

ENVIRONMENTAL RESTORATION - INSTALLATION NAVAL AIR STATION JOINT RESERVE BASE WILLOW GROVE, PA

INTRODUCTION

The former Naval Air Station Joint Reserve Base (NASJRB) Willow Grove is situated on approx. 900 acres in Horsham Township, Montgomery County, Pennsylvania, which is nearly 20 miles north of Philadelphia. The NASJRB property was originally a municipal airfield constructed in the mid-1930s. The Navy acquired the airfield in response to World War II, and NAS Willow Grove was commissioned in January 1943. After the end of World War II, the installation was designated a Reserve Training Station. In 1994, the installation was re-designated a Joint Reserve Base to more accurately reflect its status. The mission of NASJRB prior to closure was to provide, train, and maintain a ready reserve force for the country.



Naval Air Station Joint Reserve Base Willow Grove was commissioned in 1943 and closed in 2011.

The 2005 Base Realignment and Closure (BRAC) Commission recommended closure of NASJRB on September 8, 2005; which was approved by the President and accepted by Congress on November 9, 2005. The installation ceased operations and was officially closed on September 15, 2011. The Naval Facilities Systems Engineering Command's (NAVFAC) BRAC Program Management Office (BPMO) was directed to prepare the installation for surplus property disposal and future redevelopment by the local redevelopment authority (LRA).



Hangars and aircraft ramps at NASJRB. Training operations were conducted at NASJRB using perfluoroalkyl substance (PFAS) based firefighting foams.

The LRA's redevelopment plan was reviewed per the National Environmental Policy Act, and was completed in June 2015 with a Record of Decision for the Final Environmental Impact Statement (FEIS) for the disposal and reuse of NASJRB. During the preparation of the FEIS, emerging chemicals of concern were identified in the drinking water near NASJRB. BPMO established a team to rapidly respond to the drinking water impacted by perfluoroalkyl substances (PFAS).

BACKGROUND

NASJRB Willow Grove is nominated for the 2021 Secretary of the Navy Environmental Award for Environmental Restoration - Installation to recognize efforts to protect human health and the environment by cleaning up hazardous substances, pollutants, or contaminants in a timely, cost-efficient, and responsive manner. During the achievement period of October 1, 2018 through September 30, 2020; NASJRB Willow Grove made a significant contribution to environmental restoration, especially in timely responses to drinking water impacted by certain Per- and Polyfluoroalkyl Substances (PFAS) that have been identified as emerging chemicals (ECs) of concern.

Per a 2005 Federal Facility Agreement, BPMO consults with Region Three of the U.S. Environmental Protection Agency (USEPA) and the Pennsylvania Department of Environmental Protection (PADEP) on environmental restoration activities at NASJRB Willow Grove. This Team has met continually to ensure that environmental impacts associated with NASJRB are thoroughly investigated and the appropriate remedial actions are taken to protect the public health, welfare, and the environment. BPMO is supported by NAVFAC Mid-Atlantic for remedial project management and contract management, and NAVFAC Atlantic for technical support. BPMO also has an interagency agreement with the U.S. Geologic Survey for hydrogeology technical support. BPMO manages installation restoration actions at twelve sites on NASJRB Willow Grove, and prepares surplus BRAC property for disposal and redevelopment. There are only three active environmental restoration sites at NASJRB Willow Grove.

PFAS known as perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) have impacted drinking water sources near NASJRB Willow Grove. These ECs are environmentally persistent, and have been detected in environmental samples long after a release was reported. This environmental persistence and the tendency to bioaccumulate in living organisms and some demonstrated toxicity in laboratory animals, have increased interest in these compounds.

PFAS are a class of man-made chemicals that have been used for many years to make products that resist heat, stains, grease and water. PFAS have been used to make carpets, clothing, fabrics for furniture, paper packaging for food and other materials (e.g., cookware) that are resistant to water, grease or stains. Additionally PFAS are also used in a variety of other industries, including aerospace, chrome plating, automotive, building and construction, and electronics. PFAS were also used in a variety of military applications, including as a component in certain aqueous film forming foam (AFFF), routinely used in the past at airfields and firefighting training areas.

