43	J I
PFNS	68259-12-1	ND	300	100		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
PFDS	335-77-3	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
PFDoDS	79780-39-5	ND	300	50		ND	150,000	25,000		ND	15,000	2,500		ND	150,000	25,000		ND	15,000	2,500		ND	150,000	25,000		ND	2.6	0.43	
3:3 FTCA	356-02-5	ND	200	30		ND	100,000	15,000		ND	10,000	1,500	*-	ND	100,000	15,000		ND	10,000	1,500	*-	ND	100,000	15,000		ND	1.7	0.26	
5:3 FTCA	914637-49-3	ND	200	20		13,000	100,000	10,000	J	ND	10,000	1,000	*-	11,000	100,000	10,000	J	ND	10,000	1,000	*-	ND	100,000	10,000		ND	1.7	0.17	
6:2 FTCA	53826-12-3	21,000	200	40		ND	100,000	20,000		8,000	10,000	2,000	J	ND	100,000	20,000		ND	10,000	2,000		ND	100,000	20,000		ND	1.7	0.35	
7:3 FTCA	812-70-4	ND	200	30	*-	ND	100,000	15,000	*-	ND	10,000	1,500	*-	ND	100,000	15,000	*-	ND	10,000	1,500	*-	ND	100,000	15,000	*-	ND	1.7	0.26	*-
8:2 FTCA	70887-84-2	43	200	40	J	ND	100,000	10,000		ND	10,000	2,000		ND	100,000	10,000		ND	10,000	2,000		ND	100,000	10,000		ND	1.7	0.35	
10:2 FTCA	53826-13-4	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
6:2 FTUCA	70887-88-6	24,000	200	50		ND	100,000	25,000		ND	10,000	2,500	*-	ND	100,000	25,000		ND	10,000	2,500	*-	ND	100,000	20,000		ND	1.7	0.43	
8:2 FTUCA	70887-84-2	ND	200	50		ND	100,000	25,000		ND	10,000	2,500	*-	ND	100,000	25,000		ND	10,000	2,500	*-	ND	100,000	25,000		ND	1.7	0.43	
10:2 FTUCA	70887-94-4	ND	200	70		ND	100,000	25,000		ND	10,000	3,500	*-	ND	100,000	35,000		ND	10,000	3,500	*-	ND	100,000	35,000		ND	1.7	0.60	
4:2 FTS	757124-72-4	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
6:2 FTS	27619-97-2	ND	500	200		ND	250,000	100,000		ND	25,000	10,000		ND	250,000	100,000		ND	25,000	10,000		ND	250,000	100,000		ND	4.3	1.70	
8:2 FTS	39108-34-4	ND	300	100		ND	150,000	25,000		ND	15,000	5,000		ND	150,000	50,000		ND	15,000	5,000		ND	100,000	50,000		ND	2.6	0.86	
10:2 FTS	120226-60-0	ND	500	100		ND	250,000	50,000		ND	25,000	5,000		ND	250,000	50,000		ND	25,000	5,000		ND	250,000	50,000		ND	4.3	0.86	
NMeFOSE	24448-09-7	540	300	100		ND	100,000	25,000		ND	15,000	5,000		ND	150,000	50,000		ND	15,000	5,000		ND	150,000	50,000		ND	2.6	0.86	
NEtFOSE	1691-99-2	ND	300	100		ND	150,000	50,000		ND	15,000	5,000		ND	150,000	50,000		ND	15,000	5,000		ND	150,000	50,000		ND	2.6	0.86	
PFOSA	754-91-6	240	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		4.1	1.7	0.43	
NMeFOSA	31506-32-8	ND	300	100	*+	ND	150,000	50,000		ND	15,000	5,000		ND	150,000	50,000		ND	15,000	5,000		ND	150,000	50,000		ND	2.6	0.86	*+
NEtFOSA	4151-50-2	540	500	100		ND	250,000	50,000		ND	25,000	5,000		ND	250,000	50,000		ND	25,000	5,000		ND	250,000	50,000		ND	4.3	0.86	
NMeFOSAA	2355-31-9	ND	200	60		ND	100,000	30,000		ND	10,000	3,000		ND	100,000	30,000		ND	10,000	3,000		ND	100,000	30,000		ND	1.7	0.52	
NEtFOSAA	2991-50-6	ND	300	50		ND	150,000	25,000		ND	15,000	2,500		ND	150,000	25,000		ND	15,000	2,500		ND	150,000	25,000		ND	2.6	0.43	
HFPO-DA	13252-13-6	ND	300	100		ND	150,000	25,000		ND	15,000	5,000		ND	150,000	25,000		ND	15,000	5,000		ND	150,000	25,000		ND	2.6	0.86	
DONA	919005-14-4	56	200	50	J	ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
PFECA A	863090-89-5	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
PFECA B	151772-58-6	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
PFECA F	377-73-1	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
PFECA G	801212-59-9	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
PFMOAA	674-13-5	ND	200	20		ND	100,000	10,000	*-	ND	10,000	1,000		ND	100,000	10,000	*-	ND	10,000	1,000		ND	100,000	10,000	*-	ND	1.7	0.17	
PMPA	13140-29-9	410	200	20		14,000	100,000	10,000	J B	ND	10,000	1,000		10,000	100,000	10,000	J B	ND	10,000	1,000		14,000	100,000	10,000	J B	ND	1.7	0.17	
PEPA	267239-61-2	7,400	200	20		ND	100,000	10,000		ND	10,000	1,000		12,000	100,000	10,000	J	ND	10,000	1,000		ND	100,000	10,000		1.1	1.7	0.17	J
PFO2HxA	39492-88-1	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
PFO3OA	39492-89-2	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
PFO4DA	39492-90-5	ND	200	70		ND	100,000	35,000		ND	10,000	3,500		ND	100,000	35,000		ND	10,000	3,500		ND	100,000	3,500		ND	1.7	0.60	
PFO5DoDA	39492-91-6	ND	500	200		ND	250,000	100,000		ND	25,000	10,000		ND	250,000	100,000		ND	25,000	10,000		ND	250,000	100,000		ND	4.3	1.70	
EVE Acid	69087-46-3	ND	1,000	300	*-	ND	500,000	150,000	*-	ND	50,000	15,000	*-	ND	500,000	150,000	*-	ND	50,000	15,000	*-	ND	500,000	15,000	*-	ND	8.6	2.60	*-
R-EVE	2416366-22-6	2,200	200	40		ND	100,000	20,000		ND	10,000	2,000	*-	ND	100,000	20,000		ND	10,000	2,000	*-	ND	100,000	10,000		ND	1.7	0.35	
Hydro-EVE Acid	773804-62-9	ND	200	20		ND	100,000	10,000	*-	ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
MTP	93449-21-9	ND	500	200		ND	250,000	150,000	*-	ND	25,000	10,000	*-	ND	250,000	100,000	*-	ND	25,000	10,000	*-	ND	250,000	100,000	*-	ND	4.3	1.70	
9Cl-PF3ONS	756426-58-1	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
11Cl-PF3OUdS	763051-92-9	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	10,000	2,500		ND	100,000	25,000		ND	1.7	0.43	
PFEESA	113507-82-7	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	25,000		ND	1.7	0.17	
NVHOS	801209-99-4	ND	200	20		ND	100,000	10,000		ND	10,000	2,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
PS Acid	29311-67-9	ND	1,000	300	*- *1	ND	500,000	150,000	*-	ND	50,000	15,000		ND	500,000	150,000	*-	ND	50,000	15,000	*-	ND	500,000	150,000	*-	ND	8.6	2.60	*- *1
Hydro-PS Acid	749836-20-2	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
R-PSDA	2416366-18-0	350	200	50		ND	100,000	25,000		ND	10,000	2,500	*-	ND	100,000	25,000		ND	10,000	2,500	*-	ND	100,000	25,000		ND	1.7	0.43	
Hydrolyzed PSDA	2416366-19-1	ND	200	90		ND	100,000	45,000		ND	10,000	4,500	*-	ND	100,000	45,000		ND	10,000	4,500	*-	ND	100,000	45,000		ND	1.7	0.78	
R-PSDCA	2416366-21-5	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
PFECHS	133201-07-7	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	10,000	1,000		ND	100,000	10,000		ND	1.7	0.17	
AOF	N/A	22,000,000	20,000,000	10,000,000		N/A	N/A	N/A	N/A	370,000	200,000	100,000		N/A	N/A	N/A	N/A	36,000,000	20,000,000	10,000,000		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All values are in units of ng/L. CAS = Chemical Abstracts Service registry number. Conc. = concentration. RL = reporting limit. MDL = method detection limit. Qual. = qualifier. ND = not detected. J = The analytical result was below the instrument calibration range, but above the method detection limit. The reported concentration is an estimate. I = Value is estimated maximum possible concentration. *- = Lab control sample and/or lab control sample duplicate is outside acceptance limits, low biased. *+ = Lab control sample and/or lab control sample duplicate is outside acceptance limits, high biased. *1 = Lab control sample and/or lab control sample duplicate relative percent difference exceeds control limits. B = Compound was found in the blank and sample.

