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VIEQUES EAST, PR
SSIC 5000-33a

FINAL RECORD OF DECISION UNEXPLODED ORDNANCE 18 (UXO 18) CAYO LA CHIVA ATLANTIC FLEET WEAPONS TRAINING AREA FORMER VIEQUES NAVAL TRAINING RANGE VIEQUES PUERTO RICO (ENGLISH VERSION)

08/01/2018

NAVFAC ATLANTIC

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Atlantic
Norfolk, Virginia

Final

Record of Decision
UXO 18, Cayo La Chiva (English Version)

Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

August 2018

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

Record of Decision
UXO 18, Cayo La Chiva
Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico
August 2018

1 Declaration

1.1 Site Name and Location

This Record of Decision (ROD*) documents the selected remedy for an operable unit referred to as UXO 18, located on Cayo La Chiva at the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico. UXO 18 comprises the 12-acre island of Cayo La Chiva, where munitions and explosives of concern (MEC) were identified. The former VNTR is part of the Atlantic Fleet Weapons Training Area - Vieques, which was placed on the National Priorities List (NPL) on February 11, 2005 (Superfund Enterprise Management System [SEMS] identification number: PRN000204694). UXO 18 is also known as Operable Unit (OU) 28. Unlike most of the former VNTR, UXO 18 is not part of the Vieques National Wildlife Refuge, the latter of which is managed by the United States Fish and Wildlife Service (USFWS), a bureau of the United States Department of the Interior (DOI). Instead, UXO 18 is owned by the Commonwealth of Puerto Rico and managed by the Puerto Rico Department of Natural and Environmental Resources (PRDNER).

UXO 18 is a site where MEC were found and munitions response activities (MEC removal) were conducted. Although MEC is not expected to be encountered on the Cayo, it is possible that some MEC may still be present on the island. Because a future land user (e.g., trespasser, recreational user, maintenance worker, or construction worker) may encounter MEC at the Cayo, a Remedial Investigation/Feasibility Study (RI/FS) was conducted to evaluate remedial alternatives to address potential explosive hazards to future land users.

1.2 Statement of Basis and Purpose

The remedy described in this ROD is selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The United States Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC) Atlantic, United States Environmental Protection Agency (EPA) Region 2, Puerto Rico Environmental Quality Board (PREQB), and DOI entered into a Federal Facilities Agreement (FFA) in 2007, as a result of the NPL listing and pursuant to CERCLA. The FFA establishes the procedural framework and schedule for implementing the CERCLA response actions for Vieques.

This decision is undertaken pursuant to the President's authority under CERCLA Section 104, as delegated to the Navy in accordance with Executive Order 12580, and in compliance with the process set out in CERCLA Section 120. The selection of the remedy is authorized pursuant to CERCLA Section 104, and the selected remedy will be carried out in accordance with CERCLA Section 121. Therefore, the Navy is the lead response agency under Executive Order 12580 to take all appropriate CERCLA response actions necessary to protect public health, welfare, and the environment.

This remedy is being jointly selected by the Navy and EPA, with concurrence of PREQB and PRDNER. This decision is based on information contained in the Administrative Record file for UXO 18. Information not specifically

* This acronym, and all the others used in this document, can be found in alphabetical order in Section 4.

summarized in this ROD or its references, but contained in the Administrative Record, has been considered and is relevant to the remedy selection at UXO 18. Thus, the ROD is based upon and relies on those portions of the Administrative Record file that pertain to UXO 18 in making this decision. This ROD was prepared in accordance with EPA ROD guidance, specifically *A **Guide**[1] to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (EPA, 1999) and ***Toolkit**[2] for Preparing CERCLA Records of Decision* (EPA, 2011), a supplement to the 1999 guidance for producing higher quality and more user-friendly RODs. The result is a ROD format that is conducive for the general public to read and understand the information upon which the remedial decision for UXO 18 was made, including providing links to the technical details presented in the Administrative Record for this OU.

1.3 Scope and Role of Response Action

Based on investigations conducted, no chemical contaminants associated with past military activities were detected and inorganics concentrations were consistent with background levels. Therefore, no unacceptable human health or ecological risks were identified from potential exposure to environmental media at UXO 18. However, five MEC (5-inch rockets) were discovered at four locations during the RI in 2011, and were destroyed through controlled detonation on Cayo La Chiva. Additionally, three munitions debris (MD) items (expended smoke canisters) were recovered and removed for processing and disposal.

In 2010, Navy Explosive Ordnance Disposal (EOD) divers/snorkelers conducted several visual surveys of Bahia de la Chiva to inspect for potential MEC on, or protruding from, the sediment adjacent to Cayo La Chiva, within the offshore area referred to as UXO 16 (future investigation activities unrelated to this ROD are anticipated for UXO 16). The underwater surveys covered the entire area up to 30 meters offshore of Cayo La Chiva and the remainder of the bay using transects (200 foot spacing). Nine potential munitions items were identified just west and south of the island. A non-time-critical removal action (NTCRA) to address these nine items was conducted in 2017, during which all nine items were removed. Five of the items were confirmed to be Mk 10 5-inch rockets, one item was determined to be MD, and three items were found to be cylindrical calcareous rock that appeared to be old remnants of coral. Based on the finding of MEC in the waters surrounding Cayo La Chiva, a decision was made to conduct an investigation of the Cayo itself. In 2011, transect inspections were conducted across the accessible (relatively sparsely vegetated) areas of Cayo La Chiva, representing approximately 8 percent of the island, using a Schonstedt magnetometer to determine if MEC was present. Five MEC items (5-inch rockets) were discovered at four locations; each was destroyed through controlled detonation on Cayo La Chiva in March 2011.

Based on the previous information, there are potential explosive hazards posed by MEC that may remain at UXO 18. Therefore, the selected remedy will address the potential explosive hazards posed by MEC that may remain at the site.

UXO 18 is one of 18 munitions response sites within the former VNTR having been or currently being evaluated in accordance with CERCLA under the Navy's Munitions Response Program (MRP). The Site Management Plan for Vieques further details the investigation history and the schedule for CERCLA investigations/response activities at the former VNTR, and it is updated annually. The response action selected in this ROD is intended to be the final remedy for UXO 18 and does not include or affect any other sites at the former VNTR under the CERCLA process. The final determinations for the other sites within the former VNTR have been documented in past decision documents or will be documented in future decision documents. UXO 18 is the second MRP site within the former VNTR for which a final remedy determination has been made.

1.4 Description of Selected Remedy

The selected remedy for UXO 18 is Focused MEC Removal, Land Use Controls (LUCs), and MEC Inspections, as described in Section 2.9. This remedy reduces potential future explosive hazards to be compatible with the current and anticipated future land use as a recreational area, while preserving Cayo La Chiva's ecological habitat.

The components of the selected remedy are:

- Removal of any MEC identified during site preparation for recreational use (i.e., construction support)
- Physical demarcation and institutional controls (ICs) to guide future access
- Long-term monitoring (LTM) to ensure LUCs are in place and effective and to identify and remove any additional MEC that may become exposed or discovered

1.5 Statutory Determination

The selected remedy for UXO 18 meets the statutory requirements of CERCLA Section 121 and is protective of human health and the environment, complies with Federal and Commonwealth regulations that are applicable or relevant and appropriate to the remedial action, and is cost-effective.

Because MEC posing explosive hazards may remain at UXO 18 following implementation of the remedial action, in addition to this remedy the Navy will conduct statutorily required reviews every five years to ensure that the remedy remains protective of human health and the environment.

1.6 Navy Authorizing Signature for the Record of Decision for UXO 18, Atlantic Fleet Weapons Training Area – Vieques

J. R. Cirvello
Environmental Business Line Manager
Naval Facilities Engineering Command Atlantic

29 Aug 2018
Date

1.7 EPA Authorizing Signature for the Record of Decision for UXO 18, Atlantic Fleet Weapons Training Area – Vieques

John Prince
Acting Director, Emergency and Remedial Response Division
Environmental Protection Agency, Region 2

August 29, 2018
Date

1.8 PRDNER and PREQB Concurrence Signature for the Record of Decision for UXO 18, Atlantic Fleet Weapons Training Area – Vieques

AUG 20 2018

Tania Vázquez Rivera
Secretary of Puerto Rico Department of Natural and Environmental Resources
Executive Director of Puerto Rico Environmental Quality Board

Date

2 Decision Summary

2.1 Site Description and History

Vieques is approximately 7 miles southeast of the eastern tip of the main island of Puerto Rico (**Figure 1**). Aside from mainland Puerto Rico, Vieques is the largest island in the Commonwealth of Puerto Rico, encompassing 33,088 acres (51 square miles).

The Navy purchased large portions of Vieques in the early 1940s to conduct activities related to military training. Operations within the former VNTR included various aspects of naval gunfire training, such as air-to-ground ordnance delivery and amphibious landings, as well as housing the main base of operations for these activities at Camp Garcia. The former VNTR is approximately 14,600 acres and is comprised of former military training areas known as the Eastern Maneuver Area, Surface Impact Area, Live Impact Area, and Eastern Conservation Area (**Figure 2**).

The Navy ceased training exercises at the former VNTR on April 30, 2003, in accordance with the Presidential Directive to the Secretary of Defense dated January 30, 2000, when the land was transferred to the DOI, to be managed by USFWS as a National Wildlife Refuge. On February 11, 2005, the Atlantic Fleet Weapons Training Area–Vieques was added to the NPL, which required all subsequent environmental restoration activities for Navy sites on Vieques to be conducted under CERCLA. On September 7, 2007, the Navy, DOI, EPA, and PREQB finalized an FFA that established the procedural framework and 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 affected property, as warranted. Several small islands around the perimeter of Vieques, including Cayo La Chiva (UXO 18), were or may have been used for military training activities, and they are owned by the Commonwealth of Puerto Rico and managed by PRDNER.

UXO 18, also known as OU 28, encompasses the entire Cayo La Chiva (an island approximately 12 acres in size), which is located several hundred yards south of Playa La Chiva (Blue Beach) and south of the Eastern Maneuver Area along the southern edge of the former VNTR in Vieques, Puerto Rico. The surrounding waters are part of a separate operable unit (OU 17, also known as UXO 16), which is not being addressed under this Record of Decision. The only documented military training activity on Cayo La Chiva was along the northern portion where a 0.50-caliber machine gun nest fired blank rounds during simulated amphibious landings at Playa La Chiva (on the south shore of the island of Vieques) in 1950. However, during site investigation activities, several MEC were identified both on the island and in the nearshore waters, all of which were subsequently removed. The MEC located offshore were removed as part of the separate UXO 16 NTCRA. As a result, public access to Cayo La Chiva is currently not allowed, as indicated by signs along the northern perimeter of Cayo La Chiva (accessible portion of the island), by signs at the nearby Blue Beach access areas, and by landscape features (natural dense vegetation and steep rock cliffs), as shown in **Figure 3**.

