

# Proposed Remedial Action Plan

Atlantic Fleet Weapons Training Area - Vieques Former Naval Ammunition Support Detachment Vieques, Puerto Rico November 2022

## 1. Introduction

This Proposed Plan, also referred to as Proposed Remedial Action Plan, identifies the preferred alternative and associated rationale for UXO 16.1, located adjacent to the western-most portion of the former Naval Ammunition Support Detachment (NASD) in Viegues, Puerto Rico. UXO 16 comprises approximately 11,500 acres offshore of the former Viegues Naval Training Range (VNTR) and former NASD that may have been impacted by munitions during past military training activities. UXO 16 is also referred to as Operable Unit (OU) 17 in the Superfund Enterprise Management System (SEMS), which is a database maintained by the United States Environmental Protection Agency (EPA) to track the progress at hazardous waste sites. UXO 16.1 is a 200-acre portion of UXO 16 comprising the offshore explosive safety buffer arc associated with the adjacent former open burn/open detonation (OB/OD) site known as Solid Waste Management (SWMU) 4. A Record of Decision (ROD) for SWMU 4 (OU 7 in SEMS) was signed in 2019.

This Proposed Plan summarizes the UXO 16.1 history, the results of previous environmental investigations, and the preferred alternative to address potential explosive hazards (also referred to as "explosive risks") at UXO 16.1, and it solicits and facilitates public review of and comment on the preferred alternative as well as the other alternatives presented.

# Mark Your Calendar for the Public Comment Period

November 9 - December 9, 2022



Submit Written Comments

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

Attend the Public Meeting November 16, 2022 at 5:00 p.m. Vieques Multiple Use Center Antonio Mellado – (across from Plaza) Isabel Segunda, Vieques, PR



The Navy will hold a public meeting to present and discuss the preferred remedial alternative as well as the other alternatives considered. Verbal and written comments will also be accepted at this meeting.

## Location of Administrative Record File Online at: <u>https://go.usa.gov/xSfZq</u>

This document is issued by the Department of the Navy (Navy), Naval Facilities Engineering Systems Command (NAVFAC) Atlantic and EPA Region 2 in consultation with the Puerto Rico Department of Natural and Environmental Resources (PRDNER). The Proposed Plan fulfills the public participation requirements in Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Beginning in 2012, a number of investigations were conducted at UXO 16.1 to determine the nature and extent of munitions and explosives of concern (MEC) and contaminants that may have been released to the environment because of historical OB/OD activities. These investigations included a Site Inspection (SI) in 2012, an Expanded Site Inspection (ESI) in 2015, and a Remedial Investigation (RI) in 2016. Based on the results of and observations made during these investigations it was concluded a low quantity of MEC, which represents an explosive hazard, may be present within UXO 16.1, but that there are no unacceptable risks associated with contaminants that may be present, as further detailed in this Proposed Plan.

Based on the investigations performed and current and future anticipated use of UXO 16.1 as a recreational area, the preferred alternative is Nearshore MEC Clearance and Land Use Controls with Monitoring to address MEC that potentially remain in UXO 16.1. The "nearshore" areas are those areas just offshore of SWMU 4 most representative of where beachgoers participate in recreational activities such as wading, swimming, snorkeling, scuba diving, fishing, and boat anchoring.

The Navy and EPA, in consultation with PRDNER, will make the final decision on the preferred alternative for UXO 16.1 after reviewing and considering all information submitted during the 30-day public comment period. If warranted, based on public comments and/or new information, the preferred alternative set forth in this document may be modified or another alternative described in the Proposed Plan may be considered. This Proposed Plan summarizes information that can be found in greater detail in the RI Report (CH2M, 2018), Feasibility Study (FS) Report (CH2M, 2022), and other documents associated with the various investigations conducted at UXO 16.1 (see Section 2.3), which are contained in the Administrative Record file for UXO 16.1. A glossary of key terms in this document is presented in Section 10. These key terms are identified in bold print the first time they appear.

## 2. Site Background

#### 2.1. Facility Description and History

Vieques is located in the Caribbean Sea, approximately 7 miles southeast of the eastern tip of the main island of Puerto Rico (Figure 1). Other than the main island of Puerto Rico itself, Vieques is the largest island of the Commonwealth. It is approximately 20 miles long and 4.5 miles wide and has an area of approximately 33,088 acres (51 square miles).

The Navy purchased portions of Viegues in the early 1940s to conduct activities related to military training. Operations within the 8,114-acre former NASD (the western one-third of Viegues) consisted mainly of ammunition loading and storage, vehicle and facility maintenance, and some training. Operations within the 14,600-acre former VNTR, the eastern one-half of Viegues, comprised various aspects of naval gunfire training, including air-to-ground ordnance delivery and amphibious landings, as well as housing the main base of operations for these activities at Camp García. In accordance with a January 30, 2000, Presidential Directive to the Secretary of Defense, the Navy ceased operations at the former NASD on April 30, 2001, at which time the land was subdivided and transferred to the Department of the Interior (DOI), Municipality of Viegues, and Puerto Rico Conservation Trust (Figure 2). SWMU 4, the former OB/OD site adjacent to UXO 16.1, is part of the 3,158 acres of the former NASD transferred to DOI to be managed by the

United States Fish and Wildlife Service (USFWS) as a National Wildlife Refuge.

On February 11, 2005, the Atlantic Fleet Weapons Training Area – Vieques (also known as AFWTA-Vieques), comprising the former NASD and former VNTR, was added to the National Priorities List (NPL), which required all subsequent environmental restoration activities to be conducted under CERCLA. On September 7, 2007, the Navy, DOI, EPA, and Commonwealth of Puerto Rico finalized a Federal Facility Agreement (FFA) that established the procedural framework and general schedule for implementing the CERCLA activities for Vieques. The Navy retains the primary responsibility under the FFA for conducting the environmental investigations and cleanup of the property, as warranted. The area within UXO 16.1 is under the administrative jurisdiction of PRDNER. While DOI has no jurisdictional authority over UXO 16 and is therefore not a signatory agency for UXO 16 RODs, because much of UXO 16 borders National Wildlife Refuge lands, DOI (through USFWS) is an integral part of cleanup planning for offshore areas such as UXO 16.1.



#### Figure 1 – Regional Location Map





#### 2.2. Site Description

UXO 16.1 is approximately 200 acres and is at the western end of Vieques adjacent to SWMU 4

(Figure 2). While UXO 16.1 had no specific use, SWMU 4 was used for the thermal destruction of retrograde and surplus munitions, fuels, and

propellants from 1969 through 1979 and may have periodically been used for this purpose as far back as the late 1940s. Fuels, propellants, and explosive waste materials were burned and/or detonated in 16 man-made earthen bermed pits that ranged in size from 10 to 25 feet across. These OB/OD activities resulted in MEC and related debris being ejected from the OB/OD pits into surrounding areas, including the adjacent offshore area. UXO 16.1 is the offshore portion of the SWMU 4 explosive safety arc, which is the area within which material ejected from the OB/OD pits could have fallen.

