

N00221_003565
MARE ISLAND
SSIC NO. 5090.3.A

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, CA 92132-5190

CONTRACT NO. N68711-98-D-5713
CTO No. 0073

APPENDIX H

FINAL

**STANDARD OPERATING PROCEDURE ONE
MUNITION AND EXPLOSIVES OF CONCERN,
RECOVERY, STORAGE AND DISPOSITION
(SOP-1)
Revision 2
March 26, 2004**

**MARINE CORPS FIRING RANGE ON
FORMER MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA**

DCN: FWSD-RAC-04-1476

Prepared by:



TETRA TECH FW, INC.

1230 Columbia Street, Suite 500
San Diego, CA 92101

DRAFT STANDARD OPERATING PROCEDURE ONE
MUNITIONS AND EXPLOSIVES OF CONCERN, RECOVERY,
STORAGE, AND DISPOSITION (SOP-1)
REVISION 1, IS APPENDIX H OF:

DRAFT
PROJECT WORK PLAN
TIME-CRITICAL REMOVAL ACTION AT THE MARINE CORPS
FIRING RANGE AND HISTORIC OUTFALL 4S
REVISION 1

DATED 18 JULY 2003

THIS RECORD IS ENTERED IN THE DATABASE AND FILED
AS

RECORD NO. N00221_000630

TABLE OF CONTENTS

	<u>Page</u>
1.0 PURPOSE.....	1-1
2.0 SCOPE.....	2-1
2.1 MUNITION WITH THE GREATEST FRAGMENTATION DISTANCE.....	2-1
2.2 PREPARATORY ACTIONS.....	2-1
2.2.1 Vegetation Cutting.....	2-1
2.2.2 Surface Sweep.....	2-2
2.2.3 Grid Network.....	2-2
2.2.4 Geophysical survey.....	2-2
2.2.5 Exclusion Zone/Inhabited Building Distance.....	2-3
2.3 RADIOLOGICAL SURVEY.....	2-4
2.4 REMOVAL ACTION/EXCAVATION.....	2-4
2.4.1 MEC Safe to Move.....	2-7
2.4.2 MEC Not Safe to Move.....	2-8
3.0 PERSONNEL REQUIREMENTS.....	3-1
3.1 TRAINING REQUIREMENTS.....	3-2
4.0 OPERATIONAL CONSIDERATIONS.....	4-1
4.1 NOTIFICATION, SCHEDULING, AND COORDINATION.....	4-1
4.2 EQUIPMENT/MATERIAL REQUIREMENTS.....	4-2
4.3 MEC IDENTIFICATION.....	4-2
4.3.1 MEC Emergency Response.....	4-2
4.4 HANDLING, TRANSPORTATION, AND STORAGE.....	4-3
4.4.1 Explosive Transport Vehicle.....	4-3
4.4.2 Packaging.....	4-4
4.4.3 MEC Storage.....	4-4
4.4.4 Inventory.....	4-5
4.5 TREATMENT.....	4-5
4.5.1 Interim Hazard Classification.....	4-5
4.5.2 Package Design.....	4-6
4.5.3 Shipping.....	4-6
4.6 COMMUNICATIONS.....	4-6
4.7 FIRE FIGHTING.....	4-6
4.8 EMERGENCY MEDICAL SUPPORT.....	4-7
4.9 FIRE SUPPORT.....	4-7
4.10 PERSONAL PROTECTIVE EQUIPMENT.....	4-7
4.11 RECORDKEEPING.....	4-7
4.12 TWO-MAN RULE.....	4-7
4.13 MEC SCRAP.....	4-7
4.14 ENGINEERING CONTROLS.....	4-8
5.0 QUALITY CONTROL.....	5-1
5.1 SEP TEST.....	5-1

TABLE OF CONTENTS

(Continued)

5.2	MEC REMOVAL	5-1
5.3	OVERSIZED MATERIALS.....	5-2
5.4	DEPTH OF EXCAVATION.....	5-2
5.5	FINAL GRID CONDITION.....	5-2
6.0	GENERAL SAFETY PRECAUTIONS.....	6-1
7.0	REFERENCES	7-1

ATTACHMENTS

Attachment 1	Field Supervisor Review Sheet
Attachment 2	Field Team Review Sheet
Attachment 3	Daily Equipment Checklist
Attachment 4	Daily Health and Safety Equipment Checklist
Attachment 5	UXO Acquisition and Accountability Log
Attachment 6	Ordnance Accountability Inventory
Attachment 7	Explosive Vehicle Inspection Form

LIST OF TABLES

Table 2-1	Authorized Blast Shield Construction Materials and Thickness
-----------	--

ABBREVIATIONS AND ACRONYMS

AFB	Air Force Base
BIP	blow-in-place
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CL	Confident Level
CQC	Contractor Quality Control
CY	Cubic Yard
DDESB	Department of Defense Explosives Safety Board
DGPS	Differential Global Positioning System
DoD	Department of Defense
DON	U.S. Department of the Navy
DOT	Department of Transportation
DTSC	Department of Toxic Substances Control
ECM	Environmental Compliance Manager
EMM	Earth Moving Machinery
EOD	explosive ordnance disposal
EODB	explosive ordnance disposal basic
EPA	U.S. Environmental Protection Agency
ESC	Explosives Shipment Certification
ESS	Environmental Safety Specialist
ETV	Explosives Transport Vehicle
EZ	Exclusion Zone
HFD	Hazard Fragment Distance
HERO	Hazardous of Electromagnetic Radiation to Ordnance
IBD	Inhabited Building Distance
IHC	Interim Hazard Classification
MCRF	Marine Corps Rifle Range
MEC	Munitions and Explosives of Concern
MGDF	Munition with the Greatest Fragment Distance
MINS	Mare Island Naval Shipyard
NEW	Net Explosive Weight
NOSSA	Naval Ordnance Safety and Security Activity

PD	Probability of Detection
PHST	Packaging, Handling and Storage
PjM	Project Manager
PPE	personal protective equipment
QA	quality assurance
QC	quality control
QD	quantity distance
RASO	Radiation Safety Officer
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
SHSS	Site Health Safety Supervisor
SOP	Standard Operating Procedure
SSA	Significant Subsurface Anomalies
SUXOS	Senior UXO Supervisor
TDEM	Time Domain Electromagnetic
TTFWI	Tetra Tech FW Inc.
TCRA	Time Critical Removal Action
UN	United Nations
USAF	United States Air Force
UXO	unexploded ordnance
WP	White Phosphorus

1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to establish procedures for the recovery and storage of recovered Munitions and Explosives of Concern (MEC) in support of characterization and Time-Critical Removal Action activities at the Marine Corps Firing Range (MCRF) on the former Mare Island Naval Shipyard (MINS), Vallejo, California by Tetra Tech FW Inc (TTFWI). A radiological survey and the removal of radiological items will also be accomplished during the course of this project. The primary consideration of this SOP is the protection of human health and the environment.

