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FACILITY ACTION PLAN MILLINGTON SUPPACT TN
03/01/2015
RESOLUTION CONSULTANTS

FACILITY ACTION PLAN

NAVAL SUPPORT ACTIVITY MID-SOUTH MILLINGTON, TENNESSEE

Prepared For:



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Statement of Purpose

The purpose of the Facility Action Plan (FAP) is to outline the total multiyear cleanup program for Naval Support Activity Mid-South (NSA Mid-South, otherwise referred to as the Facility). The plan identifies cleanup requirements at each site or area of concern, and proposes a comprehensive, facility-wide approach for environmental restoration at the Facility. The objective of the FAP is to provide holistic planning and execution information for Navy Remedial Project Managers, Facility personnel, and the Tennessee Department of Environment and Conservation to meet the environmental restoration goals of their respective organizations.

The FAP document generally mirrors the Army's Installation Action Plan which was developed as a comprehensive planning tool for Army Installations to tell a clear story of their cleanup program, the direction in which it was proceeding, how it was getting there, and why the journey was warranted. The objective of this FAP is the same. As such, there is terminology related to the Navy's Normalization of Data database, also known as NORM, included in the document. The Navy uses NORM as a registry for environmental sites, tracking them from cradle to grave, and forecasting their future budgets and anticipated completion milestones until their ultimate closure. Similarly, there is terminology associated with different phases and milestone completed within the Resource Conservation and Recovery Act (RCRA) program, which are compared in the table below.

NORM Descriptions and RCRA Permit Phase Comparison				
NORM Phase	NORM Description	NORM Milestone	RCRA Permit	
Phase I	Preliminary Assessment		• RCRA Facility Assessment	
	Site Inspection		• Confirmation Sampling	
Phase II	Remedial Investigation/ Feasibility Study		• RCRA Facility Investigation/ Corrective Measures Study	
	Record of Decision		• Statement of Basis and Permit Mod	
Decision Document				
Phase III	Remedial Design			• Corrective Measures Implementation (Construction)
Phase IV	Remedial Action (Construction)			
Remedy in Place				
Phase V*	Interim Remedial Action *		• Interim Measure	
Phase VI	Remedial Action (Operation)		• Corrective Measures Implementation (Operation)	
Response Complete**				
Phase VII	Long Term Management		Monitoring/Land use control Management	
Site Closeout				

Notes:

* Interim Remedial Action may be initiated and continued through any Phase.

** Response Complete may also be achieved at the end of one of the study phases, recorded in a Decision Document.

NORM = Navy "Normalization of Data" database

RCRA = Resource Conservation and Recovery Act

The first section of the document outlines general facility information, history, and a brief summary of the three active environmental programs at NSA Mid-South:

- Environmental Restoration, Navy — Installation Restoration Program
- Base Realignment and Closure — Installation Restoration Program
- Munitions Response Program

The report is then divided into three major sections, detailing the following within each program:

- Summary — lists the number of active and closed sites, their types (landfills, tanks, buildings, etc.), most widespread contaminant, media of concern, completed remedial actions, and schedule for program completion.
- Contamination Assessment — provides the status of each site within the program, its location, and the anticipated schedule for site cleanup/exit.
- Previous Studies — provides reference for major studies/Resource Conservation and Recovery Act milestones for all sites within the program in chronological order.
- Response Complete Sites — dates and documentation associated with sites which have been closed and/or received a no further action status.
- Milestones and Schedule — provides a summary of completed NORM phases and schedule for when remaining NORM phases are anticipated for completion.
- Site Descriptions — provides individual site histories of the remaining active sites, cleanup strategies, NORM phase information, and projected scope and schedule for the upcoming year.

Acronyms

µg/L	Microgram per liter
1,1-DCE	1,1-dichloroethene
A&H	Allen & Hoshall
AOC	Area of Concern
BCT	Base Cleanup Team
bls	below land surface
BRAC	Base Realignment and Closure
cis-1,2-DCE	cis-1,2-dichloroethene
CMS	Corrective Measures Study
CSI	Confirmatory Sampling Investigation
CS/VP	Confirmation Sampling/Verification Phase
DD-SB	Decision Document — Statement of Basis
EDGe	Engineering, Design and Geosciences Group, Inc.
ERC	Environmental Research and Consulting
ER,N	Environmental Restoration, Navy
FAP	Facility Action Plan
HSWA	Hazardous and Solid Waste Amendments
INV	Investigation
IRA	Interim Remedial Action
IRP	Installation Restoration Program
LTM	Long Term Monitoring
LUC	Land use controls
mg/kg	milligrams per kilogram
MCL	Maximum Contaminant Levels
MRP	Munitions response program
N/A	Not applicable
NAS	Naval Air Station
NAVFAC	Naval Facilities Engineering Command
NFA	no further action
NORM	Navy “Normalization of Data” database
NSA	Naval Support Activity
PA	Preliminary Assessment
PAHs	Polynuclear Aromatic Hydrocarbons
PAL	Project action level
PCBs	Polychlorinated biphenyls
PCE	tetrachloroethylene

RA	Remedial actions
RC	Response complete
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RFI/CMI	RCRA Facility Investigation/Corrective Measures Implementation
RFI/CMS	RCRA Facility Investigation/Corrective Measures Study
RIP	Remedy in Place
SC	Site closure
SI	Site Inspection
SWMUs	Solid waste management units
TCE	Trichloroethylene
TDEC	Tennessee Department of Environment and Conservation
TPH	Total petroleum hydrocarbons
U.S. EPA	U.S. Environmental Protection Agency
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VCA	Voluntary corrective action
VOCS	Volatile organic compounds

Facility Information

Facility Location

Facility Size (Acreage): 1,600 active; 1,858 transferred (BRAC)

City: Millington

County: Shelby

State: Tennessee

Facility Mission

The mission of the facility is to serve as the Navy's Human Resources Center of Excellence, enabling manpower management for the Fleet and cradle-to-grave career management for sailors and their families.

Facility Information and History

Naval Support Activity (NSA) Mid-South is located in Millington, Tennessee, approximately 20 miles north of Memphis in West Tennessee. This Facility Action Plan covers the active installation and the property transferred under the 1993 Base Realignment and Closure Act (BRAC). The size of the active installation is 1,600 acres and the BRAC property is 1,858 acres.

During World War I, an Army Air Corps Training Field was located on a portion of the Facility, south of Navy Road (otherwise known as the Southside). In 1942 the Naval Training Station was officially commissioned and in 1943 it became the Naval Air Technical Training Center which provided aircraft maintenance and training operations through its 21 different schools to Navy and Marine Corps aviation personnel. The Chief of Naval Air Technical Training headquarters was moved from Pensacola, Florida to Memphis, Tennessee in 1946. In 1971, Naval Air Station (NAS) Memphis became the headquarters for all Navy technical training under a Navy-wide reorganization, and was responsible for technical training at 52 activities in 27 geographic locations in the United States.

The 1993 BRAC Act directed the realignment of NAS Memphis to NSA Memphis which took place in 1995. In 1998 NSA Memphis was realigned to NSA Mid-South at which time airfield training operations transferred back to NAS Pensacola and the airfield closed. In 1999, the 551-acre airfield parcel transferred to the Millington Municipal Airport Authority and the 1,311-acre non-airfield parcel transferred to the City of Millington. As a result, the NSA Mid-South footprint was reduced from a 3,500-acre complex to its current 1,600 acres, with most of the post-realignment Navy activities presently taking place on the Base's Southside. The remaining facility became headquarters for the Navy Personnel Command (Bureau of Naval Personnel) which relocated from Arlington, Virginia as well as the Navy Recruiting Command, the Navy Manpower Analysis Center and the U.S. Army Corps of Engineers Finance Center. Today, approximately 7,500 military, civilian, and contract personnel are employed at the NSA Mid-South.

Lead Organization

Chief of Naval Personnel

Lead Executing Agencies for Facility Installation Restoration Program

Naval Facilities Engineering Command Base Realignment and Closure Commission Program Management Office for BRAC.

Naval Facilities Engineering Command Southeast for Environmental Restoration, Navy (ER,N).

Regulator Participation

State: Tennessee Department of Environment and Conservation (TDEC) Division of Solid Waste Management.

Federal: Since 2010, U.S. Environmental Protection Agency (U.S. EPA) Region 4 has chosen to not participate in the cleanup program.

National Priorities List Status

NSA Mid-South is not on the National Priorities List.

Restoration Advisory Board/Technical Review Committee/Technical Assistance for Public Participation Status

Restoration Advisory Board established in 1994

Restoration Advisory Board adjourned on 9 May 2008 (no longer needed/no interest)

Facility Program Summaries

ER,N — IRP

Primary Contaminants of Concern: Volatile organic compounds (VOCs), petroleum

Affected Media of Concern: Groundwater, Soil

BRAC — IRP

Primary Contaminants of Concern: VOCs, Petroleum

Affected Media of Concern: Groundwater

MRP — IRP

Primary Contaminants of Concern: Polynuclear Aromatic Hydrocarbons (PAHs), Lead

Affected Media of Concern: Soil

5-Year/Periodic Review Summary

All sites at NSA Mid-South are managed under the Facility's Resource Conservation and Recovery Act (RCRA) permit which does not have a five-year review requirement.

Cleanup Program Summary

ER,N — IRP

Prior Year Progress: Interim corrective measures monitoring continued at solid waste management units (SWMUs) 14 and 39 for the VOCs in the groundwater in the loess/alluvium and fluvial deposits aquifer, respectively. Assessment of VOCs in SWMU 39 loess/alluvium groundwater related to the removal of the Building S-74 slab also continued in 2014 and is anticipated to conclude in 2015. RCRA Facility Investigation (RFI) data gaps identified by TDEC during site-closeout of SWMUs 17, 22, and 65 resulted in additional data collection being conducted at these SWMUs. Data was submitted for regulatory review for each site in technical memorandums with recommendations for no further action (NFA). Regulatory concurrence has been received for the NFA recommendations for SWMUs 17 and 65 in 2014. SWMU 22 received a regulatory NFA on 26 January 2015. There are no offsite impacts associated with any of the ER,N sites.

Future Plan of Action: A NFA Statement of Basis will be drafted for SWMUs 17, 22, and 65 in 2015. Interim measures groundwater monitoring will continue at SWMUs 14 and 39. At the conclusion of the SWMU 39 loess/alluvium groundwater assessment, an interim measures work plan will be required to address the chlorinated solvent impacts. If the loess/alluvium groundwater remedy implementation is completed in 2016, then the SWMU 39 Statement of Basis may be drafted in 2017. Trichloroethylene (TCE) identified by Lee and Ryan in the upper part of the alluvial-fluvial deposits aquifer at well location 039G25LF was confirmed in 2014; however, concentrations are half that previously detected and the well will therefore undergo Long Term Monitoring (LTM) for the foreseeable future.

BRAC — IRP

Prior Year Progress: Area of concern (AOC) A underwent semi-annual and annual groundwater monitoring in 2014 to evaluate the enhanced bioremediation efforts for chlorinated solvents in groundwater. The source-area remedy was expanded in 2013 to a location closer to the former Facility property boundary to address offsite TCE migration. AOC A is the only site at NSA Mid-South where offsite groundwater impacts have been identified. Optimization recommendations to the LTM program were approved in the Progress Report containing the 2013 LTM data. Some of the optimization recommendations were implemented in the comprehensive, annual AOC A sampling event (August 2014). The SWMU 00015 benzene assessment activities continued in 2014 in an effort to identify the source for the persistent benzene in the upper fluvial deposits groundwater. The investigation shifted focus from groundwater to possible soil source-areas near the former tank farm structures (e.g., piping, loading/unloading stations, fuel islands, oil water separator).

Future Plan of Action: Annual and semi-annual groundwater monitoring will continue at AOC A and optimization opportunities will be evaluated and implemented as approved by TDEC. The 2014 LTM progress report was submitted for regulatory review on March 3, 2015. Decision rules for optimizing the LTM program are undergoing regulatory evaluation and may be implemented before the April 2015 semi-annual monitoring event. Pending successful delineation of the SWMU 00015 source area(s) in early 2015, an interim measure will likely be implemented for benzene in groundwater in 2015.

MRP

Prior Year Progress: The RFIs for unexploded ordnances (UXOs) sites 1 and 2 were completed and submitted in a single document in 2013 (Resolution Consultants 2013). As a follow-up to regulatory and Navy concerns, an addendum to the RFI was submitted this past year (Resolution Consultants 2014) to address an alternative risk exposure scenario and two lead hot-spots at the former Trap and Skeet Ranges #1 and #2.

Future Plan of Action: A corrective measures study (CMS) is currently under preparation of the Navy and is anticipated for submitting for regulatory review in 2015. Remedy implementation is anticipated in 2016 or 2017, pending Navy funding.

NSA Mid-South
Environmental Restoration, Navy —
Installation Restoration Program

Total Navy ER, N — IRP NORM Sites/Closeout Site Count: 36/31

ER,N — IRP Sites with Future and/or Underway Phases:

Contaminated Groundwater

- Site 3949 SWMU 00014 — Building S-140 and 7th Avenue Ditch
- Site 3974 SWMU 00039 — Building S-74 polychlorinated biphenyls (PCB) Storage Area
- Site 4000 SWMU 00065 — Building S-362 Training Mockup Site

Tank Sites

- Site 3952 SWMU 00017 — Former S-9 Underground Waste Tank (Building S-9)
- Site 3957 SWMU 00022 — Former Underground Fuel Tank-75W (Building S-75)

Most Widespread Contaminants of Concern

VOCs and Petroleum

Media of Concern

Groundwater, Soil

Completed Remedial Actions (Interim Remedial Action/Final Remedial Action)

NORM Site ID	NORM Site Name	Action	Remedy	Year
3937	SWMU 00002 Southside Landfill	IRA FRA	Waste Removal — Landfill debris LUCs/LTM	2005 2011
3938	SWMU 00003 Building N-121 Plating Shop Dry Well	IRA (SC)	Spill Cleanup and Waste Removal — Soils	1997
3949	SWMU 00014 Building S-140 Site and 7 th Avenue Drainage Ditch	IRA	Enhanced bioremediation — Groundwater	2005 — current
3952	SWMU 00017 S-9 Underground Waste Tank	IRA	Waste Removal — Soils	1999
3954	SWMU 00019 N-757 Underground Waste Tank (formerly 341 and 1648 UST)	IRA (SC)	Waste Removal — Soils	1999
3957	SWMU 00022 S-75 Underground Fuel Tanks	IRA	Waste Removal — Soils	2001
3959	SWMU 00024 N-114 Auto Hobby Shop Waste Oil Tanks	IRA (SC)	Waste Removal — Soils	2001
3974	SWMU 00039 S-74 PCB Storage Area	IRA	Enhanced Bio; Chemical oxidation — Groundwater	2005 — current
3980	SWMU 00045 Hazardous Waste Accumulation Point at Building S-142	IRA (SC)	Waste Removal — Soils	1995
3982	SWMU 00047 Hazardous Waste Accumulation Point at Building 344	IRA (SC)	Waste Removal — Soils	2001
3983	SWMU 00048 Hazardous Waste Accumulation Point at Building S-9	IRA (SC)	Waste Removal — Soils	2001
3984	SWMU 00049 Hazardous Waste Accumulation Point at Building N-757	IRA (SC)	Waste Removal — Soils	2004
3994	SWMU 00059 Pesticide Storage Facility (Old Pesticide Shop)	IRA (SC)	Waste Removal — Soils	1999
3996	SWMU 00061 Building N-26 (Former Printing Shop)	IRA (SC)	Waste Removal — Soils	2000
4000	SWMU 00065 Building S-362 (Training Mockup Site)	IRA	Waste Removal — Soils	2001

Notes:

- IRA = interim remedial action
- FRA = final remedial action
- SC = Site closeout complete as result of remedial action
- LTM = Long Term Monitoring
- LUCs = Land use controls
- NORM = Navy "Normalization of Data" database
- PCB = Polychlorinated biphenyls
- SWMU = Solid waste management units
- UST = Underground Storage Tank
- ID = Identification

Duration of ER,N — IRP

Date of IRP Inception: 1983

Estimated Date of Remedy-in-Place/Response Complete: December 2016

Date of ER,N — IRP completion including Long Term Management: 2050

Contamination Assessment Overview

NSA Mid-South received RCRA Permit No. TN2-170-022-600 from U.S. EPA Region 4 in September 1986. The Hazardous and Solid Waste Amendments (HSWA) portion of the permit (HSWA-TN002) required NSA Mid-South to conduct a RCRA Facility Assessment (RFA) to identify and characterize all active and inactive SWMUs on the Facility. The Navy conducted an RFA in 1986 to evaluate SWMUs that were known, suspected, or presumed to have had releases of hazardous constituents. Engineering, Design and Geosciences Group, Inc. (EDGe) submitted the RFA in April 1987 and the report identified 58 potential SWMUs and recommended 34 for additional study. The U.S. EPA established an official SWMU list in 1990 and instructed the Naval Facilities Engineering Command Southern Division to proceed with an RFI Work Plan. The RFI Work Plan was approved in 1991 and the majority of the SWMU/AOC investigations were completed between 1992 and 2000. In 1996, the official list of SWMUs was expanded to include 67 sites and one AOC. Of these, 36 SWMUs are within the active ER,N portion (primarily the former Southside) of the Facility.

SWMUs were grouped into assemblies based on the type of investigation required (Confirmatory Sampling Investigation [CSI] or RFIs), the associated waste sources (surface or subsurface), the level of complexity, and whether they are located on the BRAC or ER,N portion of the Facility, with the BRAC SWMUs receiving priority to expedite the completion of actions to support property transfer and use. A total of eight assemblies were established with four being BRAC-funded (Assemblies A through D) and four being ER,N-funded (Assemblies E through H).

The statuses of the 36 ER,N SWMUs are as follows:

- Thirty SWMUs have been approved for NFA and are eligible for unrestricted site re-use. These include the following:

ER,N NFA SWMUs — 00003 (Site 3938), 00009 (Site 3944), 00012 (Site 3947), 00013 (Site 3948), 00019 (Site 3954), 00020 (Site 3955), 00023 (Site 3958), 00024 (Site 3959), 00025 (Site 3960), 00028 (Site 3963), 00030 (Site 3965), 00033 (Site 3968), 00034 (Site 3969), 00035 (Site 3970), 00037 (Site 3872), 00041 (Site 3976), 00043 (Site 3978), 00045 (Site 3980), 00046 (Site 3981), 00047 (Site 3982), 00048 (Site 3983), 00049 (Site 3984), 00054 (Site 3989), 00055 (Site 3990), 00056 (Site 3991), 00057 (Site 3992), 00058 (Site 3993), 00059 (Site 3994), 00061 (Site 3996), and 00063 (Site 3998).
- One SWMU has final remedy/remedy in place — SWMU 00002 Southside Landfill (Site 3937).
- The following five SWMUs are listed in the permit as requiring a CMS:
 - SWMU 00014 Building S-140 Site and Seventh Avenue Ditch (Site 3949) is undergoing interim measures monitoring for chlorinated solvents in loess/alluvium groundwater.
 - SWMU 00017 S-9 Underground Waste Tank (Site 3952) underwent supplemental RFI characterization in 2014 and received regulatory concurrence for NFA.

- SWMU 00022 — S-75 Underground Fuel Tank (Site 3957) underwent supplemental RFI characterization in 2014. A technical memorandum containing the data is currently being drafted for regulatory review.
- SWMU 00039 S-74 PCB Storage Area (Site 3974) is undergoing interim measures monitoring for chlorinated solvents in the alluvial-fluvial deposits groundwater. Assessment of chlorinated solvents in the shallower loess/alluvium groundwater was initiated in 2013 and continued in 2014.
- SWMU 00065 Building S-362 Training Mockup Site (Site 4000) underwent supplemental RFI characterization in 2012 and received regulatory concurrence for NFA.