FIGURE 1
Regional Location Map

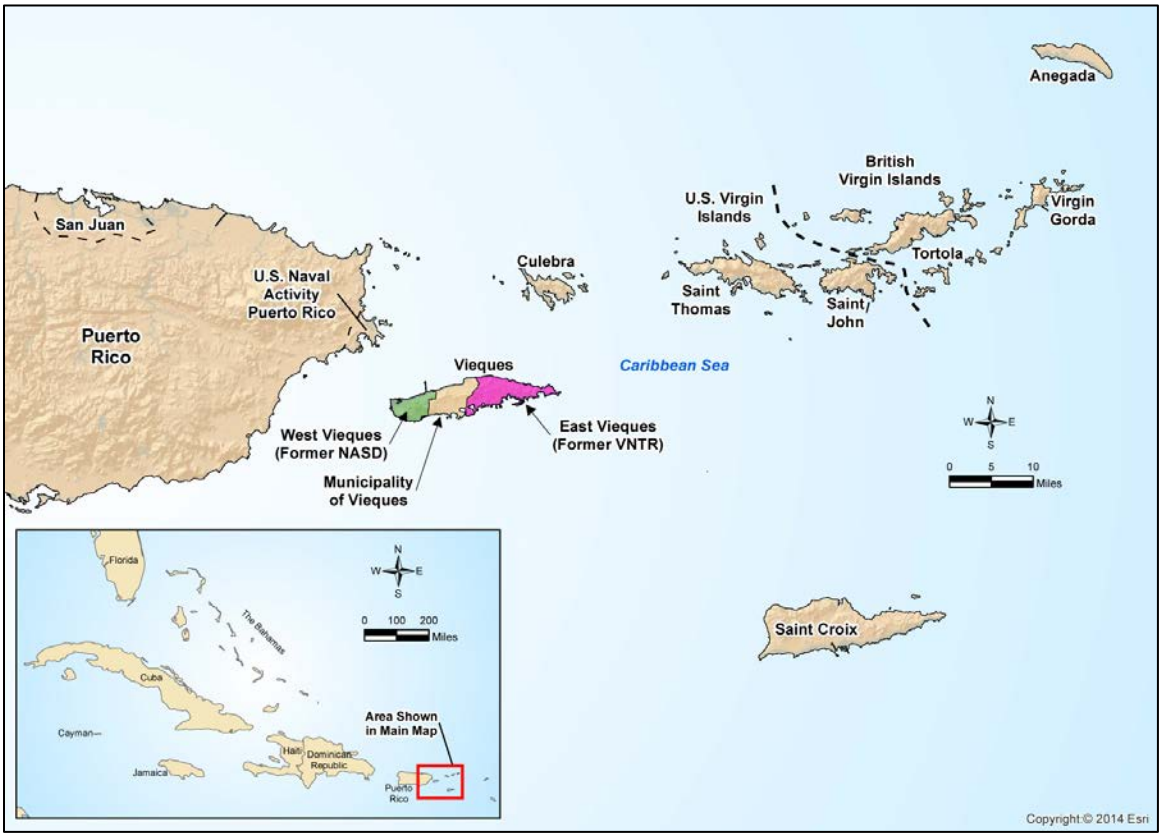
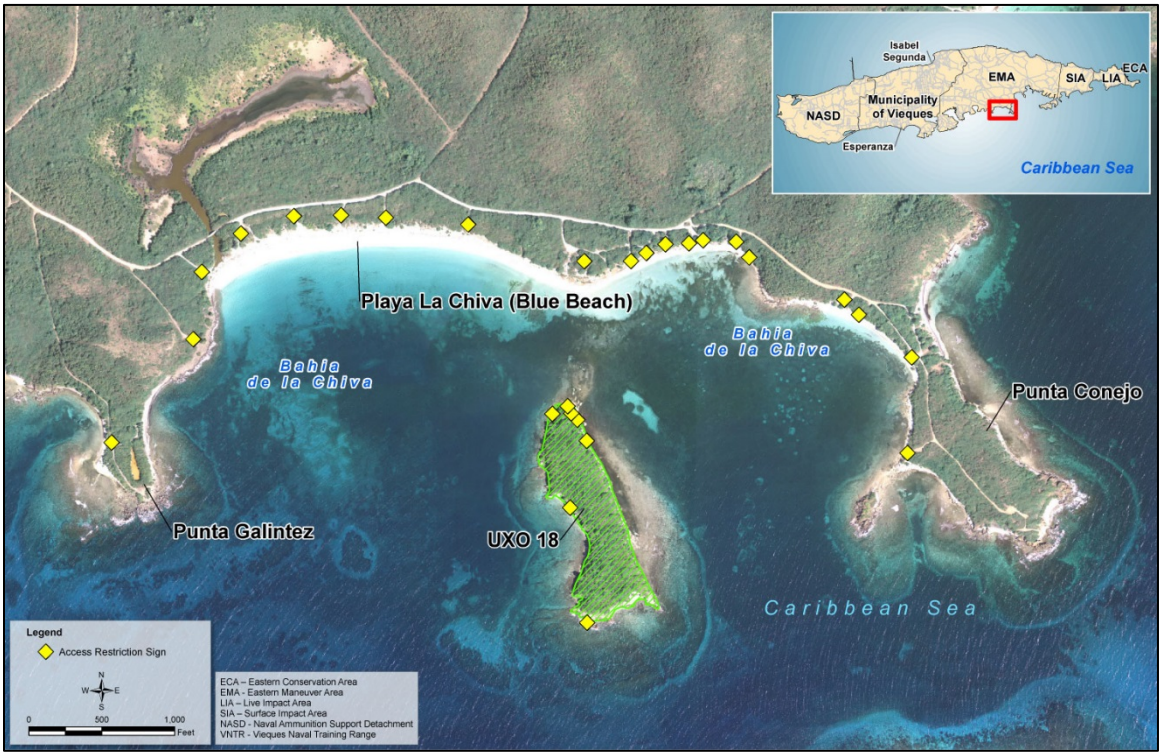


FIGURE 2
Former VNTR and Current UXO 18 Configuration



2.2 Site Characteristics

Cayo La Chiva is a rocky island located several hundred yards south of Playa La Chiva. The topography ranges from ocean level at the perimeter (0 feet above mean sea level [msl]) to about 35 feet msl in the central portion of the island. The majority of the western and southern portions of the island consist of steep, nearly vertical rock slopes rising more than 30 feet above the ocean. The northern portion and very northeastern tip of the island consists of a narrow strand of sandy beach that extends to a very shallow seagrass bed within the bay. Along the eastern side, a very thin strip of sand lies immediately adjacent to the steep rock slope. No surface water features are present within UXO 18.

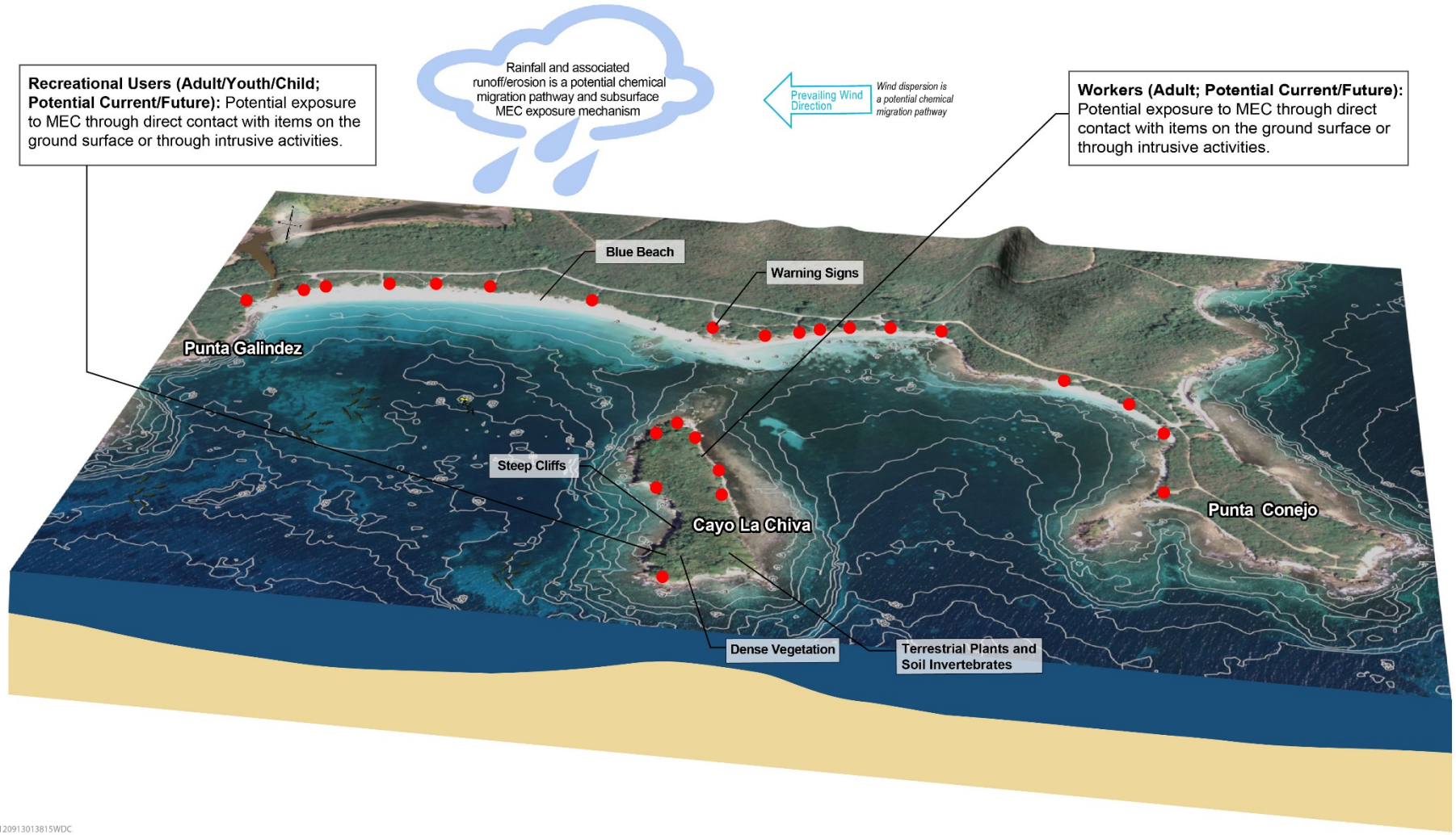
UXO 18 is heavily vegetated, with the dominant vegetation being a dry scrub forest with occasional isolated stands of taller secondary growth forest. A narrow fringe of mangrove forest exists along the eastern and northern coasts of the island.

The geology of Cayo La Chiva is characterized by weathered limestone, either near or exposed at the ground surface. In some areas, a thin layer (generally less than 1-foot thick) of sandy loam soil overlays the weathered bedrock. Only the northern portion of the island is sandy. Groundwater within UXO 18 is likely within the bedrock, and it is likely to be saline because of the thin veneer of soil, small size of the island, and the proximity to the ocean.

A Pre-Columbian archaeological site was identified in the western-central portion of Cayo La Chiva the 1970s (Isla Chiva [Vi-043]). This site was determined eligible for the National Register in 1980, but is currently not listed. As part of the June 2013 archaeological survey, Pre-Columbian cultural materials (e.g., fragments of Pre-Columbian ceramic and marine shell) were encountered at a depth of approximately 4 to 8 inches below ground surface (bgs) and recorded as a newly identified archaeological site (Isla Chiva 02). Due to the size of the island and the configuration, it is possible that the items identified are associated with the previous archaeological site identified.

There is currently no public access allowed, and there is no groundwater use within UXO 18.

FIGURE 3
UXO 18 Site Conceptual Model



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2.3 Summary of Previous Investigations

Environmental investigations of the former VNTR that are relevant to UXO 18 have been conducted since 2006, and investigations were performed specific to UXO 18 since 2011. **Table 1** summarizes the purpose, scope, and results of previous investigations and interim actions performed at, or relevant to, UXO 18.

TABLE 1
Previous Investigations

Previous Investigation*	Date	Investigation Activities
Background Investigation	2006	A Background Investigation[3] (CH2M, 2007) was conducted in 2006 for the eastern portion of Vieques to develop a set of background values for inorganic constituents in soil for comparison to soil data to be collected during future investigations. This Background Investigation included the same soil type as encountered in Cayo La Chiva.
Biological Assessment	2011	A Biological Assessment (CH2M, 2015) was conducted in 2011 to determine if any federally listed threatened or endangered plant or animal species were present on Cayo La Chiva. None were observed. No MEC were identified during this investigation.
Remedial Investigation	2011-2013	An RI (CH2M, 2015) was conducted to assess the nature and extent of MEC and environmental media contamination and to assess potential risks to human health and the environment at UXO 18. There were no unacceptable risks to human health or the environment[4] posed by constituent concentrations in site media, so no action is required for environmental media. However, because several MEC and MD were identified and removed, an FS was warranted to address potential explosive hazards associated with the possible presence of additional MEC on the island.
Warning Buoy and Sign Installation	2012	Temporary warning signs on UXO 18 were replaced with seven more-permanent signs (**Figure 2**) installed along the northern, western, and southern portions of the island (where there is the highest probability for trespasser activity) that state "No Trespassing. Restricted Area/Authorized Personnel Only. No Entry Permitted to Beaches and Land Areas." Additionally, six buoys were installed around the island that said, "No Anchor, Explosives" to warn kayakers, boaters, and snorkelers. These buoys were subsequently removed following the NTCRA as noted previously.
Feasibility Study	2015	The FS (CH2M, 2015) analyzed remedial alternatives to address potential explosive hazards[5] associated with the potential presence of MEC at UXO 18, in accordance with EPA guidance. A more detailed description of the FS is presented in Section 2.9.
Feasibility Study Addendum	2016	The FS Addendum[6] (CH2M, 2016) provides further clarification of the costs and associated assumptions used to evaluate the remedial alternatives that include MEC removal.

