Region III PFAS Status
November 16, 2016

Former Naval Air Development Center Warminster

Background
The Former Naval Air Development Center (Warminster site) is an 824-acre facility located in Warminster Township and Ivyland Borough, Bucks County, PA. In 1989, the site was listed on the NPL. This site is located approximately 5 miles east northeast of the Willow Grove Naval Air and Air Reserve Station (Willow Grove site) which is discussed later.

- In 1996, the site was closed under BRAC. A majority of the property has been transferred to private entities.
- In 1990, the Navy entered into a Federal Facility Agreement (FFA) with EPA to investigate and remediate the site.
- Since 1999 the site has operated a pump and treat system to address volatile organic compound (VOC) contamination in groundwater.
- In 2000, the site was deemed Construction Complete under the Comprehensive Environmental Response, Compensation, and Liability Act.
- In 2011, in preparation for a Five-Year Review, Per- and Polyfluoroalkyl Substances (PFASs), were discovered in wells at concentrations above the 2009 PFAS provisional health advisories near the former fire training area.
- In 2013-2014, three public supply wells near the site, monitored pursuant to EPA's Unregulated Contaminated Monitoring Rule (UCMR) detected PFASs above the 2009 provisional health advisories.
- In July 2014, EPA issued a Safe Drinking Waste Act Emergency Order to the Navy. The Order required residential sampling in the vicinity of the Warminster site and provisions for alternate water and long-term treatment to private and public wells impacted with levels of PFASs above the 2009 provisional health advisories[1].
- In May 2016, three additional Warminster public supply wells near the site were taken offline due to exceedance of the 2016 Health Advisory Level (HAL).

Status of Residential Sampling in Vicinity of Site (as of October, 2016)

- Two-hundred and sixty-five (265) homes in the vicinity of the site have been sampled. Fifty-four (54) of those wells exceed the 2016 HAL. The Navy has connected 15 residences to public water. The remaining are being provided bottled water until they can be hooked up to public water.
- Areas with residential exceedances are generally defined, with the exception of the Hartsville area located northwest of the site. It is unclear whether the impacts in the Hartsville area result from releases from the Warminster site.

Work Completed to Date Relating to PFASs (excluding residential sampling)

- In January 2014, the Navy activated two on-site extraction wells, in addition to the VOC extraction wells, to provide containment and protect a nearby municipal well.
- Concurrently in 2014, the Navy completed a Preliminary Assessment to identify source areas that would require investigation.

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[1] The Safe Drinking Water Order referenced the 2009 provisional health advisory levels, but the Navy has taken action based on the health advisory level released in May 19, 2016.

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- In late 2014-2015, the Navy conducted sampling of existing on-site wells, refurbished and re-activated 8 extraction wells, and brought a second unit to treat the discharge on-line. The sampling of effluent remains non-detect. The Navy continues to monitor discharges to a nearby stream.
- The Navy's has agreed to construct treatment systems for three (3) additional Warminster public supply wells, two of which are complete.

Ex. 5 Deliberative Process (DP)

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Willow Grove Naval Air and Air Reserve Station

Background
The Willow Grove site is a 1200-acre facility located in Horsham Township, Montgomery County, PA. In 1995, the site was listed on the NPL. An approximately 200-acre parcel, located at the northeastern portion of the property, is operated by the Air National Guard. This portion is an active facility. The remaining acres are being addressed by the Navy. The status of each parcel is discussed below separately.

Navy – Background
- In 2005, the site was closed under BRAC.
- In 2005, the Navy entered into an FFA with EPA to address its parcel.
- In late 2011, PFASs were detected in on-site groundwater near a former fire training area.
- In 2014, because of the PFAS contamination at Warminster, the Navy sampled drinking water wells at the Willow Grove site and for the Horsham Water and Sewer Authority.
- In 2014, public supply wells near the site, monitored as part of UCMR, detected PFASs above the 2009 provisional health advisories in Horsham public water supply wells. This discovery was subsequent to the discovery at Warminster.
- In 2014, the Navy voluntarily began to sample and provide alternate water for public and private wells impacted with PFASs in the vicinity of the Willow Grove site.

Navy - Status of Residential Sampling in Vicinity of Site (as of 10/3/16)
- Four-hundred and sixty (460) private water wells have been sampled. Of these, eighty-five (85) showed PFASs above the 2016 HAL. The Navy has connected close to sixty (60) of these have

to public water. The remainder are being provided bottled water until connection can be completed. Navy likely able to connect remaining residences to public water system within 6 months.

