



Atlantic
Norfolk, Virginia

Draft Final

UXO 15 Remedial Action Work Plan for Surface Munitions and Explosives of Concern Removal, Land Use Control Implementation and Monitoring

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

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Prepared for NAVFAC Atlantic
by CH2M HILL, Inc.
Virginia Beach, Virginia
Contract N62470-21-D-0007
CTO N6247021F4140



Executive Summary

This document, the Remedial Action Work Plan (RAWP), documents how the UXO 15 remedy, jointly selected by Naval Facilities Engineering Systems Command Atlantic (NAVFAC) and United States Environmental Protection Agency (EPA) Region 2, with concurrence from Puerto Rico Department of Natural and Environmental Resources (PRDNER) and the Department of the Interior (DOI), in a Record of Decision (ROD; NAVFAC, 2023) will be implemented. UXO 15 is located on the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico (Figures ES-1 and ES-2). The remedy reduces explosive hazards, preserves important ecological habitat, is protective of human health, and supports public access under the United States Fish and Wildlife Service (USFWS) land use plan that is shown in Figure ES-3.

The RAWP was prepared by CH2M HILL, Inc. (CH2M), a subsidiary of Jacobs, under the Comprehensive Long-term Environmental Action – Navy (CLEAN) Contract N62470-21-D-0007, Contract Task Order N6247021F4140, for submittal to NAVFAC, EPA, PRDNER, and USFWS. NAVFAC, EPA, PRDNER, and USFWS work jointly to implement the Vieques Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Environmental Restoration Program.

The selected remedy for UXO 15 is Surface Munitions and Explosives of Concern (MEC) Removal in Planned Public Use Areas and Land Use Controls (LUCs), which will achieve the following Remedial Action Objectives (RAOs):

- Reduce the risk of exposure to potential munitions-related explosive hazards to be consistent with current and anticipated future land use identified by USFWS in accordance with its Comprehensive Conservation Plan (CCP) and as set forth in Public Law 106-398, as amended by Public Law 107-107, which requires the land containing UXO 15, among other sites, to be managed by USFWS as a National Wildlife Refuge.
- Reduce or prevent the potential for unauthorized access to portions of UXO 15.

The components of the remedy are:

- Surface MEC removal within areas identified and maintained by USFWS for land management and public recreational use. For the purposes of the RAWP, and consistent with the ROD (NAVFAC, 2023), the interval within which surface MEC removal will be performed is defined as being from the ground surface to a maximum depth of 12 inches below ground surface (bgs). Therefore, where the term “surface MEC removal” is used in this RAWP, it should be interpreted to mean removal within the top 12 inches. An additional element associated with this key component includes vegetation cutting, as necessary, to facilitate the surface MEC removal. Where surface MEC removal was already implemented via a removal action or will be implemented under this RAWP are shown in Figure ES-4.
- LUC implementation comprising physical controls including educational kiosks, monuments, and trail markers and administrative controls such as safety awareness and use restriction messaging) to reduce the potential for people to access areas outside authorized, accessible public-use areas. LUCs that were already implemented via a removal action or will be implemented under this RAWP are shown in Figure ES-4.
- An LUC and MEC long-term monitoring (LTM) program, including periodic site inspections for trespassing, erosion, material potentially presenting an explosive hazard (MPPEH) recurrence in public-access and trespassing areas, and the integrity and effectiveness of physical LUCs. Any MPPEH discovered during the LTM program or reported by stakeholders or other entities will be removed. If USFWS chooses not to maintain any portions of the public access areas, such that these areas become overgrown and inaccessible to the public, then the Navy will cease to perform LUC and MEC LTM in these areas, except where continued access is evident (e.g., via trespassing), including any area where unauthorized access is created. The Navy will not clear vegetation in order to provide access to areas that USFWS does not maintain as accessible to the public.

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.

It is important to note that no single element of the remedial action is responsible for remedy protectiveness; it is the cumulative results of the MEC removal, LUC implementation and maintenance, and LUC/MEC monitoring that will ensure the remedy is and remains protective.

The UXO 15 RAWP includes the following components:

Introduction

The introduction summarizes the site background, conceptual site model, RAOs, and remedial action scope of work.

MEC Removal Plan

A surface MEC removal will be conducted in areas identified by USFWS for recreational land use not previously cleared. This plan details, with reference to the associated Quality Assurance Project Plan (QAPP), the protocol for performing the surface MEC removal and disposition of any MPPEH found, including MEC.

LUC Implementation, LUC and MEC Monitoring, and LUC Maintenance Plan

LUCs will be implemented to reduce the potential for people to access areas outside authorized, accessible public-use areas (Figures ES-3 and ES-4) and provide for explosive safety awareness, both of which will reduce the potential for human exposure to any MEC potentially remaining at the site (i.e., reduce explosive hazard). This plan details the implementation process, as well as the monitoring and maintenance activities that will be conducted to ensure the LUCs remain viable in meeting the RAOs and LUC objectives. MEC removal will be performed for any MEC or other munitions-related items identified during LUC and MEC monitoring or reported by the public, USFWS, or other entity during land use.

Reporting

Following surface MEC removal in the areas where it was not performed as part of a removal action and LUC implementation, a Remedial Action Completion Report (RACR) will be prepared to summarize the activities and results.

Following remedy implementation, the LUC monitoring and maintenance, MEC inspection and monitoring program will be initiated. Checklists will be completed for each LUC and MEC inspection event and included in an annual report. The annual reports will provide detail regarding monitoring and maintenance tasks and findings, and any corrective action or maintenance procedures taken or recommended.

Five-Year Review Reports will document detailed evaluation and assessment information gathered during each five-year monitoring and maintenance period and will include such things as identification of issues that may affect the remedy protectiveness, conclusions on the remedy effectiveness, and recommendations for modifications or follow-up actions.

Resumen Ejecutivo

Este documento, el Plan de Trabajo de Acción para la Remediación (RAWP, por sus siglas en inglés), documenta cómo el remedio para UXO 15, el cual fue seleccionado conjuntamente por el Comando de Sistemas de Ingeniería de las Instalaciones Navales del Atlántico (NAVFAC, por sus siglas en inglés) y la Región 2 de la Agencia de Protección Ambiental de los Estados Unidos (EPA, por sus siglas en inglés), con la concurrencia del Departamento de Recursos Naturales y Ambientales de Puerto Rico (DRNA) y el Departamento del Interior (DOI, por sus siglas en inglés), en un Acta de Decisión (ROD, por sus siglas en inglés; NAVFAC, 2023). UXO 15 está ubicado en el antiguo Campo de Adiestramiento Naval de Vieques (VNTR, por sus siglas en inglés) en Vieques, Puerto Rico (Figuras ES-1 y ES-2). El remedio reduce los peligros que presentan los explosivos, preserva un hábitat ecológico importante, protege la salud humana y respalda el acceso público según el plan de uso de los terrenos del Servicio de Pesca y Vida Silvestre de los Estados Unidos (USFWS, por sus siglas en inglés) que se muestra en la Figura ES-3.

El RAWP fue preparado por CH2M HILL, Inc. (CH2M), una subsidiaria de Jacobs, bajo el Contrato N62470-21-D-0007 de la Acción Ambiental Integral a Largo Plazo - Marina (CLEAN, por sus siglas en inglés), Orden de Tarea de Contrato N6247021F4140, para su presentación a NAVFAC, EPA, DRNA y USFWS. NAVFAC, EPA, DRNA y USFWS trabajan conjuntamente para implementar el Programa de Restauración Ambiental de la Ley Integral de Respuesta, Compensación y Responsabilidad Ambiental de Vieques (CERCLA, por sus siglas en inglés).

El remedio seleccionado para UXO 15 es la remoción de municiones y explosivos de preocupación (MEC, por sus siglas en inglés) de la superficie en áreas de uso público planificadas y controles de uso de la tierra (LUC, por sus siglas en inglés), con el que se logrará los siguientes objetivos de acción correctiva (RAOs, por sus siglas en inglés):

- Reducir el riesgo de exposición a posibles peligros de exposición a explosivos relacionados con las municiones para que los terrenos estén de acuerdo con el uso de los terrenos actual y el uso futuro previsto identificado por USFWS de acuerdo con su Plan Integral de Conservación (CCP, por sus siglas en inglés) y según lo establecido en la Ley Pública 106-398, según enmendada por Ley Pública 107-107, que exige que el terreno que contiene UXO 15, entre otros sitios, sea administrado por USFWS como Refugio Nacional de Vida Silvestre.
- Reducir o prevenir el potencial de acceso no autorizado a partes de UXO 15.

Los componentes del remedio son:

- Remoción de MEC de superficie dentro de las áreas identificadas y mantenidas por USFWS para el manejo de los terrenos para uso recreativo del público. Para los propósitos del RAWP, y de conformidad con el ROD (NAVFAC, 2023), el intervalo dentro del cual se realizará la remoción de MEC de la superficie se define como - desde la superficie del suelo hasta una profundidad máxima de 12 pulgadas debajo de la superficie del suelo (bgs, por sus siglas en inglés) -. Por lo tanto, cuando se utiliza el término “remoción de MEC de la superficie” en este RAWP, debe interpretarse como la remoción dentro de las 12 pulgadas superiores. Un elemento adicional asociado con este componente clave incluye el corte de vegetación, según sea necesario, para facilitar la remoción del MEC de la superficie. En la Figura ES-4 se muestra dónde la remoción de MEC de la superficie ya se implementó mediante una acción de remoción o se implementará bajo este RAWP.
- Implementación de LUC que comprende controles físicos que incluyen quioscos educativos, monumentos y marcadores de veredas y controles administrativos (como es educación sobre seguridad y mensajes de restricción de uso) para así reducir el potencial de que las personas ingresen a áreas fuera de las áreas autorizadas y que están accesibles para uso público. Los LUC que ya se implementaron mediante una acción de remoción o que se implementarán según este RAWP se muestran en la Figura ES-4.

NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

- Un programa de monitoreo a largo plazo (LTM, por sus siglas en inglés) de LUC y MEC, que incluye inspecciones periódicas del sitio para detectar intrusiones ilegales, erosión, recurrencia de materiales que potencialmente presenten un riesgo de explosión (MPPEH, por sus siglas en inglés) en áreas de acceso público y donde han entrado sin autorización, y la integridad y efectividad de los LUC físicos. Cualquier MPPEH que se descubra durante el programa LTM o que sea reportado por partes interesadas u otras entidades será removido. Si USFWS decide no mantener ninguna parte de las áreas de acceso público, de modo que estas áreas se vuelvan cubiertas de maleza y sean inaccesibles para el público, entonces la Marina dejará de realizar LUC y MEC LTM en estas áreas, excepto cuando el acceso continuo sea evidente (p. ej., mediante acceso no autorizado), incluyendo cualquier área donde exista un acceso no autorizado. La Marina no limpiará la vegetación para brindar acceso a áreas que USFWS no mantiene como accesibles al público.

Es importante señalar que ningún elemento de la acción de remoción es responsable por sí solo del carácter protector de la misma; son los resultados acumulados de la remoción de MEC, la implementación y el mantenimiento de LUCs y el monitoreo de LUC/MEC los que garantizarán que el remedio sea y siga siendo protector.

El UXO 15 RAWP incluye los siguientes componentes:

Introducción

La introducción resume los antecedentes del sitio, el modelo conceptual del sitio, los RAO y el alcance del trabajo de las acciones correctivas.

Plan de Remoción de MEC

Se llevará a cabo una remoción de MEC de superficie en áreas identificadas por USFWS para los terrenos con usos recreativos que no se hayan limpiado previamente. Este plan detalla, con referencia al Plan de Proyecto de Garantía de Calidad (QAPP, por sus siglas en inglés) asociado, el protocolo para realizar la remoción de MEC de la superficie y la disposición de cualquier MPPEH que se encuentre, incluyendo MEC.

Implementación de LUC, Monitoreo de LUC y MEC, y Plan de Mantenimiento de LUC

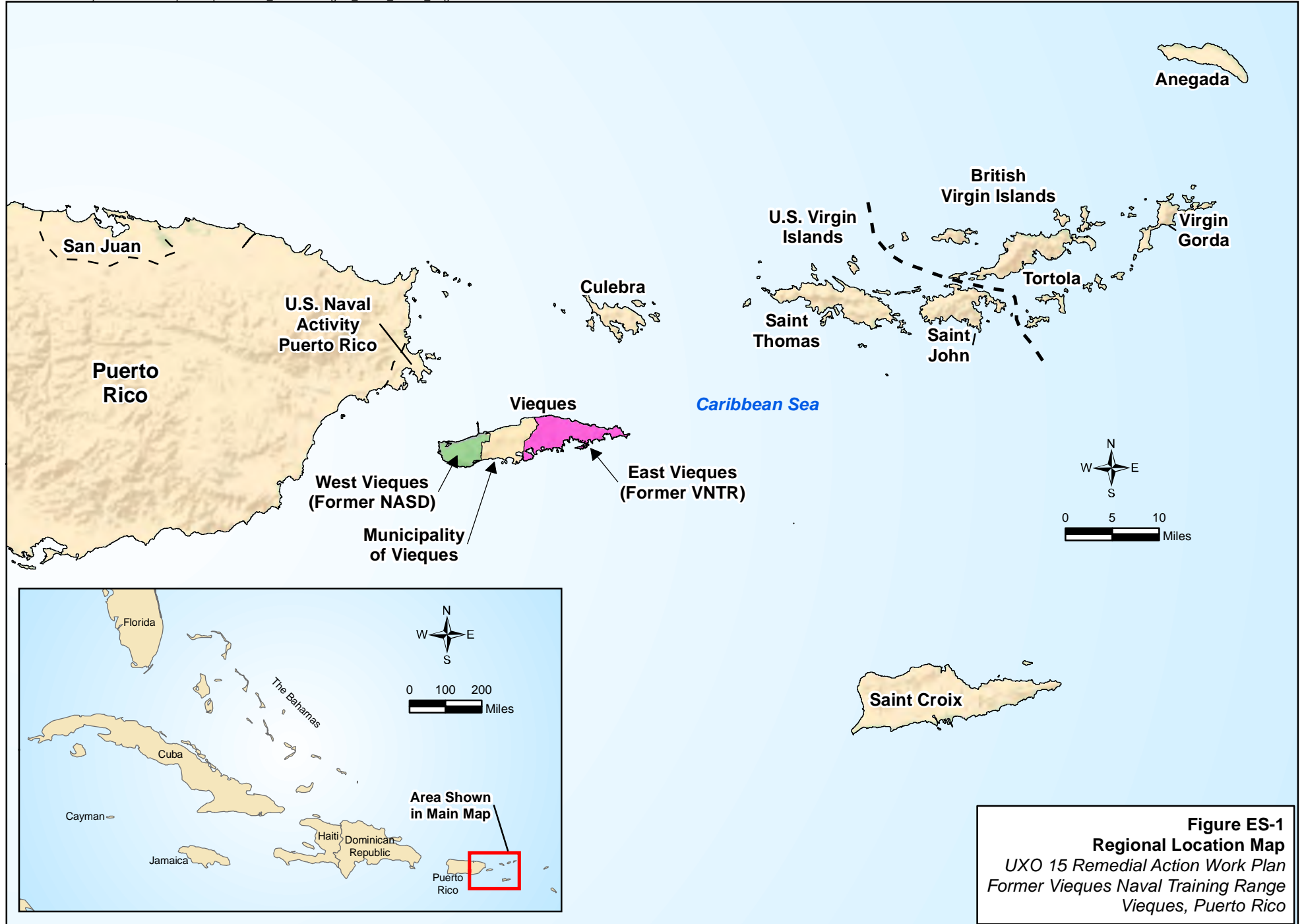
Se implementará LUCs para reducir la posibilidad de que las personas accedan a áreas fuera de las áreas de uso público accesibles y autorizadas (Figuras ES-3 y ES-4) y brindar conciencia sobre la seguridad de los explosivos, lo cual reducirá el potencial de exposición humana a cualquier MEC que potencialmente permanezcan en el sitio (es decir, reducir el riesgo de explosión). Este plan detalla el proceso de implementación, así como las actividades de monitoreo y mantenimiento que se llevarán a cabo para garantizar que los LUC sigan siendo viables para cumplir con los objetivos de los RAO y los LUC. La remoción de MEC se realizará para cualquier MEC u otros elementos relacionados con municiones que se identifiquen durante el monitoreo de LUC y MEC o que sean reportados por el público, USFWS u otra entidad durante el uso de los terrenos.

Informes

Luego de la remoción de MEC de la superficie de las áreas que se incluyeron como parte de una acción de remoción y la implementación de LUC, se preparará un Informe de Finalización de Acciones Correctivas (RACR por sus siglas en inglés,) para resumir las actividades y los resultados.

Luego de la implementación del remedio, se iniciará el programa de monitoreo y mantenimiento de LUC, inspección y monitoreo de MEC. Se completará listas de verificación para cada evento de inspección LUC y MEC, las que se incluirán en un informe anual. Los informes anuales proporcionarán detalles sobre las actividades y hallazgos de monitoreo y mantenimiento, y cualquier acción correctiva o procedimiento de mantenimiento que se tome o se recomiende.

Los informes de revisión quinquenal documentarán la evaluación detallada y la información de valoración recopilada durante cada período de seguimiento y mantenimiento de cinco años, e incluirán elementos tales como la identificación de problemas que pudieran afectar la protección del remedio, las conclusiones sobre la eficacia del remedio y las recomendaciones para modificaciones o seguimiento de acciones.



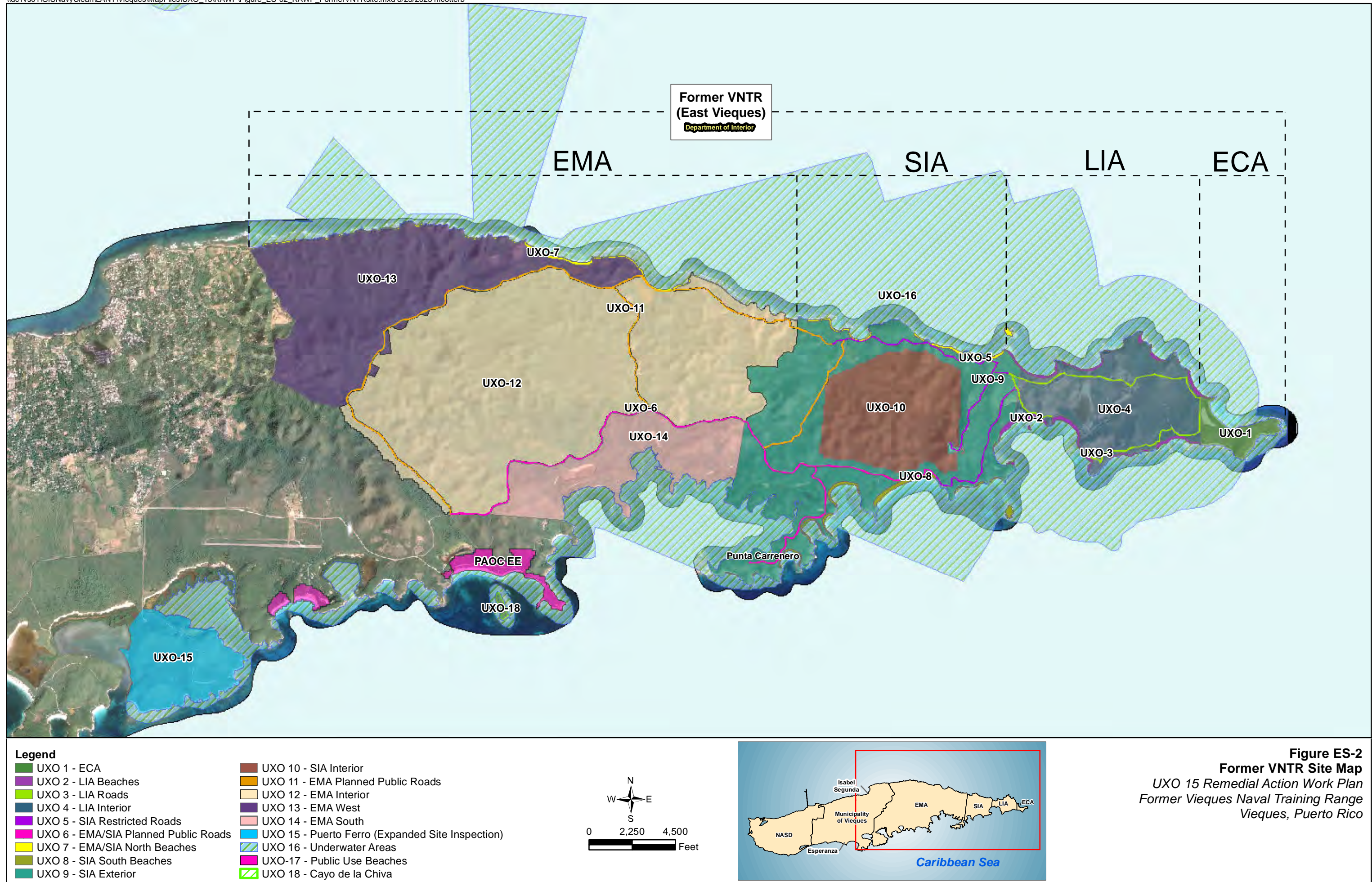


Figure ES-2
Former VNTR Site Map
UXO 15 Remedial Action Work Plan
Former Vieques Naval Training Range
Vieques, Puerto Rico



Figure ES-3
USFWS Planned Land Use
UXO 15 Remedial Action Work Plan
Former Vieques Naval Training Range
Vieques, Puerto Rico



Figure ES-4
MEC Clearance Areas and LUC Implementation
UXO 15 Remedial Action Work Plan
Former Vieques Naval Training Range
Vieques, Puerto Rico

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1-2	Former VNTR Site Map
1-3	UXO 15 Site Features
2-1	UXO 15 MEC Removal Areas and LUC Implementation
2-2	USFWS Planned Land Use

Acronyms and Abbreviations

3Rs	Recognize, Retreat, Report (munitions awareness training)
bgs	below ground surface
CCP	Comprehensive Conservation Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M	CH2M HILL, Inc.
CLEAN	Comprehensive Long-term Environmental Action—Navy
DOI	Department of the Interior
DQO	Data Quality Objective
EMA	Eastern Maneuver Area
EPA	Environmental Protection Agency
ESS	Explosives Safety Submission
FFA	Federal Facility Agreement
FS	Feasibility Study
LIA	Live Impact Area
LTM	long-term monitoring
LUC	land use control
MC	munitions constituent
MD	munitions debris
MDAS	Material Documented as Safe
MEC	munitions and explosives of concern
MPC	Measurement Performance Criteria
MPPEH	material potentially presenting an explosive hazard
NAVFAC	Naval Facilities Engineering Systems Command Atlantic
Navy	Department of the Navy
NMRD	non-munitions related debris
NTCRA	Non-Time-Critical Removal Action
PI	Photo Identified (site)
PRDNER	Puerto Rico Department of Natural and Environmental Resources
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RACR	Remedial Action Completion Report
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RI	Remedial Investigation
ROD	Record of Decision
RRD	range-related debris
SEMS	Superfund Enterprise Management System
SIA	Surface Impact Area
SOP	Standard Operating Procedure
SUXOS	Senior Unexploded Ordnance Supervisor

UXO 15 REMEDIAL ACTION WORK PLAN
FOR SURFACE MUNITIONS AND EXPLOSIVES OF CONCERN REMOVAL, LAND USE CONTROL IMPLEMENTATION AND MONITORING

USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance
UXOSO	Unexploded Ordnance Safety Officer
UXOQCS	Unexploded Ordnance Quality Control Specialist
VNTR	Vieques Naval Training Range

Introduction

This Remedial Action Work Plan (RAWP) was prepared by CH2M HILL, Inc. (CH2M), a subsidiary of Jacobs, under the Comprehensive Long-term Environmental Action – Navy (CLEAN) Contract N62470-21-D-0007, Contract Task Order N6247021F4140, for submittal to Naval Facilities Engineering Systems Command Atlantic (NAVFAC), United States Environmental Protection Agency (EPA), Puerto Rico Department of Natural and Environmental Resources (PRDNER), and the United States Fish and Wildlife Service (USFWS). NAVFAC, EPA, PRDNER, and USFWS work jointly to implement the Vieques Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Environmental Restoration Program.

This document is the RAWP for munitions and explosives of concern (MEC) removal, land use control (LUC) implementation and monitoring at UXO 15, located on the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico (Figures 1-1 and 1-2). UXO 15 is part of the Vieques National Wildlife Refuge, which is managed by USFWS, a bureau of the Department of the Interior (DOI).

This RAWP describes how the elements of the remedy jointly selected by the Department of the Navy (Navy) and the EPA, with concurrence from PRDNER and DOI, in the Record of Decision (ROD; NAVFAC, 2023) will be implemented. While this RAWP details the overall and general implementation of the selected remedy, it is supplemented by the UXO 15 Remedial Action Implementation and Long-Term Monitoring Quality Assurance Project Plan (hereafter referred to as the UXO 15 QAPP) in Appendix A, which provides specific rationale and details regarding the various elements of the remedy implementation and monitoring.

The selected remedy will address explosive hazards at UXO 15 by reducing the potential for human exposure via surface MEC removal in planned land use areas not previously cleared; implementing and maintaining LUCs; and LUC and MEC monitoring, including removal of any MEC/material potentially presenting an explosive hazard (MPPEH) found during monitoring or identified during planned land use in UXO 15.

1.1 Site Background

UXO 15 is also known as Operable Unit 26 in the Superfund Enterprise Management System (SEMS), a database maintained by the EPA to track the progress at hazardous waste sites. UXO 15 comprises the 536-acre Puerto Ferro peninsula within the southwestern portion of the former Eastern Maneuver Area (EMA), located on the eastern end of Vieques and in the western portion of the former VNTR (Figure 1-2). The former EMA was established in 1947 to provide areas and ranges for the training of Marine amphibious units and battalion landing teams in exercises that included amphibious landings, small-arms fire, artillery and tank fire, shore fire control, and combat engineering tasks.

UXO 15 was primarily used for temporary ordnance storage, transport, and loading/offloading in support of military training activities and is not contiguous with the other UXO sites within the EMA. UXO 15 includes two Photo Identified (PI) sites (PI 9 East and West and PI 13) (Figure 1-3). PI 9 West, located in the northwestern portion of the site, was likely used for temporary ammunition storage; investigation findings suggest it was not used for ammunition disposal. PI 9 East, located in the northeastern corner of UXO 15, was likely used for ordnance transport and loading/offloading activities. PI 13, located in the southeastern portion of UXO 15, was reportedly used as a firing point from which rocket-related ordnance was launched to the Live Impact Area (LIA)/Surface Impact Area (SIA); however, no evidence of this use was found during the remedial investigation (RI) or previous investigations. A potential ordnance detonation area identified within UXO 15 was investigated during the RI, the findings of which suggest the area was unlikely used for munitions disposal by detonation.

Several historical investigations and removal actions were conducted at UXO 15, the details of which can be found in the UXO 15 Remedial Investigation/Feasibility Study Report (RI/FS Report; CH2M, 2020). Based on the historical investigations and removal actions, a ROD for UXO 15 was signed in 2023 (NAVFAC, 2023). The selected remedy is based on planned land use of UXO 15 that comprises USFWS refuge management activities that support public recreational use in portions of the site.

1.2 Remedial Action Objectives

The following Remedial Action Objectives (RAOs) were developed to be protective of current and potential future receptors, in accordance with the intended land use (NAVFAC, 2023):

- Reduce the risk of exposure to potential munitions-related explosive hazards to be consistent with current and anticipated future land use identified by USFWS in accordance with its Comprehensive Conservation Plan (CCP) and as set forth in Public Law 106-398, as amended by Public Law 107-107, which requires the land containing UXO 15, among other sites, to be managed by USFWS as a National Wildlife Refuge.
- Reduce or prevent the potential for unauthorized access to portions of UXO 15.

An RAO for groundwater is not necessary for UXO 15 because no contaminants representing a leaching concern for groundwater were identified (CH2M, 2020).

1.3 Scope of Work

The scope of work included in this RAWP for the MEC removal, LUC implementation and maintenance, and LUC and MEC monitoring consists of the following key components:

- Performing surface MEC removal within areas identified and maintained by USFWS for land management and public recreational use (see Section 2). For the purposes of the RAWP, and consistent with the ROD (NAVFAC, 2023), the interval within which surface MEC removal will be performed is defined as being from the ground surface to a maximum depth of 12 inches below ground surface (bgs). Therefore, where the term “surface MEC removal” is used in this RAWP, it should be interpreted to mean removal within the top 12 inches.
- Implementing and maintaining physical demarcation (i.e., educational kiosks, monuments, and trail markers) and use restrictions to reduce the potential for people to access areas outside authorized, accessible public-use areas. At USFWS’ discretion, activities such as land crabbing may require special use permits for which USFWS may choose to include additional munitions awareness information and access constraints (see Section 3).
- Conducting inspections for trespassing, erosion, potential MEC recurrence in public access areas identified and maintained as accessible by USFWS, and the integrity and effectiveness of physical LUCs. Additionally, inspections would be conducted following events (i.e., named hurricanes/tropical storms, fires) that are determined may threaten the integrity of the UXO 15 LUCs or potentially expose MEC.
 - Includes removing any MEC/MPPEH found during LUC and MEC monitoring, or reported by USFWS, the public, or other entity.
 - If USFWS chooses not to maintain any portions of the public access areas, such that these areas become overgrown and inaccessible to the public, then the Navy will cease to perform LUC and MEC long-term monitoring (LTM) in these areas, except where continued access is evident (e.g., via trespassing), including any area where unauthorized access is created. The Navy will not clear vegetation in order to provide access to areas that USFWS does not maintain as accessible to the public.

Additional details regarding the scope of work and associated quality control (QC) and quality assurance (QA) mechanisms are provided within the UXO 15 QAPP (Appendix A).

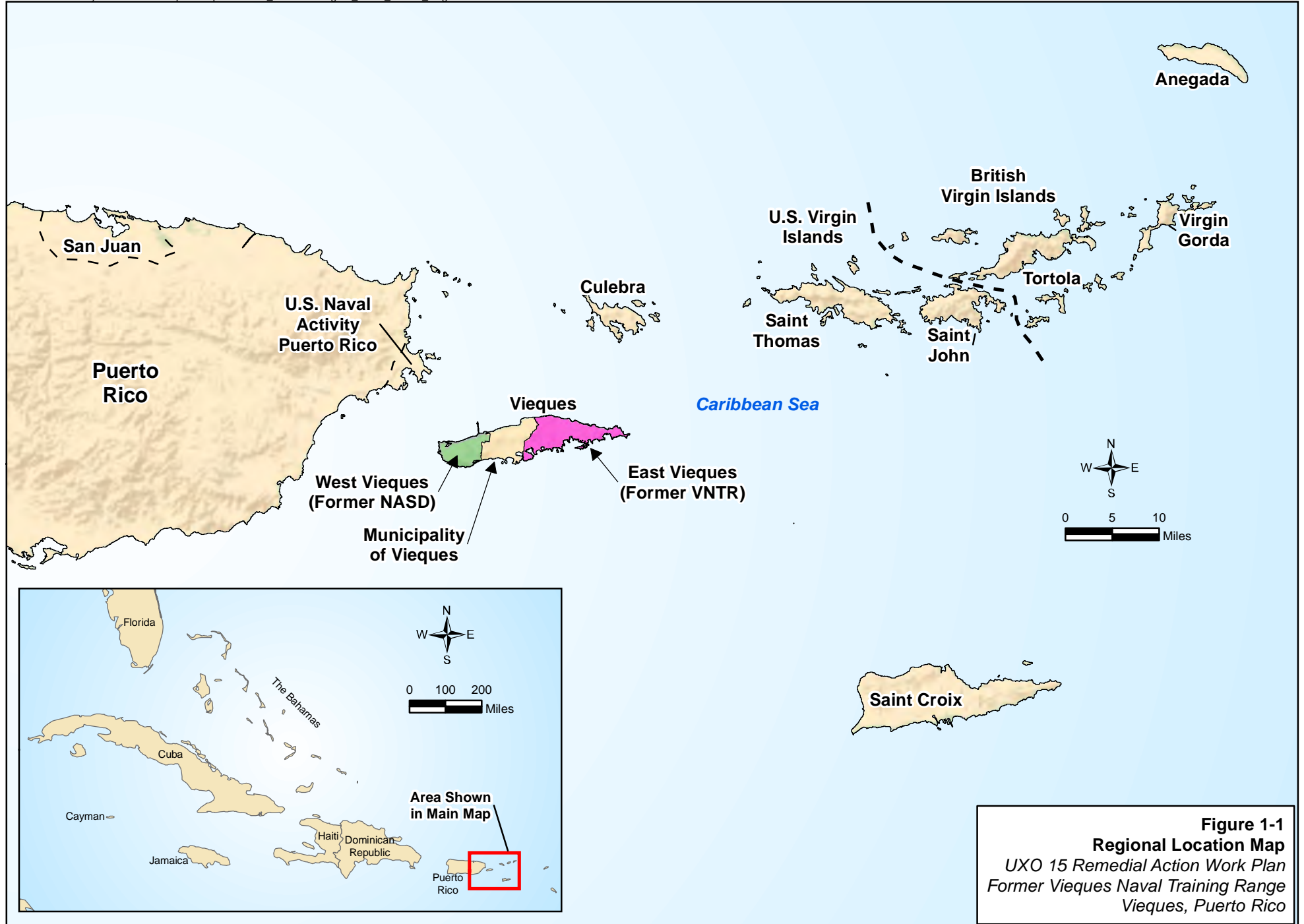
1.4 Work Plan Organization

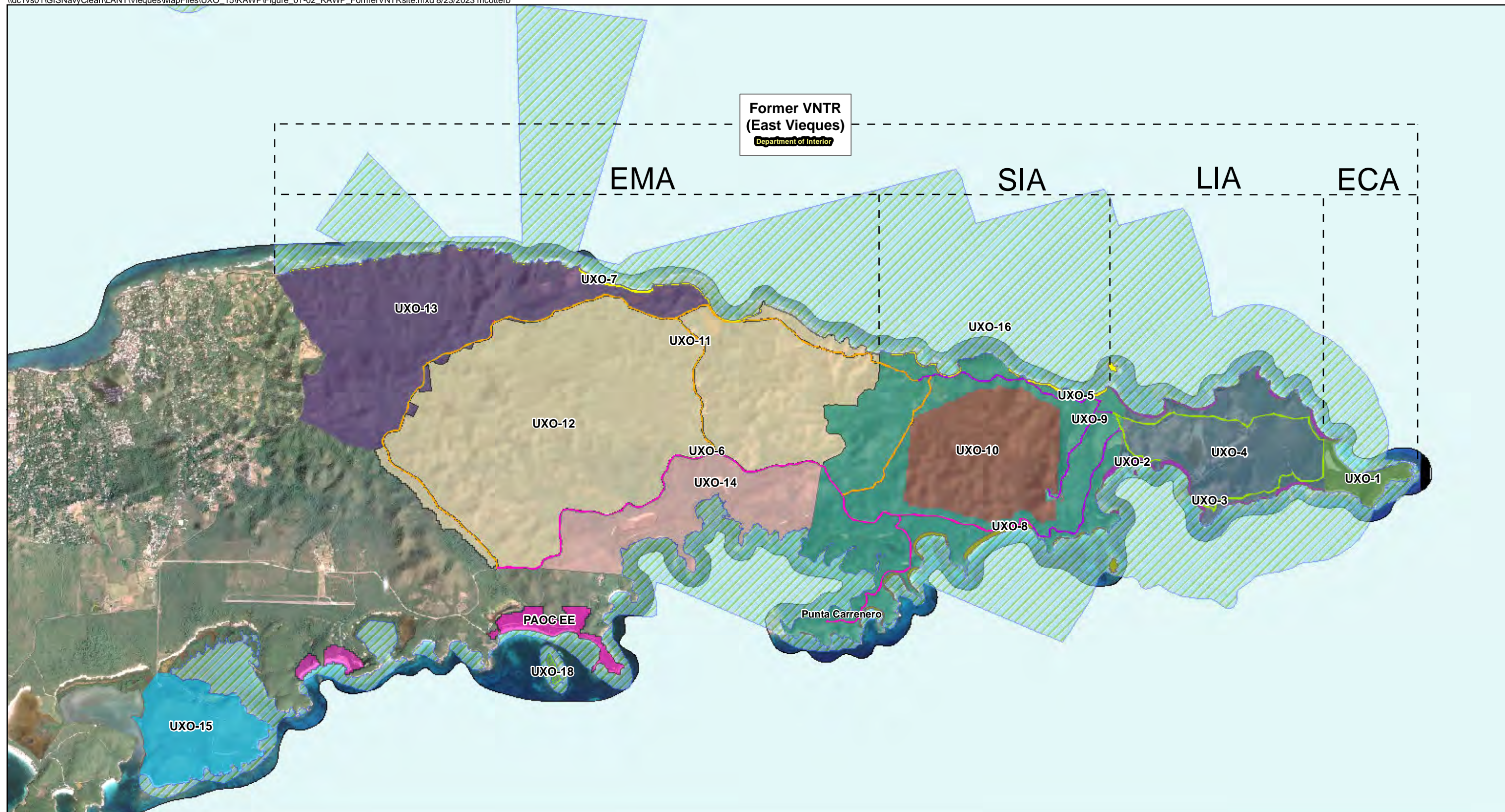
This RAWP is organized as follows:

- Section 1 – Introduction
- Section 2 – MEC Removal Plan
- Section 3 – LUC Implementation, LUC and MEC Monitoring, and LUC Maintenance Plan

- Section 4 – Reporting
- Section 5 – Project Schedule
- Section 6 – References

Tables and figures are provided at the end of each section, as applicable.





Legend

- | | |
|--------------------------------------|--|
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| UXO 2 - LIA Beaches | UXO 11 - EMA Planned Public Roads |
| UXO 3 - LIA Roads | UXO 12 - EMA Interior |
| UXO 4 - LIA Interior | UXO 13 - EMA West |
| UXO 5 - SIA Restricted Roads | UXO 14 - EMA South |
| UXO 6 - EMA/SIA Planned Public Roads | UXO 15 - Puerto Ferro (Expanded Site Inspection) |
| UXO 7 - EMA/SIA North Beaches | UXO 16 - Underwater Areas |
| UXO 8 - SIA South Beaches | UXO 17 - Public Use Beaches |
| UXO 9 - SIA Exterior | UXO 18 - Cayo de la Chiva |

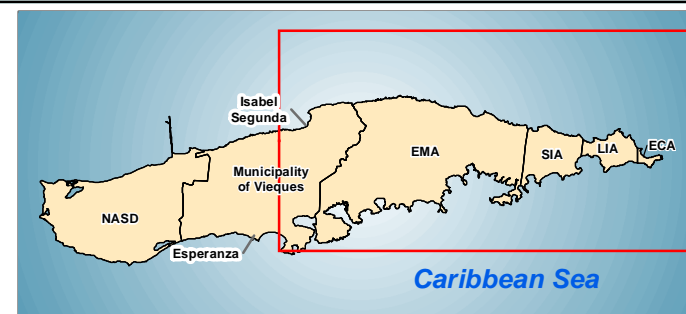
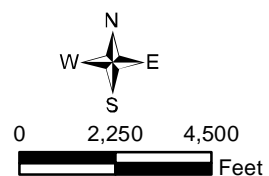
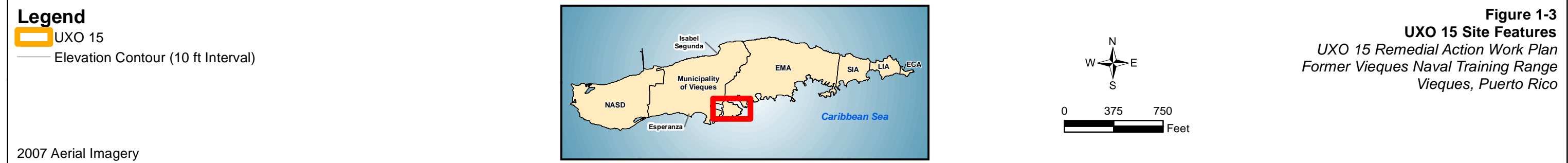


Figure 1-2
Former VNTR Site Map
 UXO 15 Remedial Action Work Plan
 Former Vieques Naval Training Range
 Vieques, Puerto Rico



MEC Removal Plan

MEC removal during the UXO 15 remedial action will consist of the removal of surface MEC and other munitions-related items from the one trail, the multipurpose road/trail, and the land crabbing area for which MEC removal was not performed during past removal actions, as shown in Figure 2-1. Additionally, any MEC or munitions-related items identified during LUC and MEC monitoring activities or reported by the public, USFWS, or other entity will be removed.

2.1 Technical Approach

The technical approach to field operations includes the general components identified herein. Specific details for the activities are provided in the UXO 15 QAPP (Appendix A). The UXO 15 QAPP also contains the associated Data Quality Objectives (DQOs), Measurement Performance Criteria (MPCs), and QC/QA elements applicable to this remedial action.

2.1.1 Surface MEC Removal within Land Management and Future Recreational Use Areas

MEC Removal

Removal of MEC and other munitions-related items to a maximum depth of 12 inches bgs will be conducted via an instrumented-aided (i.e., all-metals detector) visual survey within only the planned land use areas that were not cleared during previous removal actions (e. g., trail, multipurpose road/trail, land crabbing area). The specific DQOs, MPCs, QC/QA components, and additional rationale are detailed in the UXO 15 QAPP (Appendix A). Any MEC and/or munitions-related items identified will be documented in accordance with the QAPP and handled in accordance with the applicable Explosives Safety Submission (ESS), as further described in Section 2.1.2.

Although the ROD indicated there is a planned parking area not previously cleared that would be cleared during the remedial action, it was subsequently determined the parking area had been cleared during the Non-Time-Critical Removal Action (NTCRA; CH2M, 2015), as shown in Figure 2-1, but not properly documented at that time. Therefore, proper documentation of the parking area's MEC removal activities, including demonstration that the NTCRA met its objectives in accordance with the associated NTCRA work plan, will be included in the UXO 15 Remedial Action Completion Report (RACR), along with the findings and results of the MEC removal for the trail, multipurpose road/trail, and land crabbing area (see Section 4.1).

2.1.2 Munitions and Explosives of Concern Handling

All munitions-related items recovered will be handled in accordance with the applicable ESS and the following procedures (in the unlikely circumstance that the ESS and the procedures below conflict, the ESS will take precedence):

- To determine the most appropriate mechanism for addressing any MEC, the Senior Unexploded Ordnance (UXO) Supervisor (SUXOS) and the UXO Safety Officer (UXOSO) will conduct an explosive hazard determination and, if deemed acceptable to move to a nearby consolidation point, document that it is acceptable to move in accordance with applicable protocol contained in the munitions removal work plan in effect at the time the MEC is found. If the MEC is acceptable to move to a nearby consolidation point (as confirmed by the SUXOS and UXOSO), it will be moved the shortest distance possible for controlled detonation. It is assumed that MEC will be destroyed by controlled detonation by the use of a consolidated shot of the item(s).
- MEC that is deemed unacceptable to move will be clearly marked while accessibility, explosive hazard, location, and other factors are assessed to determine if additional safety measures should be put in place to protect site workers until it can be destroyed by destruction-in-place methods (i.e., controlled detonation) in accordance with applicable protocol contained in this RAWP or, if there is a different contractor in place

if/when MEC is found in the future, the munitions removal work plan in effect at that time. Until final disposition is initiated, the MEC team will arrange for the item(s) to be secured (e.g., qualified security detail) as needed.

Prior to initiation of detonation operations, all non-essential personnel will be evacuated from the detonation location. In addition, readily accessible avenues of ingress will be physically blocked. Upon completion of destruction-in-place or consolidated demolition, qualified UXO Technicians will visually inspect each post-demolition area and, providing that there are no residual explosive hazards, the SUXOS will authorize the resumption of operations.

Inert metallic items (i.e., munitions debris [MD], range-related debris [RRD], and non-munitions related debris [NMRD]) will be removed and consolidated onsite in a designated area. All materials will be visually inspected by two qualified UXO Technicians; the first UXO Technician (i.e., SUXOS) will perform a 100 percent inspection and the second UXO Technician (i.e., UXO Quality Control Specialist [UXOQCS]) will perform an independent 100 percent re-inspection. If both inspectors agree that the material does not present an explosive hazard, the material will be determined to be Material Documented as Safe (MDAS) and handled in accordance with the ESS and applicable Standard Operating Procedures (SOPs) for proper documentation, storage, and final disposition.

Soil sampling for munitions constituent (MC) analysis as a result of destruction-in-place (i.e., controlled detonation), consolidated demolition, or finding a breached munition(s) is not warranted. This conclusion is based on the data from hundreds of soil samples that have been collected throughout the former VNTR, including directly under and adjacent to munitions, including breached munitions. This sampling has shown that explosives are most commonly non-detect, metals concentrations are generally indistinguishable from background, and any contamination identified is very localized (i.e., a point of contamination rather than a point source of contamination). In other words, the potential contribution of contaminants to the environment from a single or even multiple items, whether they be from detonation or breaching, is insignificant in terms of potential risk. The Navy anticipates that any consolidated detonation associated with remedial action would include a comparable number (or less) than the numbers routinely included in consolidated detonations performed as part of historical cleanup activities.

With respect to breached items, if a breached munition is discovered during the remedial action implementation or associated long-term MEC monitoring, not only will the item be removed, but any visible contents on the ground from the breached item will also be removed.

2.1.3 Potential Additional Construction Support and UXO Awareness Training

While construction support will primarily comprise MEC removal within the public use areas not previously cleared, as depicted in Figure 2-1, if USFWS includes related amenities that support public use areas shown in Figure 2-2, such as signage or compost toilets, the Navy will provide UXO avoidance/clearance support during their construction. Additionally, UXO awareness training can be provided to USFWS or their designee who will be responsible for maintaining the public use areas.

2.1.4 Quality Management

The quality management process consists of QC and QA procedures to verify, validate, and determine if measurement performance criteria, which are used to help assesses if data quality and RAOs are achieved. As an attachment to this RAWP, the UXO 15 QAPP is provided as Appendix A which details the quality management (i.e., QC and QA) aspects of the remedial action implementation and monitoring.





Legend

- UXO 15
- Current Multi-Purpose Road/Trail
- Planned Multi-Purpose Road/Trail
- Planned Trail
- Planned Land Crabbing Area

Planned Land Use

- Bicycle riding road/trail
- Fishing
- Hiking

- Horseback riding road/trail
- Kayaking
- Land Crabbing
- Lighthouse

- Parking
- Photography
- Snorkeling
- Surfing

- Swimming
- Vehicle use on road
- Wildlife viewing

0 400 800 Feet

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W E
S

Figure 2-2
USFWS Planned Land Use
UXO 15 Remedial Action Work Plan
Former Vieques Naval Training Range
Vieques, Puerto Rico

LUC Implementation, LUC and MEC Monitoring, and LUC Maintenance Plan

This LUC Plan describes the implementation, monitoring, and maintenance of physical LUCs associated with the remedial action. The Navy will be responsible for implementing, monitoring, and maintaining LUCs at UXO 15 as per Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions (DON, 2003), the Federal Facility Agreement (FFA; EPA et al., 2007), the UXO 15 ROD (NAVFAC, 2023), and applicable Navy directives. Although the Navy may later transfer these procedural responsibilities for LUC/MEC monitoring and maintenance to another party by contract or through other means, there are no current plans for such a transfer and even if transferred in the future the Navy shall retain ultimate responsibility for remedy integrity. Land use at UXO 15 is anticipated to remain as identified by USFWS and shown in Figure 2-2. Any planned changes to land use at UXO 15 in the future that may necessitate a modification to the remedial action, including LUCs, will be coordinated with the Navy and any changes to the remedial action will be approved by EPA and PRDNER prior to implementation.

3.1 Land Use Control Objective

The UXO 15 physical LUCs are mechanisms that reduce the potential for people to access areas outside authorized, accessible public-use areas, thereby reducing the potential for exposure to explosive hazards. For UXO 15, the physical LUCs will be implemented to encourage access in areas intended for public use, while discouraging access to areas not planned for public use; restrict unauthorized soil disturbance and construction activities; and provide explosive safety awareness, all of which will reduce human exposure to potential MEC (i.e., reduce explosive hazard). With the exception stated below, LUCs will be monitored and maintained at UXO 15 indefinitely, but at a minimum for as long as MEC potentially remains at the site.

As noted previously, if USFWS chooses not to maintain any portions of the public access areas, such that these areas become overgrown and inaccessible to the public, then the Navy will cease to perform LUC and MEC LTM in these areas except where continued access is evident (e.g., via trespassing), including any area where unauthorized access is created. The Navy will not clear vegetation in order to provide access to areas that USFWS does not maintain as accessible to the public.

As indicated previously, at USFWS' discretion, activities such as land crabbing may require special use permits in which USFWS may choose to include additional munitions awareness information and access constraints.

3.2 LUC Implementation, LUC and MEC Monitoring, and LUC Maintenance Activities

The physical LUC elements for UXO 15 are provided in Figure 2-1. Specific implementation, monitoring, and maintenance details follow.

3.2.1 LUC Implementation

All physical LUC implementation activities (i.e., the placement of education kiosks and/or trail markers) will be conducted within areas previously cleared of MEC or those cleared during remedial action implementation. This will obviate the need for MEC removal during LUC implementation. However, as a conservative safety approach, any intrusive activities conducted as part of LUC implementation (e.g., support posts) will be supported with the use of an all-metals detector for anomaly avoidance procedures. Should any anomalies be identified, they will be addressed as described in the UXO 15 QAPP (Appendix A).

Although associated with LUC implementation, there are existing educational kiosks (bilingual – English and Spanish) that have been installed to show visitors areas of public use maintained and supported by USFWS, show

and discourage access to areas not intended for public use, provide munitions awareness and safety procedures, and identify prohibited activities. These educational kiosks will be incorporated into the LUC monitoring and maintenance program and the content will be updated as warranted to reflect the most up-to-date land use information.

Educational kiosks inform site users as to areas permissible for public use, as well as restricted areas that are not available for public use (i.e., trespassing) and prohibited activities. Yellow concrete markers will be placed at trail starts, intersections, and trail ends, as warranted, to remind site users of MEC awareness practices (similar to other sites e.g., SWMU 4). Additionally, these yellow markers will replace the need for the current “warning” signs along the primary access road. As such, these “warning” signs will be removed as part of the implementation of LUCs associated with the remedial action designed to support USFWS’ land use plans for UXO 15. Trail markers will be placed along the trails and at the ends of the trails to encourage site users to remain within the public-use areas and reduce the potential for them to access areas outside authorized, accessible public-use areas. Specifically, “trail” marker signs will be placed as needed along the hiking/biking trails, multipurpose roads/trails, and parking areas. Figure 2-1 shows a trail marker configuration whereby markers will be placed generally in a line-of-sight manner on both sides of each trail. However, based on actual observations during LUC implementation and/or monitoring, less or more trail markers will be installed. Where possible, these markers will be placed on natural features (e.g., trees not identified as “protected” by the federal government or Commonwealth of Puerto Rico or scrub habitat species), a common practice in national parks, forests, and refuges. Planned installation locations will be discussed with USFWS prior to installation. Where not possible, markers will be placed on structures (e.g., posts) installed along the trail/use area. If posts are necessary, posts designed to work well based on site-specific characteristics such as shallow bedrock will be installed. If LUC monitoring demonstrates any post becomes loose, its location will be strengthened with addition of concrete or other mechanism to increase rigidity.

At USFWS’ discretion, planned land crabbing activities may require special use permits for which USFWS may choose to include additional munitions awareness information and access constraints beyond those included on the educational kiosks. In this case, the Navy can provide MEC awareness and Recognize, Retreat, Report (3Rs) messaging information to USFWS for inclusion in its pamphlets, permits, etc. However, use of special use permits is not necessary to achieve protectiveness goals.

In accordance with the Memorandum of Agreement between the Navy and DOI (Section IV.H) (DON/DOI, 2003), DOI “shall record Land Use Controls, as documented in the Land Use Control Records, on the USFWS’ Land Status Map for East Vieques, or other appropriate Interior land status map.” The Memorandum of Agreement further defines a “Land Use Control Record” as “a document that sets forth the specific Land Use Controls at identified sites.”

3.2.2 LUC and MEC Monitoring and LUC Maintenance

It will be USFWS’ responsibility to choose whether to maintain the public use areas in an accessible manner (e.g., keep the vegetation cut back at/along the intended public use areas) because this activity is associated with the land use, not the remedial action. In fact, if public use areas are not maintained and become inaccessible, protectiveness is enhanced. The Navy will not be responsible for cutting vegetation or otherwise making areas accessible for LUC/MEC monitoring. Nonetheless, the Navy’s responsibility will be to provide inspections of accessible portions of public-use areas (as well as where trespassing is evident) and remove any MEC identified. Should USFWS decide not to retain certain areas as public-use areas, LUC/MEC monitoring will be discontinued in these locations, except in areas where continued access is evident (e.g., via trespassing).

LUC monitoring will occur at UXO 15 to assess the condition and performance of physical LUCs relative to the RAOs. As indicated previously, given that absence of access is itself sufficiently protective (i.e., there is no explosive hazard in places not being accessed due to the absence of potential contact), any area for which USFWS does not maintain access will be protective and will not require vegetation cutting/clearing to make accessible for MEC monitoring.

LUC monitoring will be conducted annually and following events (i.e., named hurricanes/tropical storms, fires) that may threaten the integrity of the UXO 15 LUCs or potentially expose MEC. Because a particular event may not impact the site at all (e.g., a hurricane that impacts only the northern side of the island) or may not impact the entire site (e.g., a fire that burns several acres only), the post-event LUC monitoring will be conducted only in those areas of UXO 15 where the event may have threatened LUC integrity or potentially exposed MEC. The Navy will communicate its schedule for conducting the LUC and MEC monitoring to USFWS prior to conducting the monitoring events. The monitoring program will include identifying any exposed MEC within public access areas that remain accessible, determining whether access is occurring in areas not intended for public use (and inspecting those areas when identified), and evaluating the condition of educational kiosks and trail markers.

- MEC inspections will be conducted in accordance with the procedures detailed in the UXO 15 QAPP (Appendix A). Prior to each monitoring event, the Navy will confirm with USFWS all areas they are maintaining for public use (i.e., trails, roads, land crabbing area, and parking areas as shown in Figure 2-1). The annual Site Management Plans include the estimated schedule of LUC and MEC monitoring events. Because the actual day(s) the monitoring events will be conducted can vary based on the days' weather, staffing availability, etc., it is not possible to specify a date(s) with complete certainty in advance of the event. However, to the extent practical, the Navy will notify the regulatory agencies of the planned/actual inspection date(s). During each monitoring event, an instrument-aided visual inspection for exposed MEC will be conducted in all areas being maintained by USFWS for public use. Minor pruning may occur on and around physical LUCs being maintained to facilitate the inspection, but vegetation clearance activities will not be conducted to make areas accessible for monitoring activities. The instrument-aided visual inspection will also take place in the designated land crabbing area but will not involve any vegetation cutting activities and will be limited to the accessible pathways established and any associated open areas. Instrument-aided visual inspections will also be conducted in other areas of observed trespassing access (e.g., trails or cut vegetation not approved or performed by USFWS). The specific details of how the MEC monitoring will be conducted and assessed are provided in the UXO 15 QAPP (Appendix A). Instrument-aided visual inspections will be conducted to the extent possible in areas USFWS is not maintaining but only in those areas that remain accessible to the inspection team as that accessibility can be reasonably assumed to represent public accessibility. Additionally, if potential MEC is identified by USFWS or a recreational user at UXO 15, both USFWS and recreational users will have been advised to follow the avoidance procedures described in the 3Rs message that is included on each educational kiosk to limit the potential for site users to contact MEC if it were to become exposed.
 - If MEC or other MPPEH is identified by the Navy during the inspections or reported to the Navy by the public, USFWS, or other entity at any time, evaluation and subsequent removal, as applicable, will be conducted in accordance with the procedures outlined in Section 2 of this RAWP and the UXO 15 QAPP (Appendix A).
 - If during an LUC/MEC monitoring event conducted in response to a named hurricane/tropical storm or fire that are determined may threaten the integrity of LUCs or presence of exposed MEC in areas where USFWS has been maintaining as publicly accessible that have become inaccessible due to downed vegetation, the Navy will provide MEC monitoring support during vegetation/debris clearing activities performed by USFWS but will not be responsible for clearing the vegetation/debris.
- The visual inspection will include observation for any signs of trespassing, such as new trails made through the vegetation, encampments, structures, etc. and subsequent MEC inspection in those areas to help ensure the remedy remains protective. It will also include inspections of kiosks and trail markers to evaluate their integrity and ability to perform their intended function. Based on observations during LUC monitoring, additional trail markers will be installed as warranted.
 - If unauthorized trails/structures/encampments are identified, they will be reported to USFWS to address. With respect to the Navy's responsibility, as long as new trails or other unapproved access areas remain accessible, they will continue to be monitored and appropriate MEC removal and/or monitoring

conducted to ensure the remedy remains protective. For LUC structures (kiosks and trail markers), repairs/replacement will be made as necessary to ensure continued integrity.

- As noted previously, during each monitoring event the LUC inspection checklist shown in Appendix B will be completed. Over time, based on observations made during the LUC and MEC monitoring program, this checklist may be modified, if warranted, to maintain applicability and increase its effectiveness.
- The Navy shall notify EPA, PRDNER, and USFWS as soon as practicable of the discovery of activity at UXO 15 inconsistent with the RAOs (Section 1.2) and/or LUC objectives (Section 3.1), and then promptly investigate and take appropriate corrective action. Such notice will also outline the steps and anticipated timeline to be taken to: (1) investigate the cause and outcomes and/or potential outcomes of the activity inconsistent with the RAOs/LUC objectives, (2) develop and implement appropriate corrective action, and (3) evaluate the effectiveness of LUCs and assess lessons learned and reduce the potential for recurrence.
- An annual summary report will be provided to EPA, PRDNER, and USFWS documenting the LUC monitoring and maintenance activities, findings, and as applicable, corrective actions taken to maintain LUCs according to this work plan as described in Section 4.2. A summary of this information will also be included in five-year reviews for the former VNTR (see Section 4.3).
- The Navy or USFWS shall not modify or terminate LUCs, implement actions, or modify land use in a manner inconsistent with the use restrictions and assumptions described in the ROD and detailed herein without appropriate regulatory approval. The Navy and USFWS shall seek prior concurrence before implementing any anticipated activity that may disrupt the effectiveness of the LUCs or that may alter or negate the need for LUCs.

Reporting

4.1 Remedial Action Completion Report

Following implementation of the remedial action (i.e., MEC removal and LUC implementation), a RACR will be prepared to summarize the activities and results. The RACR will be prepared in accordance with the following guidance documents, as applicable:

- Joint Guidance on Streamlined Site Closeout and NPL Deletion Process for DoD Facilities (DoD/EPA, 2006)
- Guidance to Documenting Milestones Throughout the Site Closeout Process (DON, 2006)
- Close Out Procedures for National Priorities List Sites 9320.2-23 (EPA, 2022)

4.2 Annual LUC and MEC Monitoring and Maintenance Report

On an annual basis, a summary report will be provided to EPA, PRDNER, and USFWS documenting the LUC and MEC monitoring and maintenance tasks, inspection findings, and, as applicable, modifications recommended, or corrective actions planned or taken. Inspection checklists will be completed for each LUC and MEC monitoring event and included in the annual report. The annual report will also include an evaluation of any MEC discovered to determine if exposure/migration is occurring and if current LUCs are effective and still protective for planned site use. Any correction actions necessary and implemented following events (i.e., after a named tropical storm/hurricane or fire) that are determined may threaten the integrity of the UXO 15 LUCs or potentially expose MEC will be conveyed to the stakeholder agencies as soon as practicable following assessment of site conditions and again after corrective actions are implemented.

A summary of all inspections, activities taken to maintain LUCs according to this work plan, LUC infractions, and modifications or corrective actions taken or proposed will be included in the five-year reviews (see Section 4.3).

4.3 Five-Year Review Report

There are six components to the five-year review process: (1) community involvement and notification, (2) document review, (3) data review and analysis, (4) site inspection, (5) interviews, and (6) protectiveness determination.

Each Five-Year Review Report will include:

- A summary of all MEC and LUC monitoring event findings, activities taken to maintain LUCs according to this work plan, and any modifications recommended, or corrective actions taken or proposed

The conclusions of the five-year review will include:

- Identification of issues, as applicable
- Evaluation and recommendation regarding the MEC and LUC monitoring, based on observations made during the annual inspections or other activities, especially if those observations identify issues that may threaten the integrity of the remedial action or LUCs
- A determination as to whether the remedial action is and is expected to remain protective of human health and the environment

The Five-Year Review Report will generally follow the template included in Appendix E of Comprehensive Five-Year Review Guide (EPA, 2001) or most recent guidance, as applicable, unless an alternate format is concurred upon by the Navy, EPA, PRDNER, and USFWS. The report shall be submitted to EPA, PRDNER, and USFWS.

SECTION 5

Project Schedule

Because the schedule for the remedial action will be based on such factors as USFWS' schedule for preparing and opening the area for public use, weather, availability of personnel and resources, funding allocation, contracting, and duration of remedial action implementation, the timing of the remedial action implementation and associated monitoring will be included in the annual Site Management Plan schedule provided for regulatory review. All agencies will be kept up to date on any changes to the schedule and the reason for those changes.