#### 2.3. Summary of Previous Investigations

Several munitions and environmental investigations have been conducted at UXO 16.1, beginning in 2012. The following subsections summarize the purpose, scope, and results of these investigations. The dates provided in the subsection headings refer to the dates the investigation fieldwork was performed.

#### Site Inspection (2012)

SI field activities were conducted in 2012, within 14 acres of the 200-acre UXO 16.1 area. The SI focused on the nearshore area closest to the OB/OD pits at the confluence of the large ephemeral stream (quebrada) and UXO 16.1.

The underwater investigation included instrumentaided visual surveys performed by divers along 14 transects from the shoreline to 600 to 800 feet offshore. While 72 non-munitions items were found, only one MEC was identified, comprising a 20millimeter (mm) projectile, which was removed.

#### Expanded Site Inspection (2015)

An ESI was conducted in 2015 that included an underwater visual survey for the presence of potential MEC on the seafloor and an instrument-aided survey and excavation of subsurface anomalies detected on the seafloor, across nearly 200 acres of UXO 16.1. The ESI was conducted to provide a more comprehensive assessment of if/where a release of MEC occurred and to determine if further investigation or action was warranted (Figure 3) (CH2M, 2016).

The ESI approach divided the investigation area into five zones (Zones A through E) with a varying transect coverage and spacing based on exposure potential (Figure 3). In general, the approach was based on the understanding that recreational/research use would be highest in areas closer to the shoreline as beachgoers engage in such activities as wading, swimming, snorkeling, scuba diving, fishing, and boat anchoring.

Approximately 15 miles of transects were surveyed, during which only three MEC, specifically discarded military munitions (DMM), were identified, all of which were within Zones A, B, and D (Figure 3). The DMM items were identified as photoflash cartridges, which are pyrotechnic cartridges designed to produce a brief/intense illumination for low altitude nighttime photography. In addition, 59 munitions debris (MD) items were identified, also primarily located within Zones A and D. All MEC and MD found during the ESI were removed.

#### Remedial Investigation (2016)

RI field activities were conducted in 2016 to complete the evaluation of the nature and extent of potential contamination initiated by the SI and ESI and determine potential risks to human and ecological receptors. The RI comprised two separate, but related components – one focusing on MEC and one focusing on chemical contaminants in sediment.

The nature and extent of MEC characterization was achieved with the information gathered during the SI and ESI. These activities demonstrated the majority of the MEC and MD were located immediately offshore nearest to the OB/OD areas and the mouth of the ephemeral stream. No munitions were identified further offshore (within Zone E and seaward extents of Zones B, C, and D), which is consistent with sediment transport moving northwestward with the direction of the waves rather than from the beach to further offshore (Figure 3). The findings indicate munitions have not been transported far from shore or beyond the UXO 16.1 boundary. The munitions items found showed significant signs of corrosion and heavy encrustation, the latter of which suggest they have been relatively immobile. In addition, no MEC or MD were identified in the ocean near the former lagoon connection with Laguna Boca Quebrada; therefore, the potential for transport of munitions from the lagoon into the ocean is likely negligible.

The nature and extent of chemical constituents (explosives and inorganics) in UXO 16.1 were characterized during the RI activities conducted in 2016. A total of 21 sediment samples were collected at UXO 16.1 from areas with the highest potential for contamination, which are depositional areas and locations where MEC and higher densities of MD were found, as well as from other areas that ensured appropriate spatial coverage within UXO 16.1. In addition, 16 background sediment samples were collected outside of UXO 16.1 to help distinguish inorganics present as a result of background or non-site-related influence.

The sediment data were evaluated in a human health risk assessment (HHRA) and ecological risk assessment (ERA) completed during the RI (see Section 4). The HHRA and ERA identified no unacceptable risks to human health or the environment as a result of historical OB/OD operations at SWMU 4. Therefore, no remedial action is necessary to be protective of potential human and ecological receptors (current or future) with respect to chemical contaminants in environmental media. However, due to the potential presence of MEC remaining within UXO 16.1, remedial action to address potential explosive hazard associated with anticipated uses of the area is warranted.

#### Beach Dynamics Investigation (2014-2017)

A Beach Dynamics Investigation (BDI) was performed at multiple beaches within the former VNTR and the beach at SWMU 4 to develop an understanding of beach and nearshore changes, and their relationship to the burial and mobility of munitions. BDI activities were conducted from October 2014 through February 2016, with additional beach surveys in October and November 2017 to evaluate the impact of the August and September 2017 hurricanes.

The BDI demonstrated that at Viegues underwater munitions do not undergo significant lateral movement, even during hurricane conditions. Between the start of active military operations at SWMU 4 (1940s) and when the SI (2012) and ESI (2015) were conducted within UXO 16.1, a number of named storms passed in relatively close proximity to Viegues (e.g., Hurricanes Betsy [1956], Hugo [1989], Marilyn [1995], Bertha [1996], Georges [1998], Jose [1999], and Debby [2000], and Tropical Storm Irene in 2011), the most significant (in terms of impact) likely being Hurricane Hugo whose eye passed directly over the island. Even after all of these hurricanes, only one MEC was found on the seafloor during the SI and three MEC were found just beneath the seafloor surface during the ESI, consistent with observations made offshore of multiple beaches during the BDI.

#### Feasibility Study (2018)

The information from the RI and other investigations was used to evaluate potential remedial alternatives in an FS (CH2M, 2019) to address any potential MEC remaining in UXO 16.1 based on its anticipated use, which includes recreational/research activities such as wading, swimming, snorkeling, scuba diving, fishing, and boat anchoring. Three alternatives were developed and screened against various criteria that are defined in the NCP and discussed in further detail later in this Proposed Plan.

#### Figure 3 – UXO 16.1 Inspection Findings



## 3. Site Characteristics

#### 3.1. Physical Characteristics

The offshore environment within UXO 16.1 includes bare sand, sand/macroalgae beds, seagrass beds, and coral reef/colonized hard bottom. A large area of predominantly bare sand occurs near the confluence of the main ephemeral stream at SWMU 4 and UXO 16.1. The mouth of the ephemeral stream is typically blocked by an accumulation of beach sand; this blockage may temporarily open or be over-topped during storm events such that a deltaic deposit of sand/sediment is present immediately offshore of the ephemeral stream mouth.

