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FINAL PROPOSED PLAN SITE UNEXPLODED ORDNANCE 19 (UXO-19) OPERABLE UNIT
25 (OU 25) MCB CAMP LEJEUNE NC
02/01/2015
CH2M HILL



Proposed Plan

Site UXO-19: Operable Unit 25

Marine Corps Installations East-Marine Corps Base Camp Lejeune

North Carolina

February 2015

1. Introduction

This **Proposed Plan (PP)** identifies the Preferred Alternative for addressing potential **munitions and explosives of concern (MEC)** and/or **material potentially presenting an explosive hazard (MPPEH)** in the subsurface at **Site UXO-19: Operable Unit (OU) 25**, located at Marine Corps Installations East-Marine Corps Base Camp Lejeune (MCIEAST-MCB CAMLEJ) in Onslow County, North Carolina. Site UXO-19 was investigated under the **Military Munitions Response Program (MMRP)** at MCIEAST-MCB CAMLEJ.

The Preferred Alternative for Site UXO-19 is **land use controls (LUCs)**. This PP is issued jointly by the U.S. Department of the Navy (Navy), **the lead agency** for site activities, MCIEAST-MCB CAMLEJ, and the **U.S. Environmental Protection Agency (EPA)**, in consultation with the **North Carolina Department of Environment and Natural Resources (NCDENR)**, in order to solicit public comments on the remedial alternatives and, in particular, the preferred **remedial action** for Site UXO-19. This PP fulfills the public participation responsibilities required under Section 117(a) of the **Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)** and Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**.

This PP summarizes the remedial alternatives evaluated for Site UXO-19. Detailed background information for Site UXO-19 is contained in the **remedial investigation (RI)/feasibility study (FS)**, and other documents in the **Administrative Record** file and **Information Repository** for MCIEAST-MCB CAMLEJ. Key information from the RI/FS report, including the remedial alternatives considered and the rationale for selection of LUCs as the Preferred Alternative for Site UXO-19, is summarized in this PP (Section 9).

The Navy, MCIEAST-MCB CAMLEJ, and EPA, in concurrence with NCDENR, will make the final decision on the remedial action for Site UXO-19 after reviewing and considering all information submitted during the 30-day **public comment period**. The Navy and MCIEAST-MCB CAMLEJ, along with EPA, may modify the Preferred Alternative based on new information or public comment. A **Record of Decision (ROD)** will then be prepared to document the Selected Remedy for Site UXO-19. Therefore, public comment on the Preferred Alternative is invited and encouraged. Information on how to participate in the decision making process is presented in the sidebar in Section 10.

• The terms shown in **bold** are explained in the **Glossary**, beginning on page 16.

Mark Your Calendar for the Public Comment Period



February 25 to March 27, 2015

Submit Written Comments

The Navy will accept written comments on the PP during the public comment period. To submit comments or obtain further information, please refer to the insert page.

Attend the Public Meeting



Wednesday, February 25, 2015, 6 pm
Coastal Carolina Community College
Business Technology Building
Room BT105
444 Western Blvd
Jacksonville, NC 28546

The Navy will hold a public meeting to explain this PP. Spoken and written comments will be accepted at the meeting.

Administrative Record File:



Available online at:
<http://go.usa.gov/Dy5T>
Internet access is available at the:
Onslow County Library
58 Doris Avenue East
Jacksonville, NC 28540
(910) 455-7350

2. Site Background

MCIEAST-MCB CAMLEJ is a 156,000-acre facility located in North Carolina, just south of the City of Jacksonville, within Onslow County. The mission of MCIEAST-MCB CAMLEJ is to maintain combat-ready units for expeditionary deployment. The Base provides housing, training facilities, and logistical support for Fleet Marine Force Units and other assigned units.

2.1 Site Description and Background

Site UXO-19 occupies an area of approximately 64 acres of the Camp Devil Dog training area in the northwest portion of MCIEAST-MCB CAMLEJ. A **Military Operations in Urban Terrain (MOUT)** training facility is adjacent to the site to the east. The MOUT is an active training area for troops to practice tactical combat maneuvers in an urban setting. The MOUT was initially investigated as part of Site UXO-19 but was removed from the site because it will continue to be an active training area.

Various ranges and training courses have been in use within and adjacent to the site since the early 1950s. As a result of the use of these ranges, potential explosive hazards are present at Site UXO-19. The potential **sources** of explosive hazards are the MEC/MPPEH resulting from the use of these historical and active ranges within and adjacent to Site UXO-19 (Figure 1).

Key MMRP Terms (See the [Glossary](#) for more details.)

MEC – Military munitions that may pose unique explosive safety risks, either (1) **Unexploded ordnance (UXO)**, (2) **Discarded military munitions**, or (3) **Munitions constituents** in high enough concentrations to pose an explosive hazard.

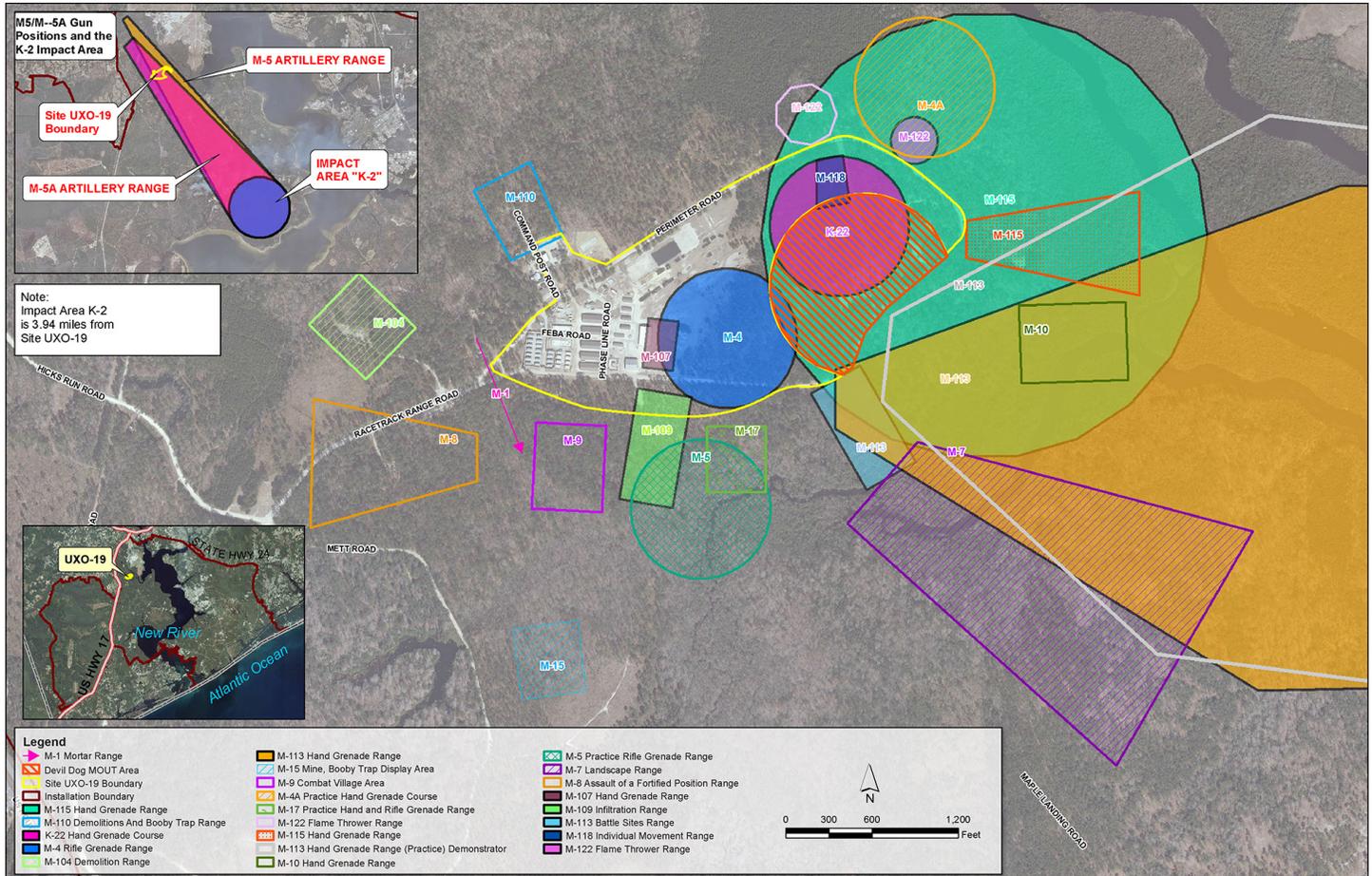
Filler in MEC items that is particularly dangerous includes high explosive and white phosphorus (which is used in flares and other devices that are designed to start fires, produce smoke, or provide illumination).

MPPEH – Munitions items that cannot be immediately inspected to determine whether the item could pose an explosive hazard. MPPEH is inspected by qualified personnel to classify it as either MEC or **material documented as safe (MDAS)**.

