I Environmental Restoration: Perfluorinated Compounds

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I-1 Introduction

This appendix discusses perfluorinated compounds (PFCs), a class of "emerging contaminants" (a chemical or material that is characterized by a perceived, potential, or real threat to human health or the environment or by a lack of published health standards) that were detected in groundwater, at and near the former NAS JRB Willow Grove installation, after the Draft EIS was published for public review in December 2013. The Navy is addressing the PFCs under the IRP in accordance with CERCLA. Discussion of the IRP is provided in Sections 3.5.4 and 4.5 of the EIS.

I-2 Affected Environment

EPA has established an Unregulated Contaminant Monitoring Rule (UCMR) program as part of the 1996 SDWA amendments. Under the UCMR program, drinking water is tested nationwide for various chemical, biological, and radiological contaminants that are suspected to be present but for which health-based standards have not been established under the SDWA (EPA 2014a). In June 2014, the HWSA collected water samples from 14 of the 15 Horsham Township public water supply wells in accordance with the third cycle of EPA's UCMR program, called UCMR 3.

Under UCMR 3, the HWSA sampled their public water supply wells for 21 of the 30 UCMR 3 constituents. Result of the June 2014 sampling showed that two of the 14 public water supply wells contained one contaminant at a concentration above the EPA provisional health advisory level (PHAL). Perfluorooctane sulfonate (PFOS) was detected in wells 26 and 40 above the PHAL of 0.2 micrograms per liter (µg/L) (parts per billion [ppb]) (EPA 2014a). PFOS is a member of a class of compounds known as PFCs. Six PFCs are included in the UCMR 3 program, and the HWSA sampled their wells for all six PFCs. PHALs have been established for only two of the six PFCs—PFOS and perfluorooctanoic acid (PFOA). PFOA also was detected in wells 26 and 40 but at levels below the PHAL of 0.4 µg/L (ppb); the result for well 26 was just below the PHAL (see Table I-1).

EPA established the PHALs for PFOS and PFOA in 2009 to assess the potential risk from short-term exposure to the chemicals through drinking water. The PHALs reflect "reasonable, health-based hazard concentrations above which action should be taken to reduce exposure to unregulated contaminants in drinking water" (EPA 2014b). In response to the UMCR 3 sampling results, the HWSA took wells 26 and 40 off-line in July 2014 (Navy et al. 2014). During the June 2014 UCMR 3 sampling conducted by the HWSA, PFOS was detected, but at levels below the PHAL, at three other public water supply wells (10, 17, and 21), and PFOA was detected, also at levels below the PHAL, in two of those wells (10 and 17) (EPA 2014a). The HWSA is continuing to monitor those wells (Navy et al. 2014).

PFOS and PFOA are emerging contaminants that the EPA is now monitoring because the constituents have been widely distributed in the environment throughout the United States. PFOS and PFOA are surface-active agents (also known as surfactants) that provide lifting properties to products such as foaming agents, detergents, and emulsifiers. They also are used in industrial and commercial applications such as metal plating, the photographic industry, paper and packaging, coating additives, cleaning products, household products, and pesticides. PFOS-based aqueous film-forming foam (AFFF) is used to extinguish fuel fires (EPA 2014b).

Based on the locations of HWSA wells 26 and 40 and typical sources of PFOS and PFOA, it is suspected that the use of firefighting agents and other chemicals at the former NAS JRB Willow Grove are likely contributors to the PFOS and PFOA levels in wells 26 and 40. Well 26 is located about 0.2 miles southwest of the installation and about 0.4 miles south of IRP Site 5 – Fire Training Area. Well 40 is located less than 0.1 miles north of the northernmost end of the installation (see Figure I-1). Of the 14 public water supply wells that the HWSA tested under the UCMR 3 program, wells 26 and 40 are the closest to the former NAS JRB Willow Grove. AFFF has been used for fire suppression at the former

NAS JRB Willow Grove at IRP Site 5 – Fire Training Area and other areas of the base, such as runways, plane crash sites, and hangar areas (Navy et al. 2014). Other potential sources of PFOS and PFOA at the former NAS JRB Willow Grove are lubricants, aviation hydraulic fluids, and paints (Resolution Consultants 2015). Limited sampling conducted in 2011 as part of the IRP Site 5 – Fire Training Area ROD identified PFOS and PFOA in groundwater as potential constituents to be reevaluated during the IRP five-year review (Navy et al. 2014). The Navy is evaluating potential historical sources of PFCs at the former NAS JRB Willow Grove installation and anticipates completing that evaluation in 2015. Preliminary reports on the use of AFFF indicate that approximately 200 gallons of AFFF were used annually to disperse fuel spills adjacent to hangars (buildings) 80 and 175, and approximately 200 gallons of AFFF were released in November 1984 from a leak in a storage tank near Building 175.