2.0 SCOPE

The MCFR dredge pond 4S historic outfall site involved in this Time Critical Removal Action (TCRA) is located in the southwestern corner of the rifle range and contains two areas that require intrusive investigation (See Figures 2-4 and 2-5 in appendix G). Efforts to remove all MEC items from the outfall debris at Outfall 4S in an earlier excavation were not completed by the time the scope of the contract had expired, and the site was not backfilled because a layer of debris, which included ordnance and radiological items, remained visible in the earthen cavity. MEC and other materials recovered in the excavation included 39,229 live ordnance items, 39,468 inert ordnance items and 537,934 pounds of non-hazardous scrap. The scrap was recycled, or destroyed, as appropriate. Lists of MEC, inert ordnance and scrap metal are found in Attachments 3, 4 and 5 to Appendix G.

2.1 MUNITION WITH THE GREATEST FRAGMENTATION DISTANCE

The Munition with the Greatest Fragmentation Distance (MGFD - the round with the greatest fragment distance that can reasonably be expected to exist in any the MEC area) for the MCFR is the 3 inch/50 caliber Anti-Aircraft/HE round (MK 27 typical -.74 lbs cast TNT or Composition A explosives), based on the recovery of 6 of them at other outfall excavation sites, and the recovery of one at Outfall 4S. The MK 33 3-inch/50-caliber antiaircraft guns were widely deployed on a variety of ships for antiaircraft protection during the WWII era and there is a medium-high probability that additional 3-inch projectiles may be encountered. A Hazardous Fragment Distance (HFD) arc of 291 feet will be established and used for the exclusion zone. This distance is based on the Net Explosive Weight (NEW) of the MGFD, Table 7-9 in OP 5, and is the distance at which the density of hazardous fragments becomes 1 per 600². If, during the course of the removal action, MEC with a greater fragment range is discovered, the HFD arc will be adjusted and an amendment to the submission will be submitted for approval.

2.2 PREPATORY ACTIONS

2.2.1 Vegetation Cutting

The vegetation in both areas will be cut to a height of 4 inches (or less). TTFWI Unexploded Ordnance (UXO) Technicians will use tractor-mounted cutting decks for the flat areas of the sites and hand-held weed cutters for the berms and other areas inaccessible to the tractors. UXO personnel will proceed ahead of the mowing equipment to prevent encountering MEC on the ground surface.

2.2.2 Surface Sweep

Photographs, drawings and figures in historical documents from earlier removal action efforts on the site will be used to establish the approximate boundaries of the two areas to be excavated. UXO Technicians will clearly mark the boundaries of the areas with stakes/surveyors' tape or pin flags.

A surface search of the two areas will be completed to ensure that the area is free from MEC items on the ground surface. A team of UXO technicians will form a line abreast, spaced in a manner that permits a slight visual overlap of individual lanes. The team member on one end of the line will act as the guide and navigate a straight path along a marked boundary line. The team will maintain even spacing and alignment with the guide. The team member on the opposite end of the line will mark the border of each sweep in a manner that provides a clear delineation of the sweep boundary. The Senior UXO Supervisor (SUXOS) will determine which technique will be used to mark the sweep boundaries (line, marking flags, cones, and so forth). The marked boundary will guide the next pass as the sweep progresses. Each team member will sweep a Schonstedt GA-52 CX magnetometer in small arcs in front of them as they proceed (this technique focuses the vision on the ground in front and provides an audible backup.) This process will be followed until both areas are cleared of surface MEC.

2.2.3 Grid Network

Survey control will be established and used by surveyors to install a Cartesian grid network of 20-foot grids to be used for geophysical and radiological surveys that will be completed in the two areas, and to mark the relative position of MEC items, when found. The coordinate axes will have an origin on the southwestern corner of the site and the gridlines will be spaced 20 feet apart, creating a network of 20- x 20-foot grids. The Y-axis will run north-to-south, the X-axis east-to-west, and the points where grid lines intersect will be marked with stakes or pin flags. The UXO Technicians will number the grids, and develop a field map of the grid network. Surface elevations at the gridline intersection points will be recorded to document excavation depths. The grid network will extend beyond the temporary boundaries (in all directions) to ensure a complete coverage of the site is accomplished.

2.2.4 Geophysical survey

Survey control will also be used to conduct a geophysical survey of the two areas to determine the extent of Significant Subsurface Anomalies (SSA), which could be outfall masses or concentrations of MEC items that remain below ground, and to refine the boundaries of the site. Information from the survey will be used as a planning aid for the excavation of the site, not as a means of reacquiring and excavating discrete anomalies. The location of identified SSA will be marked prior to the start of the excavation, and the grids that contain the SSA will be prosecuted last. The geophysical data collection will use a Geonics EM61 time-domain electromagnetic

(TDEM) instrument with an integrated Leica differential global positioning system (DGPS) to provide very precise location coordinates for anomaly reacquisition. The system is certified under the Navy's Hazards of Electromagnetic Radiation to Ordnance (HERO) program. The geophysical and DGPS data will be concatenated, processed, and a target map that identifies the position, depth (or approximate distance), and estimated size of each SSA and will be generated. The map, and a DGPS receiver will be used to locate and mark the re-defined site boundaries, and the perimeter of each SSA with pin flags or stakes connected with surveyors' tape. (Prior to driving any stakes for the grid installation or anomaly location, the stake location will be verified to be free of subterranean metal objects by a UXO technician with a magnetometer or metals detector.) If the detectors indicate a presence of buried metal at the staking point, a UXO technician will determine if the point should be offset, or if it can be cleared to a 10-inch depth for staking.

Due to the nature of the intended geophysical survey, TtFWI does not intend to perform a geophysical prove-out to demonstrate the detection capabilities of the geophysical system. The proposed methodology (Geonics EM61 metal detector and Leica DGPS) is historically able to detect a 105mm projectile to a depth of 4 feet. The SSA at Mare Island are significantly larger than a 105mm projectile, and the proposed instrumentation should be able to easily detect these outfall masses to a depth of 4 feet. TtFWI will perform daily and weekly instrument calibration and function checks to ensure that the instrumentation is operating properly and is within specifications. The EM 61 will be run over a known target at the beginning of each file to ensure it is functioning properly.

Because all of the soil in the two outfall areas will be excavated to a depth of 4 feet, normal anomaly discrimination will not be used at the site.

2.2.5 Exclusion Zone/Inhabited Building Distance

A 1,250-Inhabited Building Distance (IBD) arc will be established around Magazine A180.

The excavation of the two Outfall 4S sites to recover MEC and radiological items is considered an explosive operation. In the areas where the excavation will occur, a 291-foot Exclusion Zone (EZ) will be established as shown in Figures G.2-6 and G.2.8 in Appendix G. There are no occupied buildings or public traffic routes located within the EZ or IBD arc. Plastic A-Frame or folding traffic barricades with warning signs that read "Danger – Unexploded Ordnance – Keep Out" will be installed on the paths atop the pond berms to deter access to the excavation sites from the dredge pond areas. While excavation operations are in progress, only those personnel necessary for the operation will be allowed within the EZ. If nonessential/unauthorized personnel enter the EZ, all MEC-recovery operations will cease. The IBD arc for the magazine and EZ for the excavation areas are shown in Figures G.2-7 and G.2-8 in a in Appendix H, and an example of an UXO warning sign can be found in Figure G.2-9.

