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FINAL LIMITED MUNITIONS AND EXPLOSIVES OF CONCERN SURFACE CLEARANCE
WORK PLAN NOMANS LAND ISLAND NAS SOUTH WEYMOUTH MA
08/01/2014
TETRA TECH EC INC

**DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND, ATLANTIC
REMEDIAL ACTION CONTRACT (RAC)
CONTRACT NO. N62470-13-D-8007
CONTRACT TASK ORDER NO. WE05**

**FINAL
LIMITED MUNITIONS AND EXPLOSIVES OF CONCERN
SURFACE CLEARANCE WORK PLAN
NOMANS LAND ISLAND
CHILMARK, MASSACHUSETTS**

August 2014

Prepared for



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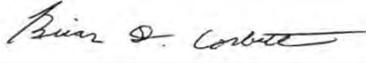
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**LIMITED MUNITIONS AND EXPLOSIVES OF CONCERN
SURFACE CLEARANCE WORK PLAN
NOMANS LAND ISLAND
Chilmark, Massachusetts
RTN #4-13390**

July 2014

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ABBREVIATIONS AND ACRONYMS

AHA	Activity Hazard Analyses
APP	Accident Prevention Plan
Base Camp	base of operations
BIP	blow-in-place
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIH	Certified Industrial Hygienist
CQC	Contractor Quality Control
CRL	Corporate Reference Library
CTO	Contract Task Order
DDESB	Department of Defense Explosives Safety Board
DMM	discarded military munitions
DOD	Department of Defense
EMR	electromagnetic radiation
EOD	Explosive Ordnance Disposal
ESRP	Explosives Safety Remediation Plan
ESS	Explosives Safety Submission
EZ	exclusion zone
FCR	Field Change Requests
GIS	Geographic Information System
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations
ID	Identification
IVS	Instrument Verification Strip
MassDEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
MDAH	Material Document as Hazardous
MDAS	material documented as safe
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazard
Navy	U.S. Navy
NSWC, IHEODTD	Naval Surface Warfare Center Indian Head, Explosive Ordnance Disposal Technology Division
NAVFAC	Naval Facilities Engineering Command
NCR	Nonconformance Report
Operators	Equipment Operators
PESM	Program Environmental and Safety Manager
PM	Project Manager
PPE	personal protective equipment

QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QCM	Quality Control Manager
QCPM	Quality Control Program Manager
RAC	Remedial Action Contract
RAM	release abatement measure
RPM	Remedial Project Manager
SHSS	Site Health and Safety Specialist
SOP	Standard Operating Procedures
SUXOS	Senior UXO Supervisor
TP	Technical Paper
TtEC	Tetra Tech EC, Inc.
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Supervisor
UXOSO	UXO Safety Officer
WP	Work Plan

1.0 INTRODUCTION

The Department of the Navy, Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic Division has contracted with Tetra Tech EC, Inc. (TtEC) to perform a limited surface clearance for munitions and explosives of concern (MEC) on Nomans Land Island (site or island), Chilmark, Massachusetts (see Figure 1-1). This project will be conducted under Remedial Action Contract (RAC) VI No. N62470-13-D-8007 Contract Task Order (CTO) No. WE05.

1.1 Purpose and Objectives

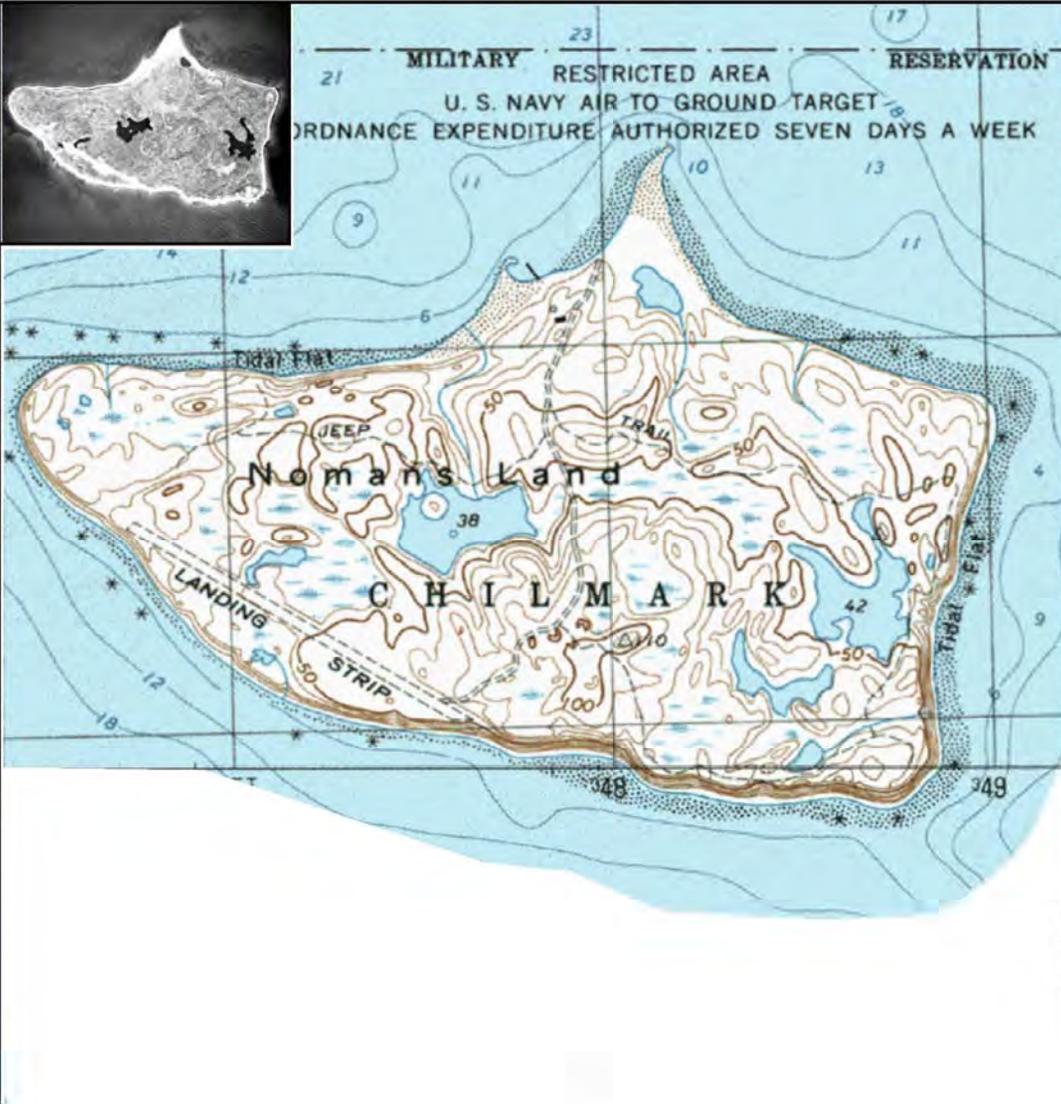
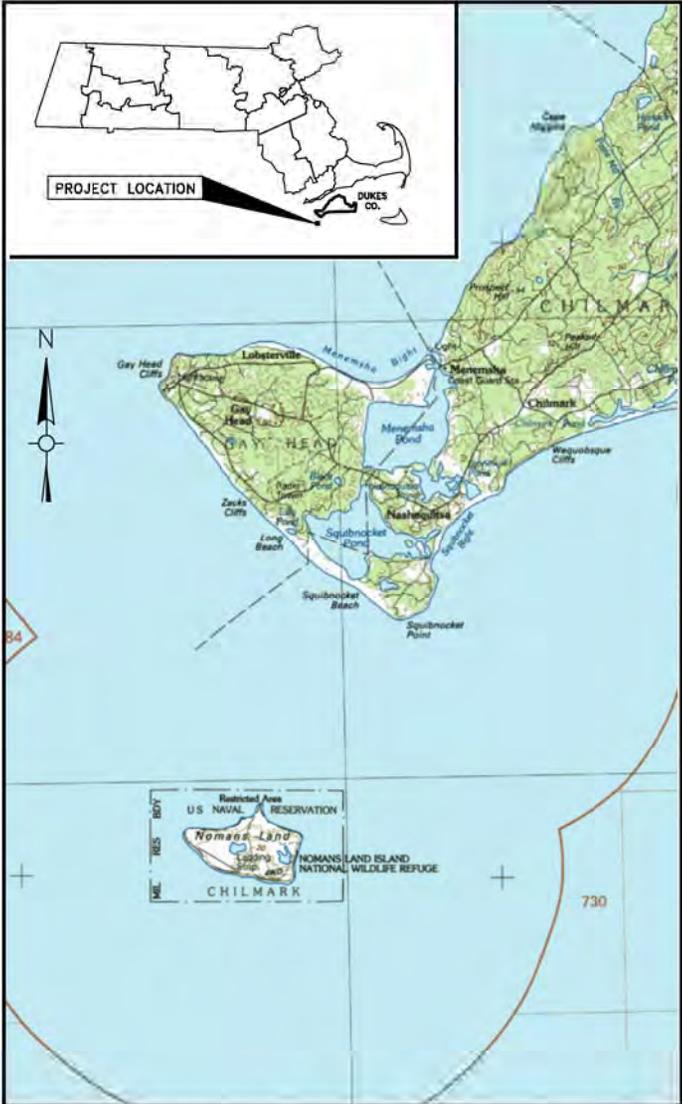
This Limited MEC Surface Clearance Work Plan (WP) provides procedures to systematically locate, inspect, remove and destroy all MEC, material potentially presenting an explosive hazard (MPPEH), and other munitions related debris identified as on the surface of, or protruding from, the surface of Nomans Land Island, as applicable. The objective of this action is to reduce the risk of exposure to MEC to U.S. Fish and Wildlife Service (USFWS) personnel, authorized visitors, and potential trespassers accessing the island.