Appendix B-1B: PFAS Data - School 1, Routine Floor Cleaning

Abbreviation	CAS Number	SCH 1 - Wastewater (preTOP)				SCH 1 - Wastewater (postTOP)				1-DB4 (preTOP)				1-DB4 (postTOP)				1-SUN (preTOP)				1-SUN (postTOP)				SCH 1 - Filtered Tap Water			
		Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.
PFPrA	422-64-0	ND	50	30		1,900	50	20	*+ B	17,000	1,300	750	B	97,000	1,300	500	*+ B	36,000	13,000	7,500	B	13,000	1,300	500	*+ B	4.2	1.7	0.69	B
PFBA	375-22-4	42	50	20	J	1,200	50	20		ND	1,300	500		3,400	1,300	500		ND	1,300	500		ND	1,300	500		1.1	1.7	0.87	J
PFPeA	2706-90-3	67	20	5.0		2,300	20	5.0		ND	500	130		220	500	130	J	ND	500	130		ND	500	130		2.3	1.7	0.26	
PFHxA	307-24-4	390	20	9.0		900	20	9.0	I	ND	500	230		1,700	500	230		ND	500	230		ND	500	230		1.4	1.7	0.17	J
PFHpA	375-85-9	16	20	5.0	J	180	20	5.0	I	ND	500	130		150	500	130	J	ND	500	130		ND	500	130		0.82	1.7	0.26	J I
PFOA	335-67-1	10	20	5.0	J	30	20	5.0	I B	ND	500	130		330	500	130	J I	ND	500	130		ND	500	130		ND	1.7	0.26	
PFNA	375-95-1	ND	20	5.0		19	20	5.0	J I	ND	500	130		710	500	130		ND	500	130		ND	500	130		ND	1.7	0.17	
PFDA	335-76-2	ND	20	5.0		8.0	20	5.0	J I	ND	500	130		500	500	130	I	ND	500	130		ND	500	130		ND	1.7	0.26	
PFUnA	2058-94-8	ND	20	5.0		5.2	20	5.0	J I	ND	500	130		ND	500	130		ND	500	130		ND	500	130		ND	1.7	0.26	
PFDoDA	307-55-1	ND	20	5.0		ND	20	5.0		ND	500	130		ND	500	130	*1	ND	500	130		ND	500	130		ND	1.7	0.35	
PFTrDA	72629-94-8	ND	20	5.0		ND	20	5.0		ND	500	130		230	500	130	J I	ND	500	130		ND	500	130		ND	1.7	0.35	
PFTeDA	376-06-7	ND	20	5.0		ND	20	5.0		ND	500	130		ND	500	130		ND	500	130		ND	500	130		ND	1.7	0.35	
PFHxDA	67905-19-5	ND	30	10		ND	30	10	*- *1	ND	750	250		ND	750	250		ND	750	250		ND	750	250	*- *1	ND	1.7	0.43	
PFODA	16517-11-6	ND	30	10		ND	30	10	*- *1	ND	750	250		ND	750	250	*- *1	ND	750	250		ND	750	250	*- *1	ND	1.7	0.43	
PFPrS	423-41-6	ND	20	2.0		ND	20	2.0		ND	500	50		38,000	500	50		ND	500	50		57	500	50	J	ND	1.7	0.35	
PFBS	375-73-5	ND	20	5.0		8.8	20	5.0	J	ND	500	130		12,000	500	130	I	ND	500	130		ND	500	130		0.63	1.7	0.26	J
PFPeS	2706-91-4	ND	20	2.0		ND	20	5.0		ND	500	130		210	500	130	J I	ND	500	130		ND	500	130		ND	1.7	0.26	
PFHxS	355-46-4	ND	20	5.0		ND	20	5.0		ND	500	130		750	500	130	I	ND	500	130		ND	500	130		ND	1.7	0.17	
PFHpS	375-92-8	ND	20	5.0		ND	20	5.0		ND	500	130		2,200	500	130	I	ND	500	130		ND	500	130		ND	1.7	0.26	
PFOS	1763-23-1	ND	20	10		ND	20	10		ND	500	250		770	500	250		960	500	250	I B	ND	500	250		ND	1.7	0.43	
PFNS	68259-12-1	ND	20	5.0		ND	20	5.0		ND	500	130		2,100	500	130	I	1,300	500	130	I	ND	500	130		ND	1.7	0.26	
PFDS	335-77-3	29	20	5.0		ND	20	2.0		ND	500	130		4,100	500	130	I	1,400	500	130	I	ND	500	130		ND	1.7	0.26	
PFDoDS	79780-39-5	ND	30	5.0		ND	30	5.0		ND	750	130		1,700	750	130		180	750	130	J	ND	750	130		ND	1.7	0.26	
3:3 FTCA	356-02-5	ND	20	3.0		ND	20	3.0		ND	500	75		ND	500	75		ND	500	75		ND	500	75		ND	1.7	0.43	
5:3 FTCA	914637-49-3	34	20	2.0		ND	20	2.0		ND	500	50		330	500	50	J B	ND	500	50		77	500	50	J	ND	1.7	0.43	*+
6:2 FTCA	53826-12-3	200	20	4.0	*-	ND	20	4.0		ND	500	100	*-	400	500	100	J *+	ND	500	100	*-	ND	500	100		ND	1.7	0.26	*- *1
7:3 FTCA	812-70-4	ND	20	3.0		ND	20	3.0		ND	500	75		79	500	75	J *+	ND	500	75		ND	500	75		ND	1.7	0.95	
8:2 FTCA	70887-84-2	ND	20	4.0		ND	20	2.0		ND	500	100	*- *1	ND	500	50	*+	ND	500	100	*- *1	ND	500	50		ND	1.7	0.35	*-
10:2 FTCA	53826-13-4	ND	20	5.0		ND	20	5.0	*+	ND	500	130	*-	ND	500	130	*+	ND	500	130	*-	ND	500	130	*-	ND	1.7	0.43	*-
6:2 FTUCA	70887-88-6	70	20	5.0		ND	20	5.0		ND	500	130		ND	500	130		ND	500	130		ND	500	130		ND	1.7	0.35	*+
8:2 FTUCA	70887-84-2	ND	20	5.0		ND	20	5.0		ND	500	130		ND	500	130		ND	500	130		ND	500	130		ND	1.7	0.35	*+
10:2 FTUCA	70887-94-4	ND	20	7.0		ND	20	7.0		ND	500	180		ND	500	180		ND	500	180		ND	500	180		ND	1.7	0.35	*+
4:2 FTS	757124-72-4	ND	20	5.0		ND	20	5.0		ND	500	130		ND	500	130		ND	500	130		ND	500	130		ND	1.7	0.43	*+
6:2 FTS	27619-97-2	ND	50	42		ND	50	42		ND	1,300	1,100		ND	1,300	1,100		ND	1,300	1,100		ND	1,300	1,100		ND	1.7	0.43	
8:2 FTS	39108-34-4	ND	30	10		ND	30	10		ND	750	250		ND	750	250		ND	750	250		ND	750	250		ND	1.7	0.52	*+
10:2 FTS	120226-60-0	ND	50	10		ND	50	10		ND	1,300	250	*-	ND	1,300	250		ND	1,300	250		ND	1,300	250		ND	1.7	0.69	*+
NMeFOSE	24448-09-7	220	30	10		ND	30	10		11,000	750	250		28,000	750	250		13,000	750	250		ND	750	250		ND	1.7	0.35	
NEtFOSE	1691-99-2	ND	30	10		ND	30	10	*-	ND	750	250		ND	750	250		600	750	250	J	ND	750	250	*-	ND	1.7	0.35	