In response to the PFOS and PFOA detections in HWSA wells 26 and 40 as well as other information, the Navy sampled perimeter groundwater monitoring wells at the former NAS JRB Willow Grove property for PFOS and PFOA between July and August 2014. The perimeter groundwater monitoring wells that were sampled consisted of 20 sets of single wells and clustered wells of varying depths that comprise a total of 34 wells. The 20 well locations are shown in Figure I-1. Of the 34 wells sampled, 30 PFOS results and 14 PFOA results exceeded their respective PHALs (see Table I-1 and Figure I-1). There were only two well locations where neither the PFOS nor the PFOA result exceeded the PHAL.

In September 2014, the Air Force tested a total of four water samples from the two drinking water wells at the Horsham Air Guard Station (HAGS). The samples were collected from various steps in the water treatment process. The PFOS and PFOA results for the four samples exceeded the respective PHALs (U.S Air Force 2014) (see Table I-1 and Figure I-1). The use of water from the HAGS wells as drinking water was discontinued in the summer of 2014, following release of the results for the HWSA public water supply wells.

Table I-1 PFOS and PFOA Results for Water Samples Collected At or Near the Former NAS JRB Willow Grove (2014)

Well	Number of Samples	PFOS Number of Results above PHAL of 0.2 µg/L	PFOA Number of Results above PHAL of 0.4 µg/L
HWSA Public Water Supply Wells			
Well 26	1	1	0
Well 40	1	1	0
Other wells (12)	12	0	0
NAS JRB Willow Grove Perimeter Groundwater Monitoring Wells			
34 wells	34	30	14
Horsham Air Guard Station Drinking Water Wells			
2 wells	4[1]	4	4

Source: EPA 2014a; Resolution Consultants 2015; U.S. Air Force 2014.

[1] Comprising samples from two drinking water wells and two samples from post-treatment processes.

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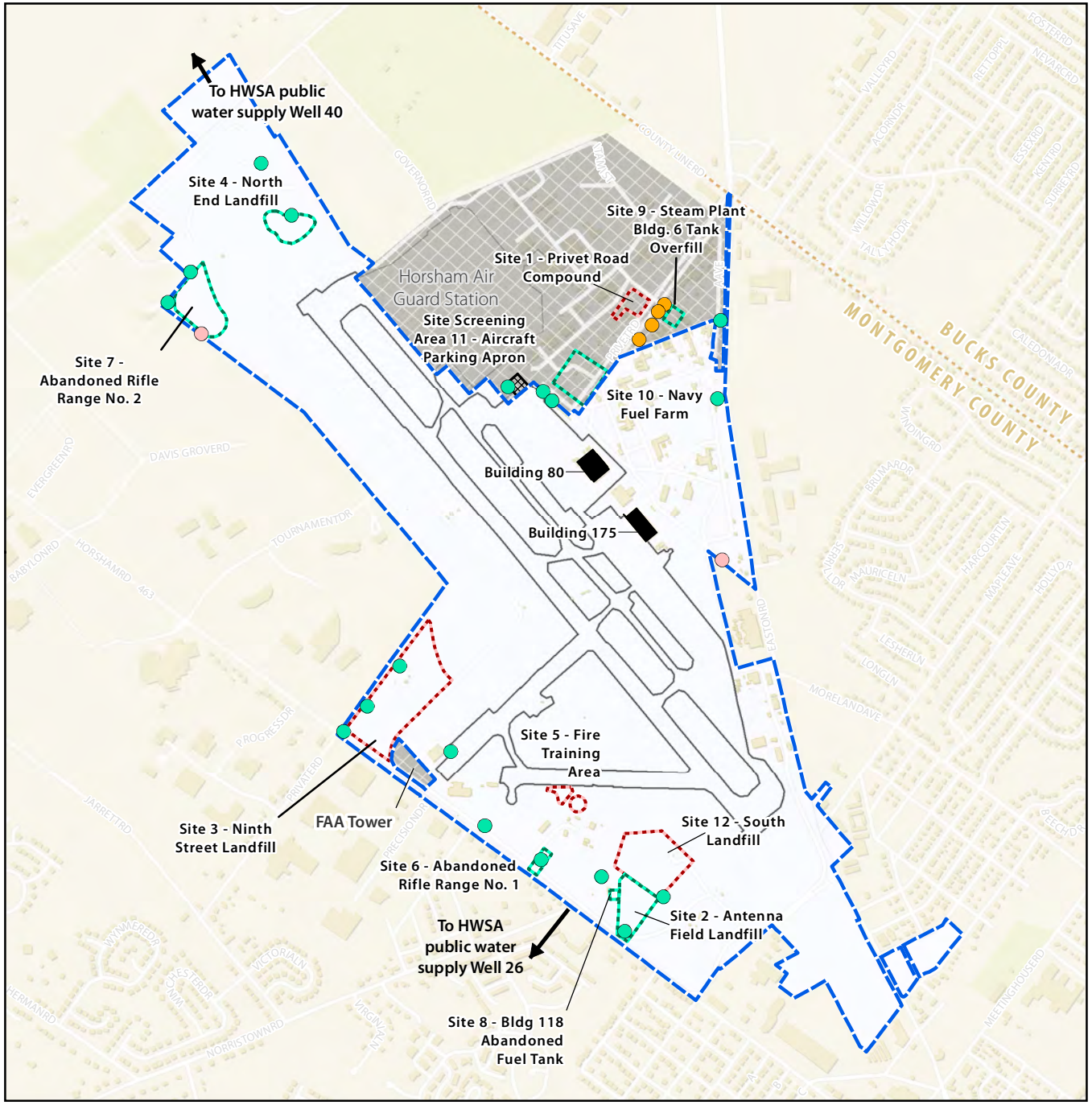

