



STATEMENT OF BASIS

BAE SYSTEMS NORFOLK SHIP REPAIR

NORFOLK, VIRGINIA

EPA ID NO. VAD003175072

August 2011

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I. INTRODUCTION

The United States Environmental Protection Agency (EPA) has prepared this Statement of Basis (SB) to solicit public comment on its proposed remedy for BAE Systems Norfolk Ship Repair (BAE NSR) located at 750 West Berkley Avenue, Norfolk, Virginia 23523 (hereinafter referred to as the Facility) EPA ID No. VAD003175072. EPA's proposed remedy for the Facility consists of the following components: restricting the property to industrial use thru compliance with and maintenance of institutional controls; and development and implementation of a Materials Management Plan. EPA's proposed remedy for the Facility groundwater is no further action.

The Facility is subject to the Corrective Action program under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. Sections 6901 *et seq.* The Corrective Action program is designed to ensure that certain facilities subject to RCRA have investigated and addressed any releases of hazardous waste and hazardous constituents that have occurred at their property.

On September 29, 2000, Virginia received authorization from EPA to enforce the Corrective Action Program under Section 3006 of RCRA. However, EPA retained the lead for this Facility under a work share agreement with the Virginia Department of Environmental Quality (VDEQ). EPA prepared this SB in cooperation with VDEQ.

EPA is providing a 30-day public comment period on this SB. EPA may modify its proposed remedy based on comments received during this period. EPA will announce its selection of a final remedy for the Facility in a Final Decision and Response to Comments (FDRTC) after the public comment period has ended.

Information on the Corrective Action program as well as a fact sheet for the Facility can be found by navigating <http://www.epa.gov/reg3wcmd/correctiveaction.htm>.

II. FACILITY DESCRIPTION AND BACKGROUND

BAE NSR is located on the eastern side of the Elizabeth River in Norfolk, Virginia. The Facility is approximately 110 acres in size and is bound on the west and southwest by the Elizabeth River and on the north, east, and southeast by parking areas, City-owned scrap yards, and Interstate 264, respectively. Surrounding BAE NSR to the east are commercial and industrial areas.

BAE NSR repairs military and private commercial ships and has been in operation since 1915. The Facility was built on native, dredged, and other fill material. The shipyard accommodates two dry docks and five piers. A variety of activities are present at the shipyard including ship repair, machine shops, offices, a waste water treatment plant, an oil recovery and treatment facility, grit blasting, painting, dry docks, metal works, hazardous material use and storage, scrap metal containers, fire protection services, and other shipyard related services.

III. SUMMARY OF ENVIRONMENTAL HISTORY

BAE NSR accepted EPA's invitation to participate in the RCRA Corrective Action Facility Lead program on September 20, 2005. In December 2005, BAE NSR submitted a RCRA Facility Investigation (RFI) Work Plan (December 2005) to EPA that documented the known current conditions at the Facility and the nine Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs). In addition, the RFI Work Plan presented the strategic approach for implementing the RCRA Corrective Action Facility Lead Program. The RFI Work Plan included a Release Assessment (RA) Work Plan; a Community Relations Plan (CRP); Sampling and Analysis Plan (SAP); Quality Assurance Project Plan (QAPP); and Health & Safety Plan (HASP).

Upon EPA's approval of the RA Work Plan, BAE NSR conducted an investigation of nine SWMUs/AOCs to evaluate whether or not a release had occurred as a result of the operation of the units. The Release Assessment investigation consisted of the collection and analysis of soil and groundwater samples from suspected release locations. Twenty-three soil samples were collected and analyzed for total RCRA metals, pH, moisture, Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), and Total Organic Carbon (TOC). The soil sample results were screened against EPA Region III's Risk-Based Concentration (RBC) Table for residential and industrial soil ingestion.

