

St. Juliens Creek Annex Restoration Advisory Board Meeting Summary: November 16, 2021 Meeting

MEETING ATTENDEES	Robert Bray, NAVFAC Mid-Atlantic Robert Stroud, EPA Region 3 Weel Lindsay, VDEQ Jason Scarborough, Norfolk Naval Shipyard Kathryn Smith, CH2M HILL, Inc. (CH2M)	Christian Conover, CH2M Pam Boatwright, Elizabeth River Project Kevin Lew, RAB Community Member
LOCATION	Microsoft Teams Conference Call	
MEETING DATE:	November 16, 2021	
PREPARED BY	Christian Conover/CH2M HILL, Inc.	
MINUTES DATE:	May 2022	

Restoration Advisory Board Welcome and Introductions

At 5:08 p.m., Mr. Robert Bray presented opening remarks and introductions to the Restoration Advisory Board (RAB). Mr. Bray thanked everyone for coming and explained that he is the Naval Facilities Engineering Systems Command (NAVFAC) Mid-Atlantic Remedial Project Manager for St. Juliens Creek Annex (SJCA). The other RAB members and guests introduced themselves. Ms. Kathryn Smith then provided a brief summary of best practices for virtual meetings including methods to unmute through Microsoft Teams or phone.

St. Juliens Creek Annex Fiscal Year 2022 Environmental Restoration Program Goals and Schedule

Mr. Bray led the topic and projected a presentation. The objectives of the presentation were to provide an overview of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process, provide an update on the SJCA Environmental Restoration Program (ERP) sites and fiscal year (FY) 2022 goals, highlight FY 2021 successes, and solicit questions and comments from the RAB.

Mr. Bray provided a brief overview of the CERCLA process. Mr. Bray explained that the CERCLA process is generally thought of in a traditional process. The process starts with a Preliminary Assessment (PA), which is a desktop study. The Site Inspection (SI) stage is conducted by sampling for presence or absence of any of the contaminants identified in the PA. The next step is the Remedial Investigation/Feasibility Study, and eventually we reach the Record of Decision, which outlines the path forward for the site. The Remedial Design describes the remedy designed for the site, and the remedial action (RA) is the build of the remedy. The down arrows in the chart presented signified a shift into other phases. The ultimate goal is to get to response complete and site closeout, which can be accomplished by different phases and milestones.

The FY begins October 1 and ends September 30 every year; we plan our year out based on the FY calendar. The FY calendar serves as a budgeting tool and a schedule for program actions. We prioritize our sites based on potential risk to human health and the environment, and our goal is to keep our remediation projects on schedule.

Figures were presented that depicted the 56 no further action ERP sites and the three currently active ERP sites (Sites 2, 4, and 21) at SJCA. Two sites are RA sites and the other is response complete with land use controls (LUCs).

An update on Site 2 was provided. Site 2 (Waste Disposal Area B) is an unlined waste disposal area that operated from 1921 to 1942. Investigations conducted at the site identified concerns from waste; chlorinated solvents, one polycyclic aromatic hydrocarbon (PAH), and one pesticide in the shallow aquifer groundwater; chlorinated solvents and metals in the surface water; and PAHs, pesticides, polychlorinated biphenyls, and metals in the sediment and soil.

Site 2 is currently in the remedial action-operation (RA-O) phase. The RA-O activities currently consist of biannual groundwater monitoring and LUCs maintenance. The first Five-Year Review (FYR) was completed for the site in May 2015, and the second review was completed in May 2020. The second FYR concluded that the remedy is protective to human health and the environment. The potential unacceptable risk has been addressed by previous actions and is currently controlled by a soil cover and LUCs, and RA-O maintenance and monitoring.