If MEC is located during excavation that has a Hazardous Fragment Distance greater than the MGFD, the SUXOS may adjust the EZ based on the NEW of the MEC discovered, and in accordance with Table 7-9 of NAVSEA OP 5.

2.3 RADIOLOGICAL SURVEY

The grid network will also be used to complete a radiological survey of the site. The survey will cover 100% of the area within the site and will be accomplished with hand-held scintillation-type gamma detectors equivalent to the Eberline Instruments Corp. Sodium Iodide (NaI) 2 x 2 SPA-3 model. To accomplish the survey, a temporary, additional grid network of 3 x 3 foot grids will be installed on each 20 x 20-foot grid using line or surveyors' tape. The line (or tape) will be pre-cut into 20-foot lengths and laid out across the first grid in their approximate locations, 3 feet apart. Two UXO Technicians will take stations at opposite ends of the grid and will use yardsticks to precisely measure 3 feet from the marked grid intersection. Using lawn staples or tent pegs, they will anchor their end of the line in the ground, then measure the next 3 feet and anchor the next line. This process will be repeated on both grid axes until the 49, 3 x 3-foot grids are established.

A UXO Technician will take the gamma radiation survey instrument and measure the radiation in the center of each 3-foot grid. Any readings over 3 times the standard deviation of the background reading (approx. 1 ½ times the background level) will be marked (pin flag, stake, etc.). When readings have been taken in each of the 49 grids, the marked grids will be hand-excavated until the source of the radiation is located. The precise location of encountered radiological items will be accomplished by recording northing/easting coordinates. The distances from the surveyed gridlines (20 x 20 ft) south and west of the object will be measured and recorded on the *UXO Acquisition and Accountability Log* form found in Attachment 5. The identity of the item and the depth at which it was found will also be recorded on the form. Recovered radiological items will be placed in plastic bags, labeled and stored in magazine A-204 until the completion of the survey, at which time they will be turned over to the Radiation Safety Office (RASO) for disposal. These procedures will be repeated during the excavation when the top 2 feet of topsoil has been removed, and every 2 feet thereafter, in every 20-foot grid until the site is cleared.

2.4 REMOVAL ACTION/EXCAVATION

To ensure that a complete removal of MEC items is accomplished, a two-step, 100% MEC-screening process will be used during the excavation of the two sites. The first step in the process will be accomplished during the excavation of buried anomalies, which will be effectuated with earthmoving machinery (EMM) (a backhoe, excavator, or bulldozer) to remove any significant overburden, and non-sparking hand tools for the actual removal of MEC items. The EMM will be equipped with blast shields to allow non-UXO equipment operators to operate the equipment. The construction type and thickness of the blast shield authorized by the U.S. Army Engineering

and Support Center, Huntsville, for the specific site Most Probable Munition (MPM) will be one of 3 types shown in Table 2-1:

**TABLE 2-1
AUTHORIZED BLAST SHIELD CONSTRUCTION MATERIALS AND THICKNESS**

Construction Material	Required Thickness	Comments
Plexiglas (cast)	2.96"	Most recommended. May be layered. Available COTS.
Lexan®	4.45"	Single Pane
Bullet-resistant Glass	2.46"	Least recommended

All of the MEC items in the excavation (with the exception of outfall masses and MEC items encased in earthen clumps) should be recovered in this step of the process. The steps subsequent to this will be completed to evaluate the effectiveness of Step 1 procedures as a part of project quality control. The excavation will begin at a boundary of an excavation area and proceed inward, using the installed grid network as a guide. (Because the removal of outfall masses is a slow and cumbersome process, grids with known SSA will be prosecuted last) *White* Metal Detectors, and *Ludlum* Model 3 G-M Scintillation Survey Meters with a *Pancake* Model 44-9 GM Detectors will be used to identify all magnetic and radiological anomalies in the top 12-inches of soil in the first grid to be excavated. Items found in the first 12 inches of soil will be hand-excavated by UXO technicians to determine if they are MEC items, radiological point sources, or scrap metal. When all anomalies have been investigated and MEC/radiological items removed, EMM will be used to remove the first 6 inches of topsoil in the grid, and place it in a dump truck. The top 12 inches of soil in the grid will be re-checked with the metal detectors, all MEC and radiological items found will be extracted, and the next 6 inches of soil will be removed by the excavator. This process will be repeated until the soil in each grid is removed to the depth of excavation.

When each truck is full, it will transport the soil and debris to a stockpile adjacent to two screening plants used in combination for this project: an Extec shaker plant fitted with a six inch grizzly and a 3-inch shaker screen, and a Trommel screening plant with a rotating drum (approximately 6' in diameter and 25' long) fitted with ½-inch screens. The second step in the MEC screening process will occur when the pre-screened, excavated soil is mechanically processed through a combination of Extec and Trommel-type screening plants. The daily amount of excavated soil will be limited by the amount that can be processed through the screen plants in one day, which will reduce the number of times the soil is handled and eliminate the need for establishing multiple stockpiles. The excavated soil will be processed as follows:

- ♦ Loaders will place the pre-screened soil atop the grizzly on the Extec shaker plant. All soil clumps and objects larger than 6-inches will drop off the back of the grizzly into a dump truck, while soil and debris less than 6 inches in size will drop to the shaker screen
- ♦ Objects larger (oversized) than 3 inches will drop off the shaker grid into the back of a dump truck. When the truck of oversized material is full (all material greater than 3"), it will be transported to a lay-down pad and dumped in a layer, and EMM will be used to further spread the layer to a depth of approximately 6 inches. UXO Technicians with metal detectors will inspect all of the oversized material for MEC items. Earthen clumps found to contain metal will be disassembled by driving over them with tracked machinery, or they will be taken to the outfall disassembly area and dissected with the machinery there.
- ♦ Soil and debris smaller than 3 inches will drop through the shaker screen onto a conveyor, which will transport it to the feed hopper of the Trommel screening plant.
- ♦ Soil and debris larger than ½-inch will be transported out of one end of the Trommel drum onto a conveyor, which will route the material back to the Extec plant to repeat the screening process. (A UXO Technician will monitor the oversized materials emerging from the Trommel plant for MEC items)
- ♦ Soil and objects smaller than ½ inches will pass through the Trommel screen and be carried by conveyor to a stockpile.

The UXO Technician monitoring the oversized materials from the Trommel will be stationed in an observation booth equipped with a Lexan[®], or Plexi-glass shields, and a remote control module to halt the screen plants if MEC items are observed. The UXO Technician will periodically check the oversized materials from the Extec plant for MEC items. Attachment 6 provides a drawing of the screen plants configuration.

Soil clumps and other debris that do not break down after several passes through the screen plants will be inspected with metals detectors to determine if MEC items might be present inside the clumps. Those clumps that test positive for containing metal will be stockpiled for later transport to the outfall mass disassembly area for investigation.

The process of clearing MEC items from the top 12 inches of soil, removing the soil in 6-inch lifts, and processing the soil through the screening plants will be repeated within each grid until the depth of excavation is reached.

