

**THIRD EXPLANATION OF SIGNIFICANT DIFFERENCES
for the
Atlantic Wood Industries, Inc. Superfund Site**

I. INTRODUCTION

Site Name: Atlantic Wood Industries, Inc. (AWI) Superfund Site
Site Location: Portsmouth, Virginia
Lead Agency: U.S. Environmental Protection Agency, Region III (EPA)
Support Agency: Virginia Department of Environmental Quality (VADEQ)

II. STATEMENT OF PURPOSE

EPA is issuing this third Explanation of Significant Differences (ESD) to modify the selected remedy described in a Record of Decision (2007 ROD) for the Atlantic Wood Industries (AWI) Superfund Site (Site) issued on December 21, 2007. Figure 1 below shows many of the elements of the cleanup that have been completed.



Figure 1: AWI Site showing elements of the cleanup and properties at or near the Site.

The 2007 ROD requires that “dredged sediment placed immediately behind the sheet pile wall would undergo *in-situ* S/S [solidification/stabilization] to create an additional five-foot-thick barrier to further enhance the wall’s effectiveness to prevent DNAPL migration” (pg. 66). This ESD documents the modification of the remedy, which utilized an alternative method to enhance the wall’s effectiveness from *in-situ* S/S to installation of a polyvinyl chloride (PVC) sheet pile wall (Secondary Wall) behind the offshore sheet pile wall (OSPW) constructed in accordance with the 2007 ROD. This ESD also documents the planting of trees immediately inside a steel sheet pile wall along the restored wetlands between the Site property owned by AWI (AWI property) and the Southgate Annex of the Norfolk Naval Shipyard (Inland Wall).

This third ESD is issued by EPA to formally document and communicate this modification of the remedy in accordance with Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA), 42 U.S.C. § 9617(c), and Section 300.435(c)(2)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. § 300.435(c)(2)(i). Section 117(c) of CERCLA and Section 300.435(c)(2)(i) of the NCP require the publication of an Explanation of Significant Differences when modifications to the remedial action selected in a Record of Decision are necessary, and such modifications significantly change, but do not fundamentally alter, the remedial action with respect to scope, performance, or cost. Since EPA is not fundamentally altering the remedial action with respect to scope, performance, or cost, EPA considers this remedy modification to be a significant change but not a fundamental change.

This third ESD and all documents that form the basis for the modifications are provided in the Site Administrative Record file in accordance with Section 300.825(a)(2) of the NCP, 40 C.F.R. § 300.825(a)(2). The Administrative Record file is available for public review at the locations listed in Section VIII of this ESD.

III. SITE HISTORY AND SITE CONDITIONS

The Site is generally located south of Elm Avenue and adjacent to the Southern Branch of the Elizabeth River in Portsmouth, Virginia. Prior to the recently completed dredging of contaminated river sediment¹, the Site included approximately 50 acres of industrialized waterfront land with contaminated soil and ground water and approximately 35 acres of contaminated sediment in the river. The Site is bounded on land by the Norfolk Naval Shipyard (NNSY) and several smaller parcels of land (see Figure 1).

A wood treating facility (AWI facility) was owned and operated by AWI and its predecessors at the Site from 1926 to 1992. Both creosote and pentachlorophenol (PCP) were used to treat wood. Facility operations included wood treatment, storage of treated wood, and waste disposal activities. These practices lead to the contamination of the Site. Historical Site operations also contaminated sediments in the Southern Branch of the Elizabeth River. Ground water and soil at the Site are heavily contaminated with creosote. Creosote contamination previously migrated into a storm sewer, which discharged to an inlet of the river on the south side of Elm Avenue.

¹ Dredging of contaminated sediment is a component of the remedy selected in the 2007 ROD and was completed the fall of 2017.

A significant portion of the western half of the AWI property, was leased to the Navy during World War II. The Navy filled low lying areas of the AWI property with contaminated material for use as a storage area. The Navy conducted sand blasting activities adjacent to the Site. Abrasive blast media contaminated with heavy metals such as copper, zinc, lead, and arsenic have impacted the Site. Calcium hydroxide waste from the Navy's acetylene production was pumped across the Site and was discharged into a wetland that straddled the property line between the NNSY and the AWI facility, contaminating both the wetland and the river.