References

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Appendix A
UXO 15 Remedial Action Implementation
and Long-Term Monitoring
Quality Assurance Project Plan



Atlantic
Norfolk, Virginia

Draft Final

UXO 15 Remedial Action Implementation and Long-Term Monitoring Quality Assurance Project Plan

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

February 2024

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Atlantic
Norfolk, Virginia

Draft Final

UXO 15 Remedial Action Implementation and Long-Term Monitoring Quality Assurance Project Plan

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

February 2024

Prepared for NAVFAC Atlantic
by CH2M HILL, Inc.
Virginia Beach, Virginia
Contract N62470-21-D-0007
CTO N6247021F4140



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Executive Summary

This Quality Assurance Project Plan (QAPP) presents the rationale and technical approach to address the Remedial Action Objectives (RAOs) for UXO 15 and supplements the UXO 15 Remedial Action Work Plan for Surface Munitions and Explosives of Concern Removal, Land Use Control Implementation and Monitoring, hereafter referred to as the UXO 15 Remedial Action Work Plan (RAWP). UXO 15 is located within the former Vieques Naval Training Range (VNTR) in Vieques, Puerto Rico (Figures ES-1). UXO 15 comprises the 536-acre Puerto Ferro peninsula located in the southwestern portion of the former Eastern Maneuver Area (EMA), on the eastern end of Vieques and in the western portion of the former VNTR (Figure ES-2).

As detailed in the UXO 15 RAWP and in accordance with the UXO 15 Record of Decision (ROD; NAVFAC, 2023), the selected remedy is Alternative 2 – Surface MEC Removal in Planned Public Use Areas and Land Use Controls. The remedy was jointly selected by the Department of the Navy (Navy) and the United States Environmental Protection Agency (EPA) Region 2, with concurrence of the Puerto Rico Department of Natural and Environmental Resources (PRDNER) and United States Department of the Interior (DOI), to achieve the RAOs, which are:

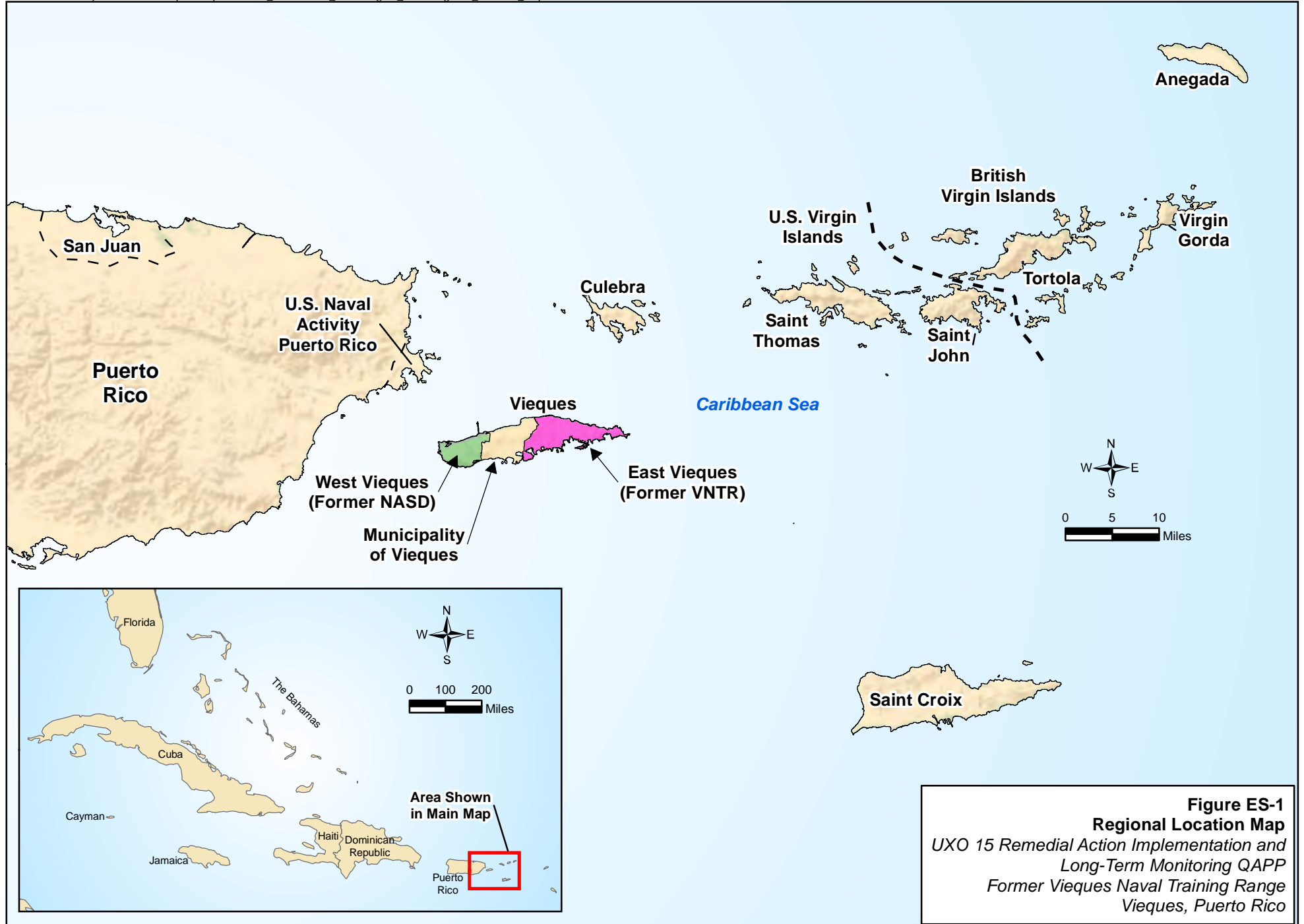
- Reduce the risk of exposure to potential munitions-related explosive hazards to be consistent with current and anticipated future land use identified by USFWS in accordance with its Comprehensive Conservation Plan (CCP) and as set forth in Public Law 106-398, as amended by Public Law 107-107, which requires the land containing UXO 15, among other sites, to be managed by USFWS as a National Wildlife Refuge.
- Reduce or prevent the potential for unauthorized access to portions of UXO 15.

An RAO for groundwater is not necessary for UXO 15 because no contaminants representing a leaching concern for groundwater were identified, as detailed in the Remedial Investigation (RI)/Feasibility Study (FS) Report (CH2M, 2020b).

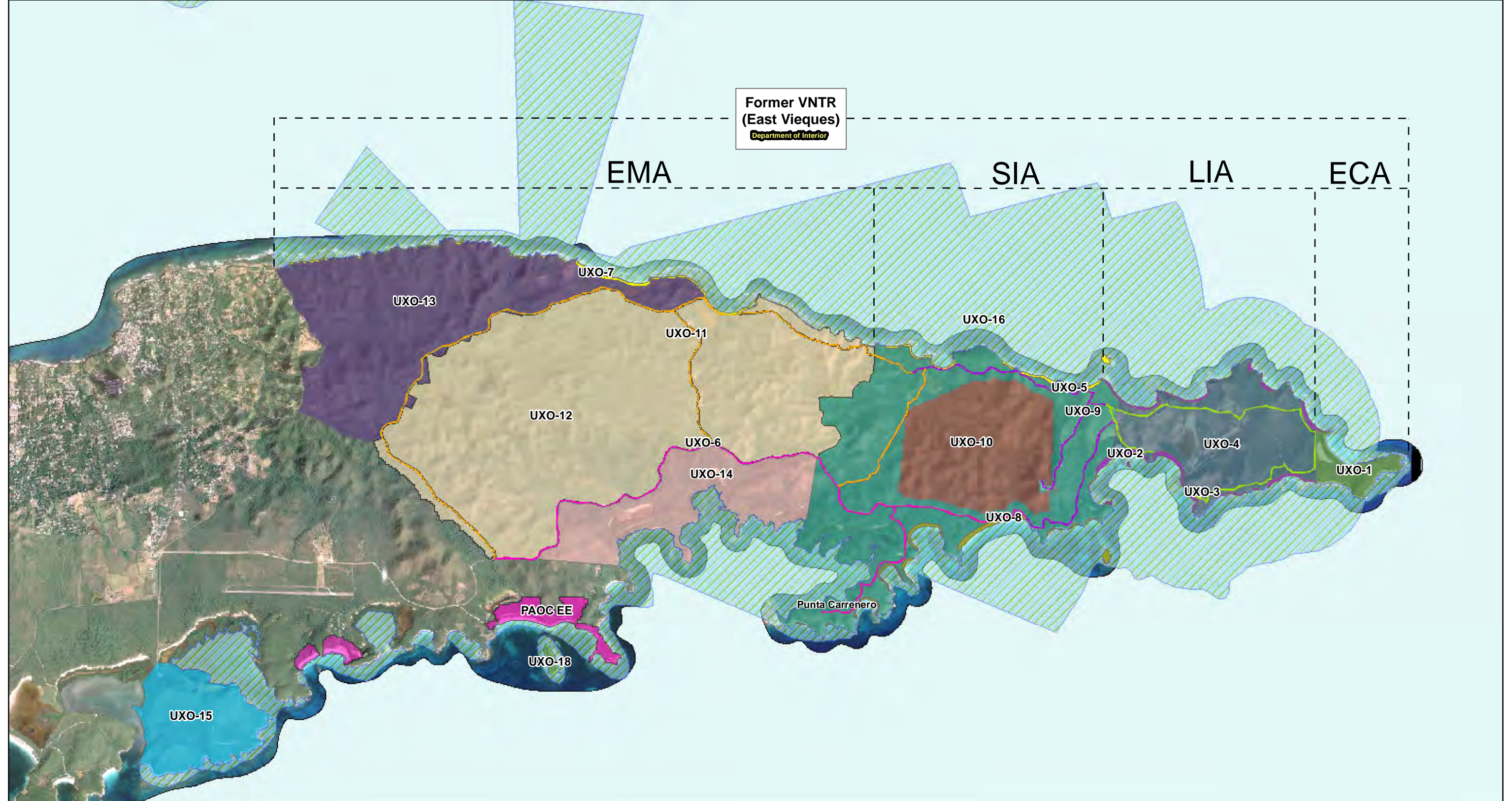
While the basis for this QAPP preparation remains the Guidance for Quality Assurance Project Plans EPA QA/G-5 (EPA, 2002), the Intergovernmental Data Quality Task Force (IDQTF) has produced focused guidance that was specifically utilized in preparing this QAPP. Therefore, this QAPP was developed in general accordance with the Uniform Federal Policy for Quality Assurance Project Plans, Munitions Response QAPP Toolkit, Module 2: Remedial Action, (IDQTF, 2023) for the surface MEC clearance component of the remedial action implementation and the MEC monitoring component of long-term monitoring (LTM).

This QAPP was prepared by CH2M HILL, Inc. (CH2M), a subsidiary of Jacobs, under the Comprehensive Long-term Environmental Action – Navy (CLEAN) Contract N62470-21-D-0007, Contract Task Order N6247021F4140, for submittal to Naval Facilities Engineering Systems Command Atlantic (NAVFAC), EPA, PRDNER, and United States Fish and Wildlife Service (USFWS). NAVFAC, EPA, PRDNER, and USFWS work jointly to implement the Vieques Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Environmental Restoration Program.

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- Legend**
- UXO 1 - ECA
 - UXO 2 - LIA Beaches
 - UXO 3 - LIA Roads
 - UXO 4 - LIA Interior
 - UXO 5 - SIA Restricted Roads
 - UXO 6 - EMA/SIA Planned Public Roads
 - UXO 7 - EMA/SIA North Beaches
 - UXO 8 - SIA South Beaches
 - UXO 9 - SIA Exterior
 - UXO 10 - SIA Interior
 - UXO 11 - EMA Planned Public Roads
 - UXO 12 - EMA Interior
 - UXO 13 - EMA West
 - UXO 14 - EMA South
 - UXO 15 - Puerto Ferro (Expanded Site Inspection)
 - UXO 16 - Underwater Areas
 - UXO 17 - Public Use Beaches
 - UXO 18 - Cayo de la Chiva

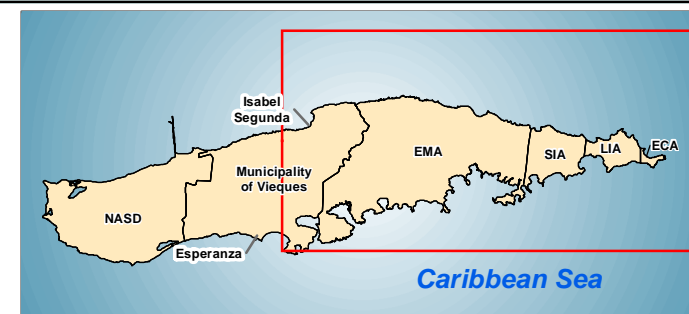
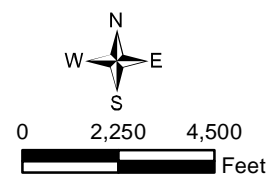


Figure ES-2
Former VNTR Site Map
UXO 15 Remedial Action Implementation and Long-Term Monitoring QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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Acronyms and Abbreviations

3Rs	Recognize, Retreat, Report (munitions awareness training)
AED	Automated External Defibrillation
AM	Activity Manager
bgs	below ground surface
CA	Corrective Action
CAP	Corrective Action Plan
CAR	Corrective Action Request
CCP	Comprehensive Conservation Plan
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CH2M	CH2M HILL, Inc.
CLEAN	Comprehensive Long-term Environmental Action – Navy
cm	centimeter(s)
CONUS	Continental United States
CPR	cardiopulmonary resuscitation
CSM	Conceptual Site Model
DDESB	Department of Defense Explosives Safety Board
DFW	definable feature of work
DoD	Department of Defense
DOI	Department of the Interior
DQI	Data Quality Indicator
DQO	Data Quality Objective
DUA	Data Usability Assessment
EBS	Environmental Baseline Survey
ECA	Eastern Conservation Area
EMA	Eastern Maneuver Area
EOD	explosive ordnance disposal
EPA	Environmental Protection Agency
ERA/SI	Expanded Range Assessment/Site Inspection
ESS	Explosives Safety Submission
FCR	Field Change Request
FFA	Federal Facility Agreement
FGDC	Federal Geographic Data Committee
FS	Feasibility Study
FTL	Field Team Leader
GIS	geographic information system
GPS	global positioning system
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDQTF	Intergovernmental Data Quality Task Force
ISO	industry standard object
ITS	instrument test strip

LIA	Live Impact Area
LTM	long-term monitoring
LUC	land use control
m	meter(s)
MC	munitions constituent
MD	munitions debris
MDAS	Material Documented as Safe
MEC	munitions and explosives of concern
mm	millimeter(s)
MPC	Measurement Performance Criteria
MPPEH	material potentially presenting an explosive hazard
MQO	Measurement Quality Objective
MRP	Munitions Response Program
msl	mean sea level
N/A	not applicable
NAD83	North American Datum of 1983
NAVD	North American Vertical Datum
NAVFAC	Naval Facilities Engineering Systems Command Atlantic
NAVSEA	Naval Sea Systems Command
Navy	Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NMRD	non-munitions related debris
NPL	National Priorities List
NTCRA	Non-Time-Critical Removal Action
O2	oxygen
OB/OD	open burn/open detonation
OP	Ordnance Pamphlet
OSHA	Occupational Safety and Health Administration
PI	Photo Identified (site)
PM	Project Manager
POC	point of contact
PRAP	Proposed Remedial Action Plan
PRDNER	Puerto Rico Department of Natural and Environmental Resources
QA	quality assurance
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	quality control
RACR	Remedial Action Completion Report
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCA	Root Cause Analysis
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager

RRD	range-related debris
RTK	real-time kinematic
RTS	robotic total station
SCUBA	self contained underwater breathing apparatus
SDSFIE	Spatial Data Standards for Facilities, Infrastructure, and Environment
SIA	Surface Impact Area
SOP	Standard Operating Procedure
SUXOS	Senior Unexploded Ordnance Supervisor
TBD	to be determined
TOI	target of interest
TP	Technical Paper
USACE	United States Army Corps of Engineers
USAE	USA Environmental, Inc.
USFWS	United States Fish and Wildlife Service
UTM	Universal Transverse Mercator
UXO	unexploded ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer
VNTR	Vieques Naval Training Range

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Worksheet #1 & 2: Title and Approval Page

1. Project Identifying Information

- a. Regulatory Program/Site Name/Project Name: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)/UXO 15, Atlantic Fleet Weapons Training Area – Vieques, former Vieques Naval Training Range (VNTR)/UXO 15 Remedial Action Implementation and Long-Term Monitoring (LTM)
- b. Site Location/Number: UXO 15, former VNTR, Vieques, Puerto Rico
- c. Lead Organization: Department of the Navy (Navy), Naval Facilities Engineering Systems Command Atlantic (NAVFAC)
- d. Remedial Action Implementation Contractor: USA Environmental, Inc. (USAE)
Quality Assurance (QA) and LTM Contractor: CH2M HILL, Inc. (CH2M)
- e. Contract Number:
N62470-17-D-8003 CTO 64270-17-F-4023 (USAE)
N62470-21-D-0007, Contract Task Order (CTO) N6247021F4140 (CH2M)

2. Lead Organization (NAVFAC)

- a. NAVFAC Remedial Project Manager (RPM)

Daniel Hood*

(Signature/Date)

- b. NAVFAC RPM

Kevin Cloe*

(Signature/Date)

- c. NAVFAC Munitions Response QA Officer (QAO)

Stacin Martin

(Signature/Date)

3. Remedial Action Implementation Contractor (USAE)

- a. USAE Project Manager (PM)

Bob Hannan*

(Signature/Date)

- b. USAE QAO

Michael Price

(Signature/Date)

- c. USAE Unexploded Ordnance (UXO) Quality Control Specialist (UXOQCS)

Danny Carabello

(Signature/Date)

- d. USAE Health and Safety Manager

Cheryl Riordan

(Signature/Date)

Worksheet #1 & 2: Title and Approval Page (continued)

4. QA and LTM Contractor (CH2M)

- a. CH2M Activity Manager (AM)

Bill Hannah

(Signature/Date)

- b. CH2M PM

Dennis Ballam

(Signature/Date)

- c. CH2M Munitions Response Safety and QAO

Jeff McCauley

(Signature/Date)

- d. CH2M Vieques Program Project Delivery and Quality Manager

Brett Doerr

(Signature/Date)

- e. CH2M Health and Safety Manager

Stephen Brand

(Signature/Date)

5. Federal Regulatory Agency (United States Environmental Protection Agency [EPA] Region 2)

EPA RPM

Jessica Mollin

(Signature/Date)

EPA QAO

Lynn Arabia, CHMM

(Signature/Date)

6. Commonwealth Regulatory Agency (Puerto Rico Department of Natural and Environmental Resources [PRDNER])

PRDNER RPM

Juan Baba Peebles

(Signature/Date)

7. Vieques National Wildlife Refuge System Supervisor (United States Fish and Wildlife Service [USFWS])

USFWS RPM

Silmarie Padron*

(Signature/Date)

Worksheet #1 & 2: Title and Approval Page (continued)

8. List of plans and reports from previous investigations relevant to this project
 - Munitions and Explosives of Concern (MEC) Master Work Plan, Former Vieques Naval Training Range (VNTR), Vieques, Puerto Rico (CH2M, 2006)
 - Proper MEC handling and MEC/MPPEH disposal operations
 - UXO 15 Remedial Investigation/Feasibility Study Report, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico (CH2M, 2020b)
 - Investigation data and findings, human health and ecological risk assessments, and evaluation of remedial alternatives for MEC
 - Record of Decision, UXO 15 Puerto Ferro, Atlantic Fleet Weapons Training Area – Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico (NAVFAC, 2023)
 - Selected remedy
9. The undersigned concur that the use of analog technology is justified in area(s).

Signature(s) not applicable. The UXO 15 Record of Decision (ROD; NAVFAC, 2023) specifies the MEC clearance is to be performed via an instrument-aided visual surface inspection. This approach is consistent with how historical MEC removal actions within planned public use areas (roads and trails) were performed. Further, analog technology will be used during MEC clearance in the planned land crabbing area (due to the need to retain vegetation generally uncut to preserve habitat, very shallow exposure concern in this area, and low likelihood of MEC present) and, if necessary, in locations of physical land use controls (LUCs) where intrusive work is required for installation. In these areas the use of analog technology will be sufficient to achieve the MEC clearance objectives, but any associated limitations on data use will be documented in the Remedial Action Completion Report (RACR).

Additionally, analog technology will be used for MEC monitoring activities within UXO 15 as part of LTM. Analog technology is appropriate to use for LTM because coupled with the removal performed during remedy implementation and past removal actions, planned visual observations (i.e., instrument-aided visual surveys), and LUCs, the technology appropriately supports meeting LTM objectives.

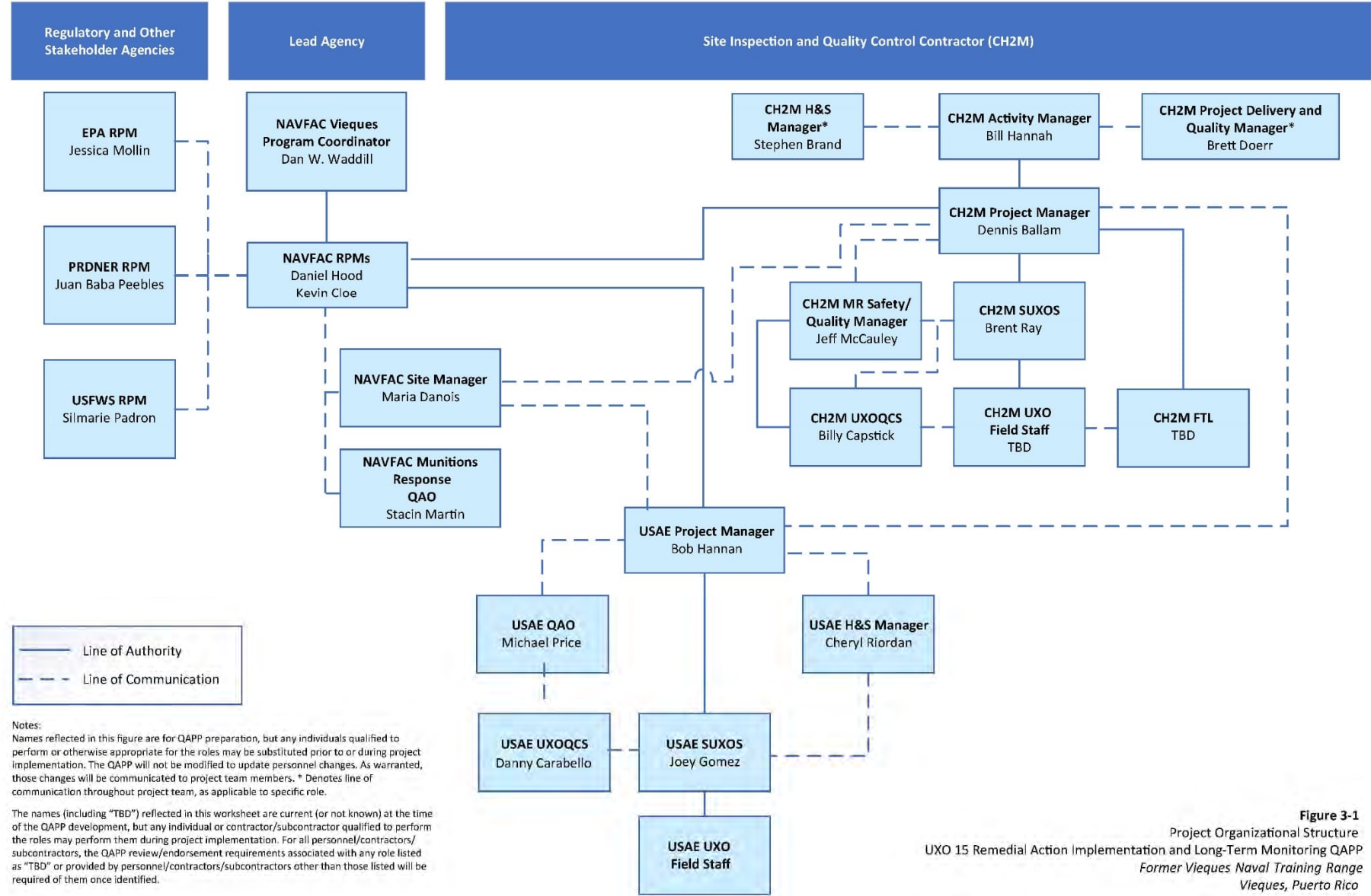
Additional details and rationale are provided in Worksheet #11.

Notes:

* Indicates Quality Assurance Project Plan (QAPP) hardcopy recipients. In addition, as standard protocol for Vieques documents, the QAPP is loaded to the Vieques document repository once finalized and an email announcing its availability is sent to all RPMs. It is then the RPM's responsibility to communicate the availability within their stakeholder agency at their discretion. This protocol is consistent with green and sustainable practices by reducing the amount of paper and associated resources consumed for document preparation and distribution. It also reduces the burden on space allocation for document hardcopies. However, hardcopies can be provided to particular individuals at the RPM's request.

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Worksheet #3 & 5: Project Organization and QAPP Distribution



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Worksheet #4, 7 & 8: Personnel Qualifications and Sign-off Sheet

Table 4-1. NAVFAC Personnel Qualifications

Name	Project Title	Education/Experience	Required Licenses/ Certifications/ Authorizations	Signature/ Date ^a
Daniel Hood	NAVFAC RPM	<ul style="list-style-type: none">30 years of environmental remediation and munitions response experience	Not applicable (N/A)	
Kevin Cloe	NAVFAC RPM	<ul style="list-style-type: none">33 years of environmental remediation and munitions response experience	N/A	
Stacin Martin	NAVFAC Munitions Response QAO	<ul style="list-style-type: none">30 years of environmental remediation and munitions response experience	N/A	

^a Signatures indicate personnel have read and agree to implement this QAPP as written.

Worksheet #4, 7 & 8: Personnel Qualifications and Sign-off Sheet (continued)

Table 4-2. QA and LTM Contractor Personnel Qualifications

Name	Project Title	Education/Experience	Specialized Training	Required Licenses/ Certifications/ Authorizations	Signature/ Date ^a
Bill Hannah	CH2M AM	<ul style="list-style-type: none">25years of environmental remediation and munitions response experience	<ul style="list-style-type: none">40-Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) with current 8-hour refresherCardiopulmonary Resuscitation (CPR) and First Aid Training	N/A	
Dennis Ballam	CH2M PM	<ul style="list-style-type: none">18 years of environmental remediation and munitions response experience	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCPR and First Aid TrainingUnmanned aircraft systems – Part 107 Pilot’s License	N/A	
Brett Doerr	CH2M Vieques Program Project Delivery and Quality Manager	<ul style="list-style-type: none">30 years of environmental remediation and munitions response experience	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCPR and First Aid TrainingProfessional Geologist (Virginia)	N/A	
Jeff McCauley	CH2M Munitions Response Safety and QAO	<ul style="list-style-type: none">30 years of US Navy explosive ordnance disposal (EOD) and diving and salvage3 years of Jacobs munitions response program	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCPR and First Aid TrainingAutomated external defibrillator (AED) and Oxygen (O2) AdministratorFormer US Navy Diver (Deep Sea/Air/Mixed Gas/Self Contained Underwater Breathing Apparatus [SCUBA]), Naval Diving and Salvage Training Center (1990)US Navy EOD Technician, Naval School Explosive Ordnance Disposal (1995)	N/A	
Stephen Brand	CH2M Health and Safety Manager	<ul style="list-style-type: none">31 years of environmental remediation and munitions response experience	<ul style="list-style-type: none">Professional Geologist (Virginia)Certified Safety ProfessionalOccupational Health and Safety Technician40-Hour HAZWOPER with current 8-hour refresher30-Hour Occupational Safety and Health Administration (OSHA) Construction CertificationCPR and First Aid Training	N/A	
Brent Ray	CH2M Senior Unexploded Ordnance Supervisor (SUXOS)	<ul style="list-style-type: none">33 years of munitions response experience	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCPR and First Aid TrainingQualified SUXOS in accordance with Department of Defense Explosives Safety Board (DDESB) Technical Paper (TP)-18Material potentially presenting an explosive hazard (MPPEH) Training in accordance with Attachment D-3p of Naval Sea Systems Command (NAVSEA) Ordnance Pamphlet (OP) 5^b	N/A	
Billy Capstick	CH2M UXOQCS	<ul style="list-style-type: none">32 years of munitions response experience	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCPR and First Aid TrainingQualified SUXOS in accordance with DDESB TP-18MPPEH Training in accordance with Attachment D-3p of NAVSEA OP 5^b	N/A	

Worksheet #4, 7 & 8: Personnel Qualifications and Sign-off Sheet (continued)

Table 4-2. QA and LTM Contractor Personnel Qualifications

Name	Project Title	Education/Experience	Specialized Training	Required Licenses/ Certifications/ Authorizations	Signature/ Date ^a
Jesse Clements	Geographic Information Systems (GIS) Lead	<ul style="list-style-type: none">15 years of GIS experience	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCPR and First Aid Training	N/A	
To be determined (TBD)	CH2M Field Team Leader (FTL)	<ul style="list-style-type: none">TBD	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCPR and First Aid Training3Rs (Recognize Retreat, Report) Munitions Awareness Training	N/A	

^a Signatures indicate personnel have read and agree to implement this QAPP as written.

^b Personnel who inspect and document the explosive safety status of MPPEH will have the training required per NAVSEA OP 5 Appendix D.

Worksheet #4, 7 & 8: Personnel Qualifications and Sign-off Sheet (continued)

Table 4-3. Remedial Action Implementation Contractor Personnel Qualifications

Name	Project Title	Education/Experience	Specialized Training	Required Licenses/ Certifications/ Authorizations	Signature/ Date ^a
Bob Hannan	USAE PM	<ul style="list-style-type: none">38 years of environmental remediation and munitions response experience	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresher30-Hour OSHA Construction TrainingMPPEH Training in accordance with Attachment D-3p of NAVSEA OP 5^bCPR and First Aid Training	N/A	
Michael Price	USAE QAO	<ul style="list-style-type: none">21 years of environmental remediation and munitions response experience	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCPR and First Aid TrainingAmerican Society for Quality Certified Quality Auditor & Certified Manager of Quality/Organizational ExcellenceUnited States Army Corps of Engineers (USACE)-NAVFAC Construction Quality Management	N/A	
Danny Carabello	USAE UXOQCS	<ul style="list-style-type: none">33 years of munitions response experience	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCPR and First Aid TrainingQualified quality control (QC) in accordance with DDESB TP-18MPPEH Training in accordance with Attachment D-3p of NAVSEA OP 5^b	N/A	
Cheryl Riordan	USAE Health and Safety Manager	<ul style="list-style-type: none">40 years of environmental remediation and munitions response experience	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCertified Safety Professional	N/A	
Joey Gomez	USAE SUXOS	<ul style="list-style-type: none">12 years of environmental remediation and munitions response experience	<ul style="list-style-type: none">40-Hour HAZWOPER with current 8-hour refresherCPR and First Aid TrainingQualified SUXOS in accordance with DDESB TP-18MPPEH Training in accordance with Attachment D-3p of NAVSEA OP 5^b	N/A	

Note: The names (including “TBD”) reflected in these tables are current (or not known) at the time of the QAPP development, but any individual or contractor/subcontractor qualified to perform the roles may perform them during project implementation. For all personnel/contractors/subcontractors, the QAPP review/endorsement requirements associated with any role listed as “TBD” or provided by personnel/contractors/subcontractors other than those listed will be required of them once identified.

^a Signatures indicate personnel have read and agree to implement this QAPP as written.

^b Personnel who inspect and document the explosive safety status of MPPEH will have the training required per NAVSEA OP 5 Appendix D.

Worksheet #6: Communication Pathways and Procedures

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
Regulatory agency interface	Daniel Hood NAVFAC RPM daniel.r.hood.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	Jessica Mollin EPA RPM – Vieques mollin.jessica@epa.gov Juan Baba Peebles PRDNER RPM juanbaba@jca.pr.gov Silmarie Padron USFWS RPM silmarie_padron@fws.gov	Navy RPM(s) provides project updates to regulatory stakeholders via email, telephone, or meetings, as necessary; can delegate communication to other internal or external points of contact (POCs).
Communications to/from Navy from Vieques onsite contractors	Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil	Daniel Hood NAVFAC RPM daniel.r.hood.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	NAVFAC Site Manager provides updates to NAVFAC RPMs via email, telephone, hardcopy, or in-person, as warranted; can delegate communication to other internal and external POCs.
Navy munitions quality/safety inputs	Stacin Martin NAVFAC Munitions Response QAO stacin.r.martin.civ@us.navy.mil	Daniel Hood NAVFAC RPM daniel.r.hood.civ@us.navy.mil Dennis Ballam CH2M PM dennis.ballam@jacobs.com	Provides review comments to Navy contractor on munitions aspects of the pre-draft QAPP via email through NAVFAC RPM(s). Provides periodic (as necessary) Navy policy or guidance regarding munitions-related aspects via direct communication with Navy contractor, as delegated.

Worksheet #6: Communication Pathways and Procedures (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
Contractor communication to/from Navy (e.g., submission of QAPP for review; response to comments, updates on project progress, etc.)	Dennis Ballam CH2M PM dennis.ballam@jacobs.com Bob Hannan USAE PM rhannan@usatampa.com	Daniel Hood NAVFAC RPM daniel.r.hood.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil	CH2M and USAE PMs provide documents and project updates to the Navy RPMs via hardcopy, email, telephone, or meetings, as necessary.
Project administration and logistics	Dennis Ballam CH2M PM dennis.ballam@jacobs.com	Various contractor staff (CH2M and/or USAE)	Direct communication (via email, telephone, hardcopy, or in-person, as needed) to/from Navy and other contractor/subcontractor project staff to ensure appropriate project implementation.
Daily field progress reports; including MEC clearance and MEC LTM inspections	Bob Hannan USAE PM rhannan@usatampa.com Brent Ray CH2M SUXOS brent.ray@jacobs.com	Dennis Ballam CH2M PM dennis.ballam@jacobs.com	At end of each day of fieldwork, USAE PM (or designee) provides daily MEC related progress reports to CH2M PM. CH2M SUXOS (or designee) provides daily progress reports to CH2M PM. CH2M PM will then inform NAVFAC Site Manager and NAVFAC RPMs via email, telephone, hardcopy, or in-person, as applicable.
Stop work due to safety issues	Bob Hannan USAE PM rhannan@usatampa.com Joey Gomez USAE SUXOS jgomez@usatampa.com	Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil Daniel Hood NAVFAC RPM daniel.r.hood.civ@us.navy.mil	As soon as possible following discovery, the USAE SUXOS/CH2M SUXOS informs the USAE PM/CH2M PM of critical safety issues and generates a follow-up Stop Work Memorandum. The USAE PM/CH2M PM will then inform the NAVFAC Site Manager and NAVFAC RPMs. USAE PM/CH2M PM will also notify NAVFAC Site Manager and NAVFAC RPMs when safety issue has been addressed (including root cause analysis, if necessary). Of note, CH2M field staff will also observe

Worksheet #6: Communication Pathways and Procedures (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
	<p>Brent Ray CH2M SUXOS brent.ray@jacobs.com</p> <p>Note: Any field personnel are empowered to stop work due to safety concern. In general, field staff will report the situation to the contractor PM and Health and Safety Manager; contractor PM reports situation to NAVFAC Site Manager and RPMs.</p>	<p>Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil</p> <p>Dennis Ballam CH2M PM dennis.ballam@jacobs.com</p> <p>Note: USAE and CH2M Health and Safety Managers are integral in the stop work communications, including development and implementation of corrective measures.</p>	<p>for potentially unsafe conditions and stop work if conditions/activities deemed to be immediately dangerous to life or health are observed.</p>
QC or QA stand-down	<p>Michael Price USAE QAO mprice@jacobs.com</p> <p>Jeff McCauley CH2M Munitions Response Safety and QAO jeff.mccauley@jacobs.com</p>	<p>Bob Hannan USAE PM rhannan@usatampa.com</p> <p>Dennis Ballam CH2M PM dennis.ballam@jacobs.com</p> <p>Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil</p> <p>Daniel Hood NAVFAC RPM daniel.r.hood.civ@us.navy.mil</p> <p>Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil</p>	<p>If an issue is identified that may warrant a QC or QA stand-down, the USAE UXOQCS (for QC issues) or CH2M UXOQCS (for QA issues) will communicate and discuss the issue with the USAE QAO or CH2M Munitions Response Safety and QAO, respectively. For QC stand-down, USAE QAO will notify the USAE PM. For a QA stand-down, CH2M Munitions Response Safety and QAO will notify the CH2M PM. The USAE PM or CH2M PM (as applicable) will then notify the NAVFAC Site Manager and NAVFAC RPMs via email and/or telephone. USAE PM or CH2M PM (as applicable) will also notify the NAVFAC Site Manager and NAVFAC RPMs when QC or QA stand-down issue has been resolved.</p>

Worksheet #6: Communication Pathways and Procedures (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
Resume work following a stop work or QC or QA stand-down	Daniel Hood NAVFAC RPM daniel.r.hood.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	Bob Hannan USAE PM rhannan@usatampa.com Dennis Ballam CH2M PM dennis.ballam@jacobs.com	NAVFAC RPMs will provide the USAE PM or CH2M PM (as applicable) written notice of approval to resume work in the event of a stop work or QC or QA stand-down.
Minor QAPP changes (i.e., those unlikely to impact meeting the Remedial Action Objectives [RAOs]) during MEC clearance	Michael Price USAE QAO mprice@jacobs.com Bob Hannan USAE PM rhannan@usatampa.com	Dennis Ballam CH2M PM dennis.ballam@jacobs.com Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil Daniel Hood NAVFAC RPM daniel.r.hood.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	USAE QAO and USAE PM ensure minor QAPP changes are recorded and documented in the associated report with an assessment of any potential impacts on data usability. The CH2M PM provides review and approval in conjunction with the NAVFAC Site Manager and NAVFAC RPMs. The NAVFAC RPMs will notify stakeholders, as necessary.
Minor QAPP changes (i.e., those unlikely to impact meeting the RAOs) during MEC/LUC LTM inspections	Dennis Ballam CH2M PM dennis.ballam@jacobs.com	Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	CH2M PM ensures minor QAPP changes are recorded and documented in the associated report with an assessment of any potential impacts on data usability. NAVFAC Site Manager and NAVFAC RPM provide review and approval. The NAVFAC RPM will notify stakeholders, as necessary.

Worksheet #6: Communication Pathways and Procedures (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
Substantive QAPP changes during project execution (i.e., those that may impact the RAOs being met)	Bob Hannan USAE PM rhannan@usatampa.com Dennis Ballam CH2M PM dennis.ballam@jacobs.com	Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil Daniel Hood NAVFAC RPM daniel.r.hood.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	USAE PM/CH2M PM submits a Field Change Request (FCR) and, as applicable, a Corrective Action Request (CAR), and a Corrective Action Plan (CAP) to the NAVFAC Site Manager and NAVFAC RPMs. The NAVFAC Site Manager and NAVFAC RPMs provide review and approval. Following approval, the NAVFAC RPMs will notify stakeholders within 24 hours or as soon as possible via email of any significant changes to the QAPP and/or corrective actions. Navy review, consideration, and incorporation of any resulting regulatory comments will be done to the extent practicable given the constraints commonly associated with a project undergoing implementation, especially in the field (e.g., equipment and other resource availability, staffing, weather, schedule, contract stipulations, etc.). Further, regulatory agencies have the opportunity to review the various elements of data collection, analysis, evaluation, and QC/QA in the associated report(s).
Technical and quality support and reporting	Brett Doerr CH2M Vieques Program Project Delivery and Quality Manager brett.doerr@jacobs.com	Various CH2M staff	Project delivery and quality support, including scope development, guidance, and technical/quality review.

Worksheet #6: Communication Pathways and Procedures (continued)

Communication Driver	Initiator (Name, Project Title)	Recipient (Name, Project Title)	Procedure (Timing, Pathway, Documentation)
MEC clearance activities are complete	Bob Hannan USAE PM rhannan@usatampa.com	Dennis Ballam CH2M PM dennis.ballam@jacobs.com Maria Danois NAVFAC Site Manager maria.m.danois.civ@us.navy.mil Daniel Hood NAVFAC RPM daniel.r.hood.civ@us.navy.mil Kevin Cloe NAVFAC RPM kevin.r.cloe.civ@us.navy.mil	Upon completion of MEC clearance activities, the USAE PM will inform the CH2M PM. The CH2M PM will verify all quality assurance aspects were met and then inform the NAVFAC Site Manager and NAVFAC RPMs.
Weekly QA reports	Jeff McCauley CH2M Munitions Response Safety and QAO jeff.mccauley@jacobs.com	Dennis Ballam CH2M PM dennis.ballam@jacobs.com	At end of each week in which geophysical field work was completed, the CH2M Munitions Response Safety and QAO will provide QA reports to the CH2M PM. The CH2M PM will inform the NAVFAC Site Manager and NAVFAC RPMs.

Note: The names (including "TBD") reflected in this table are current (or not known) at the time of the QAPP development, but any individual or contractor/subcontractor qualified to perform the roles may perform them during project implementation. For all personnel/contractors/subcontractors, the QAPP review/endorsement requirements associated with any role listed as "TBD" or provided by personnel/contractors/subcontractors other than those listed will be required of them once identified.

Worksheet #9: Project Process for Remedial Action

The collective efforts by the Navy and other stakeholder agencies to develop the UXO 15 Proposed Remedial Action Plan (PRAP) and ROD constitute the QAPP scoping sessions because the PRAP and ROD contain the key consensus elements necessary to prepare the QAPP. Below are the key meetings/calls associated with interagency preparation of the UXO 15 PRAP and ROD.

- Technical Subcommittee Meeting, October 18, 2018; Topics – UXO 15 Remedial Investigation (RI)/Feasibility Study (FS) Report finalization, proposed remedy, and PRAP schedule
- Technical Subcommittee Meeting, April 10, 2019; Topics – UXO 15 PRAP and ROD

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Worksheet #10: Conceptual Site Model

Facility Profile – Former Vieques Naval Training Range

Location, Size, Facility History, and Ownership

The former VNTR is located in Vieques, Puerto Rico, in the Caribbean Sea, approximately 7 miles southeast across the Vieques Passage from the eastern tip of the main island of Puerto Rico (Figure 10-1). The former VNTR consists of approximately 14,600 acres and is divided into four separate operational areas that from west to east comprise: the 11,000-acre Eastern Maneuver Area (EMA), the 2,500-acre Surface Impact Area (SIA), the 900-acre Live Impact Area (LIA), and the 200-acre Eastern Conservation Area (ECA) (Figure 10-2). The former VNTR is bounded by the Caribbean Sea to the north, east, and south, and the Municipality of Vieques to the west. Past military operations at the former VNTR included ground warfare and amphibious training for Marines, naval gunfire support training, and air to ground training. Following cessation of military operations on the former VNTR, the Navy subdivided the former operational areas into smaller parcels based on considerations such as historic use, geographic features, and land use. The parcels, referred to as UXO sites, were delineated in such a way to make them more manageable for the purposes of prioritization, munitions removal, site characterization, and decision making.

On April 30, 2003, the former VNTR was transferred to the Department of the Interior (DOI) to be operated and managed by the USFWS as a National Wildlife Refuge and, in some places, a Wilderness Area, pursuant to Section 1049 of the National Defense Authorization Act for Fiscal Year 2002 (Public Law 107-107). Although the DOI is directed to protect and conserve the transferred land as a wildlife refuge, the Navy retains the responsibility for conducting the environmental investigations and cleanup of the property, as warranted.

In 2005, the former VNTR was placed on the National Priorities List (NPL). The NPL required all subsequent environmental restoration activities for Navy Installation Restoration sites on Vieques to be conducted under CERCLA unless and until removed from CERCLA authority.

The Navy, EPA, Commonwealth of Puerto Rico, and DOI entered into a Federal Facility Agreement (FFA) for the former VNTR 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 environmental and munitions sites.

UXO 15 Site Profile

Location

UXO 15 comprises the 536-acre Puerto Ferro peninsula located in the southwestern portion of the EMA, located in the western portion of the former VNTR (Figure 10-2). The site features are shown on Figure 10-3. The planned land use for UXO 15 is conceptually shown on Figure 10-4 and discussed in more detail in Worksheet #11 and Worksheet #17.

Site History

UXO 15 was primarily used for temporary ordnance storage, transport, and loading/offloading in support of military training activities and is not contiguous with the other UXO sites within the EMA, all of which are being addressed separately from UXO 15. UXO 15 includes two Photo Identified (PI) sites (PI 9 East and West and PI 13) (Figure 10-3). PI 9 West, located in the northwestern portion of the site, was likely used for temporary ammunition storage; investigation findings suggest it was not used for ammunition disposal. PI 9 East, located in the northeastern corner of UXO 15, was likely used for ordnance transport and loading/offloading activities. PI 13, located in the southeastern portion of UXO 15, was reportedly used as a firing point from which rocket-related ordnance was launched to the LIA/SIA; however, no evidence of this use was found during the RI or previous

Worksheet #10: Conceptual Site Model (continued)

investigations. A potential ordnance detonation area identified within UXO 15 was investigated during the RI, the findings of which suggest the area was unlikely used for munitions disposal by detonation.

Table 10-1 summarizes the purpose, scope, and pertinent results of previous investigations and munitions removal activities performed at or relevant to UXO 15.

In accordance with the UXO 15 ROD (NAVFAC, 2023), Remedial Alternative 2 – Surface MEC Removal in Planned Public Use Areas and Land Use Controls was the selected remedial alternative and will be implemented as part of the UXO 15 Remedial Action Work Plan (RAWP). Details associated with the objectives and approach of the remedial action and LTM implementation to be conducted are provided in the applicable worksheets (specifically, Worksheet #11 and Worksheet #17) in this QAPP; however, an overview of the selected remedial action is provided below.

The RAOs were developed to be protective of current and potential future receptors in accordance with the land use plan for UXO 15. Remedial Alternative 2 was selected as the final remedy for UXO 15 based on its evaluation relative to other alternatives and with respect to the evaluation criteria provided in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The remedial action comprises the following components:

Remedial Action Implementation

- Surface MEC clearance within areas identified and maintained by USFWS for land management and public recreational use. For the purposes of the QAPP, and consistent with the ROD (NAVFAC, 2023), the interval within which surface MEC removal will be performed is defined as being from the ground surface to a maximum depth of 12 inches below ground surface (bgs). Therefore, where the term “surface MEC removal” is used in this QAPP, it should be interpreted to mean removal within the top 12 inches.
- LUC implementation comprising physical mechanisms (educational kiosks, monuments, trail markers) and administrative processes (munitions safety awareness messaging, potential land crabbing permits) to encourage access and approved activities in areas intended for public use, while discouraging access and unapproved activities to areas not planned for public use and reduce the potential for contact with MEC potentially present.

Long-term Monitoring

- LUC and MEC monitoring

Physical and Biological Characteristics

The topography of UXO 15 ranges in elevation from about 30 feet mean sea level (msl) inland to sea level at the coastline (Figure 10-3). The topographically higher areas (also referred to as upland areas) generally slope toward the ocean. Steep cliff faces tend to form the eastern and southern portions of UXO 15 while a relatively thin mangrove forest forms the western boundary with Puerto Mosquito.

UXO 15 contains a variety of environmental habitats, including dry scrub forest on hilltops and ridges; a mangrove forest associated with lagoons, salt/sand flats, or tidal mud flats; evergreen scrub habitat; exposed limestone areas; and areas of mixed native, naturalized, and invasive species. The grey land crab is common around the fringe of lagoons and in areas of shallow groundwater.

Worksheet #10: Conceptual Site Model (continued)

Generalized groundwater flow at UXO 15 is anticipated to be toward Puerto Mosquito to the west, Puerto Ferro to the north and east, and the ocean to the south, and is likely to be tidally influenced, especially near the shorelines. Due to the site's proximity to the ocean and existence primarily in limestone, groundwater at UXO 15 is likely brackish to saline and hard (contains high concentrations of naturally occurring calcium, magnesium, and other minerals).

Summary of Key Conceptual Site Model Characteristics Supporting the Remedial Action Rationale and Approach

A summary of the key Conceptual Site Model (CSM) characteristics supporting the remedial actions and technical approach for UXO 15 are provided herein. Details associated with the approach and objectives are provided in the applicable worksheets (specifically, Worksheet #11 and Worksheet #17) in this QAPP. The CSM for UXOs 15 is presented in Table 10-2.

USFWS has identified planned land use areas within UXO 15, including parking areas, hiking/bicycle riding roads/trails, horseback riding roads/trails, vehicular use on roads, and land crabbing.

Sources of Explosive Hazards

The source of explosive hazards (i.e., MEC/MPPEH) are the former temporary ordnance storage, transport, and loading/offloading activities in support of military training activities within the former VNTR. Historical removal actions and investigations have identified and removed two MEC items; however, because of the conservative assumption that there is the potential for MEC to remain at the site, remedial action is warranted. Table 10-3 provides a list of the types of munition items (including MEC and munitions debris [MD]) recovered from UXO 15 during previous removals and investigations. Figure 10-5 shows the locations of MEC and MD findings from previous removals and investigations as well as key site features. Based on the types of munitions items previously removed, it is assumed for the purposes of remedial action that munitions of these types may be present in the planned public use areas where Refuge staff and recreational users could come in contact with them.

Receptors and Exposure Scenarios

Potential receptors within UXO 15 comprise:

- USFWS workers
- Public recreational users (e.g., hikers, bikers, etc.), including land crabbers
- Trespassers

The explosive hazard exposure scenario at UXO 15 is associated with direct contact by USFWS workers, public recreational users, including land crabbers, or trespassers with MEC on the ground surface or within the shallow subsurface that may become exposed from erosion or other means. The activities associated with recreational use and maintenance of the areas to support this use are consistent with potential explosive hazard exposure scenarios that are limited to the ground surface and maximum removal depth (i.e., maximum depth of 12 inches bgs [bedrock is shallower in various planned public use areas]). In other words, reasonably anticipated refuge maintenance and repair activities, recreational use, land crabbing activities, and trespassing activities generally do not consist of any ground disturbance, or at worst minimal ground disturbance to a maximum depth of 12 inches.

TABLE 10-1**UXO 15 Summary of Previous Investigations***UXO 15 Remedial Action Implementation and Long-Term Monitoring QAPP**Former Vieques Naval Training Range**Vieques, Puerto Rico*

Previous Investigation	Dates	Summary
Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)	2000-2004	A Phase I RCRA Facility Investigation (CH2M, 2004) was conducted to determine whether releases of hazardous wastes, solid wastes, or hazardous constituents may have occurred at various sites, including PI 9 and PI 13, which were identified via aerial photograph analysis performed in 2000 to support the RFI. Based on the results of site reconnaissance performed in 2001, the Phase I RFI Report recommended PI 9 for further evaluation for munitions and munitions constituents under the MRP and an inspection for potential MEC at PI 13.
Preliminary Range Assessment	2002-2003	Preliminary Range Assessment (NAVFAC, 2003a) was conducted in 2002 consisting of personnel interviews, archive records search, and inspections, including a magnetometer survey of approximately 40 percent of PI 9 East to provide information about potential munitions use at the site. No MEC were found at UXO 15 during the PRA.
Environmental Baseline Survey (EBS)	2002-2003	An Environmental Baseline Survey (NAVFAC, 2003b) was conducted in 2002 to document the environmental conditions at the former VNTR in anticipation of the transfer of jurisdiction to the DOI. The EBS included site inspections, interviews, and additional aerial photograph evaluation for the former VNTR, including UXO 15. Findings indicated PI 9 East was an area likely used for loading and offloading of munitions, PI 9 West was likely used for temporary storage of munitions within earthen-berm areas and possible open burn/open detonation (OB/OD) operations, and PI 13 may have been the firing point from which rocket-related ordnance was launched to the LIA/SIA in the 1950s and 1960s; however, no evidence of OB/OD uses at PI 9 West or firing point uses at PI 13 was observed during subsequent site reconnaissance and investigations.
Expanded Range Assessment/ Site Inspection (ERA/SI)	2005-2008	An Expanded Range Assessment/Site Inspection (CH2M, 2010) was conducted between 2005 and 2008 within the former VNTR that included surface inspection of UXO 15. Visual and magnetometer-assisted transect surveys were conducted across approximately 6 percent (32 acres) of UXO 15. No MEC were found; a total of 32 MD items were identified, consisting mostly of empty marine artillery casings. Additionally, five small debris piles were identified in various locations within UXO 15 and encrusted empty munitions casings were identified at PI 9 East and just offshore. The ERA/SI contained a recommendation that further investigation/assessment be conducted of the debris piles, nearshore MD at PI 9 East, and subsurface anomalies to determine if MEC were present and evaluate the need for an RI/FS.
Remedial Investigation/ Feasibility Study (RI/FS)	2012-2018	An RI/FS (CH2M, 2020b) was conducted at UXO 15 to assess the nature and extent of MEC and environmental media contamination, to assess potential risks to human health and the environment, and to evaluate remedial alternatives for UXO 15. There were no unacceptable risks to human health or the environment posed by constituent concentrations in site media, so no action is required for environmental media. However, because two MEC (tear gas grenade and 40-mm grenade) were discovered during the RI, there is the potential for MEC to remain at the site. Therefore, an FS was warranted to address these potential explosive hazards. The FS analyzed remedial alternatives to address potential explosive hazards associated with the potential presence of MEC at UXO 15 in accordance with EPA guidance.