Seagrasses occur predominantly in a large nearshore area along the south side, as well as much of the deeper offshore area along the western side of UXO 16.1. Sand/macroalgae habitat typically occurs in the transition zone between the nearshore reef habitats and offshore seagrass beds, and in pockets within the reef habitats.

Reefs and colonized pavement occur across most of the nearshore area of UXO 16.1. Pavement is low relief, solid carbonate rock and is the dominant bottom type in UXO 16.1, occurring along most of the UXO 16.1/SWMU 4 shoreline and extending out to approximately 200 feet offshore in some areas. Bedrock outcrops also occur along the southern shoreline. A diverse community of hard corals, soft corals, and macroalgae occurs in this habitat type.

As documented in the RI, fourteen federally listed species are known to occur or have the potential to occur on or near UXO 16.1 (CH2M, 2018). Of these, five species of threatened corals (*Acropora cervicornis, A. palmata, Dendrogyra cylindrus, Orbicella annularis*, and *O. faveolata*), sea turtles (likely hawksbill and green sea turtles), and West Indian manatee have been observed at UXO 16.1.

#### 3.2. Nature and Extent of Contamination

The majority of the munition-related items identified within UXO 16.1 were located immediately offshore nearest to the OB/OD areas and the mouth of the

ephemeral stream, as discussed in Section 2.3. During the underwater munitions investigations, only four MEC were found, comprising a 20-mm projectile and three photoflash cartridges, all of which were removed. Additionally, 59 MD were also found.

Sediment samples were collected and analyzed for explosives and inorganics, the constituents most commonly associated with munitions; inorganics are also naturally occurring as they form much of the sediment, rock, and reef environment of the ocean.

No explosives were detected in any of the sediment samples. Inorganics data were evaluated following a process agreed to by all agencies, which is based on scientific assessment of the concentration of each inorganic to determine whether it is associated with a munitions constituent. This evaluation includes such things as the locations of particular inorganic concentrations relative to the locations of munitions items, the concentrations of other inorganics detected in a particular sample and among samples, whether an inorganic is commonly a natural constituent in the sediment and rock, and whether the inorganics detected in site samples are present at levels consistent with background. The risk-based conclusions reached based on evaluation of the UXO 16.1 data are provided in Section 4.

## 4. Summary of Site Risks

Summaries of the HHRA and ERA results for UXO 16.1 are included in the following subsections and in Table 1. Figure 4 presents a graphical representation of the Conceptual Site Model (CSM) for UXO 16.1, including the human and ecological receptors that are likely at UXO 16.1 and were considered in the HHRA and ERA. The complete HHRA and ERA are provided in the RI Report (CH2M, 2018), which is available in the Administrative Record file for UXO 16.1 (link provided on first page of this Proposed Plan).

While past investigations found relatively few MEC within UXO 16.1, potential explosive hazards associated with munitions possibly remaining at UXO 16.1 will be

considered in the remedy selection process that is the subject of this Proposed Plan.

There is no approved methodology to quantitatively assess explosive hazard from MEC in the underwater environment. Nevertheless, based on professional judgment, the explosive hazard from MEC may be reduced by several methods, which could include MEC removal, changing or restricting land use activities, training, and education.

#### 4.1. Human Health Risk Assessment

An HHRA was conducted to evaluate potential human health risks associated with exposure to constituents detected in sediment at UXO 16.1. Maximum detected concentrations of constituents in sediment were compared to EPA Regional Screening Levels (RSLs), and constituents of potential concern (COPCs) were identified based on exceedances of these screening levels. Human health risks were then evaluated for these COPCs under current and potential future human exposure scenarios at UXO 16.1. Exposure scenarios evaluated considered recreational users, including fish and crab consumers, snorkelers, and divers, and researchers. As described in the RI Report (CH2M, 2018), the exposure potential for a researcher, snorkeler, and diver is expected to be less than the exposure potential for an adult recreational user. Therefore, the estimated risks for an adult recreational user were used to conservatively represent the potential risks for a researcher, snorkeler, and diver.

Health risks are based on an estimate of the potential cancer risk and the potential non-cancer hazard, the latter of which is expressed as a hazard index (HI). A detailed explanation of how human health risks are assessed is provided in the "What is Human Health Risk and How is it Calculated?" information box. No contaminants of concern (COCs) were identified; therefore, no unacceptable human health risks are present at UXO 16.1.

#### 4.2. Ecological Risk Assessment

The ERA evaluated potential ecological (marine plants and animals) risks associated with exposure to constituents detected in sediment using established ecological effects values to assess risks from direct exposure to organisms as well as via the food chain. A detailed explanation of how ecological risk is assessed is provided in the "What is Ecological Risk and How is it Calculated?" information box. No COCs were identified for sediment or food web exposure at UXO 16.1. Therefore, no unacceptable ecological risks were identified and no action is warranted for ecological receptors at UXO 16.1.

#### 4.3. Principal Threat Waste

Any MEC that remains at UXO 16.1 may constitute a principal threat waste (PTW) because of the potential for it to pose an explosive hazard if the material is moved, handled, or disturbed. The preferred alternative (discussed below) includes MEC clearance (i.e., search for and, if found, removal of MEC) within the areas most utilized by recreational users/ researchers and land use controls (LUCs) and inspections to limit the potential for people to encounter MEC. During historical investigations, only four MEC were found, which were removed from the site. If potential MEC is later found at UXO 16.1, Department of Defense (DoD) explosive ordnance disposal personnel or similarly qualified personnel will evaluate the material to determine if it poses an explosive hazard. Material that is determined to pose an explosive hazard will normally be treated onsite or removed for destruction per applicable DoD explosives safety standards and environmental laws and regulations. In these cases, the Navy, EPA, and PRDNER will consult, in accordance with the terms of the Viegues FFA, to make a determination as to whether the material should, as defined by CERCLA, the NCP, and EPA guidance, be classified as PTW. If the material is deemed to be PTW, the Navy will conduct the actions necessary to ensure protectiveness of human health and the environment to address unacceptable risks posed by the material designated as PTW.