1.2 MPPEH and MEC

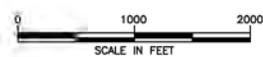
MPPEH (material that, prior to determination of its explosives safety status, potentially contains explosives or munitions [e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris]; or potentially contains a high enough concentration of explosives such that the material presents an explosive hazard [e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations) requires a dual inspection process performed IAW DODI 4140.62. The process certifies and verifies MPPEH as either material documented as safe (MDAS) or if the item cannot be certified and verified as MDAS, it will remain MPPEH and stored/treated with the MEC. Once material is determined to be MDAS, it need not be managed as explosive and is, from an explosives safety perspective, acceptable for transfer or release from Department of Defense (DOD) control without specific explosives safety management requirements. Excluded from MPPEH are MEC items (derived from military munitions) in one of two categories, unexploded ordnance (UXO) or discarded military munitions (DMM).

1.3 Regulatory Statute, Phase and Oversight

Response actions at Nomans Land Island are conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and in compliance with the substantive requirements of the Massachusetts Contingency Plan (MCP). The current action is being conducted as a maintenance action to address MEC or MPPEH that may have surfaced since the previous removal actions conducted in 1998, 2003, and 2008, respectively. The Massachusetts Department of Environmental Protection (MassDEP) listed Nomans Land Island as a site in a Notice of Responsibility on September 26, 1997, because of the potential release of hazardous materials due to the historical use of the island as an air-to-surface target range by the DOD. A 1998 surface clearance was conducted pursuant to the MCP in 310 CMR 40.0440,



Source: USGS 7.5 Minute Series Topographic Map: Squibnocket, MA 1972, photoinspected 1977, and 30 X 60 Minute Series Map: Martha's Vineyard, MA, 1994. Digital base courtesy of Maptech, Inc, Greenland, Maine.



TITLE: SITE LOCATION MAP PROJECT: NOMAN'S LAND ISLAND, CHILMARK, MASSACHUSETTS	
PREP BY: _____ DATE: _____ REV. DESCRIPTION: _____	APPROVED BY: _____ DATE: _____ TITLE: _____
SHEET 1 OF 1 FIGURE 1-1	

Release Abatement Measure (RAM), and the RAM Plan approved by MassDEP on May 20, 1998.

The Explosives Safety Remediation Plan (ESRP) for Nomans Land Island (Radian International LLC 1997) that was approved by the DOD Explosives Safety Board (DDESB) for the 1998 clearance effort required:

- Explosive Ordnance Disposal (EOD) response if USFWS personnel encountered surface munitions while visiting the island;
- Signage posted around the island warning potential trespassers of the potential dangers;
- Development of educational UXO brochures to be handed out to island visitors; and
- Recurring sweeps of the island approximately every 5 years.

This project is a recurring island sweep in compliance with the ESRP.

2.0 SITE CONDITIONS AND BACKGROUND

With the exception of the easternmost portion of the island, the remaining area on Nomans Land Island is considered to be a munitions response site, because munitions could potentially be present anywhere on the island. Description and background of Nomans Land Island, as well as previous investigations and the MEC/MPPEH risk, are described in this section.

2.1 Site Description

Nomans Land Island is situated off the east coast of the United States, approximately 2.7 miles south of Martha's Vineyard Island in Massachusetts. The 628-acre island is surrounded on three sides by wave-cut bluffs and narrow beaches, and a gently-sloping sand and pebble beach on the north. East to west, the island is 1.6 miles long, and slightly more than 1.0 mile wide, north to south. The island is heavily vegetated and dominated by rolling hills. Nomans Land Island was transferred from the U.S. Navy (Navy) to the USFWS in July 1998 and was designated an unmanned wildlife refuge. Figure 1-1 provides a site location map of Nomans Land Island that shows its location relative to the Commonwealth of Massachusetts and Martha's Vineyard Island.

2.2 History of Munitions Use on Nomans Land Island

The U.S. Government used the island as a target range to train pilots between 1943 and 1996. Prior to 1943, the island was utilized for various purposes, including fishing and game hunting, and at one time a small population of people occupied a small portion of the island. No civilians have lived on the island since 1943. The military has designated the island as Restricted Area R-4105. Because the island was used as an active military target range, civilians were not permitted to visit the island without a military escort. The Navy began leasing the island in November 1943 for use as a practice bombing site. At the conclusion of World War II, the island contained large numbers of MEC and craters. The Navy retained control of the island and continued training exercises substituting inert dummy munitions for the live munitions used during the war. The

Navy purchased the island in 1952. The island's use as a bombing and gunnery range continued until May 31, 1996.

2.3 Known or Suspect MEC and MPPEH

Upon completion of a controlled burn to remove the dense vegetation that covered nearly the entire island, a surface clearance was completed by TtEC (formerly Foster Wheeler Environmental) in 1998. The munitions items recovered during that effort included bombs (Old Style 250 lb, Mk 81, 82, and 83), rockets (2.25-inch, 2.75-inch, and 5-inch Zuni), practice bombs, and fuzes. Follow-on surface clearances were also conducted in 2003 and 2008, respectively, with the same general munitions types encountered.

2.4 Previous Investigations

There have been several previous studies to determine the nature and extent of MEC contamination on Nomans Land Island, specifically:

- *Nomans Land Island Clearance Post OP Report*. 1997. Explosive Ordnance Disposal Mobile Unit TWO Detachment Newport. 22 May.
- *Survey Report for the Radiological Screening Survey on Nomans Land Island*. 1998. Inter-Link Group Ltd. and Duke Engineering & Services Environmental Laboratory. July 2.
- *Report on Airborne Geophysical Survey of Nomans Land Island, Massachusetts*. 2002. Oak Ridge National Laboratory. March.
- *Supplemental Environmental Baseline Survey*. 2003. Tetra Tech FW. December 3.
- *Release Abatement Measure Completion Report (Ordnance Debris Removal), Nomans Land Island*. 2004. Tetra Tech FW. May 14.
- *After Action Report, Nomans Land Island, Chilmark, Massachusetts*. 2004. Engineering Field Activity Northwest, Poulsbo, Washington and Engineering Field Activity Northeast, Philadelphia, Pennsylvania. August.
- *Draft Phase IIA Comprehensive Site Assessment, Supplemental Investigation, Risk to the Environment Report*. 2004. Tetra Tech FW. September.
- *Munitions and Explosives of Concern Surface Clearance Completion Report*. 2009. Tetra Tech EC. March.
- *After Action Report Munitions and Explosives of Concern Surface Clearance*, 2009. Tetra Tech EC. March.

