



PHIL-27698

December 29, 2022

Project Number 08005-WE04

Mr. Thomas Magge  
Clean Water Environmental Program Manager  
Pennsylvania Department of Environmental Protection  
Southeast Regional Office  
2 East Main Street  
Norristown, Pennsylvania 19401

Reference: Contract No. N6247016D9008  
Contract Task Order No. WE04

Subject: Temporary Discharge Monitoring Report - November 1 to November 30, 2022  
Hangar 680 Per- and Polyfluoroalkyl Substances Pilot Test System  
Former Naval Air Station Joint Reserve Base Willow Grove  
Horsham Township, Pennsylvania

Dear Mr. Magge:

On behalf of the United States (U.S.) Navy, Tetra Tech is pleased to submit the Temporary Discharge Monitoring Report (DMR) for the Hangar 680 per- and polyfluoroalkyl substances (PFAS) pilot test system at the Former Naval Air Station Joint Reserve Base Willow Grove in Horsham Township, Pennsylvania. This DMR includes available influent, effluent, and field quality assurance/quality control (QA/QC) results for sampling from November 1 to November 30, 2022.

The temporary discharge was first approved by the Pennsylvania Department of Environmental Protection (PADEP) on February 10, 2020, as requested by the U.S. Navy under a Federal Facility Agreement permit equivalency. PADEP approved subsequent modifications to the permit equivalency in letters dated August 5, 2020, January 27, 2021, July 23, 2021, and January 13, 2022. PADEP approved a request to extend the permit equivalency duration for 180 more days on July 1, 2022 and subsequently modified on August 12, 2022. A request to extend the permit equivalency was submitted on December 15, 2022.

Full-time operation of the Hangar 680 PFAS pilot test system was initiated on March 2, 2020. A total of 26,682,769 gallons of water have been treated and discharged to Outfall 8 as of November 28, 2022. The discharge for the reporting period complied with the effluent limitations and monitoring requirements as summarized in the following bullets:

- Influent samples were collected weekly on November 7, November 14, November 21, and November 28, 2022. These samples were collected from shallow extraction well HA-EW-1S, first intermediate extraction well HA-EW-1I, second intermediate extraction well HA-EW-2I, and the combined influent of these extraction wells. These samples were analyzed for PFAS, specifically perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), and the results are provided in Table 1. During the operational period, the shallow extraction well HA-EW-1S was operated at approximately 4.4 gallons per minute (gpm), the first intermediate extraction well HA-EW-1I was operated at approximately 6.9 gpm, and the second intermediate extraction well HA-EW-2I was operated at approximately 10.3 gpm.

- Effluent samples were collected weekly on November 7, November 14, November 21, and November 28, 2022. These samples were analyzed for PFOA and PFOS. Effluent samples for tetrachloroethene (PCE), trichloroethene (TCE), carbon tetrachloride (CTC), 1,2-dichloroethane (1,2-DCA), total phenols, and total lead were collected on November 7, 2022. All effluent analytical sample results for this reporting period are provided in Table 2. Field blank QA/QC samples were collected weekly on November 7, November 14, November 21, and November 28, 2022. These samples were analyzed for PFOA, PFOS, and their analytical results are provided in Table 2.
- A trip blank QA/QC sample was collected on November 7, 2022. This sample was analyzed for PCE, TCE, CTC, and 1,2-DCA. The results are provided in Table 2.
- Per the August 12, 2022 permit equivalency modification, weekly monitoring of PFOA and PFOS shall be conducted at discharge sampling port HA-Mid2IX to determine if maintenance actions are needed. During this reporting period, all weekly PFOA and PFOS sampling results at HA-Mid2IX were below the maintenance levels described in the permit equivalency modification (0.014 µg/L PFOA and 0.018 µg/L PFOS). Therefore, no maintenance actions are planned before the next reporting period.

Lastly, analytical results from samples collected since the start of the Hangar 680 PFAS pilot test system and intermittent operation of the aqueous IDW treatment system have demonstrated that both systems effectively reduce the compounds identified in the permit equivalency to below the established limits.

Please do not hesitate to contact me if you have any questions.

