



PHIL-27649

September 27, 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 - August 1 to August 31, 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 August 1 to August 31, 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. A request to extend the permit equivalency duration for 180 more days was approved by PADEP on July 1, 2022, and modified on August 12, 2022.

A system modification to add intermediate extraction well HA-EW-2I (boring X6I) to the treatment system, as described in the January 27, 2021 modification request approval, has been completed. HA-EW-2I was brought online on November 30, 2021 and operated until December 4, 2021. The well went back online on August 11, 2022 after an overhaul of its electrical layout and replacement of faulty system equipment. Since the restart of EW-2I, this well has operated with no malfunctions and faults through the end of this reporting period.

Full-time operation of the Hangar 680 PFAS pilot test system was initiated on March 2, 2020. A total of 24,532,066 gallons of water have been treated and discharged to Outfall 8 as of August 29, 2022.

- Influent samples were collected weekly from shallow extraction well HA-EW-1S and first intermediate extraction well HA-EW-1I on August 1, August 8, August 15, August 23, and August 29, 2022. As noted in Table 1, the August 29, 2022 influent results are preliminary and not final due to reporting delays from the analytical laboratory. Samples were collected weekly from the combined influent of these extraction wells on August 1, August 8, August 15, August 24, and August 29. Influent samples were collected from the second intermediate extraction well HA-EW-2I on August 15, August 23, and August 29, 2022. 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 10.7 gpm, and the second intermediate extraction well HA-EW-2I was operated at approximately 4.7 gpm. Please note that these influent flow rates will likely be adjusted as part of ongoing system optimization activities in the upcoming reporting periods, and such changes will be discussed in future DMR submittals.

- Effluent samples were collected weekly for PFAS, specifically PFOA and PFOS, on August 1, August 8, August 15, August 23, and August 29, 2022. Effluent samples for tetrachloroethene (PCE), trichloroethene (TCE), carbon tetrachloride (CTC), 1,2-dichloroethane (1,2-DCA), total phenols, and total lead were collected on August 23, 2022. All effluent results from samples collected within this reporting period are provided in Table 2.
- Field blank QA/QC samples were collected weekly on August 1, August 8, August 15, August 23, and August 29, 2022. These samples were analyzed for PFAS (specifically PFOA and PFOS), and the results are provided in Table 2.
- A trip blank QA/QC sample was collected on August 23, 2022. This sample was analyzed for PCE, TCE, CTC, and 1,2-DCA. The results are provided in Table 2.
- All effluent and associated field duplicate sample parameters were below the maximum discharge effluent limits established by PADEP in the Temporary Discharge Request – Extension dated July 1, 2022 and modified on August 12, 2022.
- 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 ug/L PFOA and 0.018 ug/L PFOS). Therefore, no maintenance actions are planned.

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 continue to 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 August 1, 2022 through August 31, 2022

Table 2 – NPDES Permit Equivalency Effluent Sample Results from August 1, 2022 through August 31, 2022



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## TABLES

**Table 1: NPDES Permit Equivalency Influent Sample Results from August 1, 2022 through August 31, 2022  
Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample			Sample			Sample			
		Shallow Influent	Intermediate Influent	Combined Influent	Shallow Influent	Intermediate Influent	Combined Influent	Shallow Influent	Intermediate Influent - 1	Intermediate Influent - 2	Combined Influent
Operation Week		127			128			129			
Sample ID		HA-EW-1S-20220801	HA-EW-1I-20220801	HA-CombinedINF-20220801	HA-EW-1S-20220808	HA-EW-1I-20220808	HA-CombinedINF-20220808	HA-EW-1S-20220815	HA-EW-1I-20220815	HA-EW-2I-20220815	HA-CombinedINF-20220815
Sample Date		8/1/2022	8/1/2022	8/1/2022	8/8/2022	8/8/2022	8/8/2022	8/15/2022	8/15/2022	8/15/2022	8/15/2022
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.920	3.830	3.320	0.727	2.890	3.060	0.895	3.620	3.690	2.980
Perfluorooctanesulfonic acid (PFOS)	NA	56.400	35.900	36.400	36.600	25.400	31.400	40.800	24.600	89.200	43.400
PFOA + PFOS	0.07	57.320	39.730	39.720	37.327	28.290	34.460	41.695	28.220	92.890	46.380

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), and second intermediate (HA-EW-2I) influent locations are not validated.  
 Influent results from 8/29/22 are reported as preliminary data and not final data due to laboratory delays.  
**Bold value indicates result is above applicable maximum effluent limit.**  
 PADEP: Pennsylvania Department of Environmental Protection.  
 µg/L: Micrograms per liter (also referred to as parts per billion [ppb]).  
 P: Results pending.