Cleanup Exit Strategy

The exit strategy for the following sites is to have an NFA Statement of Basis drafted/approved and site closure (SC) in 2015:

SWMU 00017; S-9 Underground Waste Tank (Site 3952)

SWMU 00022; S-75 Underground Fuel Tank (Site 3957)

SWMU 00065; Building S-362 Training Mockup Site (Site 4000)

The exit strategy for the following sites is transitioning from the RFI/CMS phase to remedy in place (RIP) and long term monitoring in 2016:

SWMU 00014; Building S-140 Site and Seventh Avenue Ditch (Site 3949)

The exit strategy for the following sites is transitioning from the RFI/CMS phase to remedy in place (RIP) and long term monitoring in 2017:

SWMU 00039; S-74 PCB Storage Area (Site 3974)

Status of all ER,N — IRP SWMUs/AOCs

Site ID	Site Description	NORM Phase Status
3937	SWMU 00002 — Southside Landfill	RFI/CMS 2004; IM 2005; RIP 2011; LTM 2004 — current
3938	SWMU 00003 Building N-121 Plating Shop Dry Well	IRA 1997; RFI/CMS; 1997, SC 2011
3944	SWMU 00009 Sewage Lagoons	RFI/CMS 2001; SC 2011
3947	SWMU 00012 Galley Disposal	RFA 1990; SC 1990
3948	SWMU 00013 Building 499 Grease Pit	RFA 1990; SC 1990
3949	SWMU 00014 Building S-140 Site and Seventh Avenue Ditch	RFI/CMS current; IRA 2005 — current
3952	SWMU 00017 S-9 Underground Waste Tank	IRA 1999; RFI/CMS current
3954	SWMU 00019 N-757 Underground Waste Tank (formerly 341 and 1648 Underground Waste Tank)	IRA 1999; RFI/CMS 2004; SC 2011
3955	SWMU 00020 1594 Underground Waste Tank	RFI/CMS 2001; SC 2011
3957	SWMU 00022 S-75 Underground Fuel Tanks	IRA 2001; RFI/CMS current
3958	SWMU 00023 S-8 Underground Fuel Tank	RFI/CMS 2001; SC 2011
3959	SWMU 00024 N-114 Auto Hobby Shop Waste Oil Tanks	RFI/CMS 2001; IRA 2001; SC 2011
3960	SWMU 00025 Big Creek Landfill	RFA 1990; SC 1990
3963	SWMU 00028 Southside Sewage Treatment Plant	RFA 1990; SC 1990
3965	SWMU 00030 Park Field Waste Treatment Tank	RFI/CMS 1999; SC 2011
3968	SWMU 00033 H-10 Incinerator	RFA 1990; SC 1990
3969	SWMU 00034 H-109 Incinerator	RFA 1990; SC 1990
3970	SWMU 00035 1579 Incinerator	RFA 1990; SC 1990
3972	SWMU 00037 Southside Sewage Treatment Plant Incinerator	RFA 1990; SC 1990
3974	SWMU 00039 S-74 PCB Storage Area	RFI/CMS current; IRA 2005 — current
3976	SWMU 00041 Salvage Yard No. 2	RFI/CMS 2005; SC 2011
3977	SWMU 00042 N-12 Interim Hazardous Waste Storage Area	RFI/CMS 2005; SC 2011
3978	SWMU 00043 Hazardous Waste Accumulation Point at Building S-176	RFI/CMS 2003; SC 2011
3980	SWMU 00045 Hazardous Waste Accumulation Point at Building S-142	IRA 1995; RFI/CMS 1996; SC 2011
3981	SWMU 00046 Hazardous Waste Accumulation Point at Building S-140	RFI/CMS 2003; SC 2011
3982	SWMU 00047 Hazardous Waste Accumulation Point at Building 344	RFI/CMS & IRA 2001; SC 2011
3983	SWMU 00048 Hazardous Waste Accumulation Point at Building S-9	RFI/CMS & IRA 2001; SC 2011
3984	SWMU 00049 Hazardous Waste Accumulation Point at Building N-757	RFI/CMS & IRA 2004; SC 2004
3989	SWMU 00054 Hazardous Waste Accumulation Point at Dental Clinic	RFA 1990; SC 1990
3990	SWMU 00055 Hazardous Waste Accumulation Point at Medical Clinic	RFA 1990; SC 1990
3991	SWMU 00056 Hazardous Waste Accumulation Point at Building 352	RFA 1990; SC 1990
3992	SWMU 00057 Hazardous Waste Accumulation Point at Building S-183	RFA 1990; SC 1990
3993	SWMU 00058 Hazardous Waste Accumulation Point at Building S-360	RFA 1990; SC 1990
3994	SWMU 00059 Pesticide Storage Facility (Old Pesticide Shop)	RFI/CMS 2001; SC 2011
3996	SWMU 00061 Building N-26 (Former Printing Shop)	RFI/CMS 2001; SC 2011
3998	SWMU 00063 Underground Waste Tank S-75N	RFI/CMS 2001; SC 2011
4000	SWMU 00065 Building S-362 (Training Mockup Site)	RFI/CMS 2014; IRA 2001

Notes:

ER,N	=	Environmental Restoration, Navy
IRA	=	Interim Remedial Action
LTM	=	Long Term Monitoring
RC	=	Response complete
RFI/CMS 2001	=	RCRA Facility Investigation/Corrective Measures Study; 2011 — RFI approval date.
RFA	=	RCRA Facility Assessment
RIP	=	Remedy in Place
NORM	=	Navy "Normalization of Data" database
PCB	=	Polychlorinated biphenyls
SC	=	Site Closeout based on RCRA mod/permit renewal date.
SWMU	=	Solid waste management units

Location of ER,N – IR SWMUs



ER,N — IRP Previous Studies

	Title	Author	Date
1983	Initial Assessment Study Millington	Naval Energy and Environmental Support Activity	1 November 1983
1985	Confirmation Study Verification Phase	Geraghty & Miller, Inc.	1 November 1985
1986	Hazardous Waste Permit to Naval Air Station for PERMIT TN2 17 002 2600	TDEC	15 September 1986
1989	Preliminary Assessment for Sites 10, 11, and 12	Environmental and Energy Service Company Inc.	16 November 1989
1990	Revised Final Visual Site Inspection Report	Environmental and Energy Service Company Inc.	1 August 1990
	RCRA Facility Assessment	Environmental and Energy Service Company Inc.	1 August 1990
	RFI Report for SWMU 59 Building Number S-335 Former Pesticide Storage Facility	Environmental and Energy Service Company Inc.	1 October 1990
1992	Final Phase I Environmental Property Assessment	EnSafe/Allen & Hoshall	23 January 1992
1992	Final Hazard Ranking System Scoring	EnSafe/Allen & Hoshall	12 June 1992
1995	IM Technical Memorandum for SWMU 45 S-142 Hazardous Waste Accumulation Point	EnSafe Inc.	23 August 1995
	Geophysical Survey Report for SWMUs 14, 36, and 65	EnSafe Inc.	15 September 1995
1996	Final RFI Report Assembly A SWMU 3 Building N-121 Plating Shop Dry Well	EnSafe Inc.	15 April 1996
1997	RFI Report Assembly E for SWMUs 2, 9, 14, 38, 59, and 65	EnSafe/Allen & Hoshall	13 June 1997
	SWMU 2 Passive Soil Gas Evaluation	EnSafe/Allen & Hoshall	24 June 1997
	Building N-121 Soil Removal and Spill Cleanup Activity Report	EnSafe Inc.	29 August 1997
1998	RFI Report Assembly E for SWMUs 2, 9, 14, 38, 59, and 65	EnSafe Inc.	2 February 1998
	Confirmatory Sampling Investigation Report Assembly F SWMUs 20, 22, 63, and 39	EnSafe Inc.	31 July 1998
1999	RFI Report for Assembly E SWMUs 2, 9, 14, 38, 59, and 65	EnSafe/Allen & Hoshall	1 April 1999
	Voluntary Corrective Action for SWMUs 3, 7, 17, 18, 19, and 67 Horse Pasture Dump and Apron Area Gasoline Pits	EnSafe Inc.	12 May 1999
	Environmental Restoration Navy Gray Areas Investigation Report	EnSafe Inc.	13 May 1999
	Confirmatory Sampling Investigation Report for Assemblies G and H for SWMUs 23, 24, 41, 43, 47, 48, 49, and 61	EnSafe Inc.	13 August 1999
	Voluntary Corrective Action Report for Demolition and Soil Excavation — SWMU 59 Old Pesticide Shop	EnSafe Inc.	1 November 1999
2000	RFI Report for Assembly F SWMUs 17, 19, 20, 22, 39, and 63	EnSafe Inc.	1 September 2000
	Confirmatory Sampling Investigation Report Assemblies G and H for SWMUs 23, 24, 41, 43, 47, 48, 49, and 61	EnSafe Inc.	28 April 2000
	RFI Report Assembly F for SWMUs 17, 19, 20, 22, 39, and 63	EnSafe Inc.	15 September 2000
	RFI Report for Assembly E for SWMUs 2, 9, 14, 38, 59, and 65	EnSafe Inc.	6 October 2000

	Title	Author	Date
2001	Voluntary Corrective Action Report — SWMU 17; Petroleum Contaminated Soil Removal	EnSafe Inc.	3 January 2001
	Voluntary Corrective Action Report — SWMU 22	EnSafe Inc.	19 March 2001
	Assemblies G and H RFI Report	EnSafe Inc.	1 November 2001
	RFI Report for SWMU 2 Southside Landfill	EnSafe Inc.	11 December 2001
2003	Corrective Measures Study Report for SWMU 39	EnSafe Inc.	26 September 2003
	Technical Memorandum — Voluntary Corrective Action for SWMU 19 Former Underground Tank 1648	EnSafe Inc.	20 October 2003
	Corrective Measures Study Report for SWMU 14/46	EnSafe Inc.	22 December 2003
2004	Technical Memorandum Soil Sampling and Removal Report SWMU 3	EnSafe Inc.	7 January 2004
	Corrective Measures Study Report for SWMU 2 Southside Landfill	EnSafe Inc.	27 February 2004
2005	Technical Memorandum Recommendation for No Further Action SWMU 41	EnSafe Inc.	23 March 2005
	IM Progress Report for SWMU 39	EnSafe Inc.	9 December 2005
	IM Progress Report for SWMU 14	EnSafe Inc.	9 December 2005
	Monitored Natural Attenuation Effectiveness Progress Report for SWMU 2 Southside Landfill	EnSafe Inc.	19 December 2005
2006	Monitored Natural Attenuation Effectiveness Progress Report for SWMU 2 Southside Landfill	SpectraTech/EnSafe	26 October 2006
2007	Semi-Annual IM Progress Report for SWMU 39	SpectraTech/EnSafe	30 March 2007
	Semi-Annual IM Progress Report for SWMU 39	SpectraTech/EnSafe	16 May 2007
	Semi-Annual IM Progress Report for SWMU 14/46	SpectraTech/EnSafe	5 June 2007
	Semi-Annual IM Progress Report for SWMU 39	SpectraTech/EnSafe	18 June 2007
	Semi-Annual IM Progress Report for SWMU 14/46	SpectraTech/EnSafe	28 June 2007
2008	Alternate Concentration Limits Technical Memorandum SWMU 2 Southside Landfill	SpectraTech/EnSafe	5 June 2008
	IM Progress Report for SWMU 14/46	SpectraTech/EnSafe	6 June 2008
	IM Progress Report for SWMU 39	SpectraTech/EnSafe	6 June 2008
	Monitored Natural Attenuation Effectiveness Progress Report for SWMU 2 Southside Landfill	SpectraTech/EnSafe	2 July 2008
2009	IM Progress Report for SWMU 39	SpectraTech/EnSafe	10 July 2009
2010	2010 Annual Groundwater Monitoring Progress Report SWMU 2 Southside Landfill	SpectraTech/EnSafe	25 October 2010
	2010 IM Progress Report for SWMU 39	SpectraTech/EnSafe	21 October 2010
	2010 IM Progress Report for SWMUs 14/46	SpectraTech/EnSafe	1 October 2010
2011	Annual Groundwater Monitoring Progress Report for SWMU 2 Southside Landfill	SpectraTech/EnSafe	1 March 2011
	IM Progress Report for SWMUs 14/46	SpectraTech/EnSafe	1 November 2011

	Title	Author	Date
2012	IM Progress Report for SWMU 39 First Quarter 2012	Lee and Ryan	2 August 2012
	IM Progress Report for SWMU 39 Second Quarter 2012	Lee and Ryan	1 October 2012
	Technical Memorandum SWMU 65 Sub-Surface Investigation	Quantum Environmental and Engineering Services	4 October 2012
	IM Progress Report for SWMU 39 Third Quarter 2012	Lee and Ryan	19 October 2012
2013	SWMU 2 2012/2013 Work Summary Technical Memorandum	Quantum Environmental and Engineering Services	5 March 2013
	Removal Activities Final Closure Report (SWMU 39) TCE Plume	Lee and Ryan	1 April 2013
	SWMU 14/46 HRC Injection Technical Memorandum	Quantum Environmental and Engineering Services	3 April 2013
	2013 First Quarter Technical Memorandum for SWMU 39	Lee and Ryan	23 May 2013
	SWMU 14/46 HRC Injection Update	Quantum Environmental and Engineering Services	7 June 2013
	2013 Second Quarter Technical Memorandum for SWMU 39	Lee and Ryan	30 August 2013
	2012 Annual IM Progress Report for SWMU 39	Lee and Ryan	29 October 2013
	SWMU 2 Work Summary 2013 Technical Memorandum	Quantum Environmental and Engineering Services	18 November 2013
	SWMU 14/46 HRC Injection Technical Memorandum	Quantum Environmental and Engineering Services	4 December 2013
	2013 Third Quarter Technical Memorandum for SWMU 39	Lee and Ryan	31 December 2013
2014	SWMU 2/14/46 Sampling Event Summary Technical Memorandum	Quantum Environmental & Engineering Services	18 March 2014
	2014 First Quarter Technical Memorandum for SWMU 39	Lee and Ryan	6 May 2014
	SWMU 2 2014 Work Summary Technical Memorandum	Quantum Environmental and Engineering Services	26 August 2014
	2013 Annual IM Progress Report for SWMU 39	Lee and Ryan	20 September 2014

Notes:

RFI	=	RCRA Facility Investigation
SWMU	=	Solid waste management units
TDEC	=	Tennessee Department of Environment and Conservation
RCRA	=	Resource Conservation and Recovery Act
TCE	=	Trichloroethylene

Site Closeout (No Further Action) Summary — ER,N — IRP

Site ID #	Site Name	Site Description	NFA Date	Documentation
3938	SWMU 00003	Building N-121 Plating Shop Dry Well	2004	NFA was recommended in the SWMU 3 Soil Sampling and Removal Report (EnSafe, 7 January 2004). Approval letters: TDEC — 2/13/04; U.S. EPA — 1/15/04
3944	SWMU 00009	Sewage Lagoons	2001	NFA with a ban on fishing was recommended in the Assembly E RFI Report, Revision 2 (EnSafe, 6 October 2000). Approval letters: TDEC — 3/16/01; U.S. EPA — 6/27/01
3947	SWMU 00012	Galley Disposal	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3948	SWMU 00013	Building 499 Grease Pit	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3954	SWMU 00019	N-757 Underground Waste Tank (formerly 341 and 1648 UST)	2004	NFA was recommended in the Technical Memorandum — SWMU 19 VCA Report, Revision 0 (EnSafe, 20 October 2003). Approval letters: TDEC — 2/12/04; U.S. EPA — 2/09/04
3955	SWMU 00020	1594 Underground Waste Tank	2001	NFA was recommended in the Assembly F RFI Report, Revision 1 (EnSafe, 15 September 2000). Approval letters: TDEC — 3/07/01; U.S. EPA — 4/03/01
3958	SWMU 00023	S-8 Underground Fuel Tank	1990	NFA was recommended in the Assemblies G & H CSI Report, Revision 2 (EnSafe, 28 April 2000). Approval letters: TDEC — 5/19/00; U.S. EPA — 6/08/00
3959	SWMU 00024	N-114 Auto Hobby Shop Waste Oil Tanks	2001	NFA was recommended in the Petroleum — Cont. Soil VCA Report, Revision 1 (EnSafe, 29 June 2001). Approval letters: TDEC — 8/24/01; U.S. EPA — N/A
3960	SWMU 00025	Big Creek Landfill	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3963	SWMU 00028	Southside Sewage Treatment Plant	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3965	SWMU 00030	Park Field Waste Treatment Tank	1999	NFA was recommended in the Assembly F CSI Report, Rev.2 (EnSafe, 31 July 1998). Approval letters: TDEC — N/A; U.S. EPA — 3/15/99
3968	SWMU 00033	H-10 Incinerator	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3969	SWMU 00034	H-109 Incinerator	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3970	SWMU 00035	1579 Incinerator	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3972	SWMU 00037	Southside Sewage Treatment Plant Incinerator	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3976	SWMU 00041	Salvage Yard No. 2	2005	NFA was recommended in the Tech. Memo — Recommendation for No Further Action, SWMU 41 (EnSafe, 23 March 2005) Approval letters: TDEC — 6/21/05; U.S. EPA — N/A
3977	SWMU 00042	N-12 Interim Hazardous Waste Storage Area	1997	NFA was recommended in the Assembly D CSI Report, Revision 2 (EnSafe/A&H, 17 October 1996). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3978	SWMU 00043	Hazardous Waste Accumulation Point at Building S-176	2003	NFA was recommended in the Assemblies G & H RFI Report, Revision 1 (EnSafe, November 2001). Approval letters: TDEC — 1/10/03; U.S. EPA — N/A
3980	SWMU 00045	Hazardous Waste Accumulation Point at Building S-142	1996	NFA was recommended in the SWMU 45 Interim Measures Technical Memorandum (EnSafe/A&H, 23 August 1995). Approval letters: TDEC — 2/23/96; U.S. EPA — 1/19/96
3981	SWMU 00046	Hazardous Waste Accumulation Point at Building S-140	2004	Enhanced Bio. and MNA were recommended in the SWMU 14/46 CMS Report., Revision 1 (EnSafe, 22 December 2003). Approval letters: TDEC — 2/18/04; U.S. EPA — 2/10/04

Site ID #	Site Name	Site Description	NFA Date	Documentation
3982	SWMU 00047	Hazardous Waste Accumulation Point at Building 344	2001	NFA was recommended in the Petroleum — Cont. Soil VCA Report, Revision 1 (EnSafe, 29 June 2001). Approval letters: TDEC — 8/24/01; U.S. EPA — N/A
3983	SWMU 00048	Hazardous Waste Accumulation Point at Building S-9	2001	NFA was recommended in the Petroleum — Cont. Soil VCA Report, Revision 1 (EnSafe, 29 June 2001). Approval letters: TDEC — 8/24/01; U.S. EPA — N/A
3984	SWMU 00049	Hazardous Waste Accumulation Point at Building N-757	2004	NFA was recommended in Technical Memorandum — SWMU 19 VCA Report, Revision 0 (EnSafe, 20 October 2003). Approval letters: TDEC — 2/12/04; U.S. EPA — 2/09/04
3989	SWMU 00054	Hazardous Waste Accumulation Point at Dental Clinic	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3990	SWMU 00055	Hazardous Waste Accumulation Point at Medical Clinic	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3991	SWMU 00056	Hazardous Waste Accumulation Point at Building 352	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3992	SWMU 00057	Hazardous Waste Accumulation Point at Building S-183	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3993	SWMU 00058	Hazardous Waste Accumulation Point at Building S-360	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGe, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3994	SWMU 00059	Pesticide Storage Facility (Old Pesticide Shop)	2001	NFA was recommended in the Assembly E RFI Report, Revision 2 (EnSafe, 6 October 2000). Approval letters: TDEC — 3/16/01; U.S. EPA — 6/27/01
3996	SWMU 00061	Building N-26 (Former Printing Shop)	2000	NFA was recommended in the Assemblies G & H CSI Report, Revision 2 (EnSafe, 28 April 2000). Approval letters: TDEC — 5/19/00; U.S. EPA — 6/08/00
3998	SWMU 00063	Underground Waste Tank S-75N	2001	NFA was recommended in the Assembly F RFI Report, Revision 1 (EnSafe, 15 September 2000). Approval letters: TDEC — 3/07/01; U.S. EPA — 4/03/01

