

**Final**

# **Site-Screening Process Closeout Report**

## **Depth Charge Testing Area**

Joint Expeditionary Base Little Creek-Fort Story  
Naval Amphibious Base Little Creek  
Virginia Beach, Virginia



Prepared for

**Department of the Navy**  
**Naval Facilities Engineering Command**  
**Mid-Atlantic**

Contract No.  
N62470-08-D-1000  
CTO-036

**September 2010**

Prepared by

**CH2MHILL**

Final

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Joint Expeditionary Base Little Creek – Fort Story**

**Contract Task Order 036**

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Under the

**NAVFAC CLEAN 1000 Program  
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Prepared by



**Virginia Beach, Virginia**

# SIGNATURE CONCURRENCE PAGE

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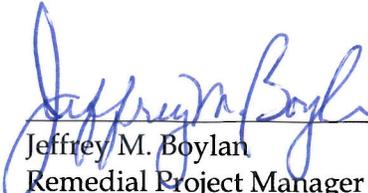
## Depth Charge Testing Area

In 2007, the Department of the Navy (Navy) completed the *Final Preliminary Assessment, Naval Amphibious Base Little Creek, Virginia* (Malcolm Pirnie, 2006) for the former MWR Skeet Range. Based on the findings of this report, the Naval Amphibious Base (NAB) Little Creek Project Management Team (PMT), a partnership between the Navy, the United States Environmental Protection Agency (USEPA) Region 3 and the Virginia Department of Environmental Quality (VDEQ), recommended additional investigation for this Military Munitions Response Program (MMRP) site. Additionally, during this assessment six MMRP Site-Screening Areas (SSA) were identified for evaluation. The assessment of these six MMRP SSAs was completed, with findings for each SSA reported in the *Final Preliminary Assessment, Naval Amphibious Base Little Creek, Virginia* (Malcolm Pirnie, 2007). Of the six SSAs evaluated in this report, four (Anti-Aircraft [A-A] Target Rifle Range, 1944 Pistol Range, 1953 Pistol Range, and Depth Charge Testing Area) were identified as potentially having a complete exposure pathway for exposure to munitions constituents (MC), and two (the 1942 Pistol Range and the Chemical Defense Area) were found to have incomplete exposure pathways.

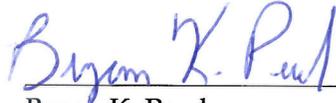
Based on this information, the NAB Little Creek PMT determined that additional investigation was required for the four MMRP SSAs with complete exposure pathways, and the two SSAs could be removed from further study due to incomplete exposure pathways. As the initial step in the further investigation of the four MMRP SSAs, the NAB Little Creek PMT conducted a comprehensive desktop evaluation, consisting of SSA visits, review of aerial photographs and SSA history, and the development of a conceptual site model (CSM) for each SSA. This Site-Screening Process (SSP) Closeout Report addresses the Depth Charge Testing Area. The three remaining MMRP SSA (A-A Target Rifle Range, 1944 Pistol Range, and 1953 Pistol Range) are addressed in a separate report.

Based on the results of the desktop evaluation, Navy guidance, and professional judgment, it is the consensus of the Navy, in partnership with the USEPA Region 3, and the VDEQ, that the Depth Charge Testing Area does not pose a threat, or potential threat to public health, welfare, or the environment, and therefore, the area should be removed from further study in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. Documentation and justification for the area being removed from further study is summarized in this SSP Closeout Report. The Depth Charge Testing Area will be identified as being removed from further study in the annual update (Fiscal Years 2011 through 2015) of the Site Management Plan (SMP) as part of the Federal Facility Agreement (FFA) between the Navy and USEPA. In the event contamination posing an unacceptable risk to human health or the environment is discovered after execution of this determination, the Navy will reevaluate the SSA as deemed necessary.

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 9.30.10  
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## Attachments

- A 1943 Naval District Memorandum
- B Ships' Logs from the 1943 Depth Charge Testing Exercises
- C Correspondence with the Virginia Institute of Marine Science
- D Navy Technical Support Finding of Fact

## Figures

- 1-1 Depth Charge Testing Area
- 3-1 Direction of Sediment Transport - Chesapeake Bay

# Acronyms and Abbreviations

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A-A	Anti-Aircraft
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-term Environmental Action—Navy
CSM	conceptual site model
CTO	Contract Task Order
DoD	Department of Defense
EOD	explosives ordnance disposal
ER	Environmental Restoration
FFA	Federal Facilities Agreement
HBX	high-blast explosive
IAS	Initial Assessment Study
IR	Installation Restoration
JEB	Joint Expeditionary Base
MC	munitions constituent
MEC	munitions and explosives of concern
MK	Mark
MMRP	Military Munitions Response Program
NAB	Naval Amphibious Base
NACIP	Naval Assessment and Control of Installation Pollutants
NARA	National Archives and Records Administration
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NCP	National Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
PA	Preliminary Assessment
PMT	Project Management Team
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
SARA	Superfund Amendment and Reauthorization Act
SMP	Site Management Plan
SSA	Site-Screening Area
SSP	Site-Screening Process

USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
UXO	unexploded ordnance
VDEQ	Virginia Department of Environmental Quality
VIMS	Virginia Institute of Marine Science

# Introduction

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On October 1, 2009, Hampton Roads' first Department of Defense Joint Base was established. This new installation comprises the former NAB Little Creek and Army post of Fort Story; the new name is Joint Expeditionary Base (JEB) Little Creek-Fort Story. With the forming of this new command, the Navy assumes responsibility for management of both properties and will now merge meetings regarding the ongoing environmental restoration programs. However, separate records will be maintained to ensure the integrity of ongoing efforts at both properties. When required for public notices and distributions, the former bases will be individually identified as JEB Little Creek-Fort Story, Fort Story and JEB Little Creek-Fort Story, NAB Little Creek. For Environmental Restoration (ER) Program documents, the former names NAB Little Creek and Fort Story shall be used to maintain consistency within the program.

This Site-Screening Process (SSP) Closeout Report presents an evaluation of the information obtained to determine if any potential threats to human health or the environment may occur as a result of the historical use of munitions at the former Depth Charge Testing Area located in the Chesapeake Bay and associated with NAB Little Creek, Virginia Beach, Virginia (**Figure 1-1**). The Site-Screening Area (SSA) is a closed testing area identified as potentially having a complete exposure pathway for exposure to munitions constituents (MC), as summarized in the *Final Preliminary Assessment, Naval Amphibious Base Little Creek, Virginia* (Malcolm Pirnie, 2007), and recommended for further investigation by the NAB Little Creek Project Management Team (PMT) consisting of representative of the Navy, United States Environmental Protection Agency (USEPA) Region 3, and Virginia Department of Environment Quality (VDEQ).

This report is prepared under the Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC), Mid-Atlantic Division, Comprehensive Long-term Environmental Action – Navy (CLEAN) 1000 Program Contract N62470-08-D-1000, Contract Task Order (CTO) 036, for submittal to NAVFAC Mid-Atlantic Division, United States Environmental Protection Agency (USEPA) Region 3, and Virginia Department of Environment Quality (VDEQ). The NAB Little Creek Project Management Team (PMT) is comprised of representatives from the USEPA, VDEQ, and the Navy.