* Documentation associated with the listed activities is available in the Administrative Record and provides detailed information used to support the remedy selection for UXO 18. The relevant referenced information is also accessible by the hyperlinks in this document.

2.4 Nature and Extent of Contamination

Five MEC (5-inch rockets) were discovered at four locations during the RI, and were destroyed through controlled detonation on Cayo La Chiva. Three MD (expended smoke canisters) were recovered and removed for processing and disposal. The transects performed during the Preliminary Inspection covered approximately 5 percent of the island, and another 3 percent of the island was covered (and no MEC identified) during the biological assessment. These transect inspections covered the accessible areas of Cayo La Chiva, which indicated only a few isolated MEC

were present and none are likely to remain in the accessible areas of the island. These findings are consistent with the historical knowledge of site use, which indicates limited use of Cayo La Chiva for training activities. However, based on these findings, it can be assumed that other isolated MEC may be present throughout UXO 18. Based the relatively thin soil horizon (i.e., non-existent to less than about a foot), all potential MEC is at or close to the ground surface.

Soil samples were collected and analyzed for explosives, inorganic constituents, and hexachloroethane (a semi-volatile organic compound potentially associated with smoke canisters) during the RI to determine if munitions-related contamination had impacted the environmental media. Neither explosives nor hexachloroethane were detected in UXO 18 soil. Only one inorganic constituent (thallium) was detected in surface soil above a screening criterion (Soil Screening Level [SSL]) and the level detected during the background study (**Table 2**). The SSL is a conservative screening criterion designed to evaluate the potential for chemicals to leach from soil to groundwater above safe drinking water levels. Thallium was detected in only one soil sample at a concentration that was estimated and potentially biased so as to result in a level higher than it actually is (see **Table 2**). In addition, thallium is not associated with the munitions types found on Vieques, nor is it associated with ordnance paint. Further, the US Army Corps Technical Guidance for Military Munitions Response Actions (EM 200-1-15, 30 October 2015) states that thallium is not associated with any known munitions. Based on this information, it is likely that thallium is attributable to natural conditions.

As shown in **Table 2**, all other detected inorganic constituents were present at concentrations below background concentrations. It is likely that if contamination associated with past military activities were present, other constituents would have been detected at elevated levels as well. This information further supports the conclusion that thallium, as well as all other inorganic concentrations detected at UXO 18, are attributable to natural conditions. Additionally, an assessment of the Site on December 4, 2017, indicated that there were no physical changes to the Site resulting from Hurricanes Irma and Maria that would lead to a change to the Selected Remedy.

TABLE 2

Remedial Investigation Soil Sample Detections and Exceedances for UXO 18

COPC	Maximum Concentration Detected	Vieques East Background, Zone TI SS & SMI	Screening Criteria[2,3]			
			Nov 2013 Adjusted RSL[1] Residential Soil	Nov 2013 Adjusted RSL[1] Industrial Soil	SSL (DAF = 10)	ESV
Total Metals (mg/kg)						
Aluminum	9,720	35,000	7,700	100,000[4]	30,000	--
Arsenic	4.8	9.17	0.68	3.0	0.29	18
Barium	49 J	212	1,500	22,000	82	330
Cadmium	0.32 J	2.4	7.1	98	0.38	32
Calcium	265,000	417,000	--	--	--	--
Chromium	0.69	70.0	--	--	100,000	64
Chromium (trivalent, calc)	0.69	--	12,000	100,000[4]	100,000	--
Cobalt	2.5	15.8	2.3	35	0.27	13
Copper	13.6	94.2	310	4,700	46	70
Iron	7,710	38,100	5,500	82,000	350	--
Lead	2	16.0	400	800	14	120
Magnesium	12,300	22,200	--	--	--	--
Manganese	315	2,600	180	2,600	28	220
Nickel (as soluble salts)	19.3	41	150	2,200	26	38
Potassium	2,350	10,800	--	--	--	--
Sodium	627 J	1,590	--	--	--	--
Thallium (as soluble salts)	0.55 J+	0.13	0.078	1.2	0.14	1
Vanadium	14.6	55.7	39	580	86	130
Zinc	23.7	32	2,300	35,000	370	120

[1] RSLs were adjusted downward by a factor of 10 for noncarcinogens to account for exposure to multiple constituents. The November 2013 RSLs used in the RI/FS are presented in this table.

[2] Shading indicates screening criterion and background exceeded. COPCs selected based on exceedance of background and RSL and/or ecological screening values.

[3] The source of the human health and ecological screening criteria were those listed in the Master Standard Operating Procedures, Protocols[7], and Plans (CH2M, 2010). The screening criteria used in the RI/FS are presented in this table; however, no RSL or ESV presented in this table has been updated as of the issuance of this Record of Decision.

[4] Per EPA RSL guidance, the ceiling limit of 100,000 mg/kg is used when the calculated RSL exceeds the limit. The ceiling limit of 100,000 mg/kg is equivalent to a chemical representing 10% by weight of the soil sample.

COPC = chemical of potential concern
DAF = dilution attenuation factor
J = analyte present, value may or may not be accurate or precise
J+ = Analyte present, value may be biased high, actual value may be lower
mg/kg = milligrams per kilogram
RSL = Regional Screening Level (human health)
SSL = Soil Screening Level (protection of groundwater)
ESV = Ecological Screening Value

2.5 Current and Potential Future Land and Resource Uses

Cayo La Chiva is owned by the Commonwealth of Puerto Rico, and recreational use under PRDNER management is the anticipated future use of a portion of the island. There is currently no public access allowed and no current or planned groundwater use within UXO 18. Because of the presence of high cliffs and dense native vegetation, the practical route of access to UXO 18 is limited to the northern portion of the island where a narrow sandy beach is present.

2.6 Summary of Site Risks

The results of the Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA) conducted for UXO 18 during the RI are discussed in the following subsections and summarized in **Table 3**. The complete HHRA and ERA are provided in the RI/FS Report, which is available in the Administrative Record File.

TABLE 3
UXO 18 Risk Assessment Results

Current/Future Demographic	Human Health Risk
Trespasser/Recreational Adult	ELCR = 1×10^{-6} and HI = 0.05 **Acceptable**
Trespasser/Recreational Youth	ELCR = 9×10^{-7} and HI = 0.09 **Acceptable**
Trespasser/Recreational Child	ELCR = 3×10^{-6} and HI = 0.4 **Acceptable**
Worker	ELCR = 4×10^{-7} and HI = 0.003 **Acceptable**
Media	**Ecological Risk**
	All Receptors
Soil	**Acceptable**

For there to be unacceptable cancer risk, the ELCR would need to be higher than 1×10^{-4}

For there to be unacceptable non-cancer hazard, the HI would need to be higher than 1

ELCR = excess lifetime cancer risk
HI = hazard index

2.6.1 Human Health Risk Assessment

The HHRA was conducted to evaluate potential human health risks associated with exposure to chemicals detected in soil at UXO 18. Maximum detected concentrations of chemicals were compared to risk-based screening levels (that is, Regional Screening Levels [RSLs]), and if there were exceedances, chemicals of potential concern (COPCs) were identified based on those exceedances of screening levels. Six inorganics (aluminum, arsenic, cobalt, iron, manganese, and thallium) in surface soil were identified as COPCs for trespasser/recreational users based on the comparison to residential screening levels, whereas arsenic in surface soil was identified as a COPC for workers based on the comparison to industrial screening levels.

Human health risks were quantitatively evaluated for potential human receptors exposed to COPCs in surface soil under reasonable maximum exposure (RME) scenarios. The RME assumes the highest level of human exposure that could reasonably be expected to occur. Exposure scenarios evaluated for site soil were for current trespassers

and future recreational users (adults, youths, and children) and workers, since these groups are likely to have the highest potential exposures based on the anticipated future land use of the island. Potential exposure pathways were ingestion, dermal contact, and inhalation of chemicals in soil. The potential non-cancer hazards, expressed as the hazard index (HI), and cancer risk estimates, expressed as the excess lifetime cancer risk (ELCR), were calculated using RME assumptions.

No unacceptable risks or hazards from potential exposure to COPCs in soil were identified for potential human receptors; in other words, risk estimates were below threshold values (the upper end of EPA's acceptable ELCR range of 10^{-4} and non-cancer HI of 1). **Table 3** provides the risk and hazard results for the four demographics analyzed that are anticipated to be engaged in recreational use of, or maintenance work on, Cayo La Chiva.

2.6.2 Ecological Risk Assessment

The ERA was conducted to evaluate potential risks to terrestrial ecological receptors exposed to chemicals detected in soil at UXO 18. The ERA used established ecological effects values to assess risks from direct exposure to organisms as well as via the food chain. UXO 18 is relatively undisturbed and provides suitable terrestrial habitat for a variety of plant, invertebrate, reptile, bird, and mammal communities. No unacceptable risks to plants and animals and other wildlife potentially feeding on those plants and animals were identified (**Table 3**).

2.6.3 Explosive Hazard

Munitions response actions have been completed at Cayo La Chiva, significantly reducing the potential risks to human health and the environment from explosive hazards associated with MEC. However, potential explosive hazard remains at UXO 18, associated with the possible presence of additional MEC in the subsurface, with surface MEC in inaccessible areas, and from MEC that may become exposed on the surface as a result of erosion.

2.6.4 Basis for Response Action

In cooperation with EPA, PREQB, and PRDNER, and in accordance with applicable guidance, the Navy performed investigations at UXO 18 to evaluate the nature and extent of MEC and potentially associated contamination, to assess the potential risks to human health and the environment from exposure to UXO 18, and to evaluate remedial alternatives for their suitability to reduce possible explosive hazards remaining at the site. No unacceptable human health or ecological risks from exposure to chemicals in soil were identified. Although MEC and MD were removed from the ground surface within the accessible area of UXO 18 during previous investigations, the Navy evaluated remedial alternatives and ultimately selected a response action to address potential explosive hazards remaining because there is the potential for MEC to be present in certain areas (such as steep cliff areas, inaccessible areas), or where it may become exposed over time from erosion.

2.7 Principal Threat Waste

MEC, specifically discarded military munitions (DMM) or unexploded ordnance (UXO), if any, that remains present at UXO 18, may constitute a principal threat waste (PTW) due to the potential for it to pose an explosive hazard if the material is moved, handled, or disturbed. The selected remedy includes LUCs and inspections to limit the potential for people to encounter MEC. During the RI, five MEC (5-inch rockets) were identified and removed. If potential MEC is later found at UXO 18, Department of Defense (DoD) explosive ordnance disposal personnel or similarly qualified personnel will evaluate the material to determine if it poses an explosive hazard. Such material that is determined to pose an explosive hazard will normally be treated on site or removed for destruction per applicable DoD explosives safety standards and environmental laws and regulations. In these cases, the Navy, EPA, and the Commonwealth will consult, in accordance with the terms of the Vieques 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.

2.8 Remedial Action Objectives

Remedial Action Objectives (RAOs) are cleanup objectives that specify contaminants to be cleaned up, the cleanup standard, the area of cleanup, and the time required to achieve cleanup, for the purpose of protecting human health and the environment. The following RAOs were developed to be protective of current and potential future receptors, in accordance with the current and anticipated future recreational land use for UXO 18:

- Prevent or reduce explosive hazard that may be present associated with MEC to be compatible with current and anticipated future land use.
- Prevent or reduce the potential for unauthorized access to portions of UXO 18.

2.9 Description and Comparative Analysis of Remedial Alternatives

Remedial alternatives were developed based on site-specific considerations related to the potential explosive hazard, site conditions, and anticipated site use.