The recently completed and ongoing activities for Site 2 are as follows:

- RA-O Groundwater Monitoring
 - Conducted Event 11 in November 2020
 - Conducted Event 12 in May 2021
 - Currently conducting Event 13 in November 2021
- Conducting the annual LUC inspection in November 2021

The FY 2022 goals for Site 2 are as follows:

- Conduct annual LUC inspection and reporting
- RA-O Groundwater Monitoring Event 12 Report
- RA-O Groundwater Monitoring Event 13 Report
- Treatability Study Sampling and Analysis Plan

An update on Site 4 was provided. Site 4 is a sanitary landfill that operated from 1970 to 1981. Soil and sediment contaminated with PAHs, polychlorinated biphenyls, and metals were identified at the site. The RA to address the contamination, consisting of a soil cover, excavation of drainage ditch sediment, and LUCs, was completed in 2005. Site 4 is currently in the response complete phase with ongoing LUCs maintenance and FYRs. The first FYR for Site 4 was completed in May 2010, second FYR in May 2015, and third FYR in May 2020. The third FYR concluded that the remedy is protective of human health and the environment.

The recently completed and ongoing activities for Site 4 are as follows:

- Conducting the annual LUC inspection in November 2021

The FY 2022 goal for Site 4 is as follows:

- Conduct annual LUC inspections and reporting

An update on Site 21 was provided. Site 21 is the primary industrial area of the facility, where buildings were historically used for maintenance, electrical shops, and munitions loading, and outdoor areas were used for equipment and chemical storage. The fuel service station is no longer present at the site. The environmental concern at Site 21 is chlorinated volatile organic compounds in the shallow aquifer groundwater. In situ chemical reduction, enhanced reductive dechlorination, and LUCs were the selected remedies to address the contamination at the site. The site is currently in the RA-O phase. The RA-O activities consist of biannual groundwater, storm water, and vapor intrusion monitoring; emulsified vegetable oil (EVO) injections; and LUC maintenance. Figures presented show that the concentrations of constituents of concern in the groundwater over time is ultimately decreasing. The first FYR for Site 21 was completed in May 2015 and the second FYR was completed in May 2020. The second FYR for Site 21 concluded that the remedy is protective of human health and the environment. The next (fourth) FYR is scheduled for spring 2025. The potential unacceptable risk has been addressed by previous actions and is currently controlled by LUCs and RA-O maintenance and monitoring.

The recently completed and ongoing activities for Site 21 are as follows:

- Conducting the annual LUC inspection in November 2021
- RA-O Vapor Intrusion Monitoring
 - Conducted Event 17 in January 2021
 - Conducted Event 18 in August 2021
- RA-O Groundwater and Storm Water Monitoring
 - Conducted Event 17 in November 2020
 - Conducted conducting Event 18 in May 2021
 - Currently conducting Event 19 in November 2021

The FY 2022 goals for Site 21 are as follows:

- Conduct annual LUC inspections and reporting
- Finalize the RA-O Groundwater and Storm Water Monitoring Event 18 Report
- Finalize the RA-O Groundwater and Storm Water Monitoring Event 19 Report

The facility-wide goals for SJCA for FY 2022 are as follows:

- Complete the FY 2023 through 2027 Site Management Plan update
- Conduct the per- and polyfluoroalkyl substances (PFAS) SI field work in FY 2022

The successes for SJCA during FY 2021 were the following:

- COVID-19 Pandemic
 - Continued to successfully accomplish team goals and kept projects moving forward during the pandemic
- Basewide PFAS Investigation
 - Resolved team comments and finalized the PFAS PA
 - Finalized the PFAS SI Sampling and Analysis Plan (SAP) to prepare for SI fieldwork
- Site 2 Research Project
 - Facilitated Engineering and Expeditionary Warfare Center/GSI and Naval Research Laboratory research projects at Site 2
- Site 21 Vapor Intrusion (VI)
 - Completed Optimization Study and discontinued semiannual inhalation monitoring program
 - Completed the Building 81 VI investigation and removed Building 81 from the monitoring program
- LUC Inspections and Maintenance
 - Completed LUC inspections at Sites 2, 4, and 21
- RAB and Community Outreach
 - Hosted RAB meeting in November 2020
 - Kept public Web site updated throughout COVID-19 pandemic with information regarding canceled RAB meeting

Mr. Bray asked if there were any additional questions or comments. Ms. Pam Boatwright believed the PFAS investigations had been completed at most Bases. Mr. Bray responded that many Bases have most likely completed desktop studies, but no other PFAS investigations have been conducted at SJCA. The sites that will be investigated during the SI were identified during the PA (desktop study). No additional questions or comments were received.

