



## **INTRODUCTION**

Naval Weapons Station (NWS) Yorktown is an 8,881-acre Installation on the Virginia Peninsula in York and James City Counties, Virginia.

NWS Yorktown, originally named the Navy Mine Depot, was established in 1918 to produce Naval mines for the North Sea Mine Barrage during World War I. For 20 years after World War I, the depot continued to receive, reclaim, store, and issue mines, depth charges, and other weapons. During World War II, the facility was expanded to include three trinitrotoluene loading plants and new torpedo overhaul facilities. A research and development laboratory for experimentation with high explosives was established in 1944. In 1947, a quality evaluation laboratory was developed to monitor special tasks assigned to the facility, which included the design and development of depth charges and advanced underwater weapons. On August 7, 1958, the depot was renamed NWS Yorktown. Today, the primary mission of NWS Yorktown and its tenant commands is to provide critical fleet ordnance support for the Department of the Navy (Navy); expeditionary logistics training and operations; and warfare training for Sailors, Marines, and other branches of the military.

Currently, the Installation is a hub of activity. The Installation and its tenant commands work together as a team to provide ordnance logistics, technical, supply, and related services to the Atlantic Fleet. NWS Yorktown hosts 37 tenant commands, which include the Navy Munitions Command, Navy Munitions Command Contiguous United States East Division, Naval Ophthalmic Support and Training Activity, Marine Corps Security Force Regiment, Fleet Industrial Supply Center, Navy Expeditionary Logistics Support Group, Naval Expeditionary Medical Support Command, Navy Cargo Handling Battalion One, and 19 departments.

Current land use throughout much of the Installation is restricted within explosive safety quantity distance arcs of munitions storage areas. Much of the Installation is wooded and dissected by ravines and tributaries that drain to the York River. Several ponds are used for catch-and-release fishing.

The community surrounding the Installation consists of primarily of residences and recreational space, with some commercial and industrial areas. The Installation shares almost 14 miles of the York River shoreline with the National Park Service. The York River is heavily used for both commercial and recreational fishing and boating.

## **BACKGROUND**

### **Program Summary**

NWS Yorktown was added to the National Priorities List in 1992. A Federal Facility Agreement between the Navy and the U.S. Environmental Protection Agency (EPA) was signed in 1994. Environmental restoration at NWS Yorktown is challenging because of the Installation's mission, size, and environmental conditions. To help streamline the environmental cleanup process, Environmental Restoration Program (ERP) Partnering Teams were chartered to streamline closure of ERP sites by using consensus-based site management strategies following the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process.

To date, 68 potentially contaminated Installation Restoration and Munitions Response sites, solid waste management units, and areas of concern have been identified for evaluation based on previous assessments and investigations. Of those sites, 46 sites have been closed with No Further Action (NFA). Of the 22 active ERP sites, more than half are currently in the Remedial Investigation (RI)/Feasibility Study (FS) phase, and a majority of the sites are complex because of multimedia contamination, a variety of contaminants, and challenging physical characteristics. Seventy-five percent of the Installation is within restricted areas of explosive safety quantity distance arcs of munitions storage areas. Much of the landscape is bisected by water bodies and ravines. The historical activities conducted



at the site have resulted in a wide range of contaminants requiring cleanup, including volatile organic compounds, semivolatile organic compounds, pesticides, polychlorinated biphenyls, metals, explosives constituents, dioxins/furans, per- and polyfluoroalkyl substances (PFAS), radiological constituents, and munitions and explosives of concern.

**Partnering Team and Community Involvement**

The Partnering Team consists of representatives from Navy Facilities Engineering Systems Command (NAVFAC), EPA, Virginia Department of Environmental Quality (VDEQ), and environmental consulting firms (**Table 1**). The Team is supported by Navy technical and legal experts and a variety of specialized environmental contractors and works in accordance with a Partnering Deliverable, which outlines the Team’s framework for implementing the ERP and includes the Team’s Mission, Goals, and Measures of Success. The Team has monthly status update calls and meets in-person three to four times a year to set schedules with interim milestones and develop site strategies. The Team successfully collaborates to evaluate the needs of the community, the ERP, and the mission and apply economical, environmentally sound, and sustainable methodologies to issues under examination.

**Partnering Team Mission**  
 To expeditiously clean up and restore the installation using cost-effective, innovative, and site-specific technology that will ensure protection of human health and the environment.