Notes:

A&H	=	Allen & Hoshall
CMS	=	Corrective Measures Study
CSI	=	Confirmatory Sampling Investigation
EDGe	=	Engineering, Design and Geosciences Group, Inc.
ERC	=	Environmental Research and Consulting
N/A	=	Not applicable
NFA	=	no further action
RCRA	=	Resource Conservation and Recovery Act
RFI	=	RCRA Facility Investigation
SWMU	=	Solid waste management units
TDEC	=	Tennessee Department of Environment and Conservation
U.S. EPA	=	U.S. Environmental Protection Agency
UST	=	Underground Storage Tank
VCA	=	voluntary corrective action

ER,N — IRP Milestones

Date of IRP Inception: 1983

Past Phase Completion Milestones

1983	PA/SI	3937 — SWMU 00002 Southside Landfill; 3938 — SWMU 00003 Building N-121 Plating Shop Dry Well; 3944 — SWMU 00009 Sewage Lagoons; 3947 3 SWMU 00012 Gallery Disposal.
1985	CS/VP	3937 — SWMU 00002 Southside Landfill; 3938 — SWMU 00003 Building N-121 Plating Shop Dry Well; 3944 — SWMU 00009 Sewage Lagoons underwent preliminary sampling.
1989	PA/SI	NFA recommendation for Site 3944 — SWMU 00009 Sewage Lagoons
1990	RFA	<p>62 SWMUs identified.</p> <p>ER,N –IR SWMUs recommended for preliminary RFI sampling: 3955 — SWMU 00020 1594 Underground Waste Tank; 3959 — SWMU 00024 N-114 Auto Hobby Shop Waste Oil Tanks; 3965 — SWMU 00030 Park Field Waste Treatment Tank; 3974 — SWMU 00039 S-74 PCB Storage Area; 3976 — SWMU 00041 Salvage Yard No. 2; 3978 — SWMU 00043 Hazardous Waste Accumulation Point at Building S-176; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3982 — SWMU 00047 Hazardous Waste Accumulation Point at Building 344; 3983 — SWMU 00048 Hazardous Waste Accumulation Point at Building 344; 3984 — SWMU 00049 Hazardous Waste Accumulation Point at Building N-757; 3996 — SWMU 00061 Building N-26 (Former Printing Shop).</p> <p>SWMUs recommended for full RFI characterization: 3937 — SWMU 00002 Southside Landfill; 3944 — SWMU 00009 Sewage Lagoons; 3949 SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3994 SWMU 00059 Pesticide Storage Facility (Old Pesticide Shop).</p> <p>SWMUs recommended for investigation under UST program: 3955 SWMU 00020 1594 Underground Waste Tank; 3958 SWMU 00023 S-8 Underground Fuel Tank</p>
1995	IRA	3980 — SWMU 00045 S-142 Hazardous Waste Accumulation Point
	INV	Geophysical Survey Report for Site 3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; and 4000 — SWMU 00065 Building S-362 (Training Mockup Site)
1996	RFI/CMS	Site 3938 — SWMU 00003 Building N-121 Plating Shop Dry Well
1997	RFI/CMS	<p>3937 — SWMU 00002 Southside Landfill; 3944 — SWMU 00009 Sewage Lagoons; 3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3952 — 00017 S-9 Underground Waste Tank; 3954 — SWMU 00019 N-757 Underground Waste Tank (formerly 341 and 1648 UST); 3955 — SWMU 00020 1594 Underground Waste Tank; 3957 — SWMU 00022 S-75 Underground Fuel Tanks; 3958 — SWMU 00023 S-8 Underground Fuel Tank; 3959 — SWMU 00024 N-114 Auto Hobby Shop Waste Oil Tanks; 3965 — SWMU 00030 Park Field Waste Treatment Tank; 3974 — SWMU 00039 S-74 PCB Storage Area; 3976 — SWMU 00041 Salvage Yard No. 2; 3978 — SWMU 00043 Hazardous Waste Accumulation Point at Building S-176; 3994 — SWMU 00059 Pesticide Storage Facility (Old Pesticide Shop); 3998 — SWMU 00063 Underground Waste Tank S-75N, and 4000 — SWMU 00065 Building S-362 (Training Mockup Site).</p>
	IRA	3938 — SWMU 00003 Building N-121 Plating Shop Dry Well
1998	RFI/CMS	3937 — SWMU 00002 Southside Landfill; 3944 — SWMU 00009 Sewage Lagoons, 3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3955 — SWMU 00020 1594 Underground Waste Tank; 3957 — SWMU 00022 S-75 Underground Fuel Tanks; 3974 — SWMU 00039 S-74 PCB Storage Area; 3994 — SWMU 00059 Pesticide Storage Facility (Old Pesticide Shop); 3998 — SWMU 00063 Underground Waste Tank S-75N; 4000 — SWMU 00065 Building S-362 (Training Mockup Site)

Date of IRP Inception: 1983

Past Phase Completion Milestones

1999	RFI/CMS	3937 — SWMU 00002 Southside Landfill; 3944 — SWMU 00009 Sewage Lagoons; 3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3994 — SWMU 00059 Pesticide Storage Facility (Old Pesticide Shop); 4000 — SWMU 00065 Building S-362 (Training Mockup Site)
	IRA	3938 — SWMU 00003 Building N-121 Plating Shop Dry Well; 3952 00017 — S-9 Underground Waste Tank, 3954 — SWMU 00019 N-757 Underground Waste Tank (formerly 341 and 1648 UST); 3994 SWMU — 00059 Pesticide Storage Facility (Old Pesticide Shop)
2001	RFI/CMS	3937 — SWMU 00002 Southside Landfill; 3944 — SWMU 00009 Sewage Lagoons; 3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3952 — SWMU 00017 S-9 Underground Waste Tank, 3954 — SWMU 00019 N-757 Underground Waste Tank (formerly 341 and 1648 UST); 3955 — SWMU 00020 1594 Underground Waste Tank; 3957 — SWMU 00022 S-75 Underground Fuel Tanks; 3958 — SWMU 00023 S-8 Underground Fuel Tank; 3959 — SWMU 00024 N-114 Auto Hobby Shop Waste Oil Tanks; 3974 — SWMU 00039 S-74 PCB Storage Area; 3976 — SWMU 00041 Salvage Yard No. 2; 3978 — SWMU 00043 Hazardous Waste Accumulation Point at Building S-176; 3982 — SWMU 00047 Hazardous Waste Accumulation Point at Building 344; 3983 — SWMU 00048 Hazardous Waste Accumulation Point at Building S-9; 3984 — SWMU 00049 Hazardous Waste Accumulation Point at Building N-757; 3994 — SWMU 00059 Pesticide Storage Facility (Old Pesticide Shop); 3996 — SWMU 00061 Building N-26 (Former Printing Shop); 3998 — SWMU 00063 Underground Waste Tank S-75N; 4000 — SWMU 00065 Building S-362 (Training Mockup Site)
	IRA	3952 — SWMU 00017 S-9 Underground Waste Tank; 3957 — SWMU 00022 S-75 Underground Fuel Tanks; 3959 — SWMU 00024 N-114 Auto Hobby Shop Waste Oil Tanks; 3976 — SWMU 00041 Salvage Yard No. 2; 3978 — SWMU 00043 Hazardous Waste Accumulation Point at Building S-176; 4000 — SWMU 00065 Building S-362 (Training Mockup Site); Turkey Shoot Area
2003	IRA	3937 — SWMU 00002 Southside Landfill; 3958 - SWMU 00023 S-8 Underground Fuel Tank; 3959 — SWMU 00024 N-114 Auto Hobby Shop Waste Oil Tanks; 3976 — SWMU 00041 Salvage Yard No. 2; 3978 — SWMU 00043 Hazardous Waste Accumulation Point at Building S-176; 3980 — SWMU 00045 Hazardous Waste Accumulation Point at Building S-142; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3982 — SWMU 00047 Hazardous Waste Accumulation Point at Building 344; 3983 — SWMU 00048 Hazardous Waste Accumulation Point at Building S-9; 3984 — SWMU 00049 Hazardous Waste Accumulation Point at Building N-757; 3996 — SWMU 00061 Building N-26 (Former Printing Shop)
	RFI/CMS	3937 — SWMU 00002 Southside Landfill; 3958 - SWMU 00023 S-8 Underground Fuel Tank; 3959 — SWMU 00024 N-114 Auto Hobby Shop Waste Oil Tanks; 3976 — SWMU 00041 Salvage Yard No. 2; 3978 — SWMU 00043 Hazardous Waste Accumulation Point at Building S-176; 3980 — SWMU 00045 Hazardous Waste Accumulation Point at Building S-142; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3982 — SWMU 00047 Hazardous Waste Accumulation Point at Building 344; 3983 — SWMU 00048 Hazardous Waste Accumulation Point at Building S-9; 3984 — SWMU 00049 Hazardous Waste Accumulation Point at Building N-757; 3996 — SWMU 00061 Building N-26 (Former Printing Shop)
2003	IRA	3954 — SWMU 00019 N-757 Underground Waste Tank (formerly 341 and 1648 UST)
2004	IRA	3938 — SWMU 00003 Building N-121 Plating Shop Dry Well;
	CMS	SWMU 3937 — SWMU 00002 Southside Landfill;
	DD — SB	3938 — SWMU 00003 Building N-121 Plating Shop Dry Well; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3990 — SWMU 00055 Hazardous Waste Accumulation Point at Medical Clinic
2005	IRA	3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3974 — SWMU 00039 S-74 PCB Storage Area
2006	IRA	3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3974 — SWMU 00039 S-74 PCB Storage Area
2007	IRA	3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3974 — SWMU 00039 S-74 PCB Storage Area
	RIP	3937 — SWMU 00002 Southside Landfill
	LTM	3937 — SWMU 00002 Southside Landfill
2008	IRA	3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3974 — SWMU 00039 S-74 PCB Storage Area
	LTM	3937 — SWMU 00002 Southside Landfill
2009	IRA	3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch/3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140 and 3974 — SWMU 00039 S-74 PCB Storage Area
	LTM	3937 — SWMU 00002 Southside Landfill

Date of IRP Inception: 1983

Past Phase Completion Milestones

2010	IRA	SWMUs 3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch/3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3974 — SWMU 00039 S-74 PCB Storage Area
	LTM	3937 — SWMU 00002 Southside Landfill
	RFI/CMS	SWMUs 3952 — SWMU 00017 S-9 Underground Waste Tank; 3954 — SWMU 00019 N-757 Underground Waste Tank (formerly 341 and 1648 UST); 3955 — SWMU 00020 1594 Underground Waste Tank; 3957 — SWMU 00022 S-75 Underground Fuel Tanks; 3974 — SWMU 00039 S-74 PCB Storage Area; 3998 — SWMU 00063 Underground Waste Tank S-75N
2011	IRA	3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch/3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3974 — SWMU 00039 S-74 PCB Storage Area
	LTM	3937 — SWMU 00002 Southside Landfill
	DD — SB	3937 — SWMU 00002 Southside Landfill; 3944 — SWMU 00009 Sewage Lagoons; 3952 — SWMU 00017 S-9 Underground Waste Tank; 3955 — SWMU 00020 1594 Underground Waste Tank; 3957 — SWMU 00022 S-75 Underground Fuel Tanks; 3958 — SWMU 00023 S-8 Underground Fuel Tank; 3959 — SWMU 00024 N-114 Auto Hobby Shop Waste Oil Tanks; 3965 — SWMU 00030 Park Field Waste Treatment Tank; 3976 — SWMU 00041 Salvage Yard No. 2; 3978 — SWMU 00043 Hazardous Waste Accumulation Point at Building S-176; 3980 — SWMU 00045 Hazardous Waste Accumulation Point at Building S-142; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3982 — SWMU 00047 Hazardous Waste Accumulation Point at Building 344; 3983 — SWMU 00048 Hazardous Waste Accumulation Point at Building S-9; 3984 — SWMU 00049 Hazardous Waste Accumulation Point at Building N-757; 3994 — SWMU 00059 Pesticide Storage Facility (Old Pesticide Shop); 3996 — SWMU 00061 Building N-26 (Former Printing Shop); 3998 — SWMU 00063 Underground Waste Tank S-75N
2012	IRA	3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch/3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3974 — SWMU 00039 S-74 PCB Storage Area
	LTM	3937 — SWMU 00002 Southside Landfill
	RFI/CMS	4000 — SWMU 00065 Building S-362 (Training Mockup Site)
2013	IRA	3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3974 — SWMU 00039 S-74 PCB Storage Area
	LTM	3937 — SWMU 00002 Southside Landfill
2014	IRA	3949 — SWMU 00014 Building S-140 Site and Seventh Avenue Ditch; 3981 — SWMU 00046 Hazardous Waste Accumulation Point at Building S-140; 3974 — SWMU 00039 S-74 PCB Storage Area
	LTM	3937 — SWMU 00002 Southside Landfill
	RFI/CMI	3952 — SWMU 00017 S-9 Underground Waste Tank; 3957 — SWMU 00022 S-75 Underground Fuel Tanks
2015	RFI/CMS	SWMU 00039 S-74 PCB Storage Area
	RFI/CMS	SWMU 00022 S-75 Underground Fuel Tanks

Notes:

- LTM = Long term monitoring
- IRA = Interim Remedial Action
- CS/VP = Confirmation Study/Verification Phase
- RFI/CMS = RCRA Facility Investigation/Corrective Measures Study
- DD-SB = Decision Document — Statement of Basis
- PA/SI = Preliminary Assessment/Site Investigation
- INV = Investigation
- RFA = RCRA Facility Assessment
- RIP = Remedy in Place
- ER,N = Environmental Restoration, Navy
- NFA = No Further Action
- PCB = Polychlorinated biphenyl
- SWMU = Solid waste management units
- UST = Underground Storage Tank

Projected Statement of Basis/Decision Document Approval Dates

Site ID	Site Name		SOB/DD Date
3949	SWMU 00014	Building S-140 and 7 th Avenue Ditch	2019
3952	SWMU 00017	Former S-9 Underground Waste Tank (Building S-9)	2015
3957	SWMU 00022	Former Underground Fuel Tank-75W (Building S-75)	2015
3974	SWMU 00039	Building S-74 PCB Storage Area	2019
4000	SWMU 00065	Building S-362 Tracking Mockup Site	2015

Notes:

- PCB = Polychlorinated biphenyls
- SWMU = Solid waste management units
- SOB/DD = Statement of Bases/Decision Document
- ID = Identification

Final Remedial Action (Construction) Completion Date:

2017 (SWMU 39)

Schedule for Next Five-Year Review: N/A

N/A

Estimated Completion Date of IRP at Facility (including LTM phase):

2050 (SWMU 2)

Projected Phase Completion Milestones

Site ID	Site Name	Phase	FY14	FY15	FY16	FY17	FY18	FY19	FY20+
3949	SWMU 00014 Building S-140 and 7 th Avenue Ditch	RFI/CMS							
		IRA							
		RC							
		LTM							
		SC							
Site ID	Site Name	Phase	FY14	FY15	FY16	FY17	FY18	FY19	FY20+
3952	SWMU 00017 Former S-9 Underground Waste Tank (Building S-9)	RFI/CMS							
		SC							
Site ID	Site Name	Phase	FY14	FY15	FY16	FY17	FY18	FY19	FY20+
3957	SWMU 00022 Former Underground Fuel Tank-75W (Building S-75)	RFI/CMS							
		SC							
Site ID	Site Name	Phase	FY14	FY15	FY16	FY17	FY18	FY19	FY20+
3974	SWMU 00039 Building S-74 PCB Storage Area	RFI/CMS							
		IRA							
		RC							
		LTM							
		SC							
Site ID	Site Name	Phase	FY14	FY15	FY16	FY17	FY18	FY19	FY20+
4000	SWMU 00065 Building S-362 Tracking Mockup Site	RFI/CMS							
		SC							

Notes:

- FY = Fiscal Year
- ID = Identification
- IRA = Interim Remedial Action
- LTM = Long Term Monitoring
- PCB = Polychlorinated biphenyl
- RFI/CMS = RCRA Facility Investigation/Corrective Measures Study
- RIP = Remedy in Place
- SC = site closure
- SWMU = Solid waste management units
- Highlight
- = Phase underway



ER,N IR
Site Descriptions

Site Description

SWMU 14 is the former S-140 paint spray booth building and paint wash-down area used for Navy personnel training from 1943 to 1985. Paint-related wastes were collected in two floor drains which emptied into two 1,885-gallon sump-pits. Wastes were reportedly removed on an as-needed basis with overflow discharging directly to the Seventh Avenue ditch, which borders the site to the west. After 1980, the flow from the paint booth and wash-down area was redirected to a paint separator/sump in the building's mechanical room with the overflow discharged to the sanitary sewer.



Two water-bearing hydrogeological zones were evaluated during the RFI — the perched groundwater in the clays and silt deposits of the loess, the principal land surface unit at NSA Mid-South, and the deeper, confined sand and gravels of the alluvial-fluvial deposits aquifer which was the source of most domestic water-use before municipal water was introduced to the area.

The RFI identified the VOCs TCE, tetrachloroethylene (PCE), cis-1,2-dichloroethene (cis-1,2-DCE), and benzene in the loess groundwater with TCE exceeding its risk-based or drinking water standard in seven loess groundwater wells and two fluvial wells. Total petroleum hydrocarbons (TPH) were also detected above TDEC's most stringent action level of 100 parts per billion in three loess and three fluvial well locations. Detected in two fluvial well locations, arsenic was the only metal that exceeded both its risk-based screening level and background reference concentration of 3.5 parts per billion that has been established for the Base.

Sediment samples collected from the Seventh Avenue ditch contained the pesticides 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and dieldrin exceeding the soil screening values and/or soil-to-groundwater soil screening levels; however, concentrations were similar to the concentrations detected at SWMU 38 (drainage ditch network throughout the Southside) and were concluded not to be associated with former SWMU 14 operations.