2.9.1 Description of Remedial Alternatives

Table 4 summarizes the alternatives included in the evaluation, including a listing and description of the major components and estimated cost of each alternative. The following four remedial alternatives were developed to address potential MEC explosive hazards:

- Alternative 1 – No Action
- Alternative 2 – Land Use Controls and MEC Inspections
- Alternative 3 – Focused MEC Removal, Land Use Controls, and MEC Inspections
- Alternative 4 – MEC Removal, Land Use Controls, and MEC Inspections

Consistent with the NCP, a no action alternative was evaluated as a baseline for the comparative analysis. Three additional alternatives were evaluated for their potential to meet the RAOs.

2.9.2 Comparative Analysis of Remedial Alternatives

Each remedial alternative for UXO 18 was evaluated with respect to the nine evaluation criteria[8] provided in the NCP. The alternatives were then compared to one another with respect to each NCP criterion. The RI/FS Report (CH2M, 2015) and FS Addendum (CH2M, 2016) provide details and a comparison of the remedial alternatives considered.

The following remedial alternatives, as summarized in **Table 4** and shown in **Figure 4** (Alternative 2), **Figure 5** (Alternative 3), and **Figure 6** (Alternative 4), were selected for detailed evaluation and comparative analysis. To support evaluation of the alternatives, PRDNER identified locations of planned future recreational features and public use areas, including a landing/picnic area at the northern end of Cayo La Chiva, an overlook/picnic area on the west coast of the island, a trail through the center of the island connecting these two areas, and an anchorage area to the northwest of the island. These planned public use areas are shown in **Figures 5 and 6**.

TABLE 4
Remedial Alternatives

Alternative	Components	Details	Cost
1. No Action No action and no restriction on activities.	- N/A	- No action.	**Total Present-Worth Cost: $0**

TABLE 4
Remedial Alternatives

Alternative	Components	Details	Cost
2. Land Use Controls and MEC Inspections Manages MEC explosive hazards by reducing the potential for unauthorized access to the site and by periodic inspections to identify and remove exposed MEC.	- Physical demarcation and ICs - LTM and operations and maintenance (O&M)	- Maintaining physical demarcation and ICs (restrictive covenants) to restrict future access. This includes maintaining signage and/or markers on Cayo La Chiva and on Blue Beach and Punta Galindez to deter unauthorized access to the island. - Perform LTM to observe any indications of trespassing, repair any damage to signage and/or markers, replace any missing or significantly damaged signage and/or markers, and identify and remove any MEC that may have been exposed at the surface within the area inspected. Details of the LTM, including frequency, will be included in the Remedial Action Work Plan. - Annual certification that LUCs are in place and effective.	Capital Cost: $586,000 Present Value of Future, Annual O&M Costs: $1,493,000 **Total Present-Worth Cost: $2,079,000** Assumed timeframe: 30 years
3. Focused MEC Removal, Land Use Controls, and MEC Inspections Manages MEC explosive hazards by removing surface and subsurface MEC to support potential future recreational activities. Additionally, the potential for unauthorized access will be reduced and periodic inspections to identify and remove exposed MEC will be implemented.	- Focused MEC removal - Physical demarcation and ICs - LTM and O&M	- Focused MEC removal to an estimated maximum (based on near-surface bedrock) depth of 1 foot bgs to support future recreational uses. MEC removal will be conducted out to 10 feet on each side of the PRDNER-approved trail centerline (see **Figure 5**), which will include a vegetative buffer on both sides of the trail. - Vegetation clearance to establish a landing/picnic area, an overlook/picnic area, and a trail linking the two, as well as to facilitate MEC removal activities. Minor pruning of vegetation will be conducted in the buffer area to maintain the vegetative cover while facilitating MEC clearance. Biological and archaeological surveys may need to be completed at UXO 18 prior to any vegetation clearance and MEC removal activities. - Restoration of MEC removal excavations and vegetation associated with the removal, where necessary. - Maintaining physical demarcation and ICs (restrictive covenants) to control future access. This includes (at a minimum) signage and/or markers on Cayo La Chiva to deter unauthorized access to areas of the island not intended for PRDNER-approved recreational use and guide visitors to the trails and recreational sites. The LUCs will provide the ability for planned land use and management.	Capital Cost: $1,160,000 Present Value of Future, Annual O&M Costs: $1,930,000 **Total Present-Worth Cost: $3,090,000** Assumed timeframe: 30 years

TABLE 4
Remedial Alternatives

Alternative	Components	Details	Cost
		- Perform LTM to observe any indications of trespassing, repair any damage to signage and/or markers, replace any missing or significantly damaged signage and/or markers, and identify and remove any MEC that may have been exposed at the surface within the area inspected. Details of the LTM, including frequency, will be included in the Remedial Action Work Plan. - Annual certification that LUCs are in place and effective.	
4. MEC Removal, Land Use Controls, and MEC Inspections Manages MEC explosive hazards by removing surface and subsurface MEC over the entire island. Additionally, the potential for unauthorized access will be reduced and periodic inspections to identify and remove exposed MEC will be implemented.	- MEC removal - Physical demarcation and ICs - LTM and O&M	- Surface and subsurface MEC removal to an estimated maximum depth (based on near-surface bedrock) of 1 foot bgs over the entire area of UXO 18, with the exception of the steep slopes and cliff edges (inaccessible areas). - Complete vegetation clearance of all accessible areas of the site to allow for surface and subsurface MEC removal. Biological and archaeological surveys may need to be completed at UXO 18 prior to any vegetation clearance and MEC removal activities. - Site restoration and re-vegetation of the accessible portions of the entire island. - Maintaining physical demarcation and ICs (restrictive covenants) to control future access. This includes (at a minimum) signage and/or markers on Cayo La Chiva to deter unauthorized access to areas of the island not intended for PRDNER-approved recreational use and guide visitors to the trails and recreational sites. The LUCs will provide the ability for planned land use and management. - Perform LTM to observe any indications of trespassing, repair any damage to signage and/or markers, replace any missing or significantly damaged signage and/or markers, and identify and remove any MEC that may have been exposed at the surface within the area inspected. Details of the LTM, including frequency, will be included in the Remedial Action Work Plan. - Annual certification that LUCs are in place and effective.	Capital Cost: $3,268,000 Present Value of Future, Annual O&M Costs: $2,091,000 **Total Present-Worth Cost: $5,359,000** Assumed timeframe: 30 years

2.9.3 Threshold Criteria

Overall Protection of Human Health and the Environment. Alternative 1 (no action) does not achieve the RAOs. The remaining alternatives are protective of human health and the environment and reduce the exposure to MEC by controlling land use and access, limiting intrusive activities, and performing relative degrees of MEC removal.

Compliance with Applicable Relevant and Appropriate Requirements (ARARs). All alternatives can comply with the ARARs. A complete list of the ARARs[9] are included in **Attachment A**. Chemical-specific ARARs (none), location-specific ARARs (such as those that govern activity in a coastal zone), and action-specific ARARs (such as those that govern the management of munitions) were considered.

2.9.4 Primary Balancing Criteria

Long-term Effectiveness and Permanence. Each of the alternatives, with the exception of Alternative 1, is expected to achieve long-term effectiveness and permanence. Previous investigations identified a low number of scattered MEC, and it is anticipated that any remaining MEC at UXO 18 is sporadic and in less accessible areas. Alternatives 2, 3, and 4 provide long-term control through implementation of LUCs and an LTM program to confirm the remedy effectiveness and identify changes in site conditions. The reliability of the control increases with the amount of area that is cleared of potential MEC, so Alternative 4 would have the highest reliability, with Alternatives 3 and 2 having somewhat less reliability (in that order). However, the entire island would be cleared of vegetation with Alternative 4, and with such a thin veneer of soil above bedrock at this site, successful re-vegetation and restoration of the island would be difficult.

Reduction in Toxicity, Mobility, or Volume through Treatment. Alternative 1 does not result in any reduction of toxicity, mobility, or volume (TMV) by treatment. Alternative 2 would result in reduction of TMV by MEC removal and subsequent destruction, to the extent MEC is identified during future site inspections. Alternative 3 would result in the potential for additional TMV reduction through removal and destruction of MEC found during more rigorous and invasive activities, such as the construction of trails and other recreational facilities on the island, in addition to MEC found during future site inspections. Alternative 4 provides the potential for the most TMV reduction through the removal and destruction of MEC (down to an estimated maximum depth of 1 foot bgs) from the accessible areas of the entire Cayo and through future site inspections. However, exposing the soil through vegetation clearance is anticipated to enhance erosion and may actually increase mobility of any subsurface MEC.

Short-term Effectiveness. Alternative 1 would not meet short-term-effectiveness goals. Alternative 2 can be implemented immediately after a remedy is selected and a remedial action work plan is finalized because it is mostly administrative. Alternatives 3 and 4 will achieve the RAOs within approximately seven to nine months because of the increased field effort required.

As part of the short-term effectiveness evaluation, a sustainability analysis was conducted for each of the four remedial alternatives. Sustainability is focused on energy conservation, reduction of greenhouse gases, waste minimization, and re-use and recycling of materials. Alternative 1 has no short-term construction impacts and the lowest environmental footprint since there would be no remedial construction activities. The other alternatives would include construction activities with varying levels of potential impacts to construction workers, the community, and the environment. The amount of impact is proportional to the amount of vegetation clearance, number of MEC excavations and detonations, and truck traffic through the community. Alternative 2 has limited impacts to the landscape because of minimal vegetation clearing for boundary demarcation. Alternative 3 has some temporary disturbance of land because of the clearing required for the proposed recreational areas.

Alternative 4 has significant temporary disturbance of land during construction activities (that is, significant vegetation clearance, MEC clearance, erosion control, and re-vegetation). Alternative 4 has the highest greenhouse gas emissions. In addition, Alternative 4 has the highest safety hazard for construction workers because of the significantly higher level of effort associated with the Cayo-wide clearance and commensurate increase in the potential to be in contact with MEC.

Implementability. Alternative 1 would not obtain administrative approval since it does not meet the RAOs. Alternative 2 is the most implementable among the active alternatives because it is technically and administratively feasible, and the services, equipment, and materials required are readily available. Alternative 3 is also implementable although not as easily as Alternative 2. It is, however, technically and administratively feasible, and the services, equipment, and materials required are readily available. Alternative 4 would be the most complex alternative to implement because of the much larger scale of vegetation removal and surface/subsurface MEC clearance, compared to Alternative 3. Alternative 4 would not be implementable without vegetation clearance. Alternative 4 is expected, additionally, to require consideration of a cultural resource at UXO 18 (an archaeological site) identified on site. Conversely, Alternative 3 can be implemented without impacting the cultural resources.

Cost. Alternative 1 has no cost associated with it, but it does not meet the RAOs. Alternatives 2, 3, and 4 meet the RAOs and have present-worth costs of $2,079,000, $3,090,000, and $5,359,000, respectively.