Outfall Masses

Large outfall masses of MEC, metal, and other heavy debris were encountered during an earlier removal action at the Outfall 4S site. Documentation from earlier removal actions report the excavation of some outfall masses that were the size of a small car and weighed several tons

(Weston, 2001). These masses will require disassembly using a shear, or backhoe with a concrete stinger, and will be moved intact to an area within a dredge pond that has a IBD arc of at least 1,250 feet (see Figure G.2-7). A Lexan[®], or Plexi-glass blast shield will be affixed to the cab of the machine used for mass dissection steel trench plates will be used to form the base of the disassembly area, and stacked ecology blocks will create an enclosure for the disassembly that will surround three sides of the site to provide fragmentation protection for equipment operators and UXO technicians. The open side of the enclosure will face the waters of San Pablo Bay and will be used for entry/exit and for staging the masses for dismantling. The exterior of each mass will be examined for protruding ordnance and other hazards.

The excavator used for the disassembly will be placed outside the ecology block enclosure, and the arm equipped with the shear or stinger will operate inside the enclosure. UXO technicians will direct the placement of the shear/stinger on the outfall mass, but will take shelter outside the ecology block enclosure when the actual shearing/breaking of the masses takes place. The outfall masses will be disassembled by cutting/shearing/breaking the first 6 inches of the mass away from the main mass-body and inspecting it for ordnance. This process will be repeated until the mass is completely reduced to rubble and detritus. Radiological screening of all outfall mass materials will be completed before the debris is processed for disposal. Oversized clumps of soil/clay rejected from the screen plants that contain metal will be dissected in the disassembly area by crushing or cutting.

Existing Stockpiles

Approximately 7000 cubic yards (cy) of soil from the earlier excavation of Outfall 4S are stockpiled along the eastern side of the firing range. Random sampling of the soil was conducted as the stockpiles were being moved, and a 20 mm HE projectile with an Adiabatic nose fuze was located in the first stockpile. All of the soil in all of the stockpiles will be processed through the screening plants to ensure all MEC items are removed. The soil will be processed in the manner previously discussed.

2.4.1 MEC Safe to Move

Each MEC item encountered, either at the excavation sites or in the disassembly area, will be identified and examined to determine its condition (fuzed, fired, decomposed, exposed high explosive, etc.). The condition of the ordnance items will determine if they are safe to transport and safe to ship. *Note: Some MEC items may be found safe to move to the magazine for later disposal, but they may not be safe to ship over the highways.* Those that are deemed safe to transport by the SUXOS will be placed into wooden containers, packed with inert filler material,

and sealed. The containers will then be labeled and loaded into a vehicle configured for transporting explosives and taken to Magazine A180 for future disposition. Magazine A180 has been certified for the storage and has a 1,000-pound NEW limit of Hazard Division 1.1 explosives (DDESB, 1996).

2.4.2 MEC Not Safe to Move

The Travis Air Force Base Explosive Ordnance Disposal (EOD) Detachment will be notified if MEC items encountered are not considered safe to move. Those MEC items will be cordoned off until the EOD Detachment can respond to conduct on-site, blow-in-place (BIP) procedures. BIP procedures will require the notification of several agencies to coordinate the events that must take place before the intentional detonation can occur. A QD arc for the BIP procedure will be determined based on the Tables 13-1 or 13-2 of OP 5, but not less than 1250 feet. All non-essential personnel within the Q/D arc will be removed before the demolition operations will take place. The SUXOS and other UXO technicians will assist the EOD Detachment in preparing for the event as required.

MEC items with a potential for spontaneous ignition such as smokeless powder or pyrotechnics will be packed, labeled, and placed in an open storage area near Magazine A180 awaiting later treatment.

3.0 PERSONNEL REQUIREMENTS

The key operational, on-site TTFWI personnel involved in the performance of MEC removal operations include the PjM, Site Superintendent, SUXOS, Site Health and Safety and Specialist (SHSS), UXO Quality QC, UXO Supervisor, and UXO Specialists. For this project, the SHSS and QC responsibilities will be shared by the same individual.

Project Manager

The PjM for this project is Kent Weingardt, who will be the main point of contact with the Department of the Navy (DON) for all project-related matters and he will be responsible for the overall conduct and performance of the project. The TTFWI PjM will interface directly with the DON's Remedial Project Manager (RPM). The PjM is primarily responsible for the development and implementation of the Work Plan and Explosives Safety Submission, which includes coordination among the task leads and support staff, acquisition of engineering or specialized technical support, and all other aspects of the day-to-day activities associated with the project. The PjM identifies staff requirements, directs and monitors project progress, ensures implementation of quality procedures and compliance with applicable codes and regulations, and is responsible for performance within the established budget and schedule.

Site Superintendent

TTFWI is ultimately responsible for the on-site health and safety of TTFWI and craft-labor personnel working on this project. The Site Superintendent, with the support of SUXOS, SHSS, and QC personnel, is responsible for implementation of the Work Plan, Site-Specific Health and Safety Plan (SHSP), and all on-site activities on a daily basis. Other responsibilities include, but are not limited to: (1) project planning, (2) scheduling, (3) site documentation, (4) regulatory compliance, (5) personnel assignments, (6) customer and subcontractor relations, (7) enforcing health and safety rules and SHSP requirements, and (8) conducting routine safety inspections and incident investigations. The Site Superintendent for this project is Randy Rose, who reports directly to the PjM.

Senior UXO Supervisor

The SUXOS assists in the development of site-specific work plans, identifies personnel and equipment requirements, and directly supervises all daily activities of the field team. The SUXOS is responsible for the successful performance of the field team, the early detection and identification of potential problem areas and instituting corrective measures and for the execution of instructions received from the Site Superintendent, the PjM and the DON RPM. The SUXOS is also responsible for the documentation of site conditions, MEC evaluation and photographing, MEC recovery and storage, preparation of all project reports, and identifying those efforts

required to accomplish the Scope of Work. The SUXOS is responsible for all aspects of explosive safety. The SUXOS for this project is Tim Munger.

Site Health and Safety Specialist

The SHSS will be UXO-qualified with at least 10 years of experience and must have completed the TTFWI Environmental Safety Specialist (ESS) cross training. The SHSS will be responsible for the implementation of the SHSP, on-site training requirements, and recommending changes to the level of personal protective equipment (PPE) to the Certified Industrial Hygienist (CIH) as site conditions warrant. The SHSS has stop work authority for safety conditions and evaluates and analyzes any potential safety problems, implements safety-related corrective actions, and maintains a daily safety log.

UXO Quality Control Representative

This individual will be UXO qualified and have completed the Corps of Engineers (COE) CQC course of instruction, report to the Project QC Manager and will be responsible for the field execution of the Project CQC Plan. This individual will have stop work authority. The UXO QC representative for this project is Anthony Crino, who will also perform the duties of the SHSS.

UXO Specialist

UXO Specialists perform on-site duties including locating UXO, equipment operation, UXO safety, excavation, and escort duties as required. The UXO Specialist reports to the UXO Supervisor, and ultimately the SUXOS.

All personnel involved in excavation and recovery operations will become familiar with, and follow the procedures outlined in this SOP and applicable references.