Currently, there are no Safe Drinking Water Act (SDWA) federal regulations or Clean Water Act Ambient Water Quality Human Health Criteria for any PFAS. For chemical constituents not subject to any national primary drinking water regulation, the SDWA authorizes the USEPA to publish non-regulatory health advisories or take other appropriate actions. The USEPA created

these health advisories to assist state and local officials in evaluating risks from these chemical constituents in drinking water. In May of 2016, the USEPA issued a lifetime health advisory for two PFAS, specifically PFOA and PFOS. Each health advisory was set at 70 nanograms per liter (ng/L) or parts per trillion (ppt). In addition, when both PFOA and PFOS are detected in drinking water, their combined total should be compared to 70 ng/L. Previously, USEPA's Office of Water established a provisional health advisory level of 0.2 micrograms per liter ($\mu\text{g/L}$) for PFOS and 0.4 $\mu\text{g/L}$ for PFOA for short-term exposure of these chemicals through drinking water. In 2012, USEPA included PFOA and PFOS in the Safe Drinking Water Act Third Unregulated Contaminant Monitoring Rule, which required public water systems with more than 10,000 customers to sample twice between 2013 and 2015.



This firefighting nozzle is an efficient means to dispense AFFF which is an effective fire extinguishing agent but the fluorinated compounds can seep into drinking water sources.

SUMMARY OF ACCOMPLISHMENTS

- During the achievement period, NASJRB Willow Grove continued to respond rapidly and expeditiously to prevent unnecessary drinking water exposure to PFOA and PFOS in surrounding communities, and reduce risk to human health and the environment. Commencing in 2014 and continuing through 2020, the installation has taken action to sample over 500 drinking water wells to determine if their drinking water sources exceeded the USEPA health advisory levels of PFOA and PFOS. Private drinking water well sampling efforts were initiated in 2014 and the drinking water sampling area was expanded in 2016 after USEPA issued lifetime health advisories. During this achievement period, over 350 private drinking water wells were sampled, with over 700 validated analytical results. Since 2014, approximately 90 locations have been connected to treated municipal water.
- NASJRB Willow Grove continues to provide innovative cooperative agreements grants to the local municipal authority to treat PFOA and PFOS to below the lifetime health advisory levels. Two municipal wells have permanent treatment systems and three additional wells have temporary treatment systems. Over 10,000 public water customers benefit from the removal of PFOA and PFOS exceeding the lifetime health advisory levels.
- Proposed remedial action plans (PRAP) were completed during the achievement period for two Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites: Site 3 - Ninth Street Landfill, and Site 12 – South Landfill. Both of these sites are former landfills that were used for municipal wastes at NASJRB Willow Grove between 1948 to 1967. The proposed plans were presented to the public in a virtual format, due to COVID-19 restrictions, on September 23, 2020. The feasibility study for Site 12 was completed in August

2019. The preferred remedial alternative for both sites are on-site consolidation, with soil cover, land-use controls, and long-term monitoring. The CERCLA Record of Decisions are expected to be completed in 2021. To reduce overall remediation costs, the remedial actions for both sites are planned to be performed at the same time.

- NASJRB Willow Grove has accelerated interim actions to protect human health from exposure to PFOA and PFOS above the USEPA's drinking water lifetime health advisory levels. In 2018, a Time Critical Removal Action (TCRA) was initiated to excavate and dispose of soils which exceeded a statistically derived screening level of 1,027 $\mu\text{g}/\text{kg}$ (micrograms per



Soils excavated from areas near aircraft maintenance hangars, fire station, and AFFF storage areas.

kilogram) of PFOS. These areas were located at locations on NASJRB Willow Grove which were associated with usage of AFFF. PFOS is known to be used in some historical formulations of AFFF and is water soluble. NASJRB Willow Grove is hydraulically linked to off-base groundwater used as drinking water sources. The soil excavation and disposal was completed in late 2018, per a workplan prepared in consultation with the USEPA and PADEP. Over 4,400 tons were transported to a Resource and Recovery Act non-hazardous waste landfill. The 2018 TCRA to remove the soils were preceded by three other interim actions, in 2015 and 2017 to reduce exposure to PFOA and PFOS above the lifetime health advisory levels in drinking water. Other interim actions are anticipated to be taken to further reduce drinking water exposure to PFOA and PFOS.