3.0 PROJECT MANAGEMENT

The project management team will be responsible for all technical and administrative aspects of the limited MEC surface clearance. Included among the team's responsibilities are the project schedule, staffing, data management, document control, project meetings, and reporting.

3.1 Project Organization and Personnel

The project organization consists of Navy and TtEC personnel who will conduct technical and administrative functions to ensure effective execution of the different tasks. A description of

these key personnel and their responsibilities are provided below. Table 3-1 provides a list of contact names and telephone numbers for Navy, TtEC, and other key personnel involved in this project.

Table 3-1. Key Personnel

Name	Location/Role	Telephone
Brian Helland	Navy/RPM	218-897-4912
Dave Barney	Navy/BRAC Coordinator	617-753-4656
Officer-in-Charge	Navy EOD Mobile Unit 2, Detachment Newport	401-832-3301
Stephanie Koch	USFWS/PM	978-443-4661 ext. 24
David Crossley	TtEC Site/SUXOS	425-241-0480/253- 382-9930
Buster Stancil	TtEC Site/UXOQCS/UXOSO	808-203-8862
Brian Corbett	TtEC Boston/PM	617-443-7517
David Keller	TtEC/UXO Program Environmental and Safety Manager (PESM)	425-482-7749
Roger Margotto	TtEC/Environmental PESM	619-471-3503
Mark Dollar	TtEC/UXOQC Lead	970-206-4263
Alan Sherman	Tt/Regulatory Specialist	973-630-8420
Tim Carrol	Chilmark/Selectman	508-645-2101
Bob Campbell	MassDEP/PM	617-292-5732
Senior Chief Barr	Menemsha Coast Guard	508-645-2662
Dennis Jason	Menemsha Harbormaster	508-645-2846 (summer) 508-645-2100 ext. 2846

Note: TBD – to be determined

The Navy Remedial Project Manager (RPM) for this project is Mr. Brian Helland who is responsible for managing the project, monitoring the budget, maintaining the schedule, coordinating field activities, and ensuring operations conducted on the site are in compliance with regulatory requirements.

The key TtEC personnel involved in the performance of this CTO include the Project Manager (PM), Senior UXO Supervisor (SUXOS), Quality Control (QC) Program Manager (QCPM), UXO Safety Officer (UXOSO)/UXO Quality Control Supervisor (UXOQCS), and UXO Technicians. In addition to these individuals, the project will be supported by a multi-disciplinary team of specialists who will lead or coordinate the various project subtasks, as required, under the direction of the PM.

3.1.1 Project Manager

The PM will be the main point of contact with the Navy for all project-related matters, and will be responsible for the overall conduct and performance of the project. The TtEC PM will interface directly with the Navy RPM. The PM is primarily responsible for the development and implementation of the Work Plan, which includes coordination among the task leads and support staff, acquisition of engineering or specialized technical support, submitting Field Change Requests (FCR) when necessary and all other aspects of the day-to-day activities associated with the project. The PM 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.

3.1.2 Senior UXO Supervisor

The SUXOS is responsible for effective execution of the field activities in accordance with the proposed plan and the regulatory requirements. The SUXOS will act as the Site Superintendent. The SUXOS, with the support of TtEC's Site Health and Safety Specialist (SHSS), is responsible for the health and safety of field personnel. Other responsibilities include, but are not limited to, project planning; scheduling; site documentation; regulatory compliance; preparing FCRs; personnel assignments; customer and subcontractor relations; enforcing health and safety rules and Accident Prevention Plan (APP) requirements; and conducting routine safety inspections and incident investigations. The SUXOS reports directly to the PM.

The SUXOS will be directly responsible for all aspects of explosive safety for the project. 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. The SUXOS is also responsible for executing instructions received from the TtEC PM, the Navy RPM, documenting site conditions, photographing UXO identification operations, preparing all project reports, and identifying any effort required to accomplish the scope of work.

3.1.3 UXO Safety Officer

The UXOSO (the same individual will fill the UXOQCS role) is UXO-qualified, and is responsible for implementing the APP, on-site training requirements, and recommending changes to level of personal protective equipment (PPE) to the Certified Industrial Hygienist (CIH) as site conditions warrant. The UXOSO has stop work authority for safety conditions. The UXOSO evaluates and analyzes any potential safety problems, implements safety-related corrective actions, and maintains a daily safety log.

3.1.4 UXO Quality Control Supervisor

The UXOQCS is responsible for overall management of Project QC and reports to the Quality Control Manager (QCM). The UXOQCS will be on site at all times during work activities. The UXOQCS has the authority to stop work on site-related issues affecting the quality of work

performed and for directing the correction of all nonconforming work. The UXOQCS will be on site at all times during field activities.

The UXOQCS will be responsible for QC activity related to all MPPEH and MPPEH-related work. The UXOSO will perform the duties of the UXOQCS for this project. The duties of UXOQCS include the following:

- Providing and maintaining an effective QC system for all MPPEH-related field activities;
- Monitoring MPPEH-related QC activities to ensure conformance with the Work Plan, authorized policies, procedures, contract specifications, and sound practices;
- Maintaining sufficient staff to perform all MPPEH-related QC activities to ensure QC for all work phases, work shifts, and work crews;
- Ensuring that the three phases of inspection (preparatory, initial, and follow-up) are implemented for all work related to UXO definable features of work found in the Quality Assurance Project Plan (QAPP);
- Ensuring that all required tests and inspections are performed and results reported;
- Taking responsibility for issuance and enforcement of any Nonconformance Report (NCR);
- Providing surveillance of MPPEH-related activities;
- Attending required meetings, including the pre-construction conference, all weekly QC meetings, and other scheduled meetings, as required;
- Preparing the daily Contractor Quality Control (CQC) reports;
- Performing reviews of audits and surveillance reports;
- Implementing the Navy technical directives relating to quality; and
- Discontinuing work that is not in compliance with the contract.

The UXOQCS, in conjunction with the SUXOS, will conduct an initial briefing for all project personnel that will include a review of all the plans, the QC goals and processes, and general safety. A part of the briefing will include a functionality check of metal detectors, cameras, and communications equipment, which are the primary instruments that will be used during the course of planned work.

The UXOQCS will conduct periodic quality-related briefings during the morning safety meeting. Suggested topics include, but are not limited to, results from QC activities such as surveillance, inspections, process improvements, changes to procedures, and approved FCRs.

3.1.5 UXO Technicians

The UXO Technicians will perform on-site duties, including locating and identifying MEC/MPPEH, equipment operation, MEC safety, anomaly avoidance, and escort duties, as required. The UXO Technicians report to the SUXOS. UXO Technicians will be familiar with the work plan and carry out assignments given by the team leader and/or SUXOS. The UXO Technicians will be capable of performing the functions in DDESB Technical Paper (TP) 18.

Non-intrusive MEC search activities will require one four-person team, consisting of a UXO Tech III as the team leader, and additional UXO Technicians that are a combination of UXO Techs I, II, and III, as appropriate. The SUXOS can also assist the sweep team as field conditions allow.

3.1.6 Field Data Manager

One UXO Technician will be responsible for the collection and management of the data generated resulting from project activities. This individual will perform the following activities:

- Lay out survey grid or stakes along the road and shoreline (if applicable);
- Photograph documentation;
- Survey the location of MEC or MPPEH that is encountered with the Field Geographic Information System (GIS)/Global Positioning System (GPS);
- Collect attribute data (i.e., munitions type, orientation, condition, etc.) with the Field GIS/GPS; and
- Manage these data.

3.1.7 Equipment Operators

Equipment Operators (Operators) will be familiar with the work plan, carry out assignments given by the SUXOS, team leaders, or UXO Technicians, as appropriate. Using heavy equipment, they will extract partially buried inert practice bombs (by pulling with slings/cables or other), pick up, and move munitions items and debris that have been documented in writing by the SUXOS and UXOSO as MDAS. They will perform daily equipment checks and ensure their equipment is in good working order prior to conducting operations. All slings and lifting equipment will be properly inspected and certified. They will contact the SUXOS when maintenance on their equipment is due.