Munitions Constituents – Explosives residues (like TNT) and propellants (like rocket fuel) that have, for example, leaked from broken military munitions or were left behind after munitions did not completely detonate or burn. Munitions constituents can be found in soil (at or just below the surface) and can be carried to groundwater as rain (or other) water soaks into the soil. Sampling during MMRP investigation also includes metals that are associated with munitions.

UXO – Military munitions that (1) have been primed, fuzed, armed, or otherwise prepared for action, and (2) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard, and (3) that remain unexploded.

Figure 1 - Site and Historical Range Location Map



The MMRP Investigation Process

Site Preparation/Surface Clearance – Involves visually inspecting the ground surface for MEC/MPPEH and removing it prior to field investigations. Can include clearing vegetation, removing obstructions, demolishing structures, and surveying transects (equally spaced lines) for a digital geophysical mapping (DGM) survey.

DGM Survey – Uses magnetometers to locate and create a digital map of geophysical **anomalies**—areas of higher magnetic response that may indicate buried metal objects—that might be munitions. The instruments can be towed by hand or behind a vehicle, or mounted onto aircraft. The resulting data are used to select areas for further evaluation.

Intrusive Investigation – Involves digging on some or all of the geophysical anomalies identified by DGM to determine whether they are created by MEC/MPPEH or fall into one of the following:

- Non-munitions-related debris – Any metallic debris that isn't MEC/MPPEH, such as scrap metal or construction debris
- Facility resources – Permanent structures such as utilities or culverts
- Shared anomalies – Locations where a single item was represented by multiple anomalies
- No contact - The anomaly location was investigated but no items were found
- Quality control (QC) seed – Items that were intentionally buried by investigation personnel, which are the same size and shape as MEC/MPPEH likely to be found at the site, to test the quality of the DGM and anomaly retrieval process. All QC seeds were uncovered and removed during the Site UXO-19 MMRP investigation.

Focused Preliminary Assessment (PA)/Site Inspection (SI) (Administrative Record [AR] number 002885)

In 2009, a Focused PA/SI was conducted at Site UXO-19 to evaluate the nature and extent of contamination of site **media** that may have resulted from former range activities. Activities were completed in accordance with the following planning documents:

- MMRP Master Project Plans (AR 004162)
- Site-Specific Work Plan Addendum for Focused PA/SI, Camp Devil Dog Construction Area (AR 004399)

Soil and **groundwater** samples were collected and analyzed for munitions constituents: explosives residues, perchlorate, and select metals (antimony, arsenic, copper, lead, and zinc). The locations of soil and groundwater samples are shown on Figure 2.

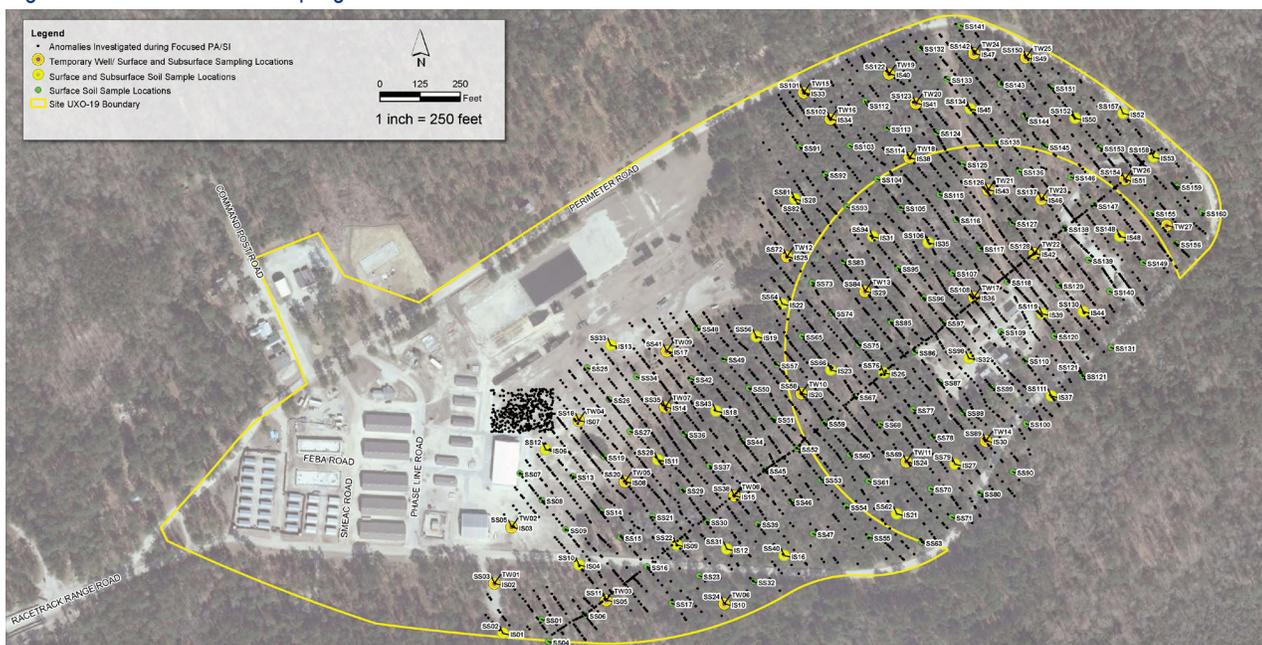
An MMRP investigation was conducted over a limited area of the site as described in the “MMRP Investigation Process” sidebar. Approximately 10 percent of the site was investigated in transects as shown on Figure 2. A total of 4,417 anomalies were investigated and approximately 51 percent were identified as either MEC or MPPEH. A total of 42 MEC items were identified and disposed of using explosive detonation. The remaining MPPEH items were inspected and re-inspected and were disposed of as MDAS. The majority of the MEC and MPPEH items were 60-millimeter (mm), and 81-mm mortar projectiles.

Human health and ecological risk screenings indicated that there were no unacceptable risks to human or ecological **receptors** from exposure to munitions constituents in soil or groundwater based on current or potential future use. However, there were unacceptable risks to human receptors from explosive hazards. Because of the number and types of MEC/MPPEH that were discovered, a 100 percent MMRP investigation was recommended to reduce the overall risk. No additional soil or groundwater sampling was recommended.

2.2 Summary of Previous Investigations, Studies, and Removal Actions

Site UXO-19 was characterized through two investigations between 2009 and 2013.

Figure 2 –Focused PA/SI Sampling Locations



RI/FS (AR 005876)¹

Based on the recommendation from the Focused PA/SI, additional MMRP investigation was completed at Site UXO-19 within an expanded area of the site. Activities were completed in accordance with the following planning document:

- Focused PA/SI Work Plan Addendum, Camp Devil Dog Construction Area Military Munitions Program Site UXO-19 (AR 002929)

The MMRP investigation was completed over 100 percent of accessible areas, including the area previously investigated during the PA/SI. The extent of the DGM survey is shown on Figure 3. The RI/FS summarized the nature and extent of munitions-related contamination, evaluated potential explosive hazards, and developed and evaluated remedial alternatives to address the remaining potential explosive hazards. MEC/MPPEH was encountered from ground surface to as deep as 4 feet (ft) below the ground surface (bgs). The distribution and number of MEC/MPPEH items are shown on Figures 4 and 5, respectively, and summarized in Table 1. The nature and extent of MEC/MPPEH is detailed in Section 3.1. Upon inspection and re-inspection, all demilitarized MPPEH was certified as MDAS.

Potential explosive hazards were significantly reduced. However, there are limitations to MMRP investigations including those imposed by instrument limits and site conditions. Although some MEC/MPPEH items were

detected at greater depths, instruments used during MMRP investigations can reliably detect the smallest items suspected to be present onsite to a depth of only 2 ft bgs. Site conditions that could limit MMRP investigations include standing water, buildings, utilities, compacted roadways, and other structures that prevented access. Therefore, MEC/MPPEH may remain onsite in those areas where it could not be detected due to the above limitations.

The FS evaluated the following remedial alternatives:

- 1 – No Action
- 2 – LUCs
- 3 – Subsurface removal of MEC/MPPEH in undeveloped areas (via excavation, DGM, and intrusive investigation) and LUCs
- 4 – Subsurface removal of MEC/MPPEH in undeveloped areas (via excavation and sifting) and LUCs

3. Site Characteristics

The topography within the site boundary is relatively flat, with surface elevations ranging from 14 to 26 ft above mean sea level (msl) across the site. No surface water bodies lie within the site, although stormwater runoff is anticipated to flow toward the east and southeast, eventually discharging to unnamed tributaries of the New River.

Figure 3 – Expanded Site Inspection Geophysical Investigation Results



¹The RI was initially planned and conducted as an Expanded Site Inspection (ESI); however, it was later determined that an RI was needed. Because the data collected during the Focused PA/SI and ESI was sufficient to complete an RI, no additional field work was necessary and the ESI results are provided and evaluated in the RI/FS.

Buildings within the site consist of small concrete block classrooms, military housing, a small medical facility, a bath house, and a headquarters building. An obstacle training course is also located on site.