Site 2 Optimization

Ms. Smith led the topic and projected a presentation. The objectives of the presentation were to review the Site 2 background, remedy, and RA-O components; discuss challenges during remedy implementation; present summary and status of optimization activities completed to date; provide an overview of the path forward; and solicit questions and comments from the RAB.

Site 2 is an unlined waste disposal area that operated from 1921 to 1942 and the remedy consists of the following:

- Soil cover over waste, soil, and inlet sediment
- Excavation of St. Juliens Creek sediment
- Enhanced reductive dichlorination within the high concentration target area of the shallow aquifer groundwater
- Monitored natural attenuation within the low concentration target area
- LUCs
- Contingency permeable reactive barrier (PRB)

RA-O was initiated in July 2014, is ongoing, and includes the following:

- Groundwater monitoring to evaluate the remedy effectiveness
- Compensatory mitigation wetland monitoring to ensure successful mitigation; monitoring was completed in 2020.
- LUC maintenance
- Additional injections (as necessary)
- Installation of a permeable reactive barrier (if necessary)

There are many site considerations and technical limitations present at Site 2 that must be considered when evaluating the site, such as the following:

- Significant utilities (particularly in the southern portion of the site)
- Munitions and munitions and explosives of concern potentially present within the landfill
- Buried waste and debris present within the landfill
- Complex hydrogeology
- High concentrations of chlorinated volatile organic compounds in groundwater identified across the site
- Residual dense nonaqueous phase liquid likely present in several different locations at Site 2
- Residual contaminant mass residing in low permeability layers
- Ecological habitats nearby (EEDB and Creek)

The most recent round of EVO injections was completed in 2019/2020. There were a lot of challenges during the implementation of the injections. During all three rounds of injections completed to date, there were “daylighting” issues at multiple well locations. Daylighting is when the substrate being injected travels to unintended areas of the site, typically due to pressure and preferential pathways. Because debris is located onsite, there can be preferential pathways that the substrate can follow, but go to the surface because of the pressure. Groundwater is shallow, and during heavy rains daylighting can occur because of saturation. Several permanent injection well locations were unable to be successfully injected during the Round 3 injections because of daylighting or fouled well screens. Wells identified as “fouled,” had sediment, substrate buildup, or other material blocking the well screen, which prevented substrate from being injected. Daylighting and injection well fouling presents potential concerns for long-term injections at the permanent injection well network.

As part of optimization activities, a Groundwater Optimization Study was completed in 2020. The objective of the study was to evaluate data and information from Site 2 to date and identify optimization opportunities. As part of the study a performance assessment was conducted that evaluated contaminant mass trends and estimated the time of remediation. Potential optimization opportunities were identified for potential alternative/additional technologies, conceptual site model refinement, and long-term management activities such as the following:

- Evaluating the potential of injecting zero valent iron (ZVI)
- Conducting additional EVO injections
- Using high-resolution tools to enhance the conceptual site model and aid in selecting areas to target during remedy implementation

The current path forward is to continue the RA-O groundwater monitoring on a semiannual basis. The team is currently exploring options to conduct a pilot study to collect additional data to evaluate treatment options, such as injecting ZVI at the site. The team will continue to consider optimization opportunities identified and continue to optimize the remedy at Site 2.

Ms. Smith asked the RAB if there were any questions or comments. Ms. Boatwright asked if the PRB has been installed already or if it will be installed in the future. Ms. Smith responded that there currently is not a PRB at the site. Ms. Boatwright asked if ZVI targets a specific contaminant. Ms. Smith responded that EVO and ZVI are both substrates that target chlorinated volatile organic compounds; particularly both known to be very successful. ZVI and EVO were used at Site 21 and were very effective. Since then, ZVI technology has improved, and the team believes it will be effective at Site 2. The team plans to perform a Treatability Study for ZVI to determine its effectiveness. No additional questions or comments were received.