3.2 Project Schedule

The project schedule is shown in Figure 3-1.

3.3 Project Communications and Reporting

The TtEC PM will work in close communication with the Navy RPM to keep him informed of any technical or administrative issues that may impact the project schedule or budget, and to ensure that all of the Navy's project requirements are met. Any communication that has the potential to impact the project scope of work, schedule, or budget will be confirmed via written correspondence between the PM and the RPM.

Activity ID	Activity Name	Original Duration	Activity % Complete	Start	Finish	2014												2015	2016
						Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1			
CTO WE05 Nomans Land Island MEC Surface Clearance, Chilmark, MA																			
Contract Award																			
A1000	Contract Award	0	100%	19-Jul-13 A		◆ Contract Award													
Period of Performance																			
A1010	Period of Performance Start	0	100%	19-Jul-13 A		◆ Period of Performance Start													
A1020	Period of Performance End	0	0%		30-Jun-15													◆ Period of Performance End	
Milestones																			
A1530	ESS	0	100%		10-Jul-14 A													◆ ESS	
A1540	Work Plan	0	0%		15-Aug-14													◆ Work Plan	
A1550	Fieldwork Start	0	0%	25-Aug-14														◆ Fieldwork Start	
A1560	Fieldwork Complete	0	0%		08-Oct-14													◆ Fieldwork Complete	
A1570	After-Action Report	0	0%		18-Sep-15													◆ After-Action Report	
A1580	Completion Report	0	0%		18-Sep-15													◆ Completion Report	
A1590	CTO Closeout	0	0%		19-Oct-15													◆ CTO Closeout	
Work Element 1 - Project Management and Administrative Support																			
Work Element 2 - Preconstruction Activities																			
Work Plan																			
A1030	Prepare and Submit Draft Work Plan to Navy	12	100%	25-Apr-14 A	24-Jul-14 A	■ Prepare and Submit Draft Work Plan to Navy													
A1040	Navy Review of Draft Work Plan	11	0%	25-Jul-14	08-Aug-14	■ Navy Review of Draft Work Plan													
A1050	Respond to Navy Comments on Draft Work Plan	5	0%	11-Aug-14	15-Aug-14	■ Respond to Navy Comments on Draft Work Plan													
A1090	Submit Final Work Plan to Regulators and Navy	1	0%	15-Aug-14	15-Aug-14	■ Submit Final Work Plan to Regulators and Navy													
A1420	Approval of Final Work Plan	1	0%	15-Aug-14	15-Aug-14	■ Approval of Final Work Plan													
ESS																			
A1430	Submit Draft ESS to NOSSA	1	100%	24-Jan-14 A	24-Jan-14 A	■ Submit Draft ESS to NOSSA													
A1440	NOSSA Review of Draft ESS	26	100%	27-Jan-14 A	16-Jun-14 A	■ NOSSA Review of Draft ESS													
A1450	Respond to NOSSA Comments on Draft ESS (Rev 2)	5	100%	17-Jun-14 A	27-Jun-14 A	■ Respond to NOSSA Comments on Draft ESS (Rev 2)													
A1460	Submit Draft Final ESS Plan to NOSSA	1	100%	27-Jun-14 A	27-Jun-14 A	■ Submit Draft Final ESS Plan to NOSSA													
A1500	Approval of Final ESS	8	100%	30-Jun-14 A	10-Jul-14 A	■ Approval of Final ESS													

Primary Baseline
 Remaining Work
 ◆ Baseline Milestone
 ◆ Milestone
 Actual Work
 Critical Remaining Work



Activity ID	Activity Name	Original Duration	Activity % Complete	Start	Finish	2013				2014				2015				2016
						Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1		
Project Meetings		228		18-Oct-13 A	15-Sep-14													
A1100	Project Meeting 1	1	100%	18-Oct-13 A	18-Oct-13 A													
A1120	TRC Meeting	1	0%	18-Aug-14	18-Aug-14													
A1110	Project Meeting 2	1	0%	15-Sep-14	15-Sep-14													
Work Element 3 - Mobilization and Setup		7		25-Aug-14	03-Sep-14													
A1130	Mobilization 1 - Mobilization of Site Equipment/ Materials to Site	7	0%	25-Aug-14	03-Sep-14													
A1140	Mobilization 2 - Installation of Temporary Pier/ Float System	7	0%	25-Aug-14	03-Sep-14													
A1150	Mobilization 3 - Mobilization of Personnel to MV/ Project Training	7	0%	25-Aug-14	03-Sep-14													
A1160	Mobilization 4 - Mobilization of Personnel to Site/ Staging Area Setup	7	0%	25-Aug-14	03-Sep-14													
Work Element 4 - Fieldwork - Limited MEC Surface Clearance		17		04-Sep-14	26-Sep-14													
A1170	Surface Clearance - Accessible Shoreline	17	0%	04-Sep-14	26-Sep-14													
A1180	Surface Clearance - Accessible Roads	4	0%	04-Sep-14	09-Sep-14													
A1210	Demolition Operation MMPEH	4	0%	10-Sep-14	15-Sep-14													
A1220	MDAS Certification	1	0%	16-Sep-14	16-Sep-14													
Work Element 5 - Transportation and Disposal of MEC Scrap		4		16-Sep-14	19-Sep-14													
A1230	Phase 1 - Off Site Transportation	1	0%	16-Sep-14	16-Sep-14													
A1240	Phase 2 - MDAS Processing	2	0%	17-Sep-14	18-Sep-14													
A1250	Phase 3 - Transport and Dispose of MDAS	1	0%	19-Sep-14	19-Sep-14													
Work Element 6 - Site Restoration		6		22-Sep-14	29-Sep-14													
A1260	Site Restoration	6	0%	22-Sep-14	29-Sep-14													
Work Element 7 - Demobilization		7		30-Sep-14	08-Oct-14													
A1270	Demobilization 1 - Demobilization of Equipment/ Materials from Site	7	0%	30-Sep-14	08-Oct-14													
A1480	Demobilization 2 - Removal of Temporary Pier/ Float System	7	0%	30-Sep-14	08-Oct-14													
A1490	Demobilization 3 - Demobilization of Personnel from Site	7	0%	30-Sep-14	08-Oct-14													
A1510	Demobilization 4 - Demobilization of Equipment/ Materials from MV	7	0%	30-Sep-14	08-Oct-14													
A1520	Demobilization 5 - Demobilization of Personnel from MV	7	0%	30-Sep-14	08-Oct-14													
Work Element 8 - Post Construction Deliverables		82		26-May-15	18-Sep-15													
Completion Report		82		26-May-15	18-Sep-15													

Primary Baseline
 Remaining Work
 Baseline Milestone
 Actual Work
 Critical Remaining Work
 Milestone



3.3.1 Progress Reports

TtEC will provide monthly progress reports to the Navy for the CTO. These reports will document activities completed during the previous month, activities in progress, and activities scheduled for the upcoming month. Work breakdown structure, cost account, and manpower spread reports will also be included in the monthly progress report. These reports will reveal any actual or potential variances in the project schedule or budget. The monthly progress report will also discuss what actions, if any, will be needed to correct such variations.

3.3.2 Contractor Quality Control Report

The UXOQCS is responsible for the maintenance of current records of QC operations, activities, and tests performed, including the work of subcontractors and suppliers. The records will include factual evidence that required QC activities and tests were performed. The daily QC Report will be completed to document site activities covered by the project QC procedures (Section 10.0) and will include the following (as applicable):

- Record inspection and/or testing performed;
- Identification and location of each defined feature of work and its current phase (preparatory, initial, follow-up) of completion;
- Results of inspections/testing;
- Location and description of deficiencies;
- Deficiencies corrected as of the date of the report;
- Rework items;
- Deviations from plans, difficulties, and resolution;
- Test and/or control activities performed with results and references to specifications/plan requirements, including the control phase (preparatory, initial, and follow-up) and deficiencies (along with corrective action);
- Material received, with statement as to its acceptability and storage;
- Submittals reviewed with contract reference, by whom, and action taken;
- Number and location of recovered MEC/MPPEH and number of items destroyed; and
- Off-site surveillance activities, including actions taken.