Sediments contaminated by both AWI and Navy operations extended from the AWI facility shoreline east to the federal navigation channel, north to near a railroad bridge that is located just south of the main portion of the NNSY, and south to Pier B of the Southgate Annex of the NNSY. The Site also includes contaminated ground water mostly located underneath the AWI facility.

EPA evaluated the Site during the 1980s and determined that the Site qualified for detailed evaluation and, if necessary, cleanup by EPA's Superfund program. The Site was formally added to the National Priorities List in 1990.

IV. DESCRIPTION OF SELECTED REMEDY AND REMEDY IMPLEMENTATION

A. Selected Remedy

The 2007 ROD remedy addresses risks to human health and the environment from soil, ground water, and sediment contamination. The main remedial components included: 1) a clean soil cover over the areas of contaminated soil; 2) stabilization of creosote- and PCP-soaked soils on the west side of the Site; 3) monitored natural attenuation (natural restoration) of ground water; 4) installation of a sealed offshore sheet pile wall (OSPW) in the Southern Branch of the Elizabeth River to prevent creosote and metals migration to the river; 5) dredging of contaminated river sediments beyond the wall with consolidation of the dredged sediments either behind the sheet pile wall to form new land or on the west side of the AWI property in a landfill; 6) enhanced monitored natural recovery of sediments; 7) creation of wetlands to replace wetlands lost due to sediment consolidation behind the wall; and 8) institutional controls (ICs) to further protect human health and the environment.

In addition to the installation of the OSPW, the 2007 ROD required that the five feet of dredged sediments consolidated inside and directly behind the OSPW be stabilized (with, for example, portland cement) to reduce the permeability of the dredged sediments to further prevent the migration of creosote in the form of dense non-aqueous phase liquid (DNAPL) to the river.

EPA issued an Explanation of Significant Differences (2012 ESD) on August 6, 2012, to document modifications to the 2007 ROD. The modifications included a significant increase to the estimated cleanup cost from \$44.9 million to \$98.2 million, due to the increase in the amount of sediment that required dredging and the quantity of soil that required *in-situ* soil stabilization.

EPA issued a second ESD (2018 ESD) on September 17, 2018, to document modifications to the 2007 ROD. The modifications included adjusting the size and location of the landfill at the western portion of the Site; increasing the thickness of the cap at most of the

AWI property; adding a ground water treatment plant, if necessary, to treat ground water captured by the collection trench before it is discharged to the river; and documenting the increase on the overall estimated cost of the cleanup from \$98.2 to \$126.6 million.

B. Remedy Implementation

EPA began the detailed design for the cleanup in early 2008. Construction started in 2010, which was about one year earlier than expected due to \$3.7 million in funding made available from the American Recovery and Reinvestment Act (ARRA). These funds were used for several projects including the construction of a berm along the banks of the Southern Branch of the Elizabeth River. Contaminated soil was excavated from the Elm Avenue right-of-way and berms were also built around part of the area of the west landfill, which contains dredged sediments.

FIGG Bridge Engineers, Inc. completed construction of the South Norfolk Jordan Bridge (see Figure 1) across the Southern Branch of the Elizabeth River in 2012. To construct the new bridge, FIGG purchased the northern portion of the AWI property. FIGG implemented a portion of the cleanup on the property it purchased.

EPA conducted *in-situ* S/S of the creosote- and PCP-saturated soils at the southwest portion of the AWI property beginning in late 2012. This activity was completed in the summer of 2013. This work involved mixing portland cement and organoclay into the soil to bind the creosote and PCP non-aqueous phase liquid (NAPL) contamination to mitigate downward migration and significantly limit their on-going contribution of contamination to ground water.

In late 2011, EPA began construction of the OSPW, which consists of steel sheet piles, steel pipe piles, and a concrete cap. Construction was completed in the summer of 2013. This work included dredging of contaminated sediments along the outside base of the wall. Since the wall blocked water that discharged from the storm sewer along Elm Avenue from reaching the river, EPA extended the storm sewer across the AWI property to the southwest terminus of the offshore wall. As part of that project, EPA also constructed a ground water collection trench that is designed to help control the ground water table to prevent the ground water from flowing away from the site and around the OSPW into the river.

In the fall of 2017, EPA completed dredging of approximately 360,000 cubic yards of contaminated sediment from the river. This component of the cleanup was the largest phase of the approximately \$100 million cleanup and addressed the worst area of contamination in the river, which flows to the Chesapeake Bay. About 24 acres of the river bottom was dredged. Most of the sediment was mixed with cement and some of the sediment/cement mixture was used to cover an additional seven acres of heavily contaminated area of the river behind the wall creating new land. The remainder of the dredged sediment went to an area of the Site away from the riverfront where a landfill was constructed as part of EPA's selected remedy.