Groundwater samples were collected from 15 monitoring wells (13 new wells and two existing wells) and analyzed for RCRA metals, pH, SVOCs, and VOCs. See Figure I for well locations. Groundwater results were compared to Virginia Groundwater Protection Standards (GWPS) and/or Federal Maximum Contaminant Levels (MCLs) promulgated at 40 C.F.R. Part 141 pursuant to Section 1412 of the Safe Drinking Water Act, 42 U.S.C. Section 300g-1 where applicable. If there was neither a GWPS nor an MCL for a constituent, then EPA Region III RBC tap water screening value for hazardous constituents was used for screening. For carcinogens, the EPA Region III RBC screening values are based on a cancer risk of 1×10^{-6} , meaning that an exposed individual would have an estimated upperbound excess probability of developing cancer of one in one million.

Initial Release Assessment findings indicated that VOCs and RCRA metals were not detected above applicable screening criteria in any soil samples. Polynuclear aromatic hydrocarbons (PAHs), which are SVOCs, were detected in the soil at three locations at a depth of 3 to 6 feet at concentrations in excess of EPA Region III RBCs for industrial soil. The three locations consisted of SWMU-105 and two locations, RA-111, and RA-114, identified in the RA Work Plan. The Initial Release Assessment soil findings lead to further investigation and at RA-111 interim corrective action measures were performed.

Groundwater samples taken during the Initial Release Assessment were non-detect for RCRA metals and VOCs. One location, SWMU-102, exhibited several

SVOCs at concentrations slightly above applicable screening criteria for groundwater, leading to further investigation.

Based on the analytical results of the Initial Release Assessment, EPA requested additional investigation. Three locations, SWMW-102, RA-111, and RA-114, were identified as requiring additional groundwater sampling. Three locations, SWMW-105, RA-111, and RA-114, were identified as requiring additional soil sampling to delineate the extent of impact. These additional investigative activities were completed in July 2008 and May-June 2009. In addition, a limited excavation was performed as an Interim Corrective Measure in the area of RA-111 in June 2009. During the June 2009 excavation at RA-111, an oily petroleum substance was uncovered in the subsurface soil. Consequently, a focused excavation was performed as an Interim Corrective Measure. The excavation extended southward and encountered three small-diameter petroleum pipelines surrounded by impacted fill material. The pipelines and soil contamination were removed and VDEQ issued a Case Closure letter under its Voluntary Remediation Program for the area on September 2, 2009.

Further soil investigation at SWMU-105 and RA-114 demonstrated that the initial PAH detections above the EPA Region III RBCs for industrial soil were of localized horizontal and vertical extent. Soil borings conducted within 5 feet of the occurrence did not detect PAHs above EPA residential RBCs. In addition, PAHs were not detected in the groundwater at these locations above MCLs, GWPS or RBCs.

BAE NSR conducted groundwater sampling in July 2008 at SWMW-102, RA-111, and RA-114. The sampling results showed RA-111 was non-detect for PAHs; RA-114 had one PAH detection which was slightly above the EPA Region III RBC tap water value and SWMU-102 had one PAH above the applicable MCL and five PAHs above EPA Region III RBC tap water value.

In May 2009, BAE NSR conducted additional groundwater sampling at SWMW-102 and RA-114. The sampling results showed that RA-111 was non-detect for PAHs and SWMU-102 had three PAHs, benzo[a]anthracene, benzo[b]fluoranthene, and naphthalene, above EPA Region III RBC tap water value.

In 2010, BAE NSR conducted further groundwater sampling at SWMU-102 to confirm the previous groundwater results. Groundwater in well SWMU-102 was sampled for SVOCs on October 8, 2010, December 3, 2010, and January 28, 2011. With the exception of naphthalene, all PAHs were non-detect in the January 28, 2011 sampling event. Naphthalene was detected at 0.58 parts per billion (ppb), which is above the screening value of 0.14 ppb.

EPA's risk reduction goal is to reduce the threat from carcinogenic contaminants such that, for any medium, the excess cumulative risk of cancer to an individual exposed over a lifetime generally falls within a range from one in one-million to one in ten-thousand. EPA utilizes a threshold risk of one in one million for its initial evaluation of site data. While EPA's preference is to select remedies that are at the more protective

end of the risk range, given the diversity of the corrective action universe and the emphasis on consideration of site-specific conditions such as exposure, uncertainty, and technical limitations, EPA expects that other risk reduction goals may be appropriate at many corrective action facilities.