The Department of Defense (DoD) established the Military Munitions Response Program (MMRP) under the Defense Environmental Restoration Program to address munitions and explosives of concern (MEC) and MC at closed ranges and other sites. The MMRP response action is conducted under the process outlined in the National Contingency Plan (NCP) as authorized by Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

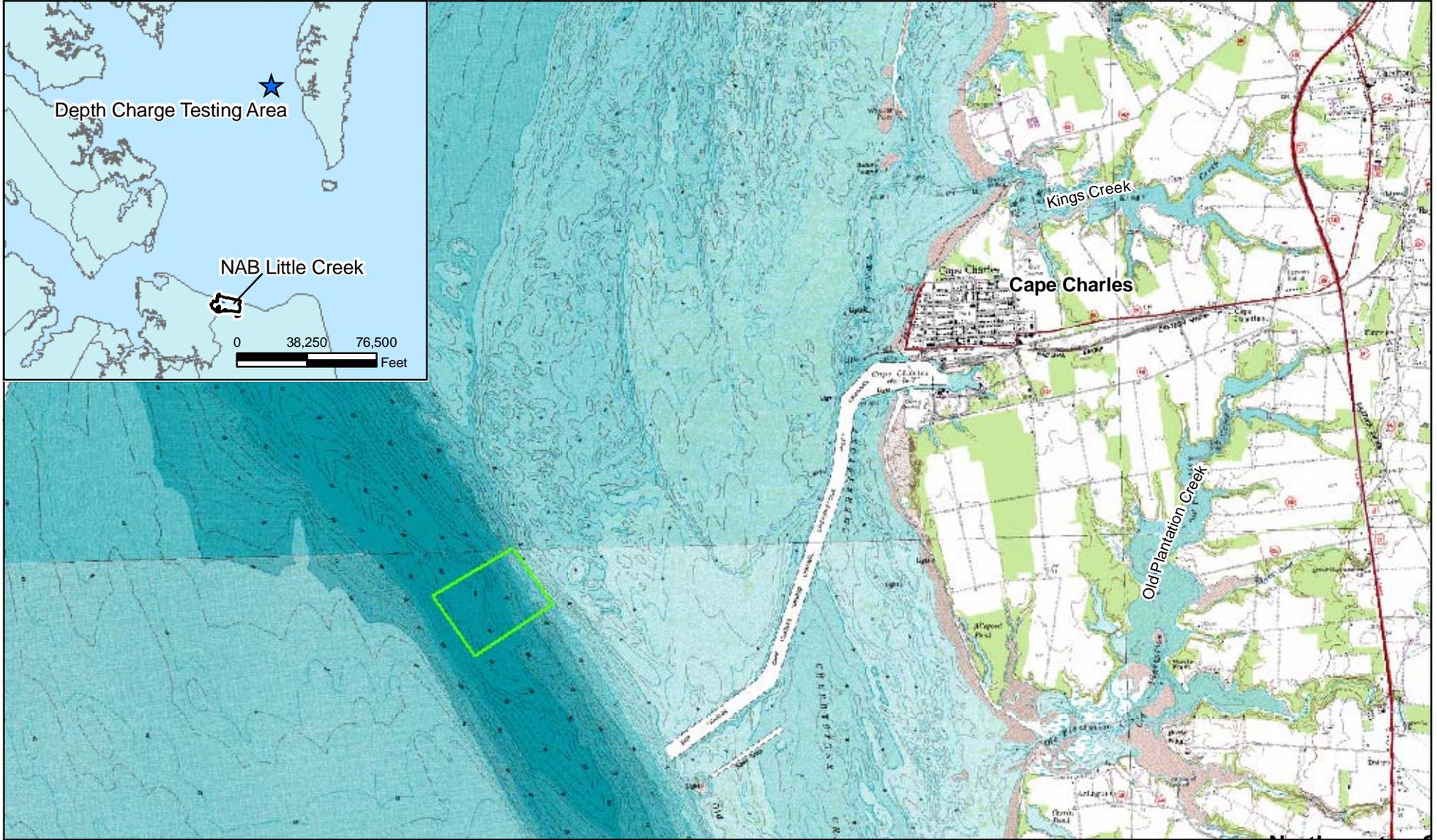
The NAB Little Creek Federal Facility Agreement (FFA) between the Navy, USEPA, and VDEQ was executed in 2003 to ensure that environmental impacts from past and present activities are properly investigated, and establishes the procedural framework and schedule for the implementation of actions to complete such investigations. Following the site

identification procedures of the FFA, the *Site Management Plan, Fiscal Years 2009 through 2013* recommended further investigation of the Depth Charge Testing Area (CH2MHILL, September, 2008).

This SSP Closeout Report summarizes the desktop evaluation performed for the SSA and documents the decision that the Depth Charge Testing Area does not pose a threat, or potential threat to public health, welfare, or the environment, and therefore, should be removed from further study. The report includes a review of SSA history, munitions use, conceptual site model (CSM), and data evaluation. The report comprises the following:

- Signature Concurrence Page
- Section 1 - Introduction
- Section 2 - Facility Background
- Section 3 - SSA Background and Summary of Data Evaluation
- Section 4 - Conclusions and Recommendations
- Section 5 - References

Figures are located at the end of each section. Attachments are located at the end of the document.



**Legend**  
■ Depth Charge Testing Area  
□ Installation Boundary

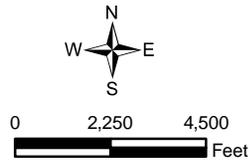


Figure 1-1  
Depth Charge Testing Area  
Depth Charge Testing Area Site-Screening Process Closeout Report  
Naval Amphibious Base Little Creek  
Joint Expeditionary Base Little Creek - Fort Story  
Virginia Beach, Virginia

# Facility Background

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## 2.1 Facility Description

NAB Little Creek encompasses 2,215 acres in the northwest corner of Virginia Beach, Virginia, adjacent to the Chesapeake Bay (**Figure 1-1**). The facility is primarily industrial, with personnel providing logistics and support services for local commands, organizations, home-ported ships, and other United States and allied units to meet amphibious warfare-training requirements of the Armed Forces of the United States. The base is also used for recreational, commercial, and residential purposes. Ancillary activities that have occurred at NAB Little Creek with potential for contaminant release include: vehicle and boat maintenance, boat painting and sandblasting, construction and repair of buildings and piers, mixing and application of pesticides, electroplating of musical instruments, laundry and dry cleaning operations, historical land filling of waste and construction debris, medical and dental treatment, generation of steam for heat, fuel storage and use, and munitions storage and use. Activities conducted outside of NAB Little Creek with the potential for contaminant release include maritime testing and training exercises conducted in the Chesapeake Bay.

Land development surrounding the base is residential, commercial, and industrial. The surrounding area is low-lying and relatively flat, with several freshwater lakes (Chubb Lake, Lake Bradford, Little Creek Reservoir/Lake Smith, and Lake Whitehurst) located on or adjacent to the base. NAB Little Creek centers around four saltwater bodies: Little Creek Harbor, Little Creek Cove, Desert Cove, and the Little Creek Channel, which connects the coves and harbor with the Chesapeake Bay. Little Creek Reservoir/Lake Smith, located south of the base, serves as a secondary supply of drinking water for parts of the city of Norfolk.

## 2.2 Environmental History

Comprehensive environmental restoration activities at NAB Little Creek began in 1984 under the Navy Assessment and Control of Installation Pollutants (NACIP) and Installation Restoration (IR) (later termed ER) Programs. The purpose of the NACIP and ER programs was to identify, assess, characterize, and clean up or control contamination from past waste management activities at Navy and Marine Corps facilities. Environmental assessment efforts at NAB Little Creek began under the NACIP program with an Initial Assessment Study (IAS) (RGH, 1984), and continued with a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) (A. T. Kearney, 1989). The NACIP program was modified in 1986 to reflect the requirements of CERCLA as amended by the Superfund Amendments and Reauthorization Act (SARA).