The records will indicate a description of both conforming and nonconforming features covered with a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The daily QC Report attached to the Daily Contractor Production Report will be furnished to the Navy on the first workday following the date covered by the report, except the report need not be submitted for days during which no work is performed. At a minimum, one report will be prepared and submitted for every seven days of no work and on the last day of a no-work period. All calendar days will be accounted for throughout the life of the contract. The first report following a day of no work will summarize work for that day only. The report will be signed and dated by the UXOQCS. The report will include copies of test reports, if applicable.

3.3.3 Contractor Production Report

The Daily Contractor Production Report will be prepared for each day work is performed and will be attached to the Daily QC Report (as applicable) prepared for the same day. The Contractor Production Report will be prepared, signed, and dated by the SUXOS and will contain the following information:

- Contractor and subcontractor and their area of responsibility;
- Location and description of work performed;
- Trades working on the project that day and number of personnel;
- Operating equipment, with hours worked, idle, or down for repair;
- Work performed that day giving location, description, weather conditions, and by whom work was done;
- Any delays encountered;
- Site visitors/purpose;
- Job safety evaluations stating what was checked, results, and instructions or corrective actions;
- A list of instructions given/received and conflicts in plans and/or specifications; and
- Contractor's verification statement.

3.3.4 Project Completion Report

Upon completion of work activities, TtEC will prepare a Project Completion Report which will include the following:

- Work performed (chronology);
- Summary of MEC/MPPEH encountered;
- Deviations from work plan; and
- Waste documentation.

3.4 Training

All UXO personnel will meet the training requirements established in DDESB TP 18 and will have successfully completed a 40-hour Hazardous Waste Operations (HAZWOPER) training, in accordance with 29 CFR 1910.120, and within the previous 12 months, must have completed an 8-hour HAZWOPER refresher training, as applicable.

3.4.1 UXO Procedural Training

UXO Personnel will have on-site training covering the munitions sweep and recovery procedures (see Section 4.9) that will be used on the island, as well as the explosives, equipment and procedures that will be used to detonate or perforate suspect munitions.

3.4.2 Site-Specific Orientation

All personnel assigned to the project will attend a site-specific orientation. The purpose of this training will be to review site-specific, communications and emergency response procedures. Course attendance sheets will be used to document completion of each training session. Daily tailgate site briefings covering specific health and safety issues, UXO safety precautions, sweep and recovery procedures used for that day’s operations, and emergency procedures will also be held. A copy of the updated Tetra Tech Project Rules Handbook will be provided to the staff. Staff will be required to read the entire handbook and document their training and acceptance. This handbook is included in Appendix A.

4.0 PROJECT EXECUTION

This section describes the specific activities and procedures involved in preparation for, and field implementation of, the planned limited MEC surface clearance activities on Nomans Land Island. The planned activities include pre-inspection preparation, subcontracting and procurement, notifications, a kick-off meeting, mobilization, a surface sweep of the accessible road system and shoreline, the detonation of all suspect MEC and MDEH materials and the removal of all collected debris. Pre-construction preparation and subcontracting and procurement will not be discussed.

4.1 Kickoff Meeting

A kickoff meeting will be held between the Navy and TtEC at least one week prior to the start of the field activities on Nomans Land Island. The following personnel will be requested to attend:

Table 4-1. Kickoff Meeting Participants

NAVFAC	TtEC
RPM – Brian Helland	Program Manager – Carl Tippmann
	PM – Brian Corbett
	SUXOS – David Crossley
	UXOSO/QCS – Buster Stancil

The purpose of this meeting will be to develop a mutual understanding of the limited MEC surface clearance activities, the CQC details including forms to be used, administration of on-site work, and coordination of the surface sweep and exclusion zone (EZ) implementation.

4.2 Mobilization

A list of field personnel with health and safety certifications and site vehicle information (proof of current vehicle registration and insurance) will be collected during mobilization and retained in project files. Upon receipt of appropriate records and authorizations, field personnel and equipment will be mobilized to the island. Equipment mobilization will be accomplished with

either a flat bottom boat equipped with a bow ramp (roll-on/roll-off vessel) enabling the safe transfer of personnel and equipment on and off the island or with a barge/boat combination. Daily personnel transport will be either via this same roll-on/roll-off vessel or via a standard crew boat. If a standard crew boat is utilized, a temporary pier/float will be constructed on the island to provide a means of access. Personnel will embark daily at the pier to transit to the island at 0600 and will depart the island to arrive back at the pier by 1800 each work day. During transit all briefings, debriefings, equipment set up, testing and cleanup will be accomplished in order to expedite the work processes once arriving at the island. End of day reports will be made during the transit to the pier in the evening and sent to the PM as soon as internet connection can be made. If communication allows internet access on the site, these activities may occur during the work day.

4.3 Safety Considerations

Safety is the primary concern during the performance of all activities for the project. Personnel engaged in these efforts will adhere to the provisions of the APP. Additional safety guidance pertaining to MEC/MPPEH can be found in TtEC procedure UXO-4 (*General UXO Safety Precautions*), contained in Appendix B, and DOD 4145.26-M, *Contractor's Safety Manual for Ammunition and Explosives* (DOD 2008). The UXOSO will brief all site personnel on the Activity Hazard Analyses (AHAs) attached to the APP and the other aforementioned safety documentation at the initial safety/indoctrination briefing and selected safety topics during morning safety tailgate briefings.

4.4 Status and Monitoring

Status of project activities will occur daily with daily QC and progress reports (see Section 3.3) provided to the PM. Monitoring of the field schedule will be based on the tracking of the daily production rate by the SUXOS. It is estimated that the daily surface clearance production rate will be the following:

- Roads: 161 grids (17 acres) 5 acres/day for a total of 4 days.
- Shoreline: 201 grids (58 acres) 5 acres/day or 16 grids/day for a total of 12 days.

It should be noted that only those areas subject to the clearance (i.e. shoreline, road) within these grids will be cleared and not the entire grid. Additional effort will be necessary to address the known 500LB practice bombs that remain in the intertidal zone surrounding the island. These items have been rendered safe in past efforts and have been left in place due to the difficulty of removing them from hard to access areas and within the tidal zone.

4.5 Communications

Hand-held radios and cellular phones will be the primary source of communications between the TtEC sweep team and safety and management personnel. Emergency telephone numbers and the telephone numbers for critical personnel associated with this project will be included in the APP. A revised list of contact names and telephone numbers will be prepared and distributed to the Navy immediately following site mobilization. Given the recent construction of cellular towers

on Martha's Vineyard, reliable internet connectivity may be possible on the island. An attempt will be made to access the internet for communication and documentation purposes utilizing green (i.e. solar/wind) or small portable generator power. The power supply will also enable communication equipment such as VHF radios and cell phones to be charged throughout the work day.

Electromagnetic radiation (EMR) is produced by hand-held radios and cellular telephones and may cause a detonation hazard with electrically fuzed munitions. EMR precautions will be taken during the inspection activities where MEC with electrical fuzing is encountered. No radios or cellular telephones will be used inside the EZ without prior notification and permission from the SUXOS, except in emergency situations.

4.6 Site Preparation

Upon completion of site mobilization, TtEC will establish the base of operations (base camp) at the location previously utilized during past events. This location is shown on Figure 4-1. Base camp will consist of three 20-foot connex boxes. Outside canopies may also be erected to provide shelter from the sun and in the event of a lightning storm. This area will act as the base of operations for all site activities including field office, meetings, communications, etc.