During the fall of 2017, EPA began passively discharging ground water to the river from the ground water collection trench. Initially, the ground water was stored in a tank and tested prior to discharge to determine if it could be released to the river without treatment. Sampling results documented that treatment prior to discharge was unnecessary. Therefore, the ground

water is currently discharged from the trench directly to the river. On-going sampling will determine if treatment becomes necessary.

In 2020, EPA completed the landfill construction, capping the Site, planting additional trees to control ground water, installing dolphin piles to protect the OSPW, and other remedial action activities. EPA also conducted monitoring activities in the river and for the ground water.

V. DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE BASIS FOR SUCH DIFFERENCES

This ESD documents the modifications necessary to implement the cleanup selected in the 2007 ROD.

The modifications include:

- Deleting the requirement in Performance Standard 11.2.8.1.2 of the 2007 ROD (pg. 95) to stabilize/solidify a five-foot zone of consolidated sediments behind the OSPW;
- Substituting the following requirements in place of Performance Standard 11.2.8.1.2. of the 2007 ROD:
 - Installing a secondary PVC sheet pile wall (Secondary Wall) with sealed interlocks behind the OSPW, except for the 120-foot south bulkhead portion of the OSPW, instead of conducting *in-situ* S/S along the OSPW;
 - Continuing the Secondary Wall along the northern boundary of the consolidated dredged sediment to control ground water migration north offsite; and
 - Planting of trees inside the Inland Wall that separates the production area of the AWI facility and the restored wetland that straddles the AWI property and the Southgate Annex of the NNSY.

These changes provide the extra protection to the OSPW, which EPA anticipated would be achieved by the *in-situ* S/S to prevent migration of creosote DNAPL to the river. The 2007 ROD stated, "*in-situ* solidification/stabilization (S/S) of the soil immediately behind the sheet pile wall [OSPW] would be performed to further enhance the wall's effectiveness as a barrier to DNAPL migration." (pg. 63)

For constructibility and construction efficiency, and to make the new land usable as required by the 2007 ROD, the dredging and sediment consolidation work included the installation of prefabricated vertical drains (PVDs or wick drains) in the pre-existing river sediments behind the OSPW and mixing of all dredged sediments with cement prior to consolidation behind the OSPW. These activities resulted in Site conditions subsequent to the dredging and consolidation that were different than originally anticipated in the 2007 ROD. Specifically, settlement induced by removal of water from the pre-existing river sediments through the PVDs unexpectedly also removed high quantities of DNAPL from the sediments, such that the new land behind the OSPW contains a much smaller volume of DNAPL than

anticipated. Additionally, the mixing of cement with the dredged sediments bound all the flowable DNAPL removed from the river. Both the settlement and the mixing of cement also lowered the permeability of the material consolidated behind the OSPW reducing the potential for contaminant migration.² Because of these new Site conditions, EPA evaluated whether any extra protection to ensure the effectiveness of the OSPW was still necessary by measuring the permeability of the various layers of material behind the wall. Since the permeability data showed that the amended dredged material behind the OSPW did not meet the 2007 ROD maximum permeability requirement of 1×10^{-7} centimeters per second, EPA began considering a modification to the selected remedy.

In-situ S/S could be accomplished by technologies such as deep-soil mixing where a large auger would stir, for example, bentonite into the soil as an auger drills into the ground; jet-grouting where high-pressure is used to inject material into the ground; or excavation of a trench to mix bentonite into the ground, all of which can reduce the permeability. However, each of these technologies would increase the soil load beyond the OSPW's capacity and create a significant volume of waste for which there would not have been space in the onsite landfill. For the area of the OSPW located near a pier of the South Norfolk Jordan Bridge, EPA was also concerned that weakening the soil structure on one side of the bridge pier could create excessive lateral loads on the bridge foundation. Differential lateral loads had previously caused movement of several bridge piers during consolidation of the dredged sediment.