TABLE 10-1**UXO 15 Summary of Previous Investigations***UXO 15 Remedial Action Implementation and Long-Term Monitoring QAPP**Former Vieques Naval Training Range**Vieques, Puerto Rico*

Previous Investigation	Dates	Summary
Non-Time-Critical Removal Action (NTCRA) at the Main Access Road, Lighthouse Area, Trails, and Beaches	2014	<p>An NTCRA (CH2M, 2015a) was conducted in 2014 to facilitate public access via the main road to areas around the historic Spanish lighthouse (including the adjacent parking area, trail, and Puerto Ferro Lighthouse Beach [Playa Berdiales Faro]), as well as along two planned north-south trails and Pirate's Cove Beach. MEC clearance was not necessary along the main road because in 2007 the road was constructed with geotextile and 6-inch thick, aggregate, along with an embankment for drainage that extended up to 11 feet from the edge of the road. No MEC were identified during road construction.</p> <p>MEC clearance at the lighthouse area, parking area, and trails was performed to an approximate maximum depth of 1 foot bgs using a metal detector due to the shallow nature of the bedrock. Only non-munitions-related debris was found and removed from around the lighthouse and associated parking area, and no debris was identified along the trails. MEC clearance down to a maximum depth of 4 feet bgs (or to depth of water) was performed at the beaches. No MEC or MD were identified in these areas.</p>
NTCRA at the Southwest Beach	2015	<p>AN NTCRA (CH2M, 2015b) was completed in 2015 for MEC clearance at the Southwest Beach (Playa Novillo) down to a maximum depth of 4-feet bgs to facilitate future public access to the beach. No MEC or MD were identified.</p>
NTCRA at UXO 15 PI 9 East and Adjacent UXO 16 Encrusted Munitions	2017-2019	<p>An NTCRA (USAE, 2019) was completed in 2018 to reduce potential explosive hazards by removing the encrusted munitions-related items identified at PI 9 East in UXO 15 and within UXO 16 (underwater area) immediately adjacent to PI 9 East. A temporary cofferdam was installed to dewater the area and a remote excavator was used to remove the encrusted munitions-related items. Approximately 900 MD items were removed, but no MEC were encountered. In addition, Hurricane Maria severely impacted Playa Berdiales Faro and the surrounding area in 2017. An MEC inspection using a magnetometer was conducted at the public use areas at UXO 15 following the hurricane and no MEC or MD were identified.</p>

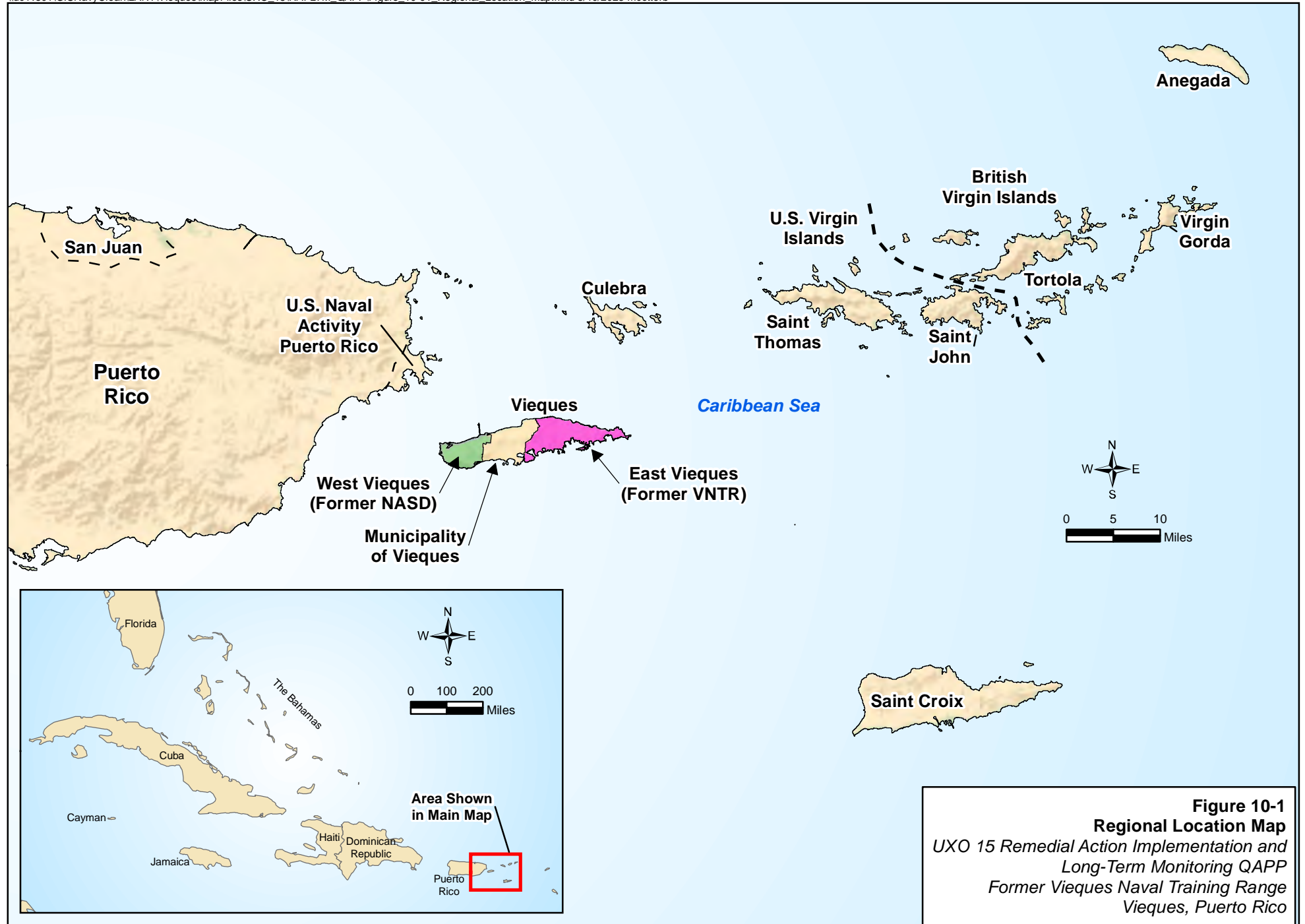
TABLE 10-2**UXO 15 Conceptual Site Model***UXO 15 Remedial Action Implementation and Long-Term Monitoring QAPP**Former Vieques Naval Training Range**Vieques, Puerto Rico*

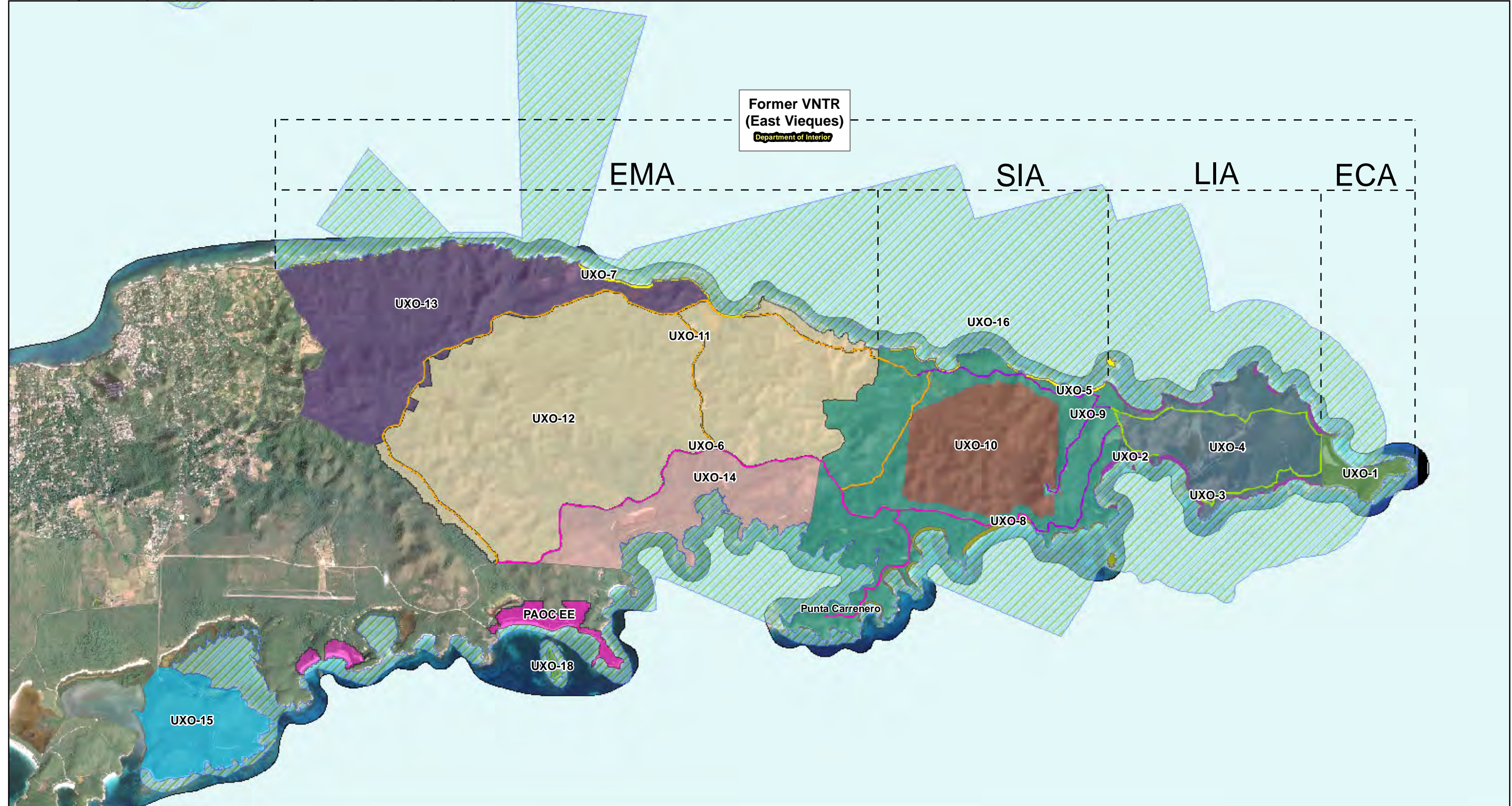
UXO 15 Conceptual Site Model - Description and Munition Items Summary			
Description and Historical Site Use	UXO 15 is approximately 536 acres and comprises the Puerto Ferro peninsula in the southwestern portion of the EMA. UXO 15 was primarily used for temporary ordnance storage, transport, and loading/offloading in support of military training activities.		
Munitions Items Summary	Encountered and Known MEC Items	Potential Additional MEC Items (Based on previous MD Encounters)¹	
	Grenades (40-mm projected grenade, Mk25 tear gas hand grenade)	Projectiles (105-mm) Rocket (3.5-inch)	
Receptors and Exposure Pathways	Current and Future Anticipated Receptors	Anticipated Exposure Pathways	Anticipated Exposure Medium (Soil)
	USFWS Workers	Potential MEC encounter during public use area maintenance	Primarily surface, but conservatively including shallow subsurface defined as the top 12 inches
	Public Recreational Users (hikers, bicyclists, land crabbers, etc.)	Potential MEC encounter during recreational or trespassing activities	Primarily surface, but conservatively including shallow subsurface defined as the top 12 inches
	Trespassers		

¹ Potential Small Arms Ammunition include 50 caliber casings and recoilless rifle cartridges

TABLE 10-3**UXO 15 MEC Findings***UXO 15 Remedial Action Implementation and Long-Term Monitoring QAPP**Former Vieques Naval Training Range**Vieques, Puerto Rico*

Item Group	ERA/SI (2010)		NTCRAs - Beaches, Roads and		2018 NTCRA - PI 9 East (2018)		RI (2012 - 2018)		Totals
	Number of Items	General Types of Items Identified	Number of Items	General Types of Items Identified	Number of Items	General Types of Items Identified	Number of Items	General Types of Items Identified	
MEC	0	-	0	-	0	-	2	40-mm Projected Grenade, Mk25 CS tear gas hand Grenade	2
MD	33	106-mm projectile cartridge casing, recoilless rifle cartridge cases, 105-mm casings, M241 container, 50 cal. casing, super sonic target, prop charge can	0	-	653	Metal debris including munitions casings	85	Metal debris including (2) 106-mm cartridge case, 3.5-inch rocket fragments, recoilless rifle cartridge cases, and base plate	771
RRD	26	Metal debris, 55-gal drums, metal pallets, corrugated metal, comm wire, metal pipes, fence posts	822	Non-munitions metal debris	193	Non-munitions metal debris	109	Metal debris including fence posts, steel wire, steel bar, metal pallets, shipping container, sheet metal, comm wire	1150
CD	0	-	18	General trash	0	-	299	non-munitions related debris	317
TOTALS	59	-	840	-	846	-	495	-	2,240





- Legend**
- UXO 1 - ECA
 - UXO 2 - LIA Beaches
 - UXO 3 - LIA Roads
 - UXO 4 - LIA Interior
 - UXO 5 - SIA Restricted Roads
 - UXO 6 - EMA/SIA Planned Public Roads
 - UXO 7 - EMA/SIA North Beaches
 - UXO 8 - SIA South Beaches
 - UXO 9 - SIA Exterior
 - UXO 10 - SIA Interior
 - UXO 11 - EMA Planned Public Roads
 - UXO 12 - EMA Interior
 - UXO 13 - EMA West
 - UXO 14 - EMA South
 - UXO 15 - Puerto Ferro (Expanded Site Inspection)
 - UXO 16 - Underwater Areas
 - UXO 17 - Public Use Beaches
 - UXO 18 - Cayo de la Chiva

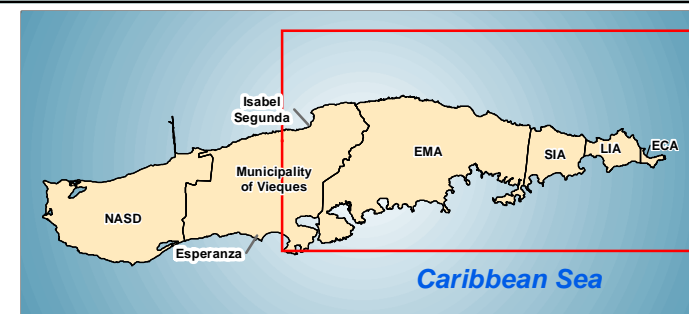
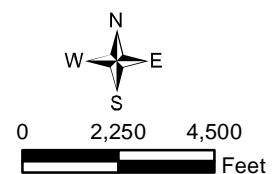
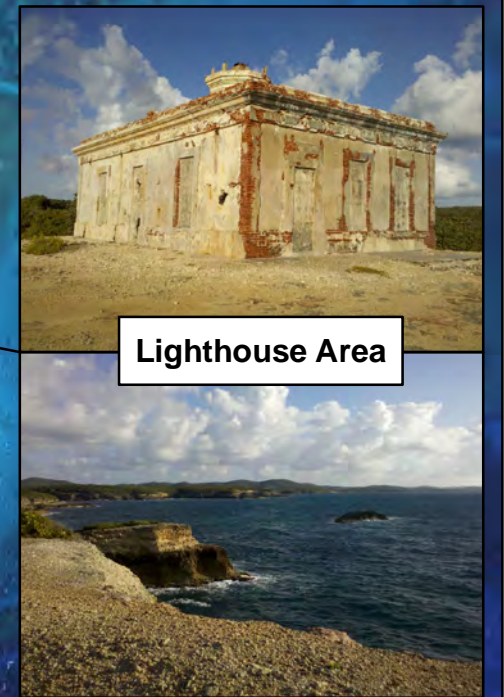


Figure 10-2
Former VNTR Site Map
 UXO 15 Remedial Action Implementation
 and Long-Term Monitoring QAPP
 Former Vieques Naval Training Range
 Vieques, Puerto Rico



Legend

- UXO 15
- Elevation Contour (10 ft Interval)



0 375 750
Feet

2007 Aerial Imagery

Figure 10-3
UXO 15 Site Features
UXO 15 Remedial Action Implementation and Long-Term Monitoring QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico



Legend

- UXO 15
- Current Multi-Purpose Road/Trail
- Planned Multi-Purpose Road/Trail
- Planned Trail
- Planned Land Crabbing Area

Planned Land Use

- Bicycle riding road/trail
- Fishing
- Hiking
- Horseback riding road/trail
- Kayaking
- Land Crabbing
- Lighthouse

Icons

- Parking
- Photography
- Snorkeling
- Surfing
- Swimming
- Vehicle use on road
- Wildlife viewing

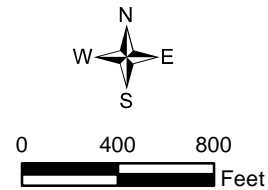


Figure 10-4
USFWS Planned Land Use
UXO 15 Remedial Action Implementation
and Long-Term Monitoring QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico



Imagery Source: ESRI Online Map Service, Maxar 2014/2021.

- Legend**
- Items Found**
- ★ MEC
 - MD
 - UXO 15
 - PI Areas
 - Current Multi-Purpose Road/Trail
 - Planned Multi-Purpose Road/Trail
 - Planned Trail

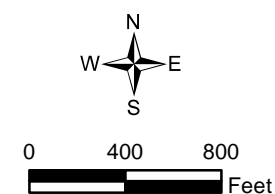


Figure 10-5
UXO 15 MEC/MD Findings
UXO 15 Remedial Action Implementation
and Long-Term Monitoring QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

Worksheet #11: Data Quality Objectives

This worksheet documents the Data Quality Objectives (DQOs) based on the EPA seven-step DQO process (EPA, 2006). As detailed in the ROD (NAVFAC, 2023), the following RAOs were developed to be protective of current, potential future, and hypothetical receptors, in accordance with the current and planned land use for UXO 15:

- Reduce the risk of exposure to potential munitions-related explosive hazards to be consistent with current and anticipated future land use identified by USFWS in accordance with its Comprehensive Conservation Plan (CCP) and as set forth in Public Law 106-398, as amended by Public Law 107-107, which requires the land containing UXO 15, among other sites, to be managed by USFWS as a National Wildlife Refuge.
- Reduce or prevent the potential for unauthorized access to portions of UXO 15.

To address these RAOs, Alternative 2 – Surface MEC Removal in Planned Public Use Areas and Land Use Controls was the selected remedy. This alternative consists of surface MEC clearance within areas identified for land use, LUC implementation, and MEC and LUC monitoring to ensure the appropriate level of protectiveness is maintained. Because of the relatively straightforward nature of LUC implementation and monitoring, they are addressed in the UXO 15 RAWP (Sections 3.2.1 and 3.2.2); this QAPP provides the specific tasks and associated quality assurance elements of the surface MEC clearance and MEC monitoring. Worksheet #11 has been subdivided into the following worksheets:

- Worksheet #11-1: DQOs for Surface MEC Clearance
- Worksheet #11-2: DQOs for MEC Monitoring

Worksheet #11-1: Project/Data Quality Objectives – Surface MEC Clearance

This worksheet documents the DQOs for surface MEC clearance within UXO 15 based on the EPA seven-step DQO process (EPA, 2006).

DQO Step	Description
Step 1 State the Problem	Although only two MEC items (one tear gas grenade and one 40-millimeter [mm] grenade) were encountered and removed from UXO 15, it is possible MEC/MPPEH (and therefore an explosive hazard) are present within areas of UXO 15 identified by USFWS for public use in its step-down land use plan. Therefore, MEC clearance and LUC implementation are warranted to address explosive hazards associated with planned land use.
Step 2 Identify the Goal	<p>Goal: The primary goal of the UXO 15 remedial action is to reduce the risk of exposure to potential munitions-related explosive hazards to be consistent with current and anticipated future land use identified by USFWS. The goal is to be accomplished by identifying and removing MEC/MPPEH from the surface, which is the potential receptor exposure interval, in planned land use areas identified by USFWS that have not already been addressed as part of historical removal actions.</p> <p>Principal Study Question(s): (1) Have surface MEC/MPPEH been removed? (2) Did the MEC clearance adequately contribute to the goal of reducing explosive hazards within the planned use areas in UXO 15? While the term “adequately” is subjective, for the purpose of the MEC clearance, the measure of adequacy will be the achievement of the associated QA/QC metrics.</p> <p>Alternative Outcomes: Based on the Principal Study Questions the potential outcomes are:</p> <ul style="list-style-type: none"> • MEC is not found on the ground surface. • MEC is found on the ground surface and removed. • Anomalies are not detected and no intrusive investigations are warranted. • Anomalies are detected and: <ul style="list-style-type: none"> – Removed if detected within the maximum removal depth (i.e., 12 inches bgs). – Not removed if the source is determined to be below the maximum removal depth, as described previously. Anomalies determined to be below the maximum removal depth will be documented as such and left in place. – The surface MEC clearance adequately contributed to the goal of reducing potential explosive hazards within the planned use areas in UXO 15. – The surface MEC clearance did not adequately contribute to the goal of reducing potential explosive hazards within the planned use areas in UXO 15.

Worksheet #11-1: Project/Data Quality Objectives – Surface MEC Clearance (continued)

DQO Step	Description
	<p>How Data will be Used in Solving the Problem: An instrument-aided visual survey will be conducted to locate and remove MEC and any other metallic items from the ground surface to reduce explosive hazards. Concurrently, the instrumented-aided survey will be conducted to locate and remove metallic anomalies within the maximum removal depth interval (i.e., 12-inches bgs).</p>
<p>Step 3 Identify Information Inputs</p>	<p>The information inputs to the decision rules include:</p> <ul style="list-style-type: none"> • CSM (Worksheet #10, Table 10-2), including planned land use areas that have not previously undergone MEC clearance (Figure 11-1) and information gathered during previous investigations and removal actions • Types of munitions previously removed and potentially present at UXO 15 (Table 10-2) • Observed site conditions during remedial action implementation (any site conditions that deviate from or impact the CSM may be used to support the data usability assessment) • The horizontal and vertical boundaries for the MEC clearance area • Defensible data collected by instrument-aided (e.g., all-metals detector in which detection is defined as an audible signal) visual survey during surface MEC clearance (see Step 5) • Items removed from the ground surface and intrusive investigation results, including: <ul style="list-style-type: none"> – Items recovered, including results of each dig (entered into database) – Photographs – Disposal records • Applicable Reports (see Worksheet #14 & 16)
<p>Step 4 Define Project Boundaries</p>	<p>Target Population: The target population includes any MEC identified or may be present at the site based on historical military training activities and past findings within UXO 15 (Table 10-2).</p> <p>Spatial and temporal boundaries: Spatial boundaries include both the horizontal (lateral) area and vertical depth established for the MEC clearance area. Establishing the spatial boundary considers: (1) the horizontal extents and vertical distribution of MEC present within the MEC clearance area, and (2) the anticipated areas and depths of potential exposure.</p> <p><u>Horizontal Boundaries:</u> The conceptualized horizontal boundaries of the planned land use areas that have not previously undergone MEC clearance are shown on Figure 11-1; however, all boundaries are approximate and final boundaries will be established as part of the LUC survey and documented in the Remedial Action Completion Report (RACR). Access to other areas (i.e., non-road/trail areas) will be discouraged by LUCs and monitored as part of LTM as detailed in the RAWP. The approximate horizontal boundaries of each planned land use area that has not previously undergone MEC clearance are as follows (actual boundaries cleared will be recorded):</p>

Worksheet #11-1: Project/Data Quality Objectives – Surface MEC Clearance (continued)

DQO Step	Description
	<ul style="list-style-type: none"> Trail – The trail width will be up to approximately 5-feet wide along the lengths shown in Figure 11-1. Multipurpose Road/Trail – The multipurpose road/trail width will be approximately 10-feet wide along the length shown in Figure 11-1. Land Crabbing Area – The approximate area shown in Figure 11-1 (USFWS to provide the actual area for clearance). <p><u>Vertical Boundaries:</u> The vertical boundary of the surface MEC clearance for each planned land use area has been established based on current and reasonably anticipated future land use (i.e., exposure depths). The maximum depths of MEC clearance were derived based on the following:</p> <ul style="list-style-type: none"> Planned land use areas (i.e., land crabbing area, multipurpose road/trail and trail) that were not previously cleared. <p>While the exposure medium based on planned land use is the ground surface, as a conservative measure to account for such things as potential erosion and road/trail maintenance, the maximum depth of intrusive investigation for each area is 12 inches bgs or to bedrock (whichever is shallower). If bedrock is encountered during intrusive investigations prior to the maximum removal depth of 12 inches bgs, the removal objective will be satisfied as UXO is unlikely to have penetrated bedrock nor will foreseeable maintenance activities extend into the bedrock. While unlikely, if the water table is encountered during intrusive investigations prior to the maximum removal depth (i.e., a “water hole”), removal activities will cease for safety reasons as water intrusion into the hole reduces visibility of the item. In the event of a water hole, additional evaluation including, but not limited to, location-specific evaluation of exposure potential will occur and a determination will be made if the location can/should be further investigated using remote-controlled excavation techniques or whether the depth of intrusive investigation reached before encountering water effectively satisfies the removal objective. All limitations and their potential impact on planned land uses and associated operations and maintenance will be documented in the UXO 15 RACR.</p> <p><u>Temporal Boundaries:</u> There are no substantial temporal boundaries that are anticipated to impact remedial action implementation.</p>
<p>Step 5</p> <p>Develop the Project Data Collection and Analysis Approach</p>	<p>The technical approach for the surface MEC clearance at the planned land use areas is as follows. Worksheet #17-1 presents specific tasks to be performed in more detail.</p> <p><u>Surface MEC Clearance:</u></p> <p>The technical approach for surface MEC clearance includes an instrument-aided visual survey to identify and remove MEC/MPPEH.</p> <p><u>Parameters of interest:</u> MEC/MPPEH located on the ground surface or identified within the maximum removal depth interval. With respect to items below the ground surface, identification is defined as producing an audible output, metal deflection, and/or numeric output indicating the presence of a metallic object.</p> <p><u>Assumptions:</u> MEC/MPPEH (if present) are randomly distributed across the areas.</p> <p><u>Decision Rules for MEC Clearance:</u></p>

Worksheet #11-1: Project/Data Quality Objectives – Surface MEC Clearance (continued)

DQO Step	Description
	<p>IF MEC and/or munitions-related item(s) are encountered, THEN they will be removed, which will reduce the explosive hazard if determined to be MEC and the MEC clearance objective in that area will have been achieved if QA/QC metrics have been achieved.</p> <p>IF no MEC and/or munitions-related item(s) are found and metallic anomalies are not detected in the maximum depth removal interval or they are detected and removed but confirmed not to be MEC, THEN it will be concluded MEC are not likely present and the MEC clearance objective in that area will have been achieved if QC/QA metrics have been achieved.</p>
Step 6 Specify Project-specific MPCs	Worksheet #12-1 presents the project-specific Measurement Performance Criteria (MPCs) for the MEC clearance for the planned land use areas that have not previously undergone MEC clearance. Project-specific MPCs are the criteria that collected data must meet to satisfy the DQOs. Failure to achieve the MPCs may have an impact on the end uses of the data, which will be discussed in the Data Usability Assessment (DUA), as discussed in Worksheet #37-1.
Step 7 Survey Design and Project Workflow	The MPCs established during Step 6 of the DQO process (documented in Worksheet #12-1) were used to develop the MEC clearance approach for the planned land use areas that have not previously undergone MEC clearance, which is described in Worksheet #17-1. The approach is broken down into a series of specific processes and data collection steps, termed definable features of work (DFWs). Figure 17-1 provides the decision tree that will be used in the execution of the MEC clearance to evaluate the conformance of the specific DFws to established MPCs.

Worksheet #11-2: Data Quality Objectives – MEC Monitoring

This worksheet documents the DQOs for MEC monitoring within UXO 15 based on the EPA seven-step DQO process (EPA, 2006).

DQO Step	Description
Step 1 State the Problem	As detailed in Worksheet #11-1, a surface MEC clearance will be conducted to address explosive hazards within planned land use areas identified by USFWS in their step-down land use plan that have not previously undergone MEC clearance; however, it is possible that MEC items will become exposed in land use areas via erosion or other means and trespassers may access restricted areas. Therefore, MEC monitoring is warranted to address explosive hazards that may appear over time or may be present in restricted areas identified as being accessed by trespassers.
Step 2 Identify the Goal	<p>Goal: The goal of the UXO 15 remedial action is to reduce and/or prevent the explosive hazards associated with land use areas. The goal of the MEC monitoring is to identify and remove MEC within actual land use areas to help ensure the remedy remains protective over time, thereby contributing to achieving the overall remedial action goal.</p> <p>Principal Study Question(s): (1) Are MEC/MPPEH present on the ground surface in designated land use areas and/or in restricted areas identified as being accessed by trespassers in UXO 15? (2) Does MEC monitoring (together with LUC monitoring) demonstrate the remedial action remains protective?</p> <p>Alternative Outcomes: Based on the Principal Study Questions the potential outcomes are:</p> <ul style="list-style-type: none"> • MEC/MPPEH is not found on the ground surface • MEC/MPPEH is found on the ground surface and removed • Evidence of trespassing is not observed • Evidence of trespassing is observed (e.g., establishment of new trails) and the observed trespassing areas are investigated for MEC/MPPEH and MEC/MPPEH is either found or not found on the ground surface • MEC monitoring (coupled with LUC monitoring) demonstrates the remedial action remains protective • MEC monitoring (coupled with LUC monitoring) does not demonstrate the remedial action remains protective <p>Should USFWS decide not to retain certain areas as public-use areas or maintain them to support public access, LUC/MEC monitoring will be discontinued in these locations, except in areas where continued access is evident (e.g., trespassing).</p>

Worksheet #11-2: Data Quality Objectives – MEC Monitoring (continued)

DQO Step	Description
	<p>How data will be used to solve the problem: Upon completion of the surface MEC clearance, MEC monitoring as part of an LUC monitoring program comprising analog instrument-aided visual surveys conducted periodically (annually and after named tropical storms/hurricanes affecting the island in a manner that may threaten remedy protectiveness or in areas of UXO 15 affected by a fire). The instrument-aided visual survey will be conducted to locate and remove MEC from the ground surface (or protruding from the surface) within land use areas being maintained as accessible by USFWS, areas observed to be indicative of trespassing (e.g., unauthorized trail), or accessible areas otherwise established (e.g., via fire) that may threaten remedy protectiveness to ensure the remedy remains protective. If additional or modified LUCs are recommended based on observations made during MEC/LUC monitoring, the recommendations, including the responsible entity, will be made in accordance with LUC monitoring and maintenance protocol and reporting, as provided in Sections 3 and 4 of the RAWP.</p>
<p>Step 3 Identify Information Inputs</p>	<p>The information inputs to the decision rules include:</p> <ul style="list-style-type: none"> • CSM (Worksheet #10, Table 10-2 and Figure 10-4), which includes the planned land use areas as identified by USFWS, modified as applicable with information gathered during remedial action implementation • Types of munitions previously removed and potentially present at UXO 15 (Worksheet #10, Table 10-2), updated to include the types of munitions encountered during the surface MEC clearance • Defensible data collected by analog instrument-aided visual survey during monitoring activities • MEC monitoring results
<p>Step 4 Define Spatial and Temporal Boundaries</p>	<p>Target Population: The target population includes any ordnance known to have been used or may be present at the site based on historical military training activities and past findings within UXO 15 (Table 10-2) and any additional ordnance information gathered during the surface and MEC clearance.</p> <p>Spatial and temporal boundaries: Spatial boundaries include lateral areas of land use and any restricted areas identified as being accessed by trespassers. The spatial boundaries of the planned land use areas are shown in Figure 11-1; however, the land use boundaries shown on figures are approximate and final boundaries will be defined as part of the LUC survey and documented in the RACR. For the MEC monitoring, the spatial boundaries will be based on the maintained and accessible portions of the surveyed boundaries. Access to restricted areas will be discouraged by LUCs and monitored as part of LTM as detailed in the RAWP; however, any area identified as being accessed by trespassers will be included in MEC monitoring. Given that the absence of access is itself sufficiently protective (i.e., there is no explosive hazard in places not being accessed due to the absence of potential contact), any area for which USFWS does not maintain for access will be protective and will not require vegetation cutting/clearing to make accessible for MEC monitoring.</p> <p>The vertical boundary will be the ground surface (including partially buried items protruding from the surface) because the objective for MEC monitoring is to determine if any MEC has become exposed or otherwise present on the ground surface; it is not to re-perform MEC clearance activities. Therefore, subsurface anomaly detection and intrusive investigation are not warranted nor included in MEC monitoring.</p>

Worksheet #11-2: Data Quality Objectives – MEC Monitoring (continued)

DQO Step	Description
	The temporal boundary for MEC monitoring will be annually and following impact from named tropical storms/hurricanes or fires determined to potentially threaten remedy protectiveness.
<p>Step 5</p> <p>Develop the Project Data Collection and Analysis Approach</p>	<p>The technical approach for MEC monitoring is as follows:</p> <p><u>MEC Monitoring:</u> The technical approach for MEC monitoring activities includes an analog instrument-aided visual survey to identify and remove MEC present on the surface or protruding from the surface. Additionally, it includes removal of MEC items reported by USFWS (including contractors), the public, and/or other entities. Worksheet #17-2 describes the specific tasks to be performed. MEC monitoring comprises periodic monitoring for MEC that may have become exposed in maintained, accessible land use areas (e.g., via erosion) and in restricted areas identified as being accessed by trespassers via creation of new trails or other accessed areas.</p> <p><u>Parameters of Interest:</u> Areas that can be accessed by the project team (i.e., vegetation or condition of structures do not preclude access), any new trails or other areas created by trespassers, areas of erosion capable of exposing munitions below the ground surface, and MEC items found during inspections or reported to the Navy by site users.</p> <p><u>Assumptions:</u> Areas meeting the access conditions described will be visually inspected (instrument-aided) for MEC items that may have become exposed or partially exposed at the surface. Areas determined not to be accessible to the project team at the time of the MEC monitoring will not be visually inspected, but lack of accessibility by the project team would also apply to potential users; therefore, protectiveness exists within inaccessible areas.</p> <p><u>Decision Rules:</u></p> <p>IF MEC is encountered, THEN it will be removed to reduce explosive hazards on the surface of the land use areas and any restricted areas being accessed as an element of ensuring the remedy remains protective.</p> <p>IF MEC is not encountered, THEN it will be concluded that there has been no MEC recurrence on the surface of the land use areas and/or no surficial MEC present within any restricted area being accessed.</p> <p>IF MEC is reported by USFWS workers (including contractors), the public, and/or other entity, THEN it will be inspected and removed (if necessary) to reduce the explosive hazard as an element of ensuring the remedy remains protective.</p> <p>IF the applicable QA/QC metrics have been achieved and MEC are not encountered or are removed as described previously, THEN it will be concluded MEC is not likely present on the ground surface in areas likely being accessed and the MEC monitoring has demonstrated the remedial action remains protective (assuming results of LUC monitoring are consistent).</p>
<p>Step 6</p> <p>Specify Project-specific MPCs</p>	<p>Worksheet #12-2 presents the project-specific MPCs for MEC monitoring within land use areas and restricted areas being accessed. Project-specific MPCs are the criteria that collected data must meet to satisfy the DQOs. Failure to achieve the MPCs may have an impact on the end uses of the data, which will be discussed in the DUA, as discussed in Worksheet #37-1.</p>

Worksheet #11-2: Data Quality Objectives – MEC Monitoring (continued)

DQO Step	Description
Step 7 Survey Design and Project Workflow	The MPCs established during Step 6 of the DQO process (documented in Worksheet #12-2) were used to develop the MEC monitoring approach for the planned land use areas and restricted areas being accessed, which is described in Worksheet #17-2. The approach is broken down into a series of specific processes and data collection steps, termed DFWs. Figure 17-2 provides the decision tree that will be used in the execution of MEC monitoring to evaluate the conformance of the specific DFWs to established MPCs.

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Figure 11-1
MEC Clearance Areas and LUC Implementation
UXO 15 Remedial Action Implementation and Long-Term Monitoring QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico

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Worksheet #12-1: Measurement Performance Criteria – Surface MEC Clearance

This worksheet documents the project-specific MPCs in terms of Data Quality Indicators (DQIs) (that is, accuracy, sensitivity, representativeness, completeness, and comparability) for the UXO 15 MEC clearance component of the RAWP and associated QAPP. Accuracy, sensitivity, and completeness can be measured quantitatively. Representativeness and comparability can only be evaluated qualitatively. These MPC establish the minimum performance specifications that the UXO 15 MEC clearance must meet to ensure collected data will satisfy the DQOs documented in Steps 1-5 on Worksheet #11-1. They are the criteria against which the DUA will be conducted as documented on Worksheet #37. The DUA must evaluate and document the data quality and decision-making impacts of any failures to meet these criteria (Worksheet #37). The MPCs for the analog-based MEC clearance are established in Table 12-1. These MPCs were developed from the guidance provided in Uniform Federal Policy for Quality Assurance Project Plan Munitions Response QAPP Toolkit Module 2: Remedial Action (IDQTF, 2023) and tailored to be specific to the UXO 15 MEC clearance. The MPCs for the MEC Monitoring are provided in Table 12-2.

Table 12-1. Measurement Performance Criteria – Surface MEC Clearance

Measurement Performance Activity	Data Quality Indicator	Specification	Activity Used to Assess Performance
<i>Site Preparation</i>			
1) Accessibility	Completeness	The final horizontal boundaries of the MEC clearance areas will be confirmed by USFWS. Once identified, all MEC clearance areas will be assessed for accessibility for the planned activities and associated equipment. All areas inaccessible to the clearance team within the defined boundaries or other site features that may impact the MEC clearance are identified and documented.	Site visit (with USFWS) – Visually inspect the planned land use areas and associated defined removal area(s) and document inaccessible areas and rationale as to why the area(s) were determined to be inaccessible. As needed and if agreed upon by USFWS, land use (and associated clearance area) boundaries will be adjusted to minimize inaccessible areas and increase the likelihood of achieving remedial action objectives. Alternative, USFWS may perform additional vegetation cutting to make all planned use areas shown in yellow in Figure 11-1 accessible for MEC clearance.

Worksheet #12-1: Measurement Performance Criteria – Surface MEC Clearance (continued)

Table 12-1. Measurement Performance Criteria – Surface MEC Clearance

Measurement Performance Activity	Data Quality Indicator	Specification	Activity Used to Assess Performance
2) Site Removal Areas (boundary and control points)	Completeness	MEC clearance area boundaries will be flagged and staked as appropriate, with a Real Time Kinematic Global Positioning System (RTK-GPS). Areas where QC/QA is performed to confirm completeness will be recorded and documented in digital field forms. GPS equipment for surface MEC clearance will be verified at established control points once at the beginning of the day to ensure the equipment is functioning properly.	1) USAE UXOQCS will confirm that the boundaries are sufficiently flagged/staked and document this in the daily report. 2) GPS equipment will be verified at an established control point and verified to be within acceptable metrics prior to MEC monitoring activities (see Worksheet #22). If the observed coordinates are outside of the acceptable tolerance, the equipment will be checked and the control point re-surveyed. Defective equipment will be repaired or removed from service and replaced.
<i>Instrument Test Strip, QC Seeding, and Validation Seeding</i>			
3) Instrument Test Strip (ITS) Construction	Accuracy/Completeness	Seeds placed so that each analog instrument passes at least one seed item during ITS. Seed type, depth, and location accuracy recorded during placement.	Daily QC Report
4) ITS Testing	Sensitivity/Completeness	Analog equipment assembled correctly and functioning as designed. Detection threshold confirmed and tested daily with ITS seeds at depth of detection.	Daily QC Report

Worksheet #12-1: Measurement Performance Criteria – Surface MEC Clearance (continued)

Table 12-1. Measurement Performance Criteria – Surface MEC Clearance

Measurement Performance Activity	Data Quality Indicator	Specification	Activity Used to Assess Performance
5) QC Seeding ^a	a) Representativeness b) Completeness c) Sensitivity d) Accuracy	a) Blind QC seeds will be placed at the site. b, c) Blind QC seeds must be located throughout the horizontal boundaries defined in the DQOs. b, d) The blind seed plan must describe the number and types of blind QC seeds.	QC Seeding Report
6) Validation Seeding ^b	a) Representativeness b) Completeness c) Sensitivity d) Accuracy	a, b, c) Validation seeds will be placed at the site. b, c) Blind QA seeds must be located throughout the horizontal boundaries defined in the DQOs. b, d) The Validation Seed Plan must describe the number and types of blind validation seeds.	Validation Seeding Report
<i>Conduct Analog Surface MEC Clearance</i>			
7) Planned Survey Coverage	Completeness	Survey lanes are designed and located to have 3-to 5-feet spacing and cover the entire survey area. Survey lanes not applicable to land crabbing area, within which survey teams will perform surveying within the accessible area (i.e., areas not requiring vegetation cutting to access)	GPS or photographic documentation
8) Detection Threshold	Sensitivity	Detection of a small industry standard object (ISO) at 12 inches must be demonstrated in the ITS.	1) Initial and ongoing ITS surveys 2) Blind QC and validation seed detection 3) Periodic verification by USAE UXOQCS (or designee)

Worksheet #12-1: Measurement Performance Criteria – Surface MEC Clearance (continued)

Table 12-1. Measurement Performance Criteria – Surface MEC Clearance

Measurement Performance Activity	Data Quality Indicator	Specification	Activity Used to Assess Performance
9) Detection Survey	Accuracy/Completeness	100 percent of QC seeds detected and recovered.	1) QC Seed Database 2) Root Cause Analysis (RCA)/Corrective Action (CA) review and acceptance
10) Detection Survey	Accuracy/Completeness	100 percent of validation seeds detected and recovered.	1) Validation Seed Database 2) RCA/CA review and acceptance
11) Detection Survey Coverage	Representativeness/Completeness	100 percent of the accessible area is surveyed.	1) Seed recovery 2) USAE UXOQCS will conduct an instrument-aided QC verification survey of approximately 10 percent of the planned use area. QC procedures are detailed in Worksheet #17-1.
12) Intrusive Investigation	Accuracy	QC verification survey (or re-check) of approximately 10 percent of the planned use area.	QC Report
13) Intrusive Investigation	Completeness	Complete project-specific database with all intrusive records.	Project Database

^a The QC/QA seeding rates are detailed in Worksheet #17-1. Although the seeding rates may ultimately be slightly varied from the Intergovernmental Data Quality Task Force (IDQTF) Module 2 guidance for a Remedial Action, the QC/QA seeding rates are comparable to historical QC/QA seedings rates at Vieques and considered robust enough for the RAOs.

^b QA seedings rates are not presented for firewall purposes but may be assumed to generally follow the QC seeding rate.

Worksheet #12-2: Measurement Performance Criteria – MEC Monitoring

This worksheet documents the project-specific MPCs in terms of DQIs for the UXO 15 MEC monitoring components of the RAWP and associated QAPP.

Table 12-2. Measurement Performance Criteria – MEC Monitoring

Measurement Performance Activity	Data Quality Indicator	Specification	Activity Used to Assess Performance
<i>Site Preparation</i>			
1) Accessibility	Completeness	<p>The final horizontal boundaries of the planned MEC monitoring areas (i.e., actual land use areas) will be the same as the MEC clearance activities and any additional new trails or accessed areas observed to have been established by trespassers. Given that absence of access is itself sufficiently protective (i.e., there is no explosive hazard in places not being accessed due to the absence of potential contact), any area for which USFWS does not maintain for access will be protective and will not require vegetation cutting/clearing to make accessible for MEC monitoring.</p> <p>Areas determined to be inaccessible to the MEC monitoring team within the defined boundaries will not be visually inspected, but lack of accessibility by the project team would also apply to potential users; therefore, protectiveness exists within inaccessible areas. Therefore, the completeness goal applies to accessible areas and not the planned MEC monitoring areas unless all areas are accessible.</p>	Completion of LUC Checklist (see RAWP, Appendix B). Document inaccessible areas and rationale as to why the area(s) were determined to be inaccessible.
2) Site Control	Completeness/ Accuracy/Precision	GPS equipment for MEC monitoring activities will be verified at an established control point once at the beginning of the day to ensure the equipment is functioning properly.	GPS equipment will be verified at an established control point and verified to be within acceptable metrics prior to MEC monitoring activities (see Worksheet #22). If the observed coordinates are outside of the acceptable tolerance, the equipment will be checked and the control point re-surveyed. Defective equipment will be repaired or removed from service and replaced.

Worksheet #12-2: Measurement Performance Criteria – MEC Monitoring (continued)

Table 12-2. Measurement Performance Criteria – MEC Monitoring

Measurement Performance Activity	Data Quality Indicator	Specification	Activity Used to Assess Performance
<i>Instrument Test Strip</i>			
3) ITS Construction	Accuracy/Completeness	Seeds placed on the ground surface so that each analog instrument passes at least one seed item at the ITS. Seed type and location accuracy recorded during placement.	Daily QC Report
4) ITS Testing	Sensitivity/Completeness	Analog equipment assembled correctly and functioning as designed. Detection threshold confirmed and tested daily with ITS seeds.	Daily QC Report
<i>MEC Removal</i>			
5) Removal of MEC Items Encountered or Reported	Completeness	Removal of MEC items encountered during inspections activities and/or reported by the public, USFWS, or other entity.	MEC removal will be considered complete when the USAE UXOQCS confirms any MEC item found is no longer present on the ground surface within the MEC inspection areas or where specifically reported. Confirmation methodology will consist of an instrumented-aided visual survey.

Worksheet #14 & 16: Remedial Action Project Tasks & Schedule

DFW	Activity	Responsible Party	Planned Start Date ^a	Planned Completion Date ^a	Deliverable(s) ^b	Deliverable Due Date
1	Pre-mobilization Activities	Remedial Action Implementation Contractor QA and LTM Contractor	Estimated Fall 2023	TBD	1) Explosives Safety Submission (ESS) 2) QAPP (interagency decision point) 3) Notification to interagency team denoting anticipated start date 4) QC Seeding Firewall Plan 5) QC Seed Plan 6) Validation Seeding Firewall Plan 7) Validation Seeding Plan	Documents accepted/ approved prior to field mobilization
2	Mobilization	Remedial Action Implementation Contractor QA and LTM Contractor	Estimated March 2024	TBD	Daily Report	Daily
3	Site Preparations	Remedial Action Implementation Contractor QA and LTM Contractor	Estimated March 2024	TBD	1) Daily Report 2) USFWS approved land use area boundaries	Daily
4	ITS Construction	Remedial Action Implementation Contractor	Estimated March 2024	TBD	Daily Report	24 hours following completion
5	QC Seeding	Remedial Action Implementation Contractor	Estimated March 2024	TBD	1) Daily Report 2) QC Seeding Report	1) Daily 2) 15 days following completion
6	Validation Seeding	QA and LTM Contractor	Estimated March 2024	TBD	Validation Seeding Report	15 days following completion

Worksheet #14 & 16: Remedial Action Project Tasks & Schedule (continued)

DFW	Activity	Responsible Party	Planned Start Date ^a	Planned Completion Date ^a	Deliverable(s) ^b	Deliverable Due Date
7	MEC Clearance	Remedial Action Implementation Contractor	Estimated March 2024	TBD	1) Daily Report 2) Munitions Response Program Enterprise Database (for all MEC items)	1) Daily 2) 15 days following completion
8	Conduct MEC/MPPEH Handling and Disposal	Remedial Action Implementation Contractor	Estimated March 2024	TBD	Disposal Records (in accordance with Master Munitions Work Plan)	Within 30 days of completing intrusive investigations for each survey area
9	Conduct Final DUA	Remedial Action Implementation Contractor QA and LTM Contractor	Estimated 2024	TBD	1) DUA Report 2) Final CSM (as applicable)	1) Within 30 days of completing all RA activities 2) Within 30 days of completing all RA activities
10	Demobilization	Remedial Action Implementation Contractor	Estimated May 2024	TBD	Daily Report	daily
11	UXO 15 RACR	QA and LTM Contractor	Estimated 2024	TBD	UXO 15 RACR (interagency decision point)	Draft UXO 15 RACR delivered to Navy within 90 days of project completion
12	MEC and LUC Monitoring	QA and LTM Contractor	Estimated 2025	TBD	1) Daily Report 2) Checklists	Daily
13	Annual Status Report and Five-Year Review Report	QA and LTM Contractor	Estimated Spring 2025	TBD	1) Annual Status Report with completed Checklist 2) Five-Year Review Report	In accordance with Site Management Plan for the applicable year

Worksheet #14 & 16: Remedial Action Project Tasks & Schedule (continued)

DFW	Activity	Responsible Party	Planned Start Date ^a	Planned Completion Date ^a	Deliverable(s) ^b	Deliverable Due Date
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^a All TBD dates will be communicated once the actual dates are determined. With respect to MEC and LUC monitoring and associated reporting, these activities will continue indefinitely in accordance with the UXO 15 ROD and as defined in Section 3 of the UXO 15 RAWP. Termination or changes to LUCs and/or MEC and LUC monitoring and reporting, if warranted, will be with the concurrence of EPA and PRDNER.

^b The QAPP and the UXO 15 RACR will be provided for regulatory review and represent interagency decision points. All other various deliverables, such as technical memoranda, data usability assessment reports, data packages, etc., generated during the RAWP are interim and will not be provided separately, but instead included in the UXO 15 RACR.

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Worksheet #17: Survey/Sampling Design, Rationale, and Project Workflow

This worksheet documents the survey/sampling design, rationale, and project workflow for the surface MEC clearance and MEC monitoring components of the RAWP described in Worksheet #11. Like Worksheet #11, Worksheet #17 has been subdivided into the following worksheets:

- Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance
- Worksheet #17-2: Survey Design and Project Workflow for MEC Monitoring

Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance

This worksheet provides descriptions for each DFW associated with the MEC clearance for the planned land use areas within UXO 15 that have not previously undergone MEC clearance. It highlights the MEC clearance activities, inspection/oversight activities, QC/QA components, key deliverables, and decision points, as identified in Worksheet #14 & 16. Figure 17-1 provides the decision tree associated with these tasks.

DFW 1: Pre-mobilization Activities

Pre-mobilization activities include preparation of the various plans (including this QAPP) and establishing data collection protocol in advance of mobilization.

Planning Documents: In addition to and as part of this QAPP, the following relevant planning documents for implementation of the remedial action will be completed prior to mobilization:

- ESS – The existing ESS for the former VNTR will be utilized for this effort or a new one prepared if necessary.
- RAWP (including this QAPP) – Interagency decision point for concurrence on remedial action implementation and monitoring.
- QC and QA Documents – As part of this QAPP, the following QC and QA documents will be prepared under separate cover:
 - QC Seeding Firewall Plan
 - QC Seed Plan
 - Validation (QA) Firewall Plan
 - Validation (QA) Seed Plan

Standard Operating Procedures (SOPs): It is important to note that each contractor will operate under their own SOPs, but if there is a conflict between a particular element(s) of contractor-specific SOPs and this QAPP (and associated RAWP), the applicable element(s) of this QAPP and associated RAWP take precedence.

- Attachment A includes the Remedial Action Implementation Contractors SOPs
- Attachment B includes the QA and LTM Contractor SOPs and guidance procedures. Note: CH2M is a wholly-owned subsidiary of Jacobs. As such, SOPs displaying the Jacobs designation are equally applicable to CH2M.

Geographical Information System: A sitewide GIS database has been previously established for the former VNTR, and relevant geospatial-related data will be managed in the GIS database. The database can use and export Environmental Systems Research Institute, Inc. compliant formats (shape files, coverages, or geodatabases) to present GIS data during the project, with supporting tabular data provided in Microsoft Excel and/or Microsoft Access. In addition, each GIS dataset is accompanied by metadata conforming to Federal Geographic Data Committee's (FGDC's) Content Standard for Digital Geospatial Metadata and will be provided in a geodatabase that is compliant with the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) (Version 4.0).

Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance (continued)

Surveying and Mapping Standards: The FGDC's Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, and Construction and Facility Management, and the FGDC's Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy will be used for any point positioning such as GPS. Unless otherwise noted, horizontal control work will meet or exceed the Third Order, Class I specification or better, as outlined in the FGDC Geospatial Positioning Accuracy Standards, Part 4: Standards for Architecture, Engineering, and Construction and Facility Management. If RTK-GPS (e.g., Trimble R10) is used, horizontal measurements will be repeatable to ± 50 centimeters (cm) accuracy for control work. Survey data will be correlated with navigational data based upon a local "third-order" (1:5,000) monument or survey marker. Survey data will be provided in Universal Transverse Mercator (UTM), Zone 20 North, and units of meters.

Unless otherwise noted, all horizontal control work will be tied to the historic control at Observation Post 1, which is referenced to the 1997 North American Datum of 1983 (NAD83) horizontal datum and North American Vertical Datum (NAVD) 1929.

Control Points: The location, identification, coordinates, and elevations of control points that are recovered and/or established at the site will be plotted on one or more site maps. Each control point will be identified on the map by its name and number and the final adjusted coordinates. Control points include reference benchmarks as well as QC check points to verify and back-check GPS accuracy.

Digital Data: Geospatial data will conform to SDSFIE and will be provided in metric units. Location information will be collected for survey work so the position of each anomaly can be managed and presented within the GIS environment.

Data Management Systems:

Survey123 (Geophysical Data Management Collector): Survey123 is a field data gathering solution that is part of the ArcGIS platform. Survey123 will be utilized for data management. Within Survey123, forms (or surveys) are completed by the field team using an application on a tablet or computer in pre-authored forms that utilize various drop-down menus. Once completed, forms are submitted directly to ArcGIS online, where they can be viewed and analyzed. The uploaded information will be verified by QA personnel.

It is assumed that each removal area or closely spaced removal areas will be defined as its/their own gridblock where a gridblock is defined as a survey unit that will be managed as a single entity for data management and tracking purposes. Gridblocks representing a defined survey unit will be assigned a series of forms representing each phase of work in Survey123. The use of these gridblocks will allow field teams to readily manage data collection, production progress, and ensure that the survey areas are clearly defined and identifiable. Additionally, the use of defined gridblocks will allow for easy transition through the stages of work from fieldwork, to QC review, and finally to QA review and facilitate acceptance and approval for all aspects of the MEC clearance. Note that a gridblock will be defined by the lateral extents of an individual removal area, entire individual grids or portions of grids may make up a gridblock.

Munitions Response Program Enterprise (MEC Database): The Navy Comprehensive Long-term Environmental Action, Navy (CLEAN) Vieques Munitions Response Program (MRP) Enterprise system for recording field notes and other pertinent information collected/noted during intrusive field operations will be utilized for MEC clearance documentation. Information is entered in a forms-based operating system by field personnel and uploaded by QC personnel. The uploaded information will be verified by QA personnel.

Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance (continued)

Documentation: QAPP, ESS, QC Seed Plan, QC Seeding Firewall Plan, Validation Seed Plan, Validation Seed Firewall Plan, Operational Readiness Checklist

Decision Points: The key decision point in the pre-mobilization process are interagency team decisions made through the RAWP (and this QAPP) review process that will culminate in the final approved version of the RAWP (and this QAPP). Upon approval, a start date will be determined and communicated to the interagency team.

DFW 2: Mobilization

Prior to the commencement of the fieldwork, the key project staff will meet to ensure all necessary equipment, tools, and safety items have been collected and are ready to shipment. Additionally, key project staff will meet to ensure full understanding of the objectives and scope for the remedial actions and all necessary training to complete the field work in accordance with the RAWP (including this QAPP). The following general activities will be performed as part of mobilization:

1. Identify/procure, package, ship, and inventory project field equipment
2. Verify emergency communication protocols and procedures
3. Determine field operations schedule and coordinate any logistical support (e.g., USFWS)
4. Test and inspect equipment (see Worksheet #22 for details)
5. Assemble and transport the work force
6. Verify that forms and project documentation are in order, and that field project personnel understand their responsibilities regarding data collection and documentation requirements

As part of the mobilization efforts, a kickoff and site safety meeting will be conducted. This meeting will include a review of the field-related elements of the RAWP (and this QAPP). Additionally, it will include a review and acknowledgement of Health and Safety Plans by site personnel. Additional project and safety meetings will occur as needed, and as new personnel or visitors arrive at the site.

Documentation: Daily Report

Decision Points: Key decision points during mobilization activities include: (1) Has all equipment required to support removal actions arrived onsite? (2) Is the equipment free of damage and working as expected?

DFW 3: Site Preparations

Site Control

After mobilization but prior to the start of MEC clearance activities, a review of the established benchmarks and site control points will be performed. GPS data and coordinates will be referenced to UTM Zone 20N, NAD83 Continental United States (CONUS) (i.e., no local datum transform applied). GPS function tests (i.e., daily position tests) on established benchmark(s) or control point(s) will be performed at the start of each day of utilization to ensure GPS accuracy and adherence to the Measurement Quality Objectives (MQOs) (see Worksheet #22) for data usability. As needed, work crews will stake the site boundaries for operational purposes based on the established sitewide VNTR grid network.

Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance (continued)

Coordination with USFWS for Planned Land Use Areas

Prior to the remedial action implementation, it is assumed the USFWS will provide formal concurrence/documentation of the boundaries to be established for the planned land use areas that will undergo MEC clearance in accordance with this QAPP.

Vegetation Cutting

With the exception of the land crabbing area, vegetation cutting activities will be performed as necessary to facilitate MEC clearance activities within the UXO 15 planned land use areas as discussed/described in Worksheet #11-1 and defined by the boundaries established as part of DFW 3. As has been done for MEC clearance at land crabbing areas in other UXO sites, MEC clearance in land crabbing areas is performed in areas accessible to the clearance team without having to cut vegetation as cutting vegetation may alter the habitat. Further, this method of “meandering” through the land crab habitat simulates how land crabbers tend to utilize the area.

Vegetation cutting activities will be performed by the Remedial Action Implementation Contractor. The objective of the vegetation cutting is to cut and/or remove site vegetation in order to facilitate MEC clearance and may involve the utilization of mechanized equipment (e.g., backhoe) as well as hand-tools; however, vegetation cutting activities will be conducted in a manner consistent with appropriate ecological protectiveness measures.

Documentation: Daily Report

Decision Points: Formal concurrence/documentation of planned land use boundaries as noted under ‘Coordination with USFWS for Planned Land Use Areas’ is the initial decision point upon which subsequent points associated with site preparations are established. GPS function tests will be performed at the beginning of each day as needed. Measurements will be taken from an established benchmark(s) or control point(s). If the measured point does not meet the required accuracy (Worksheet #22), then the instrument will be adjusted (e.g., to provide better satellite coverage) and the point will be remeasured. Any malfunctioning equipment will be repaired or replaced.

DFW 4: Instrument Test Strip Construction

Instrument Test Strip Construction

Work crews will establish an ITS for UXO 15. The ITS will consist of two small ISOs (i.e., 1-inch by 4-inch) buried at two depths within the surface interval in a line approximately 10 feet apart in an anomaly-free area. The two small ISOs will be buried in a horizontal orientation at depths of 12- and 6- inches bgs (Table 17-1). Multiple ITSs may be established in for convenience.

Table 17-1. Planned ITS Seed Emplacement Summary

Seed Type	Depth of Burial	Orientation
Small ISO	12 inches	Horizontal
Small ISO	6 inches	Horizontal

Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance (continued)

All analog instrument(s) will be tested at the beginning of each day, the end of each day, and anytime the battery is changed for a positive response to each ISO. The analog instrument will be an all-metals detector and will function by providing a positive response upon exposure to a metallic object. The positive response will be in the form of a change in frequency from the unit's speaker that corresponds to the intensity of the object's induced field registered by the instrument's sensor(s). If an instrument fails to detect an ISO during ITS testing, then the instrument will be repaired or removed from service and replaced.

Documentation: Daily Report

Decision Point: If an instrument fails to detect the ISOs during ITS testing, the instrument will be repaired or removed from service and replaced.

DFW 5: Quality Control Seeding

QC seeds will be placed in accordance with this QAPP and the QC Seed Plan. QC seeding provides ongoing verification and feedback on the removal process as well as objective evidence that targets of interest (TOI) can be detected throughout the horizontal and vertical boundaries.

QC seeds will comprise small ISOs. The quantity, depth, orientation, and intended location (if applicable) of QC seeds will be described in detail in the QC Seed Plan, provided under separate cover for firewall purposes. For the analog-based clearance areas, the total quantity of QC seeds placed will result in, on average, each removal team encountering at least 10 seeds per field day. QC seeds will be placed throughout the vertical clearance boundary. Final as-built information on the seeds will be documented daily and summarized in the Quality Control Seeding Report upon completion of QC seeding activities.

Documentation: Daily Report, QC Seed Plan, QC Seeding Report

Decision Points: Were QC seeds placed in accordance with the QC Seed Plan? If there were deviations from the QC Seed Plan were these documented and approved by the QAO? Was the accurate position and depth of each QC seed placed in the survey area recorded?

DFW 6: Validation Seeding

Validation (or QA) seeding will be performed by the QA and LTM Contractor and is intended to supplement the Remedial Action Implementation Contractor's QC seeding program. The purpose of validation seeding is to provide an ongoing quality measure and validation of MEC clearance activities. Additionally, QA seed results provide the project delivery team defensible data at each phase of the project to aid in decision making and ensure project DQOs are being met.

For firewall purposes, details of validation seeding are not discussed in this QAPP. The QA seeding program will be documented in the Validation Seed Plan, provided under separate cover. Validation seeds will be placed by the QA and LTM Contractor SUXOS in accordance with the Validation Seed Plan, this QAPP, and applicable SOPs. Validation seeding activities will be documented in the Validation Seeding Report.

Documentation: Validation Seed Plan, Validation Seeding Report

Decision Points: Were validation seeds placed in accordance with the Validation Seed Plan? If there were deviations from the Validation Seed Plan were these documented and approved by the QAO? Was the accurate position and depth of each validation seed placed in the survey area recorded?

Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance (continued)

DFW 7: MEC Clearance

MEC Clearance

An instrument-aided MEC clearance will be conducted by the Remedial Action Implementation Contractor within the planned land use areas within UXO 15 that have not previously undergone MEC clearance (Figures 11-1). It is planned that each removal area(s) will be defined as its own gridblock where gridblock is defined as a survey unit that will be managed as a single entity for data management and tracking purposes as discussed in DFW 1. The use of these gridblocks will allow field teams to readily manage data collection, production progress, and ensure that the survey areas are clearly defined and identifiable. Prior to MEC clearance activities, these established gridblocks will be uploaded into the data management system (see DFW 1) field device/tablets for tracking purposes in the field.

Except for the planned land crabbing area, gridblocks will be sub-sectored in a manner to provide safe and efficient clearance/removal of all MEC and MD that are visible/detected. It is assumed that sub-sectoring will be achieved by the placement of ropes or other equivalent visual aids (flags, marking paint, etc.) spaced approximately 3- to 5-feet apart (the estimated coverage of a UXO Technician swinging an analog instrument) to create search lanes. The search lane widths may be optimized and adjusted as needed based on encountered site conditions; however, search lanes will be established to ensure coverage of the established grid block(s). As a conservative measure and similar to previous removal actions within UXO 15, MEC clearance will be conducted within the vegetated buffers on each side of the established trail or road.

Within the land crabbing area, MEC clearance will be performed using a meandering approach with the accessible land crabbing area as described in DFW 3. In other words, the MEC clearance within the land crabbing area will be performed via an instrument-aided visual survey with buried anomalies being investigated and removed (when applicable) to a maximum depth of 12 inches bgs. Additionally, no vegetation cutting will be conducted within the land crabbing area.

Once search lanes are established, field personnel will transverse the search lanes while visually looking for MEC/metallic items and listening for an audible change in tone from the analog instrument (which indicates a metallic object is present) while slowly swinging the analog instrument back and forth in such a manner to provide coverage of the defined search lane(s). Additionally, field personnel will search the vegetated buffers with analog instruments and investigate any response for characterization. This will be limited to the reach of the field personnel and the analog instrument (approximately 3- to 5-feet into the vegetated buffer). Should an MEC item be identified on the ground surface (either visually or audibly via the analog instrument), field personnel will flag the object for further inspection and classification as either MEC or Material Documented as Safe (MDAS) from the SUXOS and UXO Safety Officer (UXOSO) or in accordance with the Remedial Action Implementation Contractor's SOPs (Attachment A). For subsurface anomalies, intrusive investigation will be performed by manual excavation to identify the source of individual anomalies until the source is resolved or a maximum intrusive investigation depth is reached, whichever comes first. After each source is removed, the UXO Technicians will ensure no additional sources exist at that location to a maximum depth of 12 inches, using the same type of analog geophysical instrument employed during removal of the original source. A minimum of 10 percent of each gridblock will be QC checked by the UXOQCS. MEC and MD items will be documented on daily digital field forms (see DFW 1), will be photographed, and GPS coordinates collected and documented.

Field activities will be recorded on applicable daily digital field forms as described in DFW 1. In general, the following data will be recorded in the digital field forms:

1. Date and time of ITS testing and the outcome of the test for each instrument

Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance (continued)

2. GPS coordinates for survey grid corners or grid location (as needed)
3. GPS coordinates for all MEC items found and description of the item (as applicable)
4. Visual observations and condition of MEC items found
5. Photographs of MEC items found
6. Number of seeds recovered, their location, and type
7. Amounts of metal debris found (as pounds per gridblock(s) for each day)
8. When and where QC checks were performed and their outcomes
9. When and where QA checks were performed and their outcomes. The QA checks associated with DFW 7 consist of the QA contractor inspecting approximately 10 percent of the gridblocks where QC has verified MEC clearance has been completed, as indicated on Table 22-2.
10. Date, time, location, and method of disposal for MEC items (if performed)
11. Explosives used to perform demolition (if performed)

See DFW 8 for discussion of munition handling and disposal.

Documentation: Daily Report (including analog instrument function tests, Survey 123 digital forms, and QC Report)

Decision Point: Proper documentation in the Daily Report of any MEC or metallic items encountered.

DFW 8: Conduct MEC/MPPEH Handling and Disposal

The Remedial Action Implementation Contractor will handle and dispose of munitions as described in SOP(s) (Attachment A) and the ESS.

MEC Management and Disposal: All materials will be visually inspected by two qualified UXO Technicians; the first UXO Technician (i.e., SUXOS) will perform a 100 percent inspection and the second UXO Technician (i.e., UXOQCS) will perform an independent 100 percent re-inspection. If both inspectors agree that the material does not present an explosive hazard, the material will be determined to be Material Documented as Safe (MDAS) and handled in accordance with the ESS and applicable SOPs for proper documentation, storage, and final disposition..

Demolition and Demilitarization: MEC items will be detonated on an as-needed basis. Demolition activities will be performed in accordance with applicable SOPs (Attachments A and B) and the ESS. The minimum safe distance for intentional detonations will be observed during demolition operations in accordance with the approved ESS. Demolition explosives will be transported to the demolition site in accordance with the ESS. All explosives transport vehicles will be inspected daily and documented on Department of Defense (DoD) DD Form 626. If demolition is required and soil is excavated for demolition activities, then native material within the vicinity will be used to backfill the hole and will be graded to match the existing topographic contours, as warranted.

Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance (continued)

Soil sampling for munitions constituent (MC) analysis as a result of demolition in place, consolidated demolition, or finding a breached munition(s), and whether found during remedial action implementation or MEC monitoring, is not warranted. This conclusion is based on the data from hundreds of soil samples that have been collected throughout the former VNTR, including directly under and adjacent to munitions, including breached munitions. This sampling has shown that explosives are most commonly non-detect, metals concentrations are generally indistinguishable from background, and any contamination identified is very localized (i.e., a point of contamination rather than a point source of contamination). In other words, the potential contribution of contaminants to the environment from a single or even multiple items, whether that be from detonation or breaching, is insignificant in terms of potential risk. The reader is referred to the analytical data upon which these conclusions are based, which are compiled in the RI Status Report UXOs 4, 9, 10, 12, and 14 (CH2M, 2016), as well as more recent data compilations such as the UXO 13 RI/FS Report (CH2M, 2020a). Additionally, the Navy anticipates that consolidated detonations associated with remedial actions would be comparable (or less) in number than the numbers routinely included in consolidated detonations performed as part of historical removal activities.

With respect to breached items, if a breached munition is discovered not only will the item be removed, but any visible contents on the ground from the breached item will also be removed.

Munitions items not possessing an explosive hazard will be transported to a laydown area and segregated in a locked container for further demilitarization, as required, followed by inspection, certification, and verification prior to recycling. They will undergo a 100 percent inspection by a UXO Technician III under the supervision of the SUXOS and/or UXOQCS prior to final certification as MDAS. The SUXOS, UXOSO, UXOQCS, and UXO Technicians III shall be qualified according to DDESB TP-18 (DDESB, 2020) and authorized to document MPPEH as MDAS with dual signature on the Disposal Turn-in Document DD Form 1348-1A. The disposal Turn-in Document DD Form 1348-1A will include the following statement: "The material listed on this form has been inspected or processed by DDESB-approved means, as required by DoD policy, and to the best of my knowledge and belief does not pose an explosive hazard." MDAS will be demilitarized in accordance with DoD 4160.28-M, Volume 3 (series), Defense Demilitarization Manual (DoD, 2011), prior to its release to an offsite qualified recycler. The MDAS will be released in sealed containers, along with the Disposal Turn-in Document DD Form 1348-1A that serves as both the explosives safety status documentation and the chain-of-custody documentation. The qualified recycler will issue a certificate of destruction for MDAS.