#### Figure 4 – UXO 16.1 Conceptual Site Model



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#### Table 1 – UXO 16.1 Risk Assessment Results

Receptors	Human Health Risk		
Recreational Users	Adult – ELCR = 2 x 10 <sup>-7</sup> and HI < 1.0 Child – ELCR = 5 x 10 <sup>-7</sup> and HI < 1.0 Acceptable		
Fish Consumers	Adult – ELCR = $2 \times 10^{-5}$ and HI $\leq 1.0$ ; the probability of BLLs exceeding 10 µg/dL is less than 5% Child – ELCR = $9 \times 10^{-6}$ and two target organs with HIs > 1.0 (dermal [HI = 2.0] and cardiovascular [HI = 2.0]) due to arsenic; the probability of BLLs exceeding 5 µg/dL is less than 5% Although calculations indicate unacceptable non-cancer hazard for child consumers, metals concentrations responsible for calculated values are attributable to natural conditions; therefore, no unacceptable non-cancer hazard associated with past munitions-related activities.		
Blue Crab Consumers	Adult – ELCR = $2x10^{-5}$ cumulative and two target organs with HIs > 1.0 (dermal [HI = 2.0] and cardiovascular [HI = 2.0]) due to arsenic; the probability of BLLs exceeding 10 µg/dL is less than 5% Child – ELCR = $1x10^{-5}$ and two target organs with HIs > 1 (dermal [HI = 3.0] and cardiovascular [HI = 3.0]) due to arsenic; the probability of BLLs exceeding 5 µg/dL is less than 5% Although calculations indicate unacceptable non-cancer hazard for adult and child consumers, metals concentrations responsible for calculated values are attributable to natural conditions; therefore, no unacceptable non-cancer hazard associated with past munitions-related activities. While it is recognized blue crab consumers are not likely receptors within UXO 16.1 because edible-sized blue crab tend to be caught in lagoons rather than the open ocean around Vieques, blue crab is a reasonable surrogate for evaluating potential risk from consumption of crustaceans (e.g., lobster) and mollusks (e.g., conch) likely found in UXO 16.1. This is because blue crab and lobster have similar diets, and therefore similar risk, while conch, an herbivore and detritus consumer, would have less exposure than crustaceans due to their diet, and therefore lower risk. In addition, studies performed by the National Oceanic and Atmospheric Administration (NOAA) in 2010 and 2016 found that chemical constituent concentrations in the waters around Vieques were comparable to similar ecosystems elsewhere in the Caribbean and that former land uses in Vieques (including military training activities) did not have an effect on arsenic concentrations detected in the marine environment around Vieques. Further, arsenic is almost never associated with munitions and, if present, is only at trivial concentrations.		
Notes/Definitions:µg/dL = micrograms per deciliterUnacceptable ELCR = >1 x 10-4BLL = blood lead levelsUnacceptable HI = >1ELCR = excess lifetime cancer riskHI = hazard index			
Receptors	Ecological Risk		
Sediment Organisms	Thallium was identified as a COPC; no ecological screening value was available. Further risk evaluation identified thallium concentrations as attributable to background.		
Marine Birds, Mammals, and Reptiles	HQs < 1.0 Acceptable		
Notes/Definitions: HQ = Hazard quot	: cient		

### What is Human Health Risk and How is it Calculated?

An HHRA estimates the likelihood of health problems occurring if no cleanup action were taken at a site. This is also referred to as "baseline risk." HHRAs are conducted using a stepped process (as outlined in Navy and EPA HHRA policy and guidance). To estimate baseline risk at a site, the Navy performs the following four-step process:

#### Step 1: Data Collection and Evaluation

Step 2: Exposure Assessment

#### Step 3: Toxicity Assessment

#### Step 4: Risk Characterization

#### During Data Collection and Evaluation (Step 1), the concentrations of chemicals detected at a site are evaluated, including:

- Identifying and evaluating area(s) where site-related chemicals may be found (source areas) and at what concentrations
- Evaluating potential movement (transport) of chemicals in the environment
- Comparing site concentrations to Regional Screening Levels (RSLs) to determine which chemicals may pose the greatest threat to human health (called "constituents of potential concern" [COPCs]). Constituents are not excluded from the risk assessment process if they are within the range of background. However, following calculation of risk, the contribution of background concentrations to calculated risk is considered when making risk management decisions.

In Step 2, the Exposure Assessment, potential exposures to the COPCs identified in Step 1 are evaluated. This step includes:

- Identifying possible exposure media (for example, soil, air, groundwater, surface water, and/or sediment)
- Evaluating if/how people may be exposed (exposure pathways)
- Evaluating routes of exposure (for example, ingestion)
- Identifying the concentrations of COPCs to which people might be exposed
- Identifying the potential frequency and length of exposure
- Calculating a "reasonable maximum exposure" (RME) dose that portrays the highest level of human exposure that could reasonably be expected to occur

In the Toxicity Assessment (Step 3), both cancer and non-cancer toxicity values are identified for oral, dermal, and inhalation exposures to the COPCs. The toxicity values are identified using the hierarchy of toxicity value sources approved by EPA.

Step 4 is Risk Characterization, where the information developed in Steps 1-3 is used to estimate potential risk to people. The following approach is used:

- Two types of risk are considered: cancer risk and non-cancer hazard
- The likelihood of developing cancer as a result of site exposure is expressed as an upper-bound probability; for example, a "1 in 10,000 chance." In other words, for every 10,000 people that might be exposed under the conditions identified in Step 2, one additional case of cancer may occur as a result of site exposure. Unacceptable risk exists when the Excess Lifetime Cancer Risk (ELCR) of 1 x 10<sup>-4</sup> (1 in 10,000) is reached or exceeded.
- For non-cancer health effects, a "hazard index" (HI) is calculated. The HI represents the ratio between the "reference dose," which is the dose at which no adverse health effects are expected to occur over a lifetime of exposure, and the RME dose for a person contacting COPCs at the site. The key concept here is that a "threshold level" (measured as an HI of 1) exists below which no non-cancer health effects are expected to occur. However, it should be noted that an HI>1 does not mean that health effects will occur.
- The potential risks from the individual COPCs and exposure pathways are summed and a total site risk is calculated for each receptor.
- The uncertainties associated with the risk estimates are presented and their effects on the conclusions of the HHRA are discussed.

### What is Ecological Risk and How is it Calculated?

An ERA is conceptually similar to an HHRA except that it evaluates the potential risks and impacts to ecological receptors (plants, animals other than humans and domesticated species, habitats [such as wetlands], and communities [groups of interacting plant and animal species]). ERAs are conducted using a tiered, step-wise process (as outlined in Navy and EPA ERA policy and/or guidance) and are punctuated with Scientific Management Decision Points (SMDPs). SMDPs represent points in the ERA process where agreement among stakeholders on conclusions, actions, or methodologies is needed so that the ERA process can continue (or terminate) in a technically defensible manner. The results of the ERA at a particular SMDP are used to determine how the ERA process should proceed, for example, to the next step in the process or directly to a later step. The process continues until a final decision has been reached (i.e., remedial action if unacceptable risks are identified). The process can also be iterative if data needs are identified at any step; the needed data are collected and the process starts again at the point appropriate to the type of data collected.