EPA determined that a secondary PVC sheet pile wall (Secondary Wall) installed behind the OSPW provides the same level of environmental protection EPA had anticipated the *in-situ* S/S would provide without the constructibility issues associated with *in-situ* S/S. This Secondary Wall is located within five feet of the landside edge of the existing OSPW pile cap (Figure 2 below). Since the Secondary Wall does not need to support a lateral load (i.e., the soil forces are the same on both sides of the wall), sheet piles manufactured from PVC instead of steel, the material of the OSPW, became an option. Unlike steel piles, PVC piles are lower cost and eliminate concerns for corrosion. Additionally, PVC is much easier to work with and around than steel during any future development that requires subsurface disturbance. Using a sealant in the interlocks, as was used with the OSPW, produces a wall that prevents, to the maximum extent practicable, the migration of DNAPL and/or ground water to the river.

² While both the settlement and the mixing of cement also lowered the permeability of the material behind the OSPW, the installation of the PVDs included the placement of a highly permeable sand layer throughout most of the area of sediment consolidation behind the OSPW. The sand layer placement stopped approximately five feet from the OSPW. Water and DNAPL migrated from the pre-existing river sediments through the PVDs to the sand layer. Pumps removed the water and DNAPL from the sand layer for treatment.



The presence of debris in the areas of the south bulkhead portion of the OSPW (located in the southwestern portion of the OSPW) and the Inland Wall, and the tie-back system utilized at the south bulkhead, also prevented the use of *in-situ* S/S technologies. These issues also prevented the installation of the Secondary Wall in these areas. EPA determined that for the south bulkhead portion of the OSPW (120 feet of nearly 2000 feet of wall), there is no need to enhance the OSPW to protect the river. This area of the OSPW did not have dredged sediment placed behind it, the interlocks were sealed, and the wall has cathodic protection to prevent degradation by corrosion and a concrete fascia in the intertidal zone, which is the zone that undergoes the greatest attack by the environment.

Along the Inland Wall, EPA has determined that planting trees along as much of the area as possible is the best way to help control contaminant migration. The 2007 ROD required the use of trees to passively extract ground water to control the level of the water table (see Figure 3 below). The trees act as an interceptor trench and every gallon that is extracted by a tree is one less gallon that needs to be discharged from the ground water collection trench to the river.



One of the other requirements of the 2007 ROD is the need to control the ground water table behind the OSPW to prevent the migration of contaminated ground water to the north and south around the OSPW to the river (see Section 11.2.13, pg. 98). The ground water can no longer migrate directly to the river because of the OSPW. Based on ground water elevation measurements collected in 2020 and earlier, the ground water elevation in the new land has risen above that of the properties at 3975 and 3991 Elm Avenue north of the new land. This increase in water elevation means that currently, the ground water collection trench and the trees are not adequately controlling the water table elevation in the new land. EPA is evaluating whether it needs to increase ground water extraction capabilities at the Site. Because this evaluation may take time since the cap was just completed and the trees are still young and because blocking the ground water flow path to the north may increase the utility of the ground water collection trench, EPA determined that extending the Secondary Wall along the northern boundary of the new land is necessary (see Figure 2 above).

The 2007 ROD contained applicable or relevant and appropriate requirements (ARARs) that the cleanup must meet. ARARs are the substantive requirements of federal and Commonwealth environmental laws and regulations. The modifications in this ESD do not alter any of the ARARs.

Costs associated with the installation of the Secondary Wall are approximately 20% less than the estimated cost of the *in-situ* S/S behind the OSPW (\$2M versus \$2.5M). Considering that the Secondary Wall extends along the northern end of the new land, the Secondary Wall was significantly less expensive. Compared to the overall estimated cost of \$126.6M of the cleanup (see 2018 ESD), this cost difference is not significant.

VI. SUPPORT AGENCY COMMENTS

EPA has consulted with VADEQ, in accordance with 40 C.F.R. § 300.435(c)(2), concerning the changes to the 2007 ROD as described in this ESD. VADEQ has concurred with the changes to the selected remedy described in this ESD (see attached letter).

VII. STATUTORY DETERMINATIONS

EPA has determined that the selected remedy set forth in the 2007 ROD, and modified by the 2012 and 2018 ESDs and this third ESD, complies with the statutory requirements of Section 121 of CERCLA, 42 U.S.C. § 9621. EPA believes that the selected remedy remains protective of human health and the environment, meets the Federal and State requirements that are applicable or relevant and appropriate to the remedial action in accordance with 40 C.F.R. § 300.430(f)(1)(ii)(B), and is cost effective. In addition, the modified remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable for the Site.