FIGURE 4

Conceptual Layout of Alternative 2 – Land Use Controls and MEC Inspections

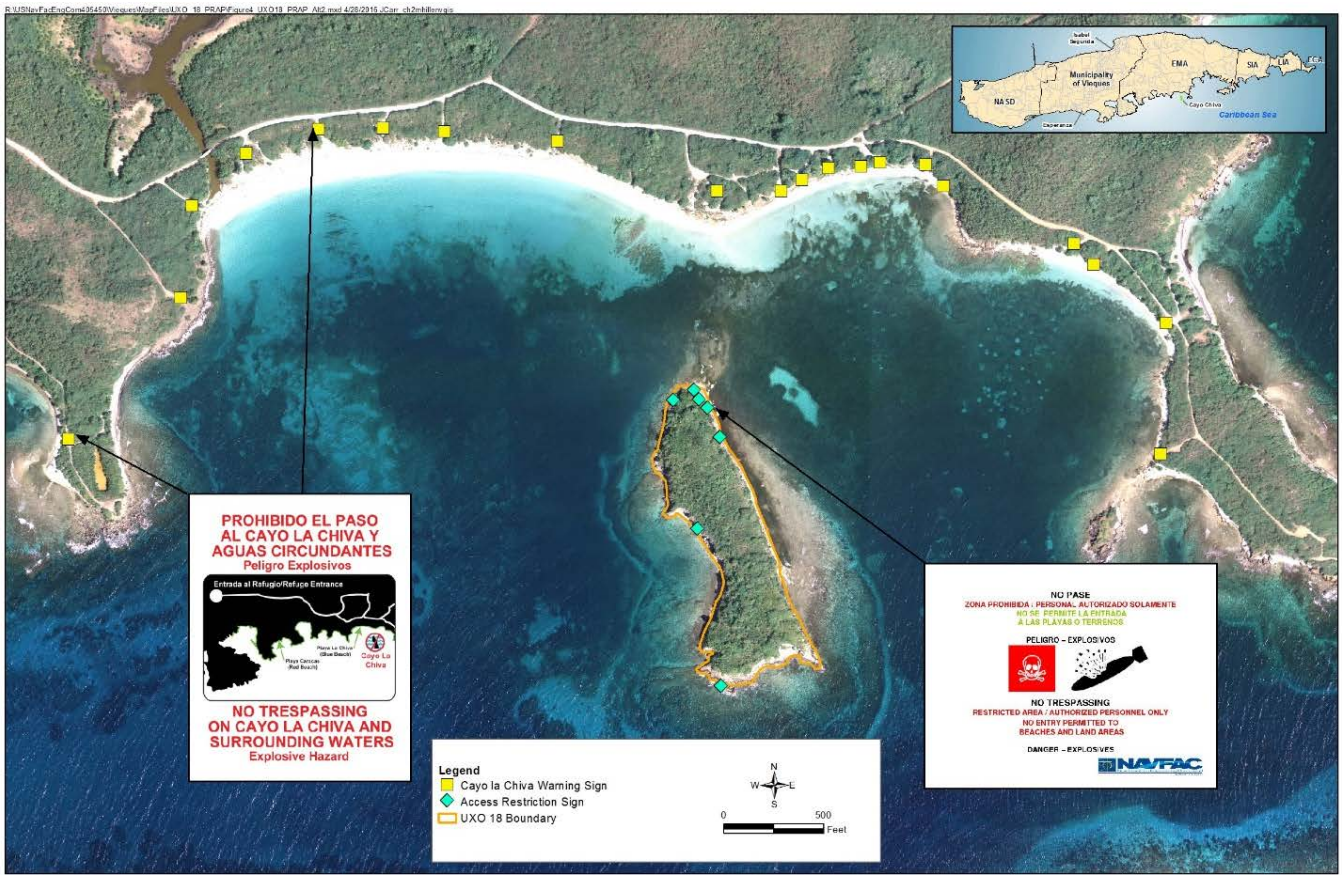


FIGURE 5

Conceptual Layout of Alternative 3 – Limited MEC Removal, LUCs, and MEC Inspections

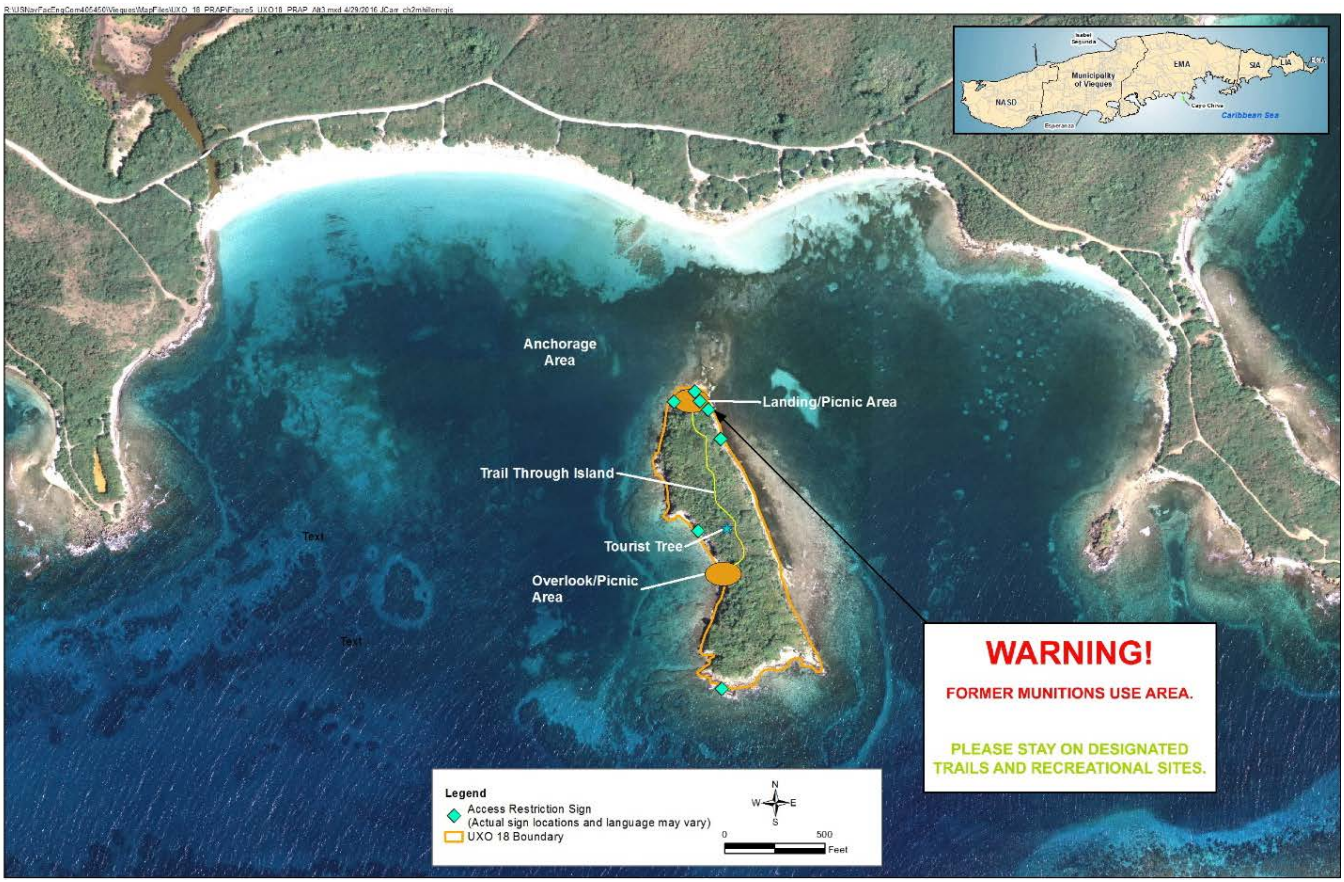
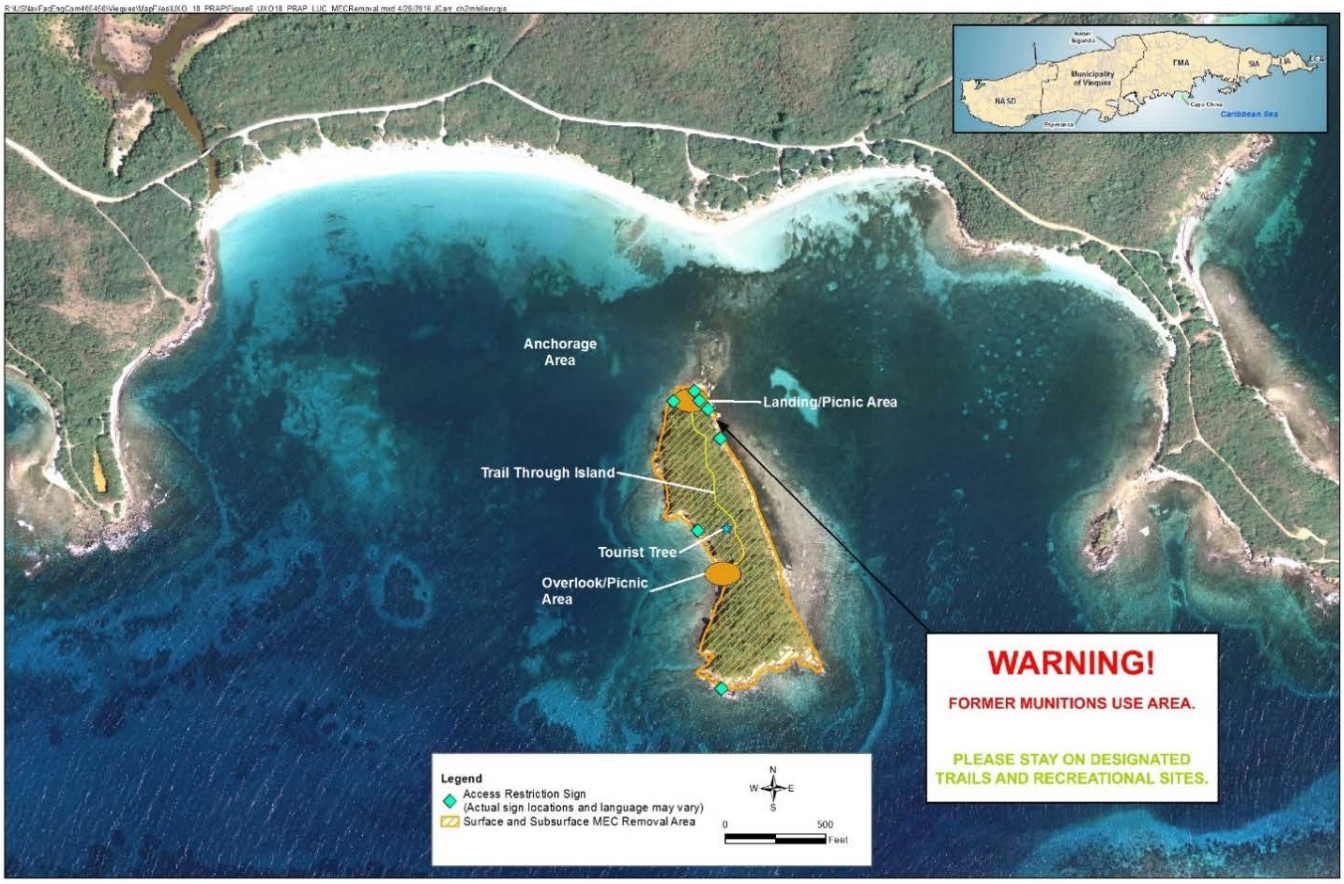


FIGURE 6
Conceptual Layout of Alternative 4 – MEC Removal, LUCs, and MEC Inspections



2.9.5 Modifying Criteria

Commonwealth Acceptance. Commonwealth involvement has been continual throughout the CERCLA process for UXO 18, and PREQB and PRDNER support and concur with the preferred alternative.

Community Acceptance. The Proposed Plan was issued for public review from July 11, 2016 to February 24, 2017 and was discussed at a public meeting on August 2, 2016. Several clarifying questions were asked and addressed at the meeting. Substantive public comments, including a summary of an alternative land use plan offered by a group of citizens, were documented and addressed in the Responsiveness Summary (**Attachment B**).

2.10 Selected Remedy

The selected remedy for UXO 18 is Alternative 3 - Focused MEC Removal, Land Use Controls, and MEC Inspections. This selected remedy is the preferred alternative that was presented in the Proposed Plan.

2.10.1 Rationale for Selected Remedy

Based on the evaluation of the data, information currently available, including the anticipated land use provided by PRDNER and the comparative analysis, the preferred alternative meets the statutory requirements of CERCLA for protection of human health and the environment under current and projected future land use as a recreational area.

2.10.2 Description of Selected Remedy

Key elements that make Alternative 3 the selected alternative are:

- MEC removal from areas identified by PRDNER for future recreational use (such as, trails and picnic areas)
- Site and vegetation restoration as needed after MEC removal and trail creation
- Ecological habitat preservation
- LUCs and associated monitoring and removal of MEC items (if any) identified during routine inspections to ensure remedy remains effective

Alternative 3 - Focused MEC Removal, Land Use Controls, and MEC Inspections involves targeted vegetation and MEC removal (and vegetation restoration, as warranted) from areas that have been identified by PRDNER for recreational use. Because MEC may still be present at the site following the MEC removal, LUCs and LTM will be employed and maintained to ensure the remedy remains effective in the long-term. The details of Alternative 3 are provided in **Table 4**. The statutorily-required 5-year reviews will also be performed every five years to assure that human health and the environment are being protected.