The eastern portion of the site is generally undeveloped. Before investigation activities began, approximately 90 percent of the site was heavily vegetated. Much of the vegetation, including trees smaller than 6 inches in diameter, was cleared during the RI.

The shallow soils encountered within the site consist of

poorly graded sands, sands with variable amounts of silt and clay, and occasional clay lenses ranging from 3 inches to more than 9 ft thick.

Groundwater elevations range from 4.62 to 10.40 ft above msl. Groundwater in the surficial **aquifer** generally flows toward the northeast with an average hydraulic conductivity of 0.002 ft/ft.

The **conceptual site model (CSM)**, Figure 6, presents a summary of the MEC-related hazard sources, exposure pathways, and environmental receptors.

Figure 4 – MEC/MPPEH Distribution

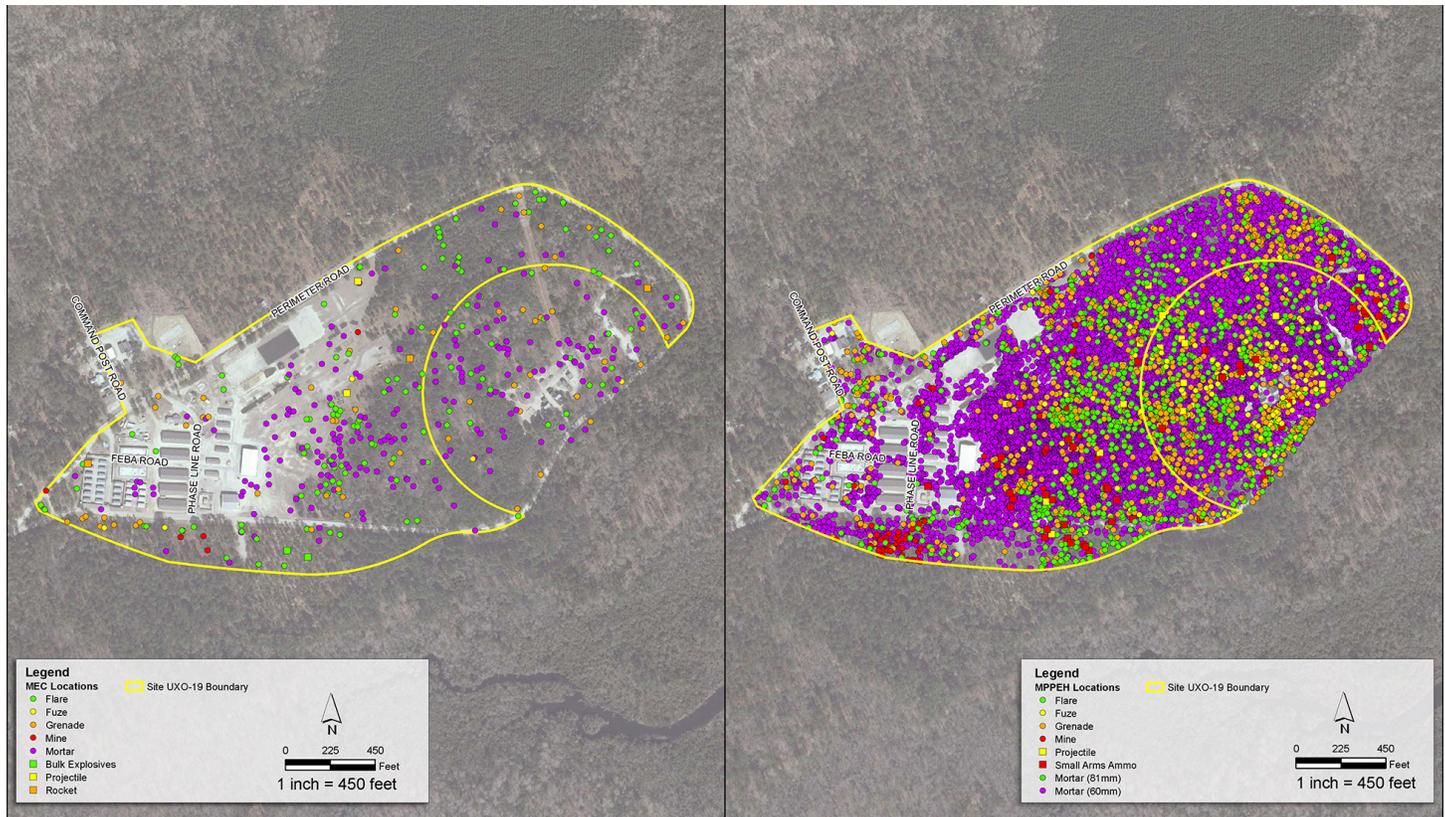


Figure 5 – Anomaly Investigation Results

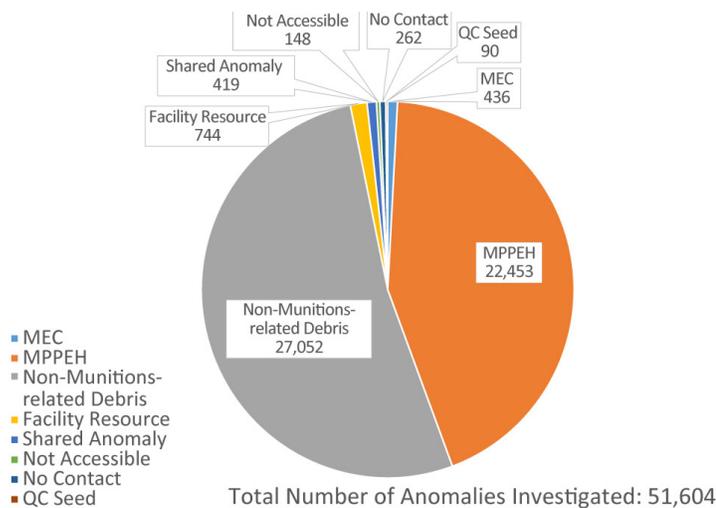


Table 1 – Type and Quantities of MEC/MPPEH

Item Type	Number of Items*	
	MEC	MPPEH
Flares	140	1,212
Fuzes and Igniters	5	233
Grenades	59	1,260
Mines	7	83
Mortar Projectiles	226	38,075
Bulk Explosives	3	0
Projectiles	2	47
Rockets	5	0
Small Arms Ammunition	Not applicable	9,861
Total	447	50,771

* Multiple items were found at some individual anomaly locations.

3.1 Nature and Extent of Contamination

Munitions Constituents

Surface and subsurface soil and groundwater were investigated during the PA/SI. Data were compared to the following screening levels:

- Groundwater – the more conservative value between the federal **maximum contaminant level (MCL)** and **North Carolina Groundwater Quality Standard (NCGWQS)**, EPA adjusted tapwater regional screening level (RSL), and MCIEAST-MCB CAMLEJ **background threshold values (BTV)** for metals.
- Soil – North Carolina Soil Screening Levels for the protection of groundwater (NC SSL), EPA adjusted residential and industrial RSL, and MCIEAST-MCB CAMLEJ BTV for metals.

The following constituents were detected above one or more screening levels

- Groundwater – 3-nitrotoluene at one location (Table 2).
- Surface Soil – Antimony, arsenic, and nitroglycerin at one or more locations (Table 3).
- Subsurface Soil – Arsenic at one or more locations (Table 3).

MEC/MPPEH

The DGM surveys identified 51,604 anomalies that represented potential MEC/MPPEH (Figures 3 and 5). Of these, the sources of 436 anomalies were found to be MEC and the sources of 22,453 were found to be MPPEH. MEC/MPPEH items were widespread across the investigation area and were found on the ground surface and at depths of up to 4 ft bgs (Figure 4). A total of 447 MEC items were uncovered; over half were mortar projectiles, with several possibly containing high explosives, white phosphorus, illuminating, smoke, or hexachlorethane filler. Flares and grenades made up the majority of the remaining MEC items. MEC items were disposed of through explosive detonation. If an item was safe to move it was transferred to a consolidation trench where it was destroyed. If an item was not safe to move or movement was not necessary it was blown in-place.

The distribution and types of MPPEH items were similar to those of MEC; mortar projectiles were the most common item, followed by grenades and flares. Several pieces of small arms ammunition (bullets) were also uncovered during the MMRP investigation. All MPPEH items that were recovered during the investigation were certified as MDAS and sent to an offsite facility for witnessed destruction.

As a result of limitations discussed in Section 2.2, MEC/MPPEH potentially remains in the uninvestigated areas and at depths greater than 2 ft bgs.