For BAE NSR, the detected concentration of naphthalene at 0.58 ppb represents a less than a one in one hundred thousand cancer risk, and therefore is already within EPA's acceptable cancer risk range for groundwater used as drinking water. Groundwater underlying the Facility currently is not used for potable purposes. The north end of BAE NSR where SWMU-102 is located was filled in with dredge materials. In addition, human exposure to groundwater is restricted by a Norfolk, Virginia ordinance that prohibits the use of groundwater for potable purposes.

EPA concludes that the level of soil contamination found during site investigations are suitable for industrial use, provided that the following proposed remedies are implemented. The naphthalene concentrations found in groundwater are already within an acceptable risk range for drinking water, and no remedy for groundwater is needed.

IV. PROPOSED REMEDY

EPA's proposed remedy for the Facility consists of the following components:

1. Development and Implementation of a Materials Management Plan

EPA's proposed remedy requires the development and implementation of a Materials Management Plan to be approved by EPA before any earth moving activities, including construction and drilling, can be done at the Facility. The Materials Management Plan will detail how all excavated soils will be handled and disposed.

Soil remediation cleanup standards will be determined by EPA using EPA Region III's Risk-Based Concentrations (RBCs) for industrial screening levels. In addition, all soils that are stockpiled will be sampled using the Toxicity Characteristic Leaching Procedure (TCLP) and will be disposed off-site. In addition, the Materials Management Plan will include soil stabilization requirements to minimize contact between storm water runoff and the parcel soils. Soil stabilization measures may include the construction of berms to prevent storm water from flowing onto certain areas as well as the construction of sumps with pumps to remove ponded water from low lying areas.

The Materials Management Plan will include a Health and Safety Plan, Sampling and Analysis Plan and Quality Assurance Project Plan. The Health and Safety Plan will among other things, identify the locations at the Facility where contaminants remain in soils; detail how future on-site workers and contractors will be notified about such locations and about the presence of the contaminated soil.

2. Compliance with and Maintenance of Institutional Controls

Because contamination will remain in the soils at the Facility, EPA's proposed final remedy includes land use restrictions to prevent human exposure to the remaining contaminants. The land use restrictions will be implemented through ICs. ICs are non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use and inform subsequent purchasers of the environmental conditions at the Facility and of EPA's final remedy for the Facility.

EPA is proposing the following land use restrictions be implemented through institutional controls at the Facility:

- i. a restriction that Facility property not be used for any purpose other than industrial unless it is demonstrated to EPA that another use will not pose a threat to human health or the environment and EPA provides prior written approval for such use;
- ii. all earth moving activities, including drilling and construction activities, be done in accordance with the EPA-approved Materials Management Plan.

EPA also proposes to require BAE NSR to provide a coordinate survey as well as a metes and bounds survey, of the Facility boundary. Mapping the extent of the land use restrictions will allow for presentation in a publicly accessible mapping program such as Google Earth or Google Maps. In addition, compliance with the institutional controls shall be evaluated by the Facility on an annual basis. A report documenting the findings of the evaluation shall be provided to EPA and VDEQ.

3. No Further Action for Groundwater

PAH concentrations in Facility groundwater since the Initial Release Assessment in 2007 have generally shown a decreasing trend. As of the January 2011 sampling event, naphthalene was the only contaminant detected in Facility groundwater. The sampling results from the January 2011 sampling event show that the concentrations of naphthalene in Facility groundwater are within an acceptable risk range for drinking water. Therefore, EPA is requiring no further action for Facility groundwater.

4. Implementation

EPA anticipates that the final remedy will be implemented using available legal authorities such as an order, permit and/or an environmental covenant, to be recorded with the Recorder of Deeds Office of the Circuit Court of Norfolk pursuant to the Virginia Uniform Environmental Covenants Act, Title 10.1, Chapter 12.2, Sections 10.1-1238-10.1-1250 of the Code of Virginia (Environmental Covenant). If the Facility fails to meet its obligations under the enforceable mechanism proposed, EPA, in its sole

discretion, deems that additional ICs are necessary to protect human health or the environment, EPA has the authority to require such institutional controls.