PFOSA	754-91-6	ND	20	7.0		ND	20	7.0		ND	500	180		ND	500	180		ND	500	180		ND	500	180		0.83	1.7	0.26	J
NMeFOSA	31506-32-8	ND	30	10		ND	30	10		ND	750	250		510	750	250	J	ND	750	250		ND	750	250		ND	1.7	0.61	
NEtFOSA	4151-50-2	ND	50	10		ND	50	10		ND	1,300	250		ND	1,300	250		ND	1,300	250		ND	1,300	250		ND	1.7	0.35	
NMeFOSAA	2355-31-9	ND	20	6.0		ND	20	6.0		ND	500	150		ND	500	150		ND	500	150		ND	500	150		ND	1.7	0.35	
NEtFOSAA	2991-50-6	16	30	5.0	J	ND	30	5.0		ND	750	130		ND	750	130		ND	750	130		ND	750	130		ND	1.7	0.43	
HFPO-DA	13252-13-6	ND	30	10		ND	30	10		ND	750	250		390	750	250	J	ND	750	250		ND	750	250		ND	1.7	0.35	
DONA	919005-14-4	ND	20	5.0		ND	20	5.0		ND	500	130		ND	500	130		ND	500	130		ND	500	130		ND	1.7	0.43	
PFECA A	863090-89-5	ND	20	2.0		ND	20	2.0		ND	500	50		ND	500	50		ND	500	50		ND	500	50		ND	1.7	0.26	*+
PFECA B	151772-58-6	ND	20	2.0		ND	20	2.0		ND	500	50		ND	500	50		ND	500	50		93	500	50	J	ND	1.7	0.26	*+
PFECA F	377-73-1	ND	20	2.0		ND	20	2.0		ND	500	50		520	500	50		ND	500	50		ND	500	50		ND	1.7	0.26	
PFECA G	801212-59-9	ND	20	2.0		ND	20	2.0		ND	500	50		ND	500	50		250	500	50	J	ND	500	50		ND	1.7	0.43	*+
PFMOAA	674-13-5	ND	20	2.0		ND	20	2.0	*-	57	500	50	J *-	ND	500	50		370	500	50	J *-	ND	500	50	*-	ND	1.7	0.26	
PMPA	13140-29-9	ND	20	2.0		33	20	2.0	B	ND	500	50		23,000	500	50	B	ND	500	50		370	500	50	J B	ND	1.7	0.52	
PEPA	267239-61-2	2.9	20	2.0	J	52	20	2.0		ND	500	50		21,000	500	50	B	ND	500	50		31,000	500	50		ND	1.7	0.52	
PFO2HxA	39492-88-1	ND	20	2.0		ND	20	2.0		ND	500	50		1,800	500	50		ND	500	50		ND	500	50		ND	1.7	0.26	
PFO3OA	39492-89-2	ND	20	2.0		ND	20	2.0		ND	500	50		ND	500	50		ND	500	50		ND	500	50		ND	1.7	0.26	
PFO4DA	39492-90-5	ND	20	2.0		ND	20	7.0		ND	500	180		730	500	180		ND	500	180		ND	500	180		ND	1.7	0.26	*+
PFO5DoDA	39492-91-6	ND	50	20		ND	50	20		ND	1,300	500		ND	1,300	500		810	1,300	500	J	ND	1,300	500		ND	1.7	0.43	
EVE Acid	69087-46-3	ND	100	30	*-	ND	100	30	*-	ND	2,500	750	*-	ND	2,500	750	*-	ND	2,500	750	*-	ND	2,500	750	*-	ND	1.7	0.43	*-
R-EVE	2416366-22-6	ND	20	4.0		ND	20	4.0		ND	500	100		280	500	100	J	ND	500	100		ND	500	100		ND	1.7	0.43	*+
Hydro-EVE Acid	773804-62-9	ND	20	2.0		ND	20	2.0		ND	500	50		53	500	50	J	ND	500	50		ND	500	50		ND	1.7	0.43	*+
MTP	93449-21-9	ND	50	20		ND	50	20	*-	ND	1,300	500	*-	ND	1,300	500	*-	ND	1,300	500	*-	ND	1,300	500	*-	ND	1.7	0.52	
9Cl-PF3ONS	756426-58-1	ND	20	5.0		ND	20	5.0		ND	500	130		ND	500	130		ND	500	130		ND	500	130		ND	1.7	0.43	*+
11Cl-PF3OUdS	763051-92-9	ND	20	5.0		ND	20	5.0		ND	500	130		ND	500	130		ND	500	130		ND	500	130		ND	1.7	0.43	*+
PFEESA	113507-82-7	ND	20	2.0		ND	20	2.0		ND	500	50		ND	500	50		ND	500	50		ND	500	50		ND	1.7	0.26	
NVHOS	801209-99-4	ND	20	2.0		ND	20	2.0		ND	500	50		ND	500	50		ND	500	50		ND	500	50		ND	1.7	0.35	*+
PS Acid	29311-67-9	ND	100	30	*-	ND	100	30	*-	ND	2,500	750	*-	ND	2,500	750	*-	ND	2,500	750	*-	ND	2,500	750	*-	ND	1.7	0.52	*-
Hydro-PS Acid	749836-20-2	ND	20	2.0		ND	20	2.0	*-	ND	500	50		ND	500	50		ND	500	50		ND	500	50		ND	1.7	0.43	*+
R-PSDA	2416366-18-0	35	20	5.0		ND	20	5.0		ND	500	130		ND	500	130		ND	500	130		ND	500	130	*-	ND	1.7	0.61	*+
Hydrolyzed PSDA	2416366-19-1	ND	20	9.0		ND	20	9.0	*-	ND	500	230		ND	500	230	*+	ND	500	230		ND	500	230		ND	1.7	0.35	*+
R-PSDCA	2416366-21-5	ND	20	2.0		ND	20	2.0		ND	500	50		ND	500	50		ND	500	50		ND	500	50		ND	1.7	0.26	*+
PFECHS	133201-07-7	ND	20	2.0		ND	20	2.0		ND	500	50		920	500	50		ND	500	50		ND	500	50		ND	1.7	0.26	
AOF	N/A	410,000	200,000	100,000		N/A	N/A	N/A	N/A	3,000,000	2,000,000	1,000,000		N/A	N/A	N/A	N/A	1,100,000	2,000,000	1,000,000	J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All values are in units of ng/L. CAS = Chemical Abstracts Service registry number. Conc. = concentration. RL = reporting limit. MDL = method detection limit. Qual. = qualifier. ND = not detected. J = The analytical result was below the instrument calibration range, but above the method detection limit. The reported concentration is an estimate. I = Value is estimated maximum possible concentration. *- = Lab control sample and/or lab control sample duplicate is outside acceptance limits, low biased. *+ = Lab control sample and/or lab control sample duplicate is outside acceptance limits, high biased. *1 = Lab control sample and/or lab control sample duplicate relative percent difference exceeds control limits. B = Compound was found in the blank and sample.