*Table 1 – Partnering Team Representatives*

	<p><b>NAVFAC</b>  <b>Mr. Melvin Acree</b>          NWS Yorktown NAVFAC Remedial Project Manager (RPM)</p>
	<p><b>VDEQ</b>  <b>Mr. Wade Smith</b>          NWS Yorktown VDEQ RPM</p>
	<p><b>EPA</b>  <b>Mr. Vincent Grassi</b>          NWS Yorktown EPA RPM</p>
	<p><b>CH2M HILL, Inc. (a wholly owned subsidiary of Jacobs)</b>  <b>Mr. Nathaniel Price</b>          NWS Yorktown Activity Manager   <b>Ms. Victoria Kilbert</b>          NWS Yorktown Deputy Activity Manager</p>

The Installation’s community involvement program for the ERP includes the Restoration Advisory Board (RAB), created in 1994. The RAB is co-chaired by the Installation’s Commanding Officer and a community member. The RAB meets annually to provide an information exchange between community members, the Navy, EPA, and VDEQ. In addition, the Installation connects with the community through public meetings, public website, fact sheets, announcements in the local newspapers (*Daily Press* and *The Virginia Gazette*), the Installation’s social media page, and the *Williamsburg Yorktown Daily* online publication.



The key challenge for the Partnering Team during this achievement period was the development of closeout strategies for the remaining sites, which are the most complex because of the physical characteristics and type of contaminated media. Despite the challenges, the ERP for the Installation continued to progress the sites through the CERCLA process. The following reports were developed during the achievement period, four Sampling and Analysis Plans (SAPs), four Remedial Investigation (RI) Reports, three Feasibility Studies (FSs), one Remedial Design, one Non-Time Critical Removal Action (NTCRA) Engineering Evaluation/ Cost Analysis (EE/CA), one NTCRA Action Memorandum, two Construction Completion Reports (CCRs), one Remedial Action Work Plan, one Long-Term Monitoring Report, two Proposed Plans, one Remedial Action Completion Report, and one Radiological Preliminary Assessment Work Plan.

The Partnering Team continued to foster a closer working relationship with EPA technical support personnel by inviting them to, and requesting their participation in, the quarterly Partnering Team meetings. Site-specific technical presentations requiring Team consensus on the path forward are provided at least 30 days before each quarterly Partnering Team meeting so EPA technical support personnel could review material, which helped to facilitate constructive discussion during the quarterly presentations. This has expedited comment resolution and progressed project schedule and delivery. During this achievement period, the NWS Yorktown team was recognized by the EPA Region 3 Navy/ Marine Corps Tier 2 Partnering Team with the *Excellence in Overall Project Delivery and Sustainability* award for the Navy/Marine Corps Mid-Atlantic Region Partnering Team competition in 2024.

The key initiatives for the ERP during this achievement period included the following:

- Completion of a NTCRA to address impacted surface soil at the Site 6 Excavated Area, resulting in unlimited use and unrestricted exposure (UU/UE) and a change in the protectiveness determination from Not Protective in the 2023 Five-Year Review to Protective in the 2028 Five-Year Review.
- Initiation of a Time Critical Removal Action (TCRA) to address indoor air risks at Site 31 Sheds 3 and 6, which will result in approximately 100,000 square feet of currently unoccupied building space being made available for tenant commands.
- Completion of a Remedy Optimization Pilot Study consisting of installation and operation of a subgrade biogeochemical reactor (SBGR) at Site 22 with the results to date having shown the system to be an effective option for treating impacted groundwater at the site. Following completion of the Site 22 Remedy Optimization Tech Memorandum, the SBGR is planned to be included in the site remedy via completion of a Revised Proposed Plan and Record of Decision (ROD) Amendment.