On May 10, 1999, NAB Little Creek was placed on the National Priorities List (NPL), and the FFA, negotiated between the Navy, USEPA, and VDEQ, was signed in October 2003. The FFA requires the Navy to annually update the Site Management Plan (SMP) to amend the

facility's restoration planning and schedule. In accordance with the FFA and the annual SMPs, which amend the FFA, all past and future work at ER Program sites will be reviewed, and a course of action for future work requirements at each site will be developed.

# SSA Background and Summary of Data Evaluation

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A description of the SSA, the environmental history, munitions used, and results of data evaluations are presented in this section.

## 3.1 SSA Description and History of Depth Charge Testing Area

During World War II, NAB Little Creek was the location of several naval training and testing missions. The Depth Charge Testing Area was identified in the Preliminary Assessment (PA) (Malcolm Pirnie, 2007) based on two Naval District memorandums dated February 1943 and May 1943. As stated in the PA, the February 1943 memorandum notes one depth charge was detonated in 35 feet of water; however, the exact coordinates for the depth charge testing area were not provided. The May 1943 memorandum (Fifth Naval District, 1943) states 19 depth charges were dropped; the first two failed to detonate and an additional depth charge had a delayed detonation. The depth of water recorded in the memorandum was approximately 120 feet and was based on approximately 10 soundings collected in the area. The memorandum stated the channel selected for the detonation was very narrow and the lack of detonation of the first two depth charges may have been due to insufficient water depth to trigger the detonating fuse. The May 1943 memorandum is provided in **Attachment A**.

The location for the Depth Charge Testing Area was estimated in the PA by a comparison of nautical charts to the depth of water and the general latitude and longitude recorded in the May 1943 memorandum. The PA identified an area approximately 1,800 acres, located within a channel in the Chesapeake Bay offshore of Cape Charles, Virginia as the approximate location for the Depth Charge Testing Area (**Figure 1-1**). The area identified is approximately 23 miles northeast of NAB Little Creek; the associated channel is several miles long and approximately 1 mile wide. Water depths at the SSA vary from approximately 30 to 120 feet deep.

The PA (Malcom Pirnie, 2007) recommended further investigation due to the possibility of MEC and MC posing potentially unacceptable risks for human health and/or the environment. Following the PA, a review of historical documents was conducted to confirm the location of the Depth Charge Testing Area, obtain supporting information on testing activities, and identify other activities that may have impacted the area. Results of this review are presented in the following sections.

## 3.2 Munitions and Munitions Related Materials Associated with the SSA

Historical documents indicate depth charges used in the May 1943 tests were Mark (MK) 10 "Hedgehog" 7.2-inch rockets. The MK 10 depth charge was one of a series of 7.2 inch rockets

utilized by the US Navy in the “Hedgehog” firing system which launches a spread pattern of 25 MK 10 rockets designed to destroy enemy submarines. The final version of this system utilized a pressure arming point detonating fuse; however, from the May 1943 memorandum it appears that during the tests in question the MK 10 was fused in a different manner.

The May 1943 memorandum states the MK 10 depth charges utilized a XSDC 16 Pistol; the term pistol is associated with British munitions and is a mechanically functioning fuse. These mechanically operated fuses utilized intricate mechanisms containing ball bearings and several sensitive parts to ignite the explosive material contained in the MK 10 depth charge. These fuses were pressure detonating, and could be set to initiate the explosive material at a specific depth (Navy Department Bureau of Ordnance, 1944).

The May 1943 memorandum describes “throwing” these depth charges off the stern of the vessel, or over the side near the stern of the vessel, after arming the fuse by setting them to explode at a specified depth. The two MK 10 depth charges that failed to detonate during the 1943 testing exercise had depth settings of 101 feet and 76 feet. It does not clearly state if these MK 10 depth charges were equipped with the rocket attachment for firing, or if they were simply hand-thrown from the vessel. Depth charges with the rocket attachment are 7.2 inches in diameter, 38.5 inches long, and weigh 65 pounds. Depth charges without the rocket attachment are approximately half the length (20 inches) and several pounds lighter, allowing them to be handled by a single person with relative ease.

Potential MC associated with MK 10 depth charges includes torpex and high-blast explosive (HBX).

### 3.3 Conceptual Site Model

An updated CSM of the Depth Charge Testing Area is discussed below. The CSM is based on interpretations of the physical characteristics of the Depth Charge Testing Area based on similar locations in the Chesapeake Bay, the assumed nature of the depth charges, the potential migration pathways, and potential receptors and exposure pathways.

#### 3.3.1 Physical Characteristics

Chesapeake Bay sediments in the approximate location of the Depth Charge Testing Area consist of mud, sand, and shells (National Oceanic and Atmospheric Administration [NOAA], 2009a,b). Site specific geology and the thickness of the sediments are unknown. However, the source of the sediment in the mouth of the Chesapeake Bay is derived from erosion of the shoreline and marshes, ocean input, transport from rivers and streams, and biogenic production of skeletal and organic material (USGS, 2003). The major pathways of sediment transport within the bay are shown in **Figure 3-1** (Virginia Institute of Marine Science, 1990).

#### 3.3.2 Land Use/Access Controls

The Depth Charge Testing Area is located on a public waterway and is currently used for recreational boating, fishing, and crabbing. There is also commercial shipping traffic associated with industry in Cape Charles and ship anchorages that are used for vessels waiting to travel in or out of the Chesapeake Bay. It is not known if the bay is dredged,

however, when comparing 1943 charts to present charts it does not appear that significant dredging has occurred in this area.

The shipwreck of the *Texaco Tanker* is marked on NOAA Nautical Chart #12224, located approximately 500 feet north of the Depth Charge Testing Area (NOAA, 2009c). This shipwreck is not considered a diving area, due to the low visibility in water of the area. However, the shipwreck is a common fishing area.

There are no access control features specific to the Depth Charge Testing Area and no known land use/development restrictions.

### 3.3.3 Potential Presence of MEC and MC

The Depth Charge Testing Area is considered a suspected MEC area, since two depth charges did not detonate during testing. There have been no subsequent investigations to confirm the presence of MEC in this area. Coordinates of degrees and minutes were provided for a location of the test, and soundings were taken to determine water depths. Based on this information, and assuming that the coordinates and depths given were accurate, the minimum area in which the depth charges might have been deployed encompasses approximately 1,800 acres.

The MK 10 depth charges were equipped with pressure sensitive fuses that were set to detonate at a predetermined depth. Sixty-six years of exposure to sediment accretion, scouring, corrosion, and marine growth have likely affected the functionality of these items. The depth charges may be buried in sediment or possibly transported in the direction of sediment transport by the effects of waves and tidal influences. The depth charges could have also been potentially transported by dredging activities; however, no evidence of dredging in the area was identified.

There is also the potential for the depth charges to have detonated after the vessel left the area. The tests were conducted in an area with a maximum water depth of approximately 120 feet; however, the water depth varies significantly within the Depth Charge Testing Area. According to the May 1943 memorandum, one depth charge had a delayed detonation of 4 to 5 minutes on the deepest set test (94 feet), which was believed to be a result of the depth charge encountering a soft bottom and slowly sinking to a depth which activated the fuse. The two failed depth charges (set to detonate at 76 and 90 feet) were suspected to be a result of insufficient water depth to activate the fuse. If these depth charges similarly encountered a soft bottom, a delayed detonation may have taken place after the vessel left the testing area.