Appendix B-2A: PFAS Data - School 2, Floor Stripping and Refinishing

Abbreviation	CAS Number	SCH 2 - Wastewater				2-BUR				2-BEC				SCH 2 - Tap Water			
		Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.
PFPrA	422-64-0	ND	5,000	3,000		ND	5,000	3,000		ND	5,000	3,000		ND	4.3	2.60	
PFBA	375-22-4	3,500	5,000	2,000	J	ND	5,000	2,000		ND	5,000	2,000		ND	4.3	0.17	
PFPeA	2706-90-3	2,400	2,000	500		3,200	2,000	500		ND	2,000	500		1.3	1.7	0.43	J
PFHxA	307-24-4	19,000	2,000	500		7,200	2,000	500		1,100	2,000	500	J	2.0	1.7	0.43	
PFHpA	375-85-9	3,600	2,000	500		1,600	2,000	500	J	ND	2,000	500		ND	1.7	0.43	
PFOA	335-67-1	9,700	2,000	500		ND	2,000	500		ND	2,000	500		3.6	1.7	0.43	
PFNA	375-95-1	34,000	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFDA	335-76-2	1,100	2,000	500	J	ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFUnA	2058-94-8	4,900	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFDoDA	307-55-1	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFTrDA	72629-94-8	2,200	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFTeDA	376-06-7	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFHxDA	67905-19-5	ND	3,000	1,000		ND	3,000	1,000		ND	3,000	1,000		ND	2.6	0.86	
PFODA	16517-11-6	ND	3,000	1,000		ND	3,000	1,000		ND	3,000	1,000		ND	2.8	0.86	
PFPrS	423-41-6	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PFBS	375-73-5	ND	2,000	500		ND	2,000	500		ND	2,000	500		1.3	1.7	0.43	J
PFPeS	2706-91-4	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFHxS	355-46-4	5,800	2,000	500		ND	2,000	500		ND	2,000	500		0.86	1.7	0.43	J
PFHpS	375-92-8	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFOS	1763-23-1	19,000	2,000	500	I	ND	2,000	500		2,800	2,000	500	I	1.5	1.7	0.43	J
PFNS	68259-12-1	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFDS	335-77-3	39,000	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFDoDS	79780-39-5	ND	3,000	500		ND	3,000	500		ND	3,000	500		ND	2.6	0.43	
3:3 FTCA	356-02-5	ND	2,000	300	*-	ND	2,000	300	*-	ND	2,000	300	*-	ND	1.7	0.26	*-
5:3 FTCA	914637-49-3	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
6:2 FTCA	53826-12-3	4,100	2,000	400	*-	2,300	2,000	400	*-	ND	2,000	400	*-	0.61	1.7	0.34	J *-
7:3 FTCA	812-70-4	ND	2,000	300	*-	ND	2,000	300	*-	ND	2,000	300	*-	ND	1.7	0.26	*-
8:2 FTCA	70887-84-2	ND	2,000	400		ND	2,000	400		ND	2,000	400		ND	1.7	0.34	
10:2 FTCA	53826-13-4	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
6:2 FTUCA	70887-88-6	4,400	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
8:2 FTUCA	70887-84-2	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
10:2 FTUCA	70887-94-4	ND	2,000	700		ND	2,000	700		ND	2,000	700		ND	1.7	0.60	
4:2 FTS	757124-72-4	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
6:2 FTS	27619-97-2	14,000	5,000	4,200		ND	5,000	4,200		ND	5,000	4,200		ND	4.3	3.60	
8:2 FTS	39108-34-4	ND	3,000	1,000		ND	3,000	1,000		ND	3,000	1,000		ND	2.6	0.86	
10:2 FTS	120226-60-0	ND	5,000	1,000		ND	5,000	1,000		ND	5,000	1,000		ND	4.3	0.86	
NMeFOSE	24448-09-7	ND	3,000	1,000		ND	3,000	1,000		2,200	3,000	1,000	J	ND	2.6	0.86	
NEtFOSE	1691-99-2	ND	3,000	1,000		ND	3,000	1,000		ND	3,000	1,000		ND	2.6	0.86	
PFOSA	754-91-6	7,600	2,000	500		ND	2,000	500		ND	2,000	500		2.4	1.7	0.43	
NMeFOSA	31506-32-8	ND	3,000	1,000		ND	3,000	1,000		ND	3,000	1,000		ND	2.6	0.86	
NEtFOSA	4151-50-2	ND	5,000	1,000		ND	5,000	1,000		ND	5,000	1,000		ND	4.3	0.86	
NMeFOSAA	2355-31-9	ND	2,000	600		ND	2,000	600		ND	2,000	600		ND	1.7	0.51	
NEtFOSAA	2991-50-6	55,000	3,000	500		ND	3,000	500		ND	3,000	500		ND	2.6	0.43	
HFPO-DA	13252-13-6	ND	3,000	1,000		ND	3,000	1,000		ND	3,000	1,000		ND	2.6	0.86	
DONA	919005-14-4	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFECA A	863090-89-5	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PFECA B	151772-58-6	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PFECA F	377-73-1	ND	2,000	200		400	2,000	200	J	ND	2,000	200		ND	1.7	0.17	
PFECA G	801212-59-9	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PFMOAA	674-13-5	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PMPA	13140-29-9	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PEPA	267239-61-2	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PFO2HxA	39492-88-1	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PFO3OA	39492-89-2	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PFO4DA	39492-90-5	ND	2,000	700		ND	2,000	700		ND	2,000	700		ND	1.7	0.60	
PFO5DoDA	39492-91-6	ND	5,000	2,000		ND	5,000	2,000		ND	5,000	2,000		ND	4.3	1.70	
EVE Acid	69087-46-3	ND	10,000	3,000	*-	ND	10,000	3,000	*-	ND	10,000	3,000	*-	ND	8.6	2.60	*-
R-EVE	2416366-22-6	ND	2,000	400		ND	2,000	400		ND	2,000	400		ND	1.7	0.34	
Hydro-EVE Acid	773804-62-9	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
MTP	93449-21-9	ND	5,000	200		ND	5,000	2,000		ND	5,000	2,000		ND	4.3	1.70	
9Cl-PF3ONS	756426-58-1	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
11Cl-PF3OUdS	763051-92-9	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
PFEESA	113507-82-7	ND	2,000	200	*-	ND	2,000	200	*-	ND	2,000	200	*-	ND	1.7	0.17	*-
NVHOS	801209-99-4	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PS Acid	29311-67-9	ND	10,000	3,000	*-	ND	10,000	3,000	*-	ND	10,000	3,000	*-	ND	8.6	2.60	*-
Hydro-PS Acid	749836-20-2	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
R-PSDA	2416366-18-0	ND	2,000	500		ND	2,000	500		ND	2,000	500		ND	1.7	0.43	
Hydrolyzed PSDA	2416366-19-1	ND	2,000	900		ND	2,000	900		ND	2,000	900		ND	1.7	0.77	
R-PSDCA	2416366-21-5	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
PFECHS	133201-07-7	ND	2,000	200		ND	2,000	200		ND	2,000	200		ND	1.7	0.17	
AOF	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All values are in units of ng/L. CAS = Chemical Abstracts Service registry number. Conc. = concentration. RL = reporting limit. MDL = method detection limit. Qual. = qualifier. ND = not detected. J = The analytical result was below the instrument calibration range, but above the method detection limit. The reported concentration is an estimate. I = Value is estimated maximum possible concentration. *- = Lab control sample and/or lab control sample duplicate is outside acceptance limits, low biased. *+ = Lab control sample and/or lab control sample duplicate is outside acceptance limits, high biased. *1 = Lab control sample and/or lab control sample duplicate relative percent difference exceeds control limits. B = Compound was found in the blank and sample.

