



PHIL-27623

July 22, 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 - June 1 to June 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 June 1 to June 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. A request to extend the permit equivalency duration was submitted to the PADEP for consideration on May 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. However, the well was subsequently taken offline due to electrical issues with the pump controls. As a result, no samples were collected from HA-EW-2I or the treatment system when HA-EW-2I was operational. An investigation into the electrical issues with the pump is ongoing, and HA-EW-2I will be brought back online following electrical repairs and equipment replacement. The well is anticipated to be online before the end of July 2022.

Full-time operation of the Hangar 680 PFAS pilot test system was initiated on March 2, 2020. A total of 22,821,361 gallons of water have been treated and discharged to Outfall 8 as of June 28, 2022.

- Influent samples were collected weekly from shallow extraction well HA-EW-1S, intermediate extraction well HA-EW-1I, and the combined influent from HA-EW-1S and HA-EW-1I on June 1, June 6, June 13, June 20, and June 28, 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, shallow extraction well HA-EW-1S was operated at approximately 4.8 gallons per minute (gpm), and intermediate extraction well HA-EW-1I was operated at approximately 14.7 gpm.

- Effluent samples were collected weekly for PFAS, specifically PFOA and PFOS, on June 1, June 6, June 13, June 20, and June 28, 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 June 1 and June 28, 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 June 1, June 6, June 13, June 20, and June 28, 2022. These samples were analyzed for PFAS (specifically PFOA and PFOS), and the results are provided in Table 2.
- Trip blank QA/QC samples were collected on June 1 and June 28, 2022. These sample were 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 January 13, 2022.
- The aqueous investigation-derived waste (IDW) treatment system was not in operation during this reporting period and therefore no sampling or reporting associated with its operation is included in this DMR.

In the May 2022 DMR, CTC concentrations were observed to be increasing in the effluent although below its effluent discharge limit of 0.23 ug/L. Upon investigation, it was found that the pilot system plumbing and circulation of water within the granular activated carbon (GAC) vessels did not have the proper contact time with the GAC. The water delivery pipe to the GAC was not sealing with its respective o-ring and thereby reducing the efficacy of GAC treatment. Delivery piping was replaced in the GAC vessels, and the June 28, 2022 CTC result showed non-detect, rendering the fix as effective.

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

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TABLES

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

Parameter	Maximum Effluent Limit ⁽¹⁾	Sample			Sample		
		Shallow Influent	Intermediate Influent	Combined Influent	Shallow Influent	Intermediate Influent	Combined Influent
Operation Week		118			119		
Sample ID		HA-EW-1S-20220601	HA-EW-1I-20220601	HA-CombinedINF-20220601	HA-EW-1S-20220606	HA-EW-1I-20220606	HA-CombinedINF-20220606
Sample Date		6/1/2022	6/1/2022	6/1/2022	6/6/2022	6/6/2022	6/6/2022
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.957	3.080	2.550	P	P	P
Perfluorooctanesulfonic acid (PFOS)	NA	44.800	28.100	34.000	P	P	P
PFOA + PFOS	0.07	45.757	31.180	36.550	P	P	P

Notes:

⁽¹⁾: Maximum effluent limits per PADEP Temporary Discharge Request - Extension (January 13, 2022).

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

Results from the shallow (HA-EW-1S) and intermediate (HA-EW-1I) influent locations are not validated.

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 June 1, 2022 through June 30, 2022
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Parameter	Maximum Effluent Limit ⁽¹⁾	Sample			Sample		
		Shallow Influent	Intermediate Influent	Combined Influent	Shallow Influent	Intermediate Influent	Combined Influent
Operation Week		120			121		
Sample ID		HA-EW-1S-20220613	HA-EW-1I-20220613	HA-CombinedINF-20220613	HA-EW-1S-20220620	HA-EW-1I-20220620	HA-CombinedINF-20220620
Sample Date		6/13/2022	6/13/2022	6/13/2022	6/20/2022	6/20/2022	6/20/2022
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	P	P	P	P	P	P
Perfluorooctanesulfonic acid (PFOS)	NA	P	P	P	P	P	P
PFOA + PFOS	0.07	P	P	P	P	P	P

Notes:

⁽¹⁾: Maximum effluent limits per PADEP Temporary Discharge Request - Extension (January 13, 2022).