During the 66 years since the test, if the depth charge did not detonate, the MCs, torpex and HBX, may have been released to the environment if the munitions casings were comprised from exposure to a marine environment. Each depth charge is believed to contain approximately 35 pounds of the explosive constituents.

### 3.3.4 Contaminant Migration Routes

Environmental media through which MC may migrate from the Depth Charge Testing Area include surface water and sediment. Migration routes include tidal influence, erosion/redeposition, dredging, and relocation by events such as storm surges and hurricanes. MC in sediments may migrate through plant/animal uptake.

Torpex and HBX have low to moderate solubilities. These compounds would most likely intermix with sediment and migrate in the south-southeastern sediment transport direction (**Figure 3-1**). With the potential for 66 years of migration, the MC constituents are expected to be dispersed at concentrations below screening levels.

### 3.3.5 Potential Receptors

Potential human receptors include commercial and recreational users and construction workers. The Depth Charge Testing Area is located offshore of Cape Charles, Virginia (309 people per square mile). The town of Cape Charles is roughly 3.5 miles from this area and is a popular tourist area of the Eastern Shore of Virginia with a beach and several homes and businesses.

Plant and animal biota are also potential receptors. Receptor fauna that could be affected are common fish, amphibians, and invertebrates.

### 3.3.6 Exposure Pathways

The potential interactions between the source (e.g., locations where MEC/MC may be found) and receptors (e.g., Navy personnel, construction workers, recreational users), are assessed differently for MEC and MC. The primary potential exposure pathway is related to the explosive safety hazard of the MEC. Due to the small size and volume of MC in each depth charge, exposure pathways related to the MC are not believed to be significant.

#### Munitions and Explosives of Concern

For MEC, interaction between the potential receptors and an MEC source has two components. The receptor must have access to the source, and must engage in some activity that results in contact with individual MEC items within the source area.

Commercial and recreational users could disturb MEC through activities such as fishing or boating. Due to the depth of water at the SSA (20 to 120 feet) and the small size of the depth charges, there is a minimal potential for commercial/recreational contact with surface sediment and no risk of contact with subsurface sediment. Construction workers may be exposed to MEC resting on the sediment surface or suspended in subsurface sediment in the event that dredging occurs in this area of the Chesapeake Bay.

#### Munitions Constituents

For MC, interaction between the source and receptors involves a release mechanism for the MC, an exposure medium that contains the MC, and an exposure route that places the receptor into contact with the contaminated medium.

**Sediment** Commercial and recreational users are not expected to contact MC in sediment at depths of water between 20 and 120 feet. Construction workers may be exposed to sediments should dredging occur in this area. Biota may be exposed to MC in sediment via feeding and burrowing activities. However, concentrations of MC are expected to be below screening levels due to 66 years of dispersion from currents within the bay.

**Surface Water** Due to the low solubilities of the MC, the potential exposure pathway via surface water is not expected to be significant.

**Plant/Animal Uptake** There is a potential pathway for biota to be exposed to MC via the food chain. MC may be assimilated by plants or bioaccumulated in prey species and transferred through the food chain to feeding biota. Commercial and recreation users could potentially be exposed to MC that has bioaccumulated in fish and shellfish. However, MC constituents are expected to occur at concentrations below screening levels due to 66 years of dispersion from currents within the bay.

## 3.4 Data Evaluations

### 3.4.1 Archive Search

The archives review included a detailed document review at historical archive repositories, evaluation of nautical charts, and correspondence with the following:

- National Archives and Records Administration (NARA)
- United States Army Corps of Engineers (USACE) Archives
- United States Coast Guard (USCG) Archives
- The Virginia Institute of Marine Science (VIMS)

The archive search focused on documents pertaining to land use, easements, property leases, munitions and weapons procurement, and specific information related to the depth charges testing activities. The following documents were found during the archive search:

- Ship logs from Vessel #CGR-61006 on March 1, 1943 and Vessel #YP-543 on April 12, 1943
- NOAA Nautical Chart #12221, *Chesapeake Bay Entrance*, and Chart #12222, *Chesapeake Bay Cape Charles to Norfolk Harbor*

The ships' logs are included in **Attachment B**.

The following letter reports were referenced in the May 1943 Naval District memorandum, but could not be located during the archive search:

- CIP letter ND5(13)/S76-2 over (JPM:re), March 23, 1943 to CO., SB, LC, Va.
- CIP conference letter S76-2/NN4/ND5 over (JPM:JPL), February 11, 1943 to CO., SB, LC, Va.
- BuOrd conference letter (Re6b) of 2/1/43 to ComFive
- NOLR No. 720
- ComFive 2nd End. ND5(32) / S76-2 (ATL:thg), Serial 1987 of 3/19/43 on CO., SB, LC, Va., Conference letter S76-2/NB34 over (AHM:a) of 3/8/43

USACE confirmed the channel within the Depth Charge Testing Area is not a federal channel, and as a result, no records of dredging were available in the USACE archives or NARA.

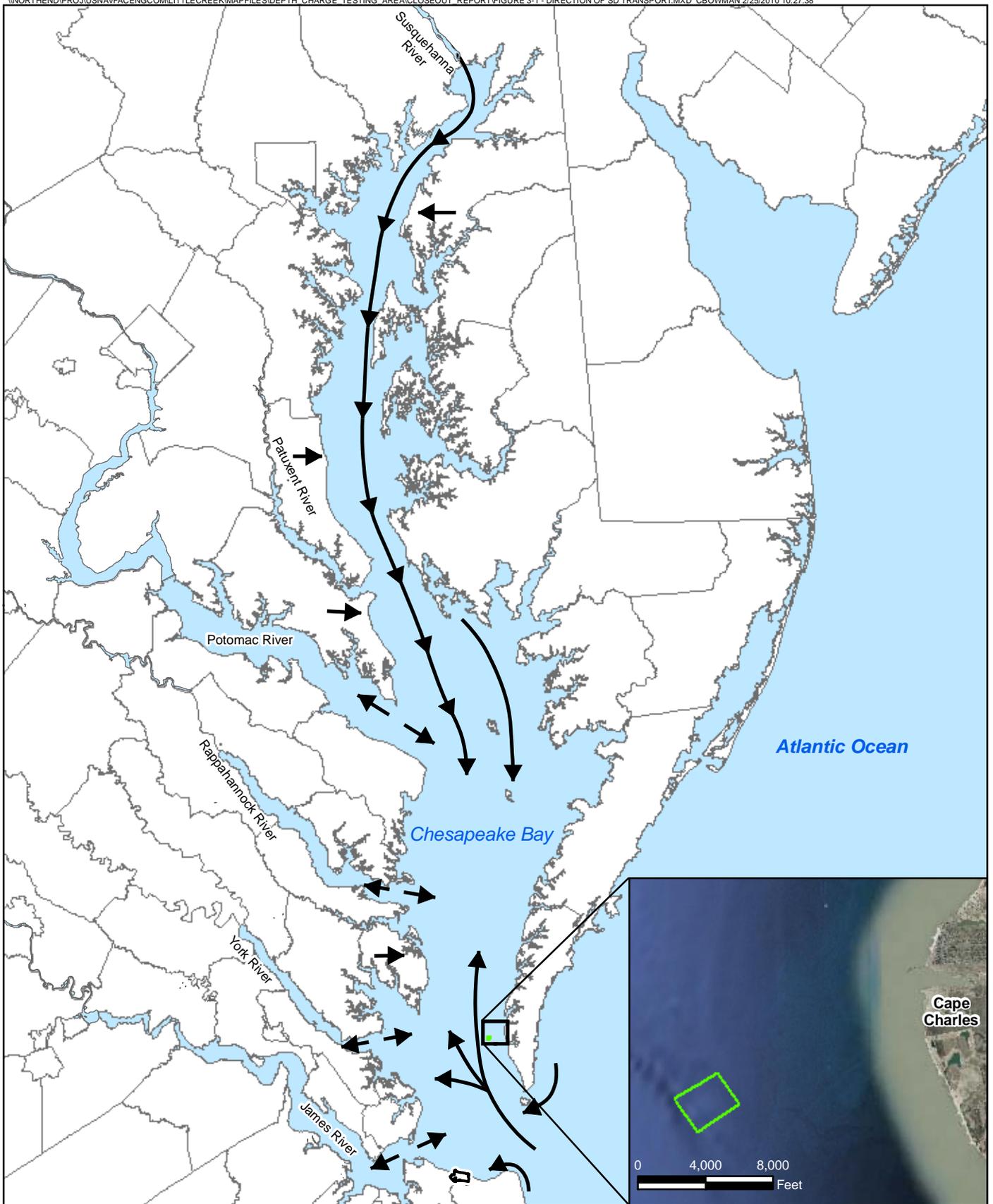
VIMS did not have records pertaining to the Depth Charge Testing Area or any dredging activities in the area. Correspondence with VIMS is included in **Attachment C**.