Appendix B-3A: PFAS Data - School 3, Floor Stripping and Refinishing

Abbreviation	CAS Number	SCH 3 - Wastewater				3-HPS				3-HTS				SCH 3 - Unfiltered Tap Water			
		Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.
PFPrA	422-64-0	1,000	500	200		ND	25,000	15,000		17,000	25,000	15,000	J	6.2	4.6	1.8	
PFBA	375-22-4	4,000	500	200		ND	25,000	10,000		ND	25,000	10,000		5.6	4.6	1.8	
PFPeA	2706-90-3	3,600	200	50		ND	10,000	2,500		ND	10,000	2,500		19	1.8	0.46	
PFHxA	307-24-4	35,000	200	50	*- *1	ND	10,000	2,500		ND	10,000	2,500		61	1.8	0.46	
PFHpA	375-85-9	2,500	200	50		ND	10,000	2,500		ND	10,000	2,500		3.8	1.8	0.46	
PFOA	335-67-1	400	200	50		ND	10,000	2,500		ND	10,000	2,500		19	1.8	0.46	
PFNA	375-95-1	1,700	200	50		ND	10,000	2,500		ND	10,000	2,500		1.1	1.8	0.46	J
PFDA	335-76-2	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
PFUnA	2058-94-8	210	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
PFDoDA	307-55-1	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
PFTrDA	72629-94-8	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
PFTeDA	376-06-7	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
PFHxDA	67905-19-5	ND	300	100		ND	15,000	5,000		ND	15,000	5,000		ND	2.7	0.91	
PFODA	16517-11-6	ND	300	100		5,000	15,000	5,000	J ^2	ND	15,000	5,000		ND	2.7	0.91	
PFPrS	423-41-6	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		0.54	1.8	0.18	J
PFBS	375-73-5	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		1.8	1.8	0.46	
PFPeS	2706-91-4	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		0.65	1.8	0.46	J
PFHxS	355-46-4	ND	200	50		9,500	10,000	2,500	J I	ND	10,000	2,500		2.2	1.8	0.46	
PFHpS	375-92-8	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
PFOS	1763-23-1	2,600	200	50	I	ND	10,000	2,500		ND	10,000	2,500		3.7	1.8	0.46	
PFNS	68259-12-1	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
PFDS	335-77-3	660	200	50	I	ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
PFDoDS	79780-39-5	ND	300	50		ND	1,500	2,500		ND	15,000	2,500		ND	2.7	0.46	
3:3 FTCA	356-02-5	110	200	30	J	ND	10,000	1,500	*-	ND	10,000	1,500	*-	ND	1.8	0.27	
5:3 FTCA	914637-49-3	3,100	200	20		ND	10,000	1,000	*-	ND	10,000	1,000	*-	ND	1.8	0.18	
6:2 FTCA	53826-12-3	7,000	200	40		ND	10,000	2,000	*-	4,300	10,000	2,000	J	ND	1.8	0.37	
7:3 FTCA	812-70-4	ND	200	30	*-	ND	10,000	1,500		ND	10,000	1,500	*-	ND	1.8	0.27	*-
8:2 FTCA	70887-84-2	ND	200	40		ND	10,000	2,000		ND	10,000	2,000		ND	1.8	0.37	
10:2 FTCA	53826-13-4	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
6:2 FTUCA	70887-88-6	32,000	200	50		ND	10,000	2,500	*-	ND	10,000	2,500	*-	ND	1.8	0.46	
8:2 FTUCA	70887-84-2	ND	200	50		ND	10,000	2,500	*-	ND	10,000	2,500	*-	ND	1.8	0.46	
10:2 FTUCA	70887-94-4	ND	200	70		ND	10,000	3,500	*-	ND	10,000	2,500	*-	ND	1.8	0.64	
4:2 FTS	757124-72-4	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		0.59	1.8	0.46	J I
6:2 FTS	27619-97-2	ND	500	200		ND	25,000	10,000		ND	25,000	10,000		ND	4.6	1.8	
8:2 FTS	39108-34-4	ND	300	100		ND	15,000	5,000		ND	15,000	5,000		ND	2.7	0.91	
10:2 FTS	120226-60-0	ND	500	200		ND	25,000	5,000		ND	25,000	5,000		ND	4.6	0.91	
NMeFOSE	24448-09-7	1,900	300	100		ND	15,000	5,000		ND	15,000	5,000		ND	2.7	0.91	
NEtFOSE	1691-99-2	730	300	100		ND	15,000	5,000		ND	15,000	5,000		ND	2.7	0.91	
PFOSA	754-91-6	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		1.2	1.8	0.46	J
NMeFOSA	31506-32-8	ND	300	100	*+	ND	15,000	5,000		ND	15,000	5,000		ND	2.7	0.91	*+
NEtFOSA	4151-50-2	ND	500	100		ND	25,000	5,000		ND	25,000	2,000		ND	4.6	0.91	
NMeFOSAA	2355-31-9	ND	200	60		ND	10,000	3,000		ND	10,000	3,000		ND	1.8	0.55	
NEtFOSAA	2991-50-6	570	300	50		ND	15,000	2,500		ND	15,000	2,500		0.47	2.7	0.46	J
HFPO-DA	13252-13-6	ND	300	100		ND	15,000	5,000		ND	15,000	5,000		ND	2.7	0.91	
DONA	919005-14-4	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
PFECA A	863090-89-5	ND	200	20		ND	10,000	1,000		ND	10,000	100		ND	1.8	0.18	
PFECA B	151772-58-6	37	200	20	J I	ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
PFECA F	377-73-1	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
PFECA G	801212-59-9	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
PFMOAA	674-13-5	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
PMPA	13140-29-9	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
PEPA	267239-61-2	1,200	200	20		ND	10,000	1,000		ND	10,000	1,000		0.29	1.8	0.18	J
PFO2HxA	39492-88-1	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
PFO3OA	39492-89-2	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
PFO4DA	39492-90-5	ND	200	70		ND	10,000	3,500		ND	10,000	3,500	*-	ND	1.8	0.64	
PFO5DoDA	39492-91-6	ND	500	200		ND	25,000	10,000		ND	25,000	10,000		ND	4.6	1.8	
EVE Acid	69087-46-3	ND	1,000	300	*-	ND	50,000	15,000	*-	ND	50,000	15,000	*-	ND	9.1	2.7	*-
R-EVE	2416366-22-6	ND	200	40		ND	10,000	2,000	*-	ND	10,000	2,000	*-	ND	1.8	0.37	
Hydro-EVE Acid	773804-62-9	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
MTP	93449-21-9	ND	500	200		ND	25,000	10,000	*-	ND	25,000	10,000	*-	ND	4.6	1.8	
9Cl-PF3ONS	756426-58-1	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
11Cl-PF3OUdS	763051-92-9	ND	200	50		ND	10,000	2,500		ND	10,000	2,500		ND	1.8	0.46	
PFEESA	113507-82-7	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
NVHOS	801209-99-4	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
PS Acid	29311-67-9	ND	1,000	300	*- *1	ND	50,000	15,000	*-	ND	50,000	15,000	*-	ND	9.1	2.7	*- *1
Hydro-PS Acid	749836-20-2	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
R-PSDA	2416366-18-0	260	200	50		ND	10,000	2,500	*-	8,500	10,000	2,500	J *-	ND	1.8	0.46	
Hydrolyzed PSDA	2416366-19-1	ND	200	90		ND	10,000	4,500	*-	ND	10,000	4,500	*-	ND	1.8	0.82	
R-PSDCA	2416366-21-5	ND	200	20		ND	10,000	1,000	*-	ND	10,000	1,000		ND	1.8	0.18	
PFECHS	133201-07-7	ND	200	20		ND	10,000	1,000		ND	10,000	1,000		ND	1.8	0.18	
AOF	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All values are in units of ng/L. CAS = Chemical Abstracts Service registry number. Conc. = concentration. RL = reporting limit. MDL = method detection limit. Qual. = qualifier. ND = not detected. J = The analytical result was below the instrument calibration range, but above the method detection limit. The reported concentration is an estimate. I = Value is estimated maximum possible concentration. *- = Lab control sample and/or lab control sample duplicate is outside acceptance limits, low biased. *+ = Lab control sample and/or lab control sample duplicate is outside acceptance limits, high biased. *1 = Lab control sample and/or lab control sample duplicate relative percent difference exceeds control limits. B = Compound was found in the blank and sample.