Documentation: Applicable disposal forms, final DUA, UXO 15 Remedial Action Completion Report

DFW 9: Conduct Final Data Usability Assessment

The project team will perform a final DUA for all data streams used during the remedial action implementation per Worksheet #37.

Documentation: Final DUA

Decision rule: If all data are determined to be of sufficient quantity and quality for the intended use, the DUA will provide the supporting lines of evidence that the UXO 15 remedial action met its objective. If not all data are determined to be of sufficient quantity and quality for the intended use, the DUA will provide details regarding data limitations that can be used by the project team to assess the impact on the remedial action objective and inform the path forward decision-makers.

Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance (continued)

DFW 10: Demobilization

Prior to demobilization, the Remedial Action Implementation Contractor will perform completion inspections to verify all work has been completed, verify that the project objectives have been met, and ensure that MEC or other debris associated with MEC clearance was disposed of properly. The Remedial Action Implementation Contractor will then inform the QA and LTM Contractor that remedial actions are complete and hand over all documents for final acceptance.

Upon final acceptance by the QA and LTM Contractor, the Remedial Action Implementation Contractor will perform any necessary housekeeping of the site, including removing waste materials and other debris resulting from field activities. A post-completion photographic survey also will be performed, as warranted.

Upon receiving final concurrence from the QA and LTM Contractor, all equipment, personnel, facilities, and equipment will be demobilized from the site in an orderly manner.

Documentation: Daily Report

Decision Points: N/A

DFW 11: UXO 15 Remedial Action Completion Report

The Remedial Action Implementation Contractor will prepare an RACR following completion of the remedial action implementation to provide a record of the activities/results. The UXO 15 RACR will document the MEC clearance activities and will demonstrate the achievement of the project objectives or identify any data gaps or where objectives were not met and why. The results of the DUA (as discussed in Worksheet #37) will be included in the UXO 15 RACR, which will contain sufficient documentation to support the conclusions presented.

Documentation: UXO 15 RACR, including DUA and updated CSM (as applicable)

Decision Points: Whether the data support that the remedial action at UXO 15 has been successfully implemented.

Worksheet #17-2: Survey Design and Project Workflow for MEC Monitoring

This worksheet provides descriptions for each DFW associated with the MEC monitoring for the public use areas within UXO 15. It highlights the MEC monitoring activities, inspection/oversight activities, key deliverables, and decision points, as identified in Worksheet #14 & 16. Figure 17-2 provides the decision tree associated with these tasks.

DFW 1: Pre-mobilization

See DFW 1 under Worksheet #17-1. Only those elements applicable to MEC monitoring will be performed.

DFW 2: Mobilization

See DFW 2 under Worksheet #17-1. Only those elements applicable to MEC monitoring will be performed.

DFW 3: Site Preparations

See DFW 3 under Worksheet #17-1. Only those elements applicable to MEC monitoring will be performed. No vegetation cutting will be performed for MEC monitoring.

DFW 12: MEC Monitoring

Upon finalization of the RACR, periodic MEC monitoring will be conducted within the public use areas (i.e., those areas being maintained for public use or that do not require vegetation cutting to enable access) as well as areas where trespassing has made areas accessible in areas not intended for public access to determine if any MEC has become exposed via erosion or other means. MEC monitoring activities will be conducted by the QA and LTM Contractor and consist of an instrument-aided visual MEC survey within the lateral boundaries of the accessible portions of the land use areas.

Areas determined not to be accessible to the project team at the time of the MEC monitoring will not be visually inspected, but lack of accessibility by the project team would also apply to potential users; therefore, protectiveness exists within inaccessible areas.

MEC monitoring activities are not intended to be remedial actions and, therefore, will be limited to just the ground surface or items protruding from the ground. Additionally, MEC monitoring will only be conducted in the accessible areas of each public use area, as well as along newly-created paths/trails/accessible areas of observed trespassing.

Frequency

MEC monitoring activities will begin approximately one year after the completion of surface MEC clearance and LUC implementation and be conducted annually thereafter. Additionally, MEC monitoring will be conducted following events (i.e., named tropical storms/hurricanes, fires) determined to potentially threaten remedy protectiveness as soon as practicable, considering access logistics and safety.

Instrument Test Strip

As the MEC monitoring activities are limited to the surface only, an existing ITS or a temporary ITS will be used/established for each day of MEC monitoring activities. Should an existing ITS be utilized, the ISOs depths will be recorded and will contain at least one small ISOs (i.e., 1-inch by 4-inch) on the surface to determine proper functionality. If an existing ITS is not available (or does not meet the previously stated requirements), a temporary ITS will be constructed and consist of two small ISOs (i.e., 1-inch by 4-inch) placed on the ground surface in a horizontal orientation approximately 10 feet apart from each other. A function test for each analog

Worksheet #17-2: Survey Design and Project Workflow for MEC Monitoring (continued)

instrument used will be conducted at the beginning and end of each day of use and documented to validate the equipment is function properly.

MEC Monitoring Activities

MEC monitoring will be conducted in general accordance with the Procedures for Terrestrial Munitions and Explosives of Concern Inspections as Part of Long-Term Monitoring (Attachment B), with clarifications or deviations noted as follows:

- The QA and LTM Contractor will notify USFWS approximately two weeks prior to conducting the annual MEC monitoring activities. Should an additional MEC monitoring event take place (i.e., after a named tropical storm/hurricane or fire determined to potentially threaten remedy protectiveness), the QA and LTM Contractor will notify USFWS as soon as possible prior to the additional monitoring activities.
- An existing or temporary ITS will be utilized/established and instrument function tests completed for all equipment (e.g., all-metals detector, GPS tracking device).
- Prior to MEC monitoring activities, QC blind seeds consisting of small ISOs will be placed within the accessible public use and trespassing areas in which MEC monitoring will be conducted. The seeds will be placed by the QA UXOQCS (i.e., not the MEC monitoring team) on the ground surface in a horizontal orientation. The locations and numbers of QC seeds placed will be documented in the daily report in such a manner so that the MEC monitoring team is not aware of the QC seed locations or numbers. While the number of QC seeds placed will be determined by the QA UXOQCS based on accessible areas at the time of the MEC monitoring, in general QC seeds will be placed so that each gridblock contains a minimum of three QC surface seeds.
- The MEC monitoring team will consists of a minimum of two UXO Technicians and one Field Team Leader (FTL). The UXO Technicians will conduct the instrument-aided visual survey by walking the applicable areas while actively looking for surface MEC (or munitions-related items) and sweeping the analog detector (e.g., all-metals detector) back and forth, listening for an audible frequency change from the detector that indicates the detection of a metallic source. All metallic source detections and/or visually observed items will be inspected and determinations made as to proper disposition. The FTL will observe the UXO Technicians and document adherence to and/or deviations from the MEC monitoring activities in accordance with the Procedures for Terrestrial Munitions and Explosives of Concern Inspections as Part of Long-Term Monitoring (Attachment B) and this QAPP. Additionally, a GPS device (e.g., Garmin) will be used to track the UXO Technician's paths. The recorded tracks of the actual coverage will be plotted on a figure and presented as part of the applicable reporting (see DFW 13).
- Due to the anticipated width of trails and roads, a transect approach will not be utilized; instead, the UXO Technicians and FTL will walk the areas in a staggered approach while conducting the MEC monitoring activities to cover all accessible areas of trails and roads. Conceptually, the following areas may be considered one transect due to their width; however, no formal transects will be defined:
 - Multi-Purpose Road(s)/Trail(s)
 - Trail(s)

The specific approach to inspection of these types of areas is defined in the Procedure for Terrestrial Munitions and Explosives of Concern Inspections as Part of Long-term Monitoring, which can be found in Attachment B of this QAPP.

Worksheet #17-2: Survey Design and Project Workflow for MEC Monitoring (continued)

- As no vegetation clearance or cutting will be conducted within the future planned land crabbing area, a transect approach will not be utilized in this area. Instead, the UXO Technicians and FTL will walk a meandering path within the accessible areas of the planned land crabbing area based on site conditions encountered during MEC monitoring (similar to the approach described in DFW 7).
- Any MEC (or munitions-related items) identified will be documented and addressed accordingly (i.e., turned over to the Navy's Munitions Removal Contractor and handled in accordance with applicable plans).
- Findings and QC observations will be documented accordingly for reporting (see DFW 13).

Documentation: Daily Report, checklist

Decision Points: If an instrument fails to detect an ISO during ITS testing, the instrument will be repaired or removed from service and replaced. If QC observations determine a deviation from the SOP or this QAPP, then the nonconformance/RCA/CA process will be implemented to determine the root cause and appropriate CA(s). If a QC seed is not detected, then the nonconformance/RCA/CA process will be implemented to determine the root cause and appropriate CA(s).

DFW 13: Annual Status Report and Five-Year Review Report

Upon completion of MEC monitoring activities in any particular year, an Annual Status Report will be drafted and submitted to the interagency team that documents the activities and findings of the MEC monitoring activities. Note that MEC monitoring will be completed in conjunction with LUC monitoring (described in the RAWP). Therefore, each Annual Status Report, will also include the activities and results of LUC monitoring, including an LUC checklist (see RAWP, Appendix B) and a photographic log. Information contained in the various annual reports will be compiled and assessed during statutorily required reviews performed every 5 years to ensure the remedy remains protective of human health and the environment. The results of the assessment will be included in the Five-Year Review Reports.

Documentation: Annual Status Report (including LUC Checklist and Photographic Log), Five-Year Review

Decision Points: Whether the data support that the MEC monitoring at UXO 15 has been successfully completed and whether the findings indicate the remedial action remains protective.

UXO 15 MEC Clearance Decision Tree

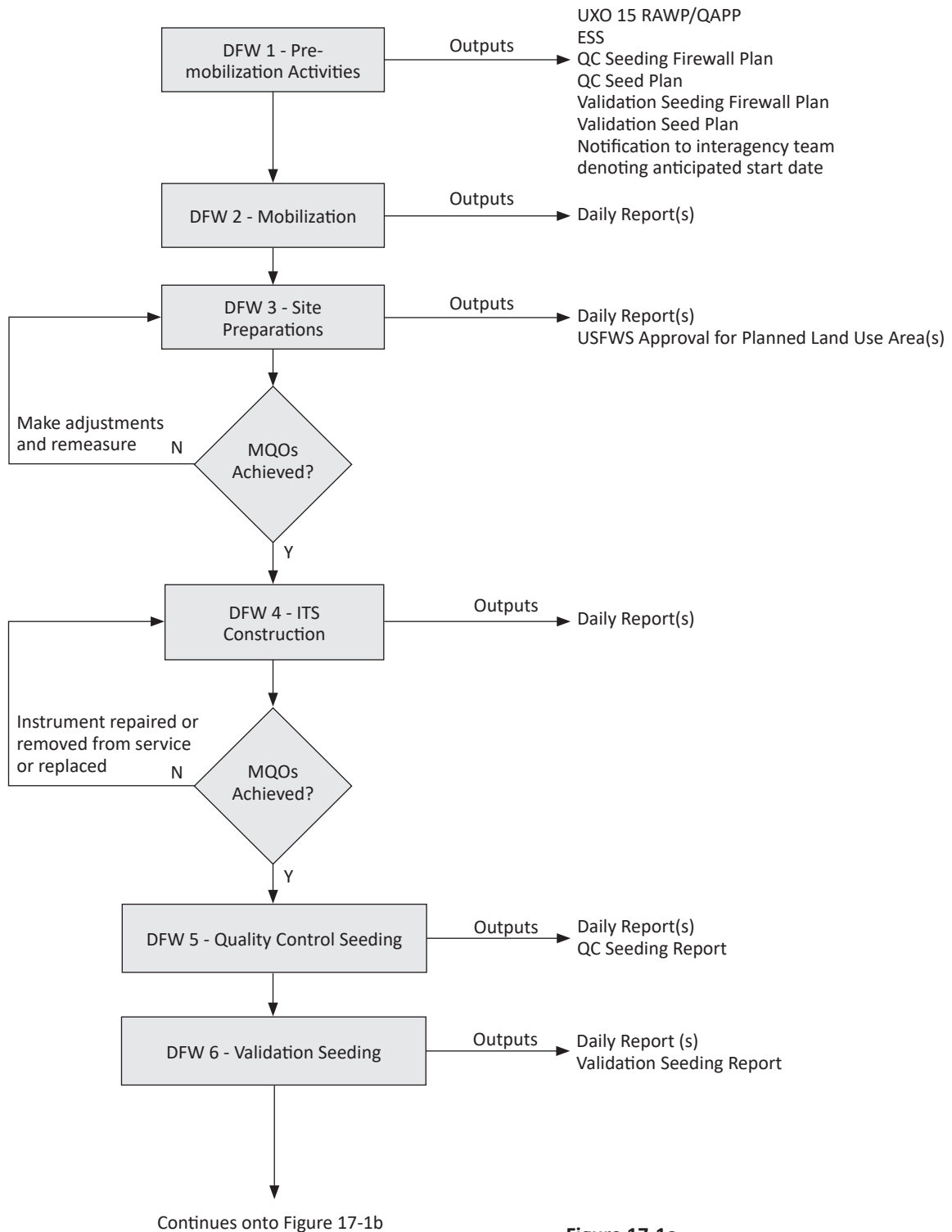
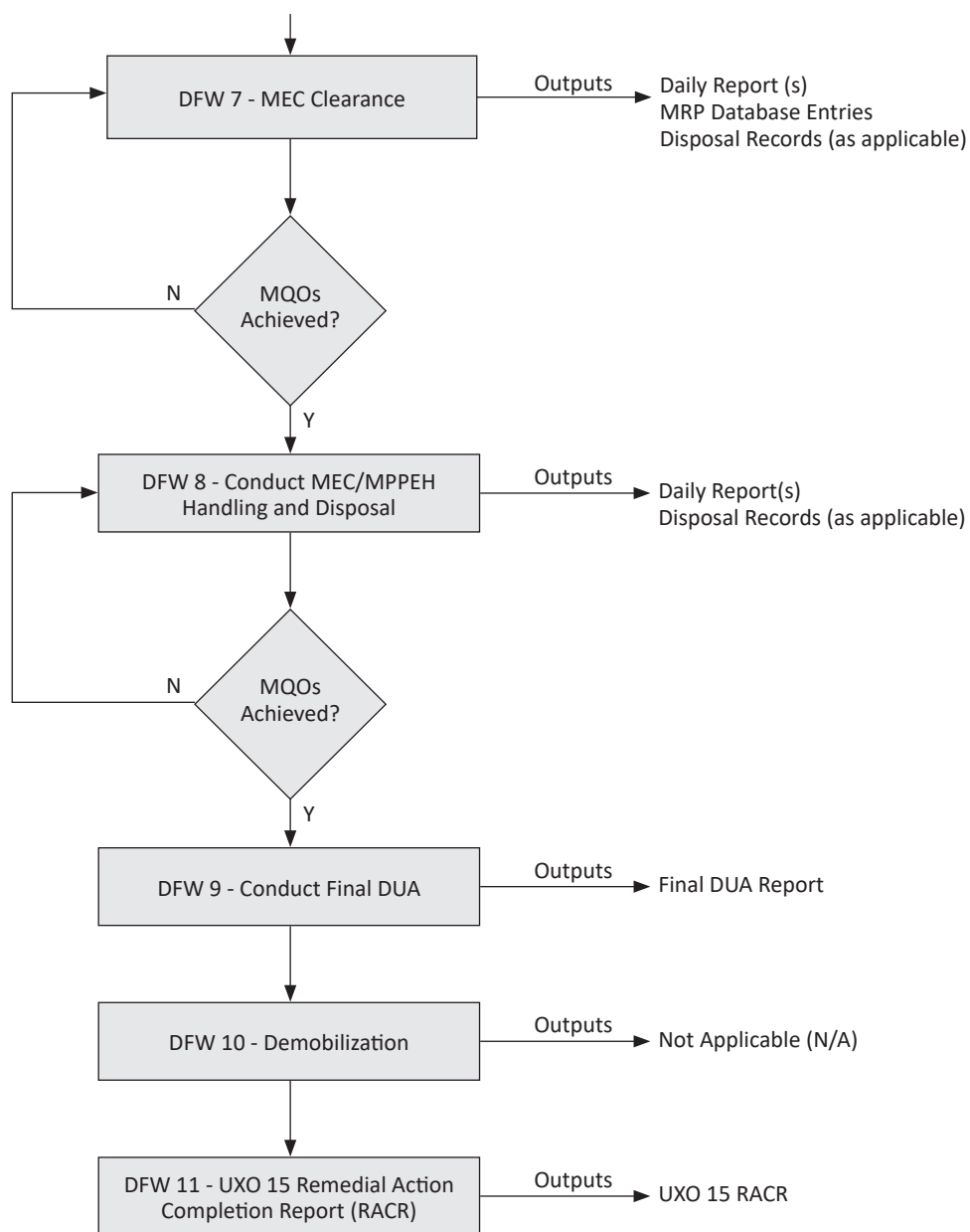


Figure 17-1a.

UXO 15 MEC Clearance Decision Tree

*UXO 15 Remedial Action Implementation and
Long-Term Monitoring QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico*

UXO 15 MEC Clearance Decision Tree**Figure 17-1b.****UXO 15 MEC Clearance Decision Tree**

*UXO 15 Remedial Action Implementation and
Long-Term Monitoring QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico*

UXO 15 MEC Monitoring Decision Tree

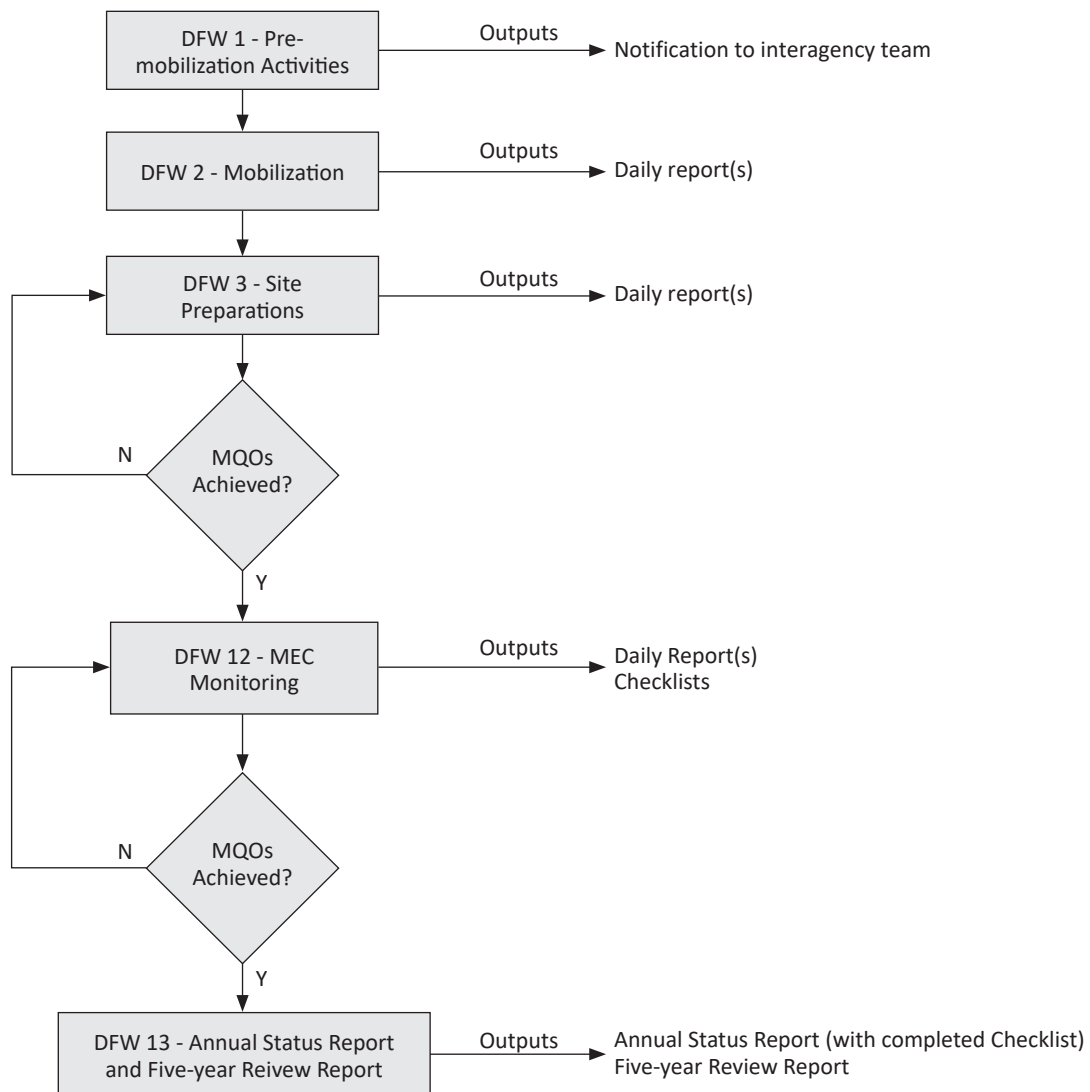


Figure 17-2.

UXO 15 MEC Monitoring Decision Tree

*UXO 15 Remedial Action Implementation and
Long-Term Monitoring QAPP
Former Vieques Naval Training Range
Vieques, Puerto Rico*

Worksheet #22-1: Equipment Testing, Inspection, and Quality Control – Surface MEC Clearance

This worksheet documents the MQOs and their respective acceptance criteria for the UXO 15 MEC clearance as part of the remedial action implementation. As previously stated, it is important to note that each contractor and subcontractor will operate under their own SOPs and that any procedure/process defined in the RAWP (which includes this QAPP) supersedes SOPs (i.e., only those elements of the SOPs that are applicable to the RAWP [which includes this QAPP] will be applied).

Table 22-1. Equipment Testing, Inspection, and Site Preparations

Measurement Quality Objective	MQO#	Frequency	Responsible Person/ Report Method/ Verified By	Acceptance Criteria	Failure Response
Geodetic Function Test	SP1	Daily (RTK-GPS) (when utilized) Daily (Garmin or other GPS device) (when utilized)	SUXOS/Daily Report/UXOQCS	± 50-cm accuracy objective ± 2-meter (m) accuracy objective	RCA/CA; document questionable information in database.
Construct ITS: Verify As-built ITS Against Design Plans (analog sensors)	SP2	Once following ITS construction.	SUXOS/Daily Report/UXOQCS	Seeds emplaced in accordance with DFW 4.	RCA/CA: Make necessary changes to seeded items and re-verify.
Initial Instrument Function Test (analog)	SP3	Beginning and end of each day of use and following instrument battery changes.	SUXOS/Daily Report/UXOQCS	Audible response consistent with expected change in tone in presence of standard objects in the ITS.	CA: If an instrument fails to detect the ISOs during function test, the instrument will be repaired or removed from service and replaced.

Worksheet #22-1: Equipment Testing, Inspection, and Quality Control – Surface MEC Clearance (continued)

Table 22-2. Surface MEC Clearance (Analog Clearance)

Measurement Quality Objective	MQO#	Frequency	Responsible Person/ Report Method/ Verified By	Acceptance Criteria	Failure Response
Geodetic Function Test	MR1	Daily (RTK-GPS) (when utilized) Daily (Garmin or other GPS device) (when utilized) Each time equipment is moved (RTS)	SUXOS/Daily Report/UXOQCS	± 50-cm accuracy objective ± 2-m accuracy objective ± 50-cm accuracy objective	RCA/CA; document questionable information in database.
Placement of QC Seeds	MR2	Prior to survey unit production. Seeds placed at variable densities throughout survey units at 95-100 percent of reliable detection such that each team encounters an average 10 seeds per day.	UXOQCS/QC Seed Log/QAO	All seeds recovered.	RCA/CA
Placement of Validation Seeds	MR3	Prior to survey unit production. Seeds placed at variable densities throughout survey units at 95-100 percent of reliable detection such that each team encounters an average 10 seeds per day.	QA Contractor SUXOS/QA Seed Log/QAO	All seeds recovered.	RCA/CA
Survey Lane Spacing	MR4	Each grid or lot.	UXOQCS/QC Summary/QAO	Survey lanes are placed 3-to-5-feet width apart.	RCA/CA; replace survey lanes.
Ongoing Instrument Function Test (analog)	MR5	Beginning and end of each day and each time instrument is turned on.	SUXOS/Daily Report/UXOQCS	Audible response consistent with expected change in tone in presence of standard objects in ITS.	RCA/CA: Make necessary repairs and re-verify.
Coverage	MR6	Verified for each defined gridblock.	SUXOS/Daily Report/UXOQCS	GPS tracked locations to demonstrate that survey lanes were appropriately covered.	RCA/CA
QC Survey of MEC Clearance Areas	MR7	Upon completion of MEC clearance within each gridblock.	SUXOS/Daily Report/UXOQCS	Approximate 10 percent coverage of the gridblock(s) inspected and no MEC is identified. QC acceptance of gridblock.	RCA/CA: resurvey of all failed gridblock(s).
QA Survey of MEC Clearance Areas	MR8	Following QC surface and subsurface MEC clearance acceptance for each gridblock.	QA SUXOS/Daily Report/UXOQCS	Approximate 10 percent coverage of the gridblock(s) will be inspected by QA and LTM Contractor SUXOS and no surface or subsurface MEC is identified. QA acceptance of gridblock.	RCA/CA: resurvey of all failed gridblock(s).
Seed Recovery	MR9	Survey unit.	UXOQCS/QC Summary/QC and QA Geophysicists	100 percent of the QC and QA seeds recorded in the intrusive database.	RCA/CA; redo survey unit.
Documenting Recovered Sources	MR10	Daily.	UXOQCS/GIS data recorded and Daily Report/QAO	All metallic debris collected is documented for the following attributes: Designation as MEC, MD, seed, range-related debris (RRD) or non-munitions-related debris (NMRD); MEC and MD described by type; weight; depth. Photos displaying all MD recovered at each target location (individual MD photos not necessary), and photos showing all surfaces of each MEC are recorded. Coordinates available for items within the acceptance criteria listed under MQO# MR1 (Table 22-2) for the equipment utilized to collect the coordinates.	RCA/CA; document questionable information in the database.

Worksheet #22-2: Equipment Testing, Inspection, and Quality Control – MEC Monitoring

This worksheet documents the MQOs and their respective acceptance criteria for the MEC monitoring. As previously stated, It is important to note that the RAWP (which includes this QAPP) supersedes SOPs (i.e., only those elements of the SOPs that are applicable to the RAWP [which includes this QAPP] will be applied).

Table 22-3. MEC Monitoring

Measurement Quality Objective	MQO#	Frequency	Responsible Person/ Report Method/ Verified By	Acceptance Criteria	Failure Response
Geodetic Function Test	MM1	Daily (Garmin unit).	FTL/Daily Report/UXOQCS	± 2-m accuracy objective.	RCA/CA; document questionable information in database.
Construct Temporary ITS (analog sensors)	MM2	Once (or as needed) prior to MEC monitoring.	FTL/Daily Report/UXOQCS	Seeds emplaced in accordance with DFW 12.	RCA/CA: make necessary changes to seeded items and re-verify.
Instrument Function Test (Analog)	MM3	Beginning and end of each day of use and following instrument battery changes.	FTL/Daily Report/UXOQCS	Audible response consistent with expected change in tone in presence of standard objects in the ITS.	CA: if an instrument fails to detect the ISOs during function test, the instrument will be repaired or removed from service and replaced.
Surface Sweep: Documenting Recovered Surface MEC and Debris	MM4	Daily during MEC monitoring activities.	SUXOS/GIS data recorded/UXOQCS	All MEC and munitions related items documented in the project database for the following attributes: Designation as MEC, MD, RRD, or NMRD (also referred to as “cultural debris”); MEC and MD described by type and weight. Coordinates available for items within the acceptance criteria listed under MQO# MR1 (Table 22-2) for the equipment utilized to collect the coordinates. Photos displaying all MEC recovered (individual MD photos not necessary) are recorded.	RCA/CA: document questionable information in database; justify safety concerns.
Detection Survey Performance	MM5	At least three blind QC seeds placed in a horizontal orientation on the surface within each gridblock	UXOQCS/Daily Report/SUXOS	All QC seeds must be detected and recovered.	RCA/CA
Quality Control Observations of MEC Monitoring Activities	MM6	FTL observes UXO Technicians during all MEC monitoring activities for adherence to QAPP and guidance documents.	FTL/Daily Report/UXOQCS	No deviation from QAPP and guidance documents observed.	Deviations identified. CA: deviation documented and assessed by QA and LTM Contractor PM for significances of deviation. If deemed significant, applicable gridblock will be surveyed by UXO Technicians.

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Worksheet #29-1: Data Management, Project Documents and Records

Part 1: Data Management Specifications

GIS Electronic File Management

A project-specific GIS will be established and maintained by the GIS Manager. This geodatabase will be used to store and manage all relevant geospatial-related project data and information. All geospatial data will conform to the FGDC Geospatial Positioning Accuracy Standards, Part 2: National Standard for Spatial Data Accuracy and Part 4: Standards for Architecture, Engineering, and Construction, and Facility Management. Each GIS data set will be accompanied by metadata conforming to the FGDC Content Standard for Digital Geospatial Metadata and provided in a database that complies with the Spatial Data Standards for Facilities, Infrastructure, and Environment. An internet-based file sharing site will be established to provide NAVFAC personnel and stakeholders access to the database.

Computer Files and Digital Data: All final document files, including reports, figures, and tables, will be submitted in electronic format as specified by the QA and LTM Contractor and NAVFAC. Data management and backup will be performed in accordance with QA and LTM contractor's documented quality system.

Worksheet #29-1: Data Management, Project Documents and Records (continued)

Part 2: Control of Documents, Records, and Databases

Table 29-1. Minimum Required Documents and Records

Document/Record	Purpose	Completion/Update Frequency	Format/Storage Location/Archive Requirements
QAPP ^{a,b}	Integrates all technical and quality aspects for the lifecycle of the project, including planning, implementation, and assessment. Documents how QA and QC are applied to data collection operations to ensure that the results obtained will satisfy the stated performance objectives.	Will be completed prior to mobilization.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
ESS ^{a,b}	Addresses hazards associated with the MEC clearance and demolition operations.	Will be completed prior to mobilization.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
QC Seed Plan ^a	Report providing details (types, quantities, depths, orientations, and locations) of QC seed placement within investigation area.	Provided and approved during project planning process.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
QC Seeding Firewall Plan ^a	Report outlining how QC seed ground truth information will be firewalled from production team members.	Provided and approved during project planning process.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
QC Seeding Technical Memorandum ^a	Report summarizing QC seeding activities and providing the as-built details for all emplaced QC seeds.	Once following completion of QC seeding activities. Will be provided to the QA and LTM Contractor within 10 working days following completion of QC seeding activities.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Validation Seed Plan ^a	Report providing details (types, quantities, depths, orientations, and locations) of QA seed placement within investigation area.	Provided and approved during project planning process.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server

Worksheet #29-1: Data Management, Project Documents and Records (continued)

Table 29-1. Minimum Required Documents and Records

Document/Record	Purpose	Completion/Update Frequency	Format/Storage Location/Archive Requirements
Validation Seeding Firewall Plan ^a	Report outlining how QA seed ground truth information will be firewalled from production team members.	Provided and approved during project planning process.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Validation Seeding Technical Memorandum ^a	Report summarizing QA seeding activities and providing the as-built details for all emplaced QA seeds.	Once following completion of QA seeding activities. A draft version will be completed within 10 working days following completion of QA seeding activities.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Daily Project Field Forms/Logbooks (digital copy of field logbook) ^{a,b}	Hard copy of daily field notes for all teams.	Completed daily/end of day.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Daily Project Report ^{a,b}	Documents all field activities to track the progress, activities, and data of each day's work.	Completed daily/end of day.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Photographic Documentation (as warranted) ^{a,b}	Highlights and visually documents all important site features and field activities, to be later included as part of the photographic log for final reports.	Completed daily and included as part of the Daily Project Report.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Instrument Assembly Checklists ^{a,b}	Documents that SOPs were followed in the assembly of field equipment.	Completed during assembly.	Digital/QA and LTM Contractor network and secure SharePoint library/ Project file and computer server
Survey 123/Collector Forms ^a	Documents each phase of removal activity including fieldwork, data QC, data QA, and intrusive activities.	Completed as appropriate following each phase of work for each defined survey unit.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server

Worksheet #29-1: Data Management, Project Documents and Records (continued)

Table 29-1. Minimum Required Documents and Records

Document/Record	Purpose	Completion/Update Frequency	Format/Storage Location/Archive Requirements
QC Seed Tracking Log ^a	File tracking daily QC seed emplacement.	As needed based on actual QC seeding activities.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Validation Seed Tracking Log ^a	File tracking daily QA seed emplacement.	As needed based on QA seeding activities.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
MRP Enterprise Database Update Forms (for all MEC/MD items) (i.e., intrusive investigation results) ^{a,b}	Documents the findings of each intrusive investigation to describe the quantity, depth, size, orientation, description of item, and other pertinent data related to the intrusive investigation.	Intrusive investigation results will be uploaded daily to a database.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Field Audit Checklists (if performed) ^{a,b}	Provides documentation that field audits have been completed.	Completed during field audits.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Final Data Archives ^{a,b}	All project files will be maintained on the Remedial Action and QA and LTM Contractor computer server as archives and stored for 3 years.	Pertinent data and documents will be transported to the final archives at the completion of the project.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Field Change Request Forms ^{a,b}	Provides information on any changes to QAPP-documented approach for approval and documentation.	Completed on an as-needed basis.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
Nonconformance, RCAs, and CARs ^{a,b}	Documents any nonconformance and provides the root cause(s) of the nonconformance and any corrective actions required. Should also identify any data usability issues associated with the nonconformance.	Completed on an as-needed basis.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server

Worksheet #29-1: Data Management, Project Documents and Records (continued)

Table 29-1. Minimum Required Documents and Records

Document/Record	Purpose	Completion/Update Frequency	Format/Storage Location/Archive Requirements
UXO 15 RACR ^a	Provides documentation of the remedial action tasks completion and achievement of objectives as defined in the QAPP.	Completed after completion of all remedial activities.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server
UXO 15 Annual Status Report(s) (as applicable) and Five-Year Review Reports ^{a,b}	Provides documentation of the MEC inspection completion and achievement of objectives as defined in the QAPP. Report also includes activities/results of LUC LTM.	MEC inspection activities will commence after finalization of the UXO 15 RACR and completed approximately yearly and/or after named tropical storms/hurricanes/fires determined to potentially threaten remedy protectiveness.	Digital/QA and LTM Contractor network and secure SharePoint library/Project file and computer server

^a Applicable or potentially applicable to MEC clearance

^b Applicable or potentially applicable to MEC monitoring

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Worksheet #31, 32 & 33: Assessments and Corrective Action

Three Phases of Control

Preparatory Phase Inspection

The Preparatory Phase comprises the planning and design process leading up to the actual field activities. A Preparatory Phase Inspection will be performed before beginning each DFW. The purposes of this inspection are to review applicable specifications and plans to verify that the necessary resources, conditions, and controls are in place and compliant before work activities start. The USAE UXOQCS or designee will review work plans and operating procedures. The USAE UXOQCS will verify that required plans and procedures have been approved and are available to the field staff; field equipment is appropriate, available, functional, and properly calibrated for its intended/stated use; staff responsibilities have been assigned and communicated; the staff members have the necessary knowledge, expertise, and information to perform their jobs; arrangements for support services have been made; training in accordance with the requirements of this QAPP has occurred; and the prerequisite mobilization tasks have been completed. The USAE UXOQCS will verify that lessons learned during previous similar work have been incorporated, as appropriate, into the project procedures to prevent recurrence of past challenges. Project personnel must correct or resolve discrepancies between existing conditions and the approved plans/procedures identified by the USAE UXOQCS during the Preparatory Phase Inspection. The USAE UXOQCS or designee will verify that unsatisfactory and/or nonconforming conditions have been corrected in this QAPP before beginning work.

Initial Phase Inspection

The Initial Phase occurs at the startup of field activities associated with a specific DFW. At the onset of a particular DFW, the USAE UXOQCS will perform an Initial Phase Inspection. The main objectives of the inspection are to check preliminary work for compliance with procedures and specifications, establish an acceptable level of workmanship, check for omissions, and resolve differences of interpretation. The Initial Phase Inspection will also verify that the Site Safety and Health Plan adequately identifies all hazards associated with actual field conditions and promulgates the appropriate safe work practices. The inspection results will be documented by the USAE UXOQCS in the QC logbook and summarized in the QC report. Should results of the inspection be unsatisfactory, the Initial Phase will be rescheduled and performed again.

Follow-up Phase Inspection

Completion of the Initial Phase of QC activity leads directly into the Follow-up Phase, which covers the routine day-to-day activities at the site. The USAE UXOQCS will perform a Follow-up Phase Inspection at regular intervals while a particular DFW is performed. This inspection ensures continuous compliance and verifies an acceptable level of workmanship. The USAE UXOQCS will monitor onsite practices and operations taking place and verify continued compliance with the specifications and requirements of this QAPP. Discrepancies between site practices and approved plans/procedures will be resolved, and corrective actions for unsatisfactory and nonconforming conditions or practices will be resolved by the UXOQCS or designee before continuing work.

Worksheet #31, 32 & 33: Assessments and Corrective Action (continued)

Additional Inspections

Additional inspections performed on a particular DFW may be required at the discretion of the Navy, Remedial Action Implementation Contractor, and QA and LTM Contractor, the PM, the SUXOS, the UXOQCS, or other supervisory personnel as appropriate. Additional preparatory and initial inspections would be warranted under the following conditions: unsatisfactory work, as determined by Remedial Action Implementation Contractor and QA and LTM Contractor or Navy; changes in key personnel; resumption of work after a substantial period of inactivity (2 weeks or more); or changes to the project scope of work. These additional inspections will be documented on the appropriate inspection checklist forms and in the QC logbook.

Final Phase Inspection

The Final Phase Inspection is performed upon conclusion of the DFW and before closeout to verify that project requirements relevant to the particular DFW have been satisfied. Outstanding and nonconforming items will be identified and documented.

Worksheet #31, 32 & 33: Assessments and Corrective Action (continued)

Table 31-1: Munitions and Geophysical Assessment Schedule

Assessment Type	Three Phases of Control	Schedule/Frequency	Responsible Party	Assessment Deliverable	Deliverable Due Date	Responsible for Responding to Assessment Findings	Assessment Response Documentation and Timeframe
Planning Documents – RAWP (including this QAPP), ESS, QC Seeding Firewall Plan, QC Seeding Plan, Validation Seeding Firewall Plan, Validation Seeding Plan ^{a,b}	Preparatory	Finalization approximately one month prior to the MEC clearance activities/ Once	Remedial Action Implementation Contractor and QA and LTM Contractor	Final documentation approval from interagency team	Prior to mobilization	Remedial Action Implementation Contractor and QA and LTM Contractor	Email or other written communication within approximately one month of mobilization
Coordination with USFWS ^{a,b}	Preparatory	Finalization approximately one month prior to the surface MEC clearance activities/ Once	USFWS and QA and LTM Contractor	Formal email confirmation from USFWS	Prior to mobilization	QA and LTM Contractor	Email or other written communication within approximately one month of mobilization
GIS and Data Management Systems Establishment ^{a,b}	Preparatory	Finalization approximately one month prior to the surface MEC clearance activities/ Once	Remedial Action Implementation Contractor and QA and LTM Contractor	GIS Database with specific project folders Electronic forms and platform establishment for Data Management System	Prior to mobilization	Remedial Action Implementation Contractor and QA and LTM Contractor	Email or other written communication within approximately one month of mobilization

Worksheet #31, 32 & 33: Assessments and Corrective Action (continued)

Table 31-1: Munitions and Geophysical Assessment Schedule

Assessment Type	Three Phases of Control	Schedule/Frequency	Responsible Party	Assessment Deliverable	Deliverable Due Date	Responsible for Responding to Assessment Findings	Assessment Response Documentation and Timeframe
Daily UXO Safety Briefing ^{a,b}	Initial/Follow-up	Daily/As required	Remedial Action Implementation Contractor and QA and LTM Contractor	Daily Report	Daily	Remedial Action Implementation Contractor and QA and LTM Contractor	Email or other written communication within approximately one month of mobilization
Site Visit and Establishment of Gridblocks ^{a,b}	Initial/Follow-up	Prior to the start of the surface MEC clearance activities/ Once and then as required	Remedial Action Implementation Contractor and QA and LTM Contractor	Daily Report, email, or other documentation	Prior to start of the surface MEC clearance activities	Remedial Action Implementation Contractor and QA and LTM Contractor	Email or other written communication within approximately 3 days after site visit
GPS Function Test ^{a,b}	Initial/Follow-up	Daily/When used	Remedial Action Implementation Contractor and QA and LTM Contractor	Daily Report	Daily	Remedial Action Implementation Contractor and QA and LTM Contractor	Email or other written communication within approximately 3 days
ITS Construction ^{a,b}	Initial/Follow-up	Prior to the start of the MEC clearance activities/Once	Remedial Action Implementation Contractor and QA and LTM Contractor	Daily Report	Prior to the start of the MEC clearance activities	Remedial Action Implementation Contractor and QA and LTM Contractor	Email or other written communication within approximately 3 days

Worksheet #31, 32 & 33: Assessments and Corrective Action (continued)

Table 31-1: Munitions and Geophysical Assessment Schedule

Assessment Type	Three Phases of Control	Schedule/Frequency	Responsible Party	Assessment Deliverable	Deliverable Due Date	Responsible for Responding to Assessment Findings	Assessment Response Documentation and Timeframe
Analog Function Test ^{a,b}	Initial/Follow-up	Twice daily/As required	Remedial Action Implementation Contractor and QA and LTM Contractor	Daily Report	Daily	Remedial Action Implementation Contractor and QA and LTM Contractor	Email or other written communication within approximately 3 days
MEC Clearance Completion per Gridblock ^a	Initial/Follow-up/Final	Once/Until QA acceptance	Remedial Action Implementation Contractor and QA and LTM Contractor	Daily Report	Upon completion of MEC clearance activities per the gridblock	Remedial Action Implementation Contractor and QA and LTM Contractor	Email or other written communication within approximately 3 days
MEC/MD Removal (including munitions management, demolition, and demilitarization) ^{a,b}	Initial/Follow-up/Final	When encountered or reported/Each occurrence	Remedial Action Implementation Contractor and QA and LTM Contractor	Daily Report, disposal records	Daily (when required)	Remedial Action Implementation Contractor and QA and LTM Contractor	Email or other written communication within approximately 3 days
Intrusive Investigations ^a	Initial/Follow-up/Final	Daily/As required	Remedial Action Implementation Contractor and QA and LTM Contractor	Daily Reports, RACR	Daily, within 90 days of completion of focused MEC clearance activities	Remedial Action Implementation Contractor and QA and LTM Contractor	Email or other written communication within approximately 60 days

Worksheet #31, 32 & 33: Assessments and Corrective Action (continued)

Table 31-1: Munitions and Geophysical Assessment Schedule

Assessment Type	Three Phases of Control	Schedule/Frequency	Responsible Party	Assessment Deliverable	Deliverable Due Date	Responsible for Responding to Assessment Findings	Assessment Response Documentation and Timeframe
MEC Monitoring ^b	Initial/Follow-up/Final	After final RACR publication/Annually	Remedial Action Implementation Contractor and QA and LTM Contractor	LUC Checklist (see RAWP Appendix B), Annual Status Report	Within two months of MEC monitoring activities	QA and LTM Contractor with direct input from the Navy, EPA, PRDNER, and USFWS	Email or other written communication within approximately 60 days of receipt of the draft Annual Status Report

^a Applicable or potentially applicable to MEC clearance

^b Applicable or potentially applicable to MEC monitoring

Worksheet #35: Data Verification, Validation, and Usability Inputs

Requirements/Specifications

Contract: N62470-21-D-0007, CTO N6247021F4140 (CH2M)
 N62470-17-D-8003, CTO 64270-17-F-4023 (USAE)
 Quality Assurance Project Plan: UXO 15 RAWP – Attachment A
 Government and Contractor Seed Plans: Provided under separate cover
 Quality Assurance Surveillance Plan: N/A
 SOPs are contained in Attachment: A and B

Table 35-1. Data Verification, Validation, and Usability Inputs

Description	Verification (completeness)	Validation (conformance to specifications)	Usability (achievement of DQOs and MPCs)
Daily Report of Debris Recovered	X	N/A	N/A
Daily Field Reports (analog)	X	N/A	N/A
Instrument Assembly Checklists	X	X	N/A
Field Logbooks	X	X	N/A
Running QC Summary	X	X	N/A
Daily QC and Weekly QA Reports	X	X	X
Corrective Action Reports	X	X	X
GIS Data	X	X	N/A
Seeding Reports/Memoranda	X	X	X
Seed Tracking Logs	X	X	N/A
Project QC Database	X	X	N/A
Disposal Reports	X	X	N/A
Revised CSM	X	X	X

Worksheet #35: Data Verification, Validation, and Usability Inputs (continued)

Table 35-2: Data Verification and Validation Procedures

Activity and Records Reviewed	Requirements/ Specifications	Process Description/Frequency	Responsible Person	Documentation
Digital Forms/ Running QC Summary	QAPP, SOPs	All information is complete for each day of field activities. Any changes/exceptions are documented and reported in accordance with requirements. Required signatures are present.	Remedial Action Implementation QAO	Survey 123 forms/daily data upload with notes/QC summary
QC Seeding	QAPP, QC Seeding Plan, SOPs	QC seeding has been conducted according to QAPP, QC Seeding Plan, and SOPs (see requirements/ specifications). All specifications have been achieved, or exceptions noted. If appropriate, corrective actions have been completed. Signatures and dates are present.	Remedial Action Implementation UXOQCS	QC seeding log files, QC Seed Report, QC Seed Technical Memorandum
QA Seeding	QAPP, QA Seeding Plan, SOPs	QA seeding has been conducted according to QAPP, QA Seeding Plan, and SOPs (see requirements/ specifications). All specifications have been achieved, or exceptions noted. If appropriate, corrective actions have been completed. Signatures and dates are present.	QA and LTM Contractor SUXOS	QA seeding log files, QA Seed Report, QA Seed Technical Memorandum
ITS Construction	QAPP, SOPs	ITS has been constructed according to QAPP. All specifications have been achieved, or exceptions noted. Signature and dates are present.	Remedial Action Implementation UXOQCS	Survey123 forms/Daily Report
Detection Surveys	QAPP, SOPs	Detection survey has been conducted according to the QAPP and appropriate SOPs (see requirements/ specifications). Checklists have been completed. All specifications have been achieved, or exceptions noted. If appropriate, corrective actions have been completed. Signatures and dates are present.	Remedial Action Implementation UXOQCS	SOP checklists specified in process description, Survey 123 reports

Worksheet #35: Data Verification, Validation, and Usability Inputs (continued)

Table 35-2: Data Verification and Validation Procedures

Activity and Records Reviewed	Requirements/ Specifications	Process Description/Frequency	Responsible Person	Documentation
Intrusive Investigation	QAPP, SOPs	Intrusive investigation has been conducted according to the QAPP, appropriate SOPs, and safety documents. All specifications have been achieved, or exceptions noted. If appropriate, corrective actions have been completed. Signatures and dates are present.	Remedial Action Implementation UXOQCS	Lot sheets, MRP Enterprise, UXO 15 RACR
MEC Monitoring	UXO 15 RAWP, QAPP, SOPs	MEC monitoring inspections have been conducted according to the UXO 15 RAWP, QAPP, applicable components of the SOPs, and safety documents.	QA and LTM Contractor SUXOS	MRP Enterprise (as needed), Annual Status Report with completed checklist

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Worksheet #37: Data Usability Assessment

This worksheet documents procedures to be used to perform a DUA. A DUA will be performed at the end of each phase of the remedial action MEC clearance. The DUA involves a qualitative and quantitative evaluation of the collected data to determine if the project data are of the right type, quality, and quantity to support the decisions that need to be made. It involves a retrospective review of the systematic planning process to evaluate whether underlying assumptions are supported, sources of uncertainty have been managed appropriately, data are representative of the population of interest, and the results can be used as intended, with the acceptable level of confidence.

Personnel (Organization and Position/Title) Responsible for Participating in the DUA¹

- QA and LTM Contractor, Dennis Ballam, Project Manager
- QA and LTM Contractor, Jeff McCauley, Munitions Response Safety and QAO
- QA and LTM Contractor, Brett Doerr, Project Delivery and Quality Manager
- Remedial Action Implementation Contractor, Bob Hannan, Project Manager
- Remedial Action Implementation Contractor, Jason Wagner, QAO

Documents Used as Input to Each Phase of the DUA

- Contract Specifications
- QAPP
- Weekly and Daily QC Reports, as applicable
- Reports and Technical Memoranda (listed in Worksheet #14 & 16)
- Nonconformance/RCA/CA Reports
- QC and Validation Seeding Technical Memoranda
- Site-specific Library
- Intrusive investigation results

How will the DUA be Documented?

The final DUA report will be included as an appendix to the UXO 15 Remedial Action Completion Report.

Data usability will be discussed in the DUA Report, which will contain sufficient documentation to support conclusions of the DUA. The following steps describe the documentation and processes to be used during the DUA and notes how DUA results will be presented so they identify trends, relationships (correlations), and anomalies. Copies of original paper forms, if any, will be maintained onsite for reference, and the originals will be forwarded to the data coordinator for review, inclusion in the project database, and final storage in the central project files. The minimum documents used as inputs to the DUAs are listed above.

¹ As of preparation of this QAPP, any individual may be substituted with another qualified individual during implementation of this QAPP.

Worksheet #37: Data Usability Assessment (continued)

Table 37-1: Data Usability Assessment and Documentation

Step 1	<p>Review the project's objectives and sampling design.</p> <p>Are underlying assumptions in the initial CSM valid?</p> <p>Review the DQOs. Were the project boundaries appropriate?</p> <p>Review the sampling design as implemented for consistency with stated objectives. Were sources of uncertainty accounted for and appropriately managed?</p> <p>Summarize any deviations from the planned sampling design and describe their impacts on the DQOs.</p>
Step 2	<p>Review the data verification/validation outputs and evaluate conformance to MPCs documented on Worksheet #12.</p> <p>Review available QA/QC reports, including weekly QC reports, assessment reports, corrective action reports, and the data verification/validation reports.</p> <p>Evaluate the implications of unacceptable QC results. For any nonconformances, was the RCA/CA effective?</p> <p>Evaluate conformance to MPCs documented on Worksheet #12. Summarize the impacts of nonconformances on data usability.</p> <p>Evaluate data completeness. Identify data gaps (i.e., data inputs that have not been satisfied) and summarize their impact on the DQOs.</p>
Step 3	<p>Document data usability, update the CSM, and draw conclusions.</p> <p>Determine if the data can be used as intended, considering implications of deviations and corrective actions.</p> <p>Assess the performance of the sampling design and identify any limitations on data use.</p> <p>Determine whether the data are suitable for proceeding to next phase of the project.</p> <p>Update the CSM, apply decision rules, and draw conclusions.</p>
Step 4	<p>Document lessons learned and make recommendations.</p> <p>Summarize lessons learned and make recommendations for changes to DQOs or the sampling design for the next phase of investigation or future investigations.</p> <p>Prepare the data usability summary report.</p>

References

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- NAVFAC. 2023. *Record of Decision, UXO 15 Puerto Ferro, Atlantic Fleet Weapons Training Area-Vieques, Former Vieques Naval Training Range, Vieques, Puerto Rico*. April.
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Attachment A
Remedial Action Implementation
Contractor Standard Operating
Procedures

PROCEDURE No.: SOP 003
DESCRIPTION: VEGETATION REMOVAL OPERATIONS
REVISION No.: FINAL
DATE: MAY 2018
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1. TITLE PAGE

STANDARD OPERATING PROCEDURE

VEGETATION REMOVAL

Munitions and Explosives of Concern Removal
Former Vieques Naval Training Range
Vieques Island, Puerto Rico

USA Environmental, Inc.

May 2018

PROCEDURE No.: SOP 003
DESCRIPTION: VEGETATION REMOVAL OPERATIONS
REVISION No.: FINAL
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2. RECORD OF CHANGES

The following section identifies any major or minor changes to this standard operating procedure (SOP).

- Major change: Change to SOP that adds operational hazards, or new hazardous items. Change to or revision of supplemental documents could be classified as major change, if the change or revision modifies the operational procedures to the point that safety is affected, or the change or revision introduces new hazards.
- Minor change: Change to an SOP that does not provide additional hazards, additions of new hazardous items, or changes in methods used to eliminate or mitigate hazards. (Example: name, code, or telephone number changes, spelling corrections, references or referenced document locations.)

Date	Supervisor's Signature	Page	Paragraph	Remarks

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PROCEDURE No.: SOP 003
DESCRIPTION: VEGETATION REMOVAL OPERATIONS
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DATE: MAY 2018
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PROCEDURE No.: SOP 003

DESCRIPTION: VEGETATION REMOVAL OPERATIONS

REVISION No.: FINAL

DATE: MAY 2018

PAGE: 5 OF 20

3. REFERENCES

The following references apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, it may be necessary to consult other SOPs and regulatory references.

- USA Environmental, Inc., Work Plan, Munitions and Explosives of Concern Former Vieques Naval Training Range, Vieques Island, Puerto Rico – current version
- Occupational Safety and Health Administration (OSHA) General Industry Standard, 29 CFR 1910 Subparts O and R – current version
- OSHA Construction Standard, 29 CFR 1926 Subpart I – current version
- USACE, Engineer Manual 385-1-1 – current version
- Equipment Operator's Manual(s) and Manufacturer's Publications

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5. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This SOP contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) during the operations at the Former Vieques Naval Training Range, Vieques Island, Puerto Rico. By signature, the undersigned certifies that this SOP is approved for implementation at the project site and will be used to direct operations as described in this SOP.

(Signature to be provided in Final SOP)

Developed by:

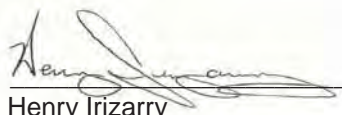


Donald Shaw
Project Manager

05/21/2018

Date

Reviewed by:



Henry Irizarry
Vieques Senior UXO Supervisor

05/21/2018

Date:

Approved by:

Jason W. Wagner

Digitally signed by Jason W. Wagner
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ou=Quality Control Manager, email=jwagner@usatampa.com,
c=US
Date: 2018.05.21 12:29:04 -04'00'

Jason W. Wagner, CMQ/OE
Vieques Quality Manager

Date

This standard operating procedure (SOP) expires four years from the date of approval and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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8. PROCEDURES

8.1 Purpose

The purpose of this Standard Operating Procedure (SOP) is to provide USA Environmental, Inc. (USA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to perform vegetation removal operations on sites contaminated with unexploded ordnance (UXO) or munitions and explosives of concern (MEC).

8.2 Scope

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in vegetation removal operations on the former Vieques Naval Training Range (VNTR) and former Naval Ammunition Support Detachment (NASD) project related areas. This SOP is not a stand-alone document and should be used together with Work Plans, other USAE SOPs, the Site Health and Safety Plan (SHSP), applicable Federal, State, local regulations, and contract restrictions and guidance. Consult the documents listed in Section 4.0 of this SOP for additional compliance issues.

8.3 Selection

Only those personnel that meet the requirements set forth by the Navy and USAE will be utilized at the project site to facilitate safe and efficient vegetation removal operations.

8.4 Training

All training on equipment will be either formal or on-the-job (OJT) training. This training will be documented by site personnel and subject to review for accuracy and completeness.

8.5 Personnel Protective Equipment

Level D personal protective equipment (PPE) is required for all personnel engaged in vegetation removal operations. Clothing includes, but is not limited to:

- Boots used during chainsaw de-vegetation activities must be constructed with cut-resistant material which will protect the employee against contact with a running chain saw, in accordance with 29 CFR 1910.266(d)(1)(v).
- Chainsaw Chaps
- Head protection, in accordance with 29 CFR 1910
- Face protection, in accordance with 29 CFR 1910
- Coveralls or work clothing as prescribed
- Work gloves, leather or canvas as appropriate
- Safety Glasses
- Dust mask, as required by wind conditions and/or the presence of airborne particulate matter
- Other PPE as needed. (e.g., hearing protection, noise attenuators or ear plugs, etc.)

8.6 Team Composition

The Vegetation Removal Team will consist of a minimum of two UXO Technicians and an appropriate number of deforesting personnel. Teams will be structured as an example; one UXO Technician III (UXOTIII), one UXO Technicians II (UXOTII) or UXO Technician I (UXOTI), and an appropriate number of deforesting personnel.

8.7 UXO Technicians

The UXOTIII directs the operation and other team personnel within the context of removal requirements. The UXOTII/I will assist the UXOTIII in overseeing the movement of personnel in and out of the powered equipment operating zone. In addition, the UXO Technician III must be familiar with the hazards, purpose and limitations of equipment being utilized.

8.8 Operator/s

The operator(s) of powered equipment will be qualified and trained on the equipment that they are utilizing (e.g., backhoes, chain saws, power trimmers, pole saws and other manually-operated cutting tools). These personnel do not need to be UXO qualified and will receive the appropriate formal training and OJT in order to operate the equipment in a safe and efficient manner. The operator performs daily inspections and maintenance functions as recommended in the operator's manual. The operator will perform other duties as needed or directed.

8.9 Safety

Safety is paramount and all personnel will observe those safety precautions/warnings that apply or may apply to vegetation removal operations. The precautions listed below are general in nature and personnel will need to review applicable publications for more specific safety precautions/warnings. Distances listed are the minimum required.

- Maintain minimum distance from other teams as established by the Explosives Safety Submission.
- Maintain safe separation distance from UXO personnel engaged in intrusive work.
- Distances may be increased by the Navy Technical Representative (NTR) as determined by site history, UXO items encountered, terrain features, and other factors that may apply.
- Use equipment safety features.
- Do not operate damaged or unserviceable equipment.
- Safety precautions/warnings found in the operator's manual/manufacture's publications will be observed.
- Maintain 6 inches of ground clearance during removal operations.
- Communications (hand signals and voice) will be maintained between the Team Leader and Operator(s) at all times.
- Maintain site control.
- Observe UXO safety precautions for items encountered or suspected.
- Ensure PPE is appropriate, serviceable, and worn/used in a proper manner.
- Do not use the front bucket of backhoes to slide vegetation across the ground.
- Removal of earth using the backhoe during vegetation removal is not permitted.
- Use of a ground guide is required at all times that the backhoe is in operation during vegetation removal operations.

8.10 Operational Procedures

Prior to commencing any vegetation removal operations, the UXOTIII conducts a tailgate safety briefing on the day's operations with emphasis on safety procedures ranging from operating zones, hand and arm and audible warning signals, PPE requirements, heat stress and hydration.

Hand and arm signals and/or audible hand-held devices will be utilized as means of communication. All team personnel must know these signals prior to operations commencing. The hand and arm signals will be documented on the tailgate safety-briefing sheet each morning of operations and at each change of team personnel.

The UXOTIII will be responsible for the direction and manner in which the vegetation is to be removed. Prior to removal operations commencing, and ahead of the vegetation clearing crew, a visual search/survey is conducted to determine the hazards that may be encountered, which may include terrain slope, vegetation types, condition and density, wildlife, environmental concerns, and MEC. The UXO Technicians will perform a visual search for UXO, ordnance scrap, surface debris, and any other obstruction/object that may pose a hazard to team personnel, these hazards will be marked with flagging tape, paint or pin flags. Hazardous items, impassable terrain, or vegetation that may affect operations will be marked and team personnel notified.

Vegetation removal will be performed by manual means by deforesting personnel. The deforesters will utilize chainsaws, power trimmers, pole saws and other manually-operated cutting tools to cut vegetation within a grid. Each piece of equipment will have a powered equipment operating zone (operating zone) of twenty feet that will not be entered by other team members while the equipment is in operation. A UXO Technician will be stationed outside of each operating zone and to the rear of the operator and maintain visual contact with operators at all times. Once the vegetation has been cut the operator will shut the equipment down and then move a minimum of 25 feet from the cut vegetation in the grid back to the UXO Technicians position. At this point, the UXO Technician will signal to the backhoe operator that all personnel are out of the operating area and he can move into position to remove the cut vegetation out of the grid and into a previously cleared grid. Once the vegetation has been removed from that grid by the backhoe the backhoe operator will move the backhoe out of the operating area and shut down the backhoe. Once the backhoe is shut down the UXO Technician will signal to the deforesters they can move into the cutting site, power up the equipment and resume cutting operations.

Team personnel are to ensure that a 6-inch ground clearance is maintained during removal operations. Those areas marked as hazards are to be avoided. The manner in which operations are accomplished will follow safe work practices and procedures. Areas of concern will be addressed to the Senior UXO Supervisor (SUXOS) and/or UXO Safety Officer (UXOSO) as needed. All MEC/UXO items encountered are marked and avoided. Notification of these items will be made to the appropriate personnel.