VIII. PUBLIC PARTICIPATION

The Nansemond Indian Nation (a Federally recognized tribe) requested government-to-government consultation regarding this ESD. EPA met with Nansemond representatives on April 20, 2021. On April 22, 2021, EPA issued a letter to the Nansemond Indian Nation opening formal consultation on the ESD and documenting Nansemond's agreement to provide any comments on the draft ESD in 30 days. EPA received a letter dated May 20, 2021, that stated "At this time, the Nation has no objection to the Explanation of Significant Differences to modify the selected remedy described in the 2007 Record of Decision for the AWI Superfund Site." On June 4, 2021, EPA issued a letter to the Nansemond Indian Nation documenting closeout of the consultation.

EPA will publish a notice that briefly summarizes the ESD and will make the ESD and supporting information available to the public in the Site's Administrative Record in accordance with CERCLA § 117(d) and NCP § 300.825(a). The Site's Administrative Record is available for review at EPA Region III office and on computers at the local repositories listed below:

U.S EPA, Region III
6th floor Docket Room
1650 Arch Street
Philadelphia, PA 19103

Hours:
Monday–Friday 8 a.m.–4 p.m.
(215) 814-3157

Portsmouth Public Library
Craddock Branch
28 Prospect Parkway
Portsmouth, VA 23702

Hours
Monday–Thursday 10 a.m.–4 p.m.
Closed Friday, Saturday & Sunday

Norfolk Public Library
[Horace C. Downing Branch](#)
555 E. Liberty Street
Norfolk, VA 23523

Hours
Monday–Thursday 10 a.m.–7 p.m.
Friday–Saturday 10 a.m.–5 p.m.

Chesapeake Public Library
[Indian River Library](#)
2320 Old Greenbrier Road
Chesapeake, VA 23325

Hours
Monday–Thursday 9 a.m.–8 p.m.
Friday 9 a.m.–6 p.m.
Saturday 9 a.m.–6 p.m.
Sunday 12 p.m.–6 p.m.

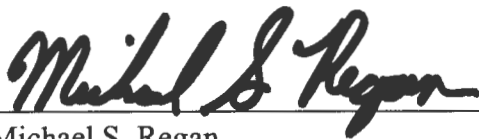
The libraries and the EPA Region III office may be closed due to the COVID-19 public health emergency. Please call for operational status. The Administrative Record file is also available online at: <https://semspub.epa.gov/src/collections/03/AR/VAD990710410> or <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0302836>.

IX. SIGNATURE

This third ESD modifies the selected remedy described in the 2007 ROD (and modified by the 2012 and 2018 ESDs) for the Atlantic Wood Industries Superfund Site to:

- Install a secondary PVC sheet pile wall (Secondary Wall) with sealed interlocks behind the OSPW, except for the 120-foot south bulkhead portion of the OSPW, in lieu of conducting *in-situ* S/S along the OSPW;
- Continue the Secondary Wall along the northern boundary of the consolidated dredged sediment to control ground water migration north offsite; and
- Plant trees inside the Inland Wall that separates the production area of the AWI facility and the restored wetland that straddles the AWI property and the Southgate Annex of the NNSY.

Approved By:



Michael S. Regan
Administrator

AUG 31 2021

Date



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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Matthew J. Strickler
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May 3, 2021

SENT VIA EMAIL

Randy Sturgeon, Remedial Project Manager
DE; VA; WV Remedial Section
Superfund Site Remediation Branch
U.S Environmental Protection Agency, Region III (3SD23)
1650 Arch Street
Philadelphia, PA 19103

Re: Atlantic Wood Industries, Inc. Superfund Site;
Draft Explanation of Significant Differences (ESD)

Dear Mr. Sturgeon,

The Virginia Department of Environmental Quality (VDEQ) has reviewed the Draft ESD for the Atlantic Wood Industries, Inc. Superfund Site. VDEQ concurs with the changes to the remedy set forth in the 2007 Record of Decision, as described in the ESD.

Please feel free to contact me at william.lindsay@deq.virginia.gov or (804) 698-4521 if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Chris M. Evans".

Chris M. Evans
Director, Office of Remediation Programs

Attachment

cc: William Lindsay, VDEQ-CO (w/o attachment)
Brett Fisher, VDEQ CO (w/o attachment)
Melinda Woodruff, VDEQ TRO (w/o attachment)