2.10.3 Expected Outcomes of the Selected Remedy

The expected outcome of the selected remedy is that the RAOs for UXO 18 will be met, and that potential explosive hazards, while reduced, will remain at the site indefinitely that will require LUCs and associated LTM.

Within 90 days following selection of the remedy, the Navy will prepare, in accordance with EPA guidance, and submit to EPA, PREQB, and PRDNER for review and concurrence, a remedial action work plan that includes an LUC Plan, LTM Plan, and a plan for focused MEC removal (from public use areas identified by PRDNER or as may be identified in the future, such as by erosion). Details of the LUCs, including performance metrics, will be included in the LUC Plan. While the potential for explosive hazards exists, the Navy is responsible for implementing, maintaining, inspecting, reporting on, and enforcing the LUCs in accordance with the remedy and associated LUC Plan.

2.10.4 Statutory Determinations

In accordance with the NCP, the selected remedy meets the following statutory determinations.

- **Protection of Human Health and the Environment -** The selected remedy is protective of human health and the environment by controlling land use and limiting intrusive activities through ICs and by performing focused additional MEC removal.
- **Compliance with ARARs -** The selected remedy will attain the Federal and Commonwealth ARARs presented herein (**Attachment A**, Tables A-1 through A-6).
- **Cost-Effectiveness -** The selected remedy provides the best value relative to the cost and planned land use.
- **Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable -** The selected remedy represents the maximum extent to which permanent solutions and alternative treatment technologies can be used in a practicable manner at UXO 18 because any MEC found during remedy implementation and associated LTM will be removed and treated (detonated).
- **Preference for Treatment as a Principal Element -** The selected remedy results in additional reduction in TMV through focused MEC removal (if found) and treatment (detonation).

2.11 Community Participation

The Navy, in consultation with the EPA, PREQB, and USFWS, established a community relations program for the Vieques Environmental Restoration Program in 2001. The program promotes communication regarding the various OU investigations and response activities between the stakeholder agencies (Navy, EPA, PREQB, PRDNER, and USFWS) and the public. The community relations program formed a Restoration Advisory Board (RAB) in 2004 to encourage community involvement. RAB meetings are held approximately every 3 months and are open to the public for participation. A summary of the community participation activities associated with this action are discussed in the next section.

3 Responsiveness Summary

The Responsiveness Summary is a concise summary of substantive comments received from the public during the public comment period and the associated responses. The Responsiveness Summary was prepared in accordance with guidance in Community Relations in Superfund: A Handbook[10] (EPA, 1992) after the public comment period ended on February 24, 2017.

3.1 Overview

The Proposed Plan that was presented to the public identified that Alternative 3 - Focused MEC Removal, LUCs, and MEC inspections - is warranted at UXO 18 to protect human health and the environment.

3.2 Community Involvement Process

In accordance with Section 117(a) of CERCLA, the Navy issued the UXO 18 Proposed Plan for public comment starting July 11, 2016 and ending August 24, 2016. The Navy and EPA held a public meeting[11] to discuss the Proposed Plan on Tuesday August 2, 2016, at the Punta Mulas Lighthouse in Isabel Segunda, Vieques, Puerto Rico. As a result of increased community interest in utilizing the island for recreational purposes, a community member representing an interested group of citizens requested a site visit and a 90-day public comment period extension, both of which were granted. The requested site visit was held on October 8, 2016. At the end of the 90-day public comment period extension, the community member requested and was granted a second 90-day public comment period extension. The rationale provided for the extension requests was that a group of community members had formed a “Friends of Cayo La Chiva” organization with the goal of developing a proposed alternate land use plan to the one PRDNER had developed for Cayo La Chiva.

The Proposed Plan and previous investigation reports for UXO 18 were available during the public comment period and are currently available in the Administrative Record for this remedial decision. The Administrative Record is accessible to the public via:

https://go.usa.gov/xRHxY

3.3 Summary of the Public Comment Period

During the UXO 18 Proposed Plan public comment period, comments were received from three individuals and two organizations (“The Working Committee in Support of Vieques” and “Coralations”). In addition, a proposed alternative land use plan to the one developed by PRDNER was submitted by the “The Friends of Cayo La Chiva” organization. The responses to public comments by the Navy and EPA, in consultation with PREQB and PRDNER, are presented in the responsiveness summary, which is included as **Attachment B** of this ROD.

4 Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COPC	chemical of potential concern
DMM	discarded military munitions
DoD	Department of Defense
DOI	Department of the Interior
ELCR	excess lifetime cancer risk
EOD	explosive ordnance disposal
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
ESV	Ecological Screening Value
FFA	Federal Facilities Agreement
FS	Feasibility Study
HHRA	Human Health Risk Assessment
HI	hazard index
IC	institutional control
LTM	long-term monitoring
LUC	land use control
MD	munitions debris
MEC	munitions and explosives of concern
MRP	Munitions Response Program
msl	mean sea level
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NTCRA	non-time-critical removal action
O&M	operations and maintenance
OU	Operable Unit

PRDNER	Puerto Rico Department of Natural and Environmental Resources
PREQB	Puerto Rico Environmental Quality Board
PTW	principal threat waste
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RI	Remedial Investigation
RME	reasonable maximum exposure
ROD	Record of Decision
RSL	Regional Screening Level
SEMS	Superfund Enterprise Management System
SSL	Soil Screening Level
TMV	toxicity, mobility, or volume
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance
VNTR	Vieques Naval Training Range

5 References

Item	Reference Phrase in ROD	Location in ROD	Identification of Referenced Document Available in the Administrative Record and/or Hyperlinked to this ROD
Ref. 1	Guide	Section 1.1	EPA. 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents.*
Ref. 2	Toolkit	Section 1.2	EPA. 2011. *Toolkit for Preparing CERCLA Records of Decision.* September.
Ref. 3	Background Investigation	Section 2.3	CH2M. 2007. *East Vieques Background Soil Inorganics Investigation Report, Former Vieques Naval Training Range, Vieques, Puerto Rico.* October.
Ref. 4	no unacceptable risks to human health or the environment	Section 2.3	CH2M. 2015. *UXO 18 Remedial Investigation/Feasibility Study Report, Atlantic Fleet Weapons Training Area-Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico.* May.
Ref. 5	remedial alternatives to address potential explosive hazards	Section 2.3	CH2M. 2015. *UXO 18 Remedial Investigation/Feasibility Study Report, Atlantic Fleet Weapons Training Area-Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico.* May.
Ref. 6	FS Addendum	Section 2.3	CH2M. 2016. *UXO 18 Feasibility Study Addendum, Atlantic Fleet Weapons Training Area - Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico.* April.
Ref. 7	Protocols	Section 2.4 Table 2	CH2M. 2010. *Master Standard Operating Procedures, Protocols, and Plans, Environmental Restoration Program, Vieques, Puerto Rico*. April.
Ref. 8	nine evaluation criteria	Section 2.9.2	CH2M. 2015. *UXO 18 Remedial Investigation/Feasibility Study Report, Atlantic Fleet Weapons Training Area, Former Vieques Naval Training Range, Vieques, Puerto Rico (Section 11.3).* May.
Ref. 9	ARARs	Section 2.9.3	CH2M. 2015. *UXO 18 Remedial Investigation/Feasibility Study Report, Atlantic Fleet Weapons Training Area, Former Vieques Naval Training Range, Vieques, Puerto Rico (Table 9.1).* May.
Ref. 10	Community Relations in Superfund: A Handbook	Section 3	EPA. 1992. *Community Relations in Superfund: A Handbook*
Ref. 11	public meeting	Section 3.2	Proposed Remedial Action Plan for UXO 18, Cayo La Chiva, Former Vieques Naval Training Range, Vieques, Puerto Rico, Public Meeting Transcript. August 2, 2016.

Attachment A
Applicable Relevant and Appropriate Requirements

Table A-1
Federal Chemical-Specific ARARs
UXO 18 Remedial Investigation/Feasibility Study Report
Atlantic Fleet Weapons Training Area—Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

Media	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
No Federal Chemical-Specific ARARs apply.						

Table A-2
Puerto Rico Chemical-Specific ARARs
UXO 18 Remedial Investigation/Feasibility Study Report
Atlantic Fleet Weapons Training Area—Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

Media	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
No Puerto Rico Chemical-Specific ARARs apply.						

Table A-3
Federal Location-Specific ARARs
UXO 18 Remedial Investigation/Feasibility Study Report
Atlantic Fleet Weapons Training Area—Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

Location	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
Coastal Zone Management Act						
Coastal zone or area that will affect the coastal zone	Federal activities must be consistent with, to the area that will affect maximum extent practicable, State coastal zone management programs. Federal agencies must supply the State with a consistency determination.	Activity taking place in a wetland, flood plain, estuary, beach, dune, barrier island, coral reef, and fish and wildlife and their habitat, within the coastal zone.	15 CFR 930.33(a)(1), (a)(2), (b); .35(a), (b); .36(a)	2, 3, and 4	Applicable	Activities at UXO 18 that will affect Puerto Rico's coastal zone will be consistent to the maximum extent practicable with Puerto Rico's enforceable policies. Activities performed on-site and in compliance with CERCLA are not subject to administrative review; however the substantive requirements of making a consistency determination will be met.
Migratory Bird Treaty Act						
Migratory bird area	Protects almost all species of native birds in the United States from unregulated taking.	Presence of migratory birds.	*Migratory Bird Treaty Act*, 16 USC 703	2, 3, and 4	Applicable	The site is located in the Atlantic Americas Migratory Flyway. If migratory birds, or their nests or eggs, are identified at the site, operations will not destroy the birds, nests, or eggs.

Table A-4
Puerto Rico Location-Specific ARARs
UXO 18 Remedial Investigation/Feasibility Study Report
Atlantic Fleet Weapons Training Area—Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

Location	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
No Puerto Rico Location-Specific ARARs apply.						

Table A-5
Federal Action-Specific ARARs
UXO 18 Remedial Investigation/Feasibility Study Report
Atlantic Fleet Weapons Training Area—Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

Action	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
Management of non-hazardous solid waste onsite in containers or in piles.	Non-hazardous solid waste staged onsite must not create a hazard or public nuisance.	Generation of non-hazardous solid waste that is managed onsite in containers or in piles.	40 CFR 273.3-1(a); 3-3; 3-4(a); 3-7(a); 3-8(d)	2, 3, and 4	Applicable	It is anticipated that non-hazardous solid wastes will be generated during the implementation of these alternatives. IDW will be sampled to confirm characterization prior to disposal. It will be assumed that MDAS is regulated as scrap metal.
Performing activities that will disturb greater than one acre of land	Requires the development and implementation of best management practices and erosion and sedimentation control measures during construction activity.	Implementation of construction activities that will disturb more than one acre of land	one to five acres: 40 CFR 122.26(a)(1)(ii), (a) (9)(i)(b), (b)(15); 122.44(k)(2) and (s)(1) five acres or more: 40 CFR 122.26(a)(1)(ii), (a)(9)(i)(b), (b)(14)(x); 122.44(k)(2) and (s)(2)	3 and 4	Applicable	If any of the selected remedies or the combination thereof disturb greater than one acre of land a Storm Water Pollution Prevention Plan will be prepared and implemented. Since activities are taking place onsite and in compliance with CERCLA, the substantive requirements will be met, but a permit will not be required.
Management of military munitions	Specifies management requirements for those military munitions that are no longer exempt from the definition of solid waste.	Management of unused military munitions that have been disposed of or fired/used military munitions that have been removed from the range.	40 CFR 266.202(b) and (c); 205 (a) and (b)	2, 3, and 4	Applicable	If any military munitions lose their exemption from the definition of solid waste they will be handled in accordance with these rules.