3.1 TRAINING REQUIREMENTS

All personnel assigned to the TCRA will attend a site-specific orientation. The purpose of this orientation will be to review site-specific and emergency response procedures. Orientation attendance sheets with an attached training agenda will be used to document completion of each orientation session. The topics to be covered during the orientation are provided as follows:

- Introduction
- TCRA overview
- Work Plan review
- Site Health and Safety Plan review

- SOP review
- Magnetometer operation
- Scintillation gamma detector operation
- DGPS operation
- Wash plant/conveyor operation
- Exclusion zones
- Safety precautions
- Quality assurance/quality control (QA/QC) training
- Emergency procedures
- Review of emergency response equipment
- Talk/walk through of emergency procedures
- Emergency drill

All personnel assigned to the project are responsible for reading and understanding the Work Plan, the Health/Safety Plan and SOP-1. After reading the aforementioned documents, the SUXOS will sign and date the *Field Supervisor Review Sheet* found in Attachment 1, and all other site personnel will sign and date the *Project Field Team Review* sheet found in Attachment 2. These sheets will be maintained in project files.

Because this removal action includes a radiological survey as a part of the scope, additional training for site personnel is required, and a radiological site protocol will be established to prevent the spread of radiological contamination, if any exists. The elements of the radiological training, and the procedures to be followed to complete the survey are found in the Radiological Survey Plan, which was published as a stand-alone document.

4.0 OPERATIONAL CONSIDERATIONS

4.1 NOTIFICATION, SCHEDULING, AND COORDINATION

Coordination of all personnel involved in the MCFR MEC removal is of critical importance to the safe conduct of site activities. Coordination activities will begin with a series of meetings with key personnel from involved agencies to identify specific responsibilities, both shared and individual. The community will be informed of the project schedule and the expected impacts. The coordination, notification, and verification activities are outlined below:

- **Coordination Meeting**—Before the MEC removal/TCRA operations are scheduled to begin, a coordination meeting will be conducted to address specific elements of planning and will involve representatives from the following organizations:
 - DON [RPM and ROICC]
 - Former MINS Caretaker/Environmental Compliance Manager (ECM)
 - U.S. Environmental Protection Agency (EPA)
 - Department of Toxic Substances Control (DTSC)
 - The City of Vallejo
 - TTFWI

- **Topics will include:**
 - Explosive handling, storage, and transportation
 - Support services required (fire, medical, security, etc.)
 - Notifications
 - Community impact
 - Daily hours of operation
 - EZ procedures
 - Emergency procedures

- **Notifications**—The TTFWI SUXOS will notify the appropriate personnel prior to scheduled MEC-removal activities as far in advance as possible to facilitate timely coordination arrangements for establishing the EZ and closing required roads. The SUXOS will ensure that the following activities/agencies are informed of the planned field activities:
 - Sutter Solano Medical Center (707) 554-4444 (554-1389 for directions)
 - Vallejo Fire Department (707) 648-5293
 - Vallejo Police Department (707) 648-5293
 - MINS (RPM) (510) 772-8832

- **Daily Verification**—Prior to beginning each day's activities, the TTFWI SUXOS will verify daily that the following activities have been performed:

- Emergency response agencies have been notified
- EZ has been set and evacuated as required

4.2 EQUIPMENT/MATERIAL REQUIREMENTS

The SUXOS will inspect health and safety equipment prior to commencing operations. Two equipment checklists will be used to ensure a proper load-out is accomplished before departing for investigative operations. A Daily Equipment Checklist is provided in Attachment 3, and a Daily Health and Safety Equipment Checklist is provided in Attachment 4. Checklists will be reviewed and updated weekly by the SUXOS and SHSS to ensure the equipment and materials necessary for the current phase of work is included on the lists. It is anticipated that all tasks will be performed in Level D PPE. The following publications are required to be on site:

- Approved Work Plan with this SOP
- Explosive Ordnance Disposal Basic (EODB) 60A-1-1-4, *Protection of Personnel and Property* [Naval Explosive Ordnance Disposal (NAVEOD), 1990]
- EODB 60A-1-1-31, *General Information on EOD Disposal Procedures* (NAVEOD, 1994)
- Naval Sea Systems Command (NAVSEA) OP5 Volume 1 (NAVSEA, 1997)

4.3 MEC IDENTIFICATION

The SUXOS will positively identify all encountered MEC items and the potential hazards associated with them and determine their condition as either safe, or unsafe to move. Items deemed unsafe to move will be detonated in place as a part of a MEC emergency response. If the MEC is safe to move, it will be placed in a sand-filled box, sealed, labeled and transported to Magazine A-180 for storage.

4.3.1 MEC Emergency Response

If the MEC encountered is determined to be unsafe to move/transport, and it poses an immediate threat to human health, public safety, property or the environment, it will be detonated in place, if possible. The SUXOS will notify the RPM, ROICC and request assistance from United States Air Force (USAF) EOD Detachment located on Travis Air Force Base (AFB) to conduct an emergency response to control, mitigate, or eliminate the threat [40 Code of Federal Regulations (CFR) 260.10]. The following procedures will be used to coordinate the response:

- The SUXOS will establish an EZ of appropriate distance for the type and size of MEC encountered
- The MEC site will be clearly marked with stakes and surveyor tape
- Gates to the project site will be closed and barriers placed in front of them

- Engineering controls (sand bags, ecology blocks) will be installed to mitigate the blast/fragmentation, as appropriate.
- The SUXOS will contact the following personnel/agencies:
 - Sutter Solano Medical Center (707) 554-4444
 - Vallejo Fire Department (707) 648-5293 (Dispatch)
 - Vallejo Fire Department (707) 648-4565 (Fire Prevention)
 - Vallejo Police Department (707) 648-5293 (Dispatch)
 - MINS (RPM) (510) 772-8832
 - Travis AFB Command Post (707) 424-5517
 - Travis AFB EOD Detachment (707) 424-2040/3146
 - RPM (Patricia McFadden) (949) 756-7514
 - Project Manager (Kent Weingardt) (619) 471-3532
 - Project UXO Coordinator (Lance Humphrey) (619) 471-3519

TTFWI UXO Technicians will assist the USAF EOD Detachment as required.

4.4 HANDLING, TRANSPORTATION, AND STORAGE

Recovered MEC items will be handled carefully to prevent shock or friction that may cause a fire or explosion. Items will not be thrown, dropped, dragged or tumbled during handling operations. The handling of MEC items will be reduced to a minimum and every precaution will be taken to avoid their contact with abrasive or spark-producing devices, or exposure to the weather or direct sunlight.

All MEC items declared safe to move will be consolidated in the grid found, packaged and transported to the Magazine A-180 for storage while awaiting treatment.