Site 21 Optimization

Ms. Smith led the topic and projected a presentation. The objectives of the presentation were to review the Site 21 remedy and RA-O components, present a summary and status of optimization activities completed to date, provide an overview of the path forward, and solicit questions and comments from the RAB.

The selected remedy for Site 21 consists of the following:

- In situ chemical reduction through injection of ZVI in the high-concentration shallow aquifer groundwater
- Enhanced reductive dichlorination through injection of EVO in the low concentration shallow aquifer groundwater
- LUCs

The RA-O was initiated in 2011, is ongoing, and includes the following:

- Groundwater monitoring to evaluate the effectiveness of the remedy
- Storm water monitoring to evaluate whether groundwater with contamination at concentrations of concern is migrating offsite through the storm drain system
- VI monitoring to evaluate whether the RA of building deterioration has resulted in potential unacceptable inhalation risks or explosive hazards
- Maintenance of LUCs
- Additional injections (as necessary)

A groundwater Optimization Study was completed in 2020. The objective of the Optimization Study was to evaluate data and information collected from Site 21 to date, and identify optimization opportunities. A performance assessment was conducted that evaluated contaminant mass trends and estimated time of remediation. Potential optimization opportunities were identified for potential alternative/additional technologies and long-term management activities such as the following:

- Additional microbial population evaluation to aid in determining if groundwater conditions are favorable for continued degradation
- Reduction of RA-O semiannual groundwater monitoring events
- Additional EVO or ZVI injections

Because buildings are located at Site 21, a VI program was implemented. A VI Optimization Study was completed in 2021. The objective was to evaluate Site 21 data and determine whether the RA-O phase VI monitoring approach can be optimized, and if so, recommend an optimization strategy. To recommend optimization, all VI data collected to date including data from the Remedial Investigation and RA-O VI phase monitoring events were evaluated. Eighteen RA-O VI phase monitoring events have been conducted to date. The VI Optimization Study concluded that concentrations in groundwater to date have not resulted in indoor air concentrations exceeding risk-based target levels at occupied buildings and are not expected to in the future. Therefore, it was recommended that the inhalation risk monitoring portion of the RA-O VI monitoring program be discontinued. Because of the recent injections completed at Site 21 in 2019 and 2020, explosive hazard monitoring was recommended to continue in accordance with the SAP until it is no longer warranted. Injections can produce hydrogen sulfide and methane as part of the chemical reaction. If additional treatment is conducted at the site, the Navy in partnership with United States Environmental Protection Agency (EPA) and Virginia Department of Environmental Quality (VDEQ) (collectively, the Partnering Team) will evaluate whether any additional VI monitoring is required in association with the treatment implemented.

The path forward for VI phase inhalation monitoring has been discontinued. The RA-O VI phase monitoring for explosive hazards is only continuing on a semiannual basis until data indicate it is no longer warranted (in accordance with the existing SAP). RA-O groundwater and storm water monitoring is still being conducted on a semiannual basis. The Partnering Team is currently evaluating the groundwater sampling frequency and considering alternatives for potentially reducing the frequency with consideration of the following:

- The plume is stable and not migrating offsite.
- Volatile organic compound concentrations have been significantly reduced and are relatively low at the site.
- No additional injections or treatment are planned for the near future.

Additionally, the sampling frequency may be reduced in the future to annually or less frequently such as every few years instead of semiannually. The team will continue to consider optimization opportunities identified thus far, and will continue to optimize the remedy at Site 21.

Ms. Smith asked if there were any additional questions or comments. No additional questions or comments were received.

Per- and Polyfluoroalkyl Substances Update

Mr. Bray reviewed the topics and objectives of this presentation, which is to give an overview of the PFAS PA that is currently being conducted.

Mr. Bray discussed that PFAS are human-made compounds that have been used in products since the 1950s. Presently, PFAS can be found in many household items. The useful properties of PFAS result in their persistence in the environment. PFAS are heat-resistant, flame-retardant, oil-resistant, and water-resistant. They work by forming a film over surfaces. PFAS are found in the blood of people, wildlife, and fish worldwide.