Table A-6
Puerto Rico Action-Specific ARARs
UXO 18 Remedial Investigation/Feasibility Study Report
Atlantic Fleet Weapons Training Area—Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

Action	Requirement	Prerequisite	Citation	Alternative	ARAR Determination	Comment
Land disturbance	A Control of Erosion and Sediment (CES) Plan and a Work Plan must be prepared for any activities that involve the alteration of ground or soil conditions that have not been specifically excluded.	Disturbance of more than 40 cubic meters of soil during construction activity	Puerto Rico Regulation 5754.1230(B), (C)	3 and 4	Applicable	Remedial alternatives involve the disturbance of more than 40 cubic meters of soil. A CES and Work Plan will be prepared for this activity.
Production of Fugitive Dust	Dust control measures must be implemented during construction activities to prevent emissions beyond the property boundary. These include, but are not limited to, the use of water or other chemicals on road ways to control dust, covering haul trucks, and cleaning tracked soil off of paved roads.	Construction activity causing particulate matter to become airborne	Puerto Rico Regulation 5300.404(A)(2), (4), (7); (B)	2, 3, and 4	Applicable	Applicable to activities that produce fugitive dust. Dust control measures will be implemented.
Performing construction activities that generate noise	No construction activity may be performed at night or in such a way that vibrations are produced that can be felt beyond the property boundary. If equipment used in construction is not manufactured in accordance with USEPA standards for newly manufactured equipment then it may not produce noise that exceeds 70 dBA.	Construction activity including earthwork	Puerto Rico Regulation 3418.3.1.5(A),(C);3.1.10; 3.1.13; and 4.1	2, 3, and 4	Applicable	The site is considered to be in Zone II (Commercial) for noise production. Noise pollution during MEC clearance and demolition, dewatering, and earthwork activities will be prevented.
Management of non-hazardous solid waste onsite in containers and piles	Non-hazardous solid waste staged onsite must not create a hazard or public nuisance.	Generation of non-hazardous solid waste that is managed onsite in containers or in piles.	Puerto Rico Non-Hazardous Solid Waste Regulation 531.H	2, 3, and 4	Applicable	It is anticipated that non-hazardous solid wastes will be generated during the implementation of these alternatives. IDW will be sampled to confirm characterization prior to disposal. It will be assumed that MDAS is regulated as scrap metal.

Attachment B
Responsiveness Summary for UXO 18

Responsiveness Summary

Proposed Plan
UXO 18 (Cayo La Chiva)
Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

1. Introduction

This responsiveness summary provides a summary of the substantive comments submitted by the public on the UXO 18 (Cayo La Chiva) Proposed Plan issued by the United States Navy, Naval Facilities Engineering Command (NAVFAC) and the United States Environmental Protection Agency (EPA), in consultation with the Puerto Rico Environmental Quality Board (PREQB) and the Puerto Rico Department of Natural and Environmental Resources (PRDNER). The responsiveness summary was prepared in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), at 40 CFR 300.430(f)(3)(F), Section 117(b) of CERCLA, and EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9230.0-06 (Superfund Responsiveness Summaries).

The UXO 18 Proposed Plan was issued for public comment from July 11, 2016 to August 25, 2016. The Navy and EPA held a public meeting to discuss the Proposed Plan on Tuesday August 2, 2016, at the Punta Mulas Lighthouse in Isabel Segunda, Vieques, Puerto Rico. During the public meeting, a community member requested and was granted a 90-day public comment period extension. At the end of the 90-day public comment period extension, the community member requested and was granted a second 90-day public comment period extension. The rationale provided for the extension requests was that a group of community members had formed a "Friends of Cayo La Chiva" organization with the goal of developing a proposed alternate land use plan to the one PRDNER had developed for Cayo La Chiva. Additional detail regarding the alternative land use plan is presented in Sections 2 and 3 below.

As detailed in the Proposed Plan, the Navy and EPA identified Alternative 3 – Limited Munitions and Explosives of Concern (MEC) Removal, Land Use Controls (LUCs), and MEC Inspections as the preferred alternative for UXO 18. Key elements of Alternative 3 are:

- MEC removal from areas identified by PRDNER for future recreational use (e.g., trails and observations tower)
- Site and vegetation restoration as needed after MEC removal and trail creation
- Ecological habitat preservation
- LUCs and associated monitoring and removal of MEC items (if any) identified during monitoring

2. Community Involvement Activities Associated with UXO 18

This section summarizes the community involvement activities associated with investigation and munitions cleanup at UXO 18. The community involvement activities discussed below were designed to ensure the community is informed and has opportunity to provide feedback and input throughout the investigation and cleanup process.

Community Involvement Plan: The Navy, EPA, PREQB, PRDNER, and United States Fish and Wildlife Service (USFWS) worked jointly to develop an updated Community Involvement Plan (CIP) in 2015 with input from community members and stakeholders via interviews, surveys, and agency-community meetings. During the interview process, several community members expressed their desire to have Cayo La Chiva opened to the public. In recognition of the large number of Spanish-speaking residents, the Navy translated the CIP into Spanish.

Information Repositories: The Navy maintains an information repository where the public can review documents associated with UXO 18. The repository is located at: https://go.usa.gov/xRHxY. In addition, the Navy submitted the following documents to the Vieques Restoration Advisory Board (RAB) to solicit community comment and input prior to issuing the final versions of the documents and placing them in the Administrative Record:

- Master Sampling and Analysis Plan, East Vieques Terrestrial UXO Sites (2013) – Described the historical information and characterization rationale and approach for various UXO sites, including UXO 18.
- Remedial Investigation/Feasibility Study Report, UXO 18 (2015) – Described the results of the Remedial Investigation and remedial alternatives evaluation to address hazards associated with potential munitions present at UXO 18.
- UXO 18 Feasibility Study Addendum (2016) – Provided further clarification of the assumptions and associated costs used in the evaluation of various remedial alternatives in the Feasibility Study.

In addition to the above, informational flyers and newsletters are regularly distributed to keep the Vieques community informed about Vieques cleanup activities. Information specific to UXO 18 was included in the following flyers/newsletters:

- January 2011 Flyer – Described the finding of munitions on Cayo La Chiva, notified readers that warning signs had been posted, and urged people to avoid the island pending further evaluation.
- February 2011 Flyer – Reprinted the January 2011 article regarding the finding of munitions on Cayo La Chiva and the public protectiveness activities.
- March 2011 Flyer – Summarized key information provided to the community at the February 2011 Restoration Advisory Board (RAB) meeting regarding the munitions findings at Cayo La Chiva, the warning signs installed on Cayo La Chiva and Playa La Chiva (Blue Beach) urging people not to visit the island while being evaluated, and the Advisory Notice regarding the area issued by the Coast Guard.
- February 2015 Newsletter – Included the request by PREQB to prioritize cleanup of Cayo La Chiva and surrounding waters due to their proximity to Playa La Chiva, a public beach.
- August 2016 Flyer – Announced the public comment period dates and public meeting date for the UXO 18 Proposed Plan. Summarized the key elements of the UXO 18 Proposed Plan.
- November 2016 Newsletter – Provided a reminder of the UXO 18 Proposed Plan public comment period dates.
- January 2017 Flyer and Newsletter – Summarized the Navy and regulatory agency transport and escort support provided for the October 2016 Cayo La Chiva visit by the “Friends of Cayo La Chiva” organization to observe the island’s natural resources. Provided a reminder of the UXO 18 Proposed Plan public comment period and reiterated contact information for submitting comments.

Restoration Advisory Board: The Vieques RAB comprises community members and representatives from stakeholder government agencies. The objective of the RAB is to foster communication among the community, regulators, and other stakeholders associated with or interested in the Vieques cleanup. RAB meetings serve as a forum to share information on the environmental restoration process. The community was updated and input was solicited regarding the investigation and cleanup progress at UXO 18 during the following RAB meetings:

- February 2011 – General update of munitions-related investigations and removals and public safety activities across the former military training areas, including Cayo La Chiva.
- April 2011 – Discussed the removal (demolition) of munitions items found on Cayo La Chiva, the identification and planned removal of nine suspected munitions items in the water surrounding Cayo La Chiva, and the installation of warning buoys around the island pending removal of the nine items.
- November 2011 – General update of munitions-related investigations and removals across the former military training areas, including Cayo La Chiva.
- March 2012 – Summary of Remedial Investigation activities (munitions evaluation) and findings to date at Cayo La Chiva.
- February 2013 – Summary of planned Remedial Investigation activities (environmental sampling) at Cayo La Chiva.
- August 2016 (Public Meeting) – Members of the "Friends of Cayo La Chiva" provided general overview of their planned approach to develop a proposed alternate land use plan to the one developed by PRDNER.
- November 2016 – Members of "Friends of Cayo La Chiva" presented their proposed alternate land use plan.

Presentations made and minutes from the RAB meetings listed above, which summarize discussions regarding UXO 18, including any comments/questions posed and the associated responses, can be found on the Vieques Public Website at the following link:

https://navfac.navy.mil/products_and_services/ev/products_and_services/env_restoration/installation_map/navfac_atlantic/vieques/outreach/rab_documents.html

3. Summary of Commenters' Major Points Regarding UXO 18 Proposed Remedial Action

During the UXO 18 Proposed Plan public comment period, comments were received from three individuals and two organizations ("The Working Committee in Support of Vieques" and "Coralations"). In addition, a proposed alternative land use plan to the one developed by PRDNER was submitted by the "The Friends of Cayo La Chiva" organization.

Several commenters provided non-site-specific comments regarding such topics as cleanup of Vieques as a whole, addressing potential underwater munitions adjacent to Cayo La Chiva, return of all former Navy lands to the Viequenses, a restitution program that involves health services for residents, involving Puerto Rican and other "third party" scientists, community technical advisory funding, public notification of controlled detonations, general opposition to the use of warning/educational signs versus complete munitions removal, and other comments not specific to the proposed remedial action at UXO 18. While these comments are outside of the scope of the UXO 18 Proposed Plan, included with these comments were comments applicable to UXO 18. The substantive comments/input are grouped by category and discussed below. Section 4 of the Responsiveness Summary provides responses to specific substantive questions.

3.1 **Major Point/Comment – Land Use:** The Friends of Cayo La Chiva submitted a proposed alternative land use to the one developed by PRDNER. The plan included significantly more land development and use of the island, including floating docks, reception center, multiple trails, camping areas, picnic area, and observation tower.

Response: PRDNER appreciates the interest and effort shown by the Friends of Cayo La Chiva in developing and proposing an alternative land use plan. That plan demonstrates the organization's sincere commitment to providing for enhanced public use of Cayo La Chiva; PRDNER shares that commitment. However, as the Commonwealth's agency responsible for protecting natural resources on

Puerto Rico-owned land, as well as administering their public use, PRDNER must balance the goals of public recreational use against the conservation and preservation of the natural resources it must protect in perpetuity. After careful review and consideration, PRDNER has determined that construction and development of the additional structures and facilities called for in the Friends' land use plan, along with the corresponding pressures of greater public use those facilities would encourage, would likely lead to long-term degradation of the Cayo's fragile natural resources. Therefore, PRDNER will retain its land use plan as proposed in the PRAP, which promotes improved public access to Cayo La Chiva while also limiting public use to be consistent with long-term protection of its sensitive natural resources. However, to the extent practical, design elements identified in the land use plan proposed by the Friends of Cayo La Chiva will be considered during planning and implementation of the remedial action and corresponding recreational facilities development.

3.2 Major Point/Comment – Cleanup Scope and Approach: Several commenters wanted cleanup across the entirety of UXO 18 without vegetation burning and open detonation.

Response: Based on knowledge of Cayo La Chiva historical use and information gathered during the Remedial Investigation and previous investigations, very few munitions items are potentially present on the island and none are expected within DNER's planned public recreational use area. Nevertheless, any munitions found during implementation of the remedial action or subsequent long-term monitoring will be addressed in the safest manner. Items deemed safe to move, will be transported to the former range for further processing and/or controlled detonation. Any item determined unsafe to move will be detonated in place using a process that ensures the safety of the workers and surrounding community. No vegetation burning will be necessary to implement the proposed Alternative 3.