Table 2– Groundwater Munitions Constituents Exceedance Summary

Constituent	Screening Level		Rate of Exceedances	Concentration
	NCGWQS	Adjusted Tapwater RSL (a)		
Groundwater				
Explosives Residues (µg/L)				
3-nitrotoluene	NS	0.13	1/27	0.21

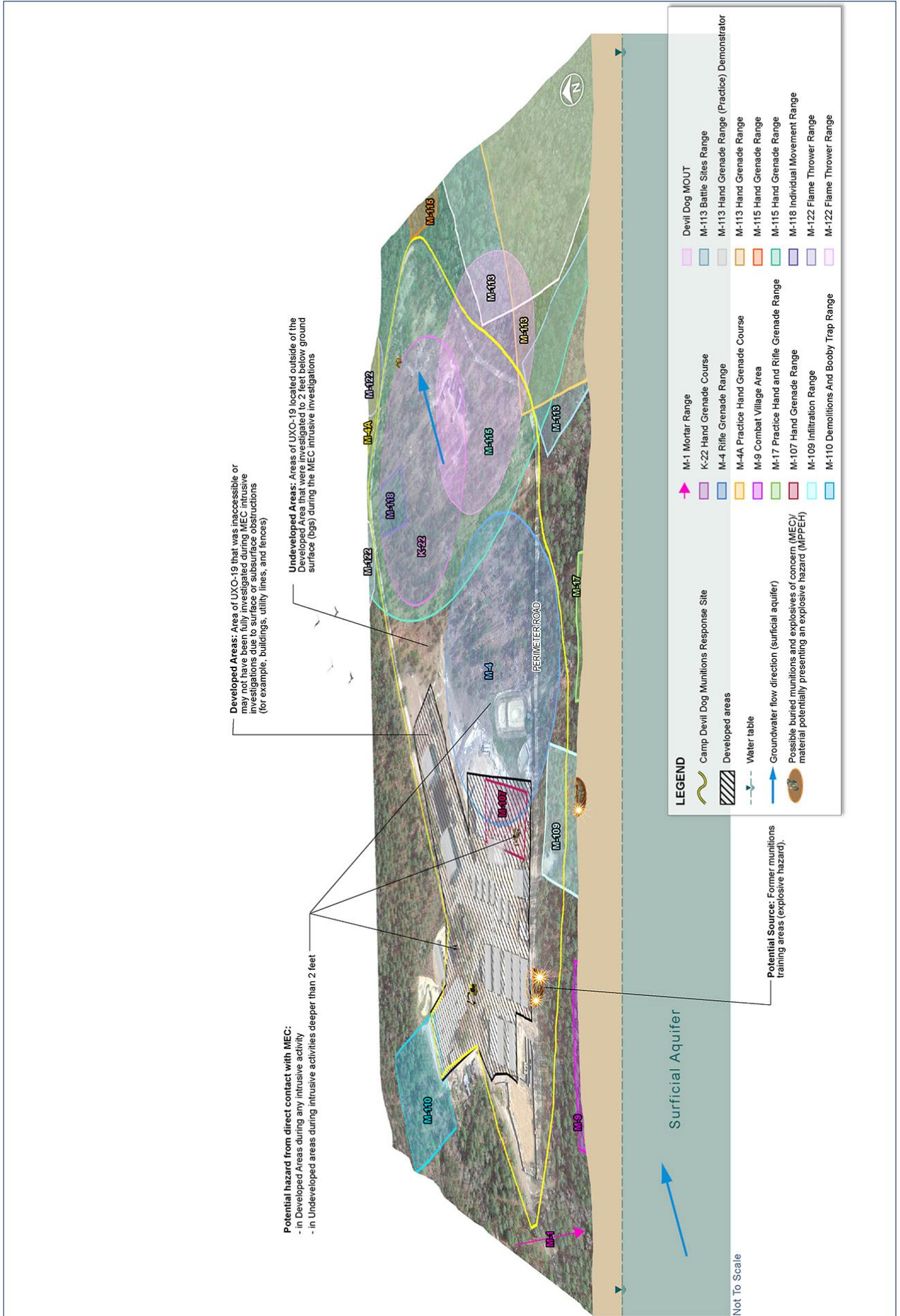
(a) RSLs are adjusted for non-carcinogens by dividing the RSL by 10 to account for cumulative effects from exposure to multiple chemicals
NS – no standard

Table 3 – Soil Munitions Constituents Exceedance Summary

Constituent	Screening Level				Rate of Exceedances	Range of Concentrations
	Background	NCSSL	Adjusted Industrial RSL (a)	Adjusted Residential RSL (a)		
Surface Soil						
Explosives Residues (mg/kg)						
Nitroglycerin	NS	NS	8.2	0.62	1/160	3.6
Metals (mg/kg)						
Antimony	1.87 (b)	0.9	41	3.1	1/160	5.2
Arsenic	1.17 (b)	5.8	3	0.67	15/160	1.6 to 11.7
Subsurface Soil						
Metals (mg/kg)						
Arsenic	5.09 (c)	5.8	3	0.67	36/54	1.4 to 11.7

(a) RSLs are adjusted for non-carcinogens by dividing the RSL by 10 to account for cumulative effects from exposure to multiple chemicals
(b) BTV for undeveloped area surface soil, combined soil types (AR 04705, 04706)
(c) BTV for undeveloped area subsurface soil, combined soil types (AR 04705, 04706)
NS – no standard

Figure 6 – Conceptual Site Model



What is an Explosive Hazard Evaluation?

An explosive hazard evaluation is a qualitative assessment of the likelihood of an explosion resulting in human injury or casualty to occur. For the presence of MEC/MPPEH to result in a human injury or casualty, MEC/MPPEH must be present, a human receptor must come into contact with, or be in the vicinity of, the MEC/MPPEH, and an event to cause the functioning of the MEC/MPPEH must take place.

In order to assess the likelihood of an explosive injury occurring, three types of factors are evaluated:

- **Site Factors** – These factors address site-specific features that impact the likelihood that a human receptor may come into contact with MEC/MPPEH, or be within close enough proximity of MEC/MPPEH to be injured during an explosive event. Site factors include physical features related to accessibility of the site.
- **Human Factors** – These factors address the likelihood that a human receptor would come into contact with or be in close proximity to MEC/MPPEH. Human factors include the number of people accessing the site, the frequency and duration of access, and the activities conducted while onsite.
- **Ordnance Factors** – These factors address whether an explosive event is likely to occur if contact is made with MEC/MPPEH and the severity of the explosive event if one did occur. Ordnance factors include size, type, sensitivity, location, density, and depth.

One tool that can be used to evaluate a UXO site's current and future potential for explosive hazards is the MEC Hazard Assessment (MEC HA). MEC HA is a qualitative tool developed to evaluate baseline explosive hazards to people based on current or reasonably anticipated land use, and to evaluate the relative reduction of explosive hazards by removal or other actions. The MEC HA is structured around three components of potential explosive hazard incidents:

- **Severity** – potential consequences of the effect (death or injury, for example) on a human receptor if an item detonates (ordnance factors)
- **Accessibility** – likelihood that a receptor will be able to come in contact with a MEC item (human and site factors)
- **Sensitivity** – likelihood that a receptor will be able to detonate the item (ordnance factors)

The MEC HA tool provides a score based on user inputs that falls within four defined ranges, called hazard levels. It is important to note that, although a numeric score is given, the results of the MEC HA should not be interpreted as a quantitative measure of explosive hazard.

- **Hazard Level 1** is a score between 840 and 1,000 and identifies a site with the highest potential explosive hazard conditions out of all of the hazard levels.
- **Hazard Level 2** is a score between 725 and 835 and identifies a site with high potential explosive hazard conditions.
- **Hazard Level 3** is a score between 530 and 720 and identifies a site with moderate potential explosive hazard conditions.
- **Hazard Level 4** is a score between 125 and 525 and identifies a site with low potential explosive hazard conditions

3.2 Fate and Transport of Contamination

Munitions Constituents

Metals and explosives residues have the potential to be released into the environment if the casing on MEC/MPPEH corrodes, exposing the filler, or if filler is exposed as a result of incomplete detonation. Upon release, fate and transport of the explosives residues and metals are controlled by physical processes such as sorption, dilution, advection, and dispersion; and by chemical and biological processes such as biodegradation, phototransformation (transformation processes requiring natural light), and phytotransformation (uptake and possible degradation through plants).

MEC/MPPEH

Migration of MEC/MPPEH, other than through human transport, is considered unlikely based on regional conditions influencing natural mechanisms and because possible MEC/MPPEH remaining onsite is either beneath structures or buried deeper than 2 ft. Frost upheaval in the Coastal Plain region of North Carolina is considered unlikely because the average temperature in the coldest months is 45° F and the average daily minimum temperature is 32° F.

Based on the historical activities conducted and the types of ordnance used at the site, MEC/MPPEH is unlikely to be deeper than 4 ft below the original ground surface due to penetration; however, site activities (construction, filling of low areas, resulting erosion, etc.) may disturb MEC/MPPEH potentially below the surface and/or cause MEC/MPPEH to become buried to deeper depths below current grade.

3.3 Principal Threats

Principal threat wastes are source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should they be exposed. Although the term principal threat waste is generally associated with, for example, contaminated soil, buried waste, non-aqueous phase liquid, and other toxic wastes, buried MEC/MPPEH in the soil may be considered a principal threat because it poses a potential explosive hazard to human receptors. However, the quantity and distribution of MEC/MPPEH most likely to be encountered (from the surface to 2 ft bgs) was significantly reduced during the MMRP intrusive investigation and the site is located on a restricted military base. If MEC/MPPEH were encountered, the likely receptors would be military personnel and other workers who have been trained in UXO avoidance. Furthermore, in order to result in an explosion, many of the items would need aggressive contact such as kicking, digging, striking, or throwing. Therefore, the potential for exposure that could result in an explosion is low.