An ERA has three principal components:

- 1. Problem Formulation establishes the goals, scope, and focus of the ERA and includes:
  - Compiling and reviewing existing information on the habitats, plants, and animals that are present on or near the site
  - Identifying and evaluating area(s) where site-related chemicals may be found (source areas) and at what concentrations
  - Evaluating potential movement (transport) of chemicals in the environment
  - Identifying possible exposure media (for example soil, air, surface water, and/or sediment)
  - Evaluating if/how the plants and animals may be exposed (exposure pathways)
  - Evaluating routes of exposure (for example, ingestion)
  - Identifying specific receptors (plants and animals) that could be exposed
  - Specifying how the risk will be measured (assessment and measurement endpoints) for all complete exposure pathways

#### 2. Risk Analysis which includes:

- Exposure Estimate An estimate of potential exposures (concentrations of chemicals in applicable media) to plants and animals (receptors). This includes direct exposures of chemicals in site media (such as soil) to lower trophic level receptors (organisms low on the food chain such as plants and insects) and upper trophic level receptors (organisms higher on the food chain such as birds and mammals). This also includes the estimated chemicals' dose to upper trophic level receptors via consumption of chemicals accumulated in lower food chain organisms.
- Effects Assessment The concentrations of chemicals at which an adverse effect may occur are determined

#### 3. Risk Calculation or Characterization:

- The information developed in the first two steps is used to estimate the potential risk to plants and/or animals by comparing the exposure estimates with the effects threshold
- Also included is an evaluation of the uncertainties (that is, potential degree of error) associated with the predicted risk estimate and their effects on ERA conclusions

The three principal components of an ERA are implemented as an 8-step, 3-tier process as follows:

 Screening-Level ERA (Steps 1-2; Tier 1) – The Screening Level ERA (SLERA) conducts an assessment of ecological risk using the three principal components described above and very conservative assumptions (such as using maximum chemical concentrations).

- 2. Baseline ERA (Steps 3-7; Tier 2) If potential risks are identified in the SLERA, a Baseline ERA (BERA) is typically conducted. The BERA is a reiteration of the three principal components described previously but uses more site-specific and realistic exposure assumptions, as well as additional methods not included in the SLERA, such as consideration of background concentrations. The BERA may also include the collection of site-specific data (such as measuring the concentrations of chemicals in the tissues of organisms, for example, fish) to address key risk issues identified in the SLERA.
- 3. Risk Management (Step 8; Tier 3) Step 8 develops recommendations on ways to address any unacceptable ecological risks that are identified in the BERA and may also include other activities, such as evaluating remedial alternatives.

# 5. Scope and Role of Response Action

For the purposes of satisfying its CERCLA obligations, the Navy divided the former training areas into 18 UXO sites. UXO 16 is the designation for the offshore underwater areas. The portion of UXO 16 that is the offshore explosive safety arc associated with the former SWMU 4 OB/OD area is designated as UXO 16.1.

In cooperation with EPA and PRDNER and in accordance with the FFA and applicable guidance, the Navy performed investigations at UXO 16.1 to evaluate the nature and extent of contamination and to assess the potential risks to human health and the environment. Although a low quantity of munitions representing potential explosive hazards was identified at UXO 16.1, there are still potential explosive hazards present because of the possibility of munitions remaining at the site. The preferred alternative described in this Proposed Plan will address potential explosive hazards to ensure UXO 16.1 can be used for recreational/research activities that may be conducted there. The response action is intended to be the final remedy for UXO 16.1 and does not include or substantively affect any other sites under the CERCLA process.

To date, a final remedy has been selected for four other munitions response sites (UXOs 1, 12, 14, and 18) located on the former VNTR on the eastern portion of the island. In addition, a final remedy was selected for SWMU 4, the terrestrial munitions response site adjacent to UXO 16.1 located on the former NASD in western Vieques. Because the land use planned by USFWS for SWMU 4 includes recreational activities, it is anticipated recreational users of UXO 16.1 will be primarily the recreational users of the public amenities, venues, and access provided at SWMU 4. Therefore, while the response action at UXO 16.1 does not include or substantively affect the remedy at SWMU 4, the UXO 16.1 remedy will enhance the protectiveness associated with recreational users of the area as a whole, including SWMU 4. Further, some LUCs applicable to UXO 16.1 may be implemented at SWMU 4 to inform users accessing UXO 16.1 via SWMU 4.

## 6. Remedial Action Objective

Remedial action objectives (RAOs) are standards that define the extent to which sites require cleanup to protect human health and/or the environment. The following RAO was developed to be protective of potential receptors in accordance with the use of UXO 16.1 for recreational/research purposes:

• Reduce the risk of exposure to potential munitions-related explosive hazards to be compatible with current and anticipated future use.

# 7. Summary of Remedial Alternatives

The following three remedial alternatives were developed to address potential MEC explosive hazards:

- Alternative 1 No Action
- Alternative 2 Land Use Controls with Monitoring
- Alternative 3 Nearshore MEC Clearance and Land Use Controls with Monitoring

These remedial alternatives were developed and evaluated in the FS Report (CH2M, 2022). Following the screening of various technologies, the remedial

alternatives summarized in Table 2 were designated for detailed evaluation and comparative analysis. To support evaluation of the alternatives, the Navy worked closely with EPA, PRDNER, and USFWS to identify anticipated uses of UXO 16.1 comprising primarily wading, swimming, snorkeling, scuba diving, and boat anchoring.

#### Table 2 – Remedial Alternatives

Alternative	Components	Details	Cost
1. No Action No action and no restriction on activities	-	-	Capital Cost: \$0
2. Land Use Controls and Monitoring Manages MEC explosive hazards by implementing explosive safety awareness/ avoidance mechanisms to reduce the potential for site users to encounter potential MEC and by performing periodic inspections to identify and remove exposed MEC. If deemed necessary, additional LUCs could be implemented to restrict certain activities and/or access to certain areas.	<ul> <li>LUCs, including physical mechanisms and institutional controls (ICs) (i.e., administrative and/or legal mechanisms)</li> <li>Long-term monitoring (LTM), including removal of any MEC identified</li> </ul>	<ul> <li>Implementing LUCs (e.g., educational kiosk/signage/warning buoys and ICs (e.g., notice to mariners, brochures, social media postings, etc.) to provide a mechanism for informing potential recreational/research users</li> <li>An MEC LTM program would be established, including site inspections for MEC/MD recurrence in public-access areas, and the integrity and effectiveness of physical LUCs. Any MEC/MD discovered during implementation of the LTM program would be removed.</li> </ul>	Capital Cost: \$1,336,000 Present Value of Future, Annual LTM Costs: \$4,617,000 Total Present-Worth Cost: \$5,953,000 Assumed timeframe: 30 years
3. Nearshore MEC Clearance and Land Use Controls with Monitoring Manages MEC explosive hazards by implementing LUCs and associated monitoring as described under Alternative 2 as well as performing additional surface MEC clearance in the nearshore areas to support anticipated recreational/research activities.	<ul> <li>LUCs (as described under Alternative 2)</li> <li>LTM (as described under Alternative 2)</li> <li>Seafloor MEC clearance (down to 12 inches)</li> </ul>	<ul> <li>Implementing LUCs as described under Alternative 2</li> <li>Seafloor clearance of MEC (down to a maximum depth of 12 inches below the seafloor) from the shoreline to a water depth of 10 feet (approximately 62 acres)</li> <li>Relocation and/or restoration of endangered corals or essential fish habitat (i.e., transplanting corals nearby or re-grading disturbed unconsolidated sediment and re- planting seagrasses)</li> <li>An MEC LTM program as described under Alternative 2</li> <li>Clearance activities will be expanded if MEC are found within several feet of the seaward clearance boundary</li> </ul>	Capital Cost: \$6,825,000 Present Value of Future, Annual LTM Costs: \$4,617,000 Total Present-Worth Cost: \$11,442,000 Assumed timeframe: 30 years