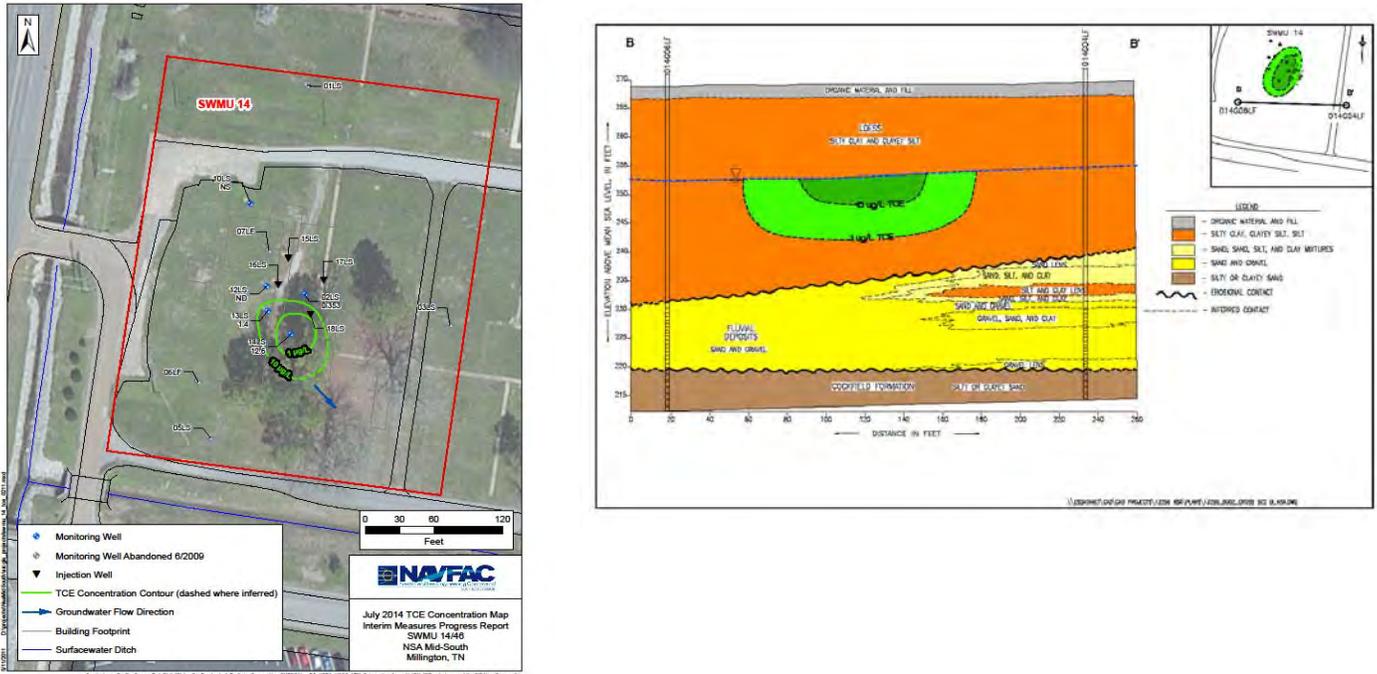
Phases	Start	End
RFA	1989	1990
RFI/CMS	1997	2016
IRA	2005	2016
RC	2017	2017
LTM	2017	2019
RIP Date: N/A		
SC Date: 2019		

Completed Interim Corrective Measures

An interim corrective measures report was approved by TDEC and U.S. EPA in 2003 and 2004, respectively, with the sole focus being the chlorinated solvents in loess groundwater. An enhanced bioremediation remedy was implemented from February 2005 to March 2011 which consisting of carbon substrate injections of sodium acetate and di-ammonium phosphate in wells strategically placed within the TCE plume. Because of the high clay/silt content of the loess within the treatment zone,

distribution of the injected substrate was spatially restricted to the injection wells and formation immediately adjacent to the well screens only. Accordingly, in April 2013, a multipoint (27 locations) injection of hydrogen release compound (HRC) was implemented throughout the entire plume. Consequently, TCE concentration reduction to Maximum Contaminant Levels (MCLs) has been nearly achieved across the entire site with the exception of two wells. The site underwent semi-annual monitoring until July 2014 when quarterly monitoring was implemented to better evaluate the effects of seasonal trends in residual contaminant concentrations.

Site Conceptual Model



Corrective Action Status

RFI completed 1999
 Interim CMS 2003
 IM Reporting 2005 — current

Summary of Recent Activities and Findings

The monitoring frequency was changed from semi-annual to quarterly in July 2014 to monitor the seasonal concentration fluctuations of TCE and cis-1,2-DCE that remain in excess of the MCLs in two wells.

Upcoming Activities

Continue quarterly monitoring of four wells for VOCs in 2015 with annual reporting. An additional injection event may be necessary in 2015, pending the outcome of the monitoring data.

Schedule

Quarterly groundwater monitoring and annual reporting

Site Description

Underground Storage Tank (UST) S-9 reportedly received used automotive oil and hydraulic fluid generated during automobile maintenance at Building S-9 between 1979 and 1996. The tank had two waste access points, connected by piping extending approximately 50 feet from Building S-252 and 150 feet from Building S-9. As a result of tank sludge failing toxicity tests for benzene during its removal and overall tank integrity, an RFI was conducted at the SWMU. Petroleum contaminated soils were identified near the former piping and tank structures which were recommended for removal. An isolated detection of 1,2-dichloropropane (28 micrograms per liter [$\mu\text{g/L}$]), which was exceeded the MCL (5 $\mu\text{g/L}$), was identified at 49 feet in depth in the upper section of the alluvial-fluvial deposits aquifer. Given the low concentration and its limited extent, the RFI recommended no further action (EnSafe 2000). In the process of preparing the Statement of Basis, TDEC indicated a CMS was required for the site as a result of the MCL exceedance in groundwater.

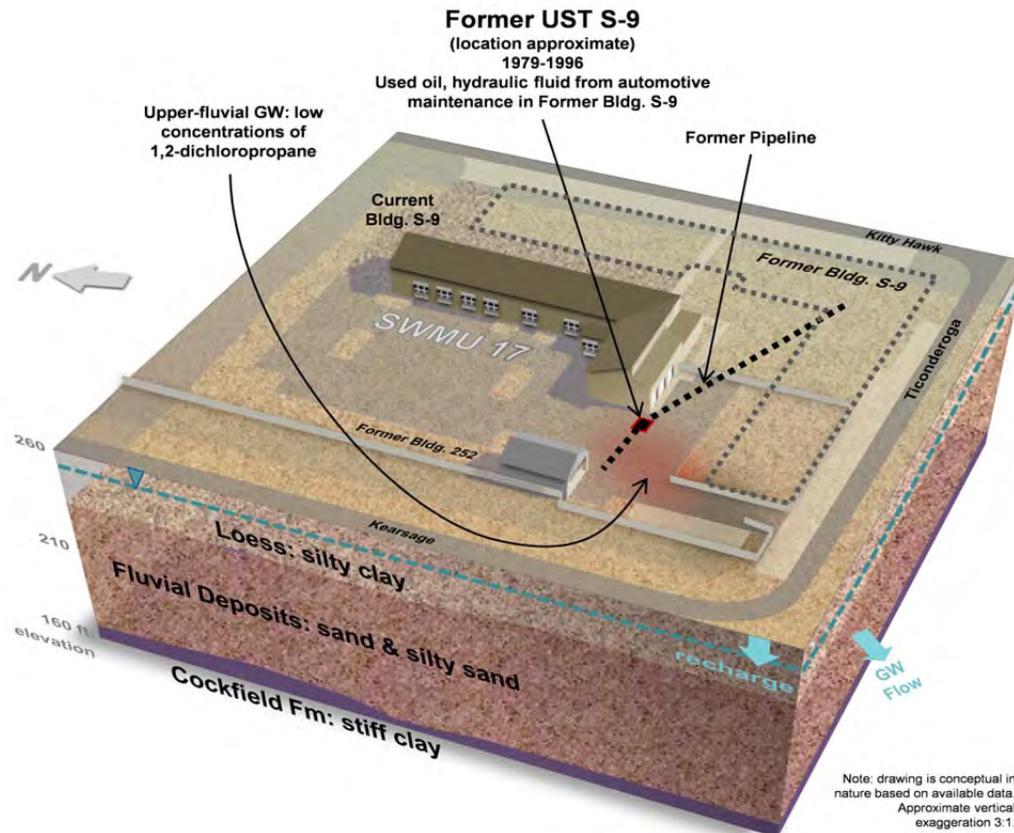


Phases	Start	End
RFA	1989	1990
IRA	2000	2000
RFI/CMS	1997	2014
RIP Date: N/A		
SC Date: 2015		

Completed Interim Corrective Measures

A voluntary corrective action (VCA) was implemented in 2000 to remove the petroleum impacted soils adjacent to the former piping and tank. The tank excavation reached a depth of 15 feet while trenches excavated around the piping lines reached a depth of 6 feet. Approximately 190 cubic yards of petroleum impacted soil were removed and residential and/or TDEC cleanup goals were met in all confirmation soil samples.

Site Conceptual Model



Corrective Action Status

RFI completed 2000
IM/VCA completed in 2000
RFI supplement completed 2014

Summary of Recent Activities

In lieu of preparing a CMS, TDEC approved revisiting whether the 1,2-dichloropropane still persisted in groundwater in the alluvial-fluvial deposits aquifer at the site. Three upper fluvial deposits monitoring wells were constructed in 2014 in the area of the former 1,2-dichloropropane detection and subsequent data did not indicate the presence of the contaminant. A request for NFA was submitted in a technical memorandum (Resolution Consultants 2014) to TDEC who concurred with the recommendation in their 14 July 2014 correspondence.

Upcoming Activities

None

Schedule

Draft NFA Statement of Basis in 2015

Site Description

SWMU 22 is a collection of four USTs near the former Boiler Plant Building (S-75). Tanks 1244, 1245, and 1246 were field constructed and used to store fuel oil for the boiler plant and each had reported capacities between 25,000 and 50,000 gallons. Tank S-75W was a 280-gallon steel-UST used for storing diesel fuel. A CSI found indications of petroleum contamination in the former tank pit areas of S-75W and S-1245 (CSI, EnSafe/Allen and Hoshall 1999). No closure records were available for tanks 1244 and 1246; however, assessment of the former tank areas during a subsequent RFI indicated no petroleum impacts that exceeded screening criteria. The RFI recommended removal of petroleum impacted soil associated with former USTs S-1245 and S-75W.

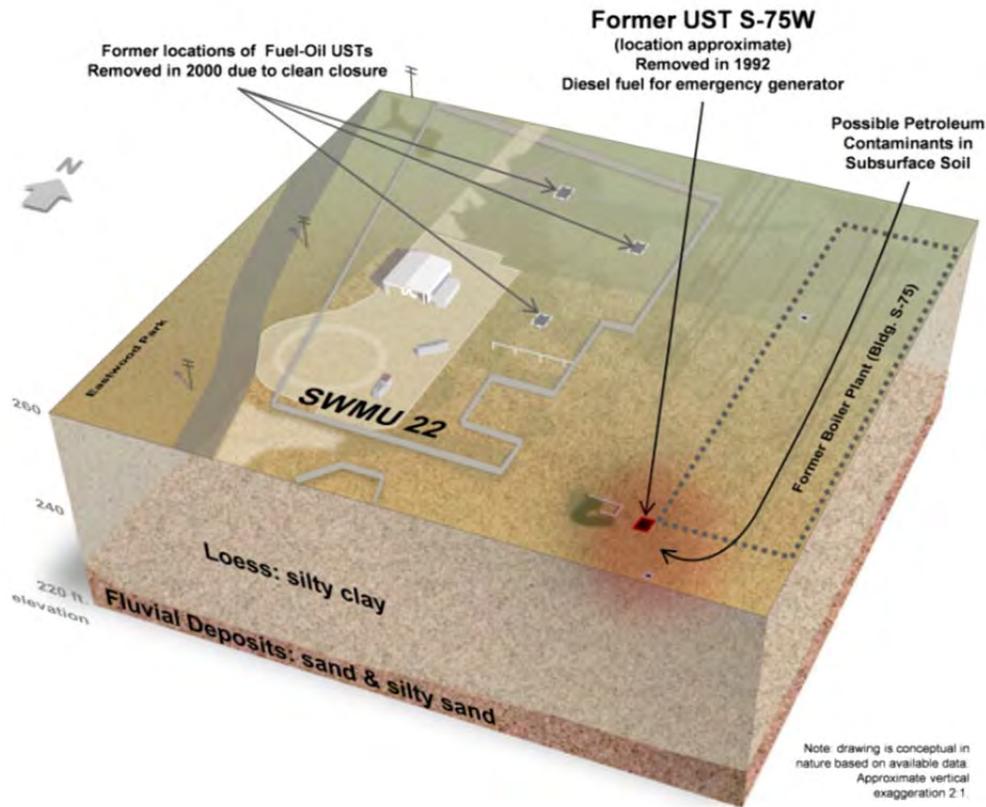


Phases	Start	End
RFA	1989	1990
IRA	2001	2001
RFI/CMS	1997	2014
RIP Date: N/A		
SC Date: 2015		

Completed Interim Corrective Measures

In 2001, 550 cubic yards of petroleum contaminated soils were removed from the former S-1245 and S-75W UST tank holds (EnSafe 2001). As a result of the findings during the removal that soil contamination extended beneath the former S-75 boiler plant building, complete removal of the petroleum impacted soil was postponed until demolition of the boiler plant building. Following the 2003 removal of the building, impacted soils were reportedly removed by the demolition contractor; however, analytical results/documentation was unavailable as to whether clean closure was achieved. During TDEC's data review and preparation of the Statement of Basis, additional data was required to achieve site closure.

Site Conceptual Model



Corrective Action Status

RFI completed 2000
IM/VCA completed in 2001
RFI Supplement completed in 2014

Summary of Recent Activities

A sub-surface soil sampling program was implemented in 2014 to verify whether the 2003 removal action had effectively addressed the residual soil petroleum contamination. Soil samples collected from four boring locations within the general area of the former tank hold found no evidence of petroleum impacted soil that exceeded the soil action levels. A technical memorandum (Resolution Consultants 2014) containing the soil data requesting no further action was approved by TDEC on 26 January 2015.

Upcoming Activities

None

Schedule

Draft NFA Statement of Basis in 2015

Site Description

SWMU 39 consists of former building S-74 which housed the Base dry cleaners from 1943 to 1981. A PCB drum and transformers storage area was present at adjacent Building S-203 which was used for storing solvent and hazardous materials. Two hydrogeological units were evaluated during the RFI: loess groundwater (approximately 8 to 20 feet below land surface [bls]) and the deeper alluvial-fluvial deposits aquifer (approximately 45 to 105 bls). While no PCBs were found in soil or groundwater, VOC impacts were identified in the alluvial-fluvial deposits aquifer with the highest concentrations detected in the basal portion of the aquifer. Two distinct TCE plumes were identified off the north and southwest corners of Building S-203 with maximum concentrations of 100 µg/L (well 039G03LF) and 320 µg/L (well 039G04LF), respectively (EnSafe 2000). The RFI found no soil or loess groundwater source areas for the chlorinated solvents that were detected in the alluvial fluvial deposits aquifer and a CMS was recommended for the site.

A loess groundwater investigation was triggered in 2013 during the removal of the slab for Building S-74. During the excavation of sub-slab contaminated soil identified beneath the slab, the side wall of a water-filled former waste-tank hold was breached, resulting in a release of the retained water into the ongoing excavation. In an effort to dispose of the released groundwater, 6 µg/L PCE was detected in the waste profile sample. An ensuing groundwater investigation detected the following low-level VOCs, that exceeded the MCLs: benzene 9.1 µg/L, vinyl chloride 49.2 µg/L, and cis-1,2-DCE 165 µ/L. The depth interval of the investigated groundwater was 6 to 16 feet bls. The deeper, alluvial-fluvial deposits aquifer was assessed in the area of the groundwater impacts during the original RFI and found to be free of impacts.

Phases	Start	End
RFA	1989	1990
IRA	2005	2016
RFI/CMS	1997	2016
RC	2017	2017
LTM	2017	2020
RIP Date: NA		
SC Date: 2019		

Corrective Action Status

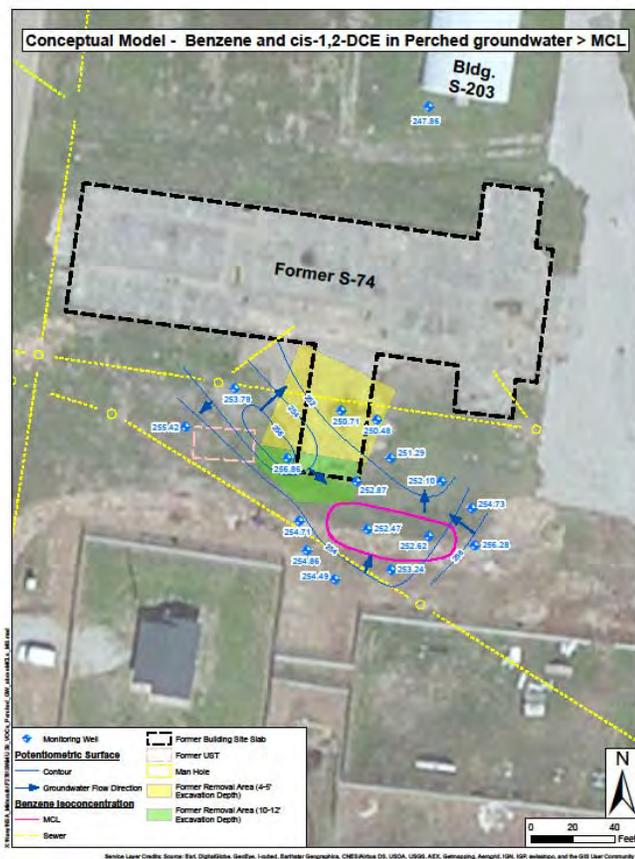
RFI completed 2000

IM for groundwater: 2005 — current

Site Conceptual Model

Completed Interim Corrective Measures

Interim corrective measures for the chlorinated solvents in the deeper, alluvial-fluvial deposits groundwater were implemented in 2005 and remain ongoing. An enhanced in-situ bioremediation remedy was initially selected, which consisted of monthly injections of simple carbohydrates and micronutrients in six injection wells strategically placed upgradient of the two TCE plumes. The injections ceased in 2011 to enable the aquifer to revert back to its naturally aerobic state — conditions necessary for the degradation of the generated daughter products, cis-1,2-DCE and vinyl chloride. The remedy had effectively reduced TCE concentrations to less than the MCL in all wells but one (039G03LF — 15 µg/L). To expedite the daughter product and residual TCE degradation, the remedy was augmented with a potassium permanganate chemical oxidation treatment in 2012 with injections occurring in wells at 15 locations within the two plumes. The site underwent effectiveness quarterly monitoring until December 2014 at which point it transitioned to semi-annual monitoring.



Summary of Recent Activities

A perched groundwater investigation report was submitted in March 2015 (Resolution Consultants 2015) with the recommendation that a subset of the shallow, loess monitoring wells also undergo semi-annual monitoring for VOC in 2015 to evaluate seasonal trends of contaminants and whether the VOCs will naturally attenuate in timely manner or corrective measures are warranted.

Samples collected from a multi-port monitoring well (039G25LF) constructed as part of the chemical oxidation remedy by Lee and Ryan and screened in the upper section of the fluvial deposits near Building S-203 contained a TCE concentration of 950 µg/L, triggering concerns that a sub-slab source may be present beneath the building. At the August 2014 Base Cleanup Team (BCT) meeting, it was decided to try and replicate the detection by installing co-located well in the same area and screened at the same depth as the interval where the TCE was detected, instead of conducting a sub-slab soil investigation. A co-located well installed in 2014 found 245 µg/L TCE at 50 to 55 feet bls. During the November 2014 BCT meeting, the Team agreed to adding two wells screened at the same depth interval at separate locations downgradient of well 039G25UF and including the new wells in the semi-annual monitoring of the groundwater in the lower fluvial deposits at SWMU 39, before deciding whether corrective measures were warranted for the site.

Upcoming Activities

Semiannual groundwater monitoring will continue in the following lower fluvial wells in 2015: 039G02LF, 039G03LF, 039G04LF, 039G10LF, and 039G22LF.

Additionally, construction of two upper fluvial monitoring wells (039G10UF and 039G11UF) downgradient of well 039G25UF(R) will be completed in 2015 to assess the extent of TCE in the upper section of the fluvial deposits aquifer. Wells will be co-located with existing lower fluvial monitoring wells 039G10LF and 039G11LF and undergo semi-annual monitoring. Data will be provided in an annual LTM report. Ten shallow, loess monitoring wells will also undergo semi-annual VOC monitoring and included in the same annual report.

Schedule

Semi-annual monitoring of perched and fluvial deposits aquifer in April and October, followed with annual reporting. Results of the supplemental upper fluvial monitoring wells will be included in the report and recommendations for further assessment activities, a CMS, or continued monitoring will be included in the report for implementing in 2016.