### 3.4.2 Finding of Fact

At the request of VDEQ and USEPA, a finding of fact document was prepared by Navy senior MMRP technical support (**Attachment D**). The document presents all relevant data used to determine whether the area documented in the 1943 memorandum was the location of isolated testing events or a depth charge range where weapons deployment and training repeatedly occurred. Technical support reviewed Navy archival data and conducted independent interviews at the following commands on NAB Little Creek:

- Public Works Division, Mr. Stanley Sumner, P.E.
- Riverine Squadron 1, in-house Quartermasters
- USCG, BM1 Brad Parker and BM2 Roberto Bobonis
- Explosives Ordnance Disposal (EOD) Mobile Unit Two EODCM Michael Cobble
- Special Boat Unit 20

Following the interviews and review of historical documents, technical support concluded there is no evidence suggesting the Depth Charge Testing Area was anything more than a stand alone test. No data suggests the area was used again for depth charge deployment. Operational records do not typically provide detail of training events, indicating the test was an isolated event used to evaluate the deployment of MK 10 depth charges. The lack of any recorded range fan information, the records of which would be retained in current EOD files, further supports the conclusion the area was used for a testing event. The finding of fact document recommends further action is not warranted at the Depth Charge Testing Area.



**Legend**

 Depth Charge Testing Area

 Installation Boundary

Adapted from: Virginia Institute of Marine Science. 1990. A 100-year sediment budget for Chesapeake Bay: Special Report in Applied Marine Science and Ocean Engineering, no. 307, Gloucester Point, Virginia.



0 11 22  
Miles



Figure 3-1  
Direction of Sediment Transport - Chesapeake Bay  
Depth Charge Testing Area Site-Screening Process Closeout Report  
Naval Amphibious Base Little Creek  
Joint Expeditionary Base Little Creek - Fort Story  
Virginia Beach, Virginia

# Conclusions and Recommendations

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Historical document review of the Depth Charge Testing Area did not identify any supporting documentation to further define the testing area and testing activities, or identify other activities that may have impacted the area.

Significant sediment deposition, erosion, and transportation occur in the Chesapeake Bay due to tidal influence from the Atlantic Ocean, deposition from rivers, and periodic storms resulting in other scouring processes. These influencing factors may have resulted in the transport of the depth charges to different areas within the Chesapeake Bay or burial of the items. Additionally, the large size of the Depth Charge Testing Area and the relatively small size of the two depth charges, results in an extremely low probability of finding the depth charges with current technology. Side scan sonar and towed magnetometer surveys would likely result in a large number of geophysical anomalies (e.g., crabbing pots, boat debris and wreckage, other miscellaneous items) that would require investigation using a dive team trained in unexploded ordnance (UXO) recognition, as well as deep water diving.

The two failed detonations were suspected to be a result of insufficient water depth to activate the XSDC 16 Pistol. A depth charge set to detonate at a similar depth had a delayed detonation, most likely due to the depth charge encountering a soft-bottom and continuing to sink through the sediment until sufficient pressure was detected to activate the fuse. If similar conditions were encountered by the two depth charges that initially failed to detonate, a delayed detonation may have taken place after the vessel left the testing area.

The mechanism used during the testing activities is a pressure sensitive mechanical fuse and susceptible to corrosion. The harsh conditions at the bottom of the seabed may have corroded the fusing mechanism, causing it to no longer be viable.

The potential for exposure to the MEC and MC is low. Therefore, the potential threat to human health and the environment is not believed to be significant. The Navy currently does not have an underwater policy in place for MEC investigations.

Therefore, based on Navy guidance; the uncertainty associated with the location of the depth charges; the possibility of the items functioning after the tests were completed; the low probability of their current functionality; the low risk of exposure with potential receptors; results of the desktop evaluation; and professional judgments of USEPA Region 3, the VDEQ, and the Navy; the Depth Charge Testing Area likely does not pose a threat or potential threat to public health, welfare, or the environment, and should be removed from further study.

## SECTION 5

# References

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- A. T. Kearney, Inc. 1989. *Revised Phase II RCRA Facility Assessment, Naval Amphibious Base, Little Creek, Norfolk, Virginia*. December.
- Fifth Naval District. 1943. *Test of Mark 10 Depth Charge with XSDC-16 Pistols*. Inshore Patrol Section Base Little Creek, Virginia. May.
- Malcolm Pirnie. 2006. *Final Preliminary Assessment, Naval Amphibious Base Little Creek, Virginia*. July.
- Malcolm Pirnie. 2007. *Final Preliminary Assessment, Naval Amphibious Base Little Creek, Virginia*. September.
- Navy. 2003. *Federal Facility Agreement, Naval Amphibious Base Little Creek, Virginia Beach, Virginia*. November.
- Navy Department Bureau of Ordnance. 1944. *Ordnance Pamphlet 866*. February.
- NOAA. 2009a. *Chesapeake Bay Entrance Nautical Chart*. Chart #12221. Updated through January 13, 2009.
- NOAA. 2009b. *Chesapeake Bay Cape Charles to Norfolk Harbor*. Chart #12222. Updated through January 13, 2009.
- NOAA. 2009c. *Chesapeake Bay Cape Charles to Norfolk Harbor*. Chart #12224. Updated through January 13, 2009.
- Rogers, Golden, and Halpern (RGH). 1984. *Initial Assessment Study, Naval Amphibious Base Little Creek, Virginia Beach, Virginia*. December
- United States Geological Survey (USGS). 2003. *A Summary Report of Sediment Processes in Chesapeake Bay and Watershed*. Water Resources Investigation Report 03-4123.
- Virginia Institute of Marine Science. 1990. *A 100-year sediment budget for Chesapeake Bay: Special Report in Applied Marine Science and Ocean Engineering, no. 307*, Gloucester Point, Virginia.

**Attachment A**  
**1943 Naval District Memorandum**

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May 15, 1943

276-2 2

Address Reply to: *AS*  
Refer to File:  
S76-2/NB34  
(JW:nf)

FIFTH NAVAL DISTRICT  
Inshore Patrol  
SECTION BASE  
LITTLE CREEK, VIRGINIA

May 15, 1943.