Backhoes will be operated by properly trained and authorized personnel only. Backhoe work will be performed with a ground guide. If the ground guide becomes distracted or is unable to maintain communication with the backhoe operator, operations will stop until the problem is resolved. Vegetation will be removed primarily with the tail bucket. The tail bucket allows for better control of the environment. The front bucket may be used in some cases. It will never be used in such a manner that causes vegetation to slide across the ground or causes the blade of the bucket to excavate earth.

8.11 Summary

USAE personnel will conduct vegetation removal operations in a safe, efficient, and productive manner and will use this SOP and references, which include changes and revisions.

9. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

The hazard analysis matrix (Table 1) lists the existing and potential hazards associated with conducting vegetation removal activities, along with methods to mitigate the hazards.

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Table 1: Hazard Analysis Matrix

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
Vegetation Removal and Surface Clearance	Slips, Trips, or Falls	Climbing slopes <30°; debris, holes, or crevasses obstructed from view by vegetation.	C/III/4	Personnel will assess their surroundings prior to proceeding with field activities. Ensure footing at all times. Wear leather safety toe work boot with ankle support and non-slip soles.	D/IV/5
	Cold Weather	Seasonal weather patterns	C/III/4	Minimize exposure to cold temperatures, water and wind by wearing layered clothing and wet weather gear. Keeping the feet dry (carry extra socks). Monitor team members for signs of cold stress disorder IAW the APP.	D/IV/5
	Hot Weather Dust	Seasonal weather patterns	C/III/4	Heat stress monitoring, cool drinking water, work-rest schedule, and cool shelter for breaks. Wear eye protection/dust mask (optional). Provide dust suppression.	D/IV/5
	Biological	Biting/stinging insects, spiders, rodents, and hazardous plants	C/III/4	Avoid biological hazards. Wear long-sleeve garments and apply repellent to clothing and exposed skin as needed. Use barrier cream, as necessary.	D/IV/5
	MPPEH	MPPEH reacts to impact by equipment, tools or personnel.	C/II/3	Refer to the ESS. Maintain the TSD between teams for the Northern MRSs (see the hazard control briefing that follows). All personnel will receive a safety briefing prior to commencing site activities. UXO-qualified person will locate an anomalous-free area with the metal detector, prior to placing a pin flag into the ground. Mark all MPPEH items with a red pin flag for later assessment by the SUXOS and the UXOSO.	D/III/5

Activity	Hazard	Triggering Events	Initial Risk Index	Hazard Mitigation	Final Risk Index
	Equipment	Use of equipment	C/II/3	Follow appropriate lifting/carrying procedures. Vegetation removal crew will maintain distance of at least 20 ft from each other. Chainsaw engines will be started and stopped when all co-workers are clear of the saw. Chainsaws will be properly supported when in use. Operator will shut off saw when carrying chainsaw over slippery surfaces, through heavy brush, and when adjacent to personnel. Never use chainsaw above shoulder height. Use of required PPE.	D/III/5
	Fire	Fueling equipment and smoking cigarettes.	C/II/3	Never fuel equipment in back of a truck with a bed liner. Do it on the ground. Use bonding/grounding when transferring flammable liquids. No smoking within 50 ft of fueling operations. No smoking except in designated smoking area equipped with sand-filled bucket for cigarette butts and fire extinguisher.	D/III/5
	Sunburn	Work in outdoor environment.	B/IV/4	Use sunscreen and wear hard hat.	C/IV/5
	Weather or Natural Disaster Emergency	Meteorological or environmental event	C/II/3	Account for all team personnel and, if required, implement the emergency response procedures outlined in the APP.	C/IV/5

9.1 Hazard Control Briefing

All personnel will attend the tailgate safety briefing given by the UXO Technician III or above team member, on the existing and potential hazards within the area they are assigned to work prior to commencing any activities.

Personnel will be cognizant of the surroundings and remain observant of their footing at all times. All personnel will be aware of the signs of heat stress, as described in Section 8.0 of the SHSP, and be able to recognize the onset of heat stress disorders in themselves and their team members.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions, and follow the Emergency Response Plan in Section 14.0 of the SHSP.

Wear long-sleeved clothing and apply insect repellent as warranted to mitigate the impact of biting/stinging insects.

The potential for encountering MPPEH is high. Maintain the TSD as specified in the ESS.

If a munitions item with larger fragmentation distance is encountered, work is to be stopped in order to modify the ESS.

10. DISTRIBUTION

SOP Number	Number of Copies	Organization	Building Number	Signature
	Master	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____

11. DIAGRAMS

Maps and diagrams are located in the approved Work Plan and/or the approved ESS. Teams will be provided maps of the overall project site, medical care locations and evacuation routes prior to beginning site work.

Below is a process diagram for vegetation removal operations:

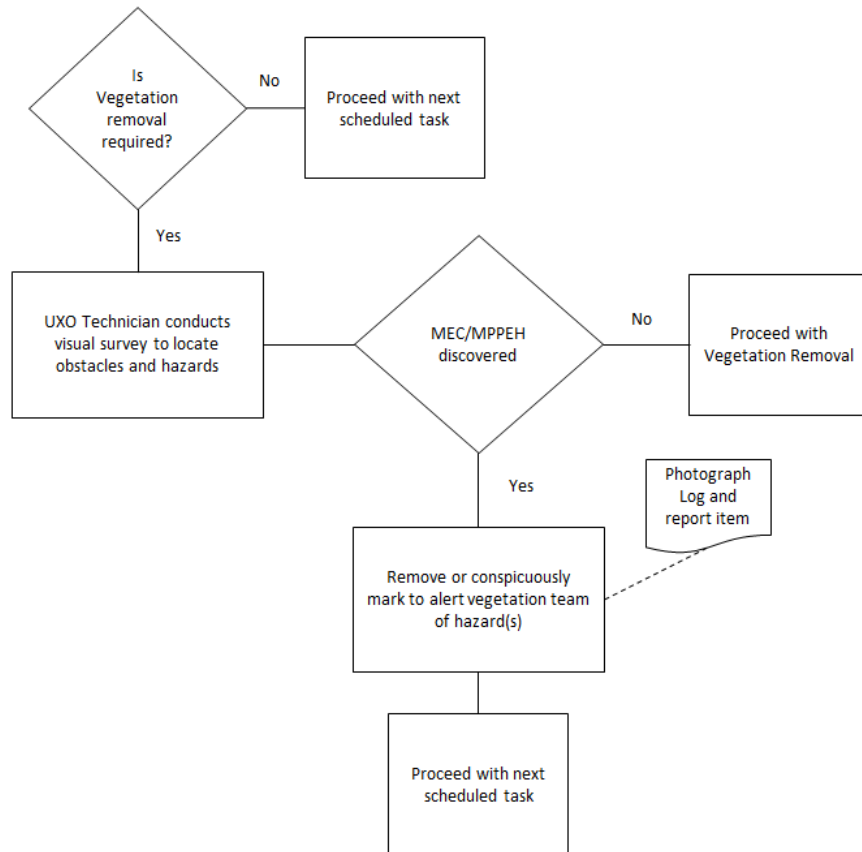


Figure 1: Diagram for Vegetation Removal Operations

12. EQUIPMENT

The team will be equipped with the following:

- Handheld analog detector
- Pin flags for marking suspected MPPEH items
- Logbook and/or personal digital assistant for recording data
- Camera
- Communications equipment.

Equipment used for vegetation cutting includes:

- Brush mower
- Gas-powered trimmers with line or metal blades
- Non-power tools for cutting branches
- Chainsaws.

The required safety equipment includes the following:

- First-Aid kit

- Level D PPE - A work uniform affording minimal protection: used for nuisance contamination only. The following constitute Level D equipment; it may be used as appropriate:

1. Coveralls
2. Gloves ⁽¹⁾
3. Boots/shoes, safety-toe and shank
4. Safety glasses
5. Hard hat ⁽¹⁾
6. Escape mask ⁽¹⁾
7. Face shield ⁽¹⁾

Footnote ⁽¹⁾ Optional, as applicable.

- Chainsaw Chaps if chainsaws are utilized
- Hearing protection (earmuffs/plugs)
- Inclement weather gear, as needed.

Safety equipment is kept in the back of the site vehicles:

- Bed (Pick-up trucks)
- Back cargo area (SUVs)

13. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in Section 12 of the APP will be followed. The single point of contact for incidents on site will be the UXOSO.

In the event that an employee has to be taken to the hospital refer to Section D.12.1 of the APP for the route to the hospital.

A map showing the hospital's location is contained in the Site-Specific Health and Safety Plan provided as Attachment 3.

The single point of contact for incidents on site will be the UXOSO.

The UXOSO will perform pre-emergency planning before starting field activities and during the mobilization and site-specific training phase of the project, and will coordinate emergency response with police/fire/rescue personnel and the nearest hospital.

In the event of an emergency requiring evacuation, the evacuation signal will be given through verbal instructions. Personnel will evacuate to a pre-determined evacuation point in the support zone identified at the daily safety briefing. The UXOSO will account for all personnel and will summon emergency response personnel, if required. If the fire department is summoned, the UXOSO will meet them upon their entrance to the site and will inform them of the presence of MEC, and provide the appropriate fragmentation distance from the fire for the purpose of fighting or preventing the spread of fire from the site evacuation is necessary, all personnel are to:

- Gather equipment to the extent safely possible
- Evacuate to the vehicle(s) location and prepare to move out.

After allowing the appropriate wait time (24 hours in the case of a fire), the SUXOS and the UXOSO will enter the site together and determine if the site is safe for re-entry.

After the emergency situation has been controlled and eliminated, or has passed the Project Manager, UXOSO, and SUXOS will review the emergency response and change procedures if necessary.

PROCEDURE No.: SOP 005

DESCRIPTION: SURFACE MEC REMOVAL

REVISION No.: FINAL

DATE: MAY 2018

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1. TITLE PAGE

STANDARD OPERATING PROCEDURE

SURFACE MEC REMOVAL

Munitions and Explosives of Concern Removal
Former Vieques Naval Training Range
Vieques Island, Puerto Rico

USA ENVIRONMENTAL, INC.

May 2018

PROCEDURE No.: SOP 005
DESCRIPTION: SURFACE MEC REMOVAL
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2. RECORD OF CHANGES

The following section identifies any major or minor changes to this standard operating procedure (SOP).

- Major change: Change to SOP that adds operational hazards, or new hazardous items. Change to or revision of supplemental documents could be classified as major change, if the change or revision modifies the operational procedures to the point that safety is affected, or the change or revision introduces new hazards.
- Minor change: Change to an SOP that does not provide additional hazards, additions of new hazardous items, or changes in methods used to eliminate or mitigate hazards. (Example: name, code, or telephone number changes, spelling corrections, references or referenced document locations.)

Date	Supervisor's Signature	Page	Paragraph	Remarks
MM/DD/YYYY				

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PROCEDURE No.: SOP 005
DESCRIPTION: SURFACE MEC REMOVAL
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PROCEDURE No.: SOP 005

DESCRIPTION: SURFACE MEC REMOVAL

REVISION No.: FINAL

DATE: MAY 2018

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3. REFERENCES

The following references apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, it may be necessary to consult other SOPs and regulatory references.

- USA Environmental, Inc., Work Plan, Munitions and Explosives of Concern Former Vieques Naval Training Range, Vieques Island, Puerto Rico – current version
- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11 – current version
- Explosives Safety Submission (ESS) – current version
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards – current version
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39 – current version
- NAVSEA OP 5 Ammunition and Explosives Safety Ashore. – current version
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual – current version
- DDESB TB 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel – current version
- DOD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- DOD 6055.09-M, DOD Ammunition and Explosives Safety Standards
- DOD 4160.21-M, Defense Reutilization and Marketing Manual
- TM 9-1300-200, Ammunition General
- TM 9-1300-214, Military Explosives.

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5. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This SOP contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) during the operations at the Former Vieques Naval Training Range, Vieques Island, Puerto Rico. By signature, the undersigned certifies that this SOP is approved for implementation at the project site and will be used to direct operations as described in this SOP.

(Signature to be provided in Final SOP)

Developed by:

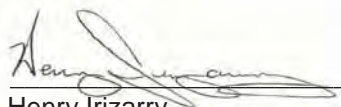


Donald Shaw
Project Manager

05/21/2018

Date

Reviewed by:



Henry Irizarry
Vieques Senior UXO Supervisor

05/21/2018

Date:

Approved by:

Jason W. Wagner

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Jason W. Wagner, CMQ/OE
Vieques Quality Manager

Date

This standard operating procedure (SOP) expires four years from the date of approval and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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8. PROCEDURES

8.1 Purpose

The purpose of this Standard Operating Procedure (SOP) is to provide all USA Environmental, Inc. (USA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to perform surface MEC removal operations at sites potentially containing unexploded ordnance (UXO) and/or munitions and explosives of concern (MEC).

8.2 Scope

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in surface MEC removal operations on the former Vieques Naval Training Range (VNTR) and former Naval Ammunition Support Detachment (NASD) project related areas. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the Site Health and Safety Plan (SHSP), the Explosives Safety Submission (ESS), applicable Federal, State, local regulations. Consult the documents listed in Section 3.0 of this SOP for additional guidance.

8.3 Surface MEC Removal Operations

All surface MEC removal operations at MEC sites will be performed under the direct supervision of fully qualified UXO Technicians. USAE personnel will strictly adhere to the SSHP and the following general safety practices:

- Operations will be conducted during daylight hours only.
- Personnel will NOT excavate to find items that are not visible on the surface during Surface MEC Operations. Grass and other vegetation will be removed to expose undisturbed soil in an effort to locate hidden items on the surface.
- Access to operating areas will be limited to only those personnel necessary to accomplish the specific operation.
- UXO will only be handled by qualified UXO Technicians.
- During UXO operations the minimum separation distance (MSD) between UXO and non-UXO operations is fragmentation distance of the munition with the greatest fragmentation distance (MGFD), as stated in the Explosives Safety Submission.
- During demolition operations personnel remaining on site will be limited to those personnel needed to safely and efficiently prepare the item/s for destruction.
- All personnel will attend the daily safety briefing (tailgate safety briefing) prior to entering the operating area.
- Anyone can stop operations for an unsafe act or situation.
- Safety violations and/or unsafe acts will be immediately reported to the UXO Safety Officer (UXOSO).
- Failure to comply with safety rules/procedures may result in termination of employment.

8.4 Personnel Qualifications

All personnel involved in surface MEC removal operations will meet the training and experience requirement of Department of Defense Explosives Safety Board Technical Paper 18 (DDESB TP 18) for the position assigned

8.5 WORK AREA DETERMINATION AND GRID LAYOUT

Once the Work Area Determination (WAD) has been requested and the initial reconnaissance, WAD walk, has been completed, the removal teams will survey in the grids using a Global Positioning System (GPS) and marking the grids utilizing wooden stakes, or equivalent, in accordance with the MWP. Avoidance procedures will be utilized while performing these operations. The site layout procedures are as follows:

- Identify and mark search grids:
 - Search grids will be 30 Meters X 30 Meters or approximately 100 feet X 100 feet as identified in the WP
 - Grid boundaries will be marked with survey wooden stakes, with survey tape, and temporary survey lanes with white pin flags or rope/twine/string as necessary.
- Establish and, mark if required, search lanes:
 - A typical search lane will be a width of approximately 5 ft. The lanes may or may not be established prior to sweeping. If temporary lanes are marked prior to sweeping it will be done by a UXO technician to ensure safety.
 - For wide area surface clearances, sweep lane boundaries may be marked while sweeping. For example, the sweep line would begin sweeping with a grid boundary on one side and place pin flags on the opposite side of the line as they sweep. This would provide a boundary for the return sweep and ensure 100% coverage.

8.5.1 Flags and Markers

USA uses a system of colored flags/flagging and markers to identify MEC scrap metal, search lanes, and site, zone, and grid boundaries. Table 1 lists the types of markers used.

Table 1: Marking Material

Type Marker	Flag/Flagging Color	Item/Area Marked
Stake	Pink	Grid boundary
Pin Flag	White	Temporary Boundary
Pin Flag	Red	MEC
Pin Flag	Red and Yellow	Sub-Munition
Pin Flag	Blue	MEC Scrap

8.5.2 Surface MEC Removal

The purpose of a surface MEC removal within a grid is twofold: first to locate, mark, and record the location of the surface MEC contamination contained in each grid; and second to consolidate the scrap metal contamination within each grid.

8.5.2.1 Surface MEC Removal Team Structure

The surface MEC removal teams will be supervised by a UXO Technician III and consist of a combination of the appropriate number of UXO Technicians II/I, not to exceed eight. MEC operations will only be performed by qualified UXO Technicians. The following is an example and composition of a typical Sweep Team:

- One UXO Technician III, who directs and supervises all team activities, confirms the identification of all MEC encountered, and maintains the sweep team journal.
- The UXO Technicians II/I's who visually search the area for MEC. These personnel perform their duties under the direction and supervision of the UXO Technician III.

8.5.2.2 Surface MEC Removal Team Procedures

All removal operations will be performed under the direct supervision of a qualified UXO Technician III. The UXO Technician III will assemble the UXOT II/I's into their sweep lane and direct their movement across the survey grid.

- At the direction of the UXOT III each grid will be broken down into 5 foot lanes and a UXOT II/I will sweep each lane. The UXOT's will move through their lane from one end to the other. During the surface clearance the following will occur with regards to items encountered;
 - When an item is encountered, the UXO Technician will stop and inspect the object to determine if it is scrap or MEC
 - If an item is MD scrap and can be moved it will be picked up and placed in the 5 gallon bucket
 - If the item is scrap but cannot be picked up or is buried the item will be left in place and marked with a blue pin flag
 - If the item is MEC it is marked with a red pin flag
 - This procedure is continued until the grid is completely swept.
- The UXO Technician III will follow behind the sweep line insuring that proper spacing is maintained, inspect and verify the identification of the flagged items, and record data in the PDA as to the type, nomenclature, and location.
- Upon completion of the grid sweep the sweep team will recover and stockpile metal scrap at a central location. Under the direct supervision of the UXO Technician III, the scrap will be stockpiled in a central location in the grid. Items marked with Red Pin Flags will be left in place for the Scrap Management/Disposal Team.

8.5.3 Magnetometer Assisted Surface Sweep

Magnetometer assisted surface sweep procedures are basically the same as surface sweeps. In addition to identifying surface contamination, magnetometers are used to locate buried MEC that may be concealed by brush or heavy grasses. Instructions on the use and calibration of magnetometers are in the operations manual. The purpose of a magnetometer assisted-surface sweep of a grid is to first locate, mark, and record the location of the surface and buried MEC contamination contained in each grid; and second to consolidate the scrap metal contamination within each grid. The typical span of control for a UXOTIII should not exceed seven magnetometer operators. This ensures positive control and safety.

8.5.3.1 Magnetometer Assisted Surface Sweep Team Structure

The sweep team will consist of all UXO Technicians. The following is the structure and composition of a typical Sweep Team:

- One UXO Technician III, who directs and supervises all team activities, confirms the identification of all MEC encountered, and maintains the sweep team journal.
- The appropriate number of UXO Technicians II/I's, not to exceed eight, utilizing handheld magnetometers who visually and electronically search the area for MEC and scrap. These personnel perform their duties under the direct supervision of the UXO Technician III.

8.5.3.2 Magnetometer Assisted Surface Sweep Team Procedures

All sweep operations will be performed under the direct supervision of a qualified UXO Technician III. The UXO Technician III will assemble the Magnetometer Operators into a sweep line and direct their movement across the survey grid. Procedures will be the same as detailed in Section 9.2.2.2 with the exception that the UXO Technicians will utilize the magnetometer to assist in searching in the grids.

9. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

9.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the UXO Technician III or above team member, on the existing and potential hazards within the area they are assigned to work prior to commencing any activities.

Personnel will be cognizant of the surroundings and remain observant of their footing at all times. All personnel will be aware of the signs of heat stress, as described in Section 8.0 of the SHSP, and be able to recognize the onset of heat stress disorders in themselves and their team members.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions, and follow the Emergency Response Plan in Section 14.0 of the SHSP.

- Wear long-sleeved clothing and apply insect repellent as warranted to mitigate the impact of biting/stinging insects.
- The potential for encountering MPPEH is high. Maintain the TSD as specified in the ESS.
- If a munitions item with larger fragmentation distance is encountered, work is to be stopped in order to modify the ESS.

10. DISTRIBUTION

SOP Number	Number of Copies	Organization	Building Number	Signature
	Master	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____

11. DIAGRAMS

Maps and diagrams are located in the approved Work Plan and/or the approved ESS. Teams will be provided maps of the overall project site, medical care locations and evacuation routes prior to beginning site work.

12. EQUIPMENT

The team will be equipped with the following:

- Handheld metal or all metals detector

- Pin flags for marking paths, and items not able to be moved or items that remain in the ground
- Logbook and/or Personal Digital Assistant (PDA) for recording data
- Camera
- Communications equipment

The required safety equipment includes the following:

- First-Aid kit
- Level D PPE - A work uniform affording minimal protection: used for nuisance contamination only.
 - The following constitute Level D equipment; items may be used as appropriate:
 1. Gloves⁽¹⁾
 2. Boots/shoes
 3. Safety glasses
 4. Hard hat⁽¹⁾
- Footnote ⁽¹⁾ Optional, as applicable.
- Fire extinguisher
- Inclement weather gear as needed

Safety equipment is kept in the back of the site vehicles:

- Bed (Pick-up trucks)
- Back cargo area (SUVs)

13. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in Section 12 of the APP will be followed. The single point of contact for incidents on site will be the UXOSO.

In the event that an employee has to be taken to the hospital refer to Section D.12.1 of the APP for the route to the hospital.

A map showing the hospital's location is contained in the Site-Specific Health and Safety Plan provided as Attachment 3.

The single point of contact for incidents on site will be the UXOSO.

The UXOSO will perform pre-emergency planning before starting field activities and during the mobilization and site-specific training phase of the project, and will coordinate emergency response with police/fire/rescue personnel and the nearest hospital.

In the event of an emergency requiring evacuation, the evacuation signal will be given through verbal instructions. Personnel will evacuate to a pre-determined evacuation point in the support zone identified at the daily safety briefing. The UXOSO will account for all personnel and will summon emergency response personnel, if required. If the fire department is summoned, the UXOSO will meet them upon their entrance to the site and will inform them of the presence of MEC, and provide the appropriate fragmentation distance from the fire for the purpose of fighting or preventing the spread of fire from the site evacuation is necessary, all personnel are to:

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- Gather equipment to the extent safely possible
- Evacuate to the vehicle(s) location and prepare to move out.

After allowing the appropriate wait time (24 hours in the case of a fire), the SUXOS and the UXOSO will enter the site together and determine if the site is safe for re-entry.

After the emergency situation has been controlled and eliminated, or has passed the Project Manager, UXOSO, and SUXOS will review the emergency response and change procedures if necessary.

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PROCEDURE No.: SOP 006

DESCRIPTION: MEC TRANSPORTATION

REVISION No.: FINAL

DATE: MAY 2018

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1. TITLE PAGE

STANDARD OPERATING PROCEDURE

MEC TRANSPORTATION

Munitions and Explosives of Concern Removal
Former Vieques Naval Training Range
Vieques Island, Puerto Rico

USA ENVIRONMENTAL, INC.

May 2018

PROCEDURE No.: SOP 006
DESCRIPTION: MEC TRANSPORTATION
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2. RECORD OF CHANGES

The following section identifies any major or minor changes to this standard operating procedure (SOP).

- Major change: Change to SOP that adds operational hazards, or new hazardous items. Change to or revision of supplemental documents could be classified as major change, if the change or revision modifies the operational procedures to the point that safety is affected, or the change or revision introduces new hazards.
- Minor change: Change to an SOP that does not provide additional hazards, additions of new hazardous items, or changes in methods used to eliminate or mitigate hazards. (Example: name, code, or telephone number changes, spelling corrections, references or referenced document locations.)

Date	Supervisor's Signature	Page	Paragraph	Remarks

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PROCEDURE No.: SOP 006

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REVISION No.: FINAL

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3. REFERENCES

The following references apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, it may be necessary to consult other SOPs and regulatory references.

- USAE, Inc. Final Work Plan Munitions and Explosives of Concern Removal for the Former Vieques Naval Training Range Vieques Island, Puerto Rico,
- CH2M HILL, Inc. Final Explosives Safety Submission, Former VNTR and the Former NASD, Vieques, Puerto Rico.
- CH2M HILL Inc. Final Non-Time Critical Removal Action/Interim Measures Work Plan for Surface Munitions and Explosives of Concern at Munitions Response Area-Surface Impact Area, Munitions Response Sites 1 through 7, Former Vieques Naval Training Range (VNTR), Vieques, Puerto Rico.
- NAVSEA OP 5. Ammunition and Explosives Safety Ashore

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PROCEDURE No.: SOP 006

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5. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This SOP contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) during the operations at the Former Vieques Naval Training Range, Vieques Island, Puerto Rico. By signature, the undersigned certifies that this SOP is approved for implementation at the project site and will be used to direct operations as described in this SOP.

(Signature to be provided in Final SOP)

Developed by:

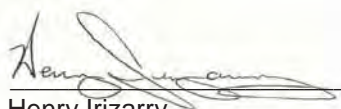


Donald Shaw
Project Manager

05/21/2018

Date

Reviewed by:



Henry Irizarry
Vieques Senior UXO Supervisor

05/21/2018

Date:

Approved by:

Jason W. Wagner

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ou=Quality Control Manager,
email=jwagner@usatampa.com, c=US
Date: 2018.05.21 12:30:56 -04'00'

Jason W. Wagner, CMQ/OE
Vieques Quality Manager

Date

This standard operating procedure (SOP) expires four years from the date of approval and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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8. PROCEDURES

8.1 General

The following USAE policies are not all inclusive nor are they applicable in all situations. This SOP is not a stand-alone document and is to be used together with the Work Plan (WP), Site Health and Safety Plan (SHSP), applicable Federal, State, Commonwealth, local regulations and, contract restrictions and guidance.

8.2 Introduction

Movement and/or Transportation of MEC and/or MPPEH may be a consideration once evaluated and determined to be safe to do and there is a compelling reason.

8.3 Determination To Move And/Or Transport MEC And/Or MPPEH

8.3.1 Movement

Prior to on-site movement, MEC and/or MPPEH must be evaluated and determined to be safe to move as follows:

- For MEC and/or MPPEH, including suspect munitions items, the SUXOS and UXOSO must determine that the risk associated with movement is acceptable and that the movement is necessary for the efficiency of the activities being conducted or the protection of personnel, property or critical assets. The SUXOS and UXOSO must agree with the risk determination and document this decision in writing prior to movement of the MEC or munitions item.
- Recovered military munitions or MEC will not be moved by personnel unless it is safe to do so. Movement of MEC by hand is authorized only after positive identification and a determination by the SUXOS and UXOSO that the MEC is safe to move. A conservative approach to MEC transportation will be taken and only considered when the item is positively identified as safe to move.

8.3.2 Transportation of Material Documented as an Explosive Hazard and Material Documented as Safe

MPPEH is assessed by visual inspection requires a 100% inspection by one UXOTIII or above, followed by an independent 100% re-inspection by a UXOTIII. The assessment categorizes the MPPEH as material documented as safe (MDAS). Documentation of the material's safety status must be maintained and accompany the movement or the material will revert to MPPEH and require the inspection process to be performed again.

8.4 Procedures for Transportation of MEC

If on-site movement of MEC for disposal or venting is approved, move the MEC in accordance with technical data. Movement over short distances for on-site consolidation will be done by hand-carrying the MEC in the position found.

Movement of greater distances (e.g., to another grid for disposal or venting) may be done in a specially-equipped pickup truck. The truck must have the appropriate placards and a non-sparking sand filled container with tie-down points. The MEC will be stabilized with sandbags and or additional sand. The wooden box will be securely tied down. The driver of the transport vehicle will be followed by another similar vehicle and driver to assist him in loading and unloading the MEC, and in the event of mechanical trouble.

During the transportation of any MEC the vehicle will be considered a non-smoking area.

9. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

9.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the UXO Technician III or above team member, on the existing and potential hazards within the MPPEH holding area prior to commencing any MPPEH Management or Disposal activities.

Personnel will be cognizant of the surroundings and remain observant of their footing at all times. All personnel will be aware of the signs of heat stress, as described in Section 8.0 of the SHSP, and be able to recognize the onset of heat stress disorders in themselves and their team members.

The potential for encountering MDEH comingled with MPPEH or MDAS is very low. Should MDEH be discovered, it will be left in place, the SUXOS and the UXOQCS will be notified to investigate the occurrence and determine the corrective actions. The grid will have to undergo re-inspection.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions, and follow the Emergency Response Plan in Section 14.0 of the SHSP.

10. DISTRIBUTION

SOP Number	Number of Copies	Organization	Building Number	Signature
	Master	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____

11. DIAGRAMS

Maps and diagrams are located in the approved Work Plan and/or the approved ESS. Teams will be provided maps of the overall project site, medical care locations and evacuation routes prior to beginning site work.

12. EQUIPMENT

The team will be equipped with the following:

- Handheld analog detector
- Logbook and/or Personal Digital Assistant (PDA) for recording data
- Camera
- Communications equipment

The required safety equipment includes the following:

- First-Aid kit
- Level D PPE - A work uniform affording minimal protection: used for nuisance contamination only.
 - The following constitute Level D equipment; items may be used as appropriate:
 1. Coveralls
 2. Gloves⁽¹⁾
 3. Boots/shoes, safety-toe and shank
 4. Safety glasses
 5. Hard hat⁽¹⁾
- Footnote ⁽¹⁾ Optional, as applicable.
- Fire extinguisher
- Inclement weather gear as needed

Safety equipment is kept in the back of the site vehicles:

- Bed (Pick-up trucks)
- Back cargo area (SUVs)

13. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in Section 12 of the APP will be followed. The single point of contact for incidents on site will be the UXOSO.

In the event that an employee has to be taken to the hospital refer to Section D.12.1 of the APP for the route to the hospital.

A map showing the hospital's location is contained in the Site-Specific Health and Safety Plan provided as Attachment 3.

The single point of contact for incidents on site will be the UXOSO.

The UXOSO will perform pre-emergency planning before starting field activities and during the mobilization and site-specific training phase of the project, and will coordinate emergency response with police/fire/rescue personnel and the nearest hospital.

In the event of an emergency requiring evacuation, the evacuation signal will be given through verbal instructions. Personnel will evacuate to a pre-determined evacuation point in the support zone identified at the daily safety briefing. The UXOSO will account for all personnel and will summon emergency response personnel, if required. If the fire department is summoned, the UXOSO will meet them upon their entrance to the site and will inform them of the presence of MEC, and provide the appropriate fragmentation distance from the fire for the purpose of fighting or preventing the spread of fire from the site evacuation is necessary, all personnel are to:

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- Gather equipment to the extent safely possible
- Evacuate to the vehicle(s) location and prepare to move out.

After allowing the appropriate wait time (24 hours in the case of a fire), the SUXOS and the UXOSO will enter the site together and determine if the site is safe for re-entry.

After the emergency situation has been controlled and eliminated, or has passed the Project Manager, UXOSO, and SUXOS will review the emergency response and change procedures if necessary.

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PROCEDURE No.: SOP 007

DESCRIPTION: TRIMBLE RTK SYSTEM

REVISION No.: FINAL

DATE: MAY 2018

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1. TITLE PAGE

STANDARD OPERATING PROCEDURE

TRIMBLE RTK SYSTEM

Munitions and Explosives of Concern Removal
Former Vieques Naval Training Range
Vieques Island, Puerto Rico

USA ENVIRONMENTAL, INC.

May 2018

PROCEDURE No.: SOP 007
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2. RECORD OF CHANGES

The following section identifies any major or minor changes to this standard operating procedure (SOP).

- Major change: Change to SOP that adds operational hazards, or new hazardous items. Change to or revision of supplemental documents could be classified as major change, if the change or revision modifies the operational procedures to the point that safety is affected, or the change or revision introduces new hazards.
- Minor change: Change to an SOP that does not provide additional hazards, additions of new hazardous items, or changes in methods used to eliminate or mitigate hazards. (Example: name, code, or telephone number changes, spelling corrections, references or referenced document locations.)

Date	Supervisor's Signature	Page	Paragraph	Remarks

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3. REFERENCES

The following references apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, it may be necessary to consult other SOPs and regulatory references.

- USA Environmental, Inc., Work Plan, Munitions and Explosives of Concern Former Vieques Naval Training Range, Vieques Island, Puerto Rico
- NOSSAINST 8023.11B, DON Standard Operating Procedures Development, Implementation, and Maintenance for Ammunition and Explosives
- Manufacturer's Publications

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5. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This SOP contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) during the operations at the Former Vieques Naval Training Range, Vieques Island, Puerto Rico. By signature, the undersigned certifies that this SOP is approved for implementation at the project site and will be used to direct operations as described in this SOP.

(Signature to be provided in Final SOP)

Developed by:

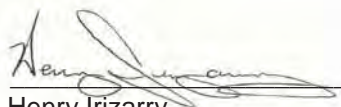


Donald Shaw
Project Manager

05/21/2018

Date

Reviewed by:



Henry Irizarry
Vieques Senior UXO Supervisor

05/21/2018

Date:

Approved by:

Jason W. Wagner

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Jason W. Wagner, CMQ/OE
Vieques Quality Manager

Date

This standard operating procedure (SOP) expires four years from the date of approval and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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PROCEDURE No.: SOP 007
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PROCEDURE No.: SOP 007
DESCRIPTION: TRIMBLE RTK SYSTEM
REVISION No.: FINAL
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8. PROCEDURES

8.1 INTRODUCTION

The purpose of this Standard Operating Procedure (SOP) is to provide USA Environmental, Inc. (USA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to conduct Trimble RTK operations on sites contaminated with unexploded ordnance (UXO) or munitions and explosives of concern (MEC).

8.2 Scope

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in Trimble RTK operations on the former Vieques Naval Training Range (VNTR) and former Naval Ammunition Support Detachment (NASD) project related areas. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the Site Health and Safety Plan (SHSP), the Explosives Safety Submission (ESS), applicable Federal, State, local regulations. Consult the documents listed in Section 2.0 of this SOP for additional guidance

8.3 How to Perform a GPS Quality Control Test

1. *Location:* the standard QC checkpoint is located at OP-1 between the two bombs. The checkpoint name is OP-1-C. Written on one of the bombs is the Easting and Northing coordinates of checkpoint OP1-C. Additional control monuments with check points are located at various locations around Vieques. Find the closest control monument to the area that the work is being performed.
2. *Assemble GPS equipment:* Set up the RTK base station at a known control monument and start a survey using procedures taught during RTK GPS training. Set up RTK rover and ensure that the rover is receiving radio corrections from the base station. Check to make sure the batteries are charged by looking at the battery indicator lights on the receiver. Also, check the receiver's satellite and radio indicator lights. Both lights should be blinking at consistent intervals.
3. *Trimble Survey Controller procedures when measuring a QC point:* When in the datalogger main menu (Figure 1), select Files> Open Job. Select the desired job name. Once loaded the name will be displayed in top left corner, and Survey Controller will return to main menu. Once a job has been selected, it will remain the active job even if the system is powered off and back on. Do not change the Job unless you are required to.
4. *Measuring a Point*
 - From the main menu select Survey>RTK>Measure Points. A new window will appear prompting for point name and code. Enter the desired point name and accompanying code. The QC point naming convention is the date followed with "gpsqc". The code is the point's location, typically OP-1-C.
 - Before measuring the point, check to the bottom middle of the screen to make sure there is a "fixed" position. If the RTK is in "float" or there is a "poor PDOP" message, do not measure the point. More about "float" will be addressed in the troubleshooting section of the SOP.
 - There is a small black circle on the concrete labeled "qc point". Place the staff point inside this circle and use the bubble on the field staff level to center the GPS antenna on the QC checkpoint.
 - Once the GPS antenna is positioned and leveled, hit the "measure point" button in the bottom right corner of the datalogger screen. A timer will appear and count down, typically between 3-5 seconds, during which the staff must remain leveled and on the point. When the countdown is complete, tap the "enter" button in the bottom right corner. A new window will appear, tap the "store" button in the bottom right corner.

- To check the coordinates of the QC point, from the main menu tap Files>Review Current Job. Select the point name that matches the QC point name and tap. The data quality objectives for RTK GPS must be within 10cm of the original point location. Compare the original point coordinates to the QC point coordinates. If the QC point's Easting and Northing is measured to within 10cm of the original then it has passed the QC test and can be used throughout the day. If it fails, measure the point again. If the QC point fails a second QC, check the base station setup to be sure it was set up correctly. Check the coordinates entered for the base station monument to be sure they were entered correctly. Do not start survey work until the QC test passes the 10cm requirement.

8.4 HOW TO STAKEOUT A GPS POINT

1. When reacquiring a GPS coordinate use the "stakeout" function on the datalogger to guide you to the point's coordinates. Using the stakeout function is similar to measuring a point but instead of you measuring a new position, the GPS will guide you to a known coordinate.
2. In the Main Menu on the datalogger screen select Survey>RTK>Stakeout.
3. Select a point name from the list of points. If the point name does not appear on the list then it has not been added. Select "add" on the bottom of the screen. Then select "all points". All points stored in the datalogger "linked files" will be added to the point list. Select the point you want to stakeout.
4. A new window will appear with the direction of the desired point indicated with an arrow. Meters north, south, east, or west also lists the offset.
5. When you are within 1m of the point the directional arrow will change to crosshairs, and the point will be represented by two circles inside of one another.
6. Position the crosshairs inside the inner circle with the staff leveled and select "measure" in the bottom right corner. The screen will change, prompting the user to enter a new point name and associated code. Once completed, tap "measure" and a countdown will begin.
7. After the countdown, tap "store".
8. The window will change to indicate the computed offsets of the new stakeout versus the original point.

8.5 HOW TO DOWNLOAD DATA

1. From the main menu select Files>Import/Export>Send ASCII Data. In file format, select Comma Delimited (.CSV).
2. Send to "Trimble Data", Trimble Data is a folder in the datalogger's file directory.
3. To name is where you enter what the file you are creating is going to be called.
4. The remaining drops down menus have "fields". The "fields" are columns in the .CSV file format and are similar to columns in an Excel file but unlike Excel files .CSV format does not have headers. Point name is assigned Field 1. Point Code is assigned Field 5. Northing is assigned Field 2. Easting is assigned Field 3. Elevation is assigned Field 4.
5. Select enter and the file is created and stored in the "Trimble Data" folder.
6. To transfer the file from the datalogger to a different computer you will need the datalogger, a multiport connector (if using a TSCe datalogger), and a USB cable. In addition, Microsoft ActiveSync software (Windows XP) must be installed on the computer downloading the data otherwise you will not be able to connect the computer with the datalogger. For computers with Windows Vista or Windows 7, the necessary software is already installed and is called Windows Mobile Device Center.

7. Attach the multi-port connector to the TSCe then connect the TSCe to your computer with the USB cable. For a TSC2 or TSC3 datalogger, connect the USB cable directly between the datalogger and the computer. When connected with the USB cable Microsoft ActiveSync/ Windows Mobile Device Center will start. A window will appear on the datalogger screen asking you to "Connect to desktop?" Select "Yes". The software will indicate your computer is connected to a mobile device and prompt you to synchronize the two devices. Do not synchronize your computer with the datalogger. Select "Cancel" and you will be signed on to the datalogger as a "Guest". For Mobile Device Center, click Connect without Setting up Device. This will allow you to transfer files between the two devices but not change or delete files.
8. In the ActiveSync main menu, select "Explore". Double click on "Disk" folder then double click on the "Trimble Data" folder. In Mobile Device Center, click File Management, then double click on the "Disk" folder then double click on the "Trimble Data" folder.
9. Select the file you created and copy it from the datalogger to your computer.

8.6 HOW TO UPLOAD DATA TO THE TSCE

1. To upload files to the datalogger you will need the datalogger, a multi-port connector (if using the TSCe datalogger), and a USB cable. In addition, Microsoft ActiveSync software (Windows XP) must be installed on the computer downloading the data otherwise you will not be able to connect the computer with the datalogger. For computers with Windows Vista or Windows 7, the necessary software is already installed and is called Windows Mobile Device Center.
2. Types of files you can upload to the datalogger are .CSV, .SHP, .DBX, etc. The most common file you will need to upload will be .CSV files, which contain point names and coordinates. Comma Delimited files (.CSV) can be created in Excel but the file must be saved as a .CSV to work properly on the datalogger.
3. Attach the multi-port connector to the TSCe then connect the TSCe to your computer with the USB cable. For a TSC2 or TSC3 datalogger, connect the USB cable directly between the datalogger and the computer. When connected with the USB cable Microsoft ActiveSync/ Microsoft Mobile Device Center will start. A window will appear on the datalogger screen asking you to "Connect to desktop?" Select "Yes". The software will indicate your computer is connected to a mobile device and prompt you to synchronize the two devices. Do not synchronize your computer with the datalogger. Select "Cancel" and you will be signed on to the datalogger as a "Guest". For Mobile Device Center, click Connect without Setting up Device. This will allow you to transfer files between the two devices but not change or delete files.
4. In the ActiveSync main menu, select "Explore". Double click on "Disk" folder then double click on the "Trimble Data" folder. . In Mobile Device Center, click File Management, then double click on the "Disk" folder then double click on the "Trimble Data" folder.
5. Select the file you created and copy it from your computer to the datalogger's "Trimble Data" folder.
6. Disconnect the datalogger from your computer.
7. On the datalogger main menu, select "Files" then "Properties of current job".
8. You will need to link the file to the current job. Select "Linked files" then select the file you want to link. When a file is linked to a job, it will have a check mark beside the file name. Multiple files can be link to a job. Linked files cannot be overwritten when linked to a job. If you are trying to export a file with the same name as a linked file, you will get a "file error" and the file will not be exported.

8.7 TROUBLESHOOTING COMMON GPS PROBLEMS

1. *Loss of radio link:* When the GPS receiver is not receiving radio corrections from the GPS base station you will not be able to measure points or stakeout points accurately. The radio indicator light on the GPS receiver will stop blinking and/or will be blinking at inconsistent intervals. Loss of radio can be caused by being too far away from the base station radio, by not having "line of sight" to the base station radio, or by another radio transmitting on the same frequency. Radio transmission can be interrupted when the signal is blocked by a being behind a mountain or when trying to use the GPS receiver when up against a steep bank or cliff.
2. *Lack of satellites:* For RTK quality, GPS the satellite icon must be receiving a minimum of five satellites in a favorable geometry. The number of satellites appears on the right side of datalogger's main menu. A lack of enough satellites will cause the GPS receiver to "float". The "float" indicator is at the bottom of the screen when measuring or staking out a point. A lack of satellites can be caused by have the satellite signal blocked by objects such as overhanging tree branches or by not having enough satellites overhead. When the system begins to "float" make sure there is nothing blocking the GPS dome. If the system is not being blocked by physical objects then check the satellite indicator and wait until there are more satellites. Usually, additional satellites will appear within 15 minutes as the satellites orbit the planet.
3. *Battery power:* Battery strength for the GPS receiver is indicated on the datalogger by the battery icon and displays remaining strength as a percentage. Battery power can also be checked on the front panel of the GPS receiver with blinking lights. Before a battery drains, the green light will blink rapidly with a warning from the datalogger.

9. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

9.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the UXO Technician III or above team member, on the existing and potential hazards within the area they are assigned to work prior to commencing any activities.

Personnel will be cognizant of the surroundings and remain observant of their footing at all times. All personnel will be aware of the signs of heat stress, as described in Section 8.0 of the SHSP, and be able to recognize the onset of heat stress disorders in themselves and their team members.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions, and follow the Emergency Response Plan in Section 14.0 of the SHSP.

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10. DISTRIBUTION

SOP Number	Number of Copies	Organization	Building Number	Signature
	Master	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____

11. DIAGRAMS

Maps and diagrams are located in the approved Work Plan and/or the approved ESS. Teams will be provided maps of the overall project site, medical care locations and evacuation routes prior to beginning site work.

12. EQUIPMENT

The team will be equipped with the following:

- Logbook and/or Personal Digital Assistant (PDA) for recording data
- Camera
- Communications equipment

The required safety equipment includes the following:

- First-Aid kit
- Level D PPE - A work uniform affording minimal protection: used for nuisance contamination only.
 - The following constitute Level D equipment; items may be used as appropriate:
 4. Coveralls
 5. Gloves⁽¹⁾
 6. Boots/shoes
 7. Safety glasses
 8. Hard hat⁽¹⁾

Footnote ⁽¹⁾ Optional, as applicable.

- Fire extinguisher
- Inclement weather gear as needed

Safety equipment is kept in the back of the site vehicles:

- Bed (Pick-up trucks)
- Back cargo area (SUVs)

12.1 EQUIPMENT FOR TRIMBLE RTK SYSTEM

12.1.1 Base GPS Station Equipment

1. Base GPS receiver (model 5800/ R8 GNSS)
2. GPS antenna tripod with leveling bubble
3. GPS/Radio power cable – “Y” cable
4. GPS/radio cable
5. Base Radio (TrimMark3)
6. Base radio tripod
7. Base radio antenna
8. Base radio antenna cable
9. Base radio 12v battery (deep discharge battery)
10. TSCE Controller cables (limo to DB9 & DB9 to DB9)
11. Serial to Serial cable

12.1.2 Rover GPS Equipment

1. Rover GPS receiver with integrated antenna and radio (model 5800/ R8 GNSS)
2. Rover Antenna range pole
3. Datalogger (TSCe/ TSC2/ TSC3 with Stylus)
4. Rover radio antenna whip
5. Rover batteries
6. Rover/datalogger pigtail cable (Limo to DB9)
7. Datalogger/serial cable (DB9 to DB9)
8. Datalogger Range Pole Bracket

13. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in Section 12 of the APP will be followed. The single point of contact for incidents on site will be the UXOSO.

In the event that an employee has to be taken to the hospital refer to Section D.12.1 of the APP for the route to the hospital.

A map showing the hospital's location is contained in the Site-Specific Health and Safety Plan provided as Attachment 3.

The single point of contact for incidents on site will be the UXOSO.

The UXOSO will perform pre-emergency planning before starting field activities and during the mobilization and site-specific training phase of the project, and will coordinate emergency response with police/fire/rescue personnel and the nearest hospital.

In the event of an emergency requiring evacuation, the evacuation signal will be given through verbal instructions. Personnel will evacuate to a pre-determined evacuation point in the support zone identified at the daily safety briefing. The UXOSO will account for all personnel and will summon emergency response personnel, if required. If the fire department is summoned, the UXOSO will meet them upon their entrance to the site and will inform them of the presence of MEC, and provide the appropriate fragmentation distance from the fire for the purpose of fighting or preventing the spread of fire from the site evacuation is necessary, all personnel are to:

- Gather equipment to the extent safely possible
- Evacuate to the vehicle(s) location and prepare to move out.

After allowing the appropriate wait time (24 hours in the case of a fire), the SUXOS and the UXOSO will enter the site together and determine if the site is safe for re-entry.

After the emergency situation has been controlled and eliminated, or has passed the Project Manager, UXOSO, and SUXOS will review the emergency response and change procedures if necessary.

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PROCEDURE No.: SOP 012

DESCRIPTION: QUALITY CONTROL SURVEILLANCE

REVISION No.: FINAL

DATE: MAY 2018

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1. TITLE PAGE

STANDARD OPERATING PROCEDURE

QUALITY CONTROL SURVEILLANCE

Munitions and Explosives of Concern Removal
Former Vieques Naval Training Range
Vieques Island, Puerto Rico

USA ENVIRONMENTAL, INC.

May 2018

PROCEDURE No.: SOP 012
DESCRIPTION: QUALITY CONTROL SURVEILLANCE
REVISION No.: FINAL
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2. RECORD OF CHANGES

The following section identifies any major or minor changes to this standard operating procedure (SOP).

- Major change: Change to SOP that adds operational hazards, or new hazardous items. Change to or revision of supplemental documents could be classified as major change, if the change or revision modifies the operational procedures to the point that safety is affected, or the change or revision introduces new hazards.
- Minor change: Change to an SOP that does not provide additional hazards, additions of new hazardous items, or changes in methods used to eliminate or mitigate hazards. (Example: name, code, or telephone number changes, spelling corrections, references or referenced document locations.)

Date	Supervisor's Signature	Page	Paragraph	Remarks
MM/DD/YYYY				

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PROCEDURE No.: SOP 012
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3. REFERENCES

The following references apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, it may be necessary to consult other SOPs and regulatory references.

- USA Environmental, Inc., Work Plan, Munitions and Explosives of Concern Former Vieques Naval Training Range, Vieques Island, Puerto Rico – current version
- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11 – current version
- Explosives Safety Submission (ESS) – current version
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards – current version
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39 – current version
- NAVSEA OP 5 Ammunition and Explosives Safety Ashore. – current version
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual – current version
- DDESB TB 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel – current version
- DOD 6055.09-M, DOD Ammunition and Explosives Safety Standards – current version
- MIL-STD 1916, 2006. DOD Test Method Standard – current version.

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Figure 1: Cause and Effect Process 27

ATTACHMENT: QUALITY SURVEILLANCE FORM

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5. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This SOP contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) during the operations at the Former Vieques Naval Training Range, Vieques Island, Puerto Rico. By signature, the undersigned certifies that this SOP is approved for implementation at the project site and will be used to direct operations as described in this SOP.

(Signature to be provided in Final SOP)

Developed by:

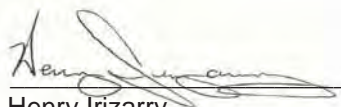


Donald Shaw
Project Manager

05/21/2018

Date

Reviewed by:



Henry Irizarry
Vieques Senior UXO Supervisor

05/21/2018

Date:

Approved by:

Jason W. Wagner

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Jason W. Wagner, CMQ/OE
Vieques Quality Manager

Date

This standard operating procedure (SOP) expires four years from the date of approval and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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8. PROCEDURES

8.1 Purpose

The purpose of this Standard Operating Procedure (SOP) is to provide all USA Environmental, Inc. (USA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to perform the Quality Control processes applicable at sites potentially containing unexploded ordnance (UXO) and/or munitions and explosives of concern (MEC). This SOP outlines procedures to ensure that project tasks achieve a level of quality that meets technical design specifications and conforms to the requirements of the Task Order.

8.2 Scope

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in Quality Control operations on the former Vieques Naval Training Range (VNTR) and former Naval Ammunition Support Detachment (NASD) project related areas. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the Site Health and Safety Plan (SHSP), the Explosives Safety Submission (ESS), applicable Federal, State, local regulations. Consult the documents listed in Section 3.0 of this SOP for additional guidance.

8.3 Responsibilities

8.3.1 Program QC Manager

- The Program QC Manager (PQCM) is responsible for ensuring the availability of the QC resources needed to implement Quality Control Plan (QCP) in accordance with this SOP, and shall also ensure that this SOP is incorporated into plans, procedures, and training for sites where this SOP is to be implemented. The PQCM is responsible for the development, execution, and maintenance of the QC Program and the direct supervision of assigned QC personnel. The PQCM reports directly to the Vice President of USA.

8.3.2 Project QC Manager

- The Project QC Manager (QCM) will ensure that this SOP is implemented in all operations involving the use of QC standards, inspections, and audits. The QCM will also ensure that relevant sections of this SOP are discussed in briefings, and that information related to its daily implementation is documented in the Site QC Log, reports and forms as required by this SOP and the QCP (Section 10 of the approved work plan). The QCM is responsible for the supervision of project QC personnel, monitoring and approving the quality of submittals, materials, and other work to ensure the compliance with specifications, workmanship, standards and the requirements of the contract. The QCM reports directly to the Director of Safety and Quality.

8.3.3 UXO QC Specialist

The UXO QC Specialist (UXOQCS) shall be responsible for implementing the QCP in accordance with this SOP. The UXOQCS is responsible for the direct supervision of MEC QC personnel, directing and approving the correction of any and all non-conforming or unsafe MEC work performed. The UXOQCS has **STOP WORK AUTHORITY** for matters relating to the assigned project.

The UXOQCS is responsible for planning and executing QC oversight of project operations, and ensuring compliance with specified QC requirements. Specifically, the UXOQCS is responsible for:

- Implementing, assessing the effectiveness of, and maintaining this SOP and related procedures.
- Reviewing and verifying the qualifications of technical staff and subcontractors.

- Planning and performing the preparatory, initial, follow-up, and completion inspections for each definable feature of work (DFW).
- Identifying quality problems and verifying that appropriate corrective actions are implemented.
- Ensuring that the requisite QC records including submittals are generated and retained as prescribed in this SOP.
- Notifying the Title II Services Contractor 48 hours prior to beginning any required action of the preparatory and initial phases. At a minimum, the UXOQCS will use weekly QC Reports for the purposes of this notification.
- The UXOQCS reports directly to the QCM.

8.3.4 Project Personnel

Project personnel are responsible for ensuring that work performed by them adheres to the requirements identified by the Work Plan, Accident Prevention Plan, Site Health and Safety Plan, and the applicable SOPs. Supervisors will also be responsible for daily inspections of site operations and conditions to ensure initial and continued compliance with the project plans, SOPs, and other guidelines are maintained. Supervisory personnel responsible for the submission of work products for QC inspection or review will strive to submit only those items or material that meets acceptance criteria.

All personnel, including contractor and subcontractor personnel, performing operations involving the use of QC standards shall be familiar with the QC requirements associated with the task or operation being performed, and with the work practices and control techniques in order to understand and comply with pass/fail criteria to be applied by QC personnel to ensure compliance with standards, procedures, practices, and contractual obligations.

8.4 UXOQCS Procedures

The UXOQCS is responsible for verifying compliance through audits and surveillance. The UXOQCS or a designee is to inspect/audit the quality of work being performed for the DFW. The UXOQCS or a designee is to verify that procedures used conform to applicable specifications stated in this Work Plan or other applicable guidance and project documents such as the ESS and contractor specific work plans. Identified deficiencies are to be communicated to the responsible individual and documented in the QC log and Weekly QC Report. Corrective actions are to be verified by the UXOQCS and recorded in the Weekly QC Report.

The specific QC audit procedures for the DFWs, including the phase during which it is performed, the frequency of performance, the pass/fail criteria and actions to take if failure occurs, are presented in Table 10-1.

The Inspection Schedule and Tracking Form are to be used by the UXOQCS for planning, scheduling and tracking the progress of audits for this project. The information on the form is to be kept up to date and reviewed by the UXOQCS for planning purposes. Audit records are to be maintained as part of the project QC file.

8.5 Definable Features of Work And the Three Phase Control Process

The quality control of work and project deliverables will be monitored by the UXOQCS through the DFWs, using the three-phase control process. The DFWs are divided into three general work activity categories:

- Planning,
- Field operations, and
- Final project reports and closeout.

8.5.1 Definable Features of Work

The DFWs that are associated with each of these activities are summarized below and are described in more detail on Table 10-1.

- **Planning**
 - Pre-Mobilization Activities—System set up for geographic information system, document management and control, data management and subcontracting
 - Technical Project Planning—Technical and operational approach
 - Removal Contractor Site Specific Work Plan and Standard Operating Procedure's (SOP): Preparation and obtaining approval.
- **Field Operations**
 - Site Preparation: Mobilization, survey, vegetation removal, surface clearance
 - MEC investigation and removal
 - MPPEH/MD management (inspection, demilitarization, certification, verification, disposition)
 - Demilitarization of MEC
 - Site Restoration and Demobilization
- **Final Project Reports and Close-Out**
 - Site-Specific Final Report: Preparation and obtaining approval
 - Proposed Plan and Decision Documents: Preparation and obtaining approval
 - Obtain MEC Response Complete Acceptance
 - Data Archiving and Project Closeout

8.5.2 Three Phases of Control

The UXOQCS is to ensure that the three-phase control process, including the Preparatory Phase, Initial Phase and Follow-Up Phase, is implemented for each DFW listed in this SOP¹. Each control phase is important for obtaining a quality product and meeting the project objectives; however, the preparatory and initial audits are particularly valuable in preventing problems. Production work is not to be performed on a DFW until a successful preparatory and initial phase has been completed.

¹ As this is an ongoing project with multiple contract task orders (TOs), the majority of the preparatory and initial phase inspections have been conducted, but will be performed where appropriate or warranted, such as if there is a degradation of the quality of work on a DFW. The DFWs associated with the final project reports and closeout will not be covered by this SOP as work on the former VNTR will continue beyond this TO and the scope of this SOP.

8.5.2.1 Preparatory Phase

The preparatory phase culminates with the planning and design process leading up to actual field activities. Successful completion of the Preparatory Phase verifies that the project delivery, QC, and safety plans have been completed and are ready to be implemented. The following actions will be performed as applicable for each DFW:

1. Confirm that the appropriate technical procedures are incorporated into the project work plan and review procedures.
2. Confirm that adequate testing is called for to assure quality delivery.
3. Confirm definition of preliminary work required at the work site and examine the work area to confirm required preliminary work has been properly completed.
4. Confirm availability of required materials and equipment. Examine materials and equipment to confirm compliance with approved submittals and procedures. Ensure equipment testing procedures are in place, with control limits and frequency.
5. Confirm qualifications of personnel and that their roles/responsibilities are well-defined and communicated.
6. Confirm with the UXOSO that the Site Health and Safety Plan (SHSP) and activity hazard analyses (AHAs) adequately address the work operations and that applicable safety requirements have been incorporated into the plan.
7. Discuss methods to be employed during the field activities.
8. Confirm any required permits and other regulatory requirements are met.
9. Verify that lessons learned during previous similar work have been incorporated as appropriate into the project procedures to prevent recurrence of past problems.

Project staff must correct or resolve discrepancies between existing conditions and the approved plans/procedures identified by the UXOQCS and the team during the Preparatory Phase. The UXOQCS or designee must then verify that unsatisfactory and nonconforming conditions have been corrected prior to granting approval to begin work.

Results of the activity are to be documented in the Preparatory Inspection Checklist specific for the DFW and summarized in the Weekly QC Report.

8.5.2.2 Initial Phase

The initial phase occurs at the startup of field activities that are associated with a specific DFW. The initial phase confirms that the Project QCP, other applicable work plan sections, and procedures are being effectively implemented and the desired results are being achieved. During the initial phase, the initial segment of the DFW is observed and inspected to ensure that the work complies with contract and work plan requirements. The initial phase should be repeated when acceptable levels of specified quality are not being met. The following shall be performed for each DFW:

1. Establish the quality of work required to properly deliver the TO in accordance with contract requirements. The UXOQCS ensures that supervision has made the work crews aware of expectations associated with the field methods established under the preparatory phase.
2. Resolve conflicts. Should conflicts arise in establishing the baseline quality for the DFW, the responsibility to resolve the conflict falls to the PM. Should the conflict not be resolved in a manner that satisfies the project requirements, the UXOQCS must elevate the conflict to the program level (Program QC Manager) and issue a non-conformance report. The UXOQCS may

direct a cessation of work activity, with the concurrence of the Program QC Manager, should the issue jeopardize the results of the DFW, or put the project at risk of non-compliant performance.

3. Verify with the UXOSO that the SHSP and AHAs were developed to ensure that the identified hazards adequately addressed field conditions. Confirm that applicable safety requirements are being implemented during field activities.

Upon completion of the initial phase activities, results are to be documented in the Initial Phase Inspection Checklist, the QC logbook and summarized in the Weekly QC Report. Should results be unsatisfactory, the initial phase will be rescheduled and performed again.

8.5.2.3 Follow-up Phase

Completion of the initial phase of QC activity then leads directly into the follow-up phase, which addresses the routine day-to-day activities on the field site. Inspection/audit activities associated with each DFW are addressed in Table 1. Specific concerns associated with the follow-up include:

1. Inspection of the work activity to ensure work is in compliance with the contract and work plans.
2. Evaluation and confirmation that the quality of work is being maintained at a level no less than that established during the initial phase.
3. Evaluation and confirmation that required testing is being performed in accordance with procedures established during the preparatory phase and confirmed during the initial phase.
4. Confirmation that non-conforming work is being corrected promptly and in accordance with the direction provided by the UXOQCS.

To conduct and document these inspections, the UXOQCS is to generate the Follow-up Phase Inspection Checklist. The follow-up phase inspections will be performed daily, or as otherwise identified in this QCP until the completion of each DFW.

The UXOQCS is responsible for onsite monitoring of the practices and operations taking place and verifying continued compliance with the specifications and requirements of the contract, TO, and approved project plans and procedures. He is also responsible for verifying that a daily H&S Inspection is performed and documented as prescribed in the site-specific Health and Safety Plan. Discrepancies between site practices and approved plans/procedures are to be resolved and corrective actions for unsatisfactory and nonconforming conditions or practices are to be verified by the UXOQCS or a designee prior to granting approval to continue work. Follow-up inspection results are to be documented and summarized in the Weekly QC Report.