4. Scope and Role of Response Action

MCIEAST-MCB CAMLEJ was placed on EPA's **National Priorities List (NPL)** effective November 4, 1989 (54 Federal Register 41015, October 4, 1989) under the narrative "Camp Lejeune Military Reservation (USNAVY)" and EPA ID# NC6170022580. There are 25 discrete OUs under CERCLA investigation at MCIEAST-MCB CAMLEJ. OU 25 is in the MMRP and consists of Site UXO-19.

Information on the status of all the OUs and sites at MCIEAST-MCB CAMLEJ can be found in the current version of the site management plan, available in the Administrative Record.

5. Summary of Site Risks

Potential human health and ecological risks from exposure to site media were evaluated in the Focused PA/SI and RI/FS. The following subsections summarize the risk assessment results.

5.1 Human Health Risk Screening – Munitions Constituents

The **human health risk screening (HHRS)** evaluated the potential risks to human health from exposure to munitions constituents in surface soil, subsurface soil, and groundwater.

Potential exposure pathways evaluated included the following:

- Contact with explosives residues and metals in surface soil (military personnel, maintenance workers, and trespassers)
- Contact with explosives residues and metals in subsurface soil (future residents and future construction workers)
- Contact with surficial groundwater during construction or excavation activities (future construction workers)
- Contact with surficial groundwater used as a potable water supply (future industrial workers and future residents)

Health risks are based on a conservative estimate of the potential cancer risk or the potential to cause other health effects not related to cancer [noncancer hazard, or **hazard index (HI)**]. EPA identifies an acceptable cancer risk range of 1 in 10,000 (10^{-4}) to 1 in 1,000,000 (10^{-6}) and below and an acceptable noncancer hazard as an HI that does not exceed 1. The estimates of risk at Site UXO-19 were used to determine if any further actions were required to sufficiently protect human health. The HHRA concluded that risks from exposure to surface soil, subsurface soil, and surficial groundwater at Site UXO-19 are within acceptable risk management ranges.

5.2 Ecological Risk Screening – Munitions Constituents

The **ecological risk screening (ERS)** evaluated potential risks from munitions constituents in soil and groundwater to ecological receptors. The ERS was completed by calculating a **hazard quotient (HQ)** by dividing the maximum concentration by **ecological screening values (ESV)**. Additional lines of evidence in the ERS included BTV for metals, frequency of detection, magnitude of exceedance, relationship between

screening value and average exposure concentration, and whether a constituent is a known laboratory contaminant.

The ERS concluded that there were no unacceptable risks to ecological receptors from exposure to surface and subsurface soil and groundwater. In addition, based on the frequency of detection and levels detected in onsite samples, risk is considered acceptable in drainage ditches that receive runoff or discharged groundwater from the site.

5.3 Explosive Hazard Evaluation – MEC/MPPEH

Information related to the explosive hazard evaluation methods can be found in the "What is an Explosive Hazard Evaluation" sidebar. The explosive hazard evaluation considered site factors, human factors, and ordnance factors in the assessment of potential explosive threats posed to human receptors by the potential presence of MEC/MPPEH in the surface and subsurface soil within the boundary of Site UXO-19.

- **Site Factors** - Site access is generally restricted to military or other authorized personnel who have been trained to recognize potential explosive hazards. There are no physical barriers to the site, but natural features and the presence of military personnel limit the likelihood that trespassers would enter the site.
- **Human Factors** – Approximately 21,000 Marines are trained at Camp Devil Dog annually. Troops live in barracks and spend most of their time onsite resulting in a high amount of potential contact time. Training may include intrusive activities, resulting in contact with buried MEC/MPPEH. All military and civilian personnel who access the site are required to complete munitions safety training.
- **Ordnance Factors** –The majority of MEC/MPPEH items found were mortar projectiles and flares with a variety of filler types including high explosives, white phosphorus, illuminating, smoke, and hexachlorethane filler. If MEC/MPPEH of the types previously discovered are onsite and did not function as designed, the probability of an unintentional detonation by casual contact, such as accidentally stepping on it, is moderate to high. More aggressive contact, such as striking the MEC/MPPEH, would make the probability of detonation even higher.

Under the current scenario (post MMRP investigation), the MEC Hazard Assessment (MEC HA) tool was used to evaluate the site conditions before (baseline) and after (current) the MMRP investigations were completed. The baseline score was 975, resulting in a Hazard Level of 1 (highest potential for explosive hazard). The MEC current scenario HA indicated that the undeveloped area had a Hazard Level of 4 (lowest potential for explosive hazards) and the developed/inaccessible area had a Hazard Level of 3 (moderate potential for explosive hazards).

The potential for human contact with MEC/MPPEH was significantly reduced by the MMRP investigations. However,

MEC/MPPEH may be encountered at depths greater than 2 ft, and in areas within the site that could not be investigated (such as beneath existing structures).

6. Remedial Action Objectives

The role of the Preferred Alternative presented in this PP is to address the explosive hazards present at Site UXO-19 by preventing current and future human exposure to potential explosive hazards posed by MEC. It is the judgment of the Navy, MCIEAST-MCB CAMLEJ, and EPA, in concurrence with NCDENR, that the Preferred Alternative identified in this PP is necessary to protect public health and welfare from potential explosive hazards.

In order to be protective of human health and the environment and to address potential hazards identified in the explosive hazard evaluation, the **Remedial Action Objective (RAO)** identified for Site UXO-19 is:

- Reduce or prevent the potential for direct physical contact with MEC/MPPEH to allow current and reasonably anticipated land use (infantry training) at the site to continue.

7. Summary of Remedial Alternatives

The remedial alternatives that were developed and evaluated to address MEC/MPPEH on the surface and in the subsurface within the developed/inaccessible areas, and MEC/MPPEH in the subsurface within the undeveloped area, at Site UXO-19 are detailed in the FS. A summary of remedial alternatives is presented in Table 4.

With the exception of the No Action alternative, all alternatives comply with ARARs and have the same RAO and anticipated future land uses. The No Action alternative does not protect human health and the environment; therefore, it does not meet the threshold criteria and will not be evaluated further.

8. Evaluation of Alternatives

The NCP outlines the approach for comparing remedial alternatives using the **nine evaluation criteria** listed in the following subsections (see the Glossary for a detailed description of each). A summary of the comparative analysis of the alternatives is presented in the following subsections and in Table 5.

8.1 Threshold Criteria

Overall Protection of Human Health and the Environment

All of the alternatives screened, with the exception of the No Action alternative, are protective of human health and the environment by reducing or controlling risks posed by the site through remedial strategies and/or LUCs. Alternatives 2, 3, and 4 are protective of human health and the environment because LUCs would control exposure to the subsurface MEC. The intrusive investigation conducted to-date has reduced the potential explosive hazard by reducing the amount of MEC/MPPEH onsite. Although Alternatives 3 and 4 would involve

actions to further reduce the potential to encounter MEC/MPPEH within the undeveloped area, complete removal of MEC/MPPEH cannot be guaranteed. MEC/MPPEH may also remain in the developed/inaccessible areas. Therefore, a low to moderate risk of explosive hazard would still be present after the MEC/MPPEH removal actions described in Alternatives 3 and 4 were implemented and LUCs would still be needed to prevent exposure.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121(d) of CERCLA, as amended, specifies in part, that remedial actions for cleanup of hazardous substances must comply with the ARARs unless they are waived under CERCLA Section 121(d) (4). See also 40 Code of Federal Regulations (CFR) § 300.430(f)(1)(ii)(B).

Alternatives 2, 3, and 4 are expected to comply with ARARs and it is not anticipated that any waivers will be required for these alternatives. A Notice of Contaminated Site will be filed as part of Alternatives 2, 3, and 4. Additional action-specific ARARs apply to Alternatives 3 and 4 based on earth-moving activities and the potential for MEC/MPPEH to be encountered, requiring management and disposal.

8.2 Primary Balancing Criteria

Alternative 1, No Action, did not meet the threshold criteria and therefore is not eligible for selection and was therefore not included in the evaluation.

Long-term Effectiveness and Permanence

Each alternative provides some degree of long-term protection that increases if MEC/MPPEH removal is included. Alternatives 3 and 4 may appear to be more effective in the long term because they would involve permanent removal of MEC/MPPEH up to a depth of 6 ft bgs throughout the undeveloped areas of the site. However, the resulting improvement of long-term effectiveness and permanence is marginal when compared to Alternative 2. Although removal of subsurface MEC/MPPEH minimizes the potential for exposure over time, the ability to remove the subsurface MEC/MPPEH is subject to the technology available to detect them and complete removal cannot be guaranteed. Additionally, the possibility for trespassers to encounter MEC/MPPEH is limited because MEC/MPPEH most likely to have been encountered (from the surface to 2 ft bgs) were removed, to the maximum extent practicable, during previous investigation activities. Therefore, the actual level of long-term protection for Alternatives 2, 3, and 4 would be relatively similar and LUCs would be required to minimize uncontrolled exposure to MEC/MPPEH that potentially remain.