*one was dropped by the 15th fished by end of March 3  
5.5 ft/sec.*

CONFIDENTIAL

From: The Commanding Officer.  
To: The Chief of the Bureau of Ordnance.  
Via: (1) The Commander, Inshore Patrol.  
(2) The Commandant, Fifth Naval District.

Subject: Mark 10 Depth Charge with XSDC-16 Pistols - Test of.

References: (a) CIP Ltr. ND5(13)/S76-2 over (JPM:re) of 3/23/43 to CO., SB, LC, Va.  
(b) CIP Conf. Ltr. S76-2/NN4/ND5 over (JPM:JPL) of 2/11/43 to CO., SB, LC, Va.  
(c) BuOrd Conf. Ltr. (Re6b) of 2/1/43 to ComFive.  
(d) NOLR No. 720.  
(e) ComFive 2nd End. ND5(32)/S76-2 (ATL:thg), Serial 1987 of 3/19/43 on CO., SB, LC, Va., Conf. Ltr. S76-2/NB34 over (AHM:a) of 3/8/43.

Enclosures: (A) Data on Tests of 10 Charges dropped from CGR-61006, 3/1/43.  
(B) Data on Tests of 9 Charges dropped from YP-543, 4/12/43.  
(C) U.S.C. & G.S. Chart Number 1222.

1. In compliance with the provisions of paragraphs (2) and (3) of reference (a), nineteen (19) Mark 10 Depth Charges were dropped in two tests. Both tests were conducted in the area of 37° 15' North and 76° 05' West.

2. The results of the two tests with comments are incorporated in enclosures (A) and (B).

*A.H. Miles*

A.H. MILES

25 MAY 1943

ND5(13)/S 76-2

CONFIDENTIAL

4316

May 26, 1943

Serial End--1 on CO, SectBase, Little Creek, Va. ltr S76-2/NB34, May 15, 1943.

From: ComFive  
To: BuOrd

052743 40301

Subj: MARK 10 DEPTH CHARGE WITH XSDC-16 PISTOLS - TEST OF.

1. Forwarded.

*A.H. Miles*  
W.A. MILES  
By direction

RQ 74, BuOrd  
E. 1003A, Off. of Admin.  
Gen. Subj. Files, 1943, Box 12

By NARA Date 4-18-05  
Authority AND9577R  
DECLASSIFIED

CONFIDENTIAL

Test of ten (10) Mark 10 Depth Charges - Dropped from CGR-61006.

Charge	Depth Setting (in feet)	Time from Contact with Water to Detonation (in sec)	Calculated Depth Fired (R.S. 4.5'/sec) (in feet)	Rate of Sinking Calculated from Depth Setting (in feet/sec)
1	101	Did not detonate	----	----
2	76	Did not detonate	----	----
3	51	9 2/5	42.3	5.4
4	58	11 4/5	53.1	4.9
5	54	10 1/2	47.25	5.1
6	53	10	45.0	5.3
7	48	7	31.5	6.85
8	53	10 2/5	46.8	5.1
9	51	10 2/5	46.6	4.9
10	48	7 4/5	35.1	6.15

Average - 5.46

CGR-61006 - Sailboat under auxiliary power.  
Length - 61 feet.  
Beam - 15 feet, 3 inches.  
Hull - wood.  
Displacement - 21.28 tons  
Speed through water at time of dropping charges -  $4\frac{1}{2}$  to 6 knots.  
Depth of water by soundings - 120 feet plus.

-Comments-

1. The first two charges did not detonate. Their failure to fire could have been due to insufficient depth of water. The area in which these experiments were conducted was chosen on USC&GS Chart No. 1222 (Enclosure (C)) and the depth of water was ascertained by taking approximately ten soundings in this area. The channel was found to be very narrow.

2. The charges were thrown from the stern of the vessel, entering the water about ten feet to one side and clear of the screw turbulence. The vessel, a representative of the type likely to be designated to carry these depth charges, was not affected by the deeper settings. At a speed of  $4\frac{1}{2}$  knots and a 50 foot depth setting, the detonation could be felt sharply on the vessel. No damage or leakage resulted from the tests.

3. The results of the tests indicate that, if the actual sinking rate is approximately  $4\frac{1}{2}$  feet per second, the depth settings on the pistols are too deep.

0 5 2 7 4 3 4 0 3 0 1

ENCLOSURE (A)

By Authority NARA Date 4-18-05  
Authority AND9577R  
DECLASSIFIED

CONFIDENTIAL

Test of nine (9) Mark 10 Depth Charges - Dropped from YP-543.

Charge	Depth Setting (in feet)	Time from Contact with Water to Detonation (in sec)	Calculated Depth Fired (R.S. 4.5"/sec) (in feet)	Rate of Sinking Calculated from Depth Setting (in feet/sec)
1	94	4 to 5 min *	*	*
2	84	27 $\frac{1}{2}$	105.8	3.57
3	83	15	67.5	5.5
4	53	10 $\frac{1}{2}$	47.3	5.05
5	53	11 $\frac{1}{2}$	51.7	5.8
6	51	13	58.5	3.92
7	51	9 $\frac{1}{2}$	42.7	5.37
8	34	7	31.5	4.86
9	34	6 $\frac{1}{2}$	29.5	5.24

Average - 4.91

\* Estimated time; no calculation was made for this reason.

YP-543 - Twin screw converted pleasure boat.  
Length - 58 feet.  
Beam - 12 feet.  
Hull - wood.  
Displacement - 20 tons.  
Draft aft - 5 feet.  
Speed (max) - 16 knots.  
Speed through water at time of dropping charges - 6 to 7 knots.  
Depth of water by soundings - 120 feet plus.

-Comments-

1. There was a delay of four to five minutes in the detonation of the first charge. This delay in detonation could have been caused by the charge striking a mud bottom and sinking slowly until the depth corresponding to the pistol setting was reached. The location for these experiments was chosen on USCGS Chart No. 1222 (Enclosure (C)).

2. The charges were thrown over the side near the stern of the vessel and entered the water at the outer edge of the screw turbulence. Since the vessel from which tests were conducted has twin screws, water disturbance might account for a slower rate of sinking than was experienced in previous tests.

3. The vessel used in these tests was representative of the type which seems most likely to be designated to carry these charges. No undue vibration, leakage or other damage due to detonations was observed.

4. The results of these tests indicate that, if the actual sinking rate is approximately  $4\frac{1}{2}$  feet per second, the depth settings of the pistols are not uniformly accurate.