Sincerely,



Tricia E. Moore, PG  
Senior Project Manager

TM/nfs

Attachments:

Table 1 – NPDES Permit Equivalency Influent Sample Results from November 1, 2022 through November 30, 2022

Table 2 – NPDES Permit Equivalency Effluent Sample Results from November 1, 2022 through November 30, 2022

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Colin Wade (PADEP)  
Sarah Kloss (EPA Region 3)  
Navy Caretaker Office  
Horsham Library  
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## **TABLES**

**Table 1: NPDES Permit Equivalency Influent Sample Results from November 1, 2022 through November 30, 2022  
Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample			
		Shallow Influent	Intermediate Influent	Intermediate Influent 2	Combined Influent
Operation Week		141			
Sample ID		HA-EW-1S-20221107	HA-EW-1I-20221107	HA-EW-2I-20221107	HA-CombinedINF-20221107
Sample Date		11/7/2022	11/7/2022	11/7/2022	11/7/2022
Units	µg/L	µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	1.510 E	3.090 E	2.960 E	2.740 E
Perfluorooctanesulfonic acid (PFOS)	NA	121.000 E	11.000 E	78.800 E	55.400 E
PFOA + PFOS	0.07	122.510	14.090	81.760	58.140

Notes:

<sup>(1)</sup>: Maximum effluent limits per PADEP Temporary Discharge Request - Extension (July 1, 2022).

Combined influent (HA-CombinedINF) results have not yet been validated.

Results from the shallow (HA-EW-1S), first intermediate (HA-EW-1I), second intermediate (HA-EW-2I), and combined (CombinedINF) influent locations are not validated.

**Bold value indicates result is above applicable maximum effluent limit.**

Results from 11/14/22 are preliminary and not final.

PADEP: Pennsylvania Department of Environmental Protection.

µg/L: Micrograms per liter (also referred to as parts per billion [ppb]).

P: Results pending.

E: Estimate, result is greater than the highest concentration level in the calibration.

T: Holding time (HT) exceeded.

D: Dilution Run. Initial run outside the initial calibration range of the instrument.

**Table 1: NPDES Permit Equivalency Influent Sample Results from November 1, 2022 through November 30, 2022  
Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample			
		Shallow Influent	Intermediate Influent	Intermediate Influent 2	Combined Influent
Operation Week		142			
Sample ID		HA-EW-1S-20221114	HA-EW-1I-20221114	HA-EW-2I-20221114	HA-CombinedINF-20221114
Sample Date		11/14/2022	11/14/2022	11/14/2022	11/14/2022
Units		µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.818	2.610 D	2.720 TD	2.460 D
Perfluorooctanesulfonic acid (PFOS)	NA	51.200 TD	9.230 D	57.300 ETD	43.500 D
PFOA + PFOS	0.07	52.018	11.840	60.020	45.960

Notes:

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Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample			
		Shallow Influent	Intermediate Influent	Intermediate Influent 2	Combined Influent
Operation Week		143			
Sample ID		HA-EW-1S-20221121	HA-EW-1I-20221121	HA-EW-2I-20221121	HA-CombinedINF-20221121
Sample Date		11/21/2022	11/21/2022	11/21/2022	11/21/2022
Units		µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.360	2.200 D	1.560	2.090 D
Perfluorooctanesulfonic acid (PFOS)	NA	35.100 D	9.910 D	47.600 E	32.800 D
PFOA + PFOS	0.07	35.460	12.110	49.160	34.890

Notes:

<sup>(1)</sup>: Maximum effluent limits per PADEP Temporary Discharge Request - Extension (July 1, 2022).

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Results from the shallow (HA-EW-1S), first intermediate (HA-EW-1I), second intermediate (HA-EW-2I), and combined (CombinedINF) influent locations are not validated.

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Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample			
		Shallow Influent	Intermediate Influent	Intermediate Influent 2	Combined Influent
Operation Week		144			
Sample ID		HA-EW-1S-20221128	HA-EW-1I-20221128	HA-EW-2I-20221128	HA-CombinedINF-20221128
Sample Date		11/28/2022	11/28/2022	11/28/2022	11/28/2022
Units		µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.785	2.250 E	1.810 E	2.120 E
Perfluorooctanesulfonic acid (PFOS)	NA	62.800 E	8.770 E	49.900 E	38.900 E
PFOA + PFOS	0.07	63.585	11.020	51.710	41.020

Notes:

<sup>(1)</sup>: Maximum effluent limits per PADEP Temporary Discharge Request - Extension (July 1, 2022).