4.4.1 Explosive Transport Vehicle

The Explosive Transport Vehicle (ETV) will be an open-bed pickup truck with a wooden deck (2 inches in thickness) installed. The assigned driver of the vehicle will use the Motor Vehicle Inspection Form found in Attachment 7 to inspect the vehicle before each daily use. All vehicle parts found unsatisfactory during the inspection will be repaired before the vehicle is used to transport MEC items. When loading or unloading the ETV, the following actions will be taken:

- The vehicle's engine is turned off
- Brakes are set and the wheels are chocked
- Vehicle has received daily inspection

4.4.2 Packaging

MEC items will be normally be placed in wooden containers for transportation to the magazine for storage (A rectangular box with rope-type grab handles is typical). Packaging materials will be used to stabilize the items in the containers and padding will be added to protect the items from heat, shock or friction. Specific packaging directions for unique MEC items are provided as follows:

- Unfired rocket motors and base-ejection projectiles will be oriented in the vehicle such that they are parallel to the rear axle.
- White Phosphorous (WP) MEC items will not be transported unless they are immersed in water, mud or wet sand.
- Loose pyrotechnic, tracer, flare or similar mixtures will be placed in No. 10 mineral oil (or equivalent) to minimize fire and explosion hazards.
- Incendiary-loaded MEC items will be placed on a bed of sand and covered with sand to assist in controlling the burn, should the items ignite.
- MEC items with exposed hazardous fillers will use packing material to prevent migration of the hazardous fillers. (EP-385-1-95a. Basic Safety Concepts and Considerations for Ordnance and Explosives Operations. USACE. June 2001.)

The container(s) will be loaded into the ETV and dunnage will be used for blocking and bracing the container(s) to prevent longitudinal or lateral movement during the transportation to the magazine. Conventional dunnage practices or alternative methods found in NAVSEA SW-023-AG-WHM-010 will be used for this purpose (Normally, sandbags will be placed around all container sides and additional sandbags are placed atop the container during transport). (*On Station Movement of Ammunition and Explosives by Truck and Railcar. 15 Dec. 2002*)

4.4.3 MEC Storage

Recovered MEC items that have been deemed safe to move will be transported to Magazine A-180 for consolidation and temporary storage. The magazine has been certified for the storage and has a 1,000-pound limit of Hazard Division 1.1 explosives (NOSSA, 1996). The items stored in the magazine will be placed on pallets and physically separated by sandbags while in storage. At no time will the rated explosive capacity of the magazine be exceeded. The magazines will be locked with Sargent & Greenleaf Model 833 High Security Padlocks that meet MIL-P-43607G specifications for High Security Key Locking Padlocks, or equivalent. The SUXOS will maintain custody of the keys to the padlock. The fenced compound that encloses the magazines will also be padlocked.

4.4.4 Inventory

An inventory of the recovered MEC will be maintained inside the storage magazine and at the on-site office trailer using the *Ordnance Accountability Inventory* found in Attachment 6. The inventory will be updated each time a MEC item is added to or removed from the magazine. The period of temporary storage for encountered MEC will be 90 days or less.

4.5 TREATMENT

If it is determined that the recovered MEC items will be shipped off-site for disposal, documentation that must be obtained prior to shipping the MEC items include the Interim Hazard Classification (IHC), the "Safe-to-Ship" certification and the Certificate of Equivalency. Although preparing MEC items for shipment, and shipping them off-site are not a part of the current project scope, if it is determined that this event will occur later in the project, the following information is provided as a contingency.

4.5.1 Interim Hazard Classification

All recovered MEC items will be examined by the SUXOS to determine if they are safe to ship when packaged, marked and labeled in accordance with the guidelines established in *Navy Transportation Safety Handbook for Hazardous Materials*, NAVSEA OP 2165. A MEC item will be found unsafe to ship if any of the following conditions or circumstances apply:

- The item cannot be positively identified
- The item has been fired/dropped
- The item has been subjected to fire or violent handling
- The items is fuzed and the arm/safe status of the fuze cannot be determined
- The item has deteriorated to a point where filler material is exposed

A list of MEC items deemed safe to ship will be provided to the project UXO Coordinator, who will request an IHC for the items from the Naval Ordnance Safety and Security Activity (NOSSA), as directed by NAVSEAINST 8020.8B. The IHC request will contain the exact identification and condition of each MEC item that requires an IHC. (If a foreign MEC item is recovered, it's identity and the US ordnance item most similar in configuration and functioning to the foreign MEC item will be provided). NOSSA will process the IHC request and provide the following information for each MEC item:

- DOD Hazard Classification
- DOT Hazard Classification

- DOT Label
- UN Number
- Proper Shipping Name
- Net Explosive Weight

4.5.2 Package Design

When the IHCs are received, they will be included in a request for package design to Naval Surface Warfare Center, Detachment Earle (NAVSEA) Packing, Handling and Storage (PHST) Center. PHST will provide package designs for each MEC item being shipped that are in compliance with hazardous material requirements of 49 CFR in regards to electromagnetic radiation, electrostatic and packaging requirements. PHST will charge for their efforts so this process will have to be accomplished through the procurement process.

When the package designs are received, the project UXO coordinator and the Senior UXO Supervisor will produce an *Explosive Shipment Certification* (ESC) that will accompany the MEC items when shipped. The ESC will contain the information provided in the IHC and the statement that the MEC items are safe to ship when packaged, marked, labeled and manifested in accordance with requirements established in NAVSEA OP 2165. The signed ESC will become a part of the administrative package necessary for the MEC shipment that will include the IHC, the ESC, the Section 1 of the Hazardous Waste Profile Sheet completed (with documentation used to establish composition of the waste) and the Land Disposal Restriction Certification.

4.5.3 Shipping

The packaging, manifesting, shipping and treatment of the recovered MEC items will be accomplished by accredited and pre-approved subcontractors licensed and certified to perform those functions. When all of the documentation required to ship the items are at hand, the contractor will be notified and a one-time pickup of the MEC will be scheduled.

4.6 COMMUNICATIONS

Communications equipment consisting of a land line for the project trailer, cellular telephones and hand-held radios will be available for routine and emergency communications with fire and medical support activities.

4.7 FIRE FIGHTING

- Do not fight any fires that involve explosives.
- Notify the Vallejo Fire Department prior to conducting demolition operations and contact them immediately if a fire is started.

- Ensure that the fire fighting equipment listed on Attachment 4 (Daily Health and Safety Checklist) is loaded into the vehicles prior to departing for site activities.

4.8 EMERGENCY MEDICAL SUPPORT

The ambulances from Sutter Solano Medical Center or fire trucks from the Vallejo Fire Department will be the first responders for emergency medical support. They can be contacted by dialing 911. A complete first-aid kit will be maintained on site and at least two UXO Technicians will be trained in CPR and first aid procedures.

4.9 FIRE SUPPORT

The Vallejo Fire Department will be notified (510-522-2423) prior to the commencement of daily operations. No attempt will be made to extinguish a fire involving explosives until the explosives have been consumed.

4.10 PERSONAL PROTECTIVE EQUIPMENT

All demolition operations will be conducted in Level "D" PPE with safety glasses.

4.11 RECORDKEEPING

Specific information regarding the type and location of MEC encountered during the surface sweep and intrusive investigation will be annotated on the first section of the *UXO Acquisition and Accountability Log* form found in Attachment 5. The MEC will be photographed with a digital camera and the disk and photograph numbers will be included on the form. The MEC description will also be added to the *UXO Accountability Form* at the project trailer, and in Magazine A-180. If MEC items are transported off-site by a subcontractor, the bottom portion of the form will be completed for the transfer and the *UXO Accountability Form* will be adjusted appropriately as well.