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Table 1: Definable Features of Work Audit Procedures

Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criterion	Action if Failure Occurs
Planning	GIS Setup (<i>Pre-mobilization Activities</i>)	Verify GIS system has been set up and is ready for site data	PP	Once	GIS system has been set up and ready for site data	Do not proceed with field activities until criterion is passed
Planning	Document management and Control (<i>Pre-mobilization Activities</i>)	Verify appropriate measures are in place to manage and control project documents	PP	Once	Appropriate measures are in place to manage and control project documents	Do not proceed with field activities until criterion is passed
Planning	Data Management (<i>Pre-mobilization Activities</i>)	Verify appropriate measures are in place to manage and control project documents	PP	Once	Appropriate measures are in place to manage and control project documents	Do not proceed with field activities until criterion is passed
Planning	Subcontracting (<i>Pre-mobilization Activities</i>)	Verify Subcontractor qualifications, training and licenses	PP/IP	Once	Subcontractors' qualifications, training and licenses are up to date and acceptable	Ensure subcontractor provides the qualifications, training and licenses or change subcontractors
Planning	Technical Approach (<i>Technical Project Planning</i>)	Verify that technical approach has been agreed on by project team	PP/IP	Once	Technical approach has been agreed on by project team	Do not proceed with field activities until criterion is passed
Planning	Operational Approach (<i>Technical Project Planning</i>)	Verify that operational approach has been agreed on by project team	PP/IP	Once	Operational approach has been agreed on by project team	Do not proceed with field activities until criterion is passed
Planning	Work Plan preparation and Approval (<i>Technical Project Planning</i>)	Verify that Work Plan has been prepared and approved	PP/IP	Once	Work Plan has been prepared and approved	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify all project plans are approved	PP/IP	Once	All project plans are approved	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify coordination with all agencies	PP/IP	Once	Coordination with local agencies conducted	Do not proceed with field activities until criterion is passed

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Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criterion	Action if Failure Occurs
Field Operations	Site preparation (including mobilization)	Verify equipment and services are procured	PP/IP	Once	Equipment and services procured	Proceed only with activities for which equipment has been procured
Field Operations	Site preparation (including mobilization)	Verify coordination for communication and logistical support	PP/IP	Once	Coordination for communication and logistical support conducted	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify coordination of Emergency Services	PP/IP	Once	Coordination of Emergency Services conducted	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify operating schedules are finalized	PP/IP	Once	Operating schedules are finalized	Proceed only with those operations with finalized operating schedules
Field Operations	Site preparation (including mobilization)	Verify explosives storage and MEC debris/scrap storage areas are established	PP/IP	Once	Explosives storage and MEC debris/scrap storage areas are established	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify site-specific training is performed and acknowledged	PP/IP	Once	Site-specific training is performed and acknowledged	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify project plans are reviewed and acknowledged	PP/IP	Once	Project plans are reviewed and acknowledged	Do not proceed with field activities until criterion is passed
Field Operations	Site Survey	Verify surveyor qualifications	PP/IP	Once	Surveyor's qualifications are up to date and acceptable	Ensure surveyor provides qualifications or change surveyor
Field Operations	Site Survey	Verify surveyor licenses	PP/IP	Once	Surveyor's licenses are up to date and acceptable	Ensure surveyor provides licenses or change surveyor
Field Operations	Site Survey	Verify benchmarks for survey are established and documented	PP/IP	Once	Benchmarks for survey are established and documented	N/A

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Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criterion	Action if Failure Occurs
Field Operations	Site Survey	Verify site boundaries have been established	PP/IP	Once	Site boundaries have been established	Do not proceed with dependent field activities until criterion is passed
Field Operations	Site Survey	Verify proper marker type, material and placement method	PP/IP	Once	Proper marker type, material and placement method were used	Replace markers as necessary to comply with requirement
Field Operations	Site Survey	Verify surveyor notes are legible, accurate and complete	IP	Once	Surveyor notes are legible, accurate and complete	Require surveyor replaces deficient notes with legible, accurate and complete notes
Field Operations	Site Survey	Verify stake alignment and spacing intervals	IP	Once	Stake alignment and spacing intervals are as specified in Work plan	Replace stakes not aligned as specified
Field Operations	Vegetation Removal	Verify personnel qualifications and training	PP/IP	Once	Personnel qualifications and training are appropriate	Ensure all personnel qualifications and training are appropriate and replace those not properly qualified
Field Operations	Vegetation Removal	Verify environmental controls are correct and functional	IP/FP	Once	Environmental controls are correct and functional	Do not proceed with vegetation removal until proper environmental controls are in place
Field Operations	Vegetation Removal	Verify vegetation removal conducted in accordance with the Work plan	IP/FP	Daily	Vegetation removal conducted in accordance with the Work plan	Stop vegetation removal activities until full compliance can be assured and any activities not performed within compliance are reevaluated and redone if necessary
Field Operations	Surface/Subsurface Removal	Verify equipment testing	IP/FP	Once/Daily	Equipment passes daily function test in equipment check area	Repair or replace defective equipment

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Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criterion	Action if Failure Occurs
Field Operations	Surface/Subsurface Removal	Verify area/boundaries	PP/IP	Once	Area/boundaries are correct	Stop activities until area/boundaries can be verified/corrected
Field Operations	Surface/Subsurface Removal	Verify work methods	IP/FP	Daily	Work methods are being performed in accordance with the Work plan and SOPs	Stop activities until Work plan and SOPs are being followed and any activities not performed within compliance are re-evaluated and re-performed if necessary
Field Operations	Surface/Subsurface Removal	Verify team separation distance	IP/FP	Daily	Team separation distance is appropriate for work performed	Stop activities until full compliance can be assured
Field Operations	Surface/Subsurface Removal	Verify removal conducted in accordance with the Work plan and SOPs	IP/FP	Daily	Removal conducted in accordance with the Work plan and SOPs	Stop activities until full compliance can be assured and any activities not performed within compliance are reevaluated and redone if necessary
Field Operations	Surface/Subsurface Removal	Check a portion of each grid/lot in accordance with Section 8.6 to ensure Acceptance Criteria are met as defined in the Work Plan	FP	Each Occurrence	See Section 8.6	See Section 8.6
Field Operations	Inspection (MPPEH Management)	Verify personnel qualifications	IP/FP	Once	Personnel qualifications and training are appropriate	Replace unqualified personnel with qualified personnel
Field Operations	Certification (MPPEH Management)	Verify inspection conducted in accordance with MPPEH Management Plan VNTR MEC WP (2006)	IP/FP	Daily/Each Occurrence	Inspection conducted in accordance with the MPPEH Management Plan	Stop activities until full compliance can be assured and any activities not performed within compliance are reevaluated and redone if necessary

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Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criterion	Action if Failure Occurs
Field Operations	Certification (MPPEH Management)	Verify personnel qualifications	IP/FP	Once	Personnel qualifications and training are appropriate	Replace unqualified personnel with qualified personnel
Field Operations	Certification (MPPEH Management)	Verify certification is conducted in accordance with the MPPEH Management Plan	IP/FP	Each Occurrence	Certification is conducted in accordance with the MPPEH Management Plan	Stop activities until full compliance can be assured and any activities not performed within compliance are reevaluated and redone if necessary
Field Operations	Disposal (MPPEH Management)	Verify disposal is conducted in accordance with the MPPEH management Plan	IP/FP	Each Occurrence	Disposal is conducted in accordance with the MPPEH Management Plan	Stop activities until full compliance can be assured and any activities not performed within compliance are reevaluated and redone if necessary
Field Operations	Demilitarization of UXO	Verify personnel qualifications	IP/FP	Once	Personnel qualifications and training are appropriate	Replace unqualified personnel with qualified personnel
Field Operations	Demilitarization of UXO	Verify operations conducted in accordance with the Work plan and SOP	IP/FP	Each Occurrence	Operations conducted in accordance with the Work plan and SOP	Stop activities until full compliance can be assured and any activities not performed within compliance are reevaluated and redone if necessary
Field Operations	Demobilization	Verify that all equipment is inspected, packaged and shipped/returned to appropriate location	FP	Once	All equipment is inspected, packaged and shipped/returned to appropriate location	N/A
Field Operations	Demobilization	Verify facilities-support infrastructures are dismantled and shipped/returned to appropriate location	FP	Once	Facilities-support infrastructures are dismantled and shipped/returned to appropriate location	N/A

Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criterion	Action if Failure Occurs
Final Project Reports and Close-out	Site Specific Final Report preparation and approval	Verify filed site is returned to original condition	FP	Once	Field site is returned to original condition	N/A
Final Project Reports and Close-out	Site Specific Final Report preparation and approval	Verify tabulation of all MEC, MD and other material recovered during the removal actions are accurate and complete	IP/FP	Daily	Tabulation of all MEC, MD and other material recovered during the removal actions are accurate and complete	Determine cause of inaccuracies and correct
Final Project Reports and Close-out	Decision Document preparation and approval	Verify reviews performed by project, technical and program teams	FP	Once	Reviews performed by project, technical and program teams	N/A
Final Project Reports and Close-out	MEC Response Completion Acceptance	Verify Final Report, Proposed Plan and Decision Document has been approved	FP	Once	Final Report, Proposed Plan and Decision Document has been approved	Take actions to ensure documents get approved
Final Project Reports and Close-out	Archiving	Verify back-up systems are in place	IP	Once	Data back-up systems are in place	Take actions to ensure back-up systems are in place
Final Project Reports and Close-out	Project Close-out	Verify purchase orders are closed out	FP	Once	Purchase orders have been closed out	Take actions to ensure purchase orders have been closed out
Final Project Reports and Close-out	Project Close-out	Verify invoices have been completed and approved	FP	Once	Invoices have been completed and approved	Take actions to ensure invoices have been completed & approved

8.6 LEVEL OF QC INSPECTION

MIL-STD 1916 will be used to determine the level of Quality Control inspection using the following criteria:

- For instrument-assisted surface removal, a lot is comprised of four 30-m x 30-m grids and is approximately 0.9 acre.
- For subsurface MEC removal, a lot is comprised of 30 prosecuted anomalies for selected roads and 30 prosecuted anomalies for selected beaches.
- The MIL-STD initial Verification Level (VL) will be "VII" for attributes sampling.
- Table 2, MIL-STD 1916 table I excerpt, will be used to determine the Code Letter (CL) for entry into the sampling table (Table 3, MLD-STD 1916 Table II).
- Table 3, MIL-STD 1916 Table II will then be used to determine the sampling size based on the CL and VL.
- The switching method will be accomplished as described in Table 3, note 2.

Table 2: MIL-STD-1916 Table I -- Code Letters (CL) for Entry into the Sampling Table

Lot or Production Interval Size	Verification Levels						
	VII	VI	V	IV	III	II	I
2-170	A	A	A	A	A	A	A
171-288	A	A	A	A	A	A	B
289-544	A	A	A	A	A	B	C
545-960	A	A	A	A	B	C	D
961-1632	A	A	A	B	C	D	E
1633-3072	A	A	B	C	D	E	E
3073-5440	A	B	C	D	E	E	E
5441-9216	B	C	D	E	E	E	E
9217-17408	C	D	E	E	E	E	E
17409-30720	D	E	E	E	E	E	E
30721 and larger	E	E	E	E	E	E	E
Note: MIL-STD-1916 DOD Test Method Standard, Table I, April 1996							

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Table 3: MIL-STD-1916 Table II – Attributes Sampling Plan

Code Letter	Verification Levels								
	T	VII	VI	V	IV	III	II	I	R
Sampling Size (Ng)									
A	3072	1280	512	192	80	32	12	5	3
B	4096	1536	640	256	96	40	16	6	3
C	5120	2048	768	320	128	48	20	8	3
D	6144	2560	1024	384	160	64	24	10	4
E	8192	3072	1280	512	192	80	32	12	5
Notes:									
1 - When the lot size is less than or equal to the sample size, 100 percent attributes inspection is required.									
2 - One verification level (VL) to the left/right of the specified normal VL is the respective tightened/reduced plan. Tightened inspection of VL-VII is T, reduced inspection VL-I is R.									
3 - MIL-STD-1916 DO D Test Method Standard, Table II, April 1996									

Based on the initial lot size and assumed VL of “VII”, the CL for entry into the sampling tables using Table 2 is “A.” Using the CL from Table I and the assumed VL, the sampling size is 1280 (Table 3 column VII). As indicated in note 1 in Table 3, when the lot size is less than the sample size, 100 percent of the lot must be inspected.

The tightening and loosening process will be used every ten lots to reduce or tighten the QC inspections as required by changing the VL as shown in Table 3. When the sampling size becomes smaller than the lot size, a random number generator will be used to select the required number of lanes to be included in the sampling.

Inspection criteria for a given task or operation is derived from the requirements found in the Scope of Work (SOW), Performance Work Statement (PWS), Task Order Requirements, or Contract. Inspection criteria is identified for the various components of the task or operation and applied during the three phases of control.

QC personnel will review, identify, and apply the pass/fail criteria for each submitted work product (see Figure 1). Inspections will be recorded on an approved QC inspection form and will contain the following at a minimum:

- Work product information
- Person or team submitting work product
- Pass/Fail Results
- Corrective requirements and references as necessary
- Signature of QC individual

8.6.1 Documentation of Testing

Test results are to be documented by the individual performing the test. Calibration and maintenance records associated with the measuring and testing equipment (M&TE) are to be generated by the individual performing the activity. Documentation for calibration and maintenance of M&TE is to be made available to the COR upon request.

The UXOQCS is responsible for ensuring that the tests are performed and that the results are summarized in and provided with the Weekly QC Report. Any failing test will be noted on the deficiency log so it can be tracked until such time as rework and re-testing can be performed and corrective action is verified.

8.6.2 Calibration and Maintenance

Calibration and maintenance of geophysical instruments, radios, vehicles, vegetation cutting equipment, cell phones, etc., will be performed per manufacturer's specifications. Geophysical detection equipment will be tested daily. Records of these activities are to be generated by the individual performing the activity with copies provided to the UXOQCS for retention in the project QC file.

8.7 DEFICIENCY MANAGEMENT

This section includes provisions for preventing quality problems and facilitating process improvements as well as for identifying, documenting, and tracking deficiencies until corrective action has been verified. Deficiency notices and corrective action requests will be provided to USEPA, PREQB, NOSSA, and USFWS during project status meetings or in project status documentation.

8.7.1 Deficiency Identification and Resolution

While deficiency identification and resolution occurs primarily at the operational level, QC inspections provide a backup mechanism to address problems that either are not identified or cannot be resolved at the operational level. Through implementation of the inspection program, the QC staff is responsible for verifying that deficiencies are identified, documented, and corrected in a timely manner. If the UXOQCS determines that a specific action can be taken to prevent the cause or similar cause for failure, the action will be implemented. An attempt to identify additional potential causes of failure will also be made (e.g., weather event, site condition change, and other activities that would result in items being introduced to a worked grid).

8.7.2 Investigation Failure Criteria

8.7.2.1 Instrument-Assisted Surface Removals

The UXOQCS or designee will conduct an instrument-assisted surface QC inspection, using the same type of analog geophysical instrument used to clear the lanes, on the select lanes and a grid failure will occur if, during the QC inspection:

- More than two munitions items which have a shape, size, or mass greater than or equal to a 20mm and less than a 30mm projectile are not removed from the grid.
- More than one munitions item which has shape, size, or mass greater than or equal to a 30mm and less than a 40mm projectile is not removed from the grid.
- Any munitions item, which has a shape, size, or mass equal to or greater than a 40mm projectile, is not removed from the grid.

8.7.2.2 Subsurface Anomaly Investigation

The UXOQCS will conduct a QC inspection of the selected anomaly locations, using the same type of DGM instrument and procedures used to reacquire the anomaly targets, and a failure will occur if:

- A blind seed item (BSI) is not selected and included on the anomaly dig list for prosecution, or
- A BSI is not recovered during the anomaly prosecution by the UXO team

- The mV reading for the anomaly location is above the removal mV reading criteria, as established during the GSV task for this project/work area.)
- For areas inaccessible to DGM coverage (as determined by the Site Geophysicist and PM), a BSI not recovered during the analog geophysical MEC removal
- For areas inaccessible to DGM coverage the UXOQCS finding in the subsurface, at the specified depths of clearance, items in the quantities listed in Section 8.7.2.1 above.

Any failure will result in a complete re-work of the entire failed lot and will initiate a cause and effect analysis to determine the root cause of the failure and to correct the problem.

The UXOQCS will conduct and document a root cause analysis to determine if the failure is the result of the process, procedures, equipment and/or personnel and to what extent the previously performed work may have been affected by the failure. The UXOQCS will provide his findings to the PM and SUXOS with suggested or required corrective actions. Once the proposed corrective actions are approved by management, the UXO Teams will implement them. The root cause analysis and corrective actions will be attached to the weekly QC reports.

Figure 1 illustrates the flow of the root cause and effect process the UXOQCS will use to determine failure causes.

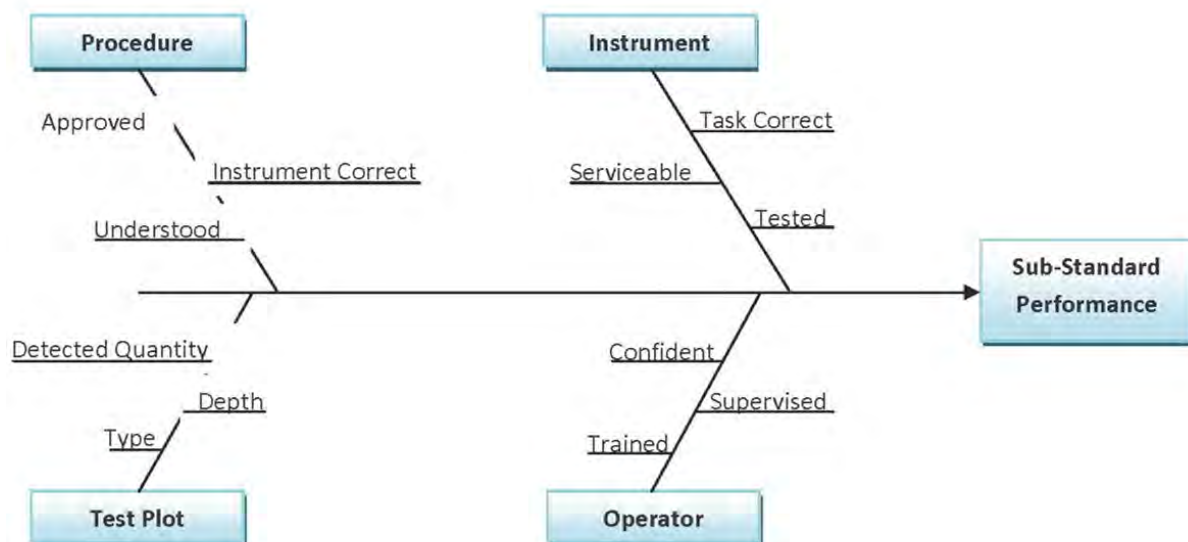


Figure 1: Cause and Effect Process

8.7.3 Corrective Action Request

A Corrective Action Request (CAR) can be issued by any member of the project staff, including the Contractor and subcontractor employees. If the individual issuing the CAR is also responsible for correcting the problem, then he or she should do so and document the results on Part B of the CAR. Otherwise, the CAR should be forwarded to the PM, who is then responsible for evaluating the validity of the request, formulating a resolution and prevention strategy, assigning personnel and resources, and specifying and

enforcing a schedule for corrective actions. Once a corrective action has been completed, the CAR and supporting information are to be forwarded to the UXOQCS for closure.

In addition to observing actual work operations, CARs are to be reviewed during follow-up QC inspections. The purposes of this review are:

- To ensure that established protocols are implemented properly;
- To verify that corrective action commitments are met; to ensure that corrective actions are effective in resolving problems;
- To identify trends within and among similar work units; and
- To facilitate system root cause analysis of larger problems.

Particular attention is to be given by the QC staff to work units that generate either an unusually large or unusually small number of CARs.

The UXOQCS will determine whether a written Corrective Action Plan (CAP) is necessary, based on whether or not the CAR priority is high; A *“high priority” is a situation that requires “expediting the corrective action plan and correction of deficient conditions noted in the CAR and extraordinary resources may be required due to the deficiency’s impact on continuing operations.”* The CAP is developed by a PM designee and approved and signed by the PM. The CAP is to indicate whether it is submitted for informational purposes or for review and approval. In either event, operational staff is to be encouraged to discuss the corrective action strategy with the QC staff throughout the process.

8.7.4 Deficiency and Corrective Action Tracking

Each CAR is to be given a unique identification number and tracked by the appropriate line manager until corrective actions have been taken and documented in and the CAR is submitted to the UXOQCS or a designee for verification and closure.

8.7.5 Documentation

The lessons learned through the deficiency management process are documented on CARs and CAPs. To share the lessons learned with the Title II Services Contractor and the Government, these documents are submitted to the Title II Services Contractor through the Weekly QC Report.

CARs should be cited in the Weekly QC Report. Minor deficiencies that are identified during a QC inspection but can be readily corrected and verified in the field are to be documented in the QC log and Weekly QC Report without initiating a CAR. Deficiencies identified in a QC inspection but that cannot be readily corrected are to be documented by the QC staff on a CAR and in the Weekly QC Report. Copies of CARs are to be referenced in and attached to the Weekly QC Report. CAPs will also be attached to Weekly QC Reports to document the final outcome of the deficiency. Similar or related deficiencies may be addressed on a single CAP. All CARs and CAPs will be maintained onsite with the project files and will be subject to audit.

8.8 REPORTS

The UXOQCS is responsible for the preparation and submittal of the Weekly QC Report to the Program QC Manager and providing concurrent courtesy copies to the PM. A copy of the Weekly QC Report with attachments will be submitted to the Title II Services Contractor on the first work day following the date covered by the report. All calendar days, including weekends and holidays, are to be accounted for

throughout this project. As a minimum, one report is to be prepared and submitted for every continuous 7 days of no work. All reports are available upon request to the NTR.

The Weekly QC Report is to provide an overview of QC activities performed each day, including those performed for subcontractor and supplier activities. The QC reports are to present an accurate and complete picture of QC activities. They are to report both conforming and deficient conditions, and should be precise, factual, legible, and objective. Copies of supporting documentation, such as checklists and surveillance reports, are to be attached.

A field QC log is to be maintained by the UXOQCS and assigned to each member of the QC staff for use in documenting details of field activities during QC monitoring activities. At the end of each day, copies of the log entries are to be attached to the Weekly QC Report. The information in the QC log provides Weekly QC Report and in addressing follow-up questions that may arise.

QC and H&S staff input for the Weekly QC Report is to be provided in writing to the UXOQCS at a previously agreed upon time and place, generally no later than about 1 hour before normal close of business. For the sake of simplicity and completeness, the format for QC staff input should follow the same as for the Weekly QC Report with only the relevant sections completed.

Each Weekly QC Report is to be assigned and tracked by a unique number comprised of the Delivery Order number followed by the date (week-ending date) expressed as "DDMMYY", example DO #XXXX-090712 is the report for site work performed the week ending on 28 September 2012. In the case of "no work day" reports, the report number is to comprise the Delivery Order, the last date covered, the number of days covered, and the initials "NW", example DO #XXXX-082212-3NW is the report for the three no work days from 18 September 2012 through 20 September 2012. Copies of Weekly QC Reports with attachments and QC logs no longer in use are to be maintained in the project QC file. Upon project closeout, all QC logs are to be included in the project QC file.

8.9 SUBMITTAL MANAGEMENT

The UXOQCS is responsible for ensuring, through detailed review, that submittals as well as the materials and the work they represent, are in full compliance with applicable contract specifications. The UXOQCS is also responsible for ensuring that a project file is established and maintained, and that accountable project documents are retained and controlled appropriately.

8.10 PROJECT RECORDS

The Removal Action Contractor PM is to establish and maintain an onsite project file in accordance with contract requirements and NAVFAC Atlantic policies for document control. The PM is responsible for controlling access to the project file to ensure that records are not lost or misplaced. The purpose of this file is to maintain a complete set of all documents, reports, certifications, and other records that provide information on project plans, contract agreements, and project activities. The initial file will be structured to include a record copy of the following documents:

- Schedule and progress reports
- Technical specifications, including addenda and modifications thereof
- Change orders and other contract modifications
- Engineer Field Orders
- Manufacturer's certificates
- Survey Records

- Daily work activity summary reports, which may include:
 - Weekly QC Report
 - Daily H&S Report
 - Reports on any emergency response actions
 - Test records
 - Records of site work
 - Chain-of-custody records
 - Reports on any spill incidents
 - Truck load tickets and shipping papers
- Other items as required by the Contracting Officer Representative:
 - Conversation logs
 - Meeting minutes and agenda
 - Inspection logs and schedules
 - Photo documentation
 - Site maps
 - As built drawings

As the project activities progress, the Removal Action Contractor PM will monitor usefulness of the project filing system for information retrieval. If he or she finds that additional file sections are needed, he or she will expand this initial filing structure to include additional sections.

8.11 CONTINUAL IMPROVEMENT

Project staff at all levels are to be encouraged to provide recommendations for improvements in established work processes and techniques. The intent is to identify activities that are compliant but can be performed in a more efficient or cost-effective manner. Typical quality improvement recommendations include identifying an existing practice that should be improved (e.g., a bottleneck in production) and/or recommending an alternative practice that provides a benefit without compromising prescribed standards of quality. Project staff is to bring their recommendations to the attention of project management or the QC staff through verbal or written means. However, deviations from established protocols are not to be implemented without prior written approval by the PM and concurrence of the UXOQCS. Where a staff-initiated recommendation results in a tangible benefit to the project, public acknowledgment is to be given by the PM.

9. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

9.1 Hazard Control Brief

All personnel will attend the tailgate safety briefing given by the UXO Technician III or above team member, on the existing and potential hazards within the area they are assigned to work prior to commencing any activities.

Personnel will be cognizant of the surroundings and remain observant of their footing at all times. All personnel will be aware of the signs of heat stress, as described in Section 8.0 of the SHSP, and be able to recognize the onset of heat stress disorders in themselves and their team members.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions, and follow the Emergency Response Plan in Section 14.0 of the SHSP.

10. DISTRIBUTION

SOP Number	Number of Copies	Organization	Building Number	Signature
	Master	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____

11. DIAGRAMS

Maps and diagrams are located in the approved Work Plan and/or the approved ESS. Teams will be provided maps of the overall project site, medical care locations and evacuation routes prior to beginning site work.

12. EQUIPMENT

The UXOQCS will be equipped with the following:

- Handheld metal or all metals detector
- Logbook and/or Personal Digital Assistant (PDA) for recording data
- Camera
- Communications equipment

The required safety equipment includes the following:

- First-Aid kit
- Level D PPE - A work uniform affording minimal protection: used for nuisance contamination only.
 - The following constitute Level D equipment; items may be used as appropriate:
 5. Gloves⁽¹⁾
 6. Boots/shoes
 7. Safety glasses
 8. Hard hat⁽¹⁾

Footnote ⁽¹⁾ Optional, as applicable.

- Fire extinguisher
- Inclement weather gear as needed

Safety equipment is kept in the back of the site vehicles:

- Bed (Pick-up trucks)
- Back cargo area (SUVs)

13. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in Section 12 of the APP will be followed. The single point of contact for incidents on site will be the UXOSO.

In the event that an employee has to be taken to the hospital refer to Section D.12.1 of the APP for the route to the hospital.

A map showing the hospital's location is contained in the Site-Specific Health and Safety Plan provided as Attachment 3.

The single point of contact for incidents on site will be the UXOSO.

The UXOSO will perform pre-emergency planning before starting field activities and during the mobilization and site-specific training phase of the project, and will coordinate emergency response with police/fire/rescue personnel and the nearest hospital.

In the event of an emergency requiring evacuation, the evacuation signal will be given through verbal instructions. Personnel will evacuate to a pre-determined evacuation point in the support zone identified at the daily safety briefing. The UXOSO will account for all personnel and will summon emergency response personnel, if required. If the fire department is summoned, the UXOSO will meet them upon their entrance to the site and will inform them of the presence of MEC, and provide the appropriate fragmentation distance from the fire for the purpose of fighting or preventing the spread of fire from the site evacuation is necessary, all personnel are to:

- Gather equipment to the extent safely possible
- Evacuate to the vehicle(s) location and prepare to move out.

After allowing the appropriate wait time (24 hours in the case of a fire), the SUXOS and the UXOSO will enter the site together and determine if the site is safe for re-entry.

After the emergency situation has been controlled and eliminated, or has passed the Project Manager, UXOSO, and SUXOS will review the emergency response and change procedures if necessary.

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ATTACHMENT
QUALITY SURVEILLANCE FORM

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DESCRIPTION: QUALITY CONTROL SURVEILLANCE
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DFW: _____

TEAM INFORMATION		
Team:	Location:	Date:
Team Leader:		
Personnel Present:		
Phase of Inspection (check one): <i>Preparatory</i> <input type="checkbox"/> <i>Initial</i> <input type="checkbox"/> <i>Follow-Up</i> <input type="checkbox"/>		

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PROCEDURE NO.: SOP 012

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CHECKLIST						
Item	Ref.	Inspection Point	Yes	No	N/A	Comments

FINDINGS	
Item	Comments

Conducted By: _____ Reviewed By: _____

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1. TITLE PAGE

STANDARD OPERATING PROCEDURE

MAGAZINE OPERATIONS

Munitions and Explosives of Concern Removal
Former Vieques Naval Training Range
Vieques Island, Puerto Rico

USA ENVIRONMENTAL, INC.

May 2018

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2. RECORD OF CHANGES

The following section identifies any major or minor changes to this standard operating procedure (SOP).

- Major change: Change to SOP that adds operational hazards, or new hazardous items. Change to or revision of supplemental documents could be classified as major change, if the change or revision modifies the operational procedures to the point that safety is affected, or the change or revision introduces new hazards.
- Minor change: Change to an SOP that does not provide additional hazards, additions of new hazardous items, or changes in methods used to eliminate or mitigate hazards. (Example: name, code, or telephone number changes, spelling corrections, references or referenced document locations.)

Date	Supervisor's Signature	Page	Paragraph	Remarks
MM/DD/YYYY				

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3. REFERENCES

The following references apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, it may be necessary to consult other SOPs and regulatory references.

- USA Environmental, Inc., Work Plan, Munitions and Explosives of Concern Former Vieques Naval Training Range, Vieques Island, Puerto Rico – current version
- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11 – current version
- Explosives Safety Submission (ESS) – current version
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards – current version
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39 – current version
- NAVSEA OP 5 Ammunition and Explosives Safety Ashore. – current version
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual – current version
- DDESB TB 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel – current version
- DOD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- DOD 6055.09-M, DOD Ammunition and Explosives Safety Standards
- DOD 4160.21-M, Defense Reutilization and Marketing Manual
- TM 9-1300-200, Ammunition General
- TM 9-1300-214, Military Explosives.

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ATTACHMENT A. MAGAZINE INSPECTION CHECKLIST

ATTACHMENT B. SAFETY REGULATIONS FOR THE HANDLING AND STORAGE OF EXPLOSIVES

ATTACHMENT C. VEHICLE INSPECTION DD 626

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5. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This SOP contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) during the operations at the Former Vieques Naval Training Range, Vieques Island, Puerto Rico. By signature, the undersigned certifies that this SOP is approved for implementation at the project site and will be used to direct operations as described in this SOP.

(Signature to be provided in Final SOP)

Developed by:

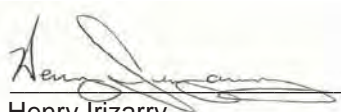


Donald Shaw
Project Manager

05/21/2018

Date

Reviewed by:



Henry Irizarry
Vieques Senior UXO Supervisor

05/21/2018

Date:

Approved by:

Jason W. Wagner

Digitally signed by Jason W. Wagner
DN: cn=Jason W. Wagner, o=USA Environmental, Inc.,
ou=Quality Control Manager,
email=jwagner@usatampa.com, c=US
Date: 2018.05.21 12:34:16 -04'00'

Jason W. Wagner, CMQ/OE
Vieques Quality Manager

Date

This standard operating procedure (SOP) expires four years from the date of approval and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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8. PROCEDURES

8.1 Purpose

The purpose of this Standard Operating Procedure (SOP) is to provide all USA Environmental, Inc. (USA) employees and subcontractors with the minimum procedures and safety and health requirements applicable operation of the magazines when explosives are stored in them in the vicinity of sites potentially containing unexploded ordnance (UXO) and/or munitions and explosives of concern (MEC).

8.2 Scope

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in explosives storage operations on the former Vieques Naval Training Range (VNTR) and former Naval Ammunition Support Detachment (NASD) project related areas. Two magazines are approved for use. They are 4710A and 4710B. This SOP is intended to be used as guidance for the conduct of daily operations. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the Site Health and Safety Plan (SHSP), the Explosives Safety Submission (ESS), applicable Federal, State, local regulations. Consult the documents listed in Section 3.0 of this SOP for additional guidance.

8.3 Operational Procedures

8.3.1 Key Control

Keys to the locks for the magazines are kept in a secure key locker inside the USA work space that is bolted to the floor. The keys are arranged on key rings in a manner that ensures no one key ring can be used to gain access into the gate or the magazine by itself, and no more than one key ring will be issued to any individual. A key log is maintained in the USA work space and this key log has the name of the individual who signed out what key to whom, the date and when the key was returned.

Personnel authorized to sign keys out and/or poses keys to the magazines are designated on the Authorization to transport and/or use list.

8.3.2 Storage

Magazine 4710A is used to store blasting caps, fuse lighters and safety fuse. These items are storage compatibility group B. This magazine has Net Explosive Weight (NEW) limit of 100lbs of Class/Division (C/D) 1.4. Magazine 4710B is used to store the donor explosives. It has an NEW limit of 2,000lbs of C/D 1.1 and is storage compatibility group D Magazine storage regulations are provided in OP 5 chapter 11.

The following procedures are for the receipt or return of explosives:

- Obtain keys from the USA SUXOS, Site Manager or UXOQCS. Access to the magazines requires a minimum of two personnel.
- Raise the bravo flag (s) prior to opening the magazines.
- **TURN MOBILE PHONES OFF PRIOR TO OPENING THE MAGAZINES AND OBSERVE HAZARDS OF ELECTRO-MAGNETIC RADIATION TO ORDNANCE (HERO) PRECAUTIONS FOR RADIOS.**
- Verify actual quantities against the receipt documents prior to signing for the explosives.
- Place material in the appropriate magazine and adjust the inventory records as appropriate.
- Ensure material is kept 6 inches from the walls to provide adequate ventilation.

- Mark any partially filled boxes as “LIGHT BOX” in the largest practical letters.
- Secure the magazines and lower the bravo flags (s).

The following procedures are to be used for issuing explosives:

- Obtain keys from the USA SUXOS, Site Manager or UXOQCS. Access to the magazines requires a minimum of two personnel.
- Raise the bravo flag (s) prior to opening the magazines.
- **TURN MOBILE PHONES OFF PRIOR TO OPENING THE MAGAZINES AND OBSERVE HERO PRECAUTIONS FOR RADIOS.**
- Remove boxes from the magazine before opening and issuing.
- Issue only the quantity of explosives necessary for the day's operation.
- Adjust inventory records as appropriate.
- Ensure explosive material is properly packaged for transportation.
- Vehicles will be inspected using form DD 626, Motor Vehicle Inspection (Transporting Hazardous Material) for transport on public roadways (see attachment C), or the Explosive Vehicle On-Site Inspection form (see Appendix F).
- The vehicle engine will not be running during loading or unloading.
- The vehicle will be chocked during the loading and unloading of explosives.
- Secure magazines and lower the bravo flag (s).

8.3.3 Magazine Inspections

Magazines will be inspected on a monthly basis using attachment (1) as guidance. The results of the inspection will be entered into the magazine inspection log.

8.3.4 Security

After normal working hours, a Security Guard performs a security check of the magazines approximately every two hours while explosives are stored in the magazines. This check is documented by the use of a time card machine. The completed time cards are maintained by the Title II Contractor.

8.4 Emergency Response Procedures

- In the event of an emergency, immediately notify “Garcia Base” that you are declaring an emergency. This will alert other Teams to maintain radio silence.
- Contact the respective Unexploded Ordnance Safety Officer (UXOSO) and provide the details of the emergency.
- The UXOSO will coordinate any required response or evacuation actions with “Garcia Base”, the SUXOS and the Title II Contractors Safety Officer.

8.5 Emergency Response Procedures For Fires

- Immediately notify “Garcia Base” and the UXOSO.
- If the fire is not supplying heat to explosives, attempt to extinguish it.
- If the fire involves explosives or involvement is imminent, evacuate all personnel a minimum of 2,500 ft from the magazines.

8.6 Inventory Discrepancies

In the event that there is a discrepancy during any inventory after movement by vessel, the item will be recounted a minimum of two additional times utilizing an additional individual if available. If a discrepancy still exists, the PM and the Corporate QC Manager will be notified. Required notifications of law enforcement will be made IAW the Emergency Notifications List. All actions from this point will be dictated by law enforcement or Corporate Management.

9. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

9.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the UXO Technician III or above team member, on the existing and potential hazards within the area they are assigned to work prior to commencing any activities.

Personnel will be cognizant of the surroundings and remain observant of their footing at all times. All personnel will be aware of the signs of heat stress, as described in Section 8.0 of the SHSP, and be able to recognize the onset of heat stress disorders in themselves and their team members.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions, and follow the Emergency Response Plan in Section 14.0 of the SHSP.

10. DISTRIBUTION

SOP Number	Number of Copies	Organization	Building Number	Signature
	Master	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____

11. DIAGRAMS

Maps and diagrams are located in the approved Work Plan and/or the approved ESS. Teams will be provided maps of the overall project site, medical care locations and evacuation routes prior to beginning site work.

12. EQUIPMENT

The team will be equipped with the following:

- Keys
- Locks
- Logbook and/or Personal Digital Assistant (PDA) for recording data
- Camera
- Communications equipment

The required safety equipment includes the following:

- First-Aid kit
 - Level D PPE - A work uniform affording minimal protection: used for nuisance contamination only.
 - The following constitute Level D equipment; items may be used as appropriate:
 1. Gloves⁽¹⁾
 2. Boots/shoes
 3. Safety glasses
- Footnote ⁽¹⁾ Optional, as applicable.
- Fire extinguisher
 - Inclement weather gear as needed

Safety equipment is kept in the back of the site vehicles:

- Bed (Pick-up trucks)
- Back cargo area (SUVs)

13. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in Section 12 of the APP will be followed. The single point of contact for incidents on site will be the UXOSO.

In the event that an employee has to be taken to the hospital refer to Section D.12.1 of the APP for the route to the hospital.

A map showing the hospital's location is contained in the Site-Specific Health and Safety Plan provided as Attachment 3.

The single point of contact for incidents on site will be the UXOSO.

The UXOSO will perform pre-emergency planning before starting field activities and during the mobilization and site-specific training phase of the project, and will coordinate emergency response with police/fire/rescue personnel and the nearest hospital.

In the event of an emergency requiring evacuation, the evacuation signal will be given through verbal instructions. Personnel will evacuate to a pre-determined evacuation point in the support zone identified at the daily safety briefing. The UXOSO will account for all personnel and will summon emergency response personnel, if required. If the fire department is summoned, the UXOSO will meet them upon their entrance to the site and will inform them of the presence of MEC, and provide the appropriate fragmentation distance from the fire for the purpose of fighting or preventing the spread of fire from the site evacuation is necessary, all personnel are to:

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- Gather equipment to the extent safely possible
- Evacuate to the vehicle(s) location and prepare to move out.

After allowing the appropriate wait time (24 hours in the case of a fire), the SUXOS and the UXOSO will enter the site together and determine if the site is safe for re-entry.

After the emergency situation has been controlled and eliminated, or has passed the Project Manager, UXOSO, and SUXOS will review the emergency response and change procedures if necessary.

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ATTACHMENT A.
MAGAZINE INSPECTION CHECKLIST

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MAGAZINE INSPECTION CHECKLIST

The Magazine inspection will address the following areas:

- a. General Housekeeping. Are the magazines free of clutter such as empty boxes, trash etc? Is the magazine clean”
- b. Fire Hazards. Inspect the magazines for combustible material.
- c. Compatibility of Contents. Ensure the contents of the magazines are compatible.
- d. Net Explosive Weight (NEW). Ensure the NEW of no magazine is exceeded.
- e. Grounding System. Visually inspect the grounding system for obvious flaws such as loose grounding straps. The magazines will receive technical grounding inspection every 24 months.
- f. Physical Condition. Inspect the physical conditions of the facilities for disrepair or deterioration.
- g. Firebreaks and Fire Fighting Equipment. Ensure that vegetation is cut a minimum of 50 ft around the magazines. Inspect the fire extinguishers for serviceability.
- h. Abnormal Odors. Note any abnormal odors present within the magazines.
- i. Placards. Inspect the exterior fire symbols to ensure they are visible and in good repair. Ensure the safety information and explosive limits are posted within the magazines.
- j. Tampering. Check for any evidence of tampering or of attempt to gain unauthorized entry.

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ATTACHMENT B.
SAFETY REGULATIONS FOR THE HANDLING AND STORAGE OF EXPLOSIVES

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THESE INSTRUCTIONS ARE NOT ALL INCLUSIVE AND OP 5 MUST BE CONSULTED FOR MORE DETAILED INSTRUCTIONS

Smoking is not permitted in magazines, vehicles or areas containing ammunition, explosives or other dangerous articles.
Minimize the number of personnel in the vicinity of ammunition/explosives.
Keep the magazines clean.
Do not carry any flame producing devices into the magazines.
Do not leave open containers in the magazine.
Only operations pertaining to storage and shipping are permitted in the magazines.
Observe HERO precautions when working in the vicinity of the magazines.
The two person rule applies for access to the magazines.
Never leave the magazine open and unattended.

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ATTACHMENT C.
VEHICLE INSPECTION DD 626

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MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS) <i>(Read Instructions before completing this form.)</i>											
This form applies to all vehicles which must be marked or placarded in accordance with Title 49 CFR.						1. BILL OF LADING/TRANSPORTATION CONTROL NUMBER					
SECTION I - DOCUMENTATION				ORIGIN a.				DESTINATION b.			
2. CARRIER/GOVERNMENT ORGANIZATION											
3. DATE/TIME OF INSPECTION											
4. LOCATION OF INSPECTION											
5. OPERATOR(S) NAME(S)											
6. OPERATOR(S) LICENSE NUMBER(S)											
7. MEDICAL EXAMINER'S CERTIFICATE*											
8. <i>(X if satisfactory at origin)</i>										9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT*	
a. HAZMAT ENDORSEMENT				d. ERG OR EQUIVALENT COMMERCIAL:				YES		NO	
b. VALID LEASE*				e. DRIVER'S VEHICLE INSPECTION REPORT*				a. TRUCK/TRACTOR		YES	
c. ROUTE PLAN				f. COPY OF 49 CFR PART 397				b. TRAILER		NO	
SECTION II - MECHANICAL INSPECTION <i>All items shall be checked on empty equipment prior to loading. Items with an asterisk shall be checked on all incoming loaded equipment.</i>											
10. TYPE OF VEHICLE(S)						11. VEHICLE NUMBER(S)					
12. PART INSPECTED <i>(X as applicable)</i>		ORIGIN (1)		DESTINATION (2)		ORIGIN (1)		DESTINATION (2)		COMMENTS (3)	
		SAT		UNSAT		SAT		UNSAT			
a. SPARE ELECTRICAL FUSES						k. EXHAUST SYSTEM					
b. HORN OPERATIVE						l. BRAKE SYSTEM*					
c. STEERING SYSTEM						m. SUSPENSION					
d. WINDSHIELD/WIPERS						n. COUPLING DEVICES					
e. MIRRORS						o. CARGO SPACE					
f. WARNING EQUIPMENT						p. LANDING GEAR*					
g. FIRE EXTINGUISHER*						q. TIRES, WHEELS, RIMS					
h. ELECTRICAL WIRING						r. TAILGATE/DOORS*					
i. LIGHTS AND REFLECTORS						s. TARPULIN*					
j. FUEL SYSTEM*						t. OTHER <i>(Specify)</i>					
13. INSPECTION RESULTS <i>(X one)</i> ACCEPTED						REJECTED					
<i>(If rejected give reason under "Remarks". Equipment will be approved if deficiencies are corrected prior to loading.)</i>											
14. SATELLITE MOTOR SURVEILLANCE SYSTEM: <i>(X one)</i> ACCEPTED						REJECTED					
15. REMARKS											
16. INSPECTOR SIGNATURE <i>(Origin)</i>						17. INSPECTOR SIGNATURE <i>(Destination)</i>					
SECTION III - POST LOADING INSPECTION This section applies to Commercial and Government/Military vehicles. All items will be checked prior to release of loaded equipment and shall be checked on all incoming loaded equipment.											
		ORIGIN (1)		DESTINATION (2)							
		SAT		UNSAT		SAT		UNSAT			
18. LOADED IAW APPLICABLE SEGREGATION/COMPATIBILITY TABLE OF 49 CFR											
19. LOAD PROPERLY SECURED TO PREVENT MOVEMENT											
20. SEALS APPLIED TO CLOSED VEHICLE; TARPULIN APPLIED ON OPEN EQUIPMENT											
21. PROPER PLACARDS APPLIED											
22. SHIPPING PAPERS/DD FORM 2890 FOR GOVERNMENT VEHICLE SHIPMENTS											
23. COPY OF DD FORM 626 FOR DRIVER											
24. SHIPPED UNDER DOT SPECIAL PERMIT 868											
25. INSPECTOR SIGNATURE <i>(Origin)</i>						26. DRIVER(S) SIGNATURE <i>(Origin)</i>					
27. INSPECTOR SIGNATURE <i>(Destination)</i>						28. DRIVER(S) SIGNATURE <i>(Destination)</i>					

INSTRUCTIONS

SECTION I - DOCUMENTATION

General Instructions.

All items (2 through 9) will be checked at origin prior to loading. Items with an asterisk (*) apply to commercial operators or equipment only. Only Items 2 through 7 are required to be checked at destination.

Items 1 through 5. Self explanatory.

Item 6. Enter operator's Commercial Driver's License (CDL) number or Military OF-346 License Number. CDL and OF-346 must have the HAZMAT and other appropriate endorsements IAW 49 CFR 383.

Item 7. *Enter the expiration date listed on the Medical Examiner's Certificate.

Item 8.a. Hazardous Materials Certification. In accordance with applicable service regulations, ensure operator has been certified to transport hazardous materials. Check the expiration date on driver's HAZMAT Certification.

b. *Valid Lease. Shipper will ensure a copy of the appropriate contract or lease is carried in all leased vehicles and is available for inspection. (49 CFR 376.12 and 376.11(c)(2)).

c. Route Plan. Prior to loading any Hazard Class/Division 1.1, 1.2, or 1.3 (Explosives) for shipment, ensure that the operator possesses a written route plan in accordance with 49 CFR Part 397. Route Plan requirements for Hazard Class 7 (Radioactive) materials are found in 49 CFR 397.101.

d. Emergency Response Guidebook (ERG) or Equivalent. Commercial operators must be in possession of an ERG or equivalent document. Shipper will provide applicable ERG page(s) to military operators.

e. *Driver's Vehicle Inspection Report. Review the operator's Vehicle Inspection Report. Ensure that there are no defects listed on the report that would affect the safe operation of the vehicle.

f. Copy of 49 CFR Part 397. Operators are required by regulation to have in their possession a copy of 49 CFR Part 397 (Transportation of Hazardous Materials Driving and Parking Rules). If military operators do not possess this document, shipper will provide a copy to operator.

Item 9. *Commercial Vehicle Safety Alliance (CVSA) Decal. Check to see if equipment has a current CVSA decal and mark applicable box. Vehicles without CVSA, check documentation of the last vehicle periodic inspection and perform DD Form 626 inspection.

SECTION II - MECHANICAL INSPECTION

General Instructions.

All items (12.a. through 12.i.) will be checked on all incoming empty equipment prior to loading. All UNSATISFACTORY conditions must be corrected prior to loading. Items with an asterisk (*) shall be checked on all incoming loaded equipment. Unsatisfactory conditions that would affect the safe off-loading of the equipment must be corrected prior to unloading.

SECTION II (Continued)

Item 12.a. Spare Electrical Fuses. Check to ensure that at least one spare fuse for each type of installed fuse is carried on the vehicle as a spare or vehicle is equipped with an overload protection device (circuit breaker). (49 CFR 393.95)

b. Horn Operative. Ensure that horn is securely mounted and of sufficient volume to serve purpose. (49 CFR 393.81)

c. Steering System. The steering wheel shall be secure and must not have any spokes cracked through or missing. The steering column must be securely fastened. Universal joints shall not be worn, faulty or repaired by welding. The steering gear box shall not have loose or missing mounting bolts or cracks in the gear box mounting brackets. The pitman arm on the steering gear output shaft shall not be loose. Steering wheel shall turn freely through the limit of travel in both directions. All components of a power steering system must be in operating condition. No parts shall be loose or broken. Belts shall not be frayed, cracked or slipping. The power steering system shall not be leaking. (49 CFR 396 Appendix G)

d. Windshield/Wipers. Inspect to ensure that windshield is free from breaks, cracks or defects that would make operation of the vehicle unsafe; that the view of the driver is not obscured and that the windshield wipers are operational and wiper blades are in serviceable condition. Defroster must be operative when conditions require. (49 CFR 393.60, 393.78 and 393.79)

e. Mirrors. Every vehicle must be equipped with two rear vision mirrors located so as to reflect to the driver a view of the highway to the rear along both sides of the vehicle. Mirrors shall not be cracked or dirty. (49 CFR 393.80)

f. Warning Equipment. Equipment must include three bidirectional emergency reflective triangles that conform to the requirements of FMVSS No. 125. FLAME PRODUCING DEVICES ARE PROHIBITED. (49 CFR 393.95)

g. Fire Extinguisher. Military vehicles must be equipped with one serviceable fire extinguisher with an Underwriters Laboratories rating of 10 BC or more. (Commercial motor vehicles must be equipped with one serviceable 10 BC Fire Extinguisher). Fire extinguisher must be located so that it is readily accessible for use and securely mounted on the vehicle. The fire extinguisher must be designed, constructed and maintained to permit visual determination of whether it is fully charged. (49 CFR 393.95)

h. Electrical Wiring: Electrical wiring must be clean and properly secured. Insulation must not be frayed, cracked or otherwise in poor condition. There shall be no uninsulated wires, improper splices or connections. Wires and electrical fixtures inside the cargo area must be protected from the lading. (49 CFR 393.28)

INSTRUCTIONS

SECTION II (Continued)

i. Lights/Reflectors. (Head, tail, turn signal, brake, clearance, marker and identification lights, Emergency Flashers). Inspect to see that all lighting devices and reflectors required are operable, of proper color and properly mounted. Ensure that lights and reflectors are not obscured by dirt or grease or have broken lenses. High/Low beam switch must be operative. Emergency Flashers must be operative on both the front and rear of vehicle. (49 CFR 393.24, 25, and 26)

j. Fuel System. Inspect fuel tank and lines to ensure that they are in serviceable condition, free from leaks, or evidence of leakage and securely mounted. Ensure that fuel tank filler cap is not missing. Examine cap for defective gasket or plugged vent. Inspect filler necks to see that they are in completely serviceable condition and not leaking at joints. (49 CFR 393.83)

k. Exhaust System. Exhaust system shall discharge to the atmosphere at a location to the rear of the cab or if the exhaust projects above the cab, at a location near the rear of the cab. Exhaust system shall not be leaking at a point forward of or directly below the driver compartment. No part of the exhaust system shall be located where it will burn, char or damage electrical wiring, fuel system or any other part of the vehicle. No part of the exhaust system shall be temporarily repaired with wrap or patches. (49 CFR 393.83)

l. Brake System (to include hand brakes, parking brakes and Low Air Warning devices). Check to ensure that brakes are operational and properly adjusted. Check for audible air leaks around air brake components and air lines. Check for fluid leaks, cracked or damaged lines in hydraulic brake systems. Ensure that parking brake is operational and properly adjusted. Low Air Warning devices must be operative. (49 CFR 393.40, 41, 42, 43, 44, 45, 47, 48, 49, 50, 51, 52, 53, and 55)

m. Suspension. Inspect for indications of misaligned, shifted or cracked springs, loosened shackles, missing bolts, spring hangers unsecured at frame and cracked or loose U-bolts. Inspect for any unsecured axle positioning parts, and sign of axle misalignment, broken torsion bar springs (if so equipped). (49 CFR 393.207)

n. Coupling Devices (Inspect without uncoupling). Fifth Wheels: Inspect for unsecured mounting to frame or any missing or damaged parts. Inspect for any visible space between upper and lower fifth wheel plates. Ensure that the locking jaws are around the shank and not the head of the kingpin. Ensure that the release lever is seated properly and safety latch is engaged. Pintle Hook, Drawbar, Towbar Eye and Tongue and Safety Devices: Inspect for unsecured mounting, cracks, missing or ineffective fasteners (welded repairs to pintle hook is prohibited). Ensure safety devices (chains, hooks, cables) are in serviceable condition and properly attached. (49 CFR 393.70 and 71)

o. Cargo Space. Inspect to ensure that cargo space is clean and free from exposed bolts, nuts, screws, nails or inwardly projecting parts that could damage the lading. Check floor to ensure it is tight and free from holes. Floor shall not be permeated with oil or other substances. (49 CFR 393.84)

p. Landing Gear. Inspect to ensure that landing gear and assembly are in serviceable condition, correctly assembled, adequately lubricated and properly mounted.

SECTION II (Continued)

q. Tires, Wheels and Rims: Inspect to ensure that tires are properly inflated. Flat or leaking tires are unacceptable. Inspect tires for cuts, bruises, breaks and blisters. Tires with cuts that extend into the cord body are unacceptable. Thread depth shall not be less than: 4/32 inches for tires on a steering axle of a power unit, and 2/32 inches for all other tires. Mixing bias and radial on the steering axle is prohibited. Inspect wheels and rims for cracks, unseated locking rings, broken, loose, damaged or missing lug nuts or elongated stud holes. (49 CFR 393.75)

r. Tailgate/Doors. Inspect to see that all hinges are tight in body. Check for broken latches and safety chains. Doors must close securely. (49 CFR 177.835(h))

s. Tarpaulin. If shipment is made on open equipment, ensure that lading is properly covered with fire and water resistant tarpaulin. (49 CFR 177.835(h))

t. Other Unsatisfactory Condition. Note any other condition which would prohibit the vehicle from being loaded with hazardous materials.

Item 14. For AA&E and other shipments requiring satellite surveillance, ensure that the Satellite Motor Surveillance System is operable. The DTTS Message Display Unit, when operative, will display the signal "DTTS ON". The munitions carrier driver, when practical, will position the DTTS message display unit in a manner that allows the shipping inspector or other designated shipping personnel to observe the "DTTS ON" message without climbing aboard the cab of the motor vehicle.

SECTION III - POST LOADING INSPECTION

General Instructions.

All placarded quantities items will be checked prior to the release of loaded equipment. Shipment will not be released until deficiencies are corrected. All items will be checked on incoming loaded equipment. Deficiencies will be reported in accordance with applicable service regulations.

Item 18. Check to ensure shipment is loaded in accordance with 49 CFR Part 177.848 and the applicable Segregation or Compatibility Table of 49 CFR 177.848.

Item 19. Check to ensure the load is secured from movement in accordance with applicable service outload drawings.

Item 20. Check to ensure seal(s) have been applied to closed equipment; fire and water resistant tarpaulin applied on open equipment.

Item 21. Check to ensure each transport vehicle has been properly placarded in accordance with 49 CFR 172.504.

Item 22. Check to ensure operator has been provided shipping papers that comply with 49 CFR 172.201 and 202. For shipments transported by Government vehicle, shipping paper will be DD Form 2890.

Item 23. Ensure operator(s) sign DD Form 626, are given a copy and understand the hazards associated with the shipment.

Item 24. Applies to Commercial Shipments Only. If shipment is made under DOT Special Permit 868, ensure that shipping papers are properly annotated and copy of Special Permit 868 is with shipping papers.

Item 26. Ensure driver/operator signs DD Form 626 at origin.

Item 28. Ensure driver/operator signs DD Form 626 at destination.

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DESCRIPTION: MAGAZINE OPERATIONS
REVISION No.: FINAL
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PROCEDURE No.: SOP 015

DESCRIPTION: DEMOLITION OPERATIONS

REVISION No.: FINAL

DATE: MAY 2018

PAGE: 1 OF 24

1. TITLE PAGE

STANDARD OPERATING PROCEDURE

DEMOLITION OPERATIONS

Munitions and Explosives of Concern Removal
Former Vieques Naval Training Range
Vieques Island, Puerto Rico

USA ENVIRONMENTAL, INC.

May 2018

PROCEDURE No.: SOP 015
DESCRIPTION: DEMOLITION OPERATIONS
REVISION No.: FINAL
DATE: MAY 2018
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2. RECORD OF CHANGES

The following section identifies any major or minor changes to this standard operating procedure (SOP).

- Major change: Change to SOP that adds operational hazards, or new hazardous items. Change to or revision of supplemental documents could be classified as major change, if the change or revision modifies the operational procedures to the point that safety is affected, or the change or revision introduces new hazards.
- Minor change: Change to an SOP that does not provide additional hazards, additions of new hazardous items, or changes in methods used to eliminate or mitigate hazards. (Example: name, code, or telephone number changes, spelling corrections, references or referenced document locations.)

Date	Supervisor's Signature	Page	Paragraph	Remarks
MM/DD/YYYY				

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PROCEDURE No.: SOP 015
DESCRIPTION: DEMOLITION OPERATIONS
REVISION No.: FINAL
DATE: MAY 2018
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PROCEDURE No.: SOP 015

DESCRIPTION: DEMOLITION OPERATIONS

REVISION No.: FINAL

DATE: MAY 2018

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3. REFERENCES

The following references apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, it may be necessary to consult other SOPs and regulatory references.

- USA Environmental, Inc., Work Plan, Munitions and Explosives of Concern Former Vieques Naval Training Range, Vieques Island, Puerto Rico
- NOSSAINST 8023.11C, DON Standard Operating Procedures Development, Implementation, and Maintenance for Ammunition and Explosives
- USA Site Health and Safety Plan (SHSP)
- OSHA General Industry Standards, 29 CFR 1910
- OSHA Construction Standards, 29 CFR 1926
- DDESB TP-16, Methodology for Calculation of Fragmentation Characteristics
- DoD 4160.21-M, Defense Reutilization and Marketing Manual
- DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards
- TM 9-1300-200, Ammunition General
- TM 9-1300-214, Military Explosives
- Applicable TM 60 Series Publications
- AR 190-11, Physical Security of Arms, Ammunition, and Explosives
- ATF 5400.7, Alcohol, Tobacco, and Firearms Explosives Laws and Regulations
- DOT, 49 CFR, Parts 100 to 199, Transportation (applicable sections)
- EPA, 40 CFR Parts 260 to 299, Protection of Environment (applicable sections).
- USACE EM 385-1-1, Safety and Health Requirements Manual

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PROCEDURE No.: SOP 015
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5. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This SOP contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) during the operations at the Former Vieques Naval Training Range, Vieques Island, Puerto Rico. By signature, the undersigned certifies that this SOP is approved for implementation at the project site and will be used to direct operations as described in this SOP.

(Signature to be provided in Final SOP)

Developed by:

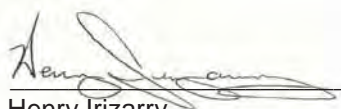


Donald Shaw
Project Manager

05/21/2018

Date

Reviewed by:



Henry Irizarry
Vieques Senior UXO Supervisor

05/21/2018

Date:

Approved by:

Jason W. Wagner

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Date: 2018.05.21 12:34:38 -04'00'

Jason W. Wagner, CMQ/OE
Vieques Quality Manager

Date

This standard operating procedure (SOP) expires four years from the date of approval and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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8. PROCEDURES

8.1 Purpose

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of demolition/disposal operations on sites contaminated with unexploded ordnance (UXO) or munitions and explosives of concern (MEC).

8.2 Scope

This SOP applies to all USA Environmental, Inc. (USA) site personnel, including contractor and subcontractor personnel, involved in the conduct of UXO/MEC demolition/disposal operations on a UXO/MEC contaminated site. This SOP is not intended to contain all of the requirements needed to ensure complete compliance, and should be used in conjunction with approved project plans and applicable referenced regulations. Consult the documents listed in Section 2.0 of this SOP for additional compliance issues.

8.3 Responsibilities

8.3.1 Project Manager

The Project Manager (PM) will be responsible for ensuring the availability of the resources needed to implement this SOP, and will also ensure that this SOP is incorporated into plans, procedures, and training for sites where this SOP is to be implemented.

8.3.2 Senior UXO Supervisor

The Senior UXO Supervisor (SUXOS) will be responsible for assuring that adequate safety measures and housekeeping are performed during all phases of site operations, to include demolition activities, and will visit site demolition locations, as deemed necessary, to ensure that demolition operations are carried out in a safe, clean, efficient, and economic manner. The demolition activities will then be conducted under the direct control of the SUXOS, who will have the responsibility of supervising all demolition operations within the area.

The SUXOS will be responsible for training all on-site UXO personnel regarding the nature of the materials handled, the hazards involved, and the precautions necessary. The SUXOS will also ensure that the Daily Operational Log, Ordnance Accountability Log, USA Demolition Shot Records, and inventory records are properly filled out and accurately depict the demolition events and demolition material consumption for each day's operations. The SUXOS will be present during all demolition operations or designate a competent, qualified person to be in charge during any absences.