Site Description

The SWMU 65 former training mock-up site was used for training in aircraft engine startup and contained two 30,000-gallon jet fuel USTs, a storage building (S-1503), and an engine test cell building (S-346). The building and USTs were removed in 1984 and today, no evidence of the former operations is present at the site.

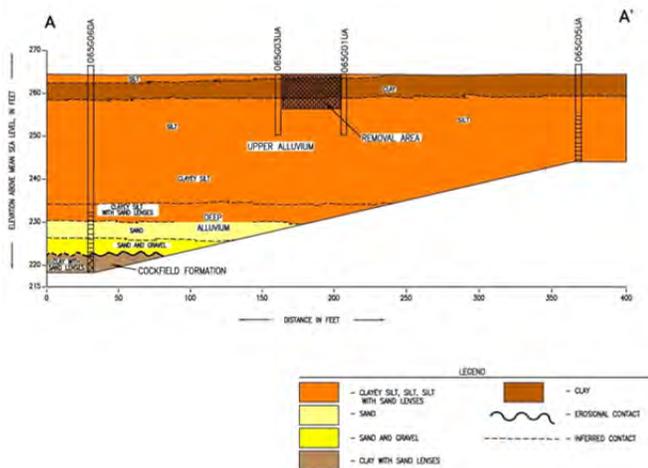
Phases	Start	End
RFA	1989	1990
IRA	2001	2001
RFI/CMS	1995	2014
RIP Date: N/A		
SC Date: 2015		

A 1992 site investigation identified petroleum impacts (TPH and benzene, toluene, ethyl benzene, and xylenes) in soil from the surface to 5 feet in depth. Groundwater samples collected from the shallow water-bearing zone in the loess/alluvium contained elevated TPH concentrations while benzene, toluene, ethyl benzene, and xylenes constituents were not detected. The SWMU underwent an RFI in 1995, and an expanded evaluation of soil, sediment, and groundwater found impacts being limited to the shallow groundwater zone. The RFI report recommended a soil removal and re-assessment of the TPH in groundwater following the removal action (EnSafe/Allen and Hoshall 1998).

Completed Interim Corrective Measures

A soil removal action was implemented at SWMU 65 in 2001, resulting in the removal of 250 cubic yards of petroleum impacted soil from two areas. A revision to the RFI (EnSafe 2000) recommended NFA based on soil and groundwater data from wells surrounding the removal area having met the TDEC TPH criteria for a non-drinking water aquifer. However, as a result of removing the loess well with the elevated TPH in 2001, confirmation that the removal action achieved the TPH cleanup goals could not be verified.

Site Conceptual Model



Corrective Action Status

- RFI completed 2000
- IM (soil) completed in 2001
- RFI Supplement completed in 2012

Summary of Recent Activities

In 2012, a supplemental investigation to the RFI was completed to verify that cleanup goals were achieved for TPH in groundwater. Groundwater was collected from one of three borings and a sub-surface soil sample (10-12' bls) was collected from each boring. The analytical results indicated low TPH concentrations in soil (7.4 milligrams per kilograms [mg/kg] maximum), while no petroleum impacts were identified in groundwater. The data was submitted to TDEC in a technical memorandum with a recommendation for NFA (QE2 2012). TDEC concurred with the recommendation in their 23 October 2012, correspondence to the Navy.

Upcoming Activities

None

Schedule

Draft NFA Statement of Basis in 2015

**NSA Mid-South
BRAC — IRP**

Total Navy BRAC NORM Sites/Closeout Site Count:

32/30

BRAC Sites with Future and/or Underway Phases:

Site 3942 AOC A (SWMU 7) — Fluvial Deposits Groundwater (Northside)

Most Widespread Contaminants of Concern

VOCs and Petroleum

Media of Concern

Groundwater, Soil

Completed Remedial Actions (Interim Remedial Action/Final Remedial Action)

Site ID	Site Name	Action	Remedy	Year
3938	SWMU 00001 Fire Department Drill Area	IRA (SC)	Removal — soil	1996
3940	SWMU 00005 Aircraft Fire Fighting Training Area	FRA	Removal — soil	1997
3942	SWMU 00007 Building N-126 Plating Shop Dry Well	IRA FRA	Removal — soil LUCs	1999 2004 — present
3943	SWMU 00008 Cemetery Disposal Area	IRA FRA	Removal — soil; Ethylene oxide cylinders LUCs	1997; 1998 2004 — present
3945	SWMU 00010 Northside Landfill (Eastern Portion)	FRA	LUCs	2004 — present
3960	SWMU 00015 N-94 Underground Tank Farm	IRA (SC)	Removal — soil	1997, 2004
3951	SMMU 00016 N-94 Above-Ground Waste Tanks	IRA (SC)	Removal — soil	1998
3953	SWMU 00018 N-112 Underground Waste Tank	IRA FRA	Removal — soil LUCs	1996, 1998 2004 — present
3958	SWMU 00021 N-10 Underground Waste Tank	FRA	LUCs	2004 — present
3962	SWMU 00027 Northside Sewage Treatment Plant	FRA	LUCs	2004 — present
3979	SWMU 00044 Hazardous Waste Accumulation Point at Building N-102	IRA (SC)	Removal — soil	1998
3985	SWMU 00060 Northside Landfill (Western Portion)	IRA FRA	Removal — soil LUCs	1997 2004 — present
3999	SWMU 00064 Materials Storage Area N-16	FRA	LUCs	2004 — present
5545	SWMU 00066 Radar Facility Dump	IRA (SC)	Removal -drums and debris	1996
5546	SWMU 00067 Horse Pasture Dump	IRA (SC)	Removal — waste debris	1996
3942*	AOC A Northside Fluvial Deposits Groundwater	IRA	Enhanced bioremediation — groundwater	2005 — current

Notes:

- AOC = Area of Concern
- IRA = interim remedial action
- FRA = final remedial action
- LUCs = Land use controls
- SC = site closeout complete as result of remedial action
- SWMU = Solid waste management unit
- * = NORM Site ID is carried under SWMU 7 NORM Site ID

Duration of BRAC — IRP

Date of IRP Inception: 1995

Estimated Date of Remedy-in-Place/Response Complete: 2016

Date of BRAC — IRP completion including Long Term Management: 2050

Contamination Assessment Overview

NSA Mid-South received RCRA Permit No. TN2-170-022-600 from U.S. EPA Region 4 in September 1986. The HSWA portion of the permit (HSWA-TN002) required NSA Mid-South to conduct an RFA to identify and characterize all active and inactive SWMUs on the Facility. The Navy conducted an RFA in 1986 to evaluate SWMUs that were known, suspected, or presumed to have had releases of hazardous constituents. EDGe submitted the RFA in April 1987 and the report identified 58 potential SWMUs and recommended 34 for additional study. The U.S. EPA established an official SWMU list in 1990 and instructed the Naval Facilities Engineering Command Southern Division to proceed with an RFI Work Plan. The RFI Work Plan was approved in 1991 and the majority of the SWMU/AOC investigations were completed between 1992 and 2000. In 1996, the official list of SWMUs was expanded to include 67 sites and one AOC. Of these, 32 SWMUs and one AOC are within the BRAC portion of the Facility.

SWMUs were grouped based on the type of investigation required (CSI or RFIs), the associated waste sources (surface or subsurface), and/or the level of complexity associated with the investigation. The BRAC SWMUs were grouped into Assemblies A through D to prioritize their investigation in advance of the 1999 property transfer. During the SWMU 00007 RFI (Building N-126 Plating Shop Dry Well), TCE was identified in groundwater across much of the airfield tarmac/infield areas and attributed to multiple small sources/releases, resulting in the designation of AOC A for the fluvial deposits groundwater beneath the Northside of the Base.

The statuses of the BRAC SWMUs, as listed in the RCRA permit, are the following:

- Twenty three BRAC SWMUs have been approved for NFA either as a result of implemented interim removal actions or due to the absence of contaminant risk. These include the following:

BRAC NFA SWMUs — 00001 (Site 3938), 00004 (Site 3939), 00005 (Site 3940), 00006 (Site 3941), 00011 (Site 3946), 00015 (Site 3960), 00016 (Site 3951), 00026 (Site 3961), 00029 (Site 3964), 00031 (Site 3965), 00032 (Site 3967), 00036 (Site 3971), 00038 (Site 3973), 00040 (Site 3975), 00042 (Site 3977), 00044 (Site 3979), 00050 (Site 3985), 00051 (Site 3986), 00052 (Site 3987), 00053 (Site 3988), 00062 (Site 3986), 00066 (Site 5545), 00067 (Site 5546).

- Eight SWMUs have final remedies in place that consist of land use controls (LUCs) which restrict any intrusive activities without prior Navy approval. These SWMUs include the following:

BRAC SWMUs — 00007 (Site 3942), 00008 (Site 3943), 00010 (Site 3945), 00018 (Site 3953), 00021 (Site 3958), 00027 (Site 3962), 00060 (Site 3985), 00064 (Site 3999).

- AOC A (Site 3942) is the only BRAC SWMU/AOC listed in the permit requiring a CMS. AOC A is undergoing interim corrective measures for chlorinated solvents in groundwater.

In addition to the above mentioned SWMU specific LUCs, parcel-wide LUCs that restrict residential development and groundwater usage, also exist within the transferred parcel. All LUCs are maintained and annually certified by the Millington Industrial Development Board and Millington Municipal Airport Authority as outlined in the Land Use Control Implementation Plan in the Finding of Suitability to Transfer (EnSafe 1999) for the airfield and non-airfield parcels.

Cleanup Exit Strategy

The exit strategy for AOC A is to transition from the RFI and interim corrective measures to remedy in place and long-term monitoring in 2016.

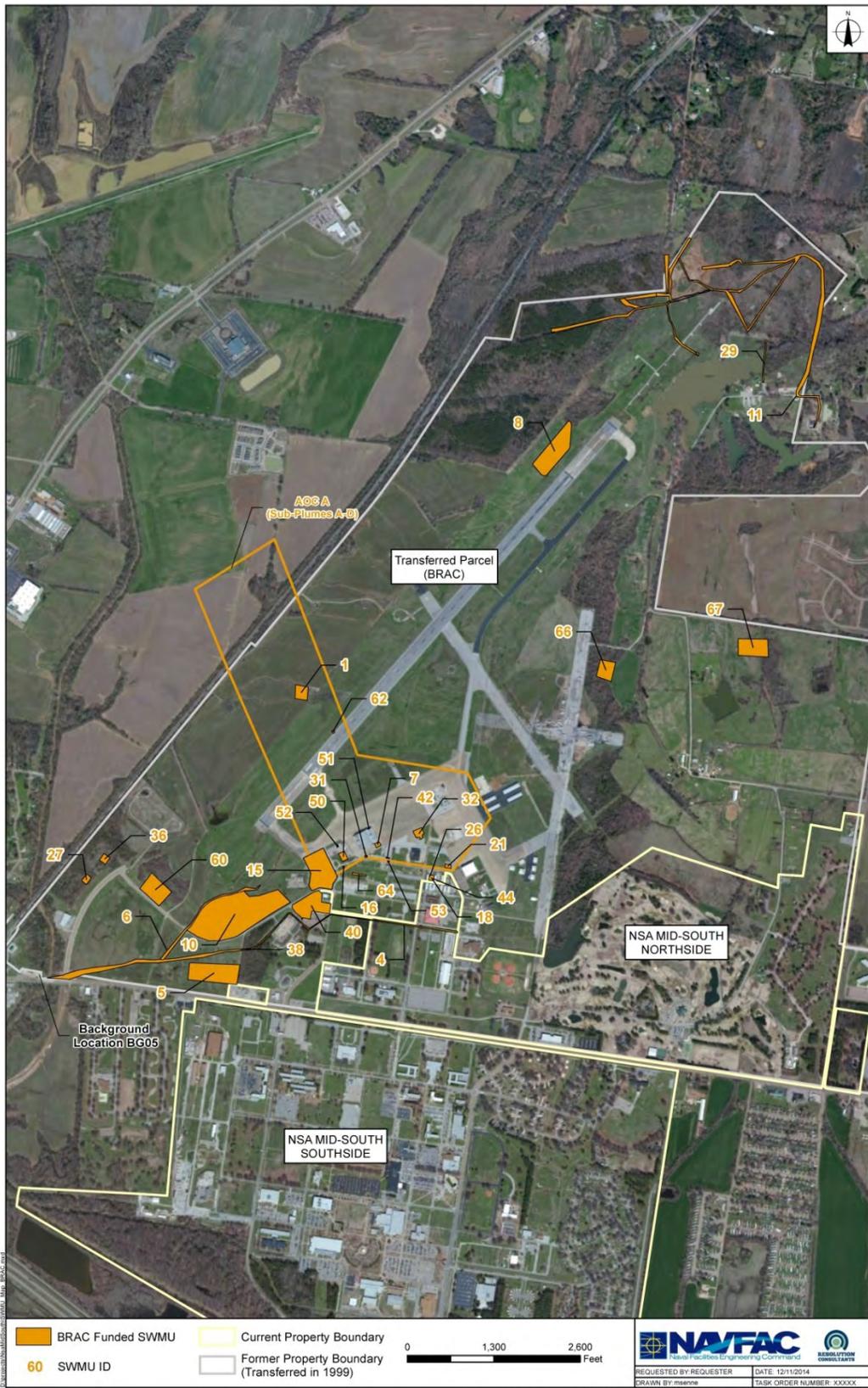
Status of all BRAC — IRP SWMUs/AOCs

Site ID	Description	NORM Phase Status
3938	SWMU 00001 Fire Department Drill Area	RFI/CMS 1997; SC 2004
3939	SWMU 00004 Building N-121 Plating Shop Storm Sewer and Drainage Ditch	RFI/CMS 1997; SC 2004
3940	SWMU 00005 Aircraft Fire Fighting Training Area	RFI/CMS 2003; SC 2011
3941	SWMU 00006 Building N-126 Battery Shop Storm Sewer and Ditch	RFI/CMS 1997; SC 1997
3942	SWMU 00007 Building N-126 Plating Shop Dry Well	RFI/CMS 2000; RIP 2011; LTM current
3943	SWMU 00008 Cemetery Disposal Area	RFI/CMS 1999; RIP 2004; LTM current
3945	SWMU 00010 Northside Landfill (Eastern Portion)	RFI/CMS 1998; RIP 2004; LTM current
3946	SWMU 00011 Oiled Dirt Roads	RFI/CMS 1997; SC 2004
3960	SWMU 00015 N-94 Underground Tank Farm	RFI/CMS current
3951	SWMU 00016 N-94 Above-Ground Waste Tanks	RFI/CMS 1999; IRA 1999; SC 2004
3953	SWMU 00018 N-112 Underground Waste Tank	RFI 1999; RIP 2004; LTM current
3958	SWMU 00021 N-10 Underground Waste Tank	RFI/CMS 1999; RIP 2004; LTM current
3961	SWMU 00026 N-102 Battery Acid Treatment (Underground Tank Only)	RFI/CMS 1997; SC 2004
3962	SWMU 00027 Northside Sewage Treatment Plant	RFI/CMS 1997; RIP 2004; LTM current
3964	SWMU 00029 Lakehouse Sewage Treatment Plant	RFA 1990; SC 1990
3965	SWMU 00031 Aircraft Wash Rack at Fourth Street	RFI/CMS 1997; SC 2004
3967	SWMU 00032 N-7 Aircraft Wash Rack	RFA 1990; SC 1990
3971	SWMU 00036 Northside Sewage Treatment Plant Incinerator	RFI/CMS 1997; SC 2004
3973	SWMU 00038 Miscellaneous Drainage Ditches	RFI/CMS 1990; SC 2004
3975	SWMU 00040 Salvage Yard No. 1	RFI/CMS 1997; SC 2004
3977	SWMU 00042 N-12 Interim Hazardous Waste Storage Area	RFI/CMS 1997; SC 2004
3979	SWMU 00044 Hazardous Waste Accumulation Point at Building N-102	RFI/CMS 1999; SC 2004
3985	SWMU 00050 Hazardous Waste Accumulation Point at Building N-126, MAG-42	RFI/CMS 1997; SC 2004
3986	SWMU 00051 Hazardous Waste Accumulation Point at Building N-126, VR-60	RFI/CMS 1997; SC 2004
3987	SWMU 00052 Hazardous Waste Accumulation Point at Building N-126, VP-67	RFI/CMS 1997; SC 2004
3988	SWMU 00053 Hazardous Waste Accumulation Point at Building N-126, AIMD	RFI/CMS 1997; SC 2004
3985	SWMU 00060 Northside Landfill (Western Portion)	RFI/CMS 1997; IRA 1997; RIP 2004; LTM current
3986	SWMU 00062 M-21 Arresting Gear Drainage Area	RFI/CMS 1997; SC 2004
3999	SWMU 00064 Materials Storage Area N-16	RFI/CMS 1997; RIP 2004; LTM current
5545	SWMU 00066 Radar Facility Dump	IRA 1998; SC 2004
5546	SWMU 00067 Horse Pasture Dump	IRA 1999; SC 2004
3942	AOC A Northside Fluvial Deposits Groundwater	RFI/CMS current; IRA 2005-current

Notes:

AOC	=	Area of Concern
IRA	=	Interim Remedial Action
RC	=	Response complete
RFI/CMS 2001	=	RCRA Facility Investigation (RFI)/Corrective Measures Study; 2001 — approval year
RFA	=	RCRA Facility Assessment
RIP	=	Remedy in Place
SC 2011	=	Site Closeout date based on Permit mod/renewal date
NORM	=	Navy "Normalization of Data" database
LTM	=	Long Term Monitoring
SWMU	=	Solid waste management units

Location of BRAC SWMUs



BRAC — IRP Previous Studies

	Title	Author Affiliation	Date
1989	Preliminary Assessment Report — Sites 10, 11, and 2	Environmental and Energy Service Co. Inc.	16 November 1989
1992	Environmental Assessment Report Tank Systems 1489 and 1508 — Aircraft Firefighting Training Facility (SWMU 5)	EnSafe/Allen and Hoshall	9 October 1992
1994	Environmental Baseline Survey (Final Report) — Vols. I & II	EnSafe/Allen and Hoshall	17 November 1994
1995	Assembly C CSI Report SWMUs 15, 21 and 26	EnSafe/Allen and Hoshall	1 November 1995
1996	Closure Report Underground Storage Tank Site SWMU 40	EnSafe Inc.	1 August 1996
	Facility Investigation Report Assembly A SWMU 1 — Fire Department Drill Area	EnSafe Inc.	18 September 1996
	Assembly C CSI — SWMUs 26, 27 AND 62	EnSafe/Allen and Hoshall	25 September 1996
1997	Assembly B RFI Report for SWMUs 4, 6, 10, 31 AND 38 — Northside Industrial Drainage Ditches	EnSafe Inc.	3 January 1997
	Assembly A Long Term Groundwater Monitoring Report for March 1995 through August 1996	EnSafe Inc.	30 May 1997
	Gray Area Investigation — Marine Air Group — 41; 90 Day Hazardous Waste Accumulation Point (SWMU 18); Revision 2.	EnSafe Inc.	24 November 1997
1998	Assembly A Long Term Groundwater Monitoring Report Addendum Event 4	EnSafe Inc.	1 January 1998
	Assembly A Long Term Groundwater Monitoring Report Addendum Event 5	EnSafe Inc.	20 March 1998
	Soil Sampling Results for the Removal of a 6-inch pipeline on the NSA Mid-South Northside	EnSafe Inc.	5 August 1998
	CSI Construction Debris Eastern Portion SWMU 10	EnSafe Inc.	11 September 1998
	Pre-Rule Landfill Closure Point Paper for SWMU 60 — Demolition Construction Debris Landfill Western Portion Revision 2	EnSafe Inc.	21 September 1998
	Pre-Rule Landfill Closure Point Paper for SWMU 10 — Demolition Construction Debris Landfill Western Portion Revision 2	EnSafe Inc.	21 September 1998
1999	Voluntary Corrective Action Report for SWMU 3, SWMU 7, SWMU 17, SWMU 18, SWMU 19 and SWMU 67, Horse Pasture Dump and Apron Area Gasoline Pits — Revision 2	EnSafe Inc.	12 May 1999
	Voluntary Corrective Action Report/Facility Investigation for SWMU 5 Fire Mat 305, SWMU 60 Northside Landfill, North Fuel Farm and Former Building N-6 Underground Waste Tank — Revision 1.	EnSafe Inc.	13 May 1999
	RFI Report for SWMU 18 Revision 2	EnSafe Inc.	25 May 1999
	Environmental Baseline Survey Transfer Airfield Parcel — SWMUs 8, 10, 11, 15, 16, 21, 32, 60, and 62	EnSafe Inc.	26 May 1999
	RFI Report Assembly A SWMU 8 Cemetery Disposal Area	EnSafe Inc.	28 May 1999
	RFI Report Assembly A SWMU 60 Northside Landfill	EnSafe Inc.	28 May 1999
	RFI Report Assembly A Investigation Report — Aircraft Fire Fighting Training Facility SWMU 5	EnSafe Inc.	3 June 1999
	RFI Report Assembly C SWMU 15 N-94 Underground Tank Farm and SWMU 21 N-10 Underground Waste Tank	EnSafe Inc.	23 June 1999
	Environmental Baseline Survey for Transfer NSA Mid-South Airfield — SWMU 5 and AOC A	EnSafe Inc.	21 July 1999
	Environmental Baseline Survey for Transfer NSA Mid-South Airfield Parcel — Basewide	EnSafe Inc.	29 June 1999
	Completion Report Landfill Cover for SWMU 60 Northside Landfill	Environmental Enterprise Group	1 November 1999
	Finding of Suitability to Transfer for Non-Airfield Parcel	NAVFAC Southeast	1 November 1999
	Finding of Suitability to Transfer for Airfield Parcel	NAVFAC Southeast	1 November 1999