As discussed in the UXO 18 Proposed Plan, munitions removal across the entirety of UXO 18 was considered by the Navy and regulatory agencies as Alternative 4. However, implementing Alternative 4 would result in significant ecological damage and potential cultural resource damage since all vegetation would be removed, would enhance erosion potential by exposing the soil through vegetation clearance, present the highest safety risk to workers, and would not significantly increase the remedy protectiveness since much of the island is inaccessible and not planned for future access. Based on this, Alternative 4 was not proposed as the remedial alternative; Alternative 3 is protective of human health and the environment while supporting the planned public use and avoiding the deleterious impacts of Alternative 4 described above.

3.3 Major Point/Comment – Community Involvement: One commenter felt the Vieques community was not sufficiently consulted regarding the UXO 18 cleanup.

Response: The Navy and regulatory agencies are committed to soliciting public input throughout the entire cleanup process for all sites, including UXO 18. Section 2 above describes the various community involvement activities associated with UXO 18. In addition to keeping the community informed and soliciting input throughout the investigative process, the Navy and EPA provided the Proposed Plan for public comment for 7 months (July 11, 2016 to February 24, 2017). Further, the Navy and regulatory agencies provided support and escort to the "Friends of Cayo La Chiva" for their visit to Cayo La Chiva in support of developing their proposed alternative land use plan.

3.4 Major Point/Comment – Characterization of UXO 18: Several comments expressed concern and/or confusion regarding the finding of unexpected munitions on Cayo La Chiva based on historical records and therefore questioned the findings and conclusions drawn for the site, especially regarding the metals concentrations detected.

Response: While historical records do not indicate there was long-term use of Cayo La Chiva for military training, it is understandable that several 5-inch rockets were found on Cayo La Chiva given that there is documentation that the island was used during simulated amphibious landings in 1950. That only several rockets were found suggests their presence may have been the result of a one-time event, which

may account for why this information is not in historical records. Nonetheless, the UXO 18 Remedial Investigation was performed in the same manner as those conducted at other Vieques UXO sites in that the sampling included explosives and metals found or potentially found across the broad spectrum of munitions types used at the former Vieques Naval Training Range. Therefore, regardless of the munitions type(s) potentially used on Cayo La Chiva, the data collected during the Remedial Investigation account for whatever munitions type(s) may have been used and indicate there is no munitions-related contamination present and that the metals concentrations are attributable to natural conditions.

3.5 Major Point/Comment – Accidental Fire: One comment raised concern about the potential for an accidental fire caused by potential open detonation of a munition item.

Response: While unintentional fires are potentially associated with controlled detonations, to date over 52,000 munitions items have been destroyed in Vieques by controlled detonation and fewer than 20 measurable fires have occurred. Further, the fires generally result when multiple, large munitions items are consolidated for detonation. On Cayo La Chiva, any detonation required would be done on an individual item basis and controls (e.g., tamping) can be put in place to significantly lower the likelihood of an accidental fire. In addition, the five 5-inch rockets that were previously detonated on Cayo La Chiva resulted in no unintentional fire.

3.6 Major Point/Comment – Biological Assessment and Interrelationship of Cayo La Chiva and Surrounding waters: One comment indicated the biological assessment failed to account for endangered snakes, species of pigeons of particular concern to PRDNER, and bottlenose dolphins. Concern was also raised that erosion caused by devegetation and accidental fires associated with the remedial action could impact surrounding waters and corals and that given this relationship and the public interest in both areas, the Navy should consolidate both with respect to remediation.

Response: The cited species (Epicrates monensis), both the Mona boa and the Virgin Island Tree boa, are not known to occur in Vieques, as documented in Section 3.3 of the Remedial Investigation/ Feasibility Study Report (2015). The Biological Assessment further lists the doves observed during the assessment and indicated many of them appeared to be nesting and using the island for roosting. The Biological Assessment of Cayo La Chiva did not include bottlenose dolphins because the assessment was for the terrestrial setting. Nonetheless, the manner in which the Biological Assessment was conducted and the information gathered were appropriate for performing investigation and remedial action.

The Navy and regulatory agencies also recognize the potential for erosion to impact the surrounding waters. This was considered in the remedial alternatives evaluation included in the Feasibility Study and was ultimately one of the factors for not recommending Alternative 4, which included island-wide vegetation removal, and instead proposing Alternative 3 as the remedial action. In fact, as shown in Section 1 above, one of the key elements of Alternative 3 is ecological habitat preservation while supporting planned public access to the island.

3.7 Major Point/Comment – Assumptions made in Feasibility Study: One comment questioned some of the assumptions included in the Feasibility Study, specifically the absence of quantity of vegetation to be cleared, absence of the quantity of MEC to be removed, absence of the parameters used to assess sustainability, especially with respect to workers, local community, and the environment.

Response: The assumptions included in the Feasibility Study are described in general in Section 10 – Development and Description of Remedial Alternatives – of the Remedial Investigation/Feasibility Study Report (2015) and Feasibility Study Addendum (2016). Specific assumptions associated with the quantity of vegetation and MEC to be cleared are provided in the Cost Estimate tables (Appendix H) of the both reports. The parameters used to assess sustainability, especially as they relate to the workers, community, and environment, are presented in Appendix G – Sustainability Analysis for UXO 18 – and

Section 11 – Detailed Analysis of Remedial Alternatives – of the Remedial Investigation/Feasibility Study Report (2015).

3.8 **Major Point/Comment – Air Quality associated with Detonations:** One comment states the Navy does not have means in place to measure air impacts from detonations and the Navy claims air quality will not exceed standards because there is a declining amount of munitions being detonated.

Response: The Navy conducted air monitoring between 2005 and 2013 to assess the potential air quality effects of munitions detonation events associated with the cleanup. Air monitoring resumed in October 2016 and is ongoing to monitor the potential air quality effects of controlled burning in the Submunitions Area of UXO 4. Since 2005, over 1,400 air samples have been collected during more than 160 detonation events. In addition, accidental brush fires have occurred over the years and controlled burning of vegetation in the UXO 4 Submunitions Area was initiated in October 2016; air samples were often collected during and after the accidental brush fires and are collected during each Submunitions Area controlled vegetation burn. Over 60 air samples were collected during 19 accidental brush fires, which ranged in size from 1 to 300 acres, and the controlled burns in the Submunitions Area. No explosives were detected during any of the air monitoring events. Additionally, there were no detections of mercury, lead, cadmium, tin, or phosphorus during any of the air monitoring events. Since iron, nickel, copper, chromium, and arsenic are naturally occurring, they were detected, but all concentrations were at least 99% below health based standards. The data demonstrate that if a controlled detonation was necessary on Cayo La Chiva, there would be no impact to air quality within the community.

3.9 **Major Point/Comment – Confusing/Contradictory Information:** One comment suggests confusing or contradictory information is included in the Proposed Plan. Specifically, citations are:

(1) "We don't understand statements like: 'Environmental investigations relevant to UXO 18 have been conducted since 2006, and specifically at UXO 18 since 2011.'

Response: Two investigations prior to 2011 are listed in the Proposed Plan – the Background Investigation (2006) and the Adjacent UXO 16 Investigation (2010). While neither of these studies was conducted **at** UXO 18, both are **relevant to** UXO 18. The background data collected in 2006 were used to help evaluate the metals data collected at UXO 18 during the Remedial Investigation. The information collected during the adjacent UXO 16 investigation provided some historical perspective to the munitions items found on UXO 18. All investigations conducted from 2011 forward were done specifically on UXO 18.

(2) "Similarly, Section 4.2.2 of the Feasibility Study states: 'Explosives were not detected in any soil samples at UXO 18. Although there were some explosives with reporting limits above their respective SSLs, other explosives reporting limits were below SSLs. Most significantly, all of the explosives reporting limits were below the residential RSLs and ecological screening values.' These are two examples of information provided that appears to contradict itself."

Response: As stated in Worksheets 11 and 15 of the Master Sampling and Analysis Plan, several screening values (SSLs [used to help evaluate the potential to leach to groundwater], RSLs [used to help evaluate potential human health risks], ESLs [used to help evaluate potential ecological risks], and background inorganics [used to help evaluate inorganics concentrations]) were used to help evaluate the data collected at UXO 18. The text states no explosives were detected in any UXO 18 soil samples, but recognizes the laboratory's reporting limits for some non-detect results were above one of the screening criteria (i.e., the SSL), but explains that this is not significant because there are other data and more significant screening values that were used to assess the data.

4. Summary of Specific Questions

This section provides specific questions asked regarding the UXO 18 Proposed Plan.

4.1 **Question:** What do your records show that the Cayo was used for by the Navy? How do you explain that in an area many miles from the bombing area unexploded munitions were found on Cayo La Chiva?

Response: Section 1 of the UXO 18 Proposed Plan states historical records indicate Cayo La Chiva was used in 1950 during simulated amphibious landings. Although five 5-inch rockets were found on Cayo La Chiva, no records were found that Cayo La Chiva was used for bombing. That only a few rockets were found on the island indicates the island was not consistently used. In fact, the number of rockets found suggests their presence may be associated with a one-time event, which may also account for historical records not listing Cayo La Chiva as a bombing area.

4.2 **Question:** Who would be liable if a visitor to this cay, managed by the Commonwealth, ignores the signs and is injured or killed by an unexploded ordnance? The Navy? The Commonwealth?

Response: It is not appropriate for the Navy or the regulators to opine whether a court may hold the Navy or the Commonwealth or any other party responsible for the injuries sustained by a visitor/trespasser.

4.3 **Question:** Will the Navy be able to clean the cay to the extent it can ever leave the Commonwealth with an assurance that it is 100% clean as is the expectation of the public. What about UXO found in the shifting sands of the offshore water?

Response: As with any munitions cleanup, there is the possibility a munitions item present will not be encountered during the UXO 18 remedial action. However, the remedial action will utilize standard procedures designed specifically to detect and remove potential munitions items (via removal from the island and/or controlled detonation), which will significantly reduce the potential for there to be munitions items remaining in areas intended for public use. In addition, educational materials, such as signs and/or kiosks, will be used to guide visitors in areas opened for public use. Further, a monitoring program will be implemented to ensure the remedial action remains protective of visitors for the long-term. Regarding potential munitions items offshore of Cayo La Chiva, a search of the area was conducted and the nine potential munitions items identified will be removed in 2017. If additional potential munitions items are found in the area, they will be addressed in the same manner.

4.4 **Question:** Was the public notified regarding the previous detonation of MECs (rockets) on the island?

Response: Yes, as noted in Section 2 above, notification of the demolition of the items was made at the April 2011 RAB meeting, which was open to the public. In addition, the Navy follows a standard notification process for demolition to ensure public safety. This notification process includes representatives of the Municipality of Vieques and regulatory agencies.

4.5 **Question:** Why does the Navy continue to fail to include evaluations for more sustainable detonations using chambers as a sustainable alternative?

Response: The Navy has evaluated the potential use of detonation chambers and determined that most munitions found on Vieques are either unsafe to move or too large to be compatible with detonation chambers. The manner in which munitions in Vieques are removed, including the five on Cayo La Chiva, is the sustainable alternative because it makes the land safer, protects the munitions removal workers, does not adversely impact the air quality within the community, and maximizes the amount of munitions removal that can be performed with available resources.

4.6 **Question:** Has thallium been associated with any Navy related activities on the island, possibly not documented on the Cay, or associated with MECs? Were elevated thallium readings found in any other soil samples on Vieques? What about antimony? What about hexavalent chromium?

Response: Thallium, antimony, and hexavalent chromium are not common components of any munitions used in Vieques and are not associated with the type of 5-inch rockets or smoke canisters found on Cayo La Chiva. Therefore, as would be expected, the thallium concentrations detected on Cayo La Chiva are consistent with what would be expected based on the rock types found there and the main island of Vieques. Antimony and hexavalent chromium were not detected on Cayo La Chiva. The evaluation of all metals detected on Cayo La Chiva suggests their presence is due to natural processes, such as erosion of the rock that forms the island, not as a result of military training activities. In fact, the primary constituents in 5-inch rockets (iron, aluminum, and explosives) and in smoke canisters (hexachloroethane, aluminum, and zinc) were either not detected (explosives and hexachloroethane) or were detected at levels consistent with background (aluminum, iron, and zinc).