#### Table 2 – Remedial Alternatives

#### Notes:

The LUCs included in the remedial alternatives evaluation were for cost estimating and comparison purposes. The specific LUCs and associated LTM monitoring protocol to be included in the selected remedial action will be detailed in the associated remedial action work plan.

Inclusion of the No Action Alternative is required under the NCP as a basis of comparison for the other alternatives. Each remedial alternative for UXO 16.1 was evaluated with respect to the first seven evaluation criteria provided in the NCP. The alternatives were then compared to one another with respect to each NCP criterion. Following the public comment period on this Proposed Plan, the preferred alternative will be evaluated further against the remaining two criteria (Commonwealth acceptance and community acceptance).

The NCP outlines the approach for comparing remedial alternatives. Evaluation of the alternatives uses nine CERCLA evaluation criteria, which fall within the three categories of "threshold," "primary balancing," and "modifying" criteria (Table 3). To be considered for selection as the preferred alternative, a remedial alternative must meet the two threshold criteria. The five primary balancing criteria, which are technical criteria based on environmental protection, cost, and engineering feasibility, are then considered to determine which alternative provides the best combination of attributes. Finally, upon receipt of public comments on this Proposed Plan, the preferred alternative is evaluated further against the two modifying criteria.

#### 7.1. Relative Evaluation of Alternatives

The comparative analysis of alternatives with respect to the first seven evaluation criteria is summarized in the remainder of this section. The UXO 16.1 FS Report (CH2M, 2022) provides a more-detailed discussion of the evaluation and includes tables that provide a relative ranking of the alternatives.

CERCLA Evaluation Criteria	Definition			
Threshold Criteria				
Protection of human health and the environment	Addresses whether a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.			
Compliance with applicable or relevant and appropriate requirements (ARARs)	Addresses whether a remedy will meet all the ARARs or other Federal and Commonwealth/State environmental laws and/or justifies a waiver of the requirements.			
Primary Balancing Criteria				
Long-term effectiveness and permanence	Addresses the expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once RAOs have been met.			
Reduction in toxicity, mobility, or volume through treatment	Discusses the anticipated performance of the treatment technologies a remedy may employ.			

Table 3 –	CERCLA	Evaluation	Criteria fo	r Comparative	Analy	isis of i	Alternatives
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CERCLA Evaluation Criteria	Definition			
Short-term effectiveness	Considers the time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.			
Implementability	Evaluates the technical and administrative feasibility of implementing a remedy, including the availability of materials and services needed to implement an option.			
Present-worth cost	Compares the estimated initial, operations and maintenance, and present- worth costs.			
Modifying Criteria				
Commonwealth/State acceptance	Considers the Commonwealth/State support agency comments on the Proposed Plan.			
Community acceptance	Provides the public's general response to the alternatives described in the Proposed Plan, RI Report, and FS Report. The specific responses to the public comments are addressed in the "Responsiveness Summary" section of the ROD.			

#### Table 3 – CERCLA Evaluation Criteria for Comparative Analysis of Alternatives

#### 7.2. Threshold Criteria

## Overall Protection of Human Health and the Environment

Alternative 1 (no action) is not protective because the RAO would not be attained. The remaining alternatives are protective of human health and the environment because they reduce the risk of exposure to potential MEC potentially present at the site by implementing explosive safety awareness/avoidance mechanisms (LUCs), performing monitoring to ensure LUCs are effective and to remove any MEC identified in the future, restricting certain activities and/or access (if deemed necessary), and/or performing additional nearshore MEC clearance (Alternative 3 only).

## Compliance with Applicable Relevant and Appropriate Requirements

Aside from Alternative 1 (no action), the alternatives can comply with the ARARs, which consist of Commonwealth Chemical-specific ARARs that address protection of coastal surface waters; Federal Location-specific ARARs that address protection of coastal zones and migratory bird areas, endangered species and critical habitat, and marine mammals; and Federal and Commonwealth Action-specific ARARs that address munitions, dredging and filling, spill, and waste management.

#### 7.3. Primary Balancing Criteria

#### Long-Term Effectiveness and Permanence

Alternative 1 (no action) does not provide any longterm effectiveness. Alternative 2 provides long-term effectiveness and permanence using LUCs, whereas Alternative 3 combines LUCs with nearshore MEC clearance. Therefore, Alternative 3 is anticipated to provide a higher level of long-term effectiveness than Alternative 2 because additional MEC clearance would be performed in the nearshore area (i.e., from shoreline to a water depth of approximately 10 feet).

## Reduction in Toxicity, Mobility, or Volume through Treatment

While removing MEC may not technically be considered treatment, for MEC that must be detonated for disposal, it is substantively similar to treatment, especially with respect to consideration of this evaluation criterion. Alternative 1 does not result in any additional reduction in toxicity, mobility, or volume (TMV). Alternative 3 has a higher degree in reduction in TMV than Alternative 2 because it additionally includes MEC clearance within the nearshore area versus removal and detonation, if necessary, of MEC only if discovered during LTM (or reported by the agencies or public).

#### Short-Term Effectiveness

Alternative 1 has the least short-term impacts because no remedial construction activities are associated with the alternative; however Alternative 1 would not meet short-term effectiveness goals because no action would be taken. Alternative 2 can be implemented almost immediately after a ROD and remedial action work plan are finalized because it involves implementation of LUCs and periodic monitoring with the potential for future MEC removal, which has the least short-term construction impacts of the two active remedial alternatives. Alternative 3 will require a somewhat longer time to complete because of the nearshore MEC clearance compared to Alternative 2, but the amount of additional time required would be insignificant (i.e., less than 6 months).