Mr. Bray described the chemistry and properties of PFAS. PFAS are composed of carbon chains of different lengths. Per-FAS (fluoro-alkyl substances) means all carbons are bonded with fluorine, and poly-FAS means some carbons are bonded with fluorine. The hydrophobic and hydrophilic properties of PFAS make it useful as a firefighting compound. The carbon fluorine bond is extremely strong and hard to break, which is why they are very persistent in the environment and last a long time. PFAS are water soluble and partition to interfaces (air-water, soil-water, and product-water).

Mr. Bray provided a brief history of PFAS, when they were developed, and some of the typical uses over the past decades. At Navy facilities, the most common source of PFAS to the environment is the use of aqueous film-forming foam (AFFF) in past firefighting training activities and emergency response. The Navy's use of AFFF started in the late 1960s and early 1970s following issuance of the military specification (MILSPEC) for a fluorocarbon-based AFFF in 1969. MILSPEC are performance-based and there are different formulations. The MILSPEC is not a recipe, but it must meet certain criteria.

Mr. Bray indicated that the Navy conducted a PA in 2021 specifically for PFAS at SJCA. The PA (desktop study) was conducted to assess potential PFAS source areas and determine which areas warranted further investigation. Areas that warranted further investigation were carried forward into the SI phase (next stage in the CERCLA phase). The objectives of the PFAS PA are as follows:

- Identify and catalog all potential or actual PFAS sources
- Eliminate from further consideration those areas where there is no evidence of a PFAS release or suspected release and document the rationale for their elimination
- Identify areas requiring further PFAS investigation
- Identify receptors and migration pathways
- Determine whether an emergency response action is warranted because of current complete exposure pathways (for example, on- or off-Base drinking water source within 1 mile downgradient of potential source area)
- Set priorities for a Basewide SI (if necessary)

The Final PFAS PA concluded that 44 areas were recommended for no further action and 5 areas were identified to move forward to the SI phase of investigation. The following five areas have been identified:

- Regional Fire Training Academy
- Building M-5
- Site 5 – Burning Grounds Group
- Site 15 – Fire Training Area Group (includes Building 271 – Former Fire Station)
- Site 21 – Industrial Area including Site 9, Building 249, and Building 104

The SI is currently being conducted for areas that were determined to warrant further investigation in the PA that were carried forward into the SI phase. The SI SAP was prepared and finalized in September 2021. The SAP outlined the field activities that will be completed to investigate each site and includes installing new monitoring wells at select sites, collecting groundwater samples from new and existing monitoring wells, and collecting soil samples.

The current path forward for PFAS at SJCA is to conduct field work in FY 2022. The results of the field work and evaluation will be documented in an SI Report.

Mr. Bray presented the following resources that provide information for PFAS:

- Secretary of the Navy
 - <https://www.secnav.navy.mil/eie/Pages/pfc-pfas.aspx>
- VDEQ
 - <https://www.deq.virginia.gov/ConnectWithDEQ/EnvironmentalInformation/PFAS.aspx>
- Agency for Toxic Substances and Disease Registry (Division of the Centers for Disease Control)
 - <https://www.atsdr.cdc.gov/pfas/index.html>
- United States Environmental Protection Agency (EPA)

- www.epa.gov/pfas
- Interstate Technology Regulatory Council
 - <https://pfas-1.itrcweb.org/fact-sheets/>

Mr. Bray asked if there were any additional questions or comments. No additional questions or comments were received.

Roundtable/Question and Answer

Mr. Bray asked if there were any additional question or comments. No additional questions or comments were received. Mr. Bray stated that the team is intending to have a site visit for the May 2022 RAB meeting and library meeting for November 2022. Safety is the main concern for everyone, so the RAB meetings will be dependent on future COVID-19 pandemic status. Ms. Smith asked if there were any potential future agenda topics the RAB was interested in hearing about. Ms. Boatwright mentioned she had heard there is a living shoreline or another wetland restoration planned for an area in Blows Creek. Mr. Bray stated he was not aware of that project but he would look into it. No additional questions were received.

Next Meeting

The next RAB meeting is scheduled for May 2022.

Meeting Adjourned