ENCLOSURE (B)

052743 40301

By Authority NARA Date 4-18-05  
Authority AM/D95772  
DECLASSIFIED

Attachment B  
Ships' Logs from the 1943 Depth Charge  
Testing Exercises

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Hour	NAUTICAL MILES	TENTHS	PATENT LOG		AVERAGE REVOLUTIONS	TENTHS	COURSE (P. S. C.)	WIND		BAROMETER	TEMPERATURE			WEATHER BY SYMBOLS	CLOUDS			VISIBILITY	CONDITION
			NAUTICAL MILES	TENTHS				DIRECTION	FORCE		HEIGHT IN INCHES	AIR, DRY BULB	AIR, WET BULB		WATER AT SURFACE	FORM	MOVING FROM		
A. M.																			
1								NE	4										
2																			
3																			
4								NE	4										
5																			
6																			
7																			
8										30.10									
9																			
10																			
11							1500	NE	4	30.14		40							
12							1500	NE	4	30.14		40							
P. M.																			
1					50°		1500	NE	4	30.14		42							
2					1500		40	NE	4	30.12		42							
3					1500		40												
4					1500		220						Ce		7		fair	1	
5					1500		220	E	2	30.12		41	c	Ce	7		fair	1	
6					1400		180	SE	2	30.12		41	c	Ce	7		fair	1	
7					1400		240	SE	2	30.12		40	e	Ce	7		fair	1	
8					1500		290	NE	2	30.12							fair	1	
9																			
10																			
11																			
12																			

At anchor ..... 11 hrs. 50 min.  
 Underway ..... 12 hrs. 10 min.  
 Total miles cruised ..... 69  
 Officers present ..... 0  
 W. O. present ..... 0  
 Enlisted force present ..... 19

Authorized enlisted complement ..... 10  
 Extra numbers ..... 1  
 Total ..... 11  
 Rations commuted .....  
 Enlisted persons absent ..... 0  
 Vacancies ..... 0  
 Total .....  
 Rations issued to general mess .....

Vessels boarded { American .....  
 Foreign .....  
 Motor boats boarded { American .....  
 Foreign .....  
 Vessels reported .....  
 Motor boats reported .....  
 Cases of assistance .....  
 Lives saved .....

Derelicts or obstructions removed .....  
 Regattas or marine parades patrolled .....  
 Drills held (enumerate) .....

Compass .....  
 Ship's head .....  
 Error .....  
 Variation .....  
 Deviation .....  
 Coal { Received ..... 100 lbs.  
 Expended ..... 50 lbs.  
 On hand ..... 475 lbs.  
 Fresh-water { Received .....  
 Expended ..... 55 gals.  
 On hand ..... 244 gals.  
 Water { Distilled .....  
 Received ..... 75 gals.  
 Expended ..... 25 gals.  
 On hand ..... 175 gals.

NOON POSITION:  
 1 mile NW of Cape Henry  
 Latitude 36° 54.3'  
 Longitude 76° 11'  
 Latitude 36° 56.3'  
 Longitude 76° 02.1'  
 Latitude 36° 55'  
 Longitude 75° 58.3'

Current { Set .....  
 Drift .....

MAGAZINE TEMPERATURES  
 Maximum .....  
 Minimum .....

under the command of Robert E. Conkey, CBM, U. S. C. G., R  
Monday, March 1, 1943

RECORD OF THE MISCELLANEOUS EVENTS OF THE DAY

00 to 09:00 moored Little Creek Sect Base, west side pier #4  
along side CGR 2022, R A Yemmy came aboard and asked  
to be put on Y.P. 529, Y.P. 524 station modified 529.

09 to 12:00 Left dock 11:00, abeam Cape Henry at 12:15 modified  
529-61 of Yemmy being aboard. Log plotted over board at 12:4  
3h. Red 2h. White, steady heading 30 1/2

13:00 approaching #2

14:15 abeam "2" H course 40° Log 37 1/2 speed 6 knots

16:15 Reversed course + proceeding back to Section Base  
Radio not getting out

18:30 Proceeding back to base course 220° speed 6 knots Log 59 knots  
position 5.5 Miles from Buoy # 14

19:10 abeam "2" H course 240° Log 63 1/2 speed 6 knots

Blimp passed overhead heading SSW

21:00 abeam Cape Henry, Put Yemmy aboard Y.P. 529

23:10 Arrived Section Base, Little Creek, Va. Moored west  
side pier #4, alongside CGR 2015, Starboard side to.  
Reported in.

Approved.

Robert E. Conkey  
U. S. C. G., Commanding.

Examined and found to be complete.

\_\_\_\_\_, Navigator.

DO NOT ADD TO THE LENGTH OF THIS SHEET

Hour	A. M.	Direction	Force	Height in inches	Thermometer, attached	TEMPERATURE		STATE OF THE WEATHER BY SYMBOLS	CLOUDS			CONDITION OF THE SEA
						Air, dry bulb	Air, wet bulb		Forms of, by symbols	Moving from—	Amount covered, tenths	

Attached to the *Y P 543*, 1943  
*8 B 7 E*  
*April 13, 1943*

same

Log of the *Y P 543*  
*5* Naval District, *April 12, 1943*  
 Attached to the *Y P 543*

Hour	WIND		BAROMETER		TEMPERATURE		STATE OF THE WEATHER BY SYMBOLS	CLOUDS			CONDITION OF THE SEA
	Direction	Force	Height in inches	Thermometer, attached	Air, dry bulb	Air, wet bulb		Forms of, by symbols	Moving from—	Amount covered, tenths	
A. M.											
4						44	BC				
8	SW		2922			63	Z				
12 M.	SW		2949			65	Z				
P. M.											
16	SW		2924								
20											
24											

REMARKS

0800 Polars men from shop repaired  
 water discharge pipe on auxiliary generator  
 1600 Watch secure.

Examined and found to be correct.

*A. A. Crockett*  
*CBM*

U. S. Command

	Force	Height in	Thermon attach	Air, dry	Air, wet	symbols	from	covered, tenths	SEA
A. M.									
4									
8	SW	2972		44		BC			
12 M.	SW	2949		63		Z			
P. M.									
16	SW	2924		65		Z			
20									
24									

REMARKS

0800 Bolero men from shop repaired  
 water discharge pipe on auxiliary generator  
 1600 Watch secure.

16-29074-1

Examined and found to be correct.

A. A. Crockett  
 CBM

, U. S. NR  
 Commanding.

Attachment C  
Correspondence with the Virginia Institute of  
Marine Science

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June 8, 2009

**VIA ELECTRONIC MAIL**

David Livingston  
Staff Scientist, CH2MHill  
5700 Cleveland Street, Suite 101  
Virginia Beach, VA 23462

Re: Freedom of Information Act requests of 5 June 2009

Dear Mr. Livingston:

This letter responds to the referenced Freedom of Information Act requests of the Virginia Institute of Marine Science (VIMS). VIMS possesses no documents pertaining to the deployment of depth charges off of the coast of Cape Charles in 1943, or for any other time period. VIMS also has no record of dredging activities or the deployment of other munitions for the area of the Chesapeake Bay Latitude 37:15:24N (37.2567); Longitude 76:05:11W (-76.0865).

I trust that VIMS now has fully complied with your information request. Please do not hesitate to contact me if you have questions.

Sincerely,



Lyle M. Varnell  
Assistant Director for Advisory Services

cc: Mr. Mike Connolly, W&M FOIA Officer  
Dr. Roger Mann, VIMS Director for Research & Advisory Services

**Attachment D**  
**Navy Technical Support Finding of Fact**

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**NAVFAC ATLANTIC  
TECHNICAL SUPPORT, CODE EV32  
TECHNICAL REQUEST**

---

Technical Lead: Michael Green, (Dawn Hayes)

Requested By: Timothy A. Reisch, P.E.

Key Words: Munitions Response Program, Depth Charges, NAB Little Creek, Environmental

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**I. REQUEST:**

The Remedial Project Manager (RPM) has requested assistance to address an MRP AOC site associated with the NAB Little Creek program. The site, "Depth Charge Testing Area" is approximately 25 miles northeast of NAB Little Creek, and was identified as an Munitions Response Program (MRP) Area of Concern (AOC) based on information from two 1943 memorandums reviewed during the 2006 Preliminary Assessment of the "MWR Skeet Range" at NAB Little Creek. Subsequent to this PA, a follow-on PA was completed in 2007 to assess the six MRP AOCs identified in the 2006 report.