- During this achievement period, phase one of a PFAS Remedial Investigation (RI) was completed in 2019. The RI is continuing into phase two to refine the conceptual site model. The results of the phase I PFAS RI found areas of high groundwater concentrations of PFOA and PFOS near source areas. NASJRB Willow Grove initiated pilot studies of a groundwater extraction and treatment system to remove PFOA and PFOS from source areas. The first pilot study, was initiated in late 2018 at former Aircraft Maintenance Hangar 680. Groundwater investigation, as part of a Remedial Investigation found some of the highest levels of PFOA and PFOS (approx. 5.5 $\mu\text{g}/\text{L}$ or parts-per-billion) in the groundwater near this hangar. In early 2019, NASJRB Willow Grove worked in consultation with USEPA and PADEP to develop a small scale (approx. 20 gallons-per-minute) system to pilot test a combined granular activated carbon (GAC) and resin based ion exchange treatment system. PADEP approved the permit

equivalent discharge and the system was activated in February 2020. As of September 30, 2020, the system has treated over 5 million gallons and the system has continually achieved all expected performance criteria, especially for PFOA and PFOS removal. The system will continue to operate to assess the long-term performance of the treatment media, which will provide valuable information of a larger scale interim groundwater treatment action in 2021.

- Despite the PFAS challenges, BPMO is continuing to support BRAC property disposal at NASJRB Willow Grove. BPMO consulted with the Environmental Protection Agency and the Pennsylvania Department of Environmental Protection to complete a Finding of Suitability for Transfer (FOST) for the first parcel to be transferred to the local redevelopment authority. The FOST for the 8 acres parcel was completed in September 2020, and the property is being transferred via a Public Benefit Conveyance through the National Park Service.
- Department of Defense sponsored research initiatives for PFAS impacts and remediation through the Strategic Environmental Research and Development Program (SERDP) and Environmental Security Technology Certification Program (ESTCP) are being integrated into PFAS investigations. Over fifteen SERDP and ESTCP projects have or are being implemented at former NASJRB Willow Grove. These projects utilize media (e.g., soil, groundwater, or surface water) to look at development of analytical techniques, characterization of potential ecological risks, or development of potential treatment technologies. Three ongoing field projects are currently looking at potential bioaccumulation and ecological effects due to exposure to PFAS. As an example, SERDP Project ER18-1063 uses the pilot PFAS GWETS to evaluate emerging treatment technologies to complete field demonstration for groundwater treatment. This project is evaluating the performance of various commercially available single use and regenerable resins and is supported by the Colorado School of Mines, CDM-Smith, and the Arizona State University. This project and others will provide valuable information to SERDP/ESTCP for potential integration into consideration at other Navy or Department of Defense PFAS sites.



SERDP project ER18-1063 is evaluating commercially available single-use and regenerable resins for PFAS treatment.

- Community outreach continues to be performed at NASJRB Willow Grove via the Restoration Advisory Board (RAB) and other public meetings to update the community on actions being taken on PFOA/PFOS in drinking water and other projects. The RAB has met continuously since 2005, and has held two virtual meetings in 2020, due to COVID-19 restrictions. The RAB meetings are held jointly with the Air National Guard Bureau, who performs environmental restoration activities on Horsham Air Guard Station, which is adjacent to NASJRB Willow Grove. USEPA and PADEP are active participants in the RAB meetings, the U.S. Geologic Survey is a frequent technical contributor on hydro-geologic issues. Bi-monthly coordination meetings are also held with federal and state partners on accelerating actions to eliminate exposure to PFOA/PFOS in drinking water.

SUMMARY

As a result of the significant contributions to environmental restoration, NASJRB Willow Grove is nominated for the 2021 Secretary of the Navy Environmental Award for Environmental Restoration - Installation to recognize efforts to protect human health and the environment by cleaning up hazardous substances, pollutants, or contaminants in a timely, cost-efficient, and responsive manner. During the achievement period of October 1, 2018 through September 30, 2020; NASJRB Willow Grove made a significant contribution to environmental restoration, especially in timely responses to drinking water impacted by certain PFAS that have been identified as ECs of concern.

The environmental restoration actions, protection of human health and the environment, and property disposal were conducted in consultation with the Environmental Protection Agency, and the Pennsylvania Department of Environmental Protection under a Federal Facility Agreement. Interim actions to accelerate the protection of human health from drinking water exposure to PFOA and PFOS continue to be executed as investigation of these ECs continue per the CERCLA process. Department of Defense PFAS research activities are actively being performed at NASJRB Willow Grove, providing valuable information for other installations.