4.7 Vegetation Clearance

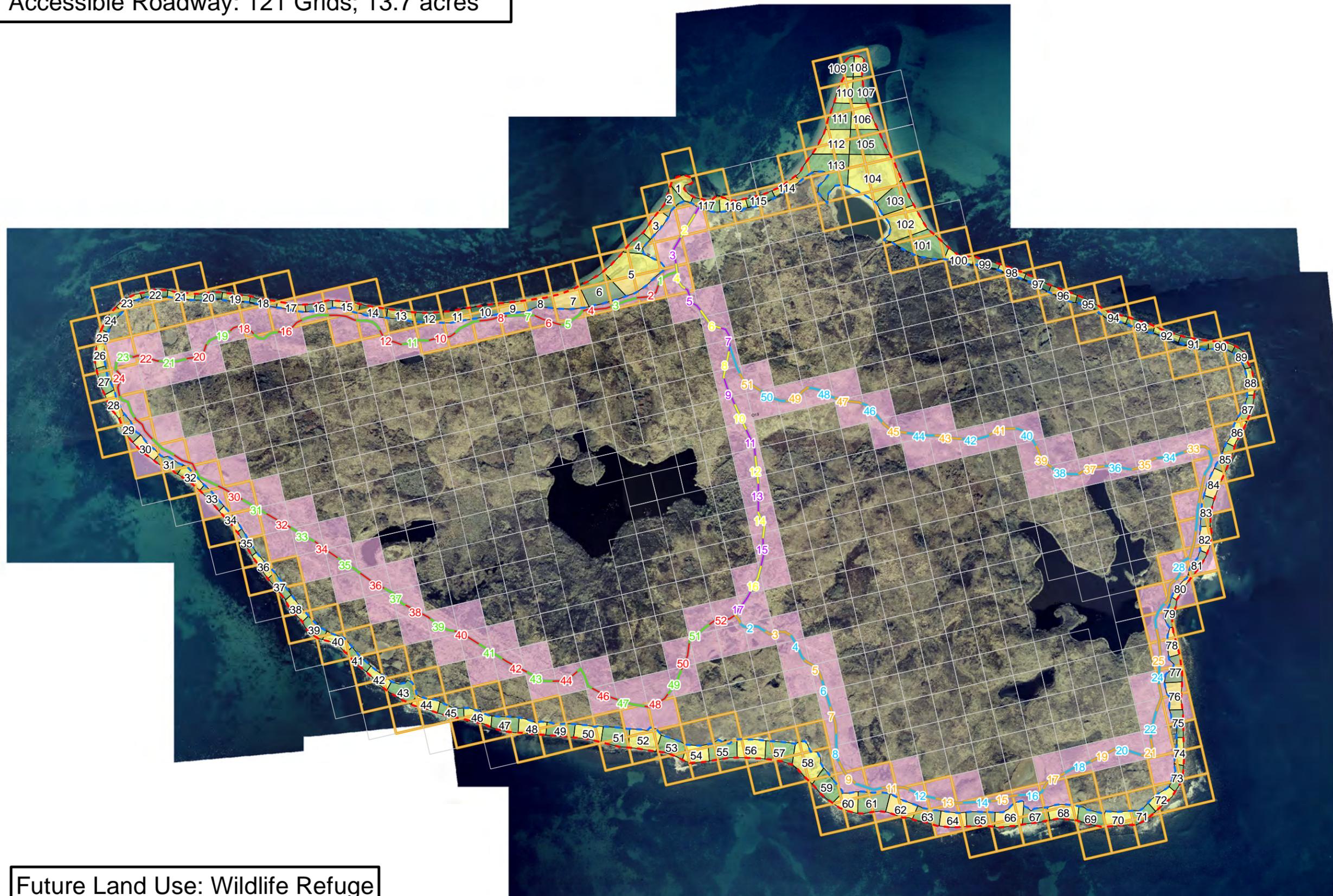
Prior to sweep operations on the accessible road system, vegetation clearance will be necessary. It is expected that a skid-steer (Bobcat or similar) will be mobilized with a mower deck attachment. The UXO team will sweep the area in front of the machine to ensure no MEC/MPPEH is within its path.

4.8 Sweep Area Marking and Documentation

The accessible road system and shoreline area to be cleared will be subdivided into grids along the road and along the shoreline. The grids will be staked/flagged as a visual reference. The shoreline grids will also include a visual survey for MEC/MPPEH of the exposed bluffs for any protruding items as the team is progressing. These items will be evaluated and removed from the cliff if determined safe to do so.

The areas to be cleared are also located within the grid system historically employed on the island which may aid in providing a means of documenting the locations of items found, if necessary. The island had been divided into 200 x 200 feet (60 x 60 meter) grids with sides running along the north-south and east-west axis. The corners of each grid can be accurately located using the field GIS/GPS (sub-meter accuracy). The grids are shown on Figure 4-1, for reference only, to use for planning and for monitoring the progress of the clearance as related to past events. Grids are named using an alphabetic designation for north-south rows, and numeric designation for east-west rows. As the clearance progresses along the roads and shoreline, utilizing the grid approach the historical grid will also be shown on the Field GIS/GPS System. This approach will enable the field team to have the ability to record/document the munitions items encountered by both its new Grid Identification (ID) and historical Grid ID (as applicable).

Accessible Shoreline: 117 Grids; 49.63 acres
 Accessible Roadway: 121 Grids; 13.7 acres



Future Land Use: Wildlife Refuge
 Owner: US Fish and Wildlife

- Central Section Road Grid (200ft)
- East Section Road Grid (200ft)
- West Section Road Grid (200ft)
- Estimated Accessible Shore Area
- Estimated Accessible Road
- Accessible Shore Area Sample Grid
- Road Sample Grid
- Approximate Top of Bluff
- Approximate Low Water Line

Notes:
 1. Metric grid is based on field sketch compiled by Foster Wheeler UXO team and UTM coordinates compiled by GPS methods in June and July, 1998. See CAD file NOMANS09.DWG, entitled "Sampling Locations Plan," Figure 3-1 dated December 1999.
 2. Blank grids represent inaccessible areas (i.e. waterbody, dense brush, etc.).
 3. Grid colors are shown at 65% transparency for ease of viewing.



0 200 400 600 800 Feet

DRAFT: JULY 21, 2014

Figure 4-1
 2014 Limited
 MEC Surface Clearance
 Proposed Plan

Nomans Land Island
 Chilmark, Massachusetts



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Documentation of MEC/MPPEH encountered will also utilize the Field GIS/GPS System. A drop-down menu will be loaded with standard attribute information, such as MEC, MPPEH, grid ID, date, type, condition, on-surface, buried, orientation, disposition, etc. This standardization will aid in keeping track of the munitions related items encountered throughout the field effort, as well as into final disposition. These field data will be downloaded to the field laptop daily and will be backed up in the TtEC Boston office network.

4.9 Clearance Progression

The surface clearance of Nomans Land Island is planned to begin on the road system and then progress to the shoreline as indicated below:

1. accessible road system:
 - begin on the Central Roadway (C) and progress north to south;
 - continue along the Eastern Roadway (E) and progress east and then north; and
 - continue along the Western Roadway (W) and progress west and then south until all roads have been covered.
2. accessible shoreline:
 - begin at the northern shore and continuously progress counterclockwise around the shore of the island (the shoreline/bluff from high tide line to top of bluff).

MEC surface clearance activities will not be performed in upland areas, ponds, or other inaccessible areas. Figure 4-1 depicts the grids (accessible roads and shoreline areas) to be included in the limited MEC surface clearance.

4.10 Search Preparation

The SUXOS will ensure that an instrument-aided visual surface sweep of all staging areas, support zones, work areas, and access roads are conducted prior to using these areas. For coastal areas, sweep teams will conduct clearances from the high-water mark inland, and will search for surface items only. The shoreline sweep will involve walking the shoreline with hand held detectors while also visually scanning the bluff area. An item will be considered to be a surface item if any portion of the item is above the ground surface. All ferrous munitions related items with a maximum dimension greater than 2.0 inches and all nonferrous ordnance components detected visually will be removed.

4.11 Sweep Team Procedures

The Schonstedt Model 52CX ordnance locator (or equivalent) will be used to assist in locating surface objects in areas overgrown with vegetation, such as prior to vegetation clearance of the roadway. No intrusive efforts will be made to remove suspect items entirely below the ground surface.