Appendix B-4A: PFAS Data - School 4, Floor Stripping and Refinishing

Abbreviation	CAS Number	SCH 4 - Wastewater (preTOP)				SCH 4 - Wastewater (postTOP)				4-BAB				4-SUP				4-BRE				SCH 4 - Unfiltered Tap Water			
		Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.
PFPrA	422-64-0	2,400	500	200		ND	250,000	100,000	*-	ND	25,000	15,000		ND	25,000	15,000		ND	25,000	15,000		21	4.7	1.9	
PFBA	375-22-4	ND	500	200		350,000	250,000	100,000		ND	25,000	10,000		ND	25,000	10,000		ND	25,000	10,000		11	4.7	1.9	
PFPeA	2706-90-3	230	200	50		770,000	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		26	1.9	0.47	
PFHxA	307-24-4	3,000	200	50		630,000	100,000	25,000	I B	ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		54	1.9	0.47	
PFHpA	375-85-9	620	200	50		360,000	100,000	25,000	I	ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		3.2	1.9	0.47	
PFOA	335-67-1	1,000	200	50		62,000	100,000	25,000	J I B	ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		11	1.9	0.47	
PFNA	375-95-1	4,600	200	50		29,000	100,000	25,000	J I	ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		20	1.9	0.47	
PFDA	335-76-2	110	200	50	J	ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		2.1	1.9	0.47	
PFUnA	2058-94-8	740	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
PFDoDA	307-55-1	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
PFTrDA	72629-94-8	300	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
PFTeDA	376-06-7	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
PFHxDA	67905-19-5	ND	300	100		ND	150,000	50,000	*- *1	ND	15,000	5,000		ND	15,000	5,000		ND	15,000	5,000		ND	2.8	0.94	
PFODA	16517-11-6	ND	300	100		ND	150,000	50,000	*- *1	ND	15,000	5,000		ND	15,000	5,000		ND	15,000	5,000		ND	2.8	0.94	
PFPrS	423-41-6	130	200	20	J	ND	100,000	10,000		ND	10,000	2,500		ND	10,000	1,000		ND	10,000	1,000		7	1.9	0.19	
PFBS	375-73-5	69	200	50	J	ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		2.5	1.9	0.47	
PFPeS	2706-91-4	50	200	50	J	ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
PFHxS	355-46-4	140	200	50	J	ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		0.84	1.9	0.47	J
PFHpS	375-92-8	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
PFOS	1763-23-1	1,900	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		19	1.9	0.47	
PFNS	68259-12-1	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
PFDS	335-77-3	790	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
PFDoDS	79780-39-5	ND	300	50		ND	150,000	25,000		ND	15,000	2,500		ND	15,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
3:3 FTCA	356-02-5	ND	200	30		ND	100,000	15,000		ND	10,000	1,500	*-	ND	10,000	1,500	*-	ND	10,000	1,500	*-	ND	1.9	0.28	
5:3 FTCA	914637-49-3	76	200	20	J	ND	100,000	10,000		ND	10,000	1,000	*-	ND	10,000	1,000	*-	ND	10,000	1,000	*-	0.46	1.9	0.19	J
6:2 FTCA	53826-12-3	1,100	200	40		ND	100,000	20,000		ND	10,000	2,000		ND	10,000	2,000		ND	10,000	2,000		7.8	1.9	0.38	
7:3 FTCA	812-70-4	ND	200	30	*-	ND	100,000	15,000	*-	ND	10,000	1,500	*-	ND	10,000	1,500	*-	ND	10,000	1,500	*-	ND	1.9	0.28	*-
8:2 FTCA	70887-84-2	ND	200	40		ND	100,000	10,000		ND	10,000	2,000		ND	10,000	2,000		ND	10,000	2,000		ND	1.9	0.38	
10:2 FTCA	53826-13-4	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
6:2 FTUCA	70887-88-6	900	200	50		ND	100,000	25,000		ND	10,000	2,500	*-	ND	10,000	2,500	*-	ND	10,000	2,500	*-	1.4	1.9	0.47	J
8:2 FTUCA	70887-84-2	52	200	50	J	ND	100,000	25,000		ND	10,000	2,500	*-	ND	10,000	2,500	*-	ND	10,000	2,500	*-	ND	1.9	0.47	
10:2 FTUCA	70887-94-4	ND	200	70		ND	100,000	35,000		ND	10,000	3,500	*-	ND	10,000	3,500	*-	ND	10,000	3,500	*-	ND	1.9	0.66	
4:2 FTS	757124-72-4	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
6:2 FTS	27619-97-2	610	500	200		ND	250,000	100,000		ND	25,000	10,000		ND	25,000	10,000		26,000	25,000	10,000		ND	4.7	1.9	
8:2 FTS	39108-34-4	ND	200	50		ND	150,000	50,000		ND	15,000	5,000		ND	15,000	5,000		ND	15,000	5,000		ND	2.8	0.94	
10:2 FTS	120226-60-0	ND	300	50		ND	250,000	50,000		ND	25,000	5,000		ND	25,000	5,000		ND	25,000	5,000		ND	4.7	0.94	
NMeFOSE	24448-09-7	2,300	300	100		ND	150,000	50,000		ND	15,000	5,000		ND	15,000	5,000		ND	15,000	5,000		ND	2.8	0.94	
NEtFOSE	1691-99-2	ND	300	100		ND	150,000	50,000		ND	15,000	5,000		ND	15,000	5,000		ND	15,000	5,000		ND	2.8	0.94	
PFOSA	754-91-6	62	200	50	J	ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		8.1	1.9	0.47	
NMeFOSA	31506-32-8	ND	300	100	*+	ND	150,000	50,000		ND	15,000	5,000		ND	15,000	5,000		ND	15,000	5,000		ND	2.8	0.94	*+
NEtFOSA	4151-50-2	ND	500	100		ND	250,000	50,000		ND	25,000	5,000		ND	25,000	5,000		ND	25,000	5,000		ND	4.7	0.94	
NMeFOSAA	2355-31-9	ND	200	60		ND	100,000	30,000		ND	10,000	3,000		ND	10,000	3,000		ND	10,000	3,000		ND	1.9	0.56	
NEtFOSAA	2991-50-6	25,000	300	50		ND	150,000	25,000		ND	15,000	2,500		ND	15,000	2,500		ND	15,000	2,500		35	2.8	0.47	
HFPO-DA	13252-13-6	ND	300	100		ND	150,000	25,000		ND	15,000	5,000		ND	15,000	5,000		ND	15,000	5,000		ND	2.8	0.94	
DONA	919005-14-4	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