Table 4 – Summary of Remedial Alternatives for Site UXO-19

Alternative	Components	Details	Cost/Timeframe	
2 – LUCs	LUCs	<p>LUCs to prevent potential exposure to explosive hazards within Site UXO-19.</p> <p>LUCs include:</p> <ul style="list-style-type: none"> Warning signs around the perimeter of the site. Restricting intrusive activities within the undeveloped area to less than 2 ft bgs. Restricting intrusive activities in areas identified as developed/inaccessible. Requiring UXO construction support for all intrusive activities greater than 2 ft bgs in the undeveloped area and any intrusive activity in the developed/inaccessible area. Munitions safety awareness training for all personnel working within the site boundary. 	<p>Capital Cost</p> <p>Total Periodic Cost</p> <p>Total Present Value Cost</p> <p>Cost Estimate Timeframe</p>	<p>\$40,000</p> <p>\$530,000</p> <p>\$570,000</p> <p>30 Years</p>
3 – Subsurface Removal of MEC/MPPEH in Undeveloped Areas (via Excavation, DGM, and Intrusive Investigation) and LUCs	<p>Removal Action</p> <p>LUCs</p>	<p>Subsurface removal of MEC/MPPEH in undeveloped areas to 6 ft bgs utilizing excavation to depth, DGM, and conducting an intrusive investigation on all anomalies identified as representing potential subsurface MEC.</p> <p>LUCs to prevent potential exposure to explosive hazards within Site UXO-19.</p> <p>LUCs include:</p> <ul style="list-style-type: none"> Warning signs around the perimeter of the site. Restricting intrusive activities within the undeveloped area to less than 6 ft bgs. Restricting intrusive activities in areas identified as developed/inaccessible. Requiring UXO construction support for all intrusive activities greater than 6 ft bgs in the undeveloped area and any intrusive activity in the developed/inaccessible area. Munitions safety awareness training for all personnel working within the site boundary. 	<p>Capital Cost</p> <p>Total Periodic Cost</p> <p>Total Present Value Cost</p> <p>Cost Estimate Timeframe</p>	<p>\$2,500,000</p> <p>\$300,000</p> <p>\$2,800,000</p> <p>30 Years</p>
4 – Subsurface Removal of MEC/MPPEH (via Excavation and Sifting) and LUCs	<p>Remove Action</p> <p>LUCs</p>	<p>Subsurface removal of MEC/MPPEH in undeveloped areas to 6 ft bgs. The entire area would be excavated from 0 to 6 ft bgs, with soils from 2 to 6 ft bgs being sifted to remove items 1 inch and larger from the soil mass.</p> <p>LUCs to prevent potential exposure to explosive hazards within Site UXO-19.</p> <p>LUCs include:</p> <ul style="list-style-type: none"> Warning signs around the perimeter of the site. Restricting intrusive activities within the undeveloped area to less than 6 ft bgs. Restricting intrusive activities in areas identified as developed/inaccessible. Requiring UXO construction support for all intrusive activities greater than 6 ft bgs in the undeveloped area and any intrusive activity in the developed/inaccessible area. Munitions safety awareness training for all personnel working within the site boundary. 	<p>Capital Cost</p> <p>Total Periodic Cost</p> <p>Total Present Value Cost</p> <p>Cost Estimate Timeframe</p>	<p>\$7,300,000</p> <p>\$300,000</p> <p>\$7,600,000</p> <p>30 Years</p>

Table 5 – Comparative Analysis of Alternatives

CERCLA Criteria	Alternative			
	(1) ¹	(2)	(3)	(4)
Threshold Criteria				
Protection of Human Health and the Environment	○	●	●	●
Compliance with ARARs	○	●	●	●
Primary Balancing Criteria				
Long-term Effectiveness and Permanence	NA	●	●	●
Reduction in Toxicity, Mobility, or Volume through Treatment	NA	○	●	●
Short-term Effectiveness	NA	●	●	●
Implementability	NA	●	●	●
Present-worth Cost	\$0	\$570k	\$2.8M	\$7.6M

Notes:

Alternative 1: No Action

Alternative 2: LUCs

Alternative 3: Subsurface Removal of MEC/MPPEH in Undeveloped Areas (via excavation, DGM, and intrusive investigation) and LUCs

Alternative 4: Subsurface Removal of MEC/MPPEH in Undeveloped Areas (via excavation and sifting) and LUCs

Relative Ranking: ● High (favorable) ● Moderate ○ Low (unfavorable)

Rankings are provided as qualitative descriptions of the relative compliance of each alternative with the criteria

¹The No Action alternative is used as a baseline for comparison purposes only, because it does not meet the threshold criteria, it is not a viable alternative for this site and was not further evaluated.

NA – Not applicable

Reviews conducted at least every 5 years, as required by CERCLA, would be necessary to evaluate the effectiveness of any of the alternatives because hazards would remain onsite above levels that allow for unlimited use and unrestricted exposure.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives 3 and 4 achieve reduction of toxicity, mobility, or volume through treatment because they include the removal and treatment (detonation) of subsurface MEC/MPPEH within the undeveloped areas of the site. There would be no reduction in toxicity, mobility, or volume through implementation of Alternative 2 because no treatment technologies would be employed.

Short-term Effectiveness

Short-term effectiveness, in terms of risks to workers, potential impacts to the community and environment during implementation, and time to implement would be most favorable for Alternative 2 as no activities other than administration of LUCs would be conducted, resulting in lower potential risks. Alternative 2 also has the lowest potential impact to the environment during implementation, and shortest implementation time-frame since no active treatment would be performed, only LUCs.

Risks to workers and the environment are higher for the active treatment Alternatives 3 and 4, but would be minimized through the use of engineering controls to prevent damage to human health and the environment. Alternative 3 is more effective than Alternative 4 in the short-term based on the shorter period of time to implement the remedy (six months vs. one year). Alternative 4 would have the largest potential impact to the environment because it would require significant use of heavy equipment to implement, resulting in higher emissions released into the atmosphere and would result in greater risk to workers than Alternatives 2 and 3.

Implementability

Alternative 2 would be the easiest to implement because LUCs are primarily an administrative action with minor field work to install signs. It is technically and administratively feasible, and the services, equipment, and materials required for its implementation are readily available. Both Alternatives 3 and 4 would require extensive vegetation clearance, soil excavation, stockpiling, and intrusive removal action activities that would potentially impact military training activities during implementation. Alternative 3 would include DGM, and subsequent intrusive investigation of the undeveloped area of the site and the resources and technologies to implement these activities are commonly used and available. Alternative 4 involves soil sifting and would have the lowest degree of implementability because of the overall volume of soil to be sifted and the duration estimated to complete the removal action.

Cost

An order-of-magnitude cost for each alternative has been estimated based on a variety of key assumptions. Costs and remedy components that were used in the cost estimate are summarized in Table 4.

The estimated present worth costs for the alternatives range from \$570,000 for Alternative 2 to \$7.6 million for Alternative 4.

8.3 Modifying Criteria

State Acceptance

State involvement has been solicited throughout the CERCLA and remedy selection process. NCDENR supports the Preferred Alternative, and its final concurrence will be solicited following the review of all comments received during the public comment period.

Community Acceptance

Community acceptance will be evaluated after the public comment period for this PP.

9. Preferred Alternative

Alternative 2, LUCs, was selected as the Preferred Alternative to address the potential explosive hazards posed by MEC/MPPEH remaining at Site UXO-19. The estimated LUCs boundaries are provided on Figure 7; the actual LUC boundaries will be finalized in the Remedial Design (RD).

The preferred alternative consists of the following:

- Installing warning signs around the perimeter of the site.
- Restricting intrusive activities within the undeveloped area to less than 2 ft bgs.
- Restricting intrusive activities in areas identified as developed/inaccessible.
- Requiring UXO construction support for all intrusive activities greater than 2 ft bgs in the undeveloped area and any intrusive activity in the developed/inaccessible area.
- Requiring munitions safety awareness training for all personnel working within the site boundary.
- Revising the Base Master Plan and/or geographic information systems mapping with the land use restrictions for this site.

The following land use restrictions would be implemented:

- Intrusive Activities Control (MEC) in Developed/Inaccessible Areas – Require UXO construction support for any intrusive activities within the areas identified as developed or inaccessible within Site UXO-19. Require 3R

(Recognize, Retreat, Report) munitions safety awareness training for Base personnel and subcontractors working within the Site UXO-19 boundary.

- Intrusive Activities Control (MEC) in Undeveloped Areas – Restrict intrusive activities within the undeveloped area with potential explosive safety hazards to less than 2 ft bgs. Require UXO construction support for all intrusive activities greater than 2 ft bgs and munitions safety awareness training for all personnel working within the Site UXO-19 boundary.

Additionally, a Notice of Contaminated Site would be filed in Onslow County real property records in accordance with North Carolina General Statutes 143B-279.9 and 143B-279.10.