- Interagency Agreement with EPA ending around June 2017, Navy developing contract to continue residential sampling
- Navy proposed discontinuing residential sampling for Warrington Township due to non-detect results and evidence migration is not coming from Navy. EPA to review proposal.

Navy - Work Completed to Date Relating to PFASs (excluding residential sampling)

- In August 2014, thirty-four (34) perimeter groundwater monitoring wells were sampled (20 single and 14 clustered wells of varying depths). All of them detected PFASs above EPA's 2009 provisional health advisory levels.
- In 2015, 15 primary potential sources and 6 secondary potential sources of PFASs were identified.
- In April 2016, the Sampling and Analysis Plan for the Perfluorinated Compound Investigation Activities was finalized.
  - Fifty-four (54) surface water and 57 sediment samples were collected from streams and tributaries near base boundaries and sent to an EPA-approved accredited laboratory.
  - Approximately 119 soils samples were collected from various depths to fill data gaps and sent to an EPA-approved accredited laboratory.
  - Three Horsham Township wells were evaluated for treatment alternatives by USGS using geophysics.
  - Thirty (30) new multilevel wells were installed to determine specific zones with high levels of PFASs.
  - A total of 161, new and existing wells, are included in the groundwater monitoring program.
- The Navy has collected soil, sediment, surface water and groundwater samples to identify data gaps. The laboratory results will be evaluated and included in the RI Report. Internal draft data report has identified potential data gaps. It is possible additional source areas and data gaps will be identified.
- The Navy is paying for treatment of 3 additional Horsham public drinking water wells to help contain the plume. That water is currently being discharged to a surface water body pursuant to a state permit.
- The Navy is in the process of adding treatment to the original two Horsham public drinking water wells, currently turned off, to mitigate plume migration.
- The Navy tasked the USGS to develop an area-wide groundwater flow model to better evaluate groundwater monitoring locations and to support a plan for remediation.

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Air National Guard (ANG)– Background

- In 2007, as a result of BRAC, the Air National Guard assumed responsibility of the environmental work from the Air Force on this parcel.
- EPA has not entered into an FFA with either the Air Force or the Air National Guard.
- Based on groundwater contamination identified through the UCMR program at nearby public supply wells, the Air National Guard property was identified as a possible source for PFASs.
- In October 2014, the Air National Guard sampled two on-site drinking water wells. The levels detected exceeded the 2009 provisional health advisories for PFASs by three orders of magnitude. These wells were taken off-line for consumption but continue to extract and treat groundwater.
- In May 2015, EPA issued a Safe Drinking Water Act Order to the Air National Guard. The Order called for an on-site investigation of PFASs, and provisions for alternate water and long term treatment to private and public wells impacted with levels of PFASs above the 2009 provisional health advisories[2]. In addition, the Order states that following review of the monitoring results, EPA may require, additional monitoring or remediation at the facility to eliminate continued discharge of PFASs to the groundwater or surface water.

Air National Guard - Status of Residential Sampling in Vicinity of Site (as of 10/3/16)

- One-hundred and twenty seven (127) private wells have been sampled in the vicinity of the site. Fifty-one (51) exceeded the 2016 HAL. The Air National Guard connected twenty-one (21) residences to public water. The remainder are being provided bottled water until connection.

Air National Guard - Work Completed to Date Relating to PFASs (excluding residential)

- A 2015 Preliminary Assessment identified 11 potential PFASs source areas.
- As required under the Safe Drinking Water Act Order, the Air National Guard developed a phased sampling plan.
  - Phase I, completed in June 2016, included sampling of soil (source areas), sediment, aqueous film forming foam (AFFF) storage tanks, surface water and existing groundwater wells. No significant soil source areas were identified during Phase I. The sampling did show extensive groundwater and surface water impacts. The Air National Guard is currently evaluating means to control surface water runoff from a basin.
  - Phase II, on-going, included the installation of 11 shallow wells located in the identified source areas. Draft results indicate groundwater concentrations throughout the site are up to 700 times the 2016 HAL. Final technical memo was submitted to EPA and the State November 8, 2016.
- The Air National Guard is extracting and treating groundwater from their two on-site drinking water wells. The extracted groundwater is being treating to non-detect and is being used for consumption purposes. They are no longer discharging to a surface water body.
- The highest concentrations in groundwater were detected near Buildings 201 and 335. Concentrations were 3 orders of magnitude above the 2016 HAL. Both of these locations are hangers with fire suppression systems that were known to have releases.
- Surface water discharge from a storm water basin detected PFASs over 4000 ppt. There is significant flow from the basin to a nearby stream, even in dry weather. Aqua PA has offered to install temporary treatment on this discharge through their cooperative agreement with Warminster due to Aqua's concern that this discharge contributes a significant portion of PFCs

[2] The Safe Drinking Water order referenced the 2009 provisional health advisory levels, but Air National Guard has taken action based on the health advisory level released in May 19, 2016.

detected at Aqua's intake downstream. ANG was to work on navigating the legal hurdles to allow this to happen. Aqua PA had not heard back from ANG on this project.