PFECA A	863090-89-5	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
PFECA B	151772-58-6	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
PFECA F	377-73-1	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
PFECA G	801212-59-9	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
PFMOAA	674-13-5	ND	200	20		ND	100,000	10,000	*-	ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
PMPA	13140-29-9	ND	200	20		17,000	100,000	10,000	J B	ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		8.3	1.9	0.19	
PEPA	267239-61-2	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		0.79	1.9	0.19	J
PFO2HxA	39492-88-1	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
PFO3OA	39492-89-2	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
PFO4DA	39492-90-5	ND	200	70		ND	100,000	35,000		ND	10,000	3,500		ND	10,000	3,500		ND	10,000	3,500		ND	1.9	0.66	
PFO5DoDA	39492-91-6	ND	500	200		ND	250,000	100,000		ND	25,000	10,000		ND	25,000	10,000		ND	25,000	10,000		ND	4.7	1.9	
EVE Acid	69087-46-3	ND	1,000	300	*-	ND	500,000	150,000	*-	ND	50,000	15,000	*-	ND	50,000	15,000	*-	ND	50,000	15,000	*-	ND	9.4	2.8	*-
R-EVE	2416366-22-6	ND	200	40		ND	100,000	20,000		ND	10,000	2,000	*-	ND	10,000	2,000	*-	ND	10,000	2,000	*-	ND	1.9	0.38	
Hydro-EVE Acid	773804-62-9	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
MTP	93449-21-9	ND	500	200		ND	250,000	100,000		ND	25,000	10,000	*-	ND	25,000	10,000	*-	ND	25,000	10,000	*-	ND	4.7	1.9	
9Cl-PF3ONS	756426-58-1	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
11Cl-PF3OUdS	763051-92-9	ND	200	50		ND	100,000	25,000		ND	10,000	2,500		ND	10,000	2,500		ND	10,000	2,500		ND	1.9	0.47	
PFEESA	113507-82-7	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
NVHOS	801209-99-4	ND	200	20		ND	100000	10000		ND	10000	1000		ND	10000	1000		ND	10000	1000		ND	1.9	0.19	
PS Acid	29311-67-9	ND	1,000	300	*- *1	ND	500,000	150,000	*-	ND	50,000	15,000	*-	ND	50,000	15,000	*-	ND	50,000	15,000	*-	ND	9.4	2.8	*- *1
Hydro-PS Acid	749836-20-2	ND	200	20		ND	100,000	10,000	*-	ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
R-PSDA	2416366-18-0	ND	200	50		ND	100,000	25,000		ND	10,000	2,500	*-	ND	10,000	2,500	*-	ND	10,000	2,500	*-	ND	1.9	0.47	
Hydrolyzed PSDA	2416366-19-1	ND	200	90		ND	100,000	45,000		ND	10,000	4,500	*-	ND	10,000	4,500	*-	ND	10,000	4,500	*-	ND	1.9	0.85	
R-PSDCA	2416366-21-5	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
PFECHS	133201-07-7	ND	200	20		ND	100,000	10,000		ND	10,000	1,000		ND	10,000	1,000		ND	10,000	1,000		ND	1.9	0.19	
AOF	N/A	660,000	200,000	100,000		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All values are in units of ng/L. CAS = Chemical Abstracts Service registry number. Conc. = concentration. RL = reporting limit. MDL = method detection limit. Qual. = qualifier. ND = not detected. J = The analytical result was below the instrument calibration range, but above the method detection limit. The reported concentration is an estimate. I = Value is estimated maximum possible concentration. *- = Lab control sample and/or lab control sample duplicate is outside acceptance limits, low biased. *+ = Lab control sample and/or lab control sample duplicate is outside acceptance limits, high biased. *1 = Lab control sample and/or lab control sample duplicate relative percent difference exceeds control limits. B = Compound was found in the blank and sample.

Appendix B-4B: PFAS Data - School 4, Routine Floor Cleaning

Abbreviation	CAS Number	SCH 4 - Wastewater (preTOP)				SCH 4 - Wastewater (postTOP)				SCH 4 - Rinse-Only Wastewater				4-PLG				SCH 4 - Filtered Tap Water			
		Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.	Conc.	RL	MDL	Qual.
PFPrA	422-64-0	ND	500	300		210	25	10	B *+	88	200	80	J *-	192	218	86	J	ND	1.7	0.69	
PFBA	375-22-4	450	500	200	J	170	25	10		ND	200	100	*1	ND	218	108		ND	1.7	0.87	*1
PFPeA	2706-90-3	1,400	200	50		360	10	2.5		ND	200	30		ND	218	32		4.6	1.7	0.26	
PFHxA	307-24-4	3,700	200	90		190	10	4.5	I	ND	200	20	*+ *1	ND	218	22		ND	1.7	0.17	*+ *1
PFHpA	375-85-9	360	200	50		75	10	2.5	I	ND	200	30		ND	218	32		ND	1.7	0.26	
PFOA	335-67-1	560	200	50		9.3	10	2.5	J I	ND	200	30	*+ *1	ND	218	32		ND	1.7	0.26	*+ *1
PFNA	375-95-1	79	200	50	J	13	10	2.5	I	ND	200	20		ND	218	22		ND	1.7	0.17	
PFDA	335-76-2	ND	200	50		ND	10	2.5		ND	200	30		ND	218	32		ND	1.7	0.26	
PFUnA	2058-94-8	ND	200	50		ND	10	2.5		ND	200	30		ND	218	32		ND	1.7	0.26	
PFDoDA	307-55-1	ND	200	50		ND	10	2.5		ND	200	40		ND	218	44		ND	1.7	0.35	
PFTrDA	72629-94-8	ND	200	50		ND	10	2.5		ND	200	40		ND	218	44		ND	1.7	0.35	
PFTeDA	376-06-7	ND	200	50		ND	10	2.5		ND	200	40		ND	218	44		ND	1.7	0.35	
PFHxDA	67905-19-5	ND	300	100		ND	15	5.0		ND	200	50		ND	218	54		ND	1.7	0.43	
PFODA	16517-11-6	ND	300	100		ND	15	5.0		ND	200	50		ND	218	54		ND	1.7	0.43	
PFPrS	423-41-6	ND	200	20		ND	10	1.0		ND	200	40		ND	218	44		ND	1.7	0.35	
PFBS	375-73-5	ND	200	50		2.7	10	2.5	J	ND	200	30	*+ *1	ND	218	32		0.78	1.7	0.26	J *+ B *1
PFPeS	2706-91-4	ND	200	50		ND	10	2.5		ND	200	30		ND	218	32		ND	1.7	0.26	