V. EVALUATION OF EPA'S PROPOSED DECISION

This section provides a description of the criteria EPA used to evaluate the proposed remedy consistent with EPA guidance. The criteria are applied in two phases. In the first phase, EPA evaluates three remedy threshold criteria as general goals. In the second phase, for those remedies which meet the threshold criteria, EPA then evaluates seven balancing criteria to determine which proposed remedy alternative provides the best relative combination of attributes.

A. Threshold Criteria

1. **Protect Human Health and the Environment** - The proposed remedy is protective of human health and the environment. Sampling results show that Facility groundwater is within an acceptable risk range for drinking water. With respect to Facility soils, the primary human health and environmental threats posed by the contaminated soil at the Facility were related to direct contact with those soils. Removal of contaminated soil in the summer of 2009 from area RA-111 resulted in protection of human health and the environment. Soil at two other locations, SWMU-105 and RA-114, are contaminated, however, the contaminated soil is below the surface at a depth ranging from 3 to 6 feet and is localized in horizontal and vertical extent. While SWMU-105 and RA-114 are known areas of contamination, the proposed remedy will restrict the use of the entire Facility property to industrial use. The proposed industrial use restriction for the entire Facility is due to the past industrial use of the property and the dredge fill that makes up a portion of the facility. The urban-industrial nature of the site dates back to 1915, and over time the Facility was built on native, dredged and other fill material of unknown origin.

2. **Achieve Media Cleanup Objectives** - The Facility has achieved the EPA's RBCs for industrial soil with the exception of two locations, SWMU-105 and RA-114. EPA's proposed final remedy requires the implementation and maintenance of institutional controls to ensure that Facility soils are used for industrial purposes. For groundwater, the Facility meets EPA's acceptable cancer risk range for groundwater used as drinking water. Both of these standards meet EPA risk guidelines for human health and the environment at the Facility.

3. **Remediating the Source of Releases** - In all remedy decisions, EPA seeks to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may pose a threat to human health and the environment. The Facility's soil removal from RA-111 eliminated that area as a source of contamination. Contaminated soils at SWMU-105 and RA-114 are localized and not a source of release to groundwater.

B. Balancing/Evaluation Criteria

1. **Long-Term Effectiveness** - The proposed remedy will be protective of human health and the environment over time by controlling exposure to the hazardous constituents remaining in soils and groundwater. EPA's proposed remedy requires the development and implementation of a Materials Management Plan which will provide soil management requirements to prevent exposure to contaminants remaining in the soil. In addition, the proposed remedy requires the compliance with and maintenance of land use restrictions at the Facility in order to prevent human exposure to soil contaminants remaining in place.

2. **Reduction of Toxicity, Mobility, or Volume of the Hazardous Constituents** - The reduction of toxicity, mobility and volume of hazardous constituents at the Facility has already been achieved by the excavation of contaminated soils.

3. **Short-Term Effectiveness** - EPA's proposed final remedy does not involve any additional activities, such as construction or excavation, that would pose short-term risks workers, residents, and the environment.

4. **Implementability** - EPA's proposed remedy is readily implementable. BAE NSR will have to prepare and submit for EPA approval a Materials Management Plan. In addition, EPA proposes to implement the institutional controls through an enforceable mechanism such as an order, permit or an Environmental Covenant, pursuant to the Virginia Uniform Environmental Covenants Act, Title 10.1, Chapter 12.2, Sections 10.1-1238-10.1-1250 of the Code of Virginia. Therefore, EPA does not anticipate any regulatory constraints in implementing its proposed remedy.

5. **Cost** - The capital costs associated with soil excavation have already been incurred and the remaining costs are minimal.

6. **Community Acceptance** - EPA will evaluate Community acceptance of the proposed remedy during the public comment period and will be described in the Final Decision and Response to Comments.

7. **State/Support Agency Acceptance** - EPA will evaluate State acceptance based on comments received from VDEQ during the public comment period and will describe the State's position in the Final Decision and Response to Comments.

VI. PUBLIC PARTICIPATION

Interested persons are invited to comment on the EPA's proposed decision. The public comment period will last thirty (30) calendar days from the date the notice is published in a local newspaper. Comments may be submitted by mail, fax, e-mail, or phone to Mr. Michael Jacobi at the address listed below.