#### Implementability

Alternative 1 requires no action or implementation but does not meet the RAO. Alternative 2 is technically feasible and could facilitate anticipated use of the area through the use of LUCs. Alternative 3 is technically and administratively feasible but would be logistically more challenging than Alternative 2 because of the nearshore MEC clearance activities. Additionally, the need to manage any MEC found and potential mitigation and restoration activities to ecological resources could increase the technical complexity of Alternative 3.

#### Cost

Alternative 1 is the least costly but it does not meet the RAO. Alternatives 2 and 3 meet the RAO and have present-worth costs of \$5,953,000 and \$11,442,000, respectively.

#### 7.4. Modifying Criteria

*Commonwealth Acceptance.* Commonwealth involvement has been continual throughout the CERCLA process for UXO 16.1, and PRDNER supports the preferred alternative. However, PRDNER's formal concurrence is pending following the review of all comments received during the public comment period.

*Community Acceptance.* Community acceptance will be evaluated following completion of the public comment period for the Proposed Plan. Substantive public comments received during the public comment period will be documented and addressed in a responsiveness summary as part of any ROD for UXO 16.1.

## 8. Preferred Alternative

The Navy and EPA, in consultation with PRDNER, have identified Alternative 3 - Nearshore MEC Clearance and Land Use Controls with Monitoring as the preferred alternative for UXO 16.1. The conceptual layout of this alternative is shown in Figure 5. The figure also shows the various land uses of adjacent SWMU 4 because users of UXO 16.1 will likely be those arriving through recreational use at SWMU 4 and because some of the physical LUCs installed at SWMU 4 may be associated with or include UXO 16.1.

Based on evaluation of the data, information currently available, and the comparative analysis of potential remedial alternatives, the preferred alternative meets the statutory requirements of CERCLA for protection of human health and the environment under anticipated use of UXO 16.1 for recreation/research.

Key elements that make Alternative 3 the preferred alternative are:

• Meeting the RAO and is compatible with anticipated use.

- Performing nearshore MEC clearance along the seafloor (to a maximum depth of 12 inches below the seafloor) from the shoreline to a water depth of approximately 10 feet (approximately 62 acres).
- Implementing LUCs to inform site users about explosive safety awareness and avoidance mechanisms to reduce the potential for encountering any explosive hazards that may remain or become exposed over time.
- Conducting LUC and MEC monitoring, including periodic inspections for MEC/MD recurrence and

assessments of the integrity and effectiveness of physical LUCs.

- Removing any future MEC/MD items identified within UXO 16.1 during monitoring or reported by the public or other entity.
- Preserving sitewide marine ecology including, as needed, relocation and/or restoration of Endangered Species Act-listed corals or essential fish habitat associated with MEC removal, which can include transplanting corals nearby or regrading disturbed sediment and re-planting seagrasses.

#### Figure 5 – Alternative 3 Layout



## 9. Community Participation

A community relations program has been ongoing for the Vieques environmental restoration program since 2001. The community relations program fosters twoway communication of investigation and remediation activities between the stakeholder agencies (Navy, EPA, PRDNER, and USFWS) and the public. A Restoration Advisory Board was formed in 2004 to provide for expanded community participation. Regular meetings are held to provide an information exchange among community members, stakeholder agencies, and the Municipality of Vieques. These meetings are open to the public and are held approximately every 3 months.

Public input is a key element in the decision-making process. Nearby residents and other interested parties are strongly encouraged to use the comment period to relay any questions and comments about the preferred alternatives or any of the other alternatives identified in this Proposed Plan for UXO 16.1. Following the public comment period, the Navy will summarize and respond to substantive comments in a responsiveness summary, which will become part of any ROD documenting the selection of a remedy for UXO 16.1.

This Proposed Plan fulfills the public participation requirements of CERCLA Section 117(a), which specifies that the lead agency (the Navy) must publish a plan outlining any remedial alternatives evaluated for a site and identify the preferred alternative. The Community Involvement Plan and technical reports supporting the preferred alternative for UXO 16.1 are available for public review in the Administrative Record at: <u>https://qo.usa.gov/xSfZq</u>

Additionally, paper copies of the UXO 16.1 Proposed Plan are available at the Navy's field office in Camp Garcia in Vieques.

The public comment period for the Proposed Plan provides an opportunity for input regarding the remedy selection process for UXO 16.1. The public comment period will be from November 9 to December 9, 2022, and a public meeting will be held on November 16, 2022 at 5:00 p.m. at the Multiple Use Center in Viegues, Puerto Rico

All interested parties are encouraged to attend the public meeting to learn more about the preferred alternative for UXO 16.1. The meeting will provide an additional opportunity to submit comments on the Proposed Plan.

Comments on the preferred alternative, or this Proposed Plan, must be postmarked no later than December 9, 2022. On the basis of comments or new information, the Navy and EPA, in consultation with PRDNER, may modify the preferred alternative or choose another alternative. The comment page included as part of this Proposed Plan may be used to provide comments to the Navy. However, questions or comments can be submitted to any of the individuals listed in the box below during the public comment period.

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Silmarie Padron Refuge Complex Supervisor US Fish and Wildlife Services Road 301 Km 5.1, Cabo Rojo, PR 00623 <u>silmarie\_padron@fws.gov</u> Note: This Proposed Plan is presented in English and Spanish for the convenience of the reader. Every effort has been made for the translations to be as accurate as reasonably possible. However, readers should be aware that the English version of the Proposed Plan is the official version.

## 10. Glossary

Acceptable Risk and Non-Cancer Hazard: EPA's human health acceptable risk range for Superfund hazardous waste sites is 1 x 10<sup>-4</sup> to 1 x 10<sup>-6</sup>, meaning there is 1 additional chance in 10,000 (1 x 10<sup>-4</sup>) to 1 additional chance in 1 million (1 x 10<sup>-6</sup>) that a person may develop cancer if exposed, under the same conditions as identified in the risk assessment, to contaminants at a site that is not remediated. EPA's acceptable non-cancer hazard (risk) threshold for Superfund sites is a hazard index less than or equal to 1, meaning that if the exposure at a particular site is less than or equal to the threshold, there is not a concern for potential non-cancer effects associated with exposure to potentially site-related contaminants. For ecological health, acceptable risk is the result of a weight-of-evidence assessment that finds ecological exposure pathways to site chemicals are incomplete, or that contaminant exposure concentrations are below ecological toxicity values, are not bioavailable, and/or are attributable to background.

Administrative Record: A compilation of documents and information for CERCLA sites that is made available to the public for review.

Applicable or Relevant and Appropriate Requirements (ARARs): CERCLA Section 121 (d)(2)(A) requires that remedial actions meet any state or federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate.