The SUXOS will assign the sweep team grids (along the accessible roads and shoreline) to search. A map showing all grids with their identification numbers will be used for plotting and

recording the status of clearance activities. Team leaders will record all items found in the assigned grids using grid sheets, an example of which can be found in Appendix C.

UXO Technicians will search each grid using standard detector-aided visual surface clearance procedures. All surface MEC/MPPEH will be identified and removed. Because partially buried MEC/MPPEH items will be also be identified and removed, limited manual digging may be required. No effort will be made to remove suspect munitions items that are buried entirely below the ground surface.

The sweep teams will use the line abreast method, removing and recording all metallic objects located. This method involves team members walking side by side, separated by a distance that does not exceed visual coverage of the adjoining person's field of view, visually scanning the surface terrain. Each sweep team member will use a hand-held detector to assist in finding metallic items. The line will be staggered such that the detectors do not interfere with each other. Traffic cones/stakes/flags (if applicable) will be placed at the ends of the grid to aid the team in walking a straight line (and in understanding where the grid ends), and the person on the end of the sweep line will guide on the traffic cone until the team reaches the edge of the grid, then the traffic cone will be moved over to be used on the next pass. In areas where the traffic cone approach cannot work, each grid will be subdivided with stake and string (or other method, as directed by the SUXOS) into lanes or subgrids to ensure complete coverage. This procedure will be repeated until the entire grid has been searched.

4.12 Marking and Collecting Procedures

When a UXO Technician locates an item, he/she will alert the sweep line leader who will halt the line. The sweep line leader will then examine the discovered item and make an initial determination of the items identification and condition. Inert items will be marked with blue flags, suspect items with yellow flags, and MEC items with red flags, as appropriate. If an item is partially above the surface, it will be marked with an appropriately colored flag for later removal (if applicable). (*Note: the flag colors may vary depending on availability and the SUXOS will ensure all involved personnel are aware of the color designations.*)

Munitions and suspect items that have been documented as acceptable to move will be consolidated in a designated point on the edge of the grid or if small enough will be collected within backpacks for ultimate transport to the MDAS collection point. Large ordnance items that cannot be moved because of their size, and which have been determined by the SUXOS to be inert, will be marked with a blue flag or survey tape and its location and nomenclature will be listed on the grid sheet for later recovery. These items will be removed by heavy equipment after a second UXO Technician has certified the item as MDAS.

4.13 Munitions Processing

All inert munitions items must be capable of venting during recycling procedures; therefore, the SUXOS will determine which items need to be perforated or explosively demilitarized. Items requiring perforation and/or explosive demilitarization will be stacked with MEC/MPPEH that are acceptable to move. Munitions that are not acceptable to move will be detonated in place.

Each item will be identified on the grid sheet by nomenclature and location on the grid. At the end of the day, the UXO team leader will deliver annotated grid sheets to the SUXOS, or his/her designee, for incorporation into the daily log.

MEC (marked with a red flag) will either be treated *in situ* or moved (if determined acceptable to move) to a consolidation point awaiting treatment. Suspect munitions (marked with a yellow flag) will be considered MEC and will be relocated to a consolidation point if determined acceptable to move. No movement of items identified as MEC will be allowed without first being inspected by the UXO team leader and/or SUXO followed by the confirmation of the UXOSO/QCS. MDAS will be picked up from the grids and taken to the processing area where they will be placed into containers (i.e., 55-gallon drums) if small enough in size or laid on the ground surface or on pallets.

4.14 Munitions Recovery

The SUXOS may direct the sweep team (s) to conduct munitions recovery operations, or may establish an independent team of personnel to establish two teams with a UXO Tech II as the team leader. The team assigned to the recovery task will remove small MEC and MPPEH items (marked with red and yellow flags, respectively) that are safe to transport from the grid to a demolition site prior to demolition operations. MDAS and other debris will be transported to the staging area for further processing and packaging.

Large munitions items that are inert and partially buried may have to be pulled out using heavy equipment. Before an item is moved, it will be inspected by the designated certification inspector to certify it as MDAS. If there is any doubt as to the status of the item, it will be marked and treated as MEC. Large MDAS will be relocated to the staging area on the north coast or the central staging area. The SUXOS or his designee will provide grid sheets to the recovery team to use for the location and removal of MEC, MPPEH, -MDAS, and other munitions related debris.

4.15 Certification/Verification Process

Certification as MDAS by visual inspection requires a 100 percent inspection by one qualified individual, followed by an independent 100 percent re-inspection by another. This will be accomplished during the course of the project by completing the certification/verification process as MPPEH items are encountered, or when they are staged or placed in containers in the staging area. The SUXOS will delegate a UXO Technician as the MPPEH certification inspector (the SUXOS may also perform this inspection). That individual will conduct a 100 percent visual inspection of the item(s) and complete the first “*Certification*” portion of the *MDAS Certification Manifest* (Appendix D). The SUXOS will also assign a Verifying Inspector, who must be a UXO Technician that is independent of the project, such as the UXOQCS. That person will conduct a second, 100 percent visual inspection of the items and complete the second, “*Verification*” portion of the form. Both personnel will print and sign their names on the form, and it will be retained in the project files. The UXO personnel completing the inspections of the munitions must be designated in writing by the Commanding Officer of the organization with the responsibility for the management of the island.

4.16 Staging Procedures

The MDAS or containers of MDAS will be staged on the north shore area and/or at the base location (shown on Figure 4-1) and a “Non-Hazardous Waste” label will be applied to each container with “Material Documented as Safe” written on the “Contents” line on the label. The *MDAS Certification Manifest* must also be affixed to the pallet/container and accompany it until the items are demilitarized. An *Inventory/Accountability Log* will be created to show the quantities of the MDAS items. When the pallets/containers become full, the certifying UXO Technician will close and seal the container to ensure nothing else is added. The verifying UXO Technician will sign the label indicating that all items have been certified as MDAS.

5.0 NEUTRALIZING MEC/MPPEH

5.1 Purpose

The following addresses the performance of explosives operations on Nomans Land Island. Its purpose is to ensure that all demolition operations are adequately planned in advance and proceed in accordance with governing directives. Because this operation is taking place on federal property, there is no requirement for the blaster to have a *Certificate of Competency* or a *Use and Handling Permit*.

5.2 Responsibilities

The SUXOS is responsible for planning, directing and executing all demolition operations and ensuring the safety of all personnel. The SUXOS ensures there is an EZ around detonation sites in accordance with NAVSEA OP 5. The SUXOS will be assisted in these tasks by the UXOQCS/UXOSO. The SUXOS may designate a UXO Tech III as the Demolition Supervisor. That person will supervise a small team of select UXO Technicians during disposal operations.

5.3 Disposal Operations

Disposal actions to be taken for MEC recovered during operations will generally fall into one of the following two categories:

- **MEC recovered and acceptable to transport:** This material will be consolidated at a disposal site determined by the SUXOS. The SUXOS will determine the method or technique to be utilized for disposal.
- **MEC recovered and not acceptable to transport:** This material will be disposed of by detonation where found using blow-in-place (BIP) procedures. There may be instances where engineering controls (e.g., trenching, barricading or tamping the shot with earth) to address hazardous fragment mitigation may be required. The SUXOS will determine the type of engineering controls that are used.

5.4 Explosives Guidance

The governing guidance document for explosives demolition procedures is found in chapter 13 of NAVSEA OP 5 Volume I, *Ammunition and Explosives Ashore*. Augmenting OP 5 are the following corporate reference library (CRL) references:

- TtEC CRL Procedure UXO-3 “*Explosive Demolition Procedures*”; and
- TtEC CRL Procedure UXO-4 “*General UXO Safety Precautions*”.

The procedures for acquiring donor explosives and processing MEC/MPPEH are found in the following CRL references:

- TtEC CRL Procedure UXO-6 “*Purchase Receipt and Accountability of Explosives*”; and
- TtEC CRL Procedure UXO-8 “*Management and Disposition for Material Potentially Presenting an Explosives Hazard (MPPEH)*”.

Appendix E contains these procedures.