*Environmental Restoration at NWS Yorktown is conducted  
in accordance with the following agreements:*

- **NWS Yorktown Federal Facility Agreement (September 1994)**
- **NWS Yorktown Site Management Plan (December 2023)**
- **NWS Yorktown Fifth Five-Year Review Report (January 2023)**
- **NWS Yorktown/Cheatham Annex Community Involvement Plan (August 2021)**



## SUMMARY OF ACCOMPLISHMENTS

### Accelerated Environmental Cleanup and Partnerships Addressing Environmental Restoration Issues Between DoW and Other Entities

#### *Site 6 Explosives-Contaminated Wastewater Impoundment*

The selected remedy in the 1998 ROD for Site 6 Excavated Area soil consisted of soil cover installation and land use controls to prevent disturbance of the impacted surface soil. A Phase I Data Gap RI was conducted in 2015 for Site 6 based on additional access to the site following building demolition. An objective of the investigation was to evaluate the presence of a soil cover in the Excavated Area. Investigation activities within the Excavated Area of Site 6 during the Phase I Data Gap RI found native material with no evidence of a soil cover. Consequently, the 2023 Five-Year Review determined that the remedy for the Site 6 Excavated Area was not protective, and action was warranted to ensure protectiveness and mitigate potential ecological exposures to zinc in surface soil.

The Team agreed that a soil cover was not the most favorable action for addressing the exposed impacted surface soil. Based on the relatively small size of the impacted area (115-foot-by-175-foot area to 1 foot below ground surface), it was decided that the remedy in the 1998 ROD would not be implemented. The Team agreed that surface soil excavation to ecological cleanup goals, confirmation soil sampling, and offsite disposal, followed by a backfilling with imported clean fill material, would be a better alternative to address the impacted area because it would achieve UU/UE for the site. The Team determined the quickest route within the CERCLA process to address the impacted surface soil was an NTCRA (EE/CA, Action Memorandum, Work Plan/SAP, Fieldwork, CCR) followed by a Revised Proposed Plan and ROD Amendment documenting NFA for the Site 6 Excavated Area. The NTCRA was completed in 2025,

with the remaining site closeout documentation (NFA Proposed Plan and ROD) planned for completion in 2026 and 2027. In addition to addressing the impacted surface soil in a shorter time frame and in a method that results in UU/UE, this approach results in completion of the surface soil removal before the 2028 Five-Year Review, allowing a change of the protectiveness determination from Not Protective to Protective.



*Site 6 NTCRA*

## Accelerated Environmental Cleanup and Reducing Risk to Human Health and the Environment

### Site 31 Barracks Road Landfill Industrial Area

Shed 3 is a 1-story rectangular building built in 1920. The building was formerly used to conduct paint and blasting operations, parts washing and assembly, and as a satellite accumulation area for aerosol paint cans. Shed 6 is a 1-story rectangular building built in 1919. The building was formerly used for missile component rework and equipment maintenance. More recently, the building was used as the Public Works storage and manufacturing facility (welding, wood, and carpentry workshops). Each building is approximately 50,000 square feet.

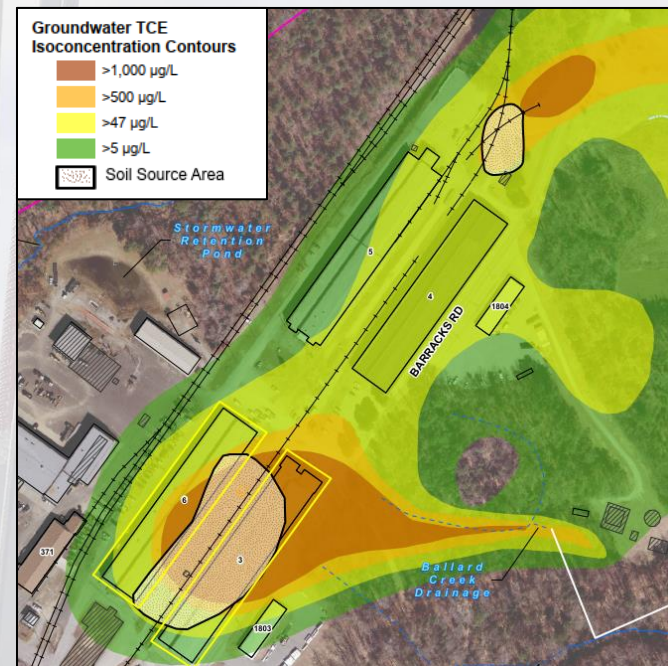
An RI was initiated in 2012 and included a vapor intrusion investigation consisting of subslab soil gas and indoor air sampling at Shed 3 and Shed 6. Trichloroethene (TCE) exceeded the risk-based indoor air criterion applicable at the time and significant source concentrations were measured in subslab soil gas. In response to the TCE concentrations detected in the indoor air, the Navy made the risk management decision to proactively relocate personnel and their operations to other buildings on NWS Yorktown. The sheds have remained unoccupied with restricted access.