	Title	Author Affiliation	Date
2000	RFI Report AOC A — Northside Fluvial Groundwater (Revision 2)	EnSafe Inc.	18 February 2000
	RFI Report Addendum AOC A — Northside Fluvial Groundwater (Revision 2)	EnSafe Inc.	18 February 2000
	Aquifer Characterization Test Report — AOC A; Naval Support Activity Mid-South	EnSafe Inc.	25 February 2000
2001	Northside Long Term Groundwater Monitoring Report Facility Investigation Event 6	EnSafe Inc.	31 January 2001
	Northside Long Term Groundwater Monitoring Report Facility Investigation Event 7	EnSafe Inc.	24 August 2001
2002	A-A Sequential Remediation Treatability Study Report, AOC A — Northside Fluvial Groundwater, Revision 1	EnSafe Inc.	17 May 2002
	Field Feasibility Test for In-Situ Bioremediation of Chlorinated Solvents via Vegetable Oil Injection at Site N-6 (Sub-Plume D)	Parsons	1 July 2002
2003	Technical Memorandum Recommendation for Site Closure SWMU 5	EnSafe Inc.	2 May 2003
	Interim Measures Work Plan; AOC A — Northside Fluvial Deposits Groundwater	EnSafe Inc.	10 November 2003
	Northside Long Term Groundwater Monitoring Report Facility Investigation Event 7	EnSafe Inc.	19 November 2003
	Corrective Measures Study Report; AOC A Northside Fluvial Deposits Groundwater; Revision 1	EnSafe Inc.	18 April 2003
2004	Northside Long Term Groundwater Monitoring Report Facility Investigation Event 9	EnSafe Inc.	13 August 2004
	Final Project Report for Soil Remediation at SWMU 15	Solutions to Environmental Problems (STEP)	1 August 2004
	Northside Long Term Groundwater Monitoring Report Facility Investigation Event 10	EnSafe Inc.	16 December 2004
2005	IM Progress Report AOC A Northside Fluvial Deposits Groundwater	EnSafe Inc.	17 March 2005
2006	Final Excavation Summary Report for Additional Remediation at SWMU 15	Solutions to Environmental Problems (STEP)	1 April 2006
2007	IM Progress Report AOC A Northside Fluvial Deposits Groundwater	SpectraTech/EnSafe Inc.	18 June 2007
2008	IM Progress Report AOC A Northside Fluvial Deposits Groundwater	SpectraTech/EnSafe Inc.	8 October 2008
2009	Technical Memorandum Proposed Cessation of Carbon Substrate Injections AOC A	SpectraTech/EnSafe Inc.	10 June 2009
	IM Progress Report AOC A Northside Fluvial Deposits Groundwater	SpectraTech/EnSafe Inc.	4 September 2009
2010	IM Progress Report AOC A Northside Fluvial Deposits Groundwater	SpectraTech/EnSafe Inc.	1 October 2010
2011	IM Progress Report AOC A Northside Fluvial Deposits Groundwater	SpectraTech/EnSafe Inc.	1 December 2011
2014	Supplemental SWMU 15 Investigations and AOC A Substrate Injections	Resolutions Consultants	16 April 2014
	Long Term Monitoring Progress Report — AOC A	Resolutions Consultants	1 June 2014
2015	Long Term Monitoring Progress Report — AOC A	Resolutions Consultants	3 March 2015

Notes:

- AOC = Area of Concern
- CSI = Confirmatory Sampling Investigation
- NSA = Naval Support Activity
- SWMU = Solid waste management plan
- NAVFAC = Naval Facilities Engineering Command

Site Closeout (No Further Action) Summary — BRAC — IRP

Site ID #	Site Name	Site Description	NFA Date	Documentation
3936	SWMU 00001	Fire Department Drill Area	1997	NFA was recommended in the SWMU 1 RFI Report, Revision 1 (EnSafe/A&H, 18 September 1996) Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3939	SWMU 00004	Building N-121 Plating Shop Storm Sewer and Drainage Ditch	1997	NFA was recommended in the Assembly B RFI Report, Revision 2 (EnSafe/A&H, 1 January 1997). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3940	SWMU 00005	Aircraft Firefighting Training Area	2003	NFA was recommended in the Technical Memorandum; Recommendation for Site Closure; Aircraft Fire Fighting Training Facility — SWMU 5, Revision 1 (EnSafe, 2 May 2003). Approval letters: TDEC — 5/8/03; U.S. EPA — 8/30/03
3941	SWMU 00006	Building N-126 Battery Shop Storm Sewer and Ditch	1997	NFA was recommended in the Assembly B RFI Report, Revision 2 (EnSafe/A&H, 1 January 1997). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3946	SWMU 00011	Oiled Dirt Roads	1997	NFA was recommended in the Assembly D CSI Report, Revision 2 (EnSafe/A&H, 17 October 1996). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3950	SWMU 00015	N-94 Underground Tank Farm	1999	The Assembly C RFI Report, Vol. I — SWMU 15, Revision 2 (EnSafe, 24 April 1998) recommended addressing fluvial deposits groundwater contamination with AOC A. Loess soil and groundwater contamination at SWMU 15 is being addressed in an ongoing IM. Approval letters: TDEC — 4/30/99; U.S. EPA — N/A
3951	SWMU 00016	N-94 Above-Ground Waste Tanks	1999	NFA was recommended in the SWMU 16 CSI/VCA Report, Revision 1 (EnSafe, 2 March 1999). Approval letters: TDEC — 5/10/99; U.S. EPA — 5/3/99
3961	SWMU 00026	N-102 Battery Acid Treatment (Underground Tank Only)	1997	NFA was recommended in the Assembly C CSI Report, Revision 3 (EnSafe/A&H, 16 December 1996). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3964	SWMU 00029	Lakehouse Sewage Treatment Plant	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGE, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3966	SWMU 00031	Aircraft Wash Rack at Fourth Street	1997	NFA was recommended in the Assembly B RFI Report, Revision 2 (EnSafe/A&H, 1 January 1997). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3967	SWMU 00032	N-7 Aircraft Wash Rack	1990	NFA was recommended in the RCRA Facility Assessment Report, (ERC/EDGE, August 1990). Approval letters: TDEC — N/A; U.S. EPA — 2/22/90
3971	SWMU 00036	Northside Sewage Treatment Plant Incinerator	1997	NFA was recommended in the Assembly D CSI Report, Revision 2 (EnSafe/A&H, 17 October 1996). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3973	SWMU 00038	Miscellaneous Drainage Ditches	1997	NFA was recommended in the Assembly B RFI Report, Revision 2 (EnSafe/A&H, 1 January 1997). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3975	SWMU 00040	Salvage Yard No. 1	1997	NFA was recommended in the Assembly B RFI Report, Revision 1 (E/A&H, 7 October 1996). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3979	SWMU 00044	Hazardous Waste Accumulation Point at Building N-102	1999	NFA was recommended in the Technical Memorandum SWMU 44 VCA Report, Revision 0 (EnSafe, 2 July 1998). Approval letters: TDEC — Email 3/8/99; U.S. EPA — N/A

Site ID #	Site Name	Site Description	NFA	Documentation
3985	SWMU 00050	Hazardous Waste Accumulation Point at Building N-126, MAG-42	1997	NFA was recommended in the Assembly D CSI Report, Revision 2 (EnSafe/A&H, 17 October 1996). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3986	SWMU 00051	Hazardous Waste Accumulation Point at Building N-126, VR-60	1997	NFA was recommended in the Assembly D CSI Report, Revision 2 (EnSafe/A&H, 17 October 1996). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3987	SWMU 00052	Hazardous Waste Accumulation Point at Building N-126, VP-67	1997	NFA was recommended in the Assembly D CSI Report, Revision 2 (EnSafe/A&H, 17 October 1996). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3988	SWMU 00053	Hazardous Waste Accumulation Point at Building N-126, AIMD	1997	NFA was recommended in the Assembly D CSI Report, Revision 2 (EnSafe/A&H, 17 October 1996). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
3997	SWMU 00062	M-21 Arresting Gear Drainage Area	1997	NFA was recommended in the Assembly C CSI Report, Revision 3 (EnSafe/A&H, 16 December 1996). Approval letters: TDEC — N/A; U.S. EPA — 3/17/97
5545	SWMU 00066	Radar Facility Dump	1999	NFA was recommended in the SWMU 66 VCA Report, Revision 3 (EnSafe, 14 August 1998). Approval letters: TDEC — 4/30/99; U.S. EPA — 10/23/98
5546	SWMU 00067	Horse Pasture Dump	1999	NFA was recommended in the SWMU 67 VCA Report, Revision 2 (EnSafe, 12 May 1999). Approval letters: TDEC — N/A; U.S. EPA — N/A

Notes:

A&H	=	Allen & Hoshall
AOC	=	Area of Concern
CSI	=	Confirmatory Sampling Investigation
EDGe	=	Engineering, Design and Geosciences Group, Inc.
ERC	=	Environmental Research and Consulting
N/A	=	Not applicable
NFA	=	no further action
RCRA	=	Resource Conservation and Recovery Act
RFI	=	RCRA Facility Investigation
SWMU	=	Solid waste management units
TDEC	=	Tennessee Department of Environment and Conservation
U.S. EPA	=	United States Environmental Protection Agency
VCA	=	voluntary corrective action

Date of BRAC Inception: 1995

Past Phase Completion Milestones

1990	RFA	<p>62 SWMUs (BRAC and ER,N) identified in RFA.</p> <p>BRAC SWMUs recommended for NFA: 3945 SWMU 00010 — Northside Landfill; 3946 SWMU 00011 — Oiled Dirt Roads; 3951 SWMU 00016, N-94 Above-Ground Waste Tanks; 3964 SWMU 00029 — Lakehouse Sewage Treatment Plant; 3966 SWMU 00031 — Aircraft Wash Rack at Fourth Street; 3967 SWMU 00032 — N-7 Aircraft Wash Rack; 3971 SWMU 00036 — Northside Sewage Treatment Plant Incinerator.</p> <p>BRAC SWMUs recommended for full RFI characterization: 3936 SWMU 00001 — Fire Department Drill Area; 3939 SWMU 00004 Building N-121 Plating Shop Storm Sewer and Drainage Ditch; 3940 SWMU 00005 — Aircraft Firefighting Training Area; 3941 SWMU 00006 — Building N-126 Battery Shop Storm Sewer and Ditch; 3942 — SWMU 00007 — Building N-126 Plating Shop Dry Well; 3943 SWMU 00008 — Cemetery Disposal Area; 3961 SWMU 00026 — N-102 Battery Acid Treatment; 3962 SWMU 00027 — Northside Sewage Treatment Plant; 3964 SWMU 00029 — Lakehouse Sewage Treatment Plant; 3973 SWMU 00038 — Miscellaneous Drainage Ditches; 3975 SWMU 00040 — Salvage Yard No. 1; 3995 SWMU 00060 — Northside Landfill (Western Portion)</p> <p>BRAC SWMUs recommended for RFI Sampling: 3953 SWMU 00018 N-112 Underground Waste Tank; 3979 SWMU 00044 Hazardous Waste Accumulation Point at Building N-102; 3985 SWMU 00050 — Hazardous Waste Accumulation Point at Building N-126, MAG-42; 3986 SWMU 00051 — Hazardous Waste Accumulation Point at Building N-126, VR-60; 3987 SWMU 00052 — Hazardous Waste Accumulation Point at Building N-126, VP-67; 3988 SWMU 00053 — Hazardous Waste Accumulation Point at Building N-126, AIMD; 3997 SWMU 00062 M-21 Arresting Gear Drainage Area</p> <p>BRAC SWMU recommended for investigation under UST program: 3950 SWMU 00015 — N-94 Underground Tank Farm</p>
1995	RFI/CMI	3936 SWMU 00001 — Fire Department Drill Area; 3950 SWMU 00015 — N-94 Underground Tank Farm; 3956 SWMU 00021 — N-10 Underground Waste Tank; 3961 SWMU 00026 — N-102 Battery Acid Treatment; 3962 SWMU 00027 — Northside Sewage Treatment Plant; 3997 SWMU 00062 — M-21 Arresting Gear Drainage Area.
	IRA	3975 SWMU 00040 — Salvage Yard No. 1
1997	RFI/CMI	3936 SWMU 00001 — Fire Department Drill Area; 3939 SWMU 00004 Building N-121 Plating Shop Storm Sewer and Drainage Ditch; 3940 SWMU 00005 — Aircraft Firefighting Training Area; 3941 SWMU 00006 — Building N-126 Battery Shop Storm Sewer and Ditch; 3942 — SWMU 00007 — Building N-126 Plating Shop Dry Well; 3966 SWMU 00031 — Aircraft Wash Rack at Fourth Street; 3979 SWMU 00044 Hazardous Waste Accumulation Point at Building N-102; 00038 — Miscellaneous Drainage Ditches;
1998	RFI/CMI	3953 SWMU 00018 — N-112 Underground Waste Tank
	IRA	3950 SWMU 00015 — N-94 Underground Tank Farm
1999	IRA	3940 SWMU 00005 — Aircraft Firefighting Training Area; 3942 SWMU 00007 — Building N-126 Plating Shop Dry Well; 3953 SWMU 00018 — N-112 Underground Waste Tank; 3995 SWMU 00060 — Northside Landfill (Western Portion); 5546 SWMU 00067 — Horse Pasture Dump
	RFI/CMI	3940 SWMU 00005 — Aircraft Firefighting Training Area; 3943 SWMU 00008 — Cemetery Disposal Area; 3950 SWMU 00015 — N-94 Underground Tank Farm; 3953 SWMU 00018 — N-112 Underground Waste Tank; 3956 SWMU 00021 — N-10 Underground Waste Tank; 3995 SWMU 00060 — Northside Landfill (Western Portion);
	EBS	Airfield and Non-Airfield Parcels
	FOST	Airfield Parcel: 3940 SWMU 00005 — Aircraft Firefighting Training Area; 3950 SWMU 00015 — N-94 Underground Tank Farm; AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well)
	RA	3995 SWMU 00060 — Northside Landfill (Western Portion)
2000	RFI/CMI	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well)
2001	LTM	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well)

Date of BRAC Inception: 1995

Past Phase Completion Milestones

2003	LTM	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well); 3945 SWMU 00010 — Northside Landfill
2004	LTM	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well); 3945 SWMU 00010 — Northside Landfill
	DD — SB	3936 SWMU 00001 — Fire Department Drill Area; 3939 SWMU 00004 Building N-121 Plating Shop Storm Sewer and Drainage Ditch; 3941 SWMU 00006 — Building N-126 Battery Shop Storm Sewer and Ditch; 3943 SWMU 00008 — Cemetery Disposal Area; 3945 SWMU 00010 — Northside Landfill; 3946 SWMU 00011 — Oiled Dirt Roads; 3951 SWMU 00016 N-94 Above-Ground Waste Tanks; 3953 SWMU 00018 N-112 Underground Waste Tank; 3956 SWMU 00021 — N-10 Underground Waste Tank; 3961 SWMU 00026 — N-102 Battery Acid Treatment; 3962 SWMU 00027 — Northside Sewage Treatment Plant; 3966 SWMU 00031 — Aircraft Wash Rack at Fourth Street; 3971 SWMU 00036 — Northside Sewage Treatment Plant Incinerator; 3973 SWMU 00038 — Miscellaneous Drainage Ditches; 3975 SWMU 00040 — Salvage Yard No. 1; 3977 — SWMU 00042 N-12 Interim Hazardous Waste Storage Area; 3979 SWMU 00044 Hazardous Waste Accumulation Point at Building N-102; 3985 SWMU 00050 — Hazardous Waste Accumulation Point at Building N-126, MAG-42; 3986 SWMU 00051 — Hazardous Waste Accumulation Point at Building N-126, VR-60; 3987 SWMU 00052 — Hazardous Waste Accumulation Point at Building N-126, VP-67; 3988 SWMU 00053 — Hazardous Waste Accumulation Point at Building N-126, AIMD; 3995 SWMU 00060 — Northside Landfill (Western Portion); 3997 SWMU 00062 M-21 Arresting Gear Drainage Area; 3999 SWMU 00064 Materials Storage Area N-165545; 5545 SWMU 00066 — Radar Facility Dump; 5546 — SWMU 00067 Horse Pasture Dump
2005	IRA	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well); 3950 SWMU 00015 — N-94 Underground Tank Farm
2006	IRA	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well); 3950 SWMU 00015 — N-94 Underground Tank Farm
2007	IRA	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well); 3950 SWMU 00015 — N-94 Underground Tank Farm
2008	IRA	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well); 3950 SWMU 00015 — N-94 Underground Tank Farm
2009	IRA	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well); 3950 SWMU 00015 — N-94 Underground Tank Farm
2010	IRA	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well); 3950 SWMU 00015 — N-94 Underground Tank Farm
2011	IRA	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well); 3950 SWMU 00015 — N-94 Underground Tank Farm
	DD — SB	3940 SWMU 00005 — Aircraft Firefighting Training Area; 3942 SWMU 00007 — Building N-126 Plating Shop Dry Well; 3950 SWMU 00015 — N-94 Underground Tank Farm
2014	IRA	AOC A (3942 SWMU 00007 — Building N-126 Plating Shop Dry Well)
	RFI/CMS	3950 SWMU 00015 — N-94 Underground Tank Farm

Notes:

- AOC = Area of Concern
- BRAC = Base Realignment and Closure
- RFI/CMI = RCRA Facility Investigation/Corrective Measures Investigation
- ER,N = Environmental Restoration, Navy
- IRA = Interim Remedial Action
- LTM = Long Term Monitoring
- NFA = no further action
- RFA = RCRA Facility Assessment
- DD-SB = Decision Document — Statement of Basis
- SWMU = Solid waste management unit
- UST = Underground storage tank

Projected Statement of Basis/Decision

Site ID	Site Name		SOB/DD Date
3942	AOC A (SWMU 7)	Northside Fluvial Deposits Groundwater	2016

Notes:

AOC = Area of Concern
 ID = Identification
 SOB/DD = Statement of Basis/Decision Document
 SWMU = Solid waste management unit

Final Remedial Action (Construction) Completion Date:

2016

Schedule for Next Five-Year Review:

N/A

Estimated Completion Date of IRP at Facility (including LTM phase):

2050

Projected Phase Completion Schedule Milestones

Site ID	Site Name	Phase	FY14	FY15	FY16	FY17	FY18	FY19	FY 20+
3942	AOC A (SWMU 7) Northside Fluvial Deposits Groundwater	RFI/CMS							
		IRA							
		RIP							
		RAO							

Notes:

AOC = Area of Concern
 FY = Fiscal Year
 RFI/CMS = RCRA Facility Investigation/Corrective Measures Study
 RIP = Remedy in Place
 SWMU = Solid waste management unit
 Highlight = Phase underway

BRAC – IR Site Descriptions

Site Description

Building N-126 is an aircraft hangar that was used for aircraft maintenance and plating operations training from the 1950s through 1995 by the Aircraft Intermediate Maintenance Department. Solvents were reportedly used to clean parts before plating, and plating wastes were reportedly disposed of in a dry well adjacent to the hangar. Shortly after beginning the 1994 RFI of the plating shop dry well (SWMU 7), it became apparent that very little groundwater or soil contamination was associated with the dry well. During the subsequent parts of the RFI, concentrations of TCE were identified at the base of the fluvial deposits aquifer around the hangar and multiple locations across the tarmac. The highest TCE concentration (4,400 µg/L) was identified adjacent to the east side of the hangar, at the base of the fluvial deposits aquifer (between 60 and 70 feet bls) in what eventually came to be known as Sub-Plume A.