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

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

Parameter	Maximum Effluent Limit ⁽¹⁾	Sample		
		Shallow Influent	Intermediate Influent	Combined Influent
Operation Week		122		
Sample ID		HA-EW-1S-20220627	HA-EW-1I-20220627	HA-CombinedINF-20220627
Sample Date		6/27/2022	6/27/2022	6/27/2022
Units	µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	P	P	P
Perfluorooctanesulfonic acid (PFOS)	NA	P	P	P
PFOA + PFOS	0.07	P	P	P

Notes:

⁽¹⁾: Maximum effluent limits per PADEP Temporary Discharge Request - Extension (January 13, 2022).

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

Results from the shallow (HA-EW-1S) and intermediate (HA-EW-1I) influent locations are not validated.

Bold value indicates result is above applicable maximum effluent limit.

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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 June 1, 2022 through June 30, 2022
Hangar 680 PFAS Pilot Test
Former Naval Air Station Joint Reserve Base Willow Grove**

Parameter	Maximum Effluent Limit ⁽¹⁾	Sample			Sample		
		Effluent	Effluent Field Duplicate	Field Blank	Effluent	Effluent Field Duplicate	Field Blank
Operation Week		118			119		
Sample ID		HA-GEFF-20220601	HA-DUP-122-20220601	HA-FB-20220601	HA-GEFF-20220606	HA-DUP-123-20220606	HA-FB-20220606
Sample Date		6/1/2022	6/1/2022	6/1/2022	6/6/2022	6/6/2022	6/6/2022
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.00235 U	0.00252 U	0.00262 U	0.00244 U	0.00252 U	0.00247 U
Perfluorooctanesulfonic acid (PFOS)	NA	0.00235 U	0.00252 U	0.00262 U	0.00244 U	0.00252 U	0.00247 U
PFOA + PFOS	0.07	ND	ND	ND	ND	ND	ND

Parameter	Maximum Effluent Limit ⁽¹⁾	Sample			Sample		
		Effluent	Effluent Field Duplicate	Trip Blank	Effluent	Effluent Field Duplicate	Trip Blank
Operation Week		118			119		
Sample ID		HA-GEFF-20220601	HA-DUP-122-20220601	HA-TB-20220601	--	--	--
Sample Date		6/1/2022	6/1/2022	6/1/2022	--	--	--
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	0.18 J	0.17 J	0.20 U	-- --	-- --	-- --
Carbon Tetrachloride	0.23	0.21 J	0.18 J	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:
⁽¹⁾: Maximum effluent limits per PADEP Temporary Discharge Request - Extension (January 13, 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.
 J: Analyte detected below the Limit of Quantitation.

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

Parameter	Maximum Effluent Limit ⁽¹⁾	Sample			Sample		
		Effluent	Effluent Field Duplicate	Field Blank	Effluent	Effluent Field Duplicate	Field Blank
Operation Week		120			121		
Sample ID		HA-GEFF-20220613	HA-DUP-124-20220613	HA-FB-20220613	HA-GEFF-20220620	HA-DUP-125-20220620	HA-FB-20220620
Sample Date		6/13/2022	6/13/2022	6/13/2022	6/20/2022	6/20/2022	6/20/2022
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.00216 U	0.00222 U	0.00238 U	0.00220 U	0.00222 U	0.00244 U
Perfluorooctanesulfonic acid (PFOS)	NA	0.00216 U	0.00222 U	0.00238 U	0.00220 U	0.00222 U	0.00244 U
PFOA + PFOS	0.07	ND	ND	ND	ND	ND	ND

Parameter	Maximum Effluent Limit ⁽¹⁾	Sample			Sample		
		Effluent	Effluent Field Duplicate	Trip Blank	Effluent	Effluent Field Duplicate	Trip Blank
Operation Week		120			121		
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	-- --	-- --	--	-- --	-- --	--

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Parameter	Maximum Effluent Limit ⁽¹⁾	Sample		
		Effluent	Effluent Field Duplicate	Field Blank
Operation Week		122		
Sample ID		HA-GEFF-20220628	HA-DUP-126-20220628	HA-FB-20220628
Sample Date		6/28/2022	6/28/2022	6/28/2022
Units		µg/L	µg/L	µg/L
Perfluorooctanoic acid (PFOA)	NA	0.00231 U	0.00235 U	0.00239 U
Perfluorooctanesulfonic acid (PFOS)	NA	0.00231 U	0.00235 U	0.00239 U
PFOA + PFOS	0.07	ND	ND	ND

Parameter	Maximum Effluent Limit ⁽¹⁾	Sample		
		Effluent	Effluent Field Duplicate	Trip Blank
Operation Week		122		
Sample ID		HA-GEFF-20220628	HA-DUP-126-20220628	HA-TB-20220628
Sample Date		6/28/2022	6/28/2022	6/28/2022
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	3.40 U	3.40 U	--
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