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Challenges Associated with Investigation and Remediation of the Warminster and Willow Grove Sites

- Due to the volume of samples and the limited number of approved laboratories, there are significant delays in acquiring sample results from laboratories.
- Increases in groundwater extraction and discharges of treated water to surface water bodies, rather than use for consumption, could increase the potential for flooding in the area.
- Township citizens and elected officials instructed their municipal water authorities to not use the treated water for consumption. They would rather use surface water connections to replace impacted wells.
- The Navy and Air National Guard are paying for treatment but do not want to pay for water replacement, in addition to long-term treatment and maintenance, for water not being consumed.
- Lack of pumping by public water supply wells is leading to further plume migration and a broader impact to private wells.
- Additional source areas, beyond the Warminster and Willow Grove sites, are suspected based on monitoring data from other public water supply systems. This is leading to more request for private sampling, despite their distance from these facilities.
- Expediting environmental work is challenging for the federal facilities due to contract requirements.

November 8, 2016 Technical Meeting

- USGS, ANG, Navy, EPA and PADEP met to discuss the USGS model being developed for Willow Grove and to share technical update from ongoing investigations at Warminster and ANG and Navy Willow Grove.
- USGS provided update on groundwater modeling efforts which will provide a tool to assist in remediation activities. Group provided feedback on questions would like the model to answer.
- The Navy agreed to fund the USGS to complete Phase I of the model to include the Warminster site, which is expected to be completed within 6 months depending on data availability.

Township and Water Authorities Drinking Water Updates

Meeting held Oct. 4th, 2016 with PADEP, EPA, Horsham, Warrington, Warminster and Aqua to discuss treatment option, long and short term solutions, water system updates, runoff and discharge.

- ~~ANG and~~ Navy is preparing to take over private well sampling from EPA (end of 2017), including long term monitoring for private wells with PFAS between 40 – 70 ppt.
- Need to determine if Navy or ANG is responsible for Warminster Wells 14 & 15.
- Concerns were expressed regarding shutdown of wells which will allow further plume migration and concerns about discharging treated groundwater surface water bodies if the townships will not use the treated water as their water supplies.

Warminster Township Municipal Authority (Navy)

- 6 of the 18 production wells were initially taken offline due to PFAS. PADEP was notified on October 7th that all wells are off the public water system and all their water is now coming from the North Wales system. Wells not receiving treatment are shutdown.
  - Well 10 (~350 gal/min) & Well 26 (~180 gal/min)- Carbon treatment in place, going to waste until testing complete. Results indicate carbon filter removing contaminant and all 6 PFCs tested are non-detect.
  - Well 13 Plan to treat and discharge to stream – NPDES application submitted
  - Well 2 (~50 gal/min) – Navy has agreed to provide treatment to bring back online. Unclear if Warminster will use well.
  - Wells 14 (~180 gal/min) & Well 15 (~180 gal/min) – currently shutdown. Neither Navy or ANG taking responsibility for contamination.
- Currently purchasing water from North Wales Water Authority (NWWA) for average use through long term (10 year) contract. Plan to use 6 wells which will receive carbon treatment as backup.

Horsham Water and Sewer Authority (Navy)

- 5 of the 15 wells taken offline due to PFAS
- 2 wells permanent treatment under construction
- Wells 10, 17, and 21 temporary treatment installed, discharged to surface water body
- Options for Long Term Plan were presented to elected officials. No decision made at this point but indicated leaning towards NWWA supply.
- Currently purchasing some water from NWWA

Warrington Water and Sewer Authority (Air National Guard)

- 5 of 9 wells offline due to PFAS
- Wells 1, 2 & 6 – 1 treatment system for group of wells – work is out for bid
- Wells 3 & 9 currently negotiating with ANG amendment to Consent Agreement
- Plan is for long term supply from NWWA (which has been servicing the western portion of township) and use treated water from Wells 1, 2 & 6 for peak use and emergencies.

Other PFAS Impacted Sites

Delaware sites

1. New Castle- All 3 Public water supply wells have treatment installed and back on line. Still working with HSCD to investigate sources including the Air Guard. Three (3) additional Artesian Water Co. wells all remain offline, using other sources for replacement. The State of DE has proposed Site Investigation work; which if approved, would be conducted using Cooperative Agreement funds provided by the Region
2. Dover- Dover Air Force Base water supply wells protected, one home outside of the property above new HA, but not inhabited.