The Navy and MCIEAST-MCB CAMLEJ are responsible for implementing, maintaining, reporting on, and enforcing the LUCs. The LUC implementation actions, including enforcement requirements, will be provided in a Land Use Control Implementation Plan (LUCIP) that will be prepared as part of the RD.

The Navy will submit the LUCIP and RD to EPA and NCDENR for review and approval pursuant to the primary document review procedures stipulated in the Federal Facility Agreement. The Navy will maintain, monitor (including conducting periodic inspections), and enforce the LUCs according to the requirements contained in the LUCIP and the RD. Land Use Controls will be maintained indefinitely unless additional action is taken to remove potential explosive hazards, allowing for unrestricted use and exposure. The need for LUCs to prevent exposure to explosive hazards and ensure protection will be periodically reassessed.

Based on information currently available, the Navy, MCIEAST-MCB CAMLEJ, EPA, and NCDENR believe the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The Navy expects the Preferred Alternative to satisfy the following requirements of CERCLA: (1) protects human health and the environment, (2) complies with ARARs, (3) is cost-effective, (4) uses permanent solutions and alternative treatment technologies to the maximum extent practicable, and (5) preference for treatment as a principal element, or justify not meeting the preference.

Although treatment is preferred wherever feasible, Alternative 2 is the Preferred Alternative because it provides a similar level of long-term protection as Alternatives 3 and 4, and previous intrusive actions have already removed a large amount of MEC/MPPEH from the surface to 2 ft bgs, the depth interval most likely to encounter MEC/MPPEH. Implementation of Alternative 2 is also significantly less damaging to the environment, would result in lower risks to workers during implementation, would be significantly less

disruptive to current training operations, and would be less expensive than Alternatives 3, and 4, both of which would still require LUCs in the long-term.

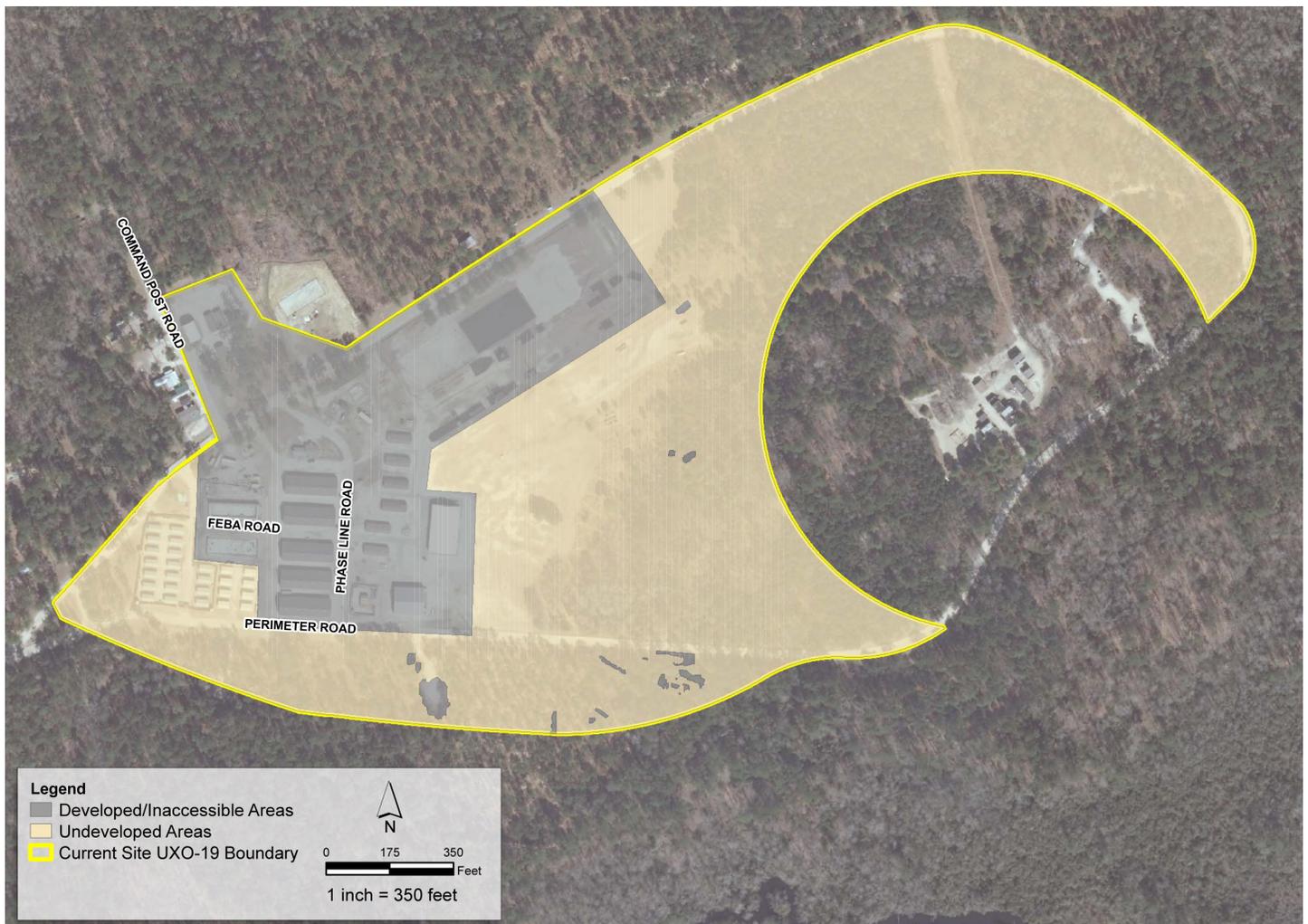
The Preferred Alternative can change in response to public comment or new information.

Because potential explosive hazards remain and unlimited use and unrestricted exposure will not be achieved, the Navy will review the final remedial action no less than every 5 years after initiation of the remedial action, in accordance with CERCLA Section 121(c) and the NCP at 40 CFR 300.4309f) (4)(ii). If results of the 5 year reviews reveal that remedy integrity is compromised and protection of human health is insufficient, additional remedial actions would be evaluated by the parties and implemented by the Navy.

10. Community Participation

The Navy and EPA provide information regarding environmental cleanups at Site UXO-19 to the public through the Restoration Advisory Board, public meetings, the Administrative Record file for the site, the Information Repository, and announcements published in Jacksonville Daily News and The Globe. The public is encouraged to gain a more comprehensive understanding of Site UXO-19 and the MMRP. The public comment period for this PP is from February 25 to March 27, 2015, and a public meeting will be held on February 25 (see page 1 for details). The Navy will summarize and respond to comments in a Responsiveness Summary, which will become part of the official ROD and will also be included in the Administrative Record file.

Figure 7 – Estimated LUC Boundaries



Location of Administrative Record and Information Repository

Available online at: <http://go.usa.gov/Dy5T>

Internet access is available at the
Onslow County Library
58 Doris Avenue East
Jacksonville, NC 28540
(910) 455-7350

During the comment period, interested parties may submit written comments to the following addresses:

Mr. Dave Cleland

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North Carolina IPT
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Raleigh, NC 27699-1646

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randy.mcelveen@ncdenr.gov

Glossary of Terms

This glossary defines in non-technical language the more commonly used environmental terms appearing in this PP. The definitions do not constitute the Navy's, EPA's, or NCDENR's official use of terms and phrases for regulatory purposes, and nothing in this glossary should be construed to alter or supplant any other federal or state document. Official terminology may be found in the laws and related regulations as published in such sources as the Congressional Record, Federal Register, and elsewhere.

Administrative Record: A compilation of site-related information for public review.

Anomaly: Any identified subsurface mass that may be geologic in origin, unexploded ordnance, or some other man-made material. Such identification is made through geophysical investigation and reflects the response of the sensor used to conduct the investigation.

Applicable or Relevant and Appropriate Requirements (ARARs):

- *Applicable requirements*, as defined in 40 CFR § 300.5, are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be applicable.
- *Relevant and appropriate requirements*, as defined in 40 CFR § 300.5, means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site. Only those state standards that are identified by the state in a timely manner and that are more stringent than federal requirements may be relevant and appropriate.

Aquifer: Underground bed of soil or rock from which groundwater can be usefully extracted. At MCIEAST-MCB CAMLEJ, there are two aquifers that are affected by contamination. The surficial aquifer ranges in depth from ground surface to 25 ft bgs. The Castle Hayne aquifer extends below the surficial aquifer to a depth of roughly 180 ft bgs. The upper most region of this aquifer is known as the upper Castle

Hayne (25 to 60 ft bgs).

Background threshold value (BTV): Levels of a constituent that is usually described as naturally occurring (substances present in the environment not related to human activity) or anthropogenic (natural and human-made substances present in the environment as a result of human activities not related to the CERCLA release in question). Background threshold values are typically calculated using statistical methods on a data collected from off-site sources that are not likely to be influenced by historical activities or releases.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA): A federal law, commonly referred to as the Superfund Program, passed in 1980 and amended in 1986 by the Superfund Amendments and Reauthorization Act codified at 42 United States Code §§ 9601 et seq., and amended again in 2000. CERCLA created a trust fund known as the Superfund, which is available to EPA to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Conceptual site model (CSM): A description of a site and its environment that is based on existing knowledge and that assists in planning, interpreting data, and communicating. It describes sources of contamination (for example, spills) and receptors (for example, humans) and the interactions that link the two.