PFHxS	355-46-4	250	200	50		ND	10	2.5		ND	200	20	*+ *1	ND	218	22		0.56	1.7	0.17	J *+ *1
PFHpS	375-92-8	ND	200	50		ND	10	2.5		ND	200	30		ND	218	32		ND	1.7	0.26	
PFOS	1763-23-1	370	200	100	I	ND	10	5.0		ND	200	50	*+ *1	ND	218	54		1.0	1.7	0.43	J *+ *1
PFNS	68259-12-1	ND	200	50		ND	10	2.5		ND	200	30		ND	218	32		ND	1.7	0.26	
PFDS	335-77-3	ND	200	50		ND	10	2.5		270	200	30		ND	218	32		ND	1.7	0.26	
PFDoDS	79780-39-5	ND	300	50		ND	15	2.5		ND	200	30		ND	218	32		ND	1.7	0.26	
3:3 FTCA	356-02-5	ND	200	30		ND	10	1.5		ND	200	50		ND	218	54		ND	1.7	0.43	
5:3 FTCA	914637-49-3	1,300	200	20		ND	10	1.0		ND	200	50		ND	218	54		ND	1.7	0.43	
6:2 FTCA	53826-12-3	220	200	40		ND	10	2.0	*+	ND	200	30	*-	ND	218	32		ND	1.7	0.26	*-
7:3 FTCA	812-70-4	ND	200	30		ND	10	1.5	*+	ND	200	110	*-	ND	218	118		ND	1.7	0.95	*-
8:2 FTCA	70887-84-2	ND	200	40		ND	10	1.0	*+	ND	200	40		ND	218	44		ND	1.7	0.35	
10:2 FTCA	53826-13-4	ND	200	50		ND	10	2.5	*+	ND	200	50		ND	218	54		ND	1.7	0.43	
6:2 FTUCA	70887-88-6	140	200	50	J	ND	10	2.5		ND	200	40		ND	218	44		ND	1.7	0.35	
8:2 FTUCA	70887-84-2	ND	200	50		ND	10	2.5		ND	200	40		ND	218	44		ND	1.7	0.35	
10:2 FTUCA	70887-94-4	ND	200	70		ND	10	3.5		ND	200	40		ND	218	44		ND	1.7	0.35	
4:2 FTS	757124-72-4	ND	200	50		ND	10	2.5		ND	200	50		ND	218	54		ND	1.7	0.43	
6:2 FTS	27619-97-2	ND	500	420		ND	25	21		ND	200	50		ND	218	54		ND	1.7	0.43	
8:2 FTS	39108-34-4	ND	300	100		ND	15	5.0		ND	200	60		ND	218	64		ND	1.7	0.52	
10:2 FTS	120226-60-0	ND	500	100		ND	25	5.0		ND	200	80		ND	218	86		ND	1.7	0.69	
NMeFOSE	24448-09-7	ND	300	100		ND	15	5.0		ND	200	40		ND	218	44		ND	1.7	0.35	
NEtFOSE	1691-99-2	ND	300	100		ND	15	5.0		ND	200	40		ND	218	44		ND	1.7	0.35	
PFOSA	754-91-6	ND	200	70		ND	10	3.5		ND	200	30		84	218	32	J	ND	1.7	0.26	
NMeFOSA	31506-32-8	ND	300	100		ND	15	5.0		ND	200	70		ND	218	76		ND	1.7	0.61	
NEtFOSA	4151-50-2	ND	500	100		ND	25	5.0		ND	200	40		ND	218	44		ND	1.7	0.35	
NMeFOSAA	2355-31-9	ND	200	60		ND	10	3.0		ND	200	40		ND	218	44		ND	1.7	0.35	
NEtFOSAA	2991-50-6	ND	300	50		ND	15	2.5		ND	200	50		ND	218	54		ND	1.7	0.43	
HFPO-DA	13252-13-6	ND	300	100		ND	15	5.0		ND	200	40		ND	218	44		ND	1.7	0.35	
DONA	919005-14-4	ND	200	50		ND	10	2.5		ND	200	50		ND	218	54		ND	1.7	0.43	
PFECA A	863090-89-5	ND	200	20		ND	10	1.0		ND	200	30		ND	218	32		ND	1.7	0.26	
PFECA B	151772-58-6	ND	200	20		ND	10	1.0		ND	200	30		ND	218	32		ND	1.7	0.26	
PFECA F	377-73-1	ND	200	20		ND	10	1.0		ND	200	30		ND	218	32		0.34	1.7	0.26	J
PFECA G	801212-59-9	ND	200	20		ND	10	1.0		ND	200	50		ND	218	54		ND	1.7	0.43	
PFMOAA	674-13-5	ND	200	20		ND	10	1.0		ND	200	30	*-	ND	218	32	*-	ND	1.7	0.26	
PMPA	13140-29-9	660	200	20		ND	10	1.0		ND	200	60		ND	218	64		ND	1.7	0.52	
PEPA	267239-61-2	ND	200	20		ND	10	1.0		ND	200	60		ND	218	64		ND	1.7	0.52	
PFO2HxA	39492-88-1	ND	200	20		ND	10	1.0		ND	200	30		ND	218	32	*-	ND	1.7	0.52	
PFO3OA	39492-89-2	ND	200	20		ND	10	1.0		ND	200	30		ND	218	32		ND	1.7	0.26	
PFO4DA	39492-90-5	ND	200	70		ND	10	3.5		ND	200	30		ND	218	32		ND	1.7	0.26	
PFO5DoDA	39492-91-6	ND	500	200		ND	25	10		ND	200	50		ND	218	54		ND	1.7	0.43	
EVE Acid	69087-46-3	ND	1,000	300		ND	50	15	*-	ND	200	50	*-	ND	218	54	*-	ND	1.7	0.43	*-
R-EVE	2416366-22-6	ND	200	40		ND	10	2.0		ND	200	50		ND	218	54		ND	1.7	0.43	
Hydro-EVE Acid	773804-62-9	ND	200	20		ND	10	1.0		ND	200	50		ND	218	54		ND	1.7	0.43	
MTP	93449-21-9	ND	500	200		ND	25	10	*- *1	ND	200	60	*-	ND	218	64	*-	ND	1.7	0.52	*-
9Cl-PF3ONS	756426-58-1	ND	200	50		ND	10	2.5		ND	200	50		ND	218	54		ND	1.7	0.43	
11Cl-PF3OUdS	763051-92-9	ND	200	50		ND	10	2.5		ND	200	50		ND	218	54		ND	1.7	0.43	
PFEESA	113507-82-7	ND	200	20		ND	10	1.0		ND	200	30		ND	218	32		ND	1.7	0.26	
NVHOS	801209-99-4	ND	200	20		ND	10	1.0		ND	200	40		ND	218	44		ND	1.7	0.35	
PS Acid	29311-67-9	ND	1,000	300		ND	50	15	*-	ND	200	60	*-	ND	218	64	*-	ND	1.7	0.52	*-
Hydro-PS Acid	749836-20-2	ND	200	20		ND	10	1.0		ND	200	50		ND	218	54		ND	1.7	0.43	
R-PSDA	2416366-18-0	ND	200	50		ND	10	2.5	*-	ND	200	70		ND	218	76		ND	1.7	0.61	
Hydrolyzed PSDA	2416366-19-1	ND	200	90		ND	10	4.5		ND	200	40		ND	218	44		ND	1.7	0.35	
R-PSDCA	2416366-21-5	ND	200	20		ND	10	1.0		ND	200	30		ND	218	32		ND	1.7	0.26	
PFECHS	133201-07-7	ND	200	20		ND	10	1.0		ND	200	30		ND	218	32		ND	1.7	0.26	
AOF	N/A	ND	200,000	100,000		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

All values are in units of ng/L. CAS = Chemical Abstracts Service registry number. Conc. = concentration. RL = reporting limit. MDL = method detection limit. Qual. = qualifier. ND = not detected. J = The analytical result was below the instrument calibration range, but above the method detection limit. The reported concentration is an estimate. I = Value is estimated maximum possible concentration. *- = Lab control sample and/or lab control sample duplicate is outside acceptance limits, low biased. *+ = Lab control sample and/or lab control sample duplicate is outside acceptance limits, high biased. *1 = Lab control sample and/or lab control sample duplicate relative percent difference exceeds control limits. B = Compound was found in the blank and sample.