In 2024, the Installation identified the sheds as spaces the facility needs to support mission requirements for NWS Yorktown. In response to requests from the Installation Commanding Officer, the Team moved quickly to conduct the following:

- Collect indoor air samples at Sheds 3 and 6 in Fiscal Year (FY) 2025 to get a current snapshot of indoor air concentrations.
- Complete a technical memorandum evaluating short-term indoor worker exposure durations for Sheds 3 and 6 to allow use of the sheds for long-term storage and short-term worker occupancy.
- Initiate a TCRA and develop an Action Memorandum in FY 2025 for vapor intrusion mitigation system design and installation to get the indoor air concentrations at levels suitable for long-term building occupancy by facility personnel. The TCRA is being implemented throughout FY 2026, resulting in approximately 100,000 square feet of building space being made available for tenant commands.



Site 31 TCRA Vapor Intrusion Sampling



Site 31 Groundwater TCE Concentrations

## Innovative Technology Demonstration, Validation and/or Implementation

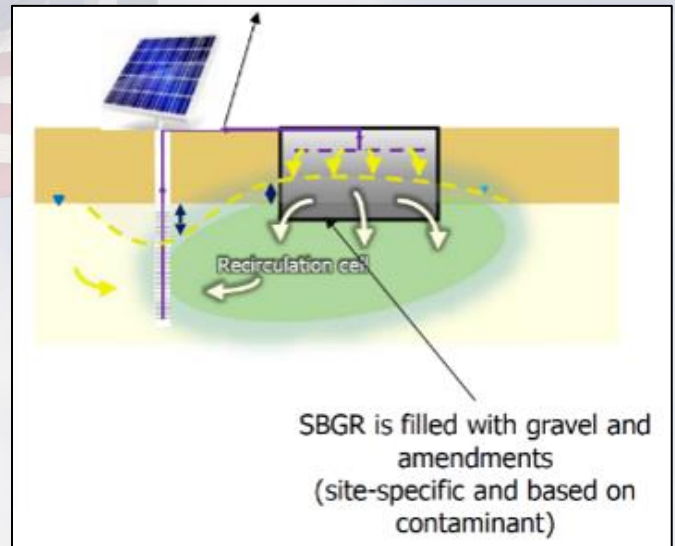
### Site 22 Subgrade Biogeochemical Reactor

A remedy optimization investigation was implemented at Site 22 to evaluate a subgrade biogeochemical reactor (SBGR) where a burn pad was used for more than five decades to dispose of waste explosives and spent solvents. Groundwater at the site is impacted by a mixed plume containing TCE, perchlorate, hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), 1,4-dioxane, and per- and PFAS. The objectives of the investigation were to evaluate treatment of TCE, vinyl chloride, perchlorate, and 1,4-dioxane and to monitor the effects of the SBGR groundwater recirculation on RDX and PFAS. SBGRs are a technology for treatment of contaminant source areas and groundwater plume hot spots, which are constructed by backfilling an excavated soil area with a proprietary mixture of sand and gravel, composted mulch, wheat straw, iron, and vegetable oil. Additionally, an SBGR is a favorable groundwater treatment technology for areas near surface water bodies, given the low potential for daylighting.

The SBGR is currently in the operations and maintenance stage with semiannual performance groundwater monitoring, and the results to date have shown the system to be an effective option for treating impacted groundwater at the site. TCE concentrations decreased by greater than 80 percent at all extraction wells, with the greatest reduction at EX-01 (99.7 percent). Within the SBGR, concentrations of TCE, vinyl chloride, RDX, and perchlorate were low or below detection, and 1,4-dioxane concentrations decreased in-reactor, while remaining relatively stable at the extraction wells. PFAS remained stable to decreasing in the reactor; any decreases were attributed to sorption to SBGR media rather than a destructive mechanism. The SBGR was successfully implemented adjacent to surface water without the occurrence of daylighting.

Following completion of the Site 22 Remedy Optimization Tech Memorandum, the SBGR is planned to be included in the site remedy via completion of a Revised Proposed Plan and ROD Amendment.