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**Table 2: NPDES Permit Equivalency Effluent Sample Results from November 1, 2022 through November 30, 2022  
Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample		
		Effluent	Effluent Field Duplicate	Field Blank
Operation Week		141		
Sample ID		HA-GEFF-20221107	HA-DUP-145-20221107	HA-FB-20221107
Sample Date		11/7/2022	11/7/2022	11/7/2022
Units		µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.00225 U	0.00223 U	0.00232 U
Perfluorooctanesulfonic acid (PFOS)	NA	0.00225 U	0.00223 U	0.00232 U
PFOA + PFOS	0.07	ND	ND	ND

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample		
		Effluent	Effluent Field Duplicate	Trip Blank
Operation Week		141		
Sample ID		HA-GEFF-20221107	HA-DUP-145-20221107	HA-TB-20221107
Sample Date		11/7/2022	11/7/2022	11/7/2022
Units		µg/L	µg/L	µg/L
Tetrachloroethylene (PCE)	0.69	0.20 U	0.20 U	0.20 U
Trichloroethylene (TCE)	2.5	0.20 U	0.20 U	0.20 U
Carbon Tetrachloride	0.23	0.20 U	0.20 U	0.20 U
1,2-Dichloroethane	0.38	0.20 U	0.20 U	0.20 U
Total Phenols	5	3.50 U	3.50 U	--
Lead (total)	3.2	0.70 U	0.70 U	--

Notes:

<sup>(1)</sup>: Maximum effluent limits per PADEP Temporary Discharge Request - Extension (July 1, 2022).

Effluent and effluent field duplicate results have not yet been validated.

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Results from 11/21/22 are preliminary and not final.

µg/L: Micrograms per liter (also referred to parts per billion [ppb]).

NA: Not applicable.

U: Analyte not detected. Value reported to limit of detection.

ND: Not detected.

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P: Results pending.



**Table 2: NPDES Permit Equivalency Effluent Sample Results from November 1, 2022 through November 30, 2022  
Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample		
		Effluent	Effluent Field Duplicate	Field Blank
Operation Week		142		
Sample ID		HA-GEFF-20221114	HA-DUP-146-20221114	HA-FB-20221114
Sample Date		11/14/2022	11/14/2022	11/14/2022
Units		µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.00232 U	0.00221 U	0.00259 U
Perfluorooctanesulfonic acid (PFOS)	NA	0.00232 U	0.00221 U	0.00259 U
PFOA + PFOS	0.07	ND	ND	ND

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample		
		Effluent	Effluent Field Duplicate	Trip Blank
Operation Week		142		
Sample ID		--	--	--
Sample Date		--	--	--
Units		µg/L	µg/L	µg/L
Tetrachloroethylene (PCE)	0.69	--	--	--
Trichloroethylene (TCE)	2.5	--	--	--
Carbon Tetrachloride	0.23	--	--	--
1,2-Dichloroethane	0.38	--	--	--
Total Phenols	5	--	--	--
Lead (total)	3.2	--	--	--

Notes:

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Hangar 680 PFAS Pilot Test  
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Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample		
		Effluent	Effluent Field Duplicate	Field Blank
Operation Week		143		
Sample ID		HA-GEFF-20221121	HA-DUP-147-20221121	HA-FB-20221121
Sample Date		11/21/2022	11/21/2022	11/21/2022
Units		µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.00222 U	0.00220 U	0.00242 U
Perfluorooctanesulfonic acid (PFOS)	NA	0.00222 U	0.00220 U	0.00242 U
PFOA + PFOS	0.07	ND	ND	ND

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample		
		Effluent	Effluent Field Duplicate	Trip Blank
Operation Week		143		
Sample ID		--	--	--
Sample Date		--	--	--
Units		µg/L	µg/L	µg/L
Tetrachloroethylene (PCE)	0.69	--	--	--
Trichloroethylene (TCE)	2.5	--	--	--
Carbon Tetrachloride	0.23	--	--	--
1,2-Dichloroethane	0.38	--	--	--
Total Phenols	5	--	--	--
Lead (total)	3.2	--	--	--

Notes:

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Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample		
		Effluent	Effluent Field Duplicate	Field Blank
Operation Week		144		
Sample ID		HA-GEFF-20221128	HA-DUP-148-20221128	HA-FB-20221128
Sample Date		11/28/2022	11/28/2022	11/28/2022
Units		µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.00227 U	0.00222 U	0.00234 U
Perfluorooctanesulfonic acid (PFOS)	NA	0.00227 U	0.00222 U	0.00234 U
PFOA + PFOS	0.07	ND	ND	ND

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample		
		Effluent	Effluent Field Duplicate	Trip Blank
Operation Week		144		
Sample ID		--	--	--
Sample Date		--	--	--
Units		µg/L	µg/L	µg/L
Tetrachloroethylene (PCE)	0.69	--	--	--
Trichloroethylene (TCE)	2.5	--	--	--
Carbon Tetrachloride	0.23	--	--	--
1,2-Dichloroethane	0.38	--	--	--
Total Phenols	5	--	--	--
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