Figure I-1

PFOS and PFOA Sampling Locations

Former NAS JRB Willow Grove

Horsham, PA

Legend

- Horsham Air Guard Station drinking water sampling location, PFOS and PFOA above Provisional Health Advisory Level
- NAS JRB Willow Grove groundwater monitoring well location, single or clustered well, PFOS and/or PFOA above Provisional Health Advisory Level
- NAS JRB Willow Grove groundwater monitoring well location, single or clustered well, PFOS and PFOA below Provisional Health Advisory Level
- County Boundary
- NAS JRB Willow Grove
- Building
- FAA Tower and Horsham Air Guard Station (not included in redevelopment)
- IRP Site - Investigation/remedy in progress
- IRP Site - No Action or No Further Action status
- Screening Site - No Further Action status; site not added to IRP

N

SCALE

0 0.25 0.5 Miles

SOURCE: ESRI 2010; Tetra Tech 2012a; Weston Solutions, Inc. 2009.

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The Navy is coordinating with the EPA, PADEP, and HWSA on the response to the contamination. The Navy (with EPA support) also is collecting samples from private water wells within approximately 1 mile of public water supply wells 26 and 40. The samples are being analyzed for PFOS, PFOA, and other constituents, and an alternate drinking water supply is being provided to private well users where PFOS/PFOA concentrations exceed the PHALs.

The HWSA is evaluating options for permanent replacement of the public water supply with wells 26 and 40 going off-line. The options include installing treatment components and reconnecting wells 26 and 40 to the system, abandoning the two wells, and purchasing water from other sources (Navy et al. 2014). Investigation is underway for effective treatment for PFOS and PFOA in drinking water (EPA 2014b).

Soils at the former NAS JRB Willow Grove property have not been tested for PFCs; therefore, it is unknown whether PFCs are present in soils at the former NAS JRB Willow Grove installation. However, the Navy assumes that if PFOS and PFOA have been found in groundwater, they may also be present in subsurface soil in certain areas. In their anionic forms, PFOS and PFOA are water-soluble and can migrate readily from soil to groundwater. The EPA has not established PHALs for PFOS and PFOA in soil (EPA 2014b). The primary exposure pathway for PFOS and PFOA would be the ingestion of contaminated drinking water.