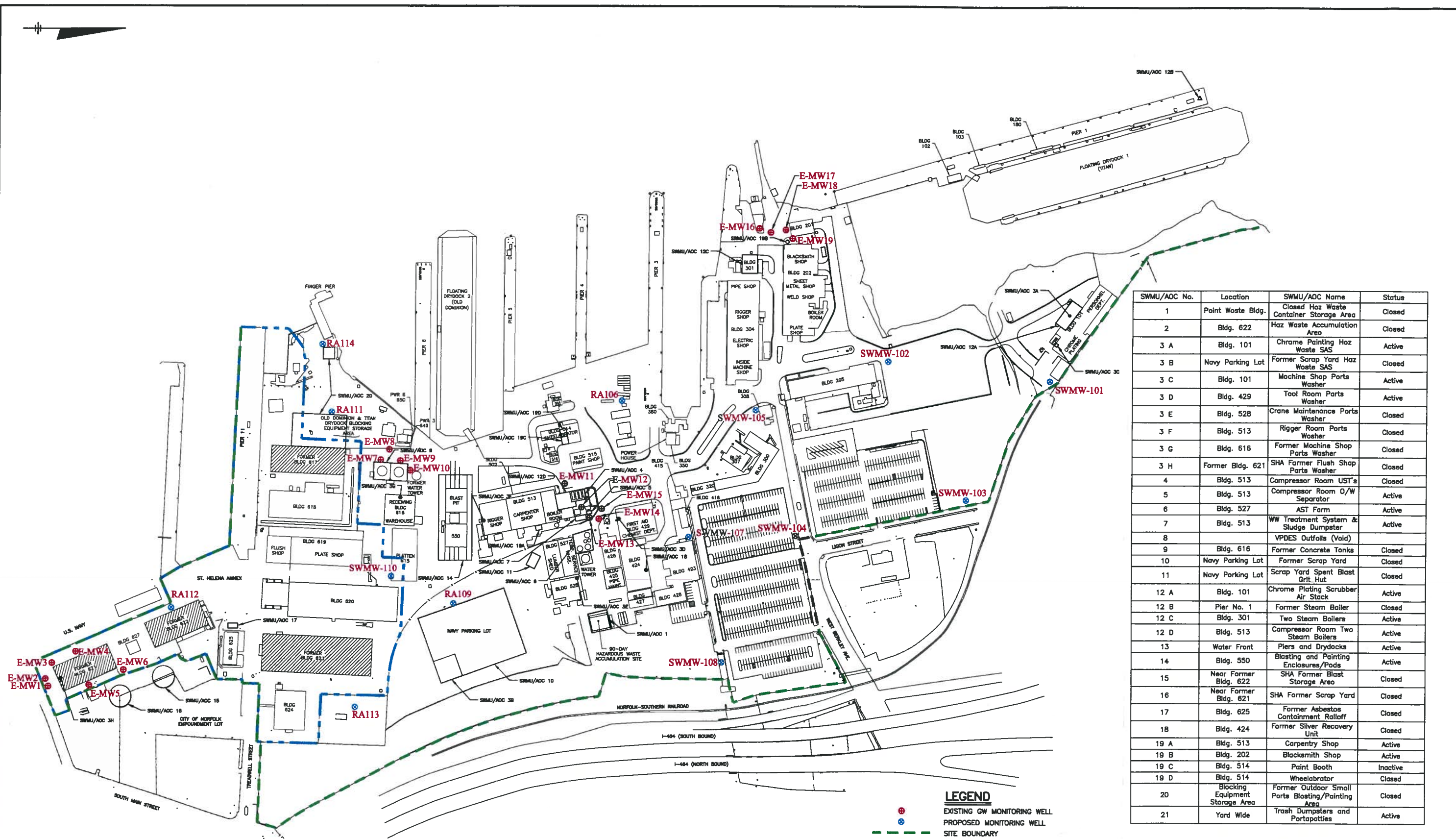
A public meeting will be held upon request. Requests for a public meeting should be made to Mr. Jacobi at the address listed below. A meeting will not be scheduled unless one is requested.