Background Concentration: Concentrations of naturally occurring and anthropogenic (because of human activities) constituents, such as inorganic constituents, found in groundwater, soil, sediment, and surface water at levels not influenced by sitespecific releases. Background concentrations of some inorganics and other constituents are often at levels that may pose a risk to human health or the environment. However, background concentrations of site chemicals are factored into risk management determinations to ensure remedial actions are not implemented for constituents whose concentrations are attributable to background conditions and not indicative of a site-related release.

Cancer Risk: Cancer risks are expressed as a number reflecting the increased chance that a person will develop cancer if exposed to chemicals or substances, as described in the Human Health Risk Assessment.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA): A Federal law passed in 1980 (United States Code Title 42, Chapter 103), commonly referred to as the "Superfund" Program, that provides for cleanup and emergency response in connection with numerous existing, inactive hazardous substance disposal sites that endanger public health and safety or the environment. CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA) in 1986.

Constituent of Potential Concern (COPC): A chemical at the site that may be hazardous to human health or the environment due to its detected concentrations.

Contaminant of Concern (COC): A contaminant that contributes risk or hazard above acceptable levels to a receptor.

Department of the Interior (DOI): Landowner of the Vieques National Wildlife Refuge.

Discarded Military Munitions (DMM): Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal.

Ecological Risk Assessment (ERA): A qualitative and quantitative evaluation of the risk posed to ecological receptors (i.e., plants and animals) by the presence of specific pollutants. Elements include identification of the hazardous substances present in the environmental media; assessment of exposure and exposure pathways; assessment of the toxicity of the site's hazardous substances; and characterization of ecological risks.

Excess Lifetime Cancer Risk (ELCR): Potential carcinogenic effects that are characterized by estimating the probability of cancer incidence in a population of individuals for a specific lifetime from projected intakes (and exposures) and chemical-specific dose-response data.

Feasibility Study (FS): A study undertaken by the lead agency to develop and evaluate options for remedial action. The FS emphasizes data analysis and is generally performed concurrently with the RI. The data from the RI is used to define the objectives of the response action, to develop remedial action alternatives, and to undertake an initial screening and detailed analysis of the alternatives.

Federal Facility Agreement (FFA): A legal agreement between the Navy, DOI, EPA, and the Commonwealth of Puerto Rico that establishes the procedural framework and general schedule for implementing the CERCLA activities for Vieques.

Groundwater: The supply of water beneath the Earth's surface that occurs in the pore spaces between soil grains or within fractures in geologic formations that are fully saturated.

Hazard Index (HI): The HI represents a measure of the potential for non-carcinogenic effects from exposure to COPCs. A "threshold level" (measured as an HI of 1) exists below which no non-cancer health effects are expected to occur. Hazard Quotient (HQ): HQs are calculated by dividing the chemical concentration by the corresponding ecological screening value or the wildlife exposure dose. HQs equaling or exceeding 1 indicate the potential for unacceptable risk since the chemical concentration or dose equals or exceeds the screening value; these chemicals are identified as COPCs.

Human Health Risk Assessment (HHRA): A qualitative and quantitative evaluation of the risk posed to human health by the presence of specific pollutants. Elements include identification of the hazardous substances present in the environmental media; assessment of exposure and exposure pathways; assessment of the toxicity of the site's hazardous substances; and characterization of human health risks.

Land Use Control (LUC): Physical, legal, or administrative methods that restrict the use of or limits access to property to reduce risks to human health and the environment.

Media (singular, Medium): Soil, groundwater, surface water, or sediment at the site.

Munitions and Explosives of Concern (MEC): Distinguishes specific categories of military munitions that may pose unique explosive hazards and comprises unexploded ordnance (UXO), DMM, or munitions constituents (MC) such as TNT or RDX present in high enough concentrations to pose an explosive hazard.

Munitions Debris (MD): Non-explosive remnants of munitions remaining after munitions use, demilitarization, or disposal.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The Federal regulations (Code of Federal Regulations [CFR], Volume 40, Part 300 [40 CFR 300]) that guide determination of the sites to be corrected under both the Superfund (CERCLA) program and the program to prevent or control spills into surface waters or elsewhere.

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.

Non-Cancer Hazard: Non-cancer hazards (or risk) are expressed as a quotient that compares the potential exposure to contaminants at a particular site to the acceptable level of exposure. There is a level of exposure (the reference dose) below which it is unlikely for even a sensitive population to experience adverse health effects.

Preferred Alternative: With respect to the nine criteria specified in the NCP for evaluating remedial alternatives, the Preferred Alternative is the proposed remedy that meets the threshold criteria and is deemed to provide the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria.

Present-Worth Cost: Total present-day cost to complete the proposed remedy.

Proposed Plan: A document that presents the preferred remedial alternative and requests public input regarding its proposed selection.

Public Comment Period: The time allowed for the members of a potentially affected community to express views and concerns regarding an action proposed to be taken at a site, such as a rulemaking, permit, or remedy selection.

Puerto Rico Department of Natural and Environmental Resources (PRDNER): The agency responsible for protecting natural resources, Commonwealth-owned conservation areas, submerged lands, and the coastal zone in the Commonwealth of Puerto Rico and enforces Commonwealth of Puerto Rico environmental protection laws delegated by the Federal Government.

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

Record of Decision (ROD): A legal document that describes the cleanup action or remedy selected for a site, the basis for choosing that remedy, and reflects the public comments that were considered regarding the selected remedy.

Regional Screening Level (RSL): A risk-based screening criterion calculated using the latest toxicity values, default exposure assumptions, and physical and chemical properties designed to evaluate constituent concentrations in environmental media for potential risk to human health.

Remedial Action Objectives (RAOs): Statements that define the extent to which sites require cleanup to protect human health and the environment.

Remedial Investigation (RI): A study in support of the selection of a remedy at a site where hazardous substances have been released. The RI identifies the nature and extent of contamination and assesses human health and ecological risk associated with the contamination.

Unacceptable Risk: Excess lifetime cancer risk that exceeds EPA's acceptable risk range for Superfund hazardous waste sites of 1 x 10<sup>-4</sup> to 1 x 10<sup>-6</sup> or a non-cancer hazard in excess of EPA's target level of 1.

United States Environmental Protection Agency (EPA): The Federal agency responsible for administration and enforcement of CERCLA (and other Federal environmental statutes and regulations).

United States Fish and Wildlife Service (USFWS): The Federal agency responsible for the management of the Department of the Interior-owned land and the protection of trust species (e.g., threatened and endangered species and migratory birds) on Vieques. Please Print or Type Your Comments Here

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NAVFAC Atlantic Attention: Code EV31 / Mr. Kevin Cloe 6506 Hampton Blvd. Norfolk, VA 23508-1278