I-3 Environmental Consequences

The investigation of PFCs in local drinking water potentially affected by activities of the former NAS JRB Willow Grove installation is ongoing and in the early stages. The Navy has initiated an RI for PFCs in on-base groundwater, which is tentatively scheduled to be completed in 2016. The RI will characterize site conditions, the nature and extent of contamination, and risks posed by that contamination to human and/or environmental receptors. The RI will provide the information needed to evaluate and select appropriate remedial alternatives. The Navy will complete the investigation and appropriate remedial activities as required under CERCLA.

The Navy would not expect there to be specific reuse constraints directly associated with PFC-contaminated groundwater at the former NAS JRB Willow Grove property, because on-base groundwater would not be used as a source of drinking water for any of the land uses proposed under the reuse alternatives. The impacts of the PFCs in base and local groundwater on water supply under the project alternatives are discussed in Section 4.8. The Navy also would not expect there to be specific reuse constraints associated with potential PFC contamination in on-base soils, because the primary exposure pathway is drinking water. Potential reuse constraints for particular future land uses with sensitive receptors such as residences or schools would be addressed in the risk assessment and remedy selection steps the Navy will conduct for PFC contamination under the CERCLA process.

As discussed in the introduction to Section 4.5, CERCLA, DERP, and National Contingency Plan provisions require that the Navy implement remedial actions necessary to adequately protect human health and the environment from risks associated with actual or potential releases of hazardous substances, pollutants, or contaminants into the environment. Prior to the transfer or lease of the former NAS JRB Willow Grove property, the Navy will prepare a FOST or FOSL that summarizes how the applicable requirements and notifications for hazardous substances and other constituents addressed under the IRP (such as PFCs in drinking water potentially affected by former base activities) have been satisfied and whether the property is environmentally suitable for transfer or lease. Property will not be transferred or leased until completion of the FOST/FOSL process, including the EPA's and PADEP's review, or until completion of a FOSET. The HLRA has not requested that any property be transferred under the early transfer process at this time.

For the reasons set forth in Section 4.5— including the issuance of a FOST or FOSET; the completed and ongoing CERCLA process; the inclusion of any necessary, appropriate, and legally enforceable CERCLA ICs; and the expectation that the future owner or developer of the Willow Grove property would adhere to local, state, and federal laws and regulations during construction and operation—there would be no significant environmental impacts associated with disposal and reuse of the former NAS JRB Willow Grove property relative to releases of emerging contaminants that are being addressed under the ER Program (including PFCs in drinking water). This conclusion would apply to Alternatives 1, 2, and 3. Accordingly, there also would be no disproportionately high or adverse impacts on environmental justice communities from PFCs at the former NAS JRB Willow Grove property. Potential environmental health or safety risks to children from PFCs in environmental media would be addressed by the CERCLA process.

The Navy, EPA, and PADEP are evaluating options for private water wells where PFOS or PFOA concentrations exceed the PHALs. Those options include strategies such as permanently connecting the residence to the public water supply or in-home treatment of the well water, which would be monitored and maintained by the federal government. As applicable, the Navy, EPA, and PADEP will continue a sampling program for private water wells (Navy et al. 2014). The Navy will continue to hold RAB meetings with the public and other stakeholders for the duration of the process in accordance with CERCLA**.**

I-4 References

EPA. 2014a. Occurrence Data: Accessing Unregulated Contaminant Monitoring Data. Unregulated Contaminant Monitoring Program. Available online at: http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/data.cfm#ucmr2013. Accessed on January 30, 2015.

EPA. 2014b. Emerging Contaminants – Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA). Fact sheet. March 2014. Available online at: http://www2.epa.gov/sites/production/files/2014-04/documents/factsheet_contaminant_pfos_pfoa_march2014.pdf. Accessed on January 30, 2015.

Resolution Consultants. 2015. Technical Memorandum. Perfluorinated Compounds Groundwater Investigation. Naval Air Station Joint Reserve Base, Willow Grove, Pennsylvania. February 4, 2015. Norfolk, Virginia.

U.S. Air Force. 2014. Results for Horsham Air Guard Station drinking water samples. Data from Anatek Labs, Inc., dated September 30, 2014.

U.S. Department of the Navy (Navy), EPA, Horsham Water and Sewer Authority (HWSA), and PADEP. 2014. Open House Meeting; Actions to Address Impacts to Drinking Water from Former Naval Air Station Joint Reserve Base Willow Grove. October 7, 2014. Available online at: http://www.horsham.org/pview.aspx?id=20863&catID=612. Accessed on October 14, 2014.