The Administrative Record contains all the information considered by the EPA for the proposed decision at this Facility. To receive a copy of the Administrative Record, contact Mr. Jacobi at the address below:

U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103
Land and Chemicals Division (3LC20)
Attn: Michael Jacobi

Phone: (215) 814-3435
Fax: (215) 814-3113
Email: jacobi.mike@epa.gov

Following the 30-day public comment period, EPA will evaluate the public's comments and prepare a Final Decision and Response to Comments (FDRTC) that identifies the final selected remedy. The FDRTC will also address all significant written comments and any significant oral comments generated at the public meeting, if held. The FDRTC will be made available to the public. If, on the basis of such comments or other relevant information, significant changes are proposed to the corrective measures identified by EPA in this Statement of Basis, EPA may seek additional public comments.



SWMU/AOC No.	Location	SWMU/AOC Name	Status
1	Point Waste Bldg.	Closed Haz Waste Container Storage Area	Closed
2	Bldg. 622	Haz Waste Accumulation Area	Closed
3 A	Bldg. 101	Chrome Painting Haz Waste SAS	Active
3 B	Navy Parking Lot	Former Scrap Yard Haz Waste SAS	Closed
3 C	Bldg. 101	Machine Shop Parts Washer	Active
3 D	Bldg. 429	Tool Room Parts Washer	Active
3 E	Bldg. 528	Crane Maintenance Parts Washer	Closed
3 F	Bldg. 513	Rigger Room Parts Washer	Closed
3 G	Bldg. 616	Former Machine Shop Parts Washer	Closed
3 H	Former Bldg. 621	SHA Former Flush Shop Parts Washer	Closed
4	Bldg. 513	Compressor Room UST's	Closed
5	Bldg. 513	Compressor Room O/W Separator	Active
6	Bldg. 527	AST Farm	Active
7	Bldg. 513	WW Treatment System & Sludge Dumper	Active
8		VPDES Outfalls (Void)	
9	Bldg. 616	Former Concrete Tanks	Closed
10	Navy Parking Lot	Former Scrap Yard	Closed
11	Navy Parking Lot	Scrap Yard Spent Blast Grit Hut	Closed
12 A	Bldg. 101	Chrome Plating Scrubber Air Stack	Active
12 B	Pier No. 1	Former Steam Boiler	Closed
12 C	Bldg. 301	Two Steam Boilers	Active
12 D	Bldg. 513	Compressor Room Two Steam Boilers	Active
13	Water Front	Piers and Drydocks	Active
14	Bldg. 550	Blasting and Painting Enclosures/Pods	Active
15	Near Former Bldg. 622	SHA Former Blast Storage Area	Closed
16	Near Former Bldg. 621	SHA Former Scrap Yard	Closed
17	Bldg. 625	Former Asbestos Containment Rolloff	Closed
18	Bldg. 424	Former Silver Recovery Unit	Closed
19 A	Bldg. 513	Carpentry Shop	Active
19 B	Bldg. 202	Blacksmith Shop	Active
19 C	Bldg. 514	Paint Booth	Inactive
19 D	Bldg. 514	Wheelabrator	Closed
20	Blocking Equipment Storage Area	Former Outdoor Small Parts Blasting/Painting Area	Closed
21	Yard Wide	Trash Dumpsters and Portapotties	Active

LEGEND

- EXISTING GW MONITORING WELL
- PROPOSED MONITORING WELL
- - - SITE BOUNDARY
- - - ST. HELENA ANNEX BOUNDARY
- SWMW SITE WIDE MONITORING WELL
- RA RELEASE ASSESSMENT MONITORING WELL
- E-MW EXISTING MONITORING WELL

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BAE SYSTEMS NORFOLK SHIP REPAIR
RCRA FACILITY LEAD PROGRAM
 EPA ID NO. VAD003175072
 NORFOLK, VIRGINIA 23523

SAMPLE LOCATIONS
RCRA Facility Investigation &
Release Assessment

FILE NO.
12674.38119-003

DATE
JUNE 2007

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