8.3.3 UXO Safety Officer

The UXO Safety Officer (UXOSO) for the site is responsible for ensuring that all demolition operations are being conducted in a safe and healthful manner, and is required to be present during all MEC demolition operations. The UXOSO will ensure the compliance of the demolition team with the above referenced documents that are applicable to the particular task being performed.

8.3.4 UXO Quality Control Specialist

The UXO Quality Control Specialist (UXOQCS) is responsible for ensuring the completeness of demolition operations records and for weekly inspection of the Ordnance Accountability Log, the Daily Operational

Log, the USA Demolition Shot Record, and the inventory of MEC and demolition material. The UXOQCS, assisted by demolition team personnel, will inspect each demolition pit and an area of appropriate radius after each demolition shot, in accordance with the approved explosive siting plan, to ensure that there are no kick-outs, hazardous UXO/MEC components, or other hazardous items. In addition, the pit may be checked with a magnetometer and large metal fragments, and any hazardous debris, will be removed on a per use basis in accordance with the SOW. Any UXO/MEC discovered during the QC check will be properly disposed of using the demolition procedures in the WP. Extreme caution must be exercised when handling UXO/MEC, which has been exposed to the forces of detonation. Personnel must adhere to acceptable safe practices and procedures when determining the condition of munitions and fuzes that have not been consumed in the disposal process.

8.4 Demolition Procedures Review

Before any disposal operations commence, all technicians assigned to or working with disposal teams will attend a site-specific orientation. The purpose of the orientation will be to review MEC disposal and emergency response procedures. The topics to be covered during the orientation will include, but are not limited to:

- SHSP
- Demolition SOP
- Demolition firing systems and components
- Disposal charge placement
- Explosives transportation
- Site ordnance briefing
- Engineering controls (protective measures for cultural features)
- Type and condition of MEC
- Emergency response equipment
- Emergency procedures
- Team assignments.

8.4.1 Weather and Environmental Considerations

- Prior to commencing disposal operations the SUXOS or UXOSO will obtain a local weather report.
- Disposal operations will not be conducted if electrical storms are within 10 miles of the disposal site or during severe weather conditions that would impact safety.
- No demolition operations will be conducted if the surface wind speed is greater than 20 miles per hour.
- Demolition operations will not be conducted during periods of visibility of less than one mile caused by, but not limited to, dense fog, blowing snow, rain, sand storms, or dust storms.
- Demolition will not be carried out on extremely cloudy days, defined as overcast (more than 80% cloud cover) with a ceiling of less than 2,000 ft.
- Demolition operations will not be initiated until an appropriate time after sunrise, and will be secured at an appropriate time prior to sunset (see Section 10.0).

8.4.2 Explosive Operations

Only qualified UXO technicians will dispose of MEC or MPPEH by open detonation. The following guidelines are provided.

- MEC/MPPEH items found requiring demolition/disposal that are deemed unacceptable to move will be disposed of using the blow-in-place (BIP) technique.
- MEC/MPPEH items that are deemed safe to move may be consolidated in a collection point on the site and detonated en masse.
- Explosive disposal operations will not be conducted without authorization from the SUXOS.

8.4.3 Initiation Systems

The firing system will use the Remote Firing Device (RFD) with electric blasting caps.

8.5 Pre/Post-Demolition/Disposal Procedures

8.5.1 Pre-Demo/Disposal Operational Briefing

It is the belief of USA that the success of any operation is dependent upon a thorough brief, covering all phases of the task, which is presented to all affected personnel. The SUXOS will brief all personnel involved in range operations in the following areas:

- Type of UXO/MEC being destroyed
- Type, placement, and quantity of demolition material being used
- Method of initiation (electric)
- Means of transporting and packaging MEC
- Route to the disposal site
- Equipment being used (i.e., galvanometer, RFD.)
- Misfire procedures
- Post-shot clean-up of range.

8.5.2 Pre-Demo/Disposal Safety Briefing

The USA SUXOS, Team Leader, or UXOSO will conduct a safety brief for all personnel involved in range operations in the following areas:

- Care and handling of explosive materials
- Personal hygiene
- Two man rule, and approved exceptions
- Personnel roles and responsibilities
- Potential trip/fall hazards
- Horseplay on the range
- Stay alert for any explosive hazards on the range
- Calling a safety stop for hazardous conditions
- Location of emergency shelter (if available)
- Parking area for vehicles (vehicles must be positioned for immediate departure, with the keys in the ignition)
- Location of range emergency vehicle
- Location of the assigned paramedic
- Wind direction (to assess potential toxic fumes)

- Locations of first aid kit and fire extinguisher
- Route to nearest hospital or emergency aid station
- Type of communications in event of an emergency
- Storage location of demolition materials and MEC awaiting disposal
- Demolition schedule.

8.5.3 Preparing Explosive Charge for Initiation

To prepare the explosive charge for initiation, the procedures listed below will be followed:

- Place demolition charge on UXO/MEC.
- Connect detonator to the RFD.
- Isolate or insulate all connections.
- Prime the demolition charge.
- Depart to firing point.
- Obtain a head count.

8.5.4 Initiation Sequence

- Announce on the radio that air-horn demolition warnings will follow.
- **Warning Signal.** Give a one minute warning signal, using the “Hornet” siren, five minutes prior to detonation.
- Check the firing circuit.
- **Blast Signal.** A series of short audible signals on the “Hornet” siren, (i.e. fire-in-the-hole like) one minute prior to the shot.
- Listen for the shot.
- Turn off RFD Transmitter.
- Remain in designated safe area until SUXOS announces the “**All Clear Signal.**” This will occur after a post-shot waiting period of 5 minutes and the shot has been inspected by the SUXOS.

8.5.5 Post Demolition/Disposal Procedures

Do not approach a smoking hole or allow personnel out of the designated safe area until cleared to do so, and follow the procedures listed below:

- After the “**All Clear**” signal, check pit for low orders or kick outs.
- Examine pit, and remove any large fragmentation, as needed.
- Back fill hole, as necessary.
- Police all equipment.
- Make the proper notifications that the operation is complete

8.6 Engineering Controls

Engineering controls will be utilized in areas where there is a probability of encountering unauthorized personnel/trespassers. The use of engineering controls will be in accordance with the Department of Defense Explosives Safety Board (DDESB)-approved Explosives Safety Submission. The two engineering control options are soil coverage as calculated using the DDESB Buried Explosion Module, and the sandbag thickness information contained in the DDESB Fragmentation Database.

8.7 Electric Detonators

The following requirements are necessary when using electric detonators:

- Electric detonators and electric blasting circuits may be energized to dangerous levels from outside sources such as static electricity, induced electric currents, and radio communication equipment. Safety precautions will be taken to reduce the possibility of a premature detonation of the electric detonator and explosive charges of which they form a part. Radios will not be operated while the pit is primed or during the priming process.
- The shunt will not be removed from the leg wires of the detonator until the continuity check of the detonator is to be performed.
- When uncoiling, or straightening, the detonator leg wires, keep the explosive end of the detonator pointing away from the body and away from other personnel. When straightening the leg wires, do not hold the detonator itself; rather, hold the detonator leg wires approximately 1 in. from the detonator body. Straighten the leg wires by hand; do not throw or wave the wires through the air to loosen them.
- Prior to use, the detonators will be tested for continuity. To conduct the test, place the detonators in a pre-bored hole in the ground or place them under a sand bag, and walk facing away from the detonators and stretch the wires to their full length, being sure to not pull the detonators from the hole or sand bag. With the leg wires stretched to their fullest length, test the continuity of the detonators one at a time by un-shunting the leg wires and attaching them to the galvanometer and checking for continuity. After the test, re-shunt the wires by twisting the two ends together. Repeat this process for each detonator until all detonators have been tested. This process will be accomplished at least 50 ft from and downwind of any MEC or demolition materials.

NOTE: Detonator wires will remain short circuited until time to connect them to the Remote Firing Device (RFD) Receiver.

- Prior to making connections to the RFD Transmitter, the entire firing circuit will be tested for electrical continuity and ohms resistance, or transmitting power (as applicable), to ensure the RFD Transmitter (distance) has the capacity to initiate the shot.
- The individual assigned to make the connections at the blasting machine or panel will not complete the circuit at the blasting machine or panel, and will not give the signal for detonation, until satisfied that all personnel in the vicinity have been evacuated to a safe distance. When in use, the blasting machine, or its actuating device, will be in the blaster's possession at all times. When using the panel, the switch must be locked in the open position until ready to fire, and the single key must be in the blaster's possession.
- Prior to initiating a demolition shot(s), a warning will be given; the type and duration of such warning will be determined by the prevailing conditions at the demolition range. At a minimum, this should be an audible signal using a siren, air horn, or megaphone, which is sounded for a duration of one minute, five minutes prior to the shot and again one minute prior to the shot, IAW EM 385-1-1, Section 29.H.04 and OSHA 29 CFR 1926, Subpart U.

8.8 Detonating Cord Use

The following procedures are required when using detonating cord (det cord):

- Det cord should be cut using approved crimpers, and only the amount required should be removed from inventory.
- When cutting det cord, the task should be performed outside the magazine.
- For ease of inventory control, remove det cord only in 1-ft increments.

- Det cord should not be placed in clothing pockets or around the neck, arm, or waist, and should be transported to the demolition location in either an approved "day box", original container, or a cloth satchel, depending upon the magazine location and proximity to the demolition area.
- Det cord should be placed at least 50 ft away from detonators and demolition materials until ready for use. To ensure consistent safe handling, each classification of demolition material will be separated by at least 25 ft until ready for use.
- When ready to "tie in" either the det cord to demolition materials, or det cord to detonator, the det cord will be connected to the demolition material and secured to the UXO/MEC. The cord is then strung out of the hole and secured in place with soil, or filled sandbags, being sure to leave a minimum of 6 ft of det cord exposed outside the hole.
- Once the hole is filled, make a loop in the det cord large enough to accommodate the detonator, place the detonator in the loop, and secure it with tape. The detonator's explosive end will face down the det cord toward the demolition material or parallel to the main line.
- In all cases, ensure that there is a minimum of 6 ft of det cord extending out of the hole to allow for ease of detonator attachment and detonator inspection/replacement should a misfire occur.
- If the det cord detonators are electric, they will be checked, tied in to the firing line, and shunted prior to being taped to the loop. If the det cord detonators are non-electric, the time/safety fuse will be prepared with the igniter in place prior to taping the detonators to the det cord loop. If the det cord detonators are Non-EI, simply tape the detonators into the loop as described above.
- .

8.9 Misfire Procedures

A thorough check of all equipment, firing wire, and detonators will prevent most misfires. However, if a misfire does occur, the procedures outlined below will be followed.

8.10 Electric Misfires

To prevent electric misfires, one technician will be responsible for all electrical wiring in the circuit. If a misfire does occur, it must be cleared with extreme caution, and the responsible technician will investigate and correct the situation, using the steps outlined below:

- Check RFD transmitter, and make a second and third initiation attempt.
- If unsuccessful, commence a 30-minute wait period.
- After the maximum delay predicted for any part of the shot has passed, the SUXOS and designated technician will proceed down range to inspect the firing system, and a safety observer must watch from a protected area.
- Disconnect and shunt the detonator wires, connect a new detonator to the RFD, check the replacement detonator for continuity, and prime the charge without disturbing the original detonator.
- Follow normal procedures for effecting initiation of the charge.

8.11 Detonating Cord Misfire

USA uses detonating cord to tie in multiple demolition shots, and to ensure that detonators are not buried. Detonation cord initiation will be electrical. In addition, the following will be conducted:

- If there is no problem with the initiating system, wait the prescribed amount of time, and inspect the initiator to the cord connection to ensure it is properly connected. If it was a bad connection, simply attach a new initiator, and follow the appropriate procedures in Paragraph 11.0.

- If the initiator detonated and the cord did not, inspect the cord to ensure that it is det cord and not time fuze. Also, check to ensure that there is PETN in the cord at the connection to the initiator.
- It may be necessary to uncover the det cord and replace it. This must be accomplished carefully, to ensure that the demolition charge and the MEC item are not disturbed.

8.12 Record Keeping Requirement

To document the demolition operations procedures and the completeness of the demolition of MEC, the following record keeping requirements will be met:

- USA (as directed) will obtain and maintain all required permits.
- The SUXOS will ensure the accurate completion of the logs, and the SUXOS and UXOQCS will monitor the entries in the log for completeness, accuracy, and compliance with meteorological conditions.
- The SUXOS will enter the appropriate data on the Ordnance Accountability Log and the Demolition Shot Record, to reflect the MEC destroyed, and will complete the appropriate information on the Explosives Accountability Log (a.k.a. the Magazine Data Card) which indicates the demolition materials used to destroy the MEC.
- The quantities of MEC recovered must also be the quantities of MEC destroyed or disposed.
- USA will retain a permanent file of all demolition records, including permits; magazine data cards; training and inspection records; waste manifests, if applicable; and operating logs.
- Copies of ATF License and any required permits must be on hand.

8.13 General Operational and Safety Procedure

All personnel, including contractor and subcontractor personnel, involved in operations on UXO/MEC-contaminated sites will be familiar with the potential safety and health hazards associated with the conduct of demolition/disposal operations, and with the work practices and control techniques used to reduce or eliminate these hazards.

During demolition operations, the general safety provisions listed below will be followed by all demolition personnel, at all times. Noncompliance with the general safety provisions listed below will result in disciplinary action, which may include termination of employment.

All safety regulations applicable to demolition range activities and demolition and MEC materials involved will be complied with.

- Demolition of any kind is prohibited without an approved ESS.
- The quantity of MEC to be destroyed will be determined by the range limit, fragmentation and K-Factor distance calculations located in the approved ESS.
- In the event of an electrical storm, dust storm, or other hazardous meteorological conditions, immediate action will be taken to cease all demolition operations and evacuate the area.
- In the event of a fire, which does not include explosives or energetic material, put out the fire using the firefighting equipment located at the site; if unable to do so, notify the fire department and evacuate the area. If injuries are involved, remove the victims from danger, administer first aid, and seek medical attention.
- The UXOSO is responsible for reporting all injuries and accidents that occur.
- Personnel will not tamper with any safety devices or protective equipment.
- Any defect or unusual condition noted that is not covered by this SOP will be reported immediately to the SUXOS or UXOSO for evaluation and/or correction.

- Methods of demolition will be conducted in accordance with this SOP and approved changes or revisions thereafter, the WP and the approved ESS.
- Adequate fire protection and first aid equipment will be provided at all times.
- All personnel engaged in the destruction of MEC will wear clothing made of natural fiber, close-weave clothes, such as cotton. Synthetic material such as nylon is not authorized unless treated with anti-static material.
- Care will be taken to minimize exposure to the smallest number of personnel, for the shortest time, to the least amount of hazard, consistent with safe and efficient operations.
- Work locations will be maintained in a neat and orderly condition.
- All hand tools will be maintained in a good state of repair.
- Each heavy equipment and/or vehicle operator will have a valid operator's permit or license for the equipment being operated.
- Equipment and other lifting devices designed and used for lifting will have the load rating and date of next inspection marked on them. The load rating will not be exceeded and the equipment will not be used without a current inspection date.
- Leather or leather-palmed gloves will be worn when handling wooden boxes, munitions, or UXO/MEC.
- Lifting and carrying require care. Improper methods cause unnecessary strains. Observe the following preliminaries before attempting to lift or carry:
 - When lifting, keep your arms and back as straight as possible, bend your knees and lift with your leg muscles.
 - Be sure you have good footing and hold, and lift with a smooth, even motion.
- The demolition range will be provided with two forms of communication, capable of contacting appropriate personnel or agencies (i.e., medical response, Quick Response Force (QRF)).
- Motor vehicles and material handling equipment (MHE) used for transporting MEC or demolition materials must meet the following requirements:
 - Exhaust systems will be kept in good mechanical repair at all times.
 - Lighting systems will be an integral part of the vehicle.
 - One Class 10B:C rated, portable fire extinguisher will, if possible, be located in the vehicle and be positioned outside the vehicle when loading operations are taking place, and one Class 10B:C fire extinguisher will be located inside the cab on the driver's side.
 - Wheels of carriers must be chocked and brakes set during loading and unloading.
 - No demolition material or MEC will be loaded into or unloaded from motor vehicles while their motors are running.
- Motor vehicles and MHE used to transport demolition material and MEC will be inspected prior to use to determine that:
 - Fire extinguishers are filled and in good working order.
 - Electrical wiring is in good condition and properly attached.
 - Fuel tank and piping are secure and not leaking.
 - Brakes, steering, and safety equipment are in good condition.
 - The exhaust system is not exposed to accumulations of grease, oil, gasoline, or other fuels, and has ample clearance from fuel lines and other combustible materials.
- Employees are required to wear leather, or rubber, gloves when handling demolition materials. The type of glove worn is dependent on the type of demolition material.
- A red warning flag, such as an "Active Range Flag" or a wind sock, will be displayed at the entrance to the demolition range during demolition operations when required by local authority. If applicable, the entrance gate will be locked when demolition work is in process.

- An observer will be stationed at a location where there is a good view of the air and surface approaches to the demolition range, before material is detonated. It will be the responsibility of the observer to order the SUXOS to suspend firing if any aircraft, vehicles, or personnel are sighted approaching the general demolition area.
- Two-way radios will not be operated in close proximity of the demolition range while the pit is primed or during the priming process. Radio transmissions and explosives will be separated by a minimum of 50 ft.
- No demolition operation will be left unattended during the active portion of the operation (i.e., during the burn or once any explosives or UXO/MEC are brought to the range).
- A minimum radius (approximately 50 feet) around the demolition pit will be cleared of dry grass, leaves, and other extraneous combustible materials around the demolition pit area.
- No demolition activities will be conducted if there is less than a 2,000-ft ceiling or if wind velocity is in excess of 20 mph.
- Demolition shots must be fired during daylight hours.
- Notification of the local authorities will be made in accordance with the site requirements.
- No more than two persons will ride in a truck transporting demolition material or MEC, and no person will be allowed to ride in the trailer/bed.
- Vehicles will not be refueled when carrying demolition material or MEC, and must be 100 ft from magazines or trailers containing such items before refueling.
- All explosive vehicles will be cleaned of visible explosive and other contamination, before releasing the vehicles for other tasks.
- Prior to conducting any other task, personnel will wash their faces and hands after handling demolition material or MEC.
- Demolition pits will be spaced a safe distance apart, with no more than 10 pits prepared for a series of shots at any one time.
- Warning signals prior to demolition events will be completed IAW EM 385-1-1, Section 29.H.04 and OSHA 29 CFR 1926, Subpart U.

9. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

9.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the UXO Technician III or above team member, on the existing and potential hazards within the MPPEH holding area prior to commencing any MPPEH Management or Disposal activities.

Personnel will be cognizant of the surroundings and remain observant of their footing at all times. All personnel will be aware of the signs of heat stress, as described in Section 8.0 of the SHSP, and be able to recognize the onset of heat stress disorders in themselves and their team members.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions, and follow the Emergency Response Plan in Section 14.0 of the SHSP.

10. DISTRIBUTION

SOP Number	Number of Copies	Organization	Building Number	Signature
	Master	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____

11. DIAGRAMS

Maps and diagrams are located in the approved Work Plan and/or the approved ESS. Teams will be provided maps of the overall project site, medical care locations and evacuation routes prior to beginning site work.

12. EQUIPMENT

The team will be equipped with the following:

- Explosives, as required
- Placards, as required
- Day box, as required
- Remote Firing Device, as required
- Tarps, as required
- Logbook and/or Personal Digital Assistant (PDA) for recording data
- Camera
- Communications equipment

The required safety equipment includes the following:

- First-Aid kit
- Level D PPE - A work uniform affording minimal protection: used for nuisance contamination only.
 - The following constitute Level D equipment; items may be used as appropriate:
 1. Coveralls⁽¹⁾
 2. Gloves
 3. Boots/shoes, safety-toe and shank

4. Safety glasses

5. Hard hat⁽¹⁾

Footnote ⁽¹⁾ Optional, as applicable.

- Fire extinguisher
- Inclement weather gear as needed

Safety equipment is kept in the back of the site vehicles:

- Bed (Pick-up trucks)
- Back cargo area (SUVs)

13. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in Section 12 of the APP will be followed. The single point of contact for incidents on site will be the UXOSO.

In the event that an employee has to be taken to the hospital refer to Section D.12.1 of the APP for the route to the hospital.

A map showing the hospital's location is contained in the Site-Specific Health and Safety Plan provided as Attachment 3.

The single point of contact for incidents on site will be the UXOSO.

The UXOSO will perform pre-emergency planning before starting field activities and during the mobilization and site-specific training phase of the project, and will coordinate emergency response with police/fire/rescue personnel and the nearest hospital.

In the event of an emergency requiring evacuation, the evacuation signal will be given through verbal instructions. Personnel will evacuate to a pre-determined evacuation point in the support zone identified at the daily safety briefing. The UXOSO will account for all personnel and will summon emergency response personnel, if required. If the fire department is summoned, the UXOSO will meet them upon their entrance to the site and will inform them of the presence of MEC, and provide the appropriate fragmentation distance from the fire for the purpose of fighting or preventing the spread of fire from the site evacuation is necessary, all personnel are to:

- Gather equipment to the extent safely possible
- Evacuate to the vehicle(s) location and prepare to move out.

After allowing the appropriate wait time (24 hours in the case of a fire), the SUXOS and the UXOSO will enter the site together and determine if the site is safe for re-entry.

After the emergency situation has been controlled and eliminated, or has passed the Project Manager, UXOSO, and SUXOS will review the emergency response and change procedures if necessary.

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PROCEDURE No.: SOP 015
DESCRIPTION: DEMOLITION OPERATIONS
REVISION No.: FINAL
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PROCEDURE No.: SOP 016

DESCRIPTION: MPPEH AND MDAS MANAGEMENT

REVISION No.: 0

DATE: MAY 2018

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1. TITLE PAGE

STANDARD OPERATING PROCEDURE

MPPEH AND MDAS MANAGEMENT

Munitions and Explosives of Concern Removal
Former Vieques Naval Training Range
Vieques Island, Puerto Rico

USA ENVIRONMENTAL, INC.

May 2018

PROCEDURE No.: SOP 016
DESCRIPTION: MPPEH AND MDAS MANAGEMENT
REVISION No.: 0
DATE: MAY 2018
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2. RECORD OF CHANGES

The following section identifies any major or minor changes to this standard operating procedure (SOP).

- Major change: Change to SOP that adds operational hazards, or new hazardous items. Change to or revision of supplemental documents could be classified as major change, if the change or revision modifies the operational procedures to the point that safety is affected, or the change or revision introduces new hazards.
- Minor change: Change to an SOP that does not provide additional hazards, additions of new hazardous items, or changes in methods used to eliminate or mitigate hazards. (Example: name, code, or telephone number changes, spelling corrections, references or referenced document locations.)

Date	Supervisor's Signature	Page	Paragraph	Remarks
MM/DD/YYYY				

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PROCEDURE No.: SOP 016
DESCRIPTION: MPPEH AND MDAS MANAGEMENT
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3. REFERENCES

The following references apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, it may be necessary to consult other SOPs and regulatory references.

- Applicable TM 60 Series Publications
- AR 190-11, Physical Security of Arms, Ammunition, and Explosives
- ATF 5400.7, Alcohol, Tobacco, and Firearms Explosives Laws and Regulations
- DDESB TP-16, Methodology for Calculation of Fragmentation Characteristics
- DoD 4160.21-M, Defense Reutilization and Marketing Manual
- DoD 6055.09-M, DoD Ammunition and Explosives Safety Standards
- DoD Directive 4145.26-M DoD Contractor Safety Manual for Ammunition and Explosives
- DoD Instruction 4140.62 Material Potentially Presenting an Explosive Hazard
- DOT, 49 CFR, Parts 100 to 199, Transportation (applicable sections)
- EPA, 40 CFR Parts 260 to 299, Protection of Environment (applicable sections)
- USA Environmental, Inc., Work Plan, Munitions and Explosives of Concern Former Vieques Naval Training Range, Vieques Island, Puerto Rico – current version
- Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8023.11 – current version
- Explosives Safety Submission (ESS) – current version
- 29 Code of Federal Regulations 1910, Occupational Safety and Health Standards – current version
- Chief of Naval Operations Instruction (OPNAVINST) 3500.39 – current version
- NAVSEA OP 5 Ammunition and Explosives Safety Ashore. – current version
- United States Army Corps of Engineers (USACE), Engineer Manual (EM) 385-1-1, Safety and Health Requirements Manual – current version
- DDESB TB 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel – current version
- DOD 4145.26-M, Contractors' Safety Manual for Ammunition and Explosives
- DOD 6055.09-M, DOD Ammunition and Explosives Safety Standards
- DOD 4160.21-M, Defense Reutilization and Marketing Manual
- TM 9-1300-200, Ammunition General
- TM 9-1300-214, Military Explosives.

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LIST OF ATTACHMENTS

ATTACHMENT A. MATERIAL INSPECTION AND RELEASE FORM

ATTACHMENT B. DD FORM 1348-1A EXAMPLES

ATTACHMENT C. NON-HAZARDOUS WASTE (CONTAINER LABEL)

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5. RECORD OF DEVELOPMENT, REVIEW, VALIDATION AND APPROVAL

This SOP contains the procedures and other information that will be needed by USA Environmental, Inc. (USA) during the operations at the Former Vieques Naval Training Range, Vieques Island, Puerto Rico. By signature, the undersigned certifies that this SOP is approved for implementation at the project site and will be used to direct operations as described in this SOP.

(Signature to be provided in Final SOP)

Developed by:

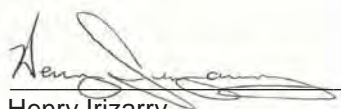


Donald Shaw
Project Manager

05/21/2018

Date

Reviewed by:



Henry Irizarry
Vieques Senior UXO Supervisor

05/21/2018

Date:

Approved by:

Jason W. Wagner

Digitally signed by Jason W. Wagner
DN: cn=Jason W. Wagner, o=USA Environmental, Inc.,
ou=Quality Control Manager,
email=jwagner@usatampa.com, c=US
Date: 2018.05.21 12:34:57 -04'00'

Jason W. Wagner, CMQ/OE
Vieques Quality Manager

Date

This standard operating procedure (SOP) expires four years from the date of approval and will require a review and approval process prior to reissue. A full review of the SOP is required annually to ensure the document remains current. Revision will be made as operational and/or guidance changes occur. The review and approval process must also be conducted prior to implementing any changes to this SOP.

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8. PROCEDURE

8.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide all USA Environmental, Inc. (USA) employees and subcontractors with the minimum procedures and safety and health requirements applicable to perform Material Potentially Presenting an Explosive Hazard (MPPEH) Management operations at sites potentially containing unexploded ordnance (UXO) and/or munitions and explosives of concern (MEC).

These procedures are to ensure that interior and exterior of all recovered MPPEH is inspected to determine what explosive hazard, if any exist, requiring further treatment before shipping off site for recycling. These procedures are general in nature and may be refined with the concurrence of the Senior UXO Supervisor (SUXOS) to adapt to specific site conditions and circumstances on the former Vieques Naval Training Range (VNTR) and former Naval Ammunition Support Detachment (NASD). Documentation is key to the safe management of MPPEH.

8.2 SCOPE

This SOP applies to all USA site personnel, including contractor and subcontractor personnel, involved in MPPEH Management operations on the former Vieques Naval Training Range (VNTR) and former Naval Ammunition Support Detachment (NASD) project related areas. This SOP is not a stand-alone document and should be used together with Work Plans, other USA SOPs, the Site Health and Safety Plan (SHSP), the Explosives Safety Submission (ESS), applicable Federal, State, local regulations. Consult the documents listed in Section 3.0 of this SOP for additional guidance.

8.3 INSPECTION PROCESS

All personnel, including contractor and subcontractor personnel involved in processing MPPEH removed from the project site, will familiarize themselves with the procedures outlined in the following paragraphs and subparagraphs.

All recovered MPPEH items will undergo a 100% inspection and an independent 100% re-inspection to determine and document whether it is safe (MDAS) or whether it is known to have or is suspected of having an explosive hazard. The sequence of events in the inspection process is summarized in Figure 1. A Material Inspection and Release Form (Attachment A) will be completed to document the two 100% inspections performed on all recovered materials.

8.3.1 Responsibilities

8.3.1.1 Unexploded Ordnance Tech II (UXOT II)

A UXOTII (a UXOTI can tentatively identify items, however, a UXOTII or UXOTIII must confirm the identification) will perform a 100% inspection of each item as it is recovered and determine:

- If the item is MDAS, requiring no additional treatment prior to containerizing for off-site shipment
- If item is range related debris that may require draining fluids or removal of visible liquid hazardous, toxic or radiological waste (HTRW) materials.

8.3.1.2 Unexploded Ordnance Tech III (UXOT III)

A UXOTIII will:

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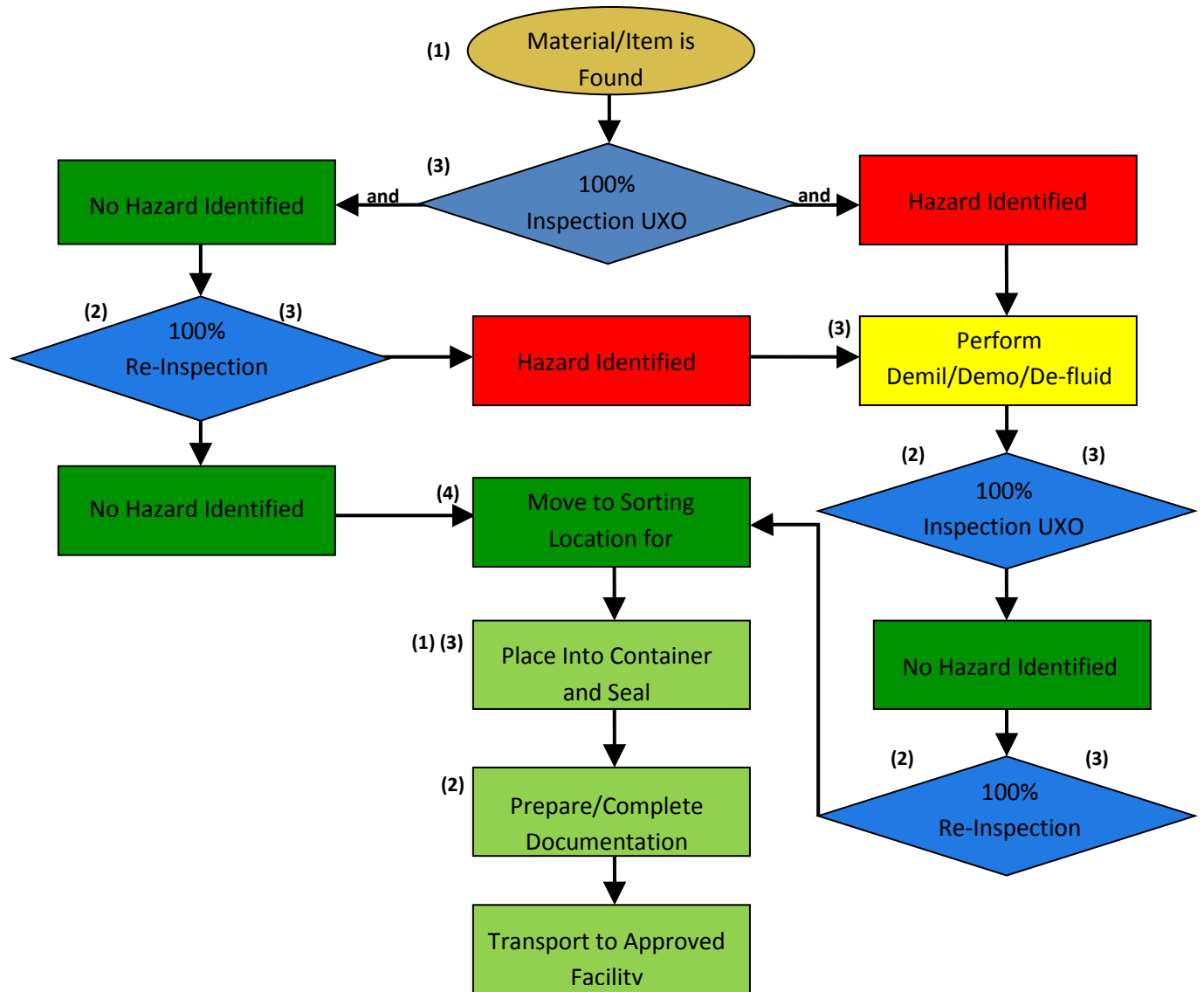
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- Conduct a 100% re-inspection of all recovered items to determine the proper classification as MDAS, or an item containing other dangerous fillers or HTRW constituents.
- Supervise the segregation of items by category to ensure no co-mingling of MDAS or HTRW items.

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Notes:

During performance of the steps within the MPPEH Inspection Process, Notes 1 – 4 below are utilized to ensure supervision and compliance requirements are met.

- (1) The UXOQCS will conduct daily audits of procedures used by UXO teams for MPPEH processing.
- (2) The UXOQCS will perform random sampling of recovered material/items and documents for accuracy/completeness.
- (3) The UXOSO will observe procedures to ensure compliance with the approved plans and safety measures.
- (4) The SUXOS will perform random checks to satisfy that the munitions debris and range-related debris is free from

Figure 1: MPPEH Inspection Process

8.3.1.2.1 **MPPEH/CPC Recovery Team**

The Recovery Team will:

- Respond to MPPEH/MDAS consolidation areas, as directed by the SUXOS for collection of material
- Inspect all items not in sealed containers before placing them into transport vehicle
- Inspect all containers for seals or padlocks to ensure chain of custody has not been broken
- Determine separation requirements of material recovered. (i.e., scrap that resembles ordnance, sorting by metal types, MPPEH requiring processing, etc.)
- Deliver all scrap to appropriate CPC staging area, and secure to prevent commingling with inspected and certified scrap awaiting storage and/or shipment at the CPC.

8.3.1.2.2 **UXO Quality Control Specialist (UXOQCS)**

The UXOQCS will:

- Conduct daily audits of UXO Teams performing the MPPEH inspection process and will conduct and document random sampling of all processed MDAS and HTRW items to ensure no co-mingling occurs
- Perform these random checks to satisfy that MPPEH is free from any explosive hazards, necessary for completion of the Issue Release/Receipt Document, Form DD 1348-1A (see Attachment B).

8.3.1.2.3 **UXO Site Safety Officer (UXOSO)**

The UXOSO will:

- Ensure that the specific procedures and responsibilities for processing MPPEH for certification as MDAS or range-related debris outlined in the WP and this SOP are being followed
- Confirm that operations are compliant with the SSHP, and consistent with applicable regulations and guidance as outlined in the WP and this SOP
- Perform random checks of processed MPPEH to ensure that items being identified as scrap are free from any explosive hazards.

8.3.1.2.4 **Senior UXO Supervisor (SUXOS)**

The SUXOS will:

- Perform random checks to determine that the munitions debris and range-related debris are free from explosive hazards necessary to complete the appropriate Requisition and Turn-in Document, DD Form 1348-1A (see Attachment B)
- Ensure that a DD Form 1348-1A is completed for all MDAS and range-related debris to be transferred for final disposition
- Ensure the WP, QC Plan and this SOP outline the procedures and responsibilities for processing MPPEH for final disposition as MDAS or range-related debris
- Certify all MDAS and range-related debris with one of the following statements as applicable –
“The material listed on this form has been inspected or processes by DDESB approved means, as required by DOD policy, and to the best of my knowledge and belief does not pose an explosive hazard.”
- Ensure that inspected debris is secured in sealed and labeled containers.

8.3.2 MDAS Containerization

MDAS is placed in closed containers that will be sequentially number and:

- Closed in such a manner that the applied seal will be broken if the container is opened
- Clearly labeled with USA Environmental, Inc., the installation/project name, the sequence number (e.g. 0001), and the container's unique seal identification, see Attachment C for detailed requirements for completing the label

Cartridge and flare cases, fuzes, primers, boosters, practice ordnance, and small pieces/fragments from all types of high explosive ordnance and other similar items DO NOT require individual marking. These items will be inspected, placed in sealable containers, and have the appropriate seal or similar locking device attached. When large amounts of residue are generated, steel hoppers may be used, provided the hopper has a lid/cover that can be secured and sealed or padlocked after inspection.

Any evidence of tampering after sealing or padlocking will require that a 100% re-inspection and 100% re-certification inspections is performed.

Where quantities permit, the contents will be separated by base metal type (e.g., copper, aluminum, steel, etc.), and tagged, or marked, to identify contents. Large MDAS that cannot be containerized or palletized will be individually inspected and marked similarly. Each will be painted with the letters MDAS and tagged with a "railroad seal" or similar device having a serial number. Items with no markings or seals will be treated as MPPEH.

8.3.3 MDAS Certification and Verification

USA, as the contractor, will ensure that scrap metal generated from MEC or Range Clearance Activities is properly inspected IAW the procedures outlined in the WP's, this SOP and OP 5. Only personnel who are qualified UXO personnel (UXOTIII) per DDESB TP-18 will perform these inspections. Once the initial inspection has been completed by the UXOTIII, the SUXOS will verify, and the UXOQCS or the Title II QA UXOTIII will certify, that the processed material is free of explosive hazards and is classified as MDAS.

Form DD 1348-1A will be used as certification/verification documentation. All DD 1348-1A's must clearly show the signatures and typed or printed names of the SUXOS and the UXOQCS or Title II QA UXOTIII, their organizations, the home office addresses, and the field office telephone numbers.

- Local directives and agreements may supplement these procedures. Coordination with local concerns will identify any desired or requested supplementation to these procedures.
- In addition to the data elements required, and any locally agreed-to directives, the DD 1348-1A must clearly indicate the following for scrap metal:
 - Basic material content (type of metal, e.g., steel or mixed)
 - Estimated weight
 - Unique container identification (i.e.; drum 001 with sequential numbering as needed)
 - Installation and Contractors Name
 - Seal's unique identification number, if different from the unique identification of the sealed container
 - Names, addresses, and contact information of Certifying and Verifying individuals
- The container shall be closed and clearly labeled on the outside.
- The container will be closed in such a manner that the seal must be broken in order to re-open the container. The seal will bear the same unique identification as the container; or the container will be clearly marked with the seal's identification, if different than the container.

- The following certification/verification will be entered on each DD 1348-1A for turnover of inspected material, and will be signed by the SUXOS and the UXOQCS:

8.3.4 Demilitarization

When required by DoD 4160.21-M-1, or the PWS where this directive is not applicable, MPPEH will be demilitarized before being released from USA custody, by means other than donor explosives. The purpose of demilitarization is to render the item unusable and/or unrecognizable as a military item. While explosives or mechanical means can be used at the SUXOS discretion to demilitarize an item, USA may also utilize a cutting torch as an acceptable method of demilitarization after a thorough inspection has been performed and an approval process with supporting documentation is completed. In the event that a cutting torch is utilized the procedures in the "Hot Work" SOP will be followed.

8.3.5 Maintaining Chain of Custody

The chain of custody must remain intact until the MDAS is released from DOD control that is received and signed for by the qualified receiver to further manage and process the material in accordance with DOD Instruction 4140.62. The qualified receiver will:

- Receive the unopened labeled containers
- Review and concur with the supporting documents
- Sign the 1348-1A and provide on company letterhead stating the contents of the sealed containers will not be sold, traded or otherwise given to another party prior to smelting and are only identifiable by their basic contents
- Send the supporting documentation and notification to USA that the MDAS in the sealed containers has been properly recycled.

If the chain of custody is broken at any time during shipment, the contents of the affected container will revert to MPPEH and will require a second 100% inspection and a 100% re-inspection, be documented as certified and verified as MDAS by qualified USA personnel.

9. HAZARD ANALYSIS/RISK ASSESSMENT AND HAZARD CONTROL BRIEF

9.1 HAZARD CONTROL BRIEF

All personnel will attend the tailgate safety briefing given by the UXO Technician III or above team member, on the existing and potential hazards within the area they are assigned to work prior to commencing any activities.

Personnel will be cognizant of the surroundings and remain observant of their footing at all times. All personnel will be aware of the signs of heat stress, as described in Section 8.0 of the SHSP, and be able to recognize the onset of heat stress disorders in themselves and their team members.

In the event of severe weather or a natural disaster (earthquake, tsunami, or very high winds, etc.), account for all team personnel, contact the UXOSO, SUXOS or Site Manager for instructions, and follow the Emergency Response Plan in Section 14.0 of the SHSP.

10. DISTRIBUTION

SOP Number	Number of Copies	Organization	Building Number	Signature
	Master	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____
	Copy #	Branch Code	XXX	Print: _____ Sign: _____

11. DIAGRAMS

Maps and diagrams are located in the approved Work Plan and/or the approved ESS. Teams will be provided maps of the overall project site, medical care locations and evacuation routes prior to beginning site work.

12. EQUIPMENT

The MDAS Management team will be equipped with the following:

- MDAS containers (e.g., 55-gallon drums)
- Signs
- Locks
- Container handling equipment as required
- Individually Numbered Seals
- Logbook and/or Personal Digital Assistant (PDA) for recording data
- Camera
- Communications equipment

The required safety equipment includes the following:

- First-Aid kit
- Level D PPE - A work uniform affording minimal protection: used for nuisance contamination only.
 - The following constitute Level D equipment; items may be used as appropriate:
 1. Gloves⁽¹⁾
 2. Boots/shoes
 3. Safety glasses
 4. Hard hat⁽¹⁾

Footnote ⁽¹⁾ Optional, as applicable.

- Fire extinguisher
- Inclement weather gear as needed

Safety equipment is kept in the back of the site vehicles:

- Bed (Pick-up trucks)
- Back cargo area (SUVs)

13. EMERGENCY RESPONSE PROCEDURES

In the case of an emergency, the procedures detailed in Section 12 of the APP will be followed. The single point of contact for incidents on site will be the UXOSO.

In the event that an employee has to be taken to the hospital refer to Section D.12.1 of the APP for the route to the hospital.

A map showing the hospital's location is contained in the Site-Specific Health and Safety Plan provided as Attachment 3.

The single point of contact for incidents on site will be the UXOSO.

The UXOSO will perform pre-emergency planning before starting field activities and during the mobilization and site-specific training phase of the project, and will coordinate emergency response with police/fire/rescue personnel and the nearest hospital.

In the event of an emergency requiring evacuation, the evacuation signal will be given through verbal instructions. Personnel will evacuate to a pre-determined evacuation point in the support zone identified at the daily safety briefing. The UXOSO will account for all personnel and will summon emergency response personnel, if required. If the fire department is summoned, the UXOSO will meet them upon their entrance to the site and will inform them of the presence of MEC, and provide the appropriate fragmentation distance from the fire for the purpose of fighting or preventing the spread of fire from the site evacuation is necessary, all personnel are to:

- Gather equipment to the extent safely possible
- Evacuate to the vehicle(s) location and prepare to move out.

After allowing the appropriate wait time (24 hours in the case of a fire), the SUXOS and the UXOSO will enter the site together and determine if the site is safe for re-entry.

After the emergency situation has been controlled and eliminated, or has passed the Project Manager, UXOSO, and SUXOS will review the emergency response and change procedures if necessary.

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ATTACHMENT A.
MATERIAL INSPECTION AND RELEASE FORM

PROCEDURE No.: SOP 016
DESCRIPTION: MPPEH AND MDAS MANAGEMENT
REVISION No.: 0
DATE: MAY 2018
PAGE: 22 OF 32

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PROCEDURE No.: SOP 016
DESCRIPTION: MPPEH AND MDAS MANAGEMENT
REVISION No.: 0
DATE: MAY 2018
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USA Environmental, Inc.

MDAS ACCUMULATION FORM FOR DRUM/CONTAINER NO.

Date	Description/NIIN	Qty (lb)	Type of Treatment*

*If applicable, the material listed on this form has been inspected or processed by DDESB-approved means, as required by DoD policy, and to the best of my knowledge and belief does not pose an explosive hazard."

CERTIFIER:

Signature: _____
Printed Name: _____
Position: _____
Organization Name: _____
Organization Address: _____
Organization Phone Number: _____

Date: _____

VERIFIER:

Signature: _____
Printed Name: _____
Position: _____
Organization Name: _____
Organization Address: _____
Organization Phone Number: _____

Date: _____

082 USA FORM
Rev. A: July 2015

MATERIAL INSPECTION AND RELEASE FORM

PROCEDURE No.: SOP 016
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PROCEDURE No.: SOP 016
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ATTACHMENT B.
DD FORM 1348-1A EXAMPLE

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1	2	3	4	5	6	7	23	24	25	26	27	28	29	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	1. TOTAL PRICE		2. SHIP FROM		3. SHIP TO	
D I C T I O N A R Y	R I F R O M	M & S	U N I T	Q U A N T I T Y	S U P P L E M E N T A R Y A D D R E S S	S I G	F U N D	D I S T R I B U T I O N	P R O J E C T	P R I	R E Q U I R E D	D E A L T E	A D V	R I	O C I P O N D	M O N T H	Y E A R	UNIT PRICE		DOLLARS		CTS		4. MARK FOR																															
																		DOLLARS	CTS	DOLLARS	CTS																																		
24. DOCUMENT NUMBER & SUFFIX (30-44)																5. DOC DATE		6. NMFC		7. FRT RATE		8. TYPE CARGO		9. PS																															
25. NATIONAL STOCK NO. & ADD (6-22)																10. QTY. REC'D		11. UP		12. UNIT WEIGHT		13. UNIT CUBE		14. UFC		15. SL																													
26. RIC (4-6) UI (23-24) QTY (25-26) CON CODE (7-1) DIST (35-36) UP (74-80)																16. FREIGHT CLASSIFICATION NOMENCLATURE																																							
27. ADDITIONAL DATA																17. ITEM NOMENCLATURE																																							
1. Material Types: _____																18. TY CONT		19. NO CONT		20. TOTAL WEIGHT		21. TOTAL CUBE																																	
2. Container ID: _____ Wgt: _____																22. RECEIVED BY																23. DATE RECEIVED																							
3. Serial Number: _____																																																							
4. Certified By: _____ Verified By: _____																																																							
Name: _____ Position: _____ Organization: _____ Address: _____																																																							
Name: _____ Position: _____ Organization: _____ Address: _____																																																							
Phone Number: _____ Phone Number: _____																																																							
The material listed on this form has been inspected or processed by DDESB-approved means, as required by DOD policy, and to the best of my knowledge and belief does not pose an explosive hazard.																																																							
Technical Method Used:																																																							
Approval Letter																																																							

PREVIOUS EDITION MAY BE USED

PROCEDURE No.: SOP 016

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PROCEDURE No.: SOP 016

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**ATTACHMENT C.
NON-HAZARDOUS WASTE (CONTAINER LABEL)**

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PROCEDURE No.: SOP 016

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USA Environmental, Inc.

NON-HAZARDOUS WASTE

(Solid Waste Excluded From Regulation Under 40 CFR 261.4 (b))

SHIPPER: USA Environmental, Inc.

PROJECT ADDRESS / LOCATION:

CITY, STATE, ZIP:

PROJECT CONTACT AND TELEPHONE NUMBER:

NAVFAC IDENTIFIER / INSTALLATION NAME OR CONTRACT #:

UNIQUE CONTAINER # (i.e., 001 of 001): of

UNIQUE SEAL IDENTIFICATION #:

Date:	Seal Number:	1 st Initials:	2 nd Initials:	Comments:

☐ DD Form 1348-1A ☐ 100% Material Inspection and Release Form

NOTE: See DD Form 1348-1A for additional information, as applicable.
Check box(s) if DD Form 1348-1A and/or the 100% Inspection Form will accompany this shipment.

COMPANY CONTACT INFORMATION:

USA Environmental, Inc.
720 Brooker Creek Blvd., Suite 204
Oldsmar, FL. 34677
Office - (813) 343-6336
Fax - (813) 343-6337

096 USA Form
Original: April 2015

CONTAINER LABEL

PROCEDURE No.: SOP 016


DESCRIPTION: MPPEH AND MDAS MANAGEMENT

REVISION No.: FINAL

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 USA Environmental, Inc. Munitions Response Services—A Small Business	STANDARD OPERATING PROCEDURE	
	SOP-DGM-01.00-INSTRUMENT VERIFICATION STRIP (IVS) SETUP AND USE	
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1.0 PURPOSE

The purpose of this SOP is to identify the means and methods to be used when verifying the operation of a geophysical system prior to and during site surveys. The Instrument Verification Strip (IVS) is setup with a series of buried inert munitions or industry standard objects (ISOs). During the IVS process, the geophysical system measures the response and location of each item in the IVS, and these measurements are compared to published response values, and “as built” locations, as well as day to day measurements to document proper system functioning. This SOP applies to IVSs for projects using either standard or geophysical classification systems.

2.0 PERSONNEL RESPONSIBILITIES

The qualifications of the personnel implementing this SOP are documented in the work plan or Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP) or Munitions Response (MR QAPP). Multiple Geophysicist roles may be performed by a single individual (e.g. the Site Geophysicist may also perform the role of Field Geophysicist and Data Processor).

2.1 Role and Responsibilities

- Project Geophysicist designs IVS and reviews IVS testing results.
- QC Geophysicist reviews IVS testing results and verifies IVS results are documented in the QC database.
- Site Geophysicist oversees IVS construction and testing.
- Field Geophysicist or Instrument Operator documents IVS item data (position, depth, and type) and operates geophysical and positioning equipment over the IVS and noise strip.
- Data Processor processes IVS data and documents results in the QC database or Tracking Spreadsheet.
- UXO Escort conducts MEC escort and anomaly avoidance activities during IVS construction and testing. Must be a qualified UXO Technician II or higher.

3.0 RELEVANT DEFINITIONS


- Cued Classification: The method of collecting data for geophysical classification that involves placing the classification sensor directly over the source and recording data while stationary.
- Geophysical Classification: The use of geophysical data to classify anomalies as related to targets of interest or other source categories.
- Geophysical System: All equipment used for geophysical data collection, including the geophysical sensor, data logger, software and positioning equipment (e.g. RTK GPS or line and fiducial equipment).
- ISO: Industry Standard Object: A readily available standard-sized metallic test item.
- Multi-sensor Array: A geophysical system that includes multiple sensors.

4.0 REQUIRED EQUIPMENT

The following is a list of required equipment and materials.

4.1 Equipment

- Geophysical Sensor: Instrument used to detect surface and/or subsurface anomalies indicating potential MEC. Typically instruments used are analog but may also be digital instruments (e.g., EM61-MK2A).

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- Positioning System: Used to record the location of IVS items and geophysical data (not required if using line/fiducial positioning).
- Excavation Tools: Picks, shovels, or a mini-excavator are used to dig a hole for the IVS test items and to backfill the hole.
- Measuring Tape: A measuring tape or ruler is used to measure the depth of each IVS test item, and their local locations along the IVS.
- Analog Instrument: A handheld metal detector such as a Schonstedt GA-52/Cx or White's or Minelab EM sensor that emits an audio tone used to search for buried metal or confirm there are no significant metallic items in a specific location.
- Battery chargers for geophysical sensor, data logger, and positioning system
- Digital camera
- Field Computer
- Communications equipment
- First-Aid Kit
- Fire extinguisher
- Inclement weather gear, as needed

4.2 Materials

- Survey line marking (plastic tent stakes, high visibility line, plastic pin flags)
- IVS Seed Items (inert ordnance or ISOs) in accordance with work plan or UFP QAPP
- RTK DGPS range pole with leveling bubble and survey controller clamp
- DGM Team Leader's Logbook

5.0 PROCEDURE

5.1 Health and Safety

All elements of this procedure are conducted in accordance with the approved site safety and health plan, including but not limited to specified requirements for training, personal protective equipment (PPE), exposure monitoring and air sampling, etc. The UXOSO or designated representative reviews the relevant site-specific activity hazard analyses (AHAs) prior to implementing this SOP.

5.2 Instrument Verification Strip Construction

Verification of the digital geophysical mapping (DGM) system is accomplished using an IVS. Multiple IVS locations may be constructed during the project if needed (for example, to avoid long travel times to reach the IVS on large sites). The construction details and verification procedures described in this document apply to each IVS location.

5.2.1 Location and Configuration of the IVS

5.2.1.1 The Project Geophysicist may propose IVS locations prior to mobilization. At project startup the DGM team visits potential locations and determines which is most appropriate for an IVS with preference for the following (although none of the conditions are vital for IVS success):

- Terrain, geology, and vegetation similar to that of a majority of the DGM survey area.
- Geophysical noise conditions similar to those expected across the survey area.

- Large enough site to accommodate all necessary IVS tests and equipment and for adequate spacing of the ISO items (at least 5-m separation and preferably greater) and the noise strip (at least 5-m separation and preferably greater) to avoid ambiguities in data evaluation.
- Readily accessible to project personnel.
- Close proximity to the actual survey site (if not within the site).
- Not prone to flooding, other weather related impacts, or local traffic.

5.2.2 IVS Objects

ISOs or inert ordnance serve as the seed objects in the IVS. ISOs, if used, should approximate the size of the MEC expected to be found on the site. See approved project work plan or QAPP for details on IVS seed items, separation distances, depths, orientations, and inclinations. **Table 1** shows the specifications for the possible ISOs and **Figure 1** is a photograph of the three sizes of ISO.

Table 1: INDUSTRY STANDARD OBJECT DIMENSIONS AND PART NUMBERS

Item	Nominal Pipe Size	Outside Diameter	Length	Part Number ⁽¹⁾	Schedule
Small ISO40	1"	1.315" (33 mm)	4" (102 mm)	44615K466	40
Small ISO80	1"	1.315" (33 mm)	4" (102 mm)	4550K226	80
Medium ISO40	2"	2.375" (60 mm)	8" (204 mm)	44615K529	40
Large ISO40	4"	4.500" (115 mm)	12" (306 mm)	44615K137	40

(1) Part number from the McMaster-Carr catalog (<http://www.mcmaster.com/>).



Figure 1: Small, Medium and Large ISOs

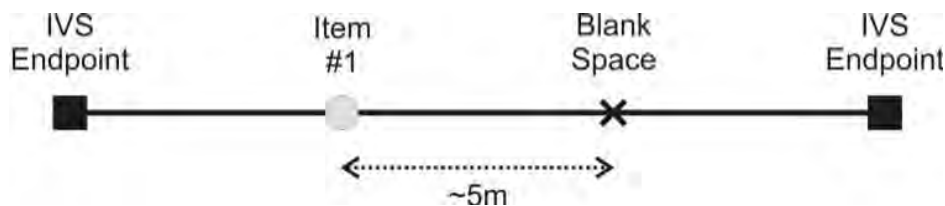


Figure 2: Example Layout of Instrument Verification Strip

5.3 IVS Procedures

5.3.1 IVS Background Survey

5.3.1.1 The DGM Team performs a background DGM survey of the selected IVS area. The purpose of this step is to document the appropriateness of the location (e.g. few existing anomalies), verify that IVS seed items are not placed near existing anomalies, and that a suitable background noise line has been identified. The data from this IVS background survey is processed and evaluated before any seeding is performed.

5.3.2 IVS Test Item Location Selection

5.3.2.1 Once the IVS area is determined suitable for use (e.g. free of significant subsurface anomalies, or containing anomalies that are clearly identified and can be avoided during seeding), IVS seed items, specified in the project work plan or QAPP, are placed in holes at their designated sequence, spacing, depth, orientation, and inclination. IVS seed items are typically buried at depths below ground surface between 3 and 7 times their diameter. These depths are intended to provide adequate signal to noise ratio for detecting the items. The generalized diagram of the seeded IVS transect is presented as **Figure 2**. A list of specific item types, depths, and orientations are provided in the work plan or QAPP. In this example, only one target is shown. This is the minimum requirement for an IVS. Local custom, stakeholder comfort, or other similar reasons may lead to larger number of items in the IVS. Rarely are more than three or four items required, unless the IVS is designed to accommodate a multi-sensor array. The blank space is only required if the IVS is also used to test advanced sensors (e.g. MetalMapper 2x2 or TEMTADS 2x2) in cued mode for the purposes of classifying anomalies detected in the geophysical data. If cued classification is not expected as part of the project, or a different IVS is used for the testing of advanced sensors, the blank space is unnecessary.

5.3.3 IVS Test Item Burial and Metadata Recording

5.3.3.1 IVS Seed Item Burial and Metadata Recording

5.3.3.1.1 The DGM Team digs the seed item holes to the appropriate depths for burial, in conjunction with the Site Geophysicist, following standard anomaly avoidance procedures. Measurements of the IVS Seed Item depths are measured from ground surface to object center of mass for each item. The IVS seed item locations are recorded in both local units, and by the Positioning System. Offset survey lines are set and marked with plastic tent stakes, or equivalent non-metallic markers, in accordance with the project work plan or QAPP. For each IVS Seed Item, the Site Geophysicist records:

- IVS transect endpoints
- Seed item description (e.g. small ISO)
- Seed item location (local coordinates, as well as Positioning System coordinates)
- Seed item depth to center of mass

- Seed item inclination (e.g. horizontal or vertical)
- Seed item orientation (e.g. across-track or along-track)
- Digital photograph, with white board, of each IVS seed item
- Offset transect line endpoints at the work plan or QAPP specified lane spacing, and half line spacing

5.3.3.1.2 Holes are backfilled once the appropriate data has been recorded, and traveling lines are run between each IVS transect endpoint. Plastic pin flags may be used to mark seed item locations.

5.3.3.2 Seeded IVS Data Collection

Once the IVS is seeded, the DGM team collects data over the seeded IVS, in accordance with the project work plan or QAPP. The initial data likely includes collecting data along the simulated grid line spacing, half line spacing, the background noise line, and several passes over the IVS. Subsequent daily dynamic IVS data collection is along the IVS and background noise lines.

5.4 IVS Data Processing Procedures

Prior to collecting production data, and each morning before beginning DGM field operations, a dynamic IVS survey is collected over the IVS and Background noise lines. This data is downloaded and passed to the data processor who performs the following steps for each IVS test:

- Import and level the data
- Apply any necessary latency correction
- Examine the response profiles to verify that all data is valid/comparable to published response values and that responses and background measurements are similar from test to test
- Identify the location of peak response measured over each IVS seed item is within project metrics, specified in the project work plan or QAPP, from “as built” locations
- Grid the initial and daily IVS data, with a map showing survey line path, known IVS seed locations, and measured IVS target locations


5.5 Evaluate the IVS MPCs/MQOs

5.5.1 The results of each IVS seed item are evaluated against the measurement performance criteria (MPCs) or measurement quality objectives (MQOs) specified in the project work plan or QAPP. The DGM Team is notified if the morning IVS data meets project requirements. If the MPCs or MQOs have not been met, the Project or QC Geophysicist initiates a root cause analysis to determine the source of the discrepancies. If modifications to the instrument or procedures can be made, so that the MPCs/MQOs can be met, these modifications are made. If the MPCs/MQOs cannot be met, the Project and QC Geophysicists discuss potential resolutions with the project team.

5.5.2 Once the initial (or modified) MPCs/MQOs have been met, the IVS survey is complete and the DGM system is verified for field use.

6.0 REFERENCES

ESTCP Geophysical System Verification (GSV): A Physics-Based Alternative to Geophysical Prove-Outs for Munitions Response Final Report, Addendum, September 24, 2015.

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7.0 DATA MANAGEMENT

Input data for this SOP are the ongoing, twice daily dynamic IVS and background noise line checks, and copies the DGM team leader's logbook. Performance and acceptability of the initial IVS data is documented in an IVS Memorandum. The results of the ongoing IVS testing are tracked in the IVS tracking spreadsheet, or the project database.

8.0 QUALITY CONTROL

This definable feature of work (DFW) is performed throughout the project DGM task. Performance of the required QC checks are documented by the Site or Project Geophysicist in the IVS tracking spreadsheet or project database, updated daily, and delivered weekly. A comprehensive root cause analysis is performed and a corrective action determined for any data failing the applicable MPCs/MQOs. The Project and/or QC Geophysicist is notified of any sudden changes identified in the IVS data, even if the results still meet the MPCs/MQOs. Any such changes receive a thorough examination of the IVS data with the intent to resolve potential equipment/procedure issues before a failure occurs.

9.0 REVISION HISTORY

REV.	DATE	SUMMARY OF CHANGE	REASON FOR REVISION
00	08/14/2018	N/A	Original Release
01	10/05/2018	Updated Reference section to current version	External audit corrective action
02	07/18/2019	Edited Section 2.0, GCMR QAPP to MR QAPP, and minor edits.	Update to ISO 17025:2017 and annual review

As prescribed by the standard ISO 17025:2017, the Quality Manager and Technical Manager approve this Policy or Procedure and appropriately authorize its implementation in the USA Environmental, Inc. Quality Management System.