4.12 TWO-MAN RULE

The two-man rule is a concept of fail-safe, where two knowledgeable individuals perform potentially hazardous operations in which each is the safety backup and watch person for the other. The two-man rule shall apply whenever MEC is handled or transported.

4.13 MEC SCRAP

MEC scrap (shrapnel, fins, expended munitions) will be controlled and accounted for from discovery to disposal. Items identified as MEC scrap will be inspected, removed from the site, containerized, and kept in the MEC scrap storage area between adjacent to Magazine A-180 until it is shipped to an approved processing facility (recycler). All MEC scrap will be documented on

the *UXO Acquisition and Accountability Log* form (Attachment 5) and on the *Ordnance Accountability Inventory* (Attachment 6) when it is transferred to the storage area.

4.14 ENGINEERING CONTROLS

Engineering controls (tamping, wetting the soil, tarpaulin-tenting, and so forth) will be used to limit/control the spread of dust and soil-borne contaminants (if present) and to control fragmentation during emergency blown-in-place (BIP) operations. The TTFWI SUXOS and USAF EOD personnel will determine the type of controls that will be used based on the situation encountered. TTFWI UXO Technicians will assist EOD personnel in the emplacement of those controls.

5.0 QUALITY CONTROL

Quality Control measures are performed to ensure that the location, recovery, transportation, storage, packaging and shipment of encountered MEC were completed in accordance with applicable regulations and directives. The SUXOS, SHSS, and QC Representative will ensure that procedures are implemented as listed below:

5.1 SEP TEST

Prior to commencing the surface search and the magnetometer search of the excavation site, each UXO Technician will be certified in the magnetometer test grid. To achieve certification, every UXO Technician conducting the survey must demonstrate the ability to achieve an 85% Probability of Detection (PD) with a 90% Confidence Level (CL) for the detection and removal of target items.

A 20 foot x 20 foot test grid/lane will be established and seeded with 35 target items that are representative of the MEC items that are likely to be encountered (20mm and larger). The grid will be divided into lanes 5-feet across and a mixture of MEC (inert) items and scrap metal will be used to seed the grid on top of the ground (surface sweep certification) or by burying them at differing depths (one foot or less) and orientations (buried MEC removal). To achieve an 85% PD at a 90% CL, 33 of 35 target items must be located by each operator. If a magnetometer operator fails to reach the required PD and CL, he/she will not be certified to participate in the survey, and the cause for the failure will be determined. After corrective action, that operator will be processed through the test grid to demonstrate the ability to reach the required levels of detection. The certification of the magnetometers and operators will be documented in the daily CQC report.

5.2 MEC REMOVAL

The investigation of all magnetic anomalies, and radiological point sources in a grid within the top 12" of soil, and the observation of the soil being removed in 6" lifts is the first step in the quality control (QC) process. This initial screening is designed to remove all MEC/radiological sources before the soil is removed from the excavation site. One hundred percent of the soil in the excavation sites will be manually inspected with magnetometers before it is excavated.

Monitoring the excavated materials for MEC items and radiological sources in the screening plants is the second step in the QC process. One hundred percent of the excavated soil and debris will be processed through the Extec and Trommel screening plants, and all oversized materials will be monitored for MEC items by UXO Technicians. Oversized soil clumps with encased metal will be disassembled to identify their contents.

5.3 OVERSIZED MATERIALS

All of the oversized materials that are rejected from the screen plants will be spread out on lay-down pads and manually inspected for MEC items. Earthen clumps that are found to contain metal will be disassembled on the lay-down pad, if possible, or taken to the outfall mass disassembly area and dissected there. The project QC representative will visually observe the manual checking of the oversized material by the UXO Technicians, and he/she will randomly inspect approximately 10% of the material in each truckload.

5.4 DEPTH OF EXCAVATION

The elevations of the intersection points of the grid system installed on the excavation sites will be recorded before the removal action takes place, and the elevations of the excavated area will be resurveyed upon the completion of the soil processing to ensure the required excavation depth was achieved. Additional soil will be removed from grids with elevations less than 4 feet in depth until the targeted depth is achieved.

5.5 FINAL GRID CONDITION

When each of the sites has been excavated to a depth of 4-feet, a magnetometer/radiological survey will be conducted to determine the final condition of the sites with respect to buried MEC and radiological items. UXO Technicians will install lanes that cross each excavation site, with each lane approximately 5-feet in width. UXO Technicians will proceed down each lane with White, Schonstedt or Vallon metals and mark all detected anomalies with a pin flags or other marking devices. This process will be repeated until each site is completely swept. If there are relatively few (i.e., 25 or less) anomalies, they will be hand excavated to identify them. If the extent of the subterranean anomalies is still significant, The SUXOS, RPM, Project Manager and ROICC will meet and develop a plan of action for either continuing the excavation, or backfilling the excavation sites with 4-feet of clean fill. This process will be repeated with sodium iodide (NaI T1) scintillation radiation detection instruments to locate and remove any radiological sources that might remain.

6.0 GENERAL SAFETY PRECAUTIONS

This section provides the following general safety precautions for MEC operations:

- Know and observe federal, state, and local laws and regulations that apply to the transportation, storage, and usage of explosives.
- Do not permit metal truck bodies, to contact explosive containers.
- Do not transport metal, flammables, or corrosive substances with explosives.
- Do not allow smoking, or the presence of unauthorized or unnecessary persons, in vehicles containing explosives.
- Do not store explosives, fuses, or fuse lighters in wet or damp places, or near oil, gasoline, cleaning solution or solvents, or near radiators, steam pipes, exhaust pipes, stoves, or other sources of heat.
- Do not store any sparking metal or sparking metal tools in an explosive magazine.
- Do not permit smoking, matches, or any source of fire or flame in or near an explosive magazine.
- Do not allow leaves, grass, brush, or debris to accumulate within 50 feet of an explosive magazine.
- Do not permit the discharge of firearms in the vicinity of an explosive magazine.
- Do not place MEC where they may be exposed to flame, excessive heat, sparks or impact.
- Do not expose MEC or devices containing MEC, to the direct rays of the sun. Such exposure increases sensitivity and deterioration.
- Ensure that MEC are returned to their proper containers and the containers are closed after use.
- Do not carry MEC or explosive components in pockets or elsewhere on the body.
- Do not insert anything but fuse or detonating cord into the open end of a blasting cap.
- Carefully load and unload MEC from vehicles. Never throw or drop MEC from the vehicle.
- Do not drive vehicles containing MEC through cities, towns, or villages, or park them near such places as restaurants, garages, and filling stations, unless absolutely necessary.
- Store MEC only in a magazine that is clean, dry, well-ventilated, reasonably cool, properly located, substantially constructed, bullet and fire resistant, and securely locked.
- Ensure the Exclusion Area is clear of any unauthorized personnel before beginning investigative activities.
- Do not handle, use, or remain near MEC during the approach or progress of an electrical storm.

- Do not transmit on a radio within the Hazardous of Electromagnetic Radiation to Ordnance (HERO) distance of that radio. Do not turn the cellular telephone within 10 feet of any MEC.

The two-man rule shall apply whenever MEC is handled or transported and during disposal operations on or off the range.