**Table 1: NPDES Permit Equivalency Influent Sample Results from August 1, 2022 through August 31, 2022  
Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample				Sample			
		Shallow Influent	Intermediate Influent - 1	Intermediate Influent - 2	Combined Influent	Shallow Influent	Intermediate Influent - 1	Intermediate Influent - 2	Combined Influent
		130				131			
Operation Week		HA-EW-1S-20220823	HA-EW-1I-20220823	HA-EW-2I-20220823	HA-CombinedINF-20220824	HA-EW-1S-20220829	HA-EW-1I-20220829	HA-EW-2I-20220829	HA-CombinedINF-20220829
Sample ID		8/23/2022	8/23/2022	8/23/2022	8/24/2022	8/29/2022	8/29/2022	8/29/2022	8/29/2022
Sample Date		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Units		NA	NA	NA	NA	NA	NA	NA	NA
Perfluorooctanoic acid (PFOA)	NA	0.663	2.420	2.170	2.440	0.672	2.610	2.540	2.340
Perfluorooctanesulfonic acid (PFOS)	NA	42.600	20.300	51.600	48.300	31.700	19.500	57.600	36.200
PFOA + PFOS	0.07	43.263	22.720	53.770	50.740	32.372	22.110	60.140	38.540

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), and second intermediate (HA-EW-2I) influent locations are not validated.  
 Influent results from 8/29/22 are reported as preliminary data and not final data due to laboratory delays.  
**Bold value indicates result is above applicable maximum effluent limit.**  
 PADEP: Pennsylvania Department of Environmental Protection.  
 µg/L: Micrograms per liter (also referred to as parts per billion [ppb]).  
 P: Results pending.

**Table 2: NPDES Permit Equivalency Effluent Sample Results from August 1, 2022 through August 31, 2022  
Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample			Sample		
		Effluent	Effluent Field Duplicate	Field Blank	Effluent	Effluent Field Duplicate	Field Blank
		127			128		
Operation Week							
Sample ID		HA-GEFF-20220801	HA-DUP-131-20220801	HA-FB-20220801	HA-GEFF-20220808	HA-DUP-132-20220808	HA-FB-20220808
Sample Date		8/1/2022	8/1/2022	8/1/2022	8/8/2022	8/8/2022	8/8/2022
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.00222 U	0.00231 U	0.00238 U	0.00225 U	0.00241 U	0.00241 U
Perfluorooctanesulfonic acid (PFOS)	NA	0.00222 U	0.00231 U	0.00238 U	0.00225 U	0.00241 U	0.00241 U
PFOA + PFOS	0.07	ND	ND	ND	ND	ND	ND

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample			Sample		
		Effluent	Effluent Field Duplicate	Trip Blank	Effluent	Effluent Field Duplicate	Trip Blank
		127			128		
Operation Week							
Sample ID		--	--	--	--	--	--
Sample Date		--	--	--	--	--	--
Units	µg/L	µg/L	µg/L	µg/L	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:  
<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.  
 PADEP: Pennsylvania Department of Environmental Protection  
 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.  
 --: Not sampled.  
 P: Results pending.

**Table 2: NPDES Permit Equivalency Effluent Sample Results from August 1, 2022 through August 31, 2022  
Hangar 680 PFAS Pilot Test  
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample			Sample		
		Effluent	Effluent Field Duplicate	Field Blank	Effluent	Effluent Field Duplicate	Field Blank
Operation Week		129			130		
Sample ID		HA-GEFF-20220815	HA-DUP-133-20220815	HA-FB-20220815	HA-GEFF-20220823	HA-DUP-134-20220823	HA-FB-20220823
Sample Date		8/15/2022	8/15/2022	8/15/2022	8/23/2022	8/23/2022	8/23/2022
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.00222 U	0.00216 U	0.00262 U	0.00217 U	0.00222 U	0.00238 U
Perfluorooctanesulfonic acid (PFOS)	NA	0.00222 U	0.00216 U	0.00262 U	0.00217 U	0.00222 U	0.00238 U
PFOA + PFOS	0.07	ND	ND	ND	ND	ND	ND

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample			Sample		
		Effluent	Effluent Field Duplicate	Trip Blank	Effluent	Effluent Field Duplicate	Trip Blank
Operation Week		129			130		
Sample ID		--	--	--	HA-GEFF-20220823	HA-DUP-134-20220823	HA-TB-20220823
Sample Date		--	--	--	8/23/2022	8/23/2022	8/23/2022
Units	µg/L	µg/L	µg/L	µg/L	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	--	--	--	3.40 U	3.40 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).  
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 NA: Not applicable.  
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**Table 2: NPDES Permit Equivalency Effluent Sample Results from August 1, 2022 through August 31, 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		131		
Sample ID		HA-GEFF-20220829	HA-DUP-135-20220829	HA-FB-20220829
Sample Date		8/29/2022	8/29/2022	8/29/2022
Units	µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.00225 U	0.00228 U	0.00226 U
Perfluorooctanesulfonic acid (PFOS)	NA	0.00225 U	0.00133 J	0.00201 J
PFOA + PFOS	0.07	ND	1.33000 J	2.01000 J

Parameter	Maximum Effluent Limit <sup>(1)</sup>	Sample		
		Effluent	Effluent Field Duplicate	Trip Blank
Operation Week		131		
Sample ID		--	--	--
Sample Date		--	--	--
Units	µg/L	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:

<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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