During the RFI, a large swath of the fluvial deposits aquifer, measuring roughly 700 feet by 4,500 feet and extending from the N-126 area off the former northwestern base boundary, was found to be impacted with TCE. Given the broad nature of contamination and multiple sources scattered across the tarmac, the BCT decided that a holistic investigative and remedial approach was necessary to address the contamination. AOC A was designated for the groundwater in the Northside fluvial deposits aquifer beneath the former Northside of the Base and added to the Base's RCRA permit in 1996.

Most of the contamination has been associated with four co-mingled TCE "hot-spots" identified in the airfield apron areas (Sub-Plumes A through D) which are the focus of the ongoing interim measures. Lesser concentrations of PCE, cis-1,2-DCE, vinyl chloride (VC), carbon tetrachloride, and 1,1-dichloroethene (1,1-DCE) also have been identified in the same areas. Elevated benzene concentrations have also been detected in the upper section of the fluvial deposits aquifer where the former N-94 underground tank farm (SWMU 00015) existed. Despite removal of the fuel-farm tanks and a significant soil removal action in 2004, benzene persisted to the point that a groundwater investigation was triggered in 2013, and more recently a soil investigation to evaluate whether the remaining piping structures, fuel dispenser islands and an oil water separator are continuing to provide a source to groundwater in the SWMU 00015 area.

The impacted zone consists of a Pliocene to Pleistocene-age fluvial sand-and-gravel aquifer that domestic and agricultural users accessed before municipal water supplies that utilize the deeper Memphis and Fort Pillow aquifers were developed in the area. The lower part of the impacted aquifer, where most of the TCE contamination resides, occurs at a depths between 70 and 100 feet bls, and is underlain by a relatively low permeability confining unit (Cockfield and Cook Mountain Formations which together form the upper Claiborne (Group) confining unit. The units are primarily composed of clay and have been determined to effectively retard downward migration of TCE. The top of the aquifer is approximately 40 feet bls and is covered by loess deposits that comprise low permeability silt and clay that extend upward from the ground surface. The loess confines the upper-most water-bearing zones at the Base. An exhaustive search for solvent source areas in the soil and loess groundwater was unsuccessful.

There are no groundwater receptors associated with the impacted aquifer. The Base's water system utilizes groundwater from the Memphis and Fort Pillow aquifers which are deeper and hydraulically isolated from the fluvial deposits aquifer. Average depths of production wells completed in the Memphis and Fort Pillow aquifers are 500 feet and 1,450 feet, respectively. Multiple lines of evidence (i.e., tritium age dating, VOC monitoring of confining unit and Memphis Sand aquifer, permeability testing) were collected during the RFI that demonstrated the absence of communication between the shallower fluvial deposits aquifer and the Memphis sand aquifer.

Phases	Start	End
RFA	1989	1990
RFI/CMS	1997	2016
IRA	2005	2016
RAO	2016	2045
LTM	2045	2050
RIP Date: 2016		
RC Date: 2050		

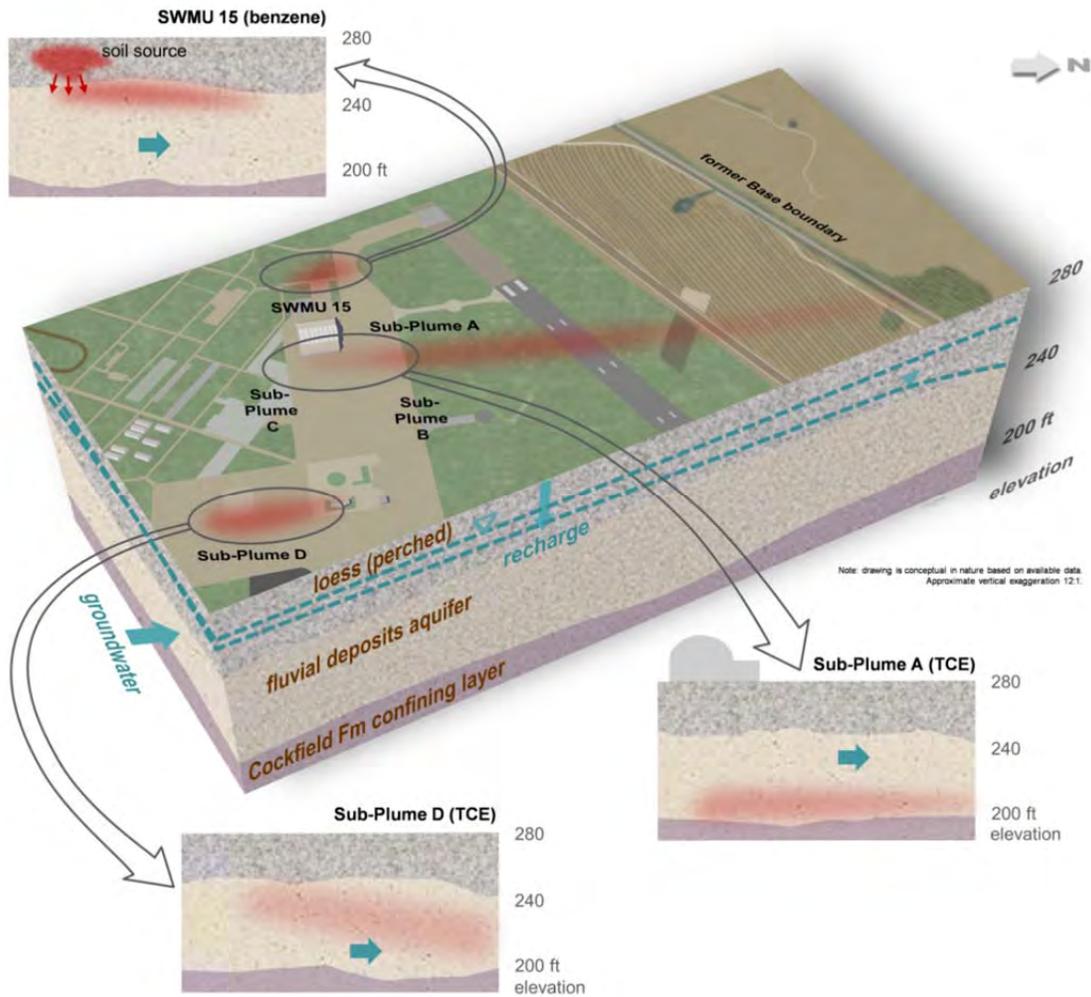
Completed Interim Corrective Measures

An enhanced bioremediation remedy was implemented between 2004 and 2009 at Sub-Plumes A through D. The remedy consisted of monthly injections of sodium acetate and ammonium phosphate into 29 injection wells within and upgradient of the highest concentration areas of the sub-plumes, with the objective being to manipulate the aquifer geochemistry and stimulate the anaerobic degradation of TCE. By 2009, the active treatment goal for TCE (100 µg/L) was met in most of the treatment-area wells, resulting in the remedy transitioning to monitored natural attenuation (MNA) for the residual TCE and the TCE daughter products, cis-1,2-DCE and VC.

Active interim measures were again implemented in 2013 to remediate the western section of Sub-Plume D where a maximum TCE concentration of 500 µg/L had been detected in 2010. Former remedial efforts focused on treating the east section of the plume, initially through a pilot study conducted by Parson's Engineering Services, Inc. A commercial grade emulsified vegetable oil/lactate-base carbon substrate, manufactured by Terra Systems, was injected into 21 wells in the western part of the plume in 2013.

Active interim measures were also conducted at the former Facility property boundary where TCE concentrations had increased in an offsite well (007G52LF) from 5 µg/L to 22 µg/L between 2001 and 2010. A similar emulsified vegetable oil/lactate-base carbon substrate was injected into a ten-well transect at the property boundary in an effort to create an anaerobic treatment zone and mitigate further offsite impacts. The effectiveness of the remedy enhancements are evaluated annually through the ongoing effectiveness monitoring program.

Site Conceptual Model



Corrective Action Status

RFI complete: 2000
IM Work Plan: 2003
IM Implementation: 2005 — current

Summary of Recent Activities

Data from the long-term monitoring events conducted in February and August 2014 will be presented in the upcoming annual progress report scheduled for release in February 2015. Review of the 2014 data indicates continued improvements in most the treatment areas with some very minor rebounding of TCE noted that will continue to be monitored. An upward trend in PCE and 1,1,-DCE at well PESMW-1S in Sub-Plume D is indicated. The overall trend in the well suggests a contaminant source may reside hydraulically upgradient of the well area which will be further evaluated in 2015. The absence of 1,1-DCE downgradient of the treatment/injection area indicates it is undergoing reduction and treatment as it migrates through the injection gallery, limiting its downgradient extent.

Persistent benzene concentrations in groundwater at SWMU 00015 (N-94 Underground Tank Farm) triggered a groundwater investigation in 2013 which has evolved into a soil investigation of suspect areas hydraulically upgradient of the contamination. A soil investigation beneath the remaining piping structures, fuel dispenser islands, and an oil/water separator in the area south-southeast of SWMU 00015 is currently underway and is expected to conclude in 2015. A 2004 removal action of impacted soil of the former SWMU 00015 tank hold resulted in a no further action being issued and the SWMU similarly being listed in the Base's RCRA permit as such. However, as a result of the benzene impacts, SWMU 00015 undergoes monitoring as part of the AOC A LTM. Therefore, the investigation and any corrective measures at SWMU 00015 are being conducted under AOC A.

Draft decision rules for optimizing the LTM program were evaluated by the BCT during the November 2014 meeting and are currently undergoing regulatory review. The decision rules for the LTM optimization consists of four components: well locations, sampling frequencies, analytes, and monitoring duration. Pending regulatory approval, the decision rules will be used for optimizing the LTM program and implemented during the upcoming April 2015 semi-annual monitoring event.

Upcoming Activities

AOC A Groundwater

- Submit 2015 AOC LTM data in year-end LTM report for NSA Mid-South.
- Conduct a groundwater evaluation in the area upgradient of well PESMW-1S for a source of 1,1-DCE and PCE. Submit an investigation report with any warranted corrective measures recommendations.
- Continue with semiannual and annual LTM of AOC A on an April and October sampling cycle.

SWMU 00015

- Submit SWMU 00015 Site Investigation Report describing the results of petroleum constituents in soil and groundwater.
- Submit CMS or similar document with recommended remedy for benzene in groundwater.
- Continue newly constructed SWMU 15 wells into AOC A LTM (outlined under AOC LTM Progress Report).

Schedule

Implement activities outlined above in 2015.

Final Remedial Action (Construction) Completion Date:

2045

Schedule for Next Five-Year Review:

N/A

Estimated Completion Date of BRAC-IRP at Facility (including LTM phase):

2050

NSA Mid-South Munitions Response Program

MRP Summary

Total Navy "Normalization of Data" database (NORM) Sites/Closeout Site Count:

6/4

MRP — ER,N Sites with Future and/or Underway Phases:

Site 7519 UXO 000001 Pistol Range

Site 8440 UXO 000002 Trap and Skeet Ranges #1 & #2

MRP — BRAC Sites with Future and/or Underway Phases:

None

Most Widespread Contaminants of Concern

Lead and PAHs

Media of Concern

Soil

Completed Remedial Actions (Interim Remedial Action/Final Remedial Action)

Site ID	Site Name	Action	Remedy	Year
<i>MRP — ER,N</i>				
8441	Horse Stables Skeet Range #1 (UXO 000001)	FRA (SC)	Soil removal	2013
<i>MRP — BRAC</i>				
12025	Horse Stables Skeet Range #2 (UXO 000002)	FRA (SC)	Soil removal	2012

Notes:

BRAC = Base Realignment and Closure
FRA = Final remedial action
SC = Site closeout complete
ER,N = Environmental Restoration, Navy
MRP = Munitions response program
UXO = Unexploded Ordnance

Duration of MRP

Date of MRP Inception: 2005

Estimated Date of Remedy-in-Place/Response Complete: December 2016

Date of MRP completion including Long Term Monitoring: 2050

Contamination Assessment Overview

In 2005, the Navy identified six Munitions Response Program (MRP) sites through a Preliminary Assessment of closed and active ranges at NSA Mid-South (Malcolm Pirnie 2005). Four sites were identified on the active ER,N portion of the Base and two within the BRAC portion of the Base. A subsequent 2010 Site Inspection (Tetra Tech NUS 2010) resulted in the following recommendation for the six sites:

MRP — ER,N Sites

- 1) Pistol Range (UXO 000001) — soil removal of the pistol range berm at 1 to 2-foot depths while screening and segregating clean and non-clean soils using x-ray fluorescence screening.
- 2) Trap and Skeet Ranges #1 and #2 (UXO 000002) — a feasibility study to address lead and PAH contamination in surface soil.
- 3) Horse Stables Skeet Range #1 (UXO 000003) — soil removal of two lead and two PAH hotspot locations.
- 4) Aircraft Firing Range (AOC 2) — confirmation sampling of an anomalously high detection of lead in soil.

MRP — BRAC Sites

- 1) Rifle Range (UXO 000001) — no further action.
- 2) Horse Stables Skeet Range #2 (UXO 000002) — soil removal where elevated PAHs were identified in surface soil.

NFAs were received for the Aircraft Firing Range (AOC 2) and Horse Stables Skeet Ranges #1 and #2 (UXOs 000003 and 000002) as a result of respective confirmation sampling and removal actions. In lieu of implementing the SI recommendations for a feasibility study and a removal action at the respective Trap and Skeet Ranges #1 and #2 (UXO 000002) and Pistol Range (UXO 000001), the two contiguous sites were combined and underwent an RFI (Resolution Consultants 2012). These are the only two MRP sites that have not received site closure.

Typically MRP sites are managed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and as a result, the six MRP sites are not currently regulated under the Facility RCRA Permit although they are listed in the Permit. Given the ongoing corrective action being conducted under the Facility's RCRA permit, the BCT decided that managing the sites under the Permit would be the most efficient approach to meeting restoration goals. As a result, the RCRA guidance was used for completing the investigations of Trap and Skeet Ranges #1 and #2 (UXO 000002) and the Pistol Range (UXO 000001). During the next revision to the Permit, the MRP sites will be included as AOCs. They are currently listed in NORM as the following:

- Site 7519 — UXO 000001 Pistol Range
- Site 8440 — UXO 000002 Trap and Skeet Ranges #1 & #2

Cleanup Exit Strategy

The exit strategy for the following sites is to have an NFA Statement of Basis approved and site closure in 2015:

MRP — BRAC Sites

- Site 12024 — UXO 000001 Rifle Range
- Site 12025 — UXO 000002 Horse Stables Skeet Range #2

MRP — ER,N Sites

- Site 8441 — UXO 000003 Horse Stables Skeet Range #1
- Site 7519 — Aircraft Firing Range (AOC 2)

The exit strategy for the following sites is to transition from the RFI to Remedy in Place and Long Term Monitoring in 2015:

- Site 7519 — UXO 000001 Pistol Range
- Site 8440 — UXO 000002 Trap and Skeet Ranges #1 & #2

Status of all MRP Sites

Site ID	Site Description	NORM Phase Status	Funding
12024	UXO 000001 Rifle Range	SI 2010	MRP — BRAC
12025	UXO 000002 Horse Stables Skeet Range #2	SI 2010; IRA 2013; RC 2014	MRP — BRAC
7519	UXO 000001 Pistol Range	SI 2010; RFI/CMS 2013	MRP — ER,N
8440	UXO 000002 Trap and Skeet Ranges #1 & #2	SI 2010; RFI/CMS 2014	MRP — ER,N
8441	UXO 000003 Horse Stables Skeet Range #1	SI 2010; IRA 2011; RC 2012	MRP — ER,N
7519*	Aircraft Firing Range (AOC 2)	SI 2010	MRP — ER,N

Notes:

- * = Site not listed in NORM. Included under UXO 000001 Pistol Range NORM ID.
- AOC = Area of Concern
- ER,N = Environmental Restoration, Navy
- IRA = Interim Remedial Action
- RC = Response complete
- RFI/CMS 2001 = RCRA Facility Investigation/Corrective Measures Study; 2012 — RFI approval date
- MRP = Munitions Response Program
- BRAC = Base Realignment and Closure
- NORM = Navy "Normalization of Data" database
- UXO = Unexploded Ordnance

MRP Previous Studies

	Title	Author	Date
2005	Final Preliminary Assessment Naval Support Activity Mid-South	Malcolm Pirnie	1 August 2005
2010	Final Site Inspection Report for Munitions Response Program Site Inspections at NAVFAC Mid-West and BRAC Management Office Southeast Munitions Response Sites and Areas of Concern; NSA Mid-South	TetraTech NUS	1 September 2010
2011	Final Technical Memorandum for the Test Pit Excavations at Horse Stables Skeet Range #1 (UXO 000003); NSA Mid-South	TetraTech NUS	4 May 2011
	Proposed Path Forward for Remedial Activities at Unexploded Ordnance Site UXO 000003 (Horse Stables Skeet Range #1); NSA Mid-South	TetraTech NUS	2 September 2011
	Letter Summarizing the Second Round of Sampling Activities at Aircraft Firing Range (AOC 2); NSA Mid-South	TetraTech NUS	19 September 2011
2012	Technical Memorandum Regarding Completed Remedial Activities at Horse Stables Skeet Range #1 UXO 000001; NSA Mid-South	TetraTech NUS	17 January 2012
	Proposed Path Forward for Remedial Activities at UXO 000002; NSA Mid-South	TetraTech NUS	12 April 2012
	Explosives Safety Submission Determination Request Form for AOC 1 and Unexploded Ordnance Site 1 (UXO 1) Small Arm Ranges; NSA Mid-South	U.S. Navy	2 July 2012
	U.S. Navy Response to Explosives Safety Submission Determination Request for AOC 1 (UXO 000001) and Unexploded Ordnance Site 1 (UXO 000001) Small Arms Ranges; NSA Mid-South	Naval Ordnance Safety and Security Activity	20 July 2012
2013	Remedial Action Completion Report, Horse Stables Skeet Range #2 (UXO 000002)	Solution-IES	25 November 2013
	Resource Conservation and Recovery Act Facility Investigation Report — Former Trap and Skeet Ranges #1 and #2 (UXO 000002) and Pistol Range (UXO 000001); NSA Mid-South	Resolution Consultants	1 December 2013
2014	Resource Conservation and Recovery Act Facility Investigation Report Addendum — Former Trap and Skeet Ranges #1 and #2; NSA Mid-South	Resolution Consultants	25 July 2014