Discarded Military Munitions (DMM): Munitions that (1) have been abandoned without proper disposal (by current standards, which may not have been in effect at the time), or (2) have been removed from storage in a military magazine or other storage area for the purpose of disposal; and (3) are not defined as unexploded ordnance.

Ecological risk screening (ERS): an evaluation of risks posed to the environment if remedial activities are not performed at the site.

Ecological screening value (ESV): Concentrations of contaminants in site media that are known to cause harmful effects in plants or animals. By comparing known, maximum concentrations of contaminants at a site to the ESV, the possibility of ecological risk can be estimated. ESVs were selected as follows:

- Soil - the more conservative between the EPA Region 4 ESV and the EPA Ecological Soil Screening Levels
- Groundwater - the lowest available freshwater and marine EPA Region 4 ESV and the EPA National Recommended Water Quality Criteria set

Feasibility study (FS): An assessment of the nature and extent of contamination at a given site, for the purpose of developing and evaluating remedial alternatives, as appropriate.

Groundwater: Subsurface water that occurs in soils and in geologic formations that are fully saturated.

Hazard index (HI): A number indicative of non-cancer health effects that is the ratio of the existing level of exposure to an acceptable level of exposure. A value equal to or less than 1 indicates that the human population is not likely to experience adverse effects.

Human health risk screening (HHR): An evaluation of the risk posed to human health should remedial activities not be implemented at a site.

Hazard quotient (HQ): the ratio of the exposure estimate to an effects concentration considered to represent a “safe” environmental concentration or dose.

Information Repository: A file containing information, technical reports, and reference documents regarding an NPL site. This file is usually maintained at a location with easy public access, such as a public library.

Intrusive investigation: a munitions response technique that uses manual and/or mechanical means to identify and remove (as applicable) the source of a geophysical anomaly.

Land use controls (LUCs): Physical, legal, or administrative methods that restrict the use of or limit access to property to reduce risks to human health and the environment.

Lead agency: Represented by a Remedial Project Manager (RPM) that has the primary responsibility for coordinating a response action. EPA, a state environmental agency, or another federal agency can serve as the lead agency. Generally, the lead agency RPM is responsible for overseeing all technical, enforcement, and financial aspects of a remedial response.

Material documented as safe (MDAS): Material that is determined not to present an explosive hazard after (1) undergoing a 100-percent visual inspection and an independent 100-percent re-inspection by qualified personnel, or (2) processing by a method (approved by the DoD Explosives Safety Board), such as controlled detonation), and followed by inspection to confirm that no explosive risk remains.

Material potentially presenting an explosive hazard (MPPEH): Munitions items or residues that cannot be immediately inspected to determine whether the item could pose an explosive hazard. MPPEH includes material potentially containing explosives or munitions; or material potentially containing high enough concentration of explosives to present an explosive hazard. MPPEH is inspected by qualified personnel to classify as either MEC or MDAS.

Maximum Contaminant Level (MCL): Standards set by the EPA regulating drinking water.

Mean sea level (MSL): Average height of the ocean’s surface.

Media: Soil, groundwater, surface water, or sediments at the site.

Military Operations in Urban Terrain (MOUT): Military actions that are planned and conducted on a terrain complex where man-made construction affects the tactical options available to the commander.

Munitions and explosives of concern (MEC): This term, which distinguishes specific categories of military munitions that may pose unique explosive safety risks, means (1) Unexploded ordnance (2) Discarded military munitions or (3) Munitions constituents present in high enough concentrations to pose an explosive hazard.

Munitions constituents: Explosives, propellants, and fillers originating from military munitions. Analyses include explosives residues (including pentaerythritol tetranitrate [PETN] and nitroglycerin), perchlorate, as well as select metals (lead, antimony, copper, zinc, and arsenic) that are associated with munitions.

Military Munitions Response Program (MMRP): The Navy, as the lead agency, acts in partnership with EPA and NCDENR to address munitions investigations at the facility through the program.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): Provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

National Priorities List (NPL): A list developed by EPA of uncontrolled hazardous substance release sites in the United States that are considered priorities for long-term remedial evaluation and response.

Nine evaluation criteria: The NCP outlines the approach for comparing remedial alternatives using the following evaluation criteria:

- *Overall Protection of Human Health and the Environment* – Addresses whether a remedy provides adequate protection and how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
- *Compliance with ARARs* – A statutory requirement for remedy selection that an alternative will either meet all of the ARARs or that there is a good rationale for waiving an ARAR.
- *Long-term Effectiveness and Permanence* – Addresses the expected residual risk that will remain at the site after completion of the remedial action and the ability of a remedy to maintain reliable protection of human health and the environment in the future as well as in the short term.
- *Reduction of Toxicity, Mobility, and Volume through Treatment* – The anticipated performance of the treatment technologies that a remedy may employ in their ability to reduce toxicity, mobility or volume of contamination.
- *Short-term Effectiveness* – Considers the short-

term impacts of the alternatives on the neighboring community, the industrial workers, remedial construction workers, and the surrounding environment, including potential threats to human health and the environment associated with the collection, handling, treatment, and transport of hazardous substances.

- *Implementability* – The technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement an option.
- *Cost* – Encompasses all construction, operation, and maintenance costs incurred over the life of the project, expressed as the net present value of these costs.
- *State Acceptance* – Considers substantial and meaningful state involvement in the PP.
- *Community Acceptance* – The public's general response to the alternatives described in the PP and the RI/FS. The specific responses to the public comments are addressed in the Responsiveness Summary section of the ROD.

North Carolina Department of Environment and Natural Resources (NCDENR): The state agency responsible for administration and enforcement of state environmental regulations.

North Carolina Groundwater Quality Standards (NCGWQS): Enforceable standards developed by NCDENR. They are the maximum allowable contaminant concentrations resulting from any discharge of contaminants to the land or waters of the state, which may be tolerated without creating a threat to human health or which would otherwise render the groundwater unsuitable for its intended best usage.

Operable Unit (OU): A discrete action that comprises an incremental step toward comprehensively addressing site problems. The cleanup of a site can be divided into a number of OUs, depending on the complexity of the problems associated with the site. OUs can address geographical portions of a site, specific site problems, or different phases of remediation at a site.

Proposed Plan (PP): A document that presents and requests public input regarding the proposed cleanup alternative.

Public comment period: The time allowed for the members of an affected community to express views and concerns regarding an action proposed to be taken by the Navy and EPA, such as a rulemaking, permitting, or Superfund remedy selection.

Receptors: Humans, animals, or plants that may be exposed to risks from contaminants related to a given site.

Record of Decision (ROD): A public document that explains which cleanup alternative(s) will be used at NPL sites where, under CERCLA, trust funds pay for the cleanup.

Regional Screening Level (RSL): chemical-specific concentrations for individual contaminants in air, drinking water and soil that may warrant further investigation or site cleanup. RSLs for non-carcinogens are adjusted by dividing by 10 to account for cumulative effects from exposure to multiple chemicals.

Remedial action: A cleanup method proposed or selected to address contaminants at a site.

Remedial action objectives (RAOs): Objectives of remedial actions that are based on contaminated media, COCs, potential receptors and exposure scenarios, human health and ecological risk assessments, and attainment of regulatory cleanup levels, if any exist.

Remedial investigation (RI): A study to determine the nature and extent of contaminants present at a site and the problems caused by their release.

Site: The area of a facility where a hazardous substance, hazardous waste, hazardous constituent, pollutant, or contaminant from the facility has been deposited, stored, disposed of, placed, has migrated, or otherwise come to be located.

Source: The suspected sources of contaminants and MEC at Site UXO-19 are historical and active ranges within and adjacent to the site.

U.S. Environmental Protection Agency (EPA): The federal agency responsible for administration and enforcement of CERCLA (and other environmental statutes and regulations), and with final approval authority for the selected remedy.

Unexploded Ordnance (UXO): Military munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material and that remain unexploded either by malfunction, design, or any other cause.

Mark Your Calendar for the Public Comment Period

Public Comment Period

February 25, 2015 -
March 27, 2015

Submit Written Comments

The Navy will accept written comments on this Proposed Plan during the public comment period. To submit comments or obtain further information, please refer to the names and contact information included at the end of Section 10. A blank sheet has been added at the end of this document to be used for writing comments.



Attend the Public Meeting

February 25, 2015
at 6:00 PM

Coastal Carolina
Community College
Business Technology Building, Room BT105
444 Western Blvd
Jacksonville, NC 28546

The Navy will hold a public meeting to explain the Proposed Remedial Action Plan. Verbal and written comments will be accepted at this meeting.



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Place
stamp
here

Mr. Dave Cleland
NAVFAC Mid-Atlantic
Marine Corps IPT
6506 Hampton Blvd
Norfolk, VA 23508