Jason W Wagner

Digitally signed by Jason W Wagner
DN: OU=Quality Control Manager, O=USA Environmental, Inc., CN=Jason W Wagner, E=jwagner@usatampa.com
Location: your signing location here
Date: 2019-08-14 16:43:08

Quality Manager



Digitally signed by Jeff Lewis
Date: 2019.08.15 15:40:49
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Technical Manager

Attachment B
QA and LTM Contractor Standard
Operating Procedures

Procedure for Terrestrial Munitions and Explosives of Concern Inspections as part of Long-term Monitoring

1.0 SCOPE AND APPLICATION

Munitions and explosives of concern (MEC) inspections are and may continue to be an element of long-term monitoring (LTM) associated with remedial actions to ensure the implemented remedies remain protective of human health and/or the environment. Therefore, this Procedure describes activities associated with terrestrial MEC inspections in support of LTM that is performed in conjunction with Records of Decision (RODs) once the associated remedial actions have been implemented. As such, the MEC inspections are not intended to repeat or mimic the remedial action, nor are they intended to be repeated rounds of surface MEC clearance. Instead, they are meant to look for MEC that may have become exposed at the ground surface and may be encountered by site users. Therefore, the inspections will take place only within areas that are being maintained by the landowner/administrator (i.e., United States Fish and Wildlife Service [USFWS] or Puerto Rico Department of Natural and Environmental Resources [PRDNER]), as accessible to site users. If the landowner/administrator chooses not to maintain any portions of planned access areas such that these areas become overgrown and inaccessible, then the Navy will cease to perform MEC inspections in these areas except where continued access is evident (e.g., via trespassing). The Navy will not cut or clear vegetation in order to provide access to areas that the landowner/administrator does not maintain as accessible. Further, if evidence of trespassing is observed in areas not previously cleared of MEC, those areas will be inspected and a determination of “corrective” measures made for those areas (e.g., measures to discourage continued access, MEC clearance, etc.) via collaboration with the landowner/administrator and regulatory agencies.

This Procedure does not address other potential elements of LTM; it specifically addresses MEC inspection protocol, equipment, inspection field team composition, and quality-related procedures derived primarily from industry guidance and related Standard Operating Procedures (SOPs). It also does not address removal and disposition of MEC/material potentially presenting an explosive hazard (MPPEH) or other military munitions-related items found during inspections, which will be performed in accordance with the SOP(s) or protocol specific to the entity performing the removal and disposition and applicable explosives safety documentation (e.g., Explosives Safety Submission [ESS]).

If any information herein conflicts with the protocol/procedures contained in a “Parent” document that refers to this Procedure or to which this Procedure is attached (i.e., Work Plan, Quality Assurance Project Plan [QAPP], etc.), the information in the Parent document will take precedence. In these cases, the Parent document will state the anticipated deviations from the Procedure and the associated rationale.

2.0 EQUIPMENT

2.1 Health and Safety Items

- Level D personal protective equipment (PPE) as appropriate
- Cellular telephone and radios
- First-aid kit (25 person), blood-borne pathogens kit, fire extinguisher, etc.
- Water

2.2 Project Specific Equipment/Tools

- Global Positioning System (GPS) unit (handheld/personal size)

- Magnetometer and/or all-metals locator (technology consistent with that used during remedial action or otherwise appropriate for the known or suspected munitions types at the site)
- Camera
- Tape measure/ruler
- Multiple colors of marking indicators (flags, ribbon, tape, paint, etc., as required)
- General purpose tools (as required)

3.0 RESPONSIBILITIES

The Munitions Response (MR) Quality Manager/Technical Support Lead is responsible for maintenance, management, and revision of this Procedure. Questions, comments, or suggestions regarding this Procedure should be sent to the MR Quality Manager/Technical Support Lead.

3.1 Project Responsibility

CH2M HILL, Inc. (CH2M) employees performing any aspect associated with terrestrial MEC inspections as part of LTM activities are responsible for meeting the requirements of this Procedure unless otherwise dictated by the Parent document, where applicable. Specific responsibilities include:

- The Project Manager has overall responsibility for the project and as such, for ensuring the satisfactory implementation of this Procedure. The Project Manager will verify any personnel performing assignments described by this Procedure are familiar with their duties and have signed the appropriate acknowledgement statement provided in Section 9. The Project Manager is also responsible for confirming with the Activity Quality Manager (AQM) that the associated quality control (QC) requirements are implemented and for ensuring the coordination of quality management requirements such as periodic MEC inspection field team assessments and audits as prescribed by Section 6.
- The MEC inspection Field Team Leader (FTL) is responsible for coordinating the inspection and helping ensure MEC inspection activities are conducted in accordance with this Procedure.
- The MEC inspection Field Team members are responsible for documenting activities and results in sufficient detail to objectively demonstrate that the requirements of this Procedure have been met. Such documentation will be retained in the project records.
- The unexploded ordnance (UXO) personnel are responsible for ensuring MEC inspections are conducted following the safety, reconnaissance, and inspection protocols defined in this Procedure.

4.0 MEC IDENTIFICATION AND MANAGEMENT

4.1 Identification of MEC and notification process

- If MEC is identified, the UXO Technicians will notify any other MEC inspection field team members and Project Manager who will notify the client and entity responsible for munitions removal (if different from the entity performing the inspection) to address the item(s).
- UXO Technicians performing the MEC inspections will not reposition or transport MEC until the item(s) is determined to be acceptable to move as determined by the project Senior UXO Supervisor (SUXOS) and concurred upon by the UXO Safety Officer (UXOSO).

5.0 MEC INSPECTIONS INTEGRAL TO LTM

LTM activities serve to methodically assess the effectiveness and adequacy of an applied remedy. Parent documents such as Remedial Action Work Plan, QAPP, etc., will detail site-specific LTM requirements including MEC inspections, where applicable. MEC inspections as a component of LTM will normally consist of periodic, instrument-aided, visual surveys in designated area(s) generally on a defined frequency but may also take place when certain events such as named hurricanes, fires, or other activities have created a potential MEC exposure. As noted previously, LTM MEC inspections are meant to look for MEC that may have become exposed at the ground surface and may be encountered by site users, not to repeat or mimic the remedial action or to be repeated rounds of surface MEC clearance. Further, various elements of LTM MEC inspections, such as frequency, may be adjusted with the approval of stakeholder agencies based on the information collected over time. The protocol for these modifications will be defined in the Parent document.

5.1 MEC Inspection Teams, Procedures, and Duties

The purpose of MEC inspections is to identify MEC visible or detected on the surface of the area to be covered by the inspection. Investigation of subsurface anomalies is not the purpose or intent of MEC inspections performed in support of LTM.

MEC inspections for LTM at terrestrial sites will require the site to be temporarily closed to non-essential personnel, vehicles, etc., during the inspection period. Temporary closure of the site (at the boundary and all access points) is necessary to enable the MEC inspection field team to perform their duties and fulfill responsibilities in manner that supports completing the MEC inspection objectives unobstructed by non-essential personnel and equipment and is sensible for managing risk to personnel and the environment. Further, should MEC be discovered, this temporary closure will have already met the requirement to evacuate personnel, etc. from the immediate area. MEC inspections will typically lead to one of two outcomes:

- MEC is not discovered (nor any item treated as MEC because inspection alone was unable to make the determination). If results of the LTM MEC inspection are negative (no MEC discovered), upon completion of the inspection, the temporary site closure will be lifted.
- MEC is discovered (or any item treated as MEC because inspection alone was unable to make the determination). If results of the LTM MEC inspection are positive (MEC is discovered), the site will remain closed until mitigation of the explosive hazard is completed. Discovery of MEC by the MEC inspection field team(s) will be reported together with a preliminary assessment of the item(s) hazard to site users to the Project Manager who will notify the client and the entity responsible for munitions removal (if different from the entity performing the inspection). Once MEC is identified and marked (as described below), coordination among the client, MEC inspection field team, and removal/disposition entity/personnel will ensure the item(s) is/are fully evaluated to determine the appropriate next step(s) warranted by the removal/disposition entity. If the action cannot be completed by close of business of the day the item(s) is/are encountered, then the MEC inspection field team and removal/disposition entity/personnel will arrange for the item(s) to be secured (i.e., qualified security detail), as necessary, until the appropriate steps can be completed.

MEC/MPPEH removal/disposition will be performed in accordance with the SOP(s) or other protocol specific to the entity performing the munitions removal/ disposition and applicable explosives safety documentation (e.g., ESS). Following completion of the MEC inspection and other LTM requirements and disposition of any MEC/MPPEH found, a determination whether to lift the temporary site closure or perform any immediate follow-up activities based on the inspection findings will be made by the client with input provided by the MEC inspection field team and the removal/disposition entity, as applicable.

Teams performing LTM MEC inspections will comprise (at a minimum) a SUXOS, UXOSO, UXO Quality Control Specialist (UXOQCS), and the necessary qualified UXO Technicians (UXO Technician III and UXO Technician II, or higher) to complete the inspections in accordance with this Procedure. It is possible the UXOQCS and the UXOSO will be the same person.

The MEC inspection field team will perform an instrument-aided visual inspection (in a manner that is verifiable) of the public (or other) use areas defined by the Parent document and being maintained by the landowner/administrator as accessible. In general, a transect-based inspection (with GPS tracking) will be completed over 10% (unless otherwise specified in the Parent document) of each specific-use area (e.g., beach, parking, picnicking, etc.) that is being maintained as accessible by the landowner/administrator, and spatial data will be registered so the inspection is defensible. For roads and trails, the inspection will not be via transects because of their configuration, but instead they will be inspected (with GPS tracking) across their entire width for the length required to achieve 10% coverage (unless otherwise specified in the Parent document).

The above constitutes the core of the MEC inspection Procedure and is achieved by traversing 10% (unless otherwise specified in the Parent document) of each specific use area (being maintained by the landowner/administrator as accessible) along defined transects. The transects will be laid out to allow for an instrument-aided visual inspection, using GPS tracking, of 5-foot-wide swath(s) of various lengths adequate to achieve 10% coverage (unless otherwise specified in the Parent document) of the accessible portion of particular designated use areas.

A GPS device, carried by the MEC inspection field team, will be used to record the track of the team through the inspection area, providing a geospatial electronic record of the general area of the inspection. In general, the percent coverage will be confirmed by multiplying the length of the “tracks” recorded by GPS in each specific-use area by the swath width (i.e., 5 feet). For roads and trails, the coverage percentage will be confirmed by multiplying the length of the GPS tracks by the width of the road/trail. However, it is important to recognize there may be areas that are accessible, but that do not receive reliable GPS signal. In these cases, the percent coverage will likely require approximations by the UXO technicians of transect locations/lengths to be made. Further, instrument-aided visual inspection may be inhibited by natural obstacles, man-made structures, overgrowth, and/or other factors which preclude access.

The UXO Technicians are responsible for conducting the instrument-aided, visual survey of the designated area(s). The analog instrument (i.e., ferrous metal detector or all-metals detector) utilized by the UXO Technician(s) for the MEC inspection will be appropriate for the types of MEC potentially present at the site, which will be based on information gathered during past site-specific investigation(s) and removal/remedial action(s) and presented in the associated Parent document.

The UXO Technicians will:

- Verify analog instrument functionality at the start and end of each workday and when instruments undergo maintenance and/or are added to the team during the workday (see Section 6.1).
- Establish fiducial control of the site to be inspected by collecting coordinates along transects and at boundaries of roads and trails to achieve 10% coverage (unless otherwise specified in the Parent document) of each use area being maintained as accessible by the landowner/administrator.
- Using the appropriate analog instrument, traverse 10% (unless otherwise specified in the Parent document) of each accessible specific designated-use area of the Munitions Response Site (MRS), giving consideration to the area identified and maintained for public access (and/or other specific use identified in the Parent document) or otherwise observed as being or having been accessed to visually search for MEC/MPPEH on the ground surface.

- For any potential military munitions-related item encountered, the UXO Technicians will evaluate the item to ensure that items such as munitions debris (MD) (like fragments of ordnance casings) that present no explosive threat are documented by their physical characteristics and location without repositioning the item. Such information will be reported to the SUXOS and UXOQCS/UXOSO who will also inspect the item and upon confirmation that it possesses no explosive hazard and is acceptable to move it will be transported to the designated scrap management location to be re-inspected and certified as Material Documented as Safe (MDAS). Encountered items that are identified as MEC/MPPEH by one of the UXO Technician team members will be confirmed by the second UXO Technician. MEC items will also be inspected by the SUXOS and UXOSO to determine further action. If an item is confirmed as MEC and is considered acceptable to move, then it will be transported to an area designated for controlled detonation by the entity responsible for munitions removal (if different from the entity performing the inspection).
- If the MEC item is determined to be unacceptable to move by the SUXOS and UXOSO then the 2-person UXO Team will identify and record the location of the MEC item with flags, tape, ribbon, paint, stakes, or other means identified during inspection planning/safety briefings. The location will be recorded with the GPS if a reliable signal can be obtained. Otherwise, a description of the location will be recorded in the field notes that, together with the aforementioned marking, can be used by the munitions removal entity to return to the location to dispose the item.
- Communicate the findings to the FTL and other MEC inspection field team members. The Project Manager will notify the client and the entity responsible for munitions removal (if different from the entity performing the inspection) or begin the process of assigning a team to handle any transport and/or disposition of the MEC item(s). The team assigned for disposition of the MEC item(s) may be composed of the MEC inspection field team SUXOS and the UXOQCS/UXOSO and the UXO Technicians that are supporting the LTM MEC Inspection if that primary assignment allows.
- Implement anomaly avoidance to ensure a safe path of retreat or maneuver for the members of the MEC inspection field team that are not UXO qualified to continue the MEC inspection if safe to do so or retreat from the site if not safe to continue the MEC inspection.
- Once the MEC inspection is complete (or paused), the UXO Technicians can support the team assigned to address the MEC by augmenting its staff structure or by simply providing all pertinent information about the MEC encountered. The team will conduct all transport and dispositioning of encountered MEC items in accordance with their entity's applicable SOPs or procedures.

The FTL will:

- Provide general oversight of the MEC inspection process, ensuring: (a) compliance with the Parent document and this Procedure, (b) inspection area coverage per maintained, accessible specific-use area is achieved by the MEC inspection field team, (c) locations of military munitions-related material are documented and marked if further evaluation and dispositioning are required, and (d) general areas where inspection is not possible, and the reason(s) why are documented.
- Receive from the MEC inspection field team reports of MEC and other munitions-related items along with recommendations regarding continued MEC inspection and communicate findings to the Project Manager, who will in turn notify the client and the munitions removal entity (if different from the entity performing the inspection).
- Ensure all MEC inspection field team members who are not qualified UXO Technicians follow the UXO Technician's lead for a safe path of retreat.

5.2 Site Specific Considerations

The site's general landscape, natural features, variations in terrain, and manmade obstacles which may affect visual inspection will be taken into consideration when planning and performing MEC inspections. The MEC inspection activities will be coordinated and performed in a manner that maximize their effectiveness while ensuring the safety of the personnel performing the inspection and minimizing impact on the environment.

5.3 Environmental Protection and Endangered Species

MEC inspections conducted as part of LTM will utilize techniques which limit negative impact to the environment. As noted previously, the Navy will not cut or clear vegetation in order to provide access to areas that landowner/administrator does not maintain as accessible. In general, paths followed by the MEC inspection field team will follow a course such that the physical steps, climbing or movement of personnel, and the use of instruments will not cause unnecessary harm or erosion to ground, soil, and natural features. Methods of inspection employed by the team will be respectful of wildlife, the natural habitats of flora, fauna, and specifically avoid disturbance of any threatened or endangered species of flora or fauna.

6.0 QUALITY CONTROL AND MANAGEMENT OF MEC INSPECTIONS

The AQM is primarily responsible for overall quality management of the project and by working with the project UXOQCS, ensuring this Procedure is effectively implemented. Quality management of the process will consist of periodic, random observations of MEC inspection field team performance and/or document audits by the AQM and/or the AQM's designated quality personnel not directly associated with the inspection. Quality management (QM) will be performed following the three-phase QM process comprising preparatory, initial, and follow-up phases, and documented accordingly.

The UXOQCS will be responsible for confirming that all portions of the site selected for inspection equate to a minimum of 10% (unless otherwise specified in the Parent document) of each designated use area's acreage that is being maintained as accessible by the landowner/administrator, for providing QC oversight through field observations, and for assessment of performance relative the guiding document(s) (i.e., this Procedure and Parent document, as applicable), and ensuring completeness of required documentation.

6.1 Quality Control of Equipment and Analog Detection Systems

UXO Technician(s) are responsible for the functionality and proper operation of equipment utilized for MEC inspections. Inherent in this responsibility is verification that the detection equipment utilized for the MEC inspection has the detection capability appropriate for the types of MEC potentially present at the site, as described in Section 5.1. QC of analog detection instruments will be accomplished through daily checks that verify the instruments are functioning prior to being used for field activities and following the completion of MEC inspections daily. Each instrument will be operated within an analog instrument check area established by the UXOQCS within the MRS which is relatively free of subsurface metallic anomalies as determined by a sweep of the selected area. The instrument check area will be comprised of items placed on the surface which are representative of munitions (size and metallic composition) anticipated to be present in the area, including the smallest anticipated munition. If the instrument is not able to detect the item, it will be taken out of use until it is repaired or replaced.

Other hand-held remote sensing and detection equipment will be checked before use in accordance the manufacturers recommendations. Equipment such as the GPS unit will be checked against a known and reliable control point at the start of each day's field effort.

6.2 Quality Management

The Vieques AQM will be directly involved in quality management through his/her assignment of personnel to

perform unannounced, random assessments of MEC inspection field team performance. Quality assessments should be performed by personnel not directly associated with the MEC inspection task with the appropriate quality training and designated by the quality manager and may include such activities as: (a) direct observation of MEC inspection field team's performance against QAPP Definable Features of Work and MEC inspection Procedure requirements, (b) MEC inspection field team adherence to warnings and safety precautions, and (c) review of daily MEC inspection reports for completeness and accuracy.

6.3 Reporting Requirements and Documentation

Daily QC reports will be completed by the UXOQCS and submitted to the Vieques AQM. All electronically captured data will be downloaded in accordance with program data management protocols.

The project UXOQCS will document nonconforming materials, items, or activities in a nonconformance report (NCR) based on observations and/or equipment inspections.

The Parent document to which this MEC Inspection Procedure is attached or referenced will define the reporting mechanism(s) and frequency associated with MEC inspections at site(s) included in the Parent document.

7.0 DEFINITIONS

Fuzes—Devices that initiate the detonation sequence in munitions. Fuzes are typically associated with munitions (for example, mortars and bombs), but they are occasionally found separately. They may contain a charge large enough to cause injury. Magnetic and proximity fuzes are the most sensitive and, depending on other factors (for example, fuze location and arming), greatly influence the likelihood of detonation. When separated from the munitions, a fuze may not look like an explosive munitions item.

Material Potentially Posing an Explosive Hazard (MPPEH)—Material that, before determination of its explosives safety status, potentially contains explosives or munitions or potentially contains a high enough concentration of explosives that the material presents an explosive hazard.

Military Munitions—Ammunition products and components produced for or used by the armed forces for national defense and security. The term military munitions include ammunition products or components under the control of the Department of Defense (DoD), the United States Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives; pyrotechnics; chemical and riot control agents; smokes and incendiaries; bulk explosives; chemical agents; chemical munitions; rockets; guided and ballistic missiles; bombs; warheads; mortar rounds; artillery ammunition; small arms ammunition; grenades; mines; torpedoes; depth charges; cluster munitions and dispensers; demolition charges; and devices and components thereof. Military munitions do not include wholly inert items, improvised explosive devices, or nuclear weapons, nuclear devices, or nuclear components. However, military munitions do include nonnuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. §2011 et seq.) have been completed [10 U.S.C. §101(e)(4)].

Munitions and Explosives of Concern (MEC)—Specific categories of military munitions that may pose unique explosive risks, including UXO, as defined in 10 U.S.C. §101(e)(5); discarded military munitions (DMM), as defined in 10 U.S.C. §2710(e)(2); or munitions constituents (MC) (for example, TNT or RDX), as defined in 10 U.S.C. §2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Debris (MD)—Remnants of munitions (such as fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Munitions Response—Response actions, including investigation, removal actions, and remedial actions, to address the explosives safety, human health, or environmental risks presented by UXO, DMM, or MC, or to

support a determination that no removal or remedial action is required.

Unexploded Ordnance (UXO)—Military munitions that have been primed, fuzed, armed, or otherwise prepared for action; have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and remain unexploded whether by malfunction, design, or any other cause [10 U.S.C. §101(e)(5)(A) through (C)] P.L. 106-65, section 3031 (c)(5)(A), provides a more detailed description].

8.0 REFERENCES

Code of Federal Regulations Title 29 Part 1910 (29 CFR 1910). “Occupational Safety and Health Standards.” Occupational Safety and Health Administration.

Code of Federal Regulations Title 40 Parts 260 to 299 (40 CFR 260-299). “Protection of Environment” (applicable sections). U.S. Environmental Protection Agency.

Code of Federal Regulations Title 49 Parts 100 to 199 (49 CFR 100-199). “Transportation” (applicable sections). U.S. Department of Transportation.

Department of Defense (DoD). 2019. Defense Explosives Safety Regulation 6055.09 Edition 1, DESR 6055.09, Edition 1, January 13, 2019.

Department of the Navy (Navy). 1997. EOD Bulletin 60A 1-1-31. Technical Manual. *Explosive Ordnance Disposal Procedures, EOD Disposal Procedures*. December 31.

Naval Sea Systems Command (NAVSEA). 2020. OP-5, Volume 1, Seventh Revision, “Ammunition and Explosives Safety Ashore,” Change 15. March 25.

Naval Ordnance Safety and Security Activity (NOSSA). 2020. Instruction 8020.15E Explosive Safety Review, Oversight, and Verification of Munitions Responses. September 11.

9.0 SUPERVISOR’S OR PROCESS SUPERVISOR’S STATEMENT

I have read and understand this Procedure. To the best of my knowledge, the processes described within this Procedure can be done in a safe, healthful, and environmentally sound manner. I have ensured that all persons assigned to this process are qualified for their duties, have read and understand the requirements of this Procedure, and have signed the worker’s or operator’s statement for this process. I will ensure the Procedures are current. If a major change to the Procedure is necessary, I will ensure any discrepancy(ies) are reported to the appropriate personnel for corrective action, including the stoppage of processes if necessary, until the Procedure is revised and approved. If unexpected safety, health, or environmental hazards are found, I will make sure the process is stopped until the hazards have been addressed and mitigations implemented to manage risks effectively.

Signature

Supervisor Name:

Date

WORKER'S OR OPERATOR'S STATEMENT

I have read this Procedure and I have received adequate training to perform the process according to the Procedure. I will follow the Procedure unless I identify a hazard not addressed in it or encounter an operation I cannot perform according to the Procedure. If that occurs, I will stop the process and notify my immediate supervisor of the problem.

Signature

Worker Name:

Date

Signature

Worker Name:

Date

Signature

Worker Name:

Date

Appendix B

UXO 15 LUC and MEC Inspection Checklist

UXOs 15 LUC and MEC Monitoring Inspection Checklist

DATE: _____

WEATHER CONDITIONS: _____

INSPECTOR'S NAME: _____

Item	Potential Problems	Observations	Acceptable ?		Recommendations	Date of Completion
			Yes	No		
Munitions	Exposed munitions, signs of erosion which may expose munitions (i.e., visible runoff patterns)					
Kiosks, trail markers	Missing, damaged, or deteriorated kiosks and/or markers; personnel unable to see/read demarcation due to obstruction					
Trespassing	Observed signs of trespassing (i.e., new trails cut into vegetation in non-public areas, encampments, etc.)					
Other observations						

ADDITIONAL COMMENTS:

Appendix C

Responses to Regulator Comments

Responses to Regulator Comments

Responses to EPA's Comments on Draft UXO 15 Remedial Action Work Plan for Surface Munitions and Explosives of Concern Removal, Land Use Control Implementation and Monitoring Atlantic Fleet Weapons Training Area, November 2023

GENERAL COMMENTS:

1. Consider adding a Document Control Number (DCN) to the cover page and/or WS1&2 to identify the most current version of the QAPP and to ensure that only that version of the QAPP is used by all project participants.

Navy Response: The Navy concurs with the substantive content of the comment, but the standard process, which includes the use of "Draft," "Draft Final," and "Final" in the document title to ensure version control, will be continued. That process has been successfully used for documents generated for Vieques and other Navy facilities under the CLEAN program for many years.

2. Add the Geographic Information Systems (GIS) lead(s) to the personnel-related worksheets. As discussed in later worksheets (e.g., WS29), this role appears to be a "key project person" who will be performing tasks defined in the QAPP.

Navy Response: The requested addition has been made.

3. Clarify when biological and archeological surveys would be applicable (as discussed in Step 3 of WS11) and if a biologist and/or an archaeologist would then be required for this project. If so, add information on this role(s), including responsibilities and tasks, throughout the QAPP.

Navy Response: Based on historical site knowledge (i.e., observations and information collected during the 2011 biological survey and 2012 archaeological survey, as well as observations made during past removal actions conducted in the area), biological and/or archeological surveys are not anticipated to be needed for the remedial action. Therefore, the associated text has been removed from the Executive Summary and Worksheet #11 Step 3.

4. Clarify when a registered PLS would be needed (as discussed in DFW 1 of WS17). As applicable, add information on this subcontractor, including responsibilities and communication processes, throughout the QAPP.

Navy Response: Based on historical site knowledge, a PLS is not anticipated to be needed for the remedial action. Therefore, the associated text has been removed from Worksheet #17-1.

5. The QAPP contains inconsistencies between WS14&16, WS17, Figure 17-1, and WS29 when describing deliverables and/or due dates associated with the various DFWs. Review the required documents/submittal schedules, and verify the appropriate ones are provided in all applicable worksheets. For example, the revised CSM is included with the DUA Report in DFW 9, while WS17 discusses this deliverable with the RACR (D FW 11). A final CSM is not associated with either of the DFWs as per Figure 17-1b.

Navy Response: There does not appear to be an inconsistency regarding the CSM. As shown by footnote “b” in Worksheet #14 & 16, the updated CSM (if applicable) will be provided in the RACR, as also stated in Worksheet #17, DFW 11. Because these worksheets state what will be included in the RACR, it is not necessary for Figure 17-1b to list the RACR’s contents.

SPECIFIC COMMENTS:

PROJECT MANAGEMENT AND OBJECTIVES ELEMENTS

1. Worksheet #1 & 2 – This information was provided in the QAPP and addressed the requirements.

Navy Response: Comment noted.

2. Worksheet #3 & 5

- a) Verify if there should be a line of authority from the NAVFAC RPMs to CH2M.

Navy Response: A line of authority from NAVFAC RPMs to CH2M has been added to Figure 3-1.

- b) Verify if a line of communication should exist between the NAVFAC Site Manager and the contractors. It appears that WS6 allows for direct contact between these personnel.

Navy Response: Lines of communication between the NAVFAC Site Manager and USAE and CH2M have been added to Figure 3-1.

- c) Verify if a line of communication should exist between CH2M and USAE. It appears that WS6 allows for direct contact between these personnel.

Navy Response: A line of communication between USAE and CH2M has been added to Figure 3-1.

3. Worksheet #4, 7 & 8

- a) Verify if lead agency staff should be listed in this worksheet. The MR-QAPP guidance format includes DoD personnel.

Navy Response: An additional table (Table 4-1, with existing Tables 4-1 and 4-2 renumbered to 4-2 and 4-3, respectively) has been added with the key NAVFAC personnel associated with the project.

4. Worksheet #6

- a) In the “Stop work due to safety issues” row, it is noted that the USAE and CH2M H&S Managers “are integral in the stop work communications...”. However, these persons are not listed in the “Procedure” column and their contact information is not provided in the row. Additionally, there is no mention of the CH2M MR Safety/Quality Officer in the process. Clarify the role/responsibilities for the H&S Managers and/or Safety/QAO and revise the text as applicable.

Navy Response: This worksheet is intended to identify the primary initiators and recipients for various communication drivers at the management (decision-making) level, not all staff that may be ultimately involved in the communication. As shown in the worksheet, for potential “stop work” issues, the Initiators and Recipients listed are the contractor and Navy managers for this project. They will receive information from and/or reach out to the appropriate USAE and CH2M staff for any issue requiring a “stop work.”

- b) In the “QC or QA stand-down” row, clarify if there will be any involvement by the on-site UXOQCS personnel (USAE and/or CH2M). If they will not be explicitly involved, then no revisions are necessary.

Navy Response: Please see the response to Comment 4a. The USAE and/or CH2M UXOQCS may be involved in the communication, but the communication at the management level (NAVFAC, USAE, and CH2M) will be through the Initiators shown. For additional clarity, the following has been added as the first sentence of the "Procedure:" "If an issue is identified that may warrant a QC or QA stand-down, the USAE UXOQCS (for QC issues) or CH2M UXOQCS (for QA issues) will communicate and discuss the issue with the USAE QAO or CH2M Munitions Response Safety and QAO, respectively."

- c) Verify the recipients for the "Minor QAPP changes..." row. Currently only one of the NAVFAC RPMs are listed. Should Daniel Hood also be included?

Navy Response: Please note there are two rows associated with Minor QAPP changes and each has the appropriate NAVFAC recipient(s) based on their areas of responsibility applicable to the Communication Driver description.

- d) Consider adding the WS6 footnote (Page 28 of QAPP) text also to WS3&5 and/or WS4,7&8, as they similarly discuss personnel.

Navy Response: The suggested revision has been made.

5. Worksheet #9 – This information was provided in the QAPP and addressed the requirements.

Navy Response: Comment noted.

6. Worksheet #10 – This information was provided in the QAPP and addressed the requirements.

Navy Response: Comment noted.

7. Worksheet #11 – This information was provided in the QAPP and addressed the requirements.

Navy Response: Comment noted.

8. Worksheet #12

- a) For clarity, consider denoting if the personnel listed are from USAE and/or CH2M.

Navy Response: The only personnel role listed in Worksheet #12 is the UXOQCS and all occurrences apply to the USAE UXOQCS. Therefore, "USAE" has been added to all occurrences of "UXOQCS" in Worksheet #12.

- b) Verify if the information on the GPS equipment given in Table 12-2 should be included in Table 12-1 also. Specifically, Step #2 of Table 12-2 indicated "GPS equipment for MEC monitoring activities will be verified at an established control point once at the beginning of the day to ensure the equipment is functioning properly."

Navy Response: The text in Table 12-1 for 2) Site Removal Areas (boundary and control points) under the "Specification" and "Activity Used to Assess Performance" has been updated as follows:

"Specification": "MEC clearance area boundaries will be flagged and staked as appropriate, with a Real Time Kinematic Global Positioning System (RTK-GPS). Areas where QC/QA is performed to confirm completeness will be recorded and documented in digital field forms. GPS equipment for surface MEC clearance will be verified at established control points once at the beginning of the day to ensure the equipment is functioning properly."

"Activity Used to Assess Performance": "A UXOQCS will confirm that the boundaries are sufficiently flagged/staked and document this in the daily report. GPS equipment will be verified at an established control point and verified to be within acceptable metrics prior to MEC monitoring activities (see Worksheet #22). If the observed coordinates are outside of the acceptable tolerance, the equipment will be checked and the control point re-surveyed. Defective equipment will be repaired or removed from service and replaced."

- c) Verify inclusion of the statement about a "permanent ITS" at "Camp Garcia" in Step #3 of Table 12-2. This appears to be an editorial error.

Navy Response: The last sentence in Step #3 under "Specification" has been deleted.

- 9. Worksheet #13 – This information was provided in the QAPP and addressed the requirements.

Navy Response: Comment noted.

- 10. Worksheet #14 & 16

- a) Clarify if Daily Reports will be prepared during the demobilization activities. If so, add to the "Deliverables" column for DFW 10.

Navy Response: For DFW 10 in Worksheet #14&16, "Daily Report" and "Daily" have been added under the "Deliverable" and "Deliverable Due Date" columns, respectively. In addition, in the DFW 11 subsection of Worksheet #17-1, the first "Decision Points" heading has been corrected to read "Documentation" and the entry revised to remove "UXO 15 RACR."

- b) The planned completion dates for the MEC/LUC monitoring (DFW 12) and reporting (DFW 13) are given as "TBD". Clarify if this is based on the monitoring/reporting being done 'in perpetuity,' and therefore this is not a known end date. Also, clarify if there is a set number of years for the monitoring/reporting under this contract and/or QAPP.

Navy Response: The following has been added to the "a" footnote of Worksheet #14&16: "With respect to MEC and LUC Monitoring and associated reporting, these activities will continue indefinitely in accordance with the UXO 15 ROD and as defined in Section 3 of the UXO 15 RAWP. Termination or changes to LUCs and/or MEC and LUC monitoring and reporting, if warranted, will be with the concurrence of EPA and PRDNER."

MEASUREMENT/DATA ACQUISITION ELEMENTS

- 11. Worksheet #17

- a) Consider if a decision point for DFW 3 would be USFWS formal concurrence, or a lack thereof. If so, add to the text. If not, then no revisions are needed.

Navy Response: The following has been added as the first sentence of "Decision Points": "Formal concurrence/documentation of planned land use boundaries as noted under 'Coordination with USFWS for Planned Land Use Areas' is the initial decision point upon which subsequent points associated with site preparations are established."

- b) Clarify the proposed QA checks listed in the Bullet Point #9 of DFW 7. QA checks are not discussed previously.

Navy Response: The referenced bullet has been revised as follows: "When and where QA checks were performed and their outcomes. The QA checks associated with DFW 7 consist of the QA contractor

inspecting approximately 10 percent of the gridblocks where QC has verified MEC clearance has been completed, as indicated in Table 22-2."

- c) Clarify which contractor, USAE or CH2M, will prepare the RACR in DFW 11.

Navy Response: The first sentence of DFW 11 has been revised to read: "The Remedial Action Implementation Contractor will prepare a RACR following completion . . ."

- d) Verify the lack of a documentation subsection for DFW 12. Revise as applicable.

Navy Response: The following has been added just before "Decision Points" in DFW 12:
"Documentation: Daily Report, checklist"

- e) Provide discussion on the Five-Year Review Reports in DFW 13 (or reference where this information is contained).

Navy Response: The following sentences have been added to the end of the first paragraph under DFW 13: "Information contained in the various annual reports will be compiled and assessed during statutorily required reviews performed every 5 years to ensure the remedy remains protective of human health and the environment. The results of the assessment will be included in Five-Year Review Reports."

12. Worksheet #22

- a) Clarify the reference to "FTL" in Table 22-1. Is this the CH2M FTL? Currently, the Munitions Response and Geophysical Contractor (USAE) does not include a FTL in their project personnel. For clarity, consider adding the name of the contractor in front of the role/title.

Navy Response: In Table 22-1 "FTL" has been replaced with "SUXOS." While UXO technicians on the MEC clearance team may perform some of the functions associated with particular MQOs for which "FTL" was listed as the responsible person, ultimately the SUXOS will be responsible for achieving the MQO.

- b) Verify the acceptance criteria for the RTK-GPS. The text in WS17-1 state ± 10 centimeters as the accuracy criterion.

Navy Response: The text in Worksheet #17-1 has been corrected to ± 50 centimeters to be consistent with Worksheet #22.

- c) Verify the frequency text for the "Placement of Validation Seeds" row. The given information on the seeds appears to contradict WS17-1 which noted that details of the validation seeding would not be discussed in the QAPP "for firewall purposes".

Navy Response: The information in Worksheet #22 satisfies the "firewall" intent by providing sufficient information of the general validation seeding process for regulatory review without providing specifics regarding locations or the exact number of seeds per team per day.

- d) Verify the spacing for the survey lanes. The "Survey Land Spacing" row in Table 22-2 states "3 feet apart". WS12-1 indicated "not to exceed 5-foot spacing..." while WS17-1 noted "approximately 3- to 5-foot apart" in DFW 7.

Navy Response: As applicable, all descriptions of survey lane width (there is no spacing/gap between lanes; each lane shares common boundaries with the immediately adjacent lanes) have been made consistent as: "3-to-5-foot width."

- e) Verify the inclusion of the "QA Survey of MEC Clearance Areas". This activity does not appear to be discussed in WS17 or elsewhere in the QAPP.

Navy Response: Please see the response to Specific Comment 11b.

- f) For consistency, clarify if the text regarding coordinates in the “Documenting Recovered Sources” row (MR10) in Table 22-2 should be added to the “Surface Sweep...” row (MM4) in Table 22-3. Additionally, consider changing “UXO” to “MEC” in the ‘acceptance criteria’ column.

Navy Response: The following has been added to the “Acceptance Criteria” cell for MM4 in Table 22-3: “Coordinates available for items within the acceptance criteria listed under MQO# MR1 (Table 22-2) for the equipment utilized to collect the coordinates.”

The sentences containing the term “UXO” have been revised to read: “Designation as MEC, MD, RRD, or NMRD (also referred to as “cultural debris”); MEC and MD described by type and weight.”

13. Worksheet #29

- a) For consistency, consider adding “and approved” after “provided” in the “QC Seed Plan” row.

Navy Response: The requested addition has been made.

ASSESSMENT/OVERSIGHT ELEMENTS

14. Worksheet #31, 32 & 33

- a) For clarity, consider denoting if the personnel listed are from USAE and/or CH2M.

Navy Response: It is assumed the comment is referring to the text contained in the “Three Phases of Control” section prior to Table 31-1. Under that assumption, the information has been added as requested. Table 31-1 already identifies whether the responsible party is from USAE (i.e., the Remedial Action Implementation Contractor) or CH2M (i.e., QA and LTM Contractor), as defined in Worksheet #1&2.

- b) Verify the documentation/timeframe for the “Daily UXO Safety Briefing” row in Table 31-1. Should the frequency be consistent with other Daily Report deliverables, such as the “GPS Function Test”, which are given as “approximately 3 days” instead of “approximately one month”?

Navy Response: The documentation and timeframe associated with any response regarding the daily UXO safety briefing appropriately reflects its lack of urgency relative to GPS function tests and ITS construction.

- c) In Table 31-1, clarify the deliverable due date for the “MEC Clearance Completion per Grid block” row. As the row title indicates “completion”, it appears confusing for the deliverable to be due “prior to the start of MEC clearance activities”.

Navy Response: The referenced Deliverable Due Date text has been corrected to read: “Upon completion of MEC clearance activities for the gridblock.”

DATA REVIEW ELEMENTS

15. Worksheet #35

- a) Verify the inclusion of “Weekly QC Reports”, “Site Preparation Technical Memorandum”, and “Data Validation Reports” in the list of inputs in Table 35-1, as they documents were not previously discussed as deliverables for the project.

Navy Response: Weekly QC Reports, Site Preparation Technical Memorandum, and Data Validation Reports have been removed from Worksheet #35 because they are not applicable. The “Daily QC

Reports" entry has been revised to read "Daily QC and QA Reports" and the "N/A" in this row has been replaced with an "X."

- b) Verify if construction/testing of the ITS and/or QA seeding should be included in Table 35-2. Revise as applicable.

Navy Response: ITS construction/testing and QA seeding have been added to Table 35-2.

16. Worksheet #37

- a) Clarify if anyone from NAVFAC will be involved in the usability assessment. DoD personnel are listed in the MR-QAPP guidance template.

Navy Response: As has been done for all previous remedial actions for Vieques sites, Navy and regulatory personnel involvement in the DUA is done at the RACR review stage because it is not realistic to coordinate personnel from all entities on an as-needed basis for the various intermediate stages of the DUA.

- b) Clarify if a DUA will be performed as part of each year's annual monitoring/reporting. The first paragraph states a DUA "will be performed at the end of each phase of investigation" but there is only mention of the DUA in the RACR in the text under "How will the DUA be Documented?"

Navy Response: The second sentence of the first paragraph of Worksheet #37 has been revised to read: "A DUA will be performed at the end of each phase of the remedial action MEC clearance." While an evaluation of whether the MEC monitoring has been completed successfully (i.e., performed in accordance with the RAWP and associated QAPP via evaluation of daily reports, checklists, recorded GPS tracks, etc.), a formal DUA, as defined in this QAPP, is not warranted. The process that will be followed for performing MEC monitoring and associated reporting will be the same as has been successfully implemented for all other munitions response site remedial actions on Vieques.

OTHER COMMENTS

17. Attachment A:

- a) Verify if SOPs for the following items should be added by the RA Implementation Contractor: ITS construction and testing; and Garmin GPS.

Navy Response: The RA Implementation Contractor SOP for IVS setup and use has been added to Attachment A. This SOP is substantively comparable to the ITS construction associated with the analog instrumentation to be utilized for the UXO 15 remedial action. No SOP for Garmin GPS use is necessary as the RA Implementation Contractor will utilize the Garmin GPS in accordance with the manufacturer's instruction.

- b) Verify if the following SOPs are required for this project, and if not, consider removing for the QAPP: SOP 004, Backhoe Operations; SOP 010, DGM Anomaly and Polygon Resolution; and SOP 014, Magazine Operations.

Navy Response: SOP 004 and SOP 010 have been removed because they are not applicable to the UXO 15 remedial action. SOP 014 has been retained because it will be applicable if MEC is found.

EPA's Evaluation of Responses to EPA's Comments on
Draft UXO 15 Remedial Action Work Plan for Surface Munitions and Explosives of Concern Removal, Land Use
Control Implementation and Monitoring Atlantic Fleet Weapons Training Area, November 2023

EPA has reviewed the Navy's response to EPA's comments on UXO 15 RAWP. All of the responses addressed our comments except for the following:

15. Worksheet #35

- a) Verify the inclusion of "Weekly QC Reports", "Site Preparation Technical Memorandum", and "Data Validation Reports" in the list of inputs in Table 35-1, as they documents were not previously discussed as deliverables for the project.

Navy Response: Weekly QC Reports, Site Preparation Technical Memorandum, and Data Validation Reports have been removed from Worksheet #35 because they are not applicable. The "Daily QC Reports" entry has been revised to read "Daily QC and QA Reports" and the "N/A" in this row has been replaced with an "X."

EPA's Evaluation: Comment 15a on Worksheet #35 requires a bit more clarification. The Navy noted that the table entry would be revised to "Daily QC and QA Reports". The QAPP previously indicated Daily QC Reports and Weekly QA Reports. Will Daily QA Reports be submitted, or should the entry read "Daily QC and Weekly QA Reports"?

Navy's Response: The entry has been revised to "Daily QC and Weekly QA Reports."

Responses to PRDNER Recommendations
 Draft UXO 15 Remedial Action Work Plan for Surface Munitions and Explosives of Concern
 Removal, Land Use Control Implementation and Monitoring
 Atlantic Fleet Weapons Training Area – Vieques
 Former Vieques Naval Training Range
 Vieques, Puerto Rico

GENERAL COMMENT:

1. As analog technology, which is the least repeatable and defensible of UXO detection technologies, is being used for the surface clearance activities, the goal of an average of at least ten QC seeds per team is below the typical seeding rate for current industry expectations during clearance activities. The footnote in Table 12-1 states, “Although the seeding rates may ultimately be slightly varied from the Intergovernmental Data Quality Task Force (IDQTF) Module 2 guidance for a Remedial Action, the QC/QA seeding rates are comparable to historical QC/QA seedings rates at Vieques and considered robust enough for the RAOs.”

Please note that Module 2, when pertaining to removal actions using analog detection, recommends in its' examples, an encounter of 5 seeds per operator per day in order to meet the measurement quality objectives. However, because the team member quantities were not found within the text, the comment is based on a standard UXO Team Member quantity of seven personnel. As the Blind Seed Plan is being firewalled from review, please note that the blind seeding rate will need to substantiate the analog clearance effort to attain the MQOs.

Navy Response: The blue text referenced in the comment is example text (without specific justification) and does not claim to be a statement of industry expectation. The planned seeding rate is consistent with what has been acceptable to all stakeholder agencies and historically done for Vieques munitions response site remedial actions. Further, inclusion of other QC/QA elements, such as team observations and ensuring the QAPP and associated SOPs are followed, contribute to the robust QC/QA program.

SPECIFIC COMMENTS:

1. Pdf p. 18, MEC Removal, 2nd para: “Although the ROD indicated there is a planned parking area not previously cleared that would be cleared during the remedial action, it was subsequently determined the parking area had been cleared during the Non-Time-Critical Removal Action (NTCRA; CH2M, 2015), as shown in Figure 2-1, but not properly documented at that time. Therefore, proper documentation of the parking area’s MEC removal activities will be included in the UXO 15 Remedial Action Completion Report (RACR), along with the findings and results of the MEC removal for the trail, multipurpose road/trail, and land crabbing area (see Section 4.1).”

Please state that the previous surface clearance effort will be presented in the RACR and will be evaluated per the DQOs and MQOs for this WP.

Navy Response: As stated in the referenced text, proper documentation of the MEC clearance performed at the parking area will be included in the RACR. That clearance was done in accordance with an NTCRA work plan specific for that activity; therefore, it is the requirements included in that work plan that will be used to evaluate the parking area clearance effort.

Further, in that the historic NTCRA activities performed at other UXO 15 planned public use areas were deemed acceptable as the final action for those areas, as documented in the UXO 15 ROD, the NTCRA at the

referenced parking area, which was performed in accordance with the same work plan, is equally suitable as the final action there.

The last sentence of Section 2.1.1 has been revised to read: "Therefore, proper documentation of the parking area's MEC removal activities, including demonstration that the NTCRA met its objectives in accordance with the associated NTCRA work plan, will be included in the UXO 15 Remedial Action Completion Report (RACR), along with the findings and results of the MEC removal for the trail, multipurpose road/trail, and land crabbing area (see Section 4.1)."

2. Pdf p.18, Section 2, 1st sentence: "MEC removal will consist of the removal of surface MEC and other munitions-related items from the one trail and one multipurpose road/trail for which MEC removal was not performed during past removal actions, as shown in Figure 2-1."

The description in this sentence should clearly define what trails are being referred to.

Navy Response: The referenced sentence has been revised to read: "MEC removal during the UXO 15 remedial action will consist of removal of surface MEC and other munitions-related items from the one trail, the one multipurpose road/trail, and the land crabbing area for which MEC removal was not performed during past removal actions, as shown in Figure 2-1."

To provide additional clarification, these three areas in Figure 2-1, which are identified by yellow color-coding, have been labeled as to which one is the "trail," which one is the "multipurpose road/trail," and which one is the "land crabbing area."

3. Pdf. P 18, Sect 2.2, 2nd bullet: "MEC that is deemed unacceptable to move will be clearly marked while accessibility, explosive hazard, location, and other factors are assessed to determine if additional safety measures should be put in place to protect site workers until it can be destroyed by destruction-in-place methods (i.e., controlled detonation) in accordance with applicable protocol contained in the munitions removal work plan in effect at the time the MEC is found and addressed. Until final disposition is initiated, the MEC team will arrange for the item(s) to be secured (e.g., qualified security detail) as needed."

Please define what other "munitions removal work plan" is being referred to here? This current plan for UXO 15 is the removal work plan and should cover actions to be taken if MEC is found.

Navy Response: MEC handling and disposition may be necessary for both the remedial action MEC clearance and MEC monitoring, which is why the MEC monitoring subsection (Section 3.2.2) of the RAWP refers back to Section 2 for handling any MEC found during monitoring. The referenced text is written with the recognition that the contractor responsible for MEC disposition may change over time given the duration for which MEC monitoring may be required. The first sentence of the referenced bullet has been revised to read: "MEC that is deemed unacceptable to move will be clearly marked while accessibility, explosive hazard, location, and other factors are assessed to determine if additional safety measures should be put in place to protect site workers until it can be destroyed by destruction-in-place methods (i.e., controlled detonation) in accordance with applicable protocol contained in this RAWP or, if there is a different contractor in place if/when MEC is found in the future, the munitions removal work plan in effect at that time."

4. Pdf p. 103, MEC Management and Disposal, "If both inspectors agree that the material does not present an explosive hazard, the material will be determined to be MDAS and handled in accordance with the ESS and applicable SOPs for proper documentation, storage, and final disposition."

MDAS is a classification certified by the SUXOS and verified by the UXOQCS or Lead Agency Representative as opposed to by the field inspectors. Regarding the disposition of MDAS, the QAPP mentions the items

being turned over to a recycler. Please ensure that the chosen entity is a qualified receiver that can meet the industry standards of MDAS disposition.

Navy Response: The referenced text has been revised to read: "All materials will be visually inspected by two qualified UXO Technicians; the first UXO Technician (i.e., SUXOS) will perform a 100 percent inspection and the second UXO Technician (i.e., UXOQCS) will perform an independent 100 percent re-inspection. If both inspectors agree that the material does not present an explosive hazard, the material will be determined to be MDAS and handled in accordance with the ESS and applicable SOPs for proper documentation, storage, and final disposition."

In addition, where reference to release of MDAS to recyclers is made in the QAPP, the term "qualified" has been added before "recycler."

Responses to PRDNER Additional Comments
Draft UXO 15 Remedial Action Work Plan for Surface Munitions and Explosives of
Concern Removal, Land Use Control Implementation and Monitoring
Atlantic Fleet Weapons Training Area – Vieques
Former Vieques Naval Training Range
Vieques, Puerto Rico

ADDITIONAL COMMENTS:

1. According to Table 11-2 on page 42 in Appendix A, “MEC monitoring as part of an LUC monitoring program comprising analog instrument-aided visual surveys conducted periodically (annually and after named tropical storms/hurricanes affecting the island in a manner that may threaten remedy protectiveness or in areas of UXO 15 affected by a fire). The instrument-aided visual survey will be conducted to locate and remove MEC from the ground surface (or protruding from the surface) within land use areas being maintained by USFWS and accessible to use and observed to be indicative of trespassing (e.g., unauthorized trail or other accessible area established) to ensure the remedy remains protective.” The comment seems to imply that if a fire should occur next to trails, roads or parking areas making these areas potentially accessible to the public and trespassers, the Navy does not plan to conduct monitoring or MEC removal in these areas as they are not normally maintained by USFW for public access. Please clarify the text. Also, please amend the text to identify the entity responsible for implementing any additional LUC necessary to prevent the public from accessing or trespassing in these areas while vegetation inhibiting access to these areas is re-established.

Navy Response: The text regarding Navy inspections is intended to account for the situation provided in the comment. Further, if additional LUCs are recommended based on observations made during MEC/LUC monitoring, the recommendations, including the responsible entity, will be made in accordance with LUC monitoring and maintenance protocol and reporting, as provided in Sections 3 and 4 of the RAWP. To clarify, the reference text has been revised to read:

“MEC monitoring as part of an LUC monitoring program comprising analog instrument-aided visual surveys conducted periodically (annually and after named tropical storms/hurricanes affecting the island in a manner that may threaten remedy protectiveness or in areas of UXO 15 affected by a fire). The instrument-aided visual survey will be conducted to locate and remove MEC from the ground surface (or protruding from the surface) within land use areas being maintained as accessible by USFWS, areas observed to be indicative of trespassing (e.g., unauthorized trail), or accessible areas otherwise established (e.g., via fire) that may threaten remedy protectiveness to ensure the remedy remains protective. If additional or modified LUCs are recommended based on observations made during MEC/LUC monitoring, the recommendations, including the responsible entity, will be made in accordance with LUC monitoring and maintenance protocol and reporting, as provided in Sections 3 and 4 of the RAWP.”

2. Section 1.3, first bullet: PRDNER recommends making this consistent with the description of this MEC review activities in the Executive Summary and Worksheet #11 of the UXO 15 QAPP included in Appendix A by adding, “Additional elements associated with this key component include vegetation cutting and biological and archaeological surveys, as necessary, to facilitate the surface MEC removal.”

Navy Response: Please see the response to EPA General Comment #3.

Responses to USFWS Comments
 Draft UXO 15 Remedial Action Work Plan for Surface Munitions and Explosives of
 Concern Removal, Land Use Control Implementation and Monitoring
 Atlantic Fleet Weapons Training Area – Vieques
 Former Vieques Naval Training Range
 Vieques, Puerto Rico

The U.S. Fish and Wildlife Service (USFWS) has reviewed and provided the following comments regarding the Draft Remedial Action Work Plan for UXO 15 Puerto Ferro.

1. 3.2 LUC Implementation, LUC and MEC Monitoring, and LUC Maintenance Activities. (Page 23)

“These educational kiosks will be incorporated into the LUC monitoring and maintenance program and the content will be updated as warranted to reflect the most up-to-date land use information. Educational kiosks inform site users as to areas permissible for public use, as well as restricted areas that are not available for public use (i.e., trespassing) and prohibited activities. Yellow concrete markers will be placed at trail starts, intersections, and trail ends, as warranted, to remind site users of MEC awareness practices (similar to other sites e.g., SWMU 4). Additionally, these yellow markers will replace the need for the current “warning” signs along the primary access road. As such, these “warning” signs will be removed as part of the implementation of LUCs associated with the remedial action designed to support USFWS’ land use plans for UXO 15. Trail markers will be placed along the trails and at the ends of the trails to encourage site users to remain within the public-use areas and reduce the potential for them to access areas outside authorized, accessible public-use areas. Specifically, “trail” marker signs will be placed as needed along the hiking/biking trails, multipurpose roads/trails, and parking areas. Figure 2-1 shows a trail marker configuration whereby markers will be placed generally in a line-of-sight manner on both sides of each trail. However, based on actual observations during LUC implementation and/or monitoring, less or more trail markers will be installed. Where possible, these markers will be placed on natural features (e.g., trees), a common practice in national parks, forests, and refuges. Where not possible, markers will be placed on structures (e.g., posts) installed along the trail/use area. If posts are necessary, posts designed to work well based on site-specific characteristics such as shallow bedrock will be installed.”

USFWS Comments: Although we agree that in many areas posting on trees is a common practice. This area contains very sensitive vegetation, and we would prefer not to post any signs on any trees. Please write that you will use existing posts and or add any new posts, as needed.

Navy Response: The approach for placing trail markers on trees where possible is the same approach included in the UXOs 12/14 remedial action work plan, which was approved by all agencies. While the Navy is certainly supportive of not posting markers on certain vegetation, the Navy’s goal is to implement signage in a consistent manner at all sites where public use is planned. Of note, there are trees at UXO 15 that are not protected or otherwise identified as sensitive. The third to last sentence of the text referenced in the comment has been revised to read: “Where possible, these markers will be placed on natural features (e.g., trees not identified as “protected” by the federal government or Commonwealth of Puerto Rico or scrub habitat species), a common practice in national parks, forests, and refuges. Planned installation locations will be discussed with USFWS prior to installation.”

2. 3.2.2 LUC and MEC Monitoring and LUC Maintenance. (Page 25)

"As noted previously, during each monitoring event the LUC inspection checklist shown in Appendix B will be completed. Over time, based on observations made during the LUC and MEC monitoring program, this checklist may be modified, if warranted, to maintain applicability and increase its effectiveness. • The Navy shall notify EPA, PRDNER, and USFWS as soon as practicable of the discovery of activity at UXO 15 inconsistent with the RAOs (Section 1.2) and/or LUC objectives (Section 3.1), and then promptly investigate and take appropriate corrective action. Such notice will also outline the steps and anticipated timeline to be taken to: (1) investigate the cause and outcomes and/or potential outcomes of the activity inconsistent with the RAOs/LUC objectives, (2) develop and implement appropriate corrective action, and (3) evaluate the effectiveness of LUCs and assess lessons learned and reduce the potential for recurrence. • An annual summary report will be provided to EPA, PRDNER, and USFWS documenting the LUC monitoring and maintenance activities, findings, and as applicable, corrective actions taken to maintain LUCs according to this work plan as described in Section 4.2. A summary of this information will also be included in five-year reviews for the former VNTR (see Section 4.3). • The Navy or USFWS shall not modify or terminate LUCs, implement actions, or modify land use in a manner inconsistent with the use restrictions and assumptions described in the ROD and detailed herein without appropriate regulatory approval. The Navy and USFWS shall seek prior concurrence before implementing any anticipated activity that may disrupt the effectiveness of the LUCs or that may alter or negate the need for LUCs."

USFWS Comments: Revise and redact the language for the general public.

Navy Response: It is unclear what language USFWS feels should be redacted. This language is consistent with CERCLA protocol and remedial action work plans for other Vieques sites that have been reviewed and approved by all agencies.

3. 1 Worksheet #4, 7 & 8: Personnel Qualifications and Sign-off Sheet (Page 52)

USFWS Comments: We recommend that the Project Organization and the QAPP Distribution should be kept updated. For example, Larry Price is no longer working for USAE.

Navy Response: The QAPP has been reviewed and updated with the most current personnel.

4. 1 Worksheet #6: Communication Pathways and Procedures (Page 55)

USFWS Comments: The same comment applies to the Personnel Qualification and Sign-Up Sheet.

Navy Response: Please see the response to Comment 3 above.

5. Figure 11-1 MEC Removal Areas and LUC Implementation UXO 15 Remedial Action Implementation and Long-Term Monitoring QAPP (Page 85)

USFWS Comments. The figure shows a yellow square representing the small Lagoon and mangrove-related crabbing area. We are concerned about how this will be done since it is all a very sensitive habitat, please expand or provide more information about the methodology and works plan.

Navy Response: MEC clearance in the land crabbing area will follow the same process USFWS requested and the Navy followed at SWMU 4, which avoided vegetation cutting and used manual MEC clearance methodologies. The UXO 15 Remedial Action Work Plan and applicable worksheets of the QAPP specify the MEC clearance and MEC monitoring processes that will be used in the land crabbing area as follows:

With respect to where the clearance will take place in the land crabbing area:

- Step 4 of QAPP Worksheet 11-1 states: "USFWS to provide the actual area for clearance."

With respect to how the MEC clearance (including how vegetation will be protected) will be done:

- Measurement Performance Activity 7 in QAPP Worksheet 12-1 (Table 12-1) states: “. . . land crabbing area, within which survey teams will perform surveying within the accessible area (i.e., areas not requiring vegetation cutting to access).”
- DFW 3: Site Preparations in QAPP Worksheet 17-1 states: “As has been done for MEC clearance at land crabbing areas in other UXO sites, MEC clearance in land crabbing areas is performed in areas accessible to the clearance team without having to cut vegetation as cutting vegetation may alter the habitat. Further, this method of “meandering” through the land crab habitat simulates how land crabbers tend to utilize the area.”
- DFW 7: MEC Clearance in QAPP Worksheet 17-1 states: “Within the land crabbing area, MEC clearance will be performed using a meandering approach with the accessible land crabbing area as described in DFW 3.”

With respect to how MEC monitoring will be performed as part of long-term monitoring:

- In Section 3.2.2 LUC and MEC Monitoring and LUC Maintenance, it is stated: “The instrument-aided visual inspection will also take place in the designated land crabbing area but will not involve any vegetation cutting activities and will be limited to the accessible pathways established and any associated open areas.”
- DFW 12: MEC Monitoring in QAPP Worksheet 17-1 states: “As no vegetation clearance or cutting will be conducted within the future planned land crabbing area, a transect approach will not be utilized in this area. Instead, the UXO Technicians and FTL will walk a meandering path within the accessible areas of the planned land crabbing area based on site conditions encountered during MEC monitoring.”

6. Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance 2 (continued) (Page 99)

USFWS Comments: Based on this concern from page 85, we referenced page 99. This is the worksheet #17.1: Survey Design and Project Workflow for Surface MEC Clearance (3rd page of this worksheet). Line 16, item 3 states: Determine field operations schedule and coordinate any logistical support (e.g., USFWS). This language is very broad; thus, we would like to carefully coordinate the logistics for your work plan.

Navy Response: The referenced language is consistent with past QAPPs and is referring to the communication and coordination the Navy and Navy contractors perform with USFWS when implementing a remedial action. Observations from past remedial actions indicate the Navy has coordinated these logistics in a careful, timely, professional, and respectful manner.

7. Worksheet #17-1: Survey Design and Project Workflow for Surface MEC Clearance 2 (continued) (Page 100 Line 3)

Coordination with USFWS for Planned Land Use Areas

4 Prior to the remedial action implementation, it is assumed the USFWS will provide formal concurrence/documentation of the boundaries to be established for the planned land use areas that will undergo MEC clearance in accordance with this QAPP.

USFWS Comments: The USFWS plans on keeping to the proposed land use plan and we are aware of your previous methods for clearing land crab areas. The Navy needs to closely coordinate with us and their contractors the details on how you will work the site, move personnel up/down the narrow trail/boardwalk, etc. For instance, using a backhoe is not realistic due to the access limitations on the above-mentioned trail/boardwalk.

Navy Response: In the paragraph that reads: "Within the land crabbing area, MEC clearance will be performed using a meandering approach with the accessible land crabbing area as described in DFW 3" in DFW 7: MEC Clearance in QAPP Worksheet 17-1, additional text has been added to clarify that clearance in the land crabbing area will be done using an instrument-aided (metal detector) visual survey and removal of MEC to a maximum depth of 12 inches below ground surface using manual methods." Similar language has been added to DFW 12: MEC Monitoring in QAPP Worksheet 17-1.

Additional USFWS Comments: As additional information to the Navy and the regulators, as previously agreed upon, the USFWS has proceeded to facilitate and open the three new trails at the Puerto Ferro Peninsula (AKA UXO 15). The trailheads have already been marked with signage that will occupy the same area as the proposed Potential Monument and/or Trail/Road Marker. There are a total of six (6) trailhead signs. These three trails have been named: the Novillo Trail, the Pirate's Cove Trail and the Connector Trail. We are attaching a document with language we prepared for the public (English and Spanish) with images of the three (3) main trailhead signs and language about the 3 RRR protocols. We do not have a clear copy with a clear quality of these graphics, so when feasible, we request that you please provide us with these images.

Navy Response: The Navy will coordinate with USFWS to ensure sufficient trail signage exists and/or is installed that meets the substantive requirements of the Record of Decision and the remedial action work plan/QAPP. Should existing signage provided by USFWS satisfy a portion of the requirements, that signage will be included when documenting implementation of the remedial action. Otherwise, additional signage will be implemented by the Navy to fulfill the requirements. Images that are consistent with satisfying the Navy's responsibilities associated with remedy implementation can be provided.