7.0 REFERENCES

- Foster Wheeler Environmental Corporation (FWENC). 2001. *Draft Final Project Contractor Quality Control Plan, Visual Surface Characterization and Geotechnical and Seismic Evaluations at Installation Restoration Site 2. Alameda Point, Alameda, California.* San Diego, California.
- Navy Explosive Ordnance Disposal (NAVEOD). 1990. *Explosive Ordnance Disposal Procedures, Protection of Personnel and Property.* (Publication 60A-1-1-4, Revision 2). Indian Head, Maryland: Naval Explosive Ordnance Disposal Technology Division.
- Naval Sea Systems Command (NAVSEA). 1997. *Ammunition and Explosives Ashore; Safety Regulations for Handling, Storing, Production, Renovation and Shipping.* (NAVSEA OP 5, Volume 1, Seventh Revision. Indian Head, Maryland: Naval Ordnance Center.

ATTACHMENT 1
FIELD SUPERVISOR REVIEW SHEET

ATTACHMENT 1

FIELD SUPERVISOR REVIEW SHEET

I have read the Project Work Plan and Standard Operating Procedure 1 (SOP-1) for MEC/UXO Disposal Disposition. I understand it. To the best of my knowledge the processes described in the Work Plan and this SOP-1 can be done in a safe, healthful, and environmentally sound manner. I have made sure all persons assigned to this process are qualified, have read and understand the requirements of the Work Plan and SOP-1, and have signed the worker's statement for this process. If necessary, I will conduct an annual review of the Work Plan and SOP-1. If deviations from this SOP-1 are necessary, I will ensure that project activities are stopped until the SOP-1 is revised and approved. If unexpected safety, health, or environmental hazards are found, I will ensure that project activities are stopped until the hazards have been eliminated.

SUPERVISOR'S NAME	SIGNATURE/DATE

ATTACHMENT 2
FIELD TEAM REVIEW SHEET

ATTACHMENT 2
FIELD TEAM REVIEW SHEET

Each field team member shall sign this section after site-specific training is completed and before being permitted to work on-site.

I have read the Project Work Plan and Standard Operating Procedure 1 (SOP-1) for MEC/UXO Disposal Disposition and I have received the hazard control briefing. I understand them. I will follow the Work Plan and SOP-1 unless I identify a hazard not addressed in it or encounter an operation I do not understand. If that occurs, I will stop site activities and notify my immediate supervisor of the problem.

WORKER'S NAME	SIGNATURE/ DATE	SUPERVISOR'S NAME	SIGNATURE/ DATE

ATTACHMENT 3
DAILY
EQUIPMENT CHECKLIST

ATTACHMENT 3
DAILY EQUIPMENT CHECKLIST

Date: _____

Disposal Supervisor: _____

Equipment	Quantity	Comments
Explosive vehicle	3	
Personnel vehicle	1	
Camcorder/digital camera	1	
Air horn	4	
Bravo Flag (Red)	2	
Hand-held radios	2	
Ruler, 24-inch	1	
Schonstedt locator	1	
Shovel, round point, long handle	3	
Shovel, round point, short handle	1	
Tape, duct	6	
Tape, measuring, 50- or 100-meter	3	
Tape, plastic	6	
Toolbox, general hand tools	1	
Knife	1	

ATTACHMENT 4
DAILY HEALTH AND SAFETY
EQUIPMENT CHECKLIST

ATTACHMENT 4

**DAILY HEALTH AND SAFETY EQUIPMENT CHECKLIST
(As Required)**

Date: _____

Disposal Supervisor: _____

Equipment	Quantity	Comments
Air horn, emergency	1	
Booties, rubber slip-on (1 pair per person)	1	
Burn gel	2	
Burn kit	1	
Compress, 18 x 36 inches	2	
Compress, 8 x 10 inches	2	
CPR kit	1	
Decontamination sprayer	2	
Emergency eye wash	1	
Eye wash, 15-minute	1	
Fire blanket	1	
Fire extinguisher, 10-pound	1	
First aid kit, 10-person	1	
Gauze pads, 3 x 3 inches	12	
Gloves, latex	12	
Gloves, leather	12	
Gloves, nitrile	5	
Goggles	5	
Hard hat	5	
Radios, hand-held	3	
Rain suit	5	
Safety vest	5	
Stretcher	1	
Tape	6	
Triangular bandages	6	
Voltage detector	1	
Water, 5-gallon bottle (emergency shower)	2	
Water, drinking 1 liter per person	6	

ATTACHMENT 5
UXO ACQUISITION
AND ACCOUNTABILITY LOG

ATTACHMENT 5

UXO ACQUISITION AND ACCOUNTABILITY LOG

Delivery Order No.: _____

Report No.: _____

UXO TEAM: _____

Date: _____

ACQUISITION DATA

Grid Number	
Ordnance length (inches)	
Ordnance diameter (inches)	
Weight (lbs/oz)	
Ordnance type (bomb, rocket, projectile, hand grenade, mortar, rifle grenade, pyrotechnics, small arms, and so forth)	
Photo roll number/disk number	
Photo exposure number/digital file number	
Video marker – Start	
Video marker – Stop	
Ordnance description	

UXO DISPOSITION

SAFE HOLDING AREA	DATE	INITIAL	TRANSFERRED TO	DATE	SIGNATURE

DESTROYED BY	DATE	SIGNATURE

Comments: _____

Senior UXO Supervisor _____

ATTACHMENT 6
ORDNANCE ACCOUNTABILITY INVENTORY

ATTACHMENT 7

MOTOR VEHICLE INSPECTION FORM

Attachment 7
Motor Vehicle Inspection Form
 (Transporting Hazardous Materials)

Motor Vehicle Inspection Form (Transporting Hazardous Materials)			
Section 1 - Documentation	Comments		
Carrier/Organization			
Date/Time of Inspection			
Location of Inspection			
Operator(s) name(s)			
Section II – Mechanical Inspection			
<i>All items will be checked on empty equipment prior to loading. Parts will be inspected to ensure they function properly and are in good repair.</i>			
Part Inspected	Sat	Unsat	Comments
1. Spare Electrical Fuses			
2. Horn Operative			
3. Steering System			
4. Windshield/Wipers			
5. Mirrors			
6. Placards			
7. Fire Extinguisher*			
8. Electrical Wiring			
9. Lights and Reflectors			
10. Exhaust System			
11. Brake System			
12. Suspension			
13. Cargo Bed			
14. Tires, Wheels, Rims			
15. Tailgate			
16. Tarpaulin*			
17. Safety equipment*			
18. Warning equipment*			
<i>1. Fire Extinguisher. One serviceable extinguisher with Underwriters Laboratory rating of 10 BC or more. Must be located so it is readily accessible and securely mounted on vehicle. Extinguisher must be designed, constructed and maintained to permit visual determination of whether it is fully charged.</i> <i>16. Tarpaulin. For use in inclement weather.</i> <i>17. Safety Equipment. Cellular phone, 2-way radios, first aid kit, tool box, tow rope</i> <i>18. Warning Equipment. Three emergency triangles, barricade tape</i>			
Remarks			
Inspector Signature			