Available records of the Coast Guard do indicate testing of 19 depth charges (Mark 10) in this area in 1943. Two of the charges did not detonate. Based on the information in the 2007 PA and research of historical records subsequent to that report, the NAB Little Creek Project Management Team (PMT), at this point, believe that the depth charges pose very little threat. However, the PMT requested additional review of existing navy records related to operational ranges to assess whether this testing in 1943 was an isolated incident in this "testing area" or if additional testing was conducted in this area and/or if this area was a "range", or could be considered as such.

**NAVFAC ATLANTIC  
TECHNICAL SUPPORT, CODE EV32  
TECHNICAL REQUEST**

**Specific Questions:**

- Is there any archival data available at this point to show that the area in question was ever a "range" and not just a "testing area" for this depth charge scenario?
- What are the opportunities that the project team can consider for the path forward?

**II. BACKGROUND:**

**BACKGROUND:**

The Depth Charge Testing Area is approximately 1,800 acres located in the Chesapeake Bay Off-shore of Cape Charles, VA. The site is approximately 25 miles northeast of NAB Little Creek. The Depth Charge Testing Area was identified from two 1943 memorandums. A February 1943 memo indicates that one depth charge was detonated in 11.6 meters of water, but does not provide an exact location. A May 1943 memo states that 19 depth charges were dropped, including two charges that did not detonate. The memo estimates that the depths of settings for the two depth charges that did not detonate were 30 and 23 meters. The depth of water for the area as listed in the same memo was 37 meters. The May 1943 memo also provides a latitude and longitude for the location of the testing area. From these coordinates, the area and location of the Depth Charge Testing Area was estimated based on the depth of water from nautical charts. The nautical charts identify a channel in the Chesapeake Bay offshore of Cape Charles, VA, that has water depths similar to those stated in the historical memos. The Depth Charge Testing Area was not identified on any

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TECHNICAL SUPPORT, CODE EV32  
TECHNICAL REQUEST**

other memos or maps of the area. The Depth Charge Testing Area was used in 1943 but the exact period of use for the site is unknown.

**Topography**

The Depth Charge Testing Area is located in the Chesapeake Bay, at a water depth ranging from approximately 10 to 38 meters. NAB Little Creek is positioned in the lowland sub province of Virginia's Coastal Plain. The surrounding area is characterized by flat, low relief areas ranging from zero to 18 meters in elevation. The area's physiography consists of stepped terraces with gently eastward sloping plains separated by linear, steeper, northward and eastward facing scarps. Elevations at the installation range from mean sea level (msl) along the Chesapeake Bay shoreline and tidal marshes to approximately 4 meters above msl in the inland areas. The greatest change in elevation occurs near the golf course and in the sand dunes along the beaches, where elevations reach up to 12 meters above msl and slopes approach 30%.

**Geology**

The site-specific geology of the Depth Charge Testing Area is unknown. NAB Little Creek lies within the Tidewater region of Virginia, directly adjacent to the Chesapeake Bay, in the coastal most portion of the Atlantic Coastal Plain physiographic province. This portion of southeastern Virginia is underlain by an eastward thickening wedge of marine and nonmarine sediments from early Cretaceous to Holocene in age. The thickness of the Sedimentary wedge varies from approximately 610 meters in the western Tidewater region to more than 1,220 meters thick in the southeastern portion of the region. Several thousand feet of interlayered unconsolidated sediment, consisting of gravel, sand, silt, and clay deposits, overlay pre-Cretaceous crystalline basement rock. Historical Coastal Plain

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TECHNICAL SUPPORT, CODE EV32  
TECHNICAL REQUEST**

sedimentation and deposition were controlled by fluctuations in sea level on a subsiding continental margin. The sediments of the Atlantic Coastal Plain are mostly undeformed, but structurally dip gently to the southeast. Differential subsidence produced a series of regional structural highs and lows, creating a series of arches and basins, or embayment's. The Virginia Tidewater region is located along the axis of a regional structural feature known as the Norfolk Arch, which represents an east-west trending structural ridge that separates the Salisbury Embayment to the north from the Albemarle Embayment to the south. The separation of the basins helped produce characteristic depositional sequences within each. Sediment of both basins consists of unconsolidated marine, alluvial, and lagoonal deposits with those of the Salisbury Embayment characteristically glauconite-rich, while those of the Albemarle Embayment are characteristically carbonate-rich. Based on the generalized regional stratigraphic column, the geologic units underlying the study area include, from youngest to oldest: Holocene (Recent) deposits, undifferentiated Pleistocene sediments, the Bacons Castle Formation, the Miocene to Pliocene Chesapeake Group, the Paleocene to Eocene Pamunkey Group, Late Cretaceous undifferentiated sediments, and the Early to Late Cretaceous Potomac Formation. The Holocene to Miocene units making up the uppermost 107 to 122 meters of the lithologic section at NAB Little Creek are those most likely to be affected by installation operations.

**III. APPLICABLE REGULATIONS/GUIDANCE/POLICY:**

- ❑ Depth Charge Testing Memorandum, dated February 1943
- ❑ Preliminary Assessment Naval Amphibious Base Little Creek, Virginia dated September 2007
- ❑ NAVSEA OP 5, Volume 1, Seventh Revision, Ammunition and Explosives

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- ❑ NOSSAINST 8020.15B, Explosives Safety Review, Oversight, and Verification of Munitions Responses, 26 January 2009: <https://nossa.nmci.navy.mil>
- ❑ Web Sites
  - ❑ NAB Little Creek: <http://www.cnmc.navy.mil/LittleCreek/index.htm>

**IV. RECOMMENDATION:**

With respect to the specific questions outlined in Section I, it is the opinion of NAVFAC Atlantic that the following recommendation be considered. This recommendation should be evaluated by the RPM for applicability. If applicable, the RPM should consult with the partnering team and ER Manager for direction as appropriate.

**1. Is there any archival data available at this point to show that the area in question was ever a "range" and not just a "testing area" for this depth charge scenario?**

The existing archival data was reviewed and independent interviews were conducted on NAB Little Creek on the following commands:

- *Public works Division, Mr. Stanley Sumner, P.E.*
- *Riverine Squadron 1, in-house Quarter masters*
- *U.S. Coast Guard, BM1 Brad Parker and BM2 Roberto Bobonis*
- *EOD Mobile Unit Two EODCM Michael Cobble*
- *Special Boat Unit 20*

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TECHNICAL REQUEST**

In addition to the interviews, my personnel experience from being stationed on NAB Little Creek twice, Special Boat Unit 20 (July 1987-January 1989) and EOD Mobile Unit Two (January 1990-November 1994), assisted in the obtaining and review of any available records/files.

At the conclusion of these interviews and the reviewing of the documents, there is no further evidence to suggest that the "Depth Charge Testing Area" was anything more than a stand alone test, and the area was never used again. Typically operational records do not provide detail of events that were recorded in the 1943 memorandum; this indicates that the "test" was associated to evaluate some sort of technical deployment of those 19 Mark 10 depth charges. Additionally, the area was likely used for a test to determine some technical deployment aspect those specific 19 Mark 10 depth charges. The lack of any recorded range fan information, the records of which would be retained in current EOD files, further support that the "Depth Charge Testing Area" was used as a one episode testing event.

**2. What is the recommended procedure that the project team can consider for the path forward?**

After the above independent research and personal knowledge of NAB Little Creek, NAVFAC Atlantic Technical Support Department recommends the PMT to proceed towards a No Further Action, (NFA) for the "Depth Charge Testing Area".