Notes:

AOC	=	Area of Concern
BRAC	=	Base Realignment and Closure
NSA	=	Naval Support Activity
NAVFAC	=	Naval Facilities Engineering Command
UXO	=	Unexploded Ordnance

Site Closeout (No Further Action) Summary — MRP

Site ID	Site Name	NFA Date	Documentation
MRP — BRAC			
12024	UXO 000001 — Former Navy Rifle Range	2010	NFA recommended in Site Investigation (TetraTech NUS 2010) Approval letter: TDEC 10/11/2010
12025	UXO 000002 — Horse Stables Skeet Range #2	2014	NFA recommended in the Remedial Action Completion Report — Horse Stables Skeet Range #2 (UXO 2; Solutions IES, 25 November 2013). Approval letter: TDEC — 1/13/2014
MRP — ER,N			
8441	UXO 000003 — Horse Stables Skeet Range #1	2012	NFA recommended in the Technical Memorandum Regarding Completed Remedial Activities at Horse Stables Skeet Range #1 (Tetra Tech NUS, 17 January 2012) Approval letter: TDEC 1/30/2012
7519 *	Aircraft Firing Range (AOC 2)	2011	NFA recommended in Aircraft Firing Range — Second Round Sampling report (Tetra Tech NUS, 19 September 2011) Approval letter: TDEC 10/31/2011

Notes:

AOC = Area of Concern
 BRAC = Base Realignment and Closure
 ER,N = Environmental Restoration, Navy
 UXO = Unexploded Ordnance

MRP Milestones

Date of MRP Inception: 2005

Past Phase Completion Milestones

2005	PA	<p>MRP — BRAC Sites Identified: 12024 — Rifle Range (UXO 000001); 12025 — Horse Stables Skeet Range #2 (UXO 000002)</p> <p>MRP — ER,N Sites Identified: 8441 — 7519 — Pistol Range (UXO 000001); 8440 — Trap and Skeet Ranges #1 & #2 (UXO 000002); 8441 — Horse Stables Skeet Range #1 (UXO 000003); 7519 — Aircraft Firing Range (AOC 2)</p>
2010	SI	<p>MRP — BRAC Sites: 12024 — Rifle Range (UXO 000001); 12025 — Horse Stables Skeet Range #2 (UXO 000002)</p> <p>MRP — ER,N Sites: 3938 — Horse Stables Skeet Range #1 (UXO 000003); 7519 — Aircraft Firing Range (AOC 2); 7519 Pistol Range (UXO 000001); 8440 — Trap and Skeet Ranges #1 & #2 (UXO 000002)</p>
2011	SI	7519 — Aircraft Firing Range (AOC 3); 8441 — Horse Stables Skeet Range #1 (UXO 000003)
2012	IRA	8441 — Horse Stables Skeet Range #1 (UXO 000003)
2013	IRA	12025 — Horse Stables Skeet Range #2 (UXO 000002)
	RFI/CMS	7519 — Pistol Range (UXO 000001); 8440 — Trap and Skeet Ranges #1 and #2 (UXO 000002);
2014		
2014	RFI/CMS	8440 — Trap and Skeet Ranges #1 and #2 (UXO 000002)

Notes:

AOC	=	Area of Concern
BRAC	=	Base Realignment and Closure
IRA	=	Interim Remedial Action
RFI/CMS	=	RCRA Facility Investigation/Corrective Measures Study
PA	=	Preliminary Assessment
SI	=	Site Investigation
ER,N	=	Environmental Restoration, Navy
UXO	=	Unexploded Ordnance

Projected Statement of Basis/Decision Document

Site ID	Site Name		SOB/DD Date
<i>MRP — BRAC</i>			
12024	UXO 000001	Rifle Range	2015
12025	UXO 000002	Horse Stables Skeet Range #2	2015
<i>MRP — ER,N</i>			
7519	UXO 000001	Pistol Range	2020
8440	UXO 000002	Trap and Skeet Ranges #1 and #2	2020
8441	UXO 000003	Horse Stables Skeet Range #1	2015
7519	AOC 2	Aircraft Firing Range	2015

Notes:

AOC	=	Area of Concern
BRAC	=	Base Realignment and Closure
ER,N	=	Environmental Restoration, Navy
SOB/DD	=	Statement of Basis/Decision Document
UXO	=	Unexploded Ordnance

Final Remedial Action (Construction) Completion Date:

2019

Schedule for Next Five-Year Review:

N/A

Estimated Completion Date of MRP (including LTM phase):

2050+

Projected Phase Completion Milestones

Site ID	Site Name	Phase	FY15	FY16	FY17	FY18	FY19	FY20+
12024	UXO 000001 Rifle Range	SC						
Site ID	Site Name	Phase	FY15	FY16	FY17	FY18	FY19	FY20+
12025	UXO 000002 Horse Stables Skeet Range #2	SC						
Site ID	Site Name	Phase	FY15	FY16	FY17	FY18	FY19	FY20+
7519	UXO 000001 Pistol Range	RFI/CMS						
		IRA						
		SC						
Site ID	Site Name	Phase	FY15	FY16	FY17	FY18	FY19	FY20+
8440	UXO 000002 Trap and Skeet Ranges #1 and #2	RFI/CMS						
		IRA						
		SC						
Site ID	Site Name	Phase	FY15	FY16	FY17	FY18	FY19	FY20+
8441	UXO 000003 Horse Stables Skeet Range #1	SC						
Site ID	Site Name	Phase	FY15	FY16	FY17	FY18	FY19	FY20+
	AOC 2 Aircraft Firing Range	SC						

Notes:

- AOC = Area of Concern
- BRAC = Base Realignment and Closure
- ER,N = Environmental Restoration, Navy
- LTM = Long Term Monitoring
- RFI/CMS = RCRA Facility Investigation/Corrective Measures Study
- RIP = Remedy in Place
- UXO = Unexploded Ordnance



MRP
Site Descriptions

Site Description

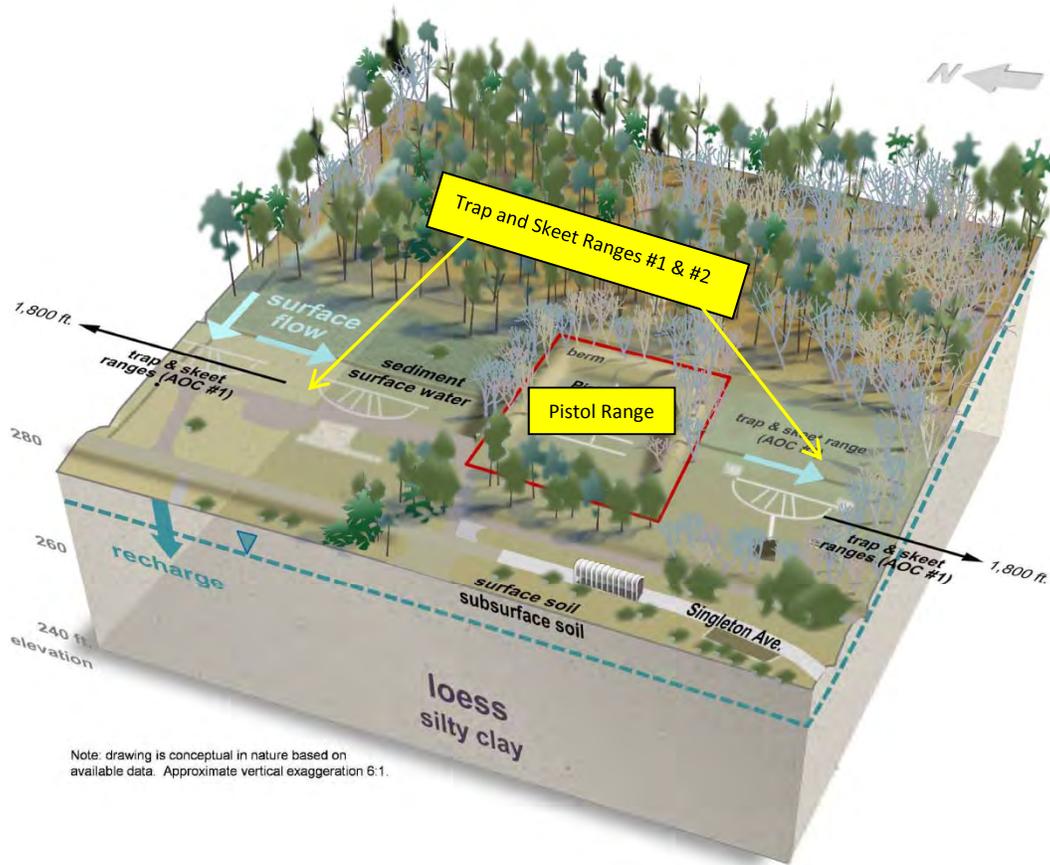
The former Pistol Range (UXO 000001) is a 0.5 acre former small arms range located within the southern section of the Trap and Skeet Ranges #1 and #2 (UXO 000002). The range operated between 1948 and 1994 and munitions use was limited to .22-caliber, .30-caliber, 9-millimeter (mm), .38-caliber, and .45-caliber ammunition (Malcolm Pirnie 2005). The range consisted of a berm backstop, shooting stations, targets, and an armory. The firing line maintained 16 firing positions with targets that operated via a manual, mechanical cable system operated from behind the firing lines. With the exception of the berm and three of the five target lines, no structures remain at the site today. Clay pigeon pieces are present on the outsides of the berm surface from when the adjacent Trap/Skeet Ranges were active. Today, the U-shaped berm, approximately 10 to 15 feet tall and 500 feet long, contains an overgrowth of small trees, bushes, and grass.

During the SI, two 40-mm riot-control training rounds were identified on the berm surface; however, subsequent interviews with Facility and Naval Facilities Engineering Command Midwest personnel failed to uncover their origin (Tetra Tech 2010). During the RFI, two 20-mm heavily corroded target-practice rounds were found but were concluded to not pose an explosive hazard. No other evidence or history of Munitions and Explosives of Concern is associated with the site.

The SI (Tetra Tech 2010) identified lead in surface soil exceeding its 400 mg/kg project action level (PAL) across most of the berm face, resulting in the recommendation of a 1-foot surface-soil scrape. However, the Navy elected to conduct an RFI and further evaluate the extent of soil impacts, particularly within the berm interior, before implementing the recommended corrective measures. Given the contiguous nature of the Pistol Range with Trap and Skeet Ranges #1 and #2, both sites were combined in a single RFI. The RFI concluded that lead PAL exceedances were primarily associated with the berm face; however, soil within the berm interior and beneath the berm’s natural grade were impacted with PAHs at concentrations exceeding the benzo(a)pyrene equivalent PAL, likely the result of the former trap and skeet range operations that preceded berm construction (Resolution Consultants 2013). Surface and subsurface soil collected from drainage areas were evaluated to determine whether mass loading was occurring due to leaching of contaminants; however, lead and PAHs concentrations were comparable with site-wide concentrations, indicating the ditches at the site were not accumulation/collection points for contaminant runoff. Given the relative stability of the site contaminants, the broad nature of contamination across the two sites, and the Base’s Master Development Plan which has no redevelopment proposed for the area, the RFI recommended a remedy evaluation that contains a combination of land use and engineering controls. The RFI also recommended removal of a clay pigeon accumulation area along the south arm of the Pistol Range berm to mitigate a possible PAH source to soil.

Phases	Start	End
PA	2005	2005
SI	2010	2010
RFI/CMS	2012	Current
IRA	2017	2017
RIP Date: 2017		
SC Date: 2019		

Site Conceptual Model



Human Health Exposure Media			
Residential	Site Worker	Construction Worker	Recreation
Surface soil	Surface soil	Surface soil	Surface soil
Sediment		Subsurface soil	
		Sediment	

Corrective Action Status

SI completed 2010
RFI completed 2012
CMS pending

Summary of Recent Activities

A draft CMS document has been prepared and is currently undergoing Navy review.

Upcoming Activities

Submit a CMS report for the UXO 000001 (Pistol Range) and UXO 000002 (Trap and Skeet Ranges #1 and #2) for regulatory review.

Schedule

Interim Remedial Action; 2017
Draft Statement of Basis; 2019

Site Description

The former Trap and Skeet Ranges #1 and #2 consist of approximately 79 acres, near the southern border of NSA Mid-South. Trap/Skeet Range #1, comprising the northern portion of the site and constructed around 1943, had an unrecorded closure date sometime after World War II. Trap/Skeet Range #2, comprising the southern portion of the site, closed in 2005. Munitions use was limited to common small arms ammunition, primarily 12- and 20-gauge shotgun shells. Today, the vast majority of the site is vacant, consists of woods along the eastern half and maintained grass fields along its western half with very little evidence of the former ranges. SWMU 2 is a closed 42-acre solid-waste landfill used by NAS Memphis between 1942 and 1970 which borders and overlaps the southern footprint of Trap/Skeet Range #2.

The SI confirmed lead and PAHs above their PALs in site surface soils, with lead impacts noted in an area extending roughly 600 feet east of the shooting stations, while PAH contaminated soils had a smaller footprint, extending approximately 200 feet from the former firing lines (Tetra Tech 2010). The SI recommended a focused feasibility study to evaluate the appropriate remedial options for the impacted soil. In lieu of proceeding with the study, the Navy elected to conduct an RFI to further delineate the extent of soil impacts — focusing in quadrants west and northwest of the shooting stations, in-between transect sampling lines, drainage ditches, and to depths where the extent was not completely delineated. Additionally, a human health risk assessment was conducted as part of the RFI.

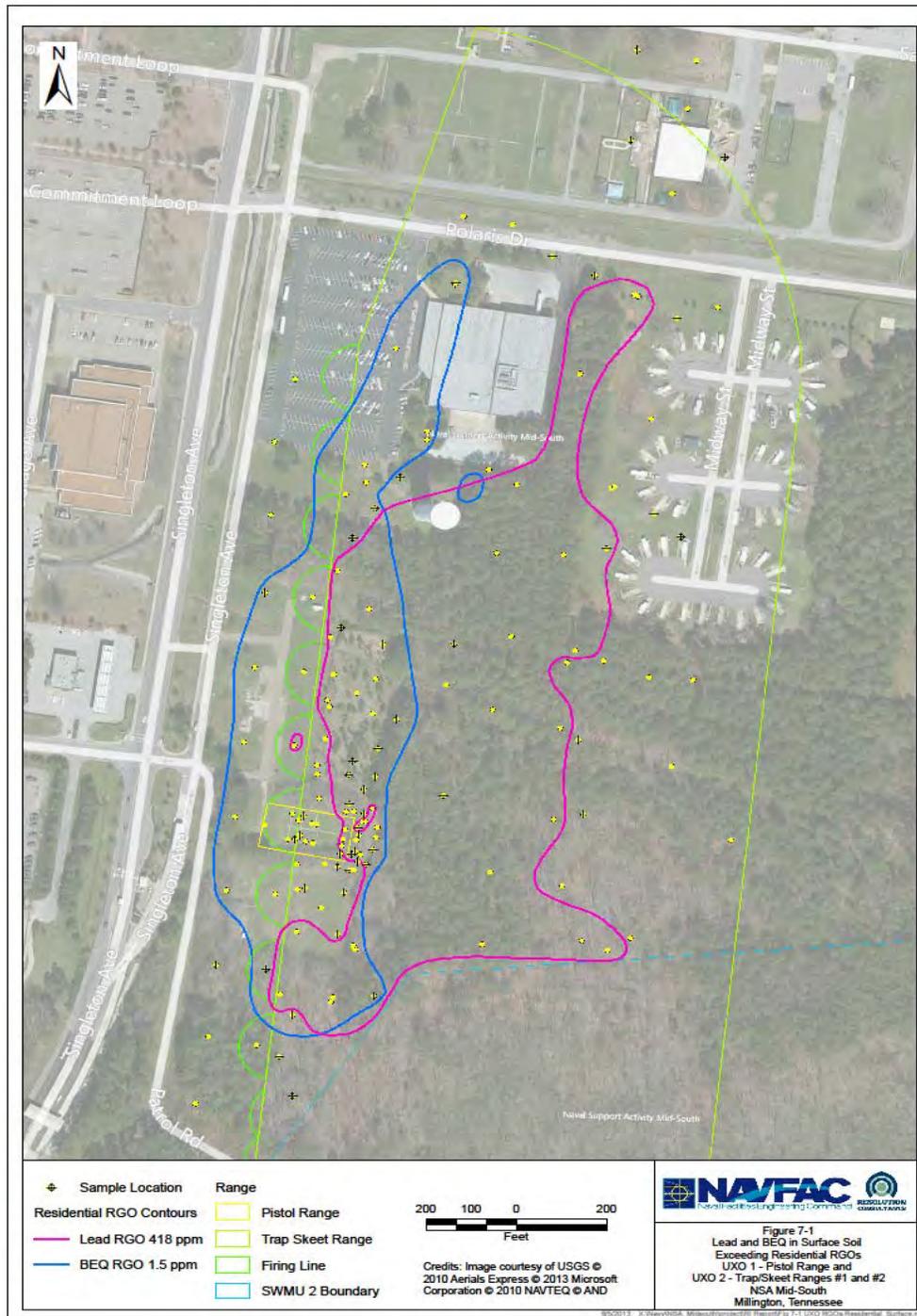
The RFI concluded lead impacts were generally absent in the newly sampled areas (north and west of the shooting stations). Lead concentrations above the PAL were primarily limited to the surface-soil interval where 41 of 111 samples exceeded the PAL while only 2 of 34 sub-surface soil samples exceeded the PAL. PAH concentrations exceeding the PAL were identified in 54 of 100 surface soil samples and 17 of 43 subsurface soil samples. Approximately 13 acres exceed the residential lead PAL for surface soil and 6 acres exceed the PAH PAL for surface soil. Similar to the Pistol Range, a comparison of soil data collected from the drainage ditches with that from across the site indicated PAHs and lead are relatively stable in site soils. The RFI recommended a similar evaluation of land use/engineering control remedy as for the Pistol Range (UXO 000001), in addition to further evaluation of two sample locations (SRSB23 and TSR-SS022) where anomalously high lead concentrations (51,900 and 12,500 mg/kg, respectively) were detected.

An addendum to the RFI with confirmation/ co-located and step-out sample data from the two above areas, in addition to an alternative risk evaluation (trespassing child tracking lead dust into homes and a subsequent child exposure), was subsequently completed (Resolution Consultants 2013). The added sample data confirmed that one of the two sample locations (TSR-SS022 — 12,500 mg/kg) was likely an actual lead hot-spot (versus high biased from possible metallic lead entrained in the original sample). Lead concentrations in the confirmation and three step-out sample locations ranged from 5,660 mg/kg to 24,500 mg/kg. The alternative risk scenario

Phases	Start	End
PA	2005	2005
SI	2009	2009
RFI/CMS	2012	Current
IRA	2018	2019
RIP Date: 2019		
SC Date: 2020		

concluded that the mean lead concentration would need to approach 10,000 mg/kg for risk to be excessive under the hypothetical trespasser/child exposure in home scenario, which is approximately an order of magnitude higher than the mean lead concentration (1,584 mg/kg) detected at the site. Currently, the RFI addendum is undergoing regulatory review.

Site Conceptual Model



Corrective Action Status

SI completed 2010
RFI completed 2014
CMS pending

Summary of Recent Activities

A draft CMS is currently undergoing Navy internal review.

Upcoming Activities

Submit a CMS report for both UXO 000001 (Pistol Range) and UXO 000002 (Trap and Skeet Ranges #1 and #2) for regulatory review.

Schedule

Interim Remedial Action; 2019
Draft Statement of Basis; 2020