Pennsylvania sites-

1. Harrisburg- United Water 1 entry point taken offline at the Airport, system re-worked to eliminate source. Airport 4 wells impacted, installing treatment under DEP permits.
2. Aqua America – conducted sampling in their well systems in Bucks and Montgomery counties and detected PFOS /PFOA in 18 of 20 sources sampled. One well in Hatboro (that has been off line for 2 years) had combined value of 99 ppt (9/16/16 retested at 63 ppt) and one well in the Chalfont area had 68 ppt combined PFOA/PFOS and was shut down. The Chalfont well was retested at 19 ppt and most recently at 40.2 ppt, remains turned off. A meeting was held with Aqua PA/Aqua America on September 9th to share information and discuss ways to improve cross agency communications and communications to their customers.
3. Doylestown Water Authority Cross Keys well - taken off line since the May HAL was issued. The PADEP is investigating the vicinity for additional private well impacts. Source is unknown at this time but the well is less than one mile from the Doylestown Airport. PADEP is sampling about 200 homes in the vicinity. Results in thus far show only one private well with PFOS+PFOA > 70 ppt and is receiving bottled water
4. North Penn Water Authority East Rockhill System – North Penn independently sampled the two East Rockhill wells. One exceeded the health advisory level with 117 ppt of combined PFOS+PFOA. North Penn shut down that well, is supplementing with purchased water from Perkasie Borough, was arranging to resample and was preparing to notify their customers of the findings. The sample from other well contained 65 ppt combined PFOA+PFOS and is still in-service.
5. Worcester Army Corps of Engineers former fire training site (located on a former Nike Missile site). The Township sampled a well on the former Nike site. Results for PFOA and PFOS were 21 ppt and 390 ppt (combined 411 ppt). This well is not used for water supply. PADEP formally requested the U.S. Army to: expedite investigations on PFCs, in coordination with EPA, by immediately sampling public and private wells in the nearby area; immediately respond to contamination. PADEP also requested by October 7th a plan of action to address the contamination. There is no word yet as to whether the Army submitted a plan, but PADEP scheduled a meeting with the Army on November 15th to discuss this site.

Virginia-

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1. Fentress Naval base, part of Oceana: 2 on-base wells offline, 7 homes/daycare/church provided bottled water.

West Virginia-

1. DuPont- in the Washington Works area covering parts of West Virginia and Ohio-About 65 homes with GAC treatment, about 50 with hook ups to public water, sampled about 400 locations to date. 8 wells in Vienna newly impacted after HA. DuPont has installed GAC treatment covering wells 11-14 for Vienna. The GAC system is online with initial samples reading below detection we are still waiting confirmations sample results using Method 537. DuPont has agreed to use method 537 for all sampling from here on, but expects it will take longer due to lab capacity. DuPont has offered resampling and bottled water to 38 homes initially known to be impacted under the new HA. We are awaiting an update of these efforts. Samples have also been taken of the Williamstown, Marietta and Warren water systems. These are in the expanded area of interest to be covered under the amended Order however, DuPont/ Chemours has already taken samples at these public systems to verify current PFOA concentrations. Results are back for these public water systems and none of their source water exceeds 22 ppt at this time. We are awaiting additional sample validation, for samples run in duplicate using method 537 to verify that these samples will be satisfactory. The only system not previously sampled under UCMR is Williamstown. An inter connection with Parkersburg is in place serving the southern portion of Vienna until treatment can be installed on their wells 9 & 10.

Ex. 5 AC / Ex. 7(A)

2. Martinsburg- Sporadic levels of PFOS above the new HA were found in one of the springs and taken offline for further investigation. No additional EPA activities in Martinsburg. WVDEP conducted an investigation and shared results with the ANG and the Department of Health. DEP's results indicate ANG is responsible for the PFCs in Martinsburg's southern source. ANG remediation director is taking the information back to senior officials to get a decision on taking ownership and paying for treatment at Martinsburg's source. Martinsburg is already moving forward to design and install GAC treatment on that currently closed water source.

Other Updates

ATSDR is preparing responses to 10 questions from the Bucks County Courier Times. EPA is also preparing a responses to the Courier Times; some of which are identical to the questions asked of ATSDR.

EPA is in the process of responding to a FOIA request from Napoli, Shkolnik PLLC.

NSF International Protocol P473 establishes specific science-based test methods to evaluate in home drinking water treatment devices on their ability to reduce PFOA and PFOS.

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NOT FOR PUBLIC RELEASE

Ex 6 PII/ Ex 9 Wells

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