SBGR construction included the beneficial use of 8,700 pounds of zero-valent iron from another Navy project, the use of solar-powered recirculation pumps to treat contaminated groundwater, and the



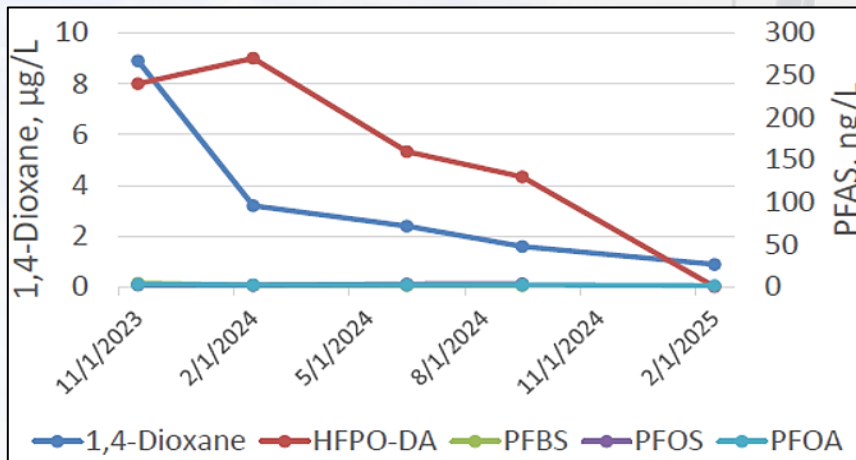
Site 22 SBGR



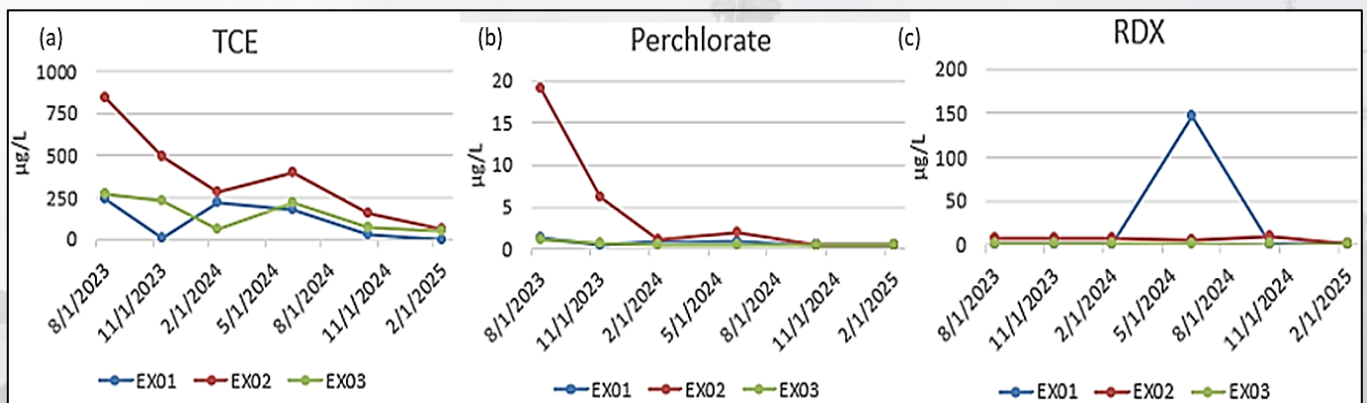
placement investigation-derived waste generated during groundwater sampling events into the SBGR instead of disposing it offsite. This has resulted in cost savings of approximately \$25,000, with continued savings growth as the system operates, from the beneficial use of zero-valent iron and reduced investigation-derived waste disposal and built in resiliency, via solar-powered recirculation pumps, for implementation of the SBGR as part of the site remedy.

The Site 22 Remedy Optimization Pilot Study has been accepted in FY 2025 as a case study for the following industry conferences and newsletters:

- 2025 Society of American Military Engineers Design and Construction Issues at Hazardous Waste Sites—East Symposium (March 2025; Philadelphia, PA)
- 2025 Battelle International Symposium on Bioremediation and Environmental Technology (June 2025; Boston, MA)
- 2026 Waste Management Symposia (March 2026; Phoenix, AZ)
- NAVFAC Engineering and Expeditionary Warfare Center Technology Transfer Newsletter (March 2026)



*Site 22 SBGR: 1,4-Dioxane and PFAS Concentrations within the SBGR*



*Site 22 SBGR: TCE, Perchlorate, and RDX Concentrations within the Extraction Wells*