The information contained in the CRL procedures above was taken from the following DOD documents, which may also be used to guide demolition operations:

- NAVSEA SWO60-AA-MMA-010 “*Demolition Materials*”
- NAVY EODB 60A-1-1-31 “*General Information on EOD Disposal Procedures*”
- NAVY EODB 60A-1-1-4 “*Protection of Personnel and Property*”
- NAVSEA OP 5. 2013 “*Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping*”. CH 13, Volume 1. Seventh Revision Change 11. March 1.

All demolition operations will be performed under the direct supervision of the SUXOS or a designated Demolition Supervisor. A minimum of three UXO Technicians will be used in conducting explosive disposal operations—the Demolition Supervisor, an assistant, and a safety observer. The safety observer will be located in the safe area and will maintain visual contact with the demolition team and will maintain communications with base operations.

5.5 Explosive Operations Safety Considerations

The following specific safety precautions for demolition operations will be observed:

- Do not allow one person to work alone during disposal operations. At least one person shall be available near the disposal site to give warning and assist in rescue activities in the event of an accident.
- Demolition operations will not be conducted during dust, wind, rain, snow, electrical storms, or when cloud cover is less than 200 meters in altitude.

- Exercise extreme care in handling and preparing high explosives for detonation. They are subject to detonation by heat, shock, and friction.
- Do not pack bomb fuze wells with explosives unless it can be positively confirmed that the fuze well does not contain any fuze components.
- Photo flash bombs must be handled with the same care as black powder filled munitions.
- Munitions containing white phosphorous will not be detonated into the ground; rather, the MEC will be counter-charged on the bottom center line when possible.
- Carry blasting caps in approved containers and keep them out of the direct rays of the sun and located at least 25 feet from other explosives, until they are needed for priming.
- Do not handle, use, or remain near explosives during the approach or progress of an electrical storm. All persons should retire to a place of safety.
- Do not use explosives or accessory equipment that is obviously deteriorated or damaged. They may cause a premature detonation or fail completely.
- Always point the explosive end of blasting caps, detonators, and explosive devices away from the body during handling.
- For shots not using Non-El, use only standard blasting caps of at least the equivalent of a commercial No. 8 blasting cap.
- Do not bury blasting caps. Use detonating cord to position blasting caps above the ground. Buried blasting caps are subject to unobserved pressures and movement which could lead to premature firing or misfires.
- In the event of a misfire when disposing of explosives by detonation, do not approach the disposal site for at least sixty minutes after the expected detonation time. When conducting non-electric procedures, the wait time shall be sixty minutes plus time fuse burn time, and when conducting electric procedures, the wait time shall be thirty minutes from the planned detonation time.
- A post-search of the detonation site shall be conducted to assure a complete disposal was accomplished.
- Consideration should be given to tamping the UXO to control fragments, if the situation warrants. Fragments shall be minimized not only to protect personnel but also property, such as buildings, trees, etc.
- Do not inhale the smoke or fumes of burning pyrotechnic or incendiary materials. The fumes and dust from many of these materials are irritating and/or toxic if inhaled.
- Do not use water on incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the mixture.
- Anticipate a high order detonation when burning pyrotechnic or incendiary-loaded UXO. Safety measures for personnel and property must be based upon this possibility.
- Inert ordnance will not be disposed of or sold for scrap until the internal fillers have been exposed and unconfined. Heat generated during a reclamation operation can cause the inert filler, moisture, or air to expand and burst the sealed casings. Venting or exposure may be accomplished in any way necessary to preclude rupture due to pressure from being confined.
- All ordnance items that contain explosives or are suspected to contain explosives will be perforated.
- Explosive materials are to be protected from unauthorized possession and may not be abandoned.

- Smoking is not allowed within 50 feet of any explosives.
- Matches, open light or other fire or flame is not allowed within 50 feet of any explosives.
- Containers of explosive materials are not to be opened within any magazine or within 50 feet of any magazine.
- When explosives/blasting agents are being loaded, the blast site is to be cleared of all unauthorized persons.
- Prior to initiation of the blast, the access routes to the blast area will be barricaded at the EZ distance and posted.
- Empty containers and packages along with paper or fiberboard packing materials that contained explosive materials cannot be re-used. These materials are to be destroyed by burning at an approved outdoor location.

5.6 Explosive Disposal Operations

Specific procedures for conducting explosives operations are found in the UXO Demolition Procedures Standard Operating Procedures (SOPs) included within Appendix E. Prior to commencing any disposal operations, the SUXOS and/or Demolition Supervisor will ensure the area is ready for operations by taking the following actions:

- Authorization has been granted to conduct the disposal operation.
- An appropriate EZ for the MEC encountered has been established.
- All personnel have been accounted for and moved to a safe area.
- Emergency Medical support on Martha's Vineyard is aware of the demolition operations taking place and have been briefed on the location and type of demolition operations being conducted. Medical personnel will have a vehicle/ambulance available on Martha's Vineyard to respond in case of an incident in which injured personnel are transported from the site to a location on Martha's Vineyard.
- Adequate protective works are in place, if required.
- Access to the area is clearly marked and emergency communications have been established.
- A 360 degree visual search for any aircraft or boat traffic in the vicinity of the island before initiating the explosives has been conducted.
- Fishing boats that are in the vicinity of the island and are in the fragmentation distances are notified on channel 16 of the marine band radio to move out of the hazard area.

Air horns or sirens that are clearly audible for a minimum of 0.5 mile, or within the maximum fragment distance (horizontal), will be used as warning signals to alert personnel that demolition operations are in progress. In addition, the following signals will be used to support demolition operations:

- **WARNING SIGNAL** – A 1 minute series of long blasts 5 minutes prior to the blast signal.
- **BLAST SIGNAL** – A series of short blasts 1 minute prior to the shot.
- **ALL CLEAR SIGNAL** – A prolonged blast following the inspection of the blast area.

After the final shot, the UXOSO/QCS and another UXO Technician will inspect the disposal site to ensure total destruction and/or complete venting has taken place. The area will be checked for bulk explosives and partially detonated munitions as a result of a “low order” detonation. If located, they will be collected and another shot prepared for their disposal.

6.0 RANGE OPERATIONS

The area outside the operation’s base area (i.e. base camp) is considered a range. Access to the range will be limited to those individuals who have an appropriate purpose for entering. All persons entering the range will sign in at the operations base and sign out upon leaving the range area. The UXOSO will maintain the list of individuals authorized by the SUXOS to enter the range area, and a log of all individuals who are in the range area.

The following general rules will govern operations on the range:

- Only the minimum number of individuals will be present in the range area during explosive operations;
- Only those individuals specifically working in demolition operations will be within the fragmentation zone during operations;
- Blasting is to be conducted only in the hours between sunrise and sunset and not on Sundays; and
- TtEC personnel will control all aspects of the demolition operations.

6.1 Notification of Demolition Operations

Prior to the initiation of demolition operations, notification will be made to the Navy, U.S. Coast Guard, Martha’s Vineyard Airport, MassDEP, and the Chilmark Fire Department. Contact will be made at the numbers listed below:

- | | |
|---|----------------|
| • U.S. Navy (NAS, South Weymouth) | (617) 753-4656 |
| • U.S. Coast Guard (Woods Hole Station) | (508) 457-3211 |
| • U.S. Coast Guard (Menemsha Station) | (508) 645-2661 |
| • Town of Chilmark (Selectman’s office- Tim Carrol) | (508) 645-2101 |
| • MassDEP (Robert Campbell) | (617) 292-5732 |
| • Chilmark Fire Department (David Norton) | (508) 645-2550 |
| • Martha’s Vineyard Hospital Emergency Department | (508) 957-0112 |
| • Boston Med-Flight | (800) 233-8998 |
| • Martha’s Vineyard Airport (Shawn Flynn) | (508) 693-7022 |

6.2 Equipment Requirements

The equipment listed in Table 6-1 will be available for use during range operations and also lists safety equipment for explosives disposal operations. This list should be amended to reflect condition-specific requirements.

6.3 Activity Hazard Analysis (AHA)

Hazards and controls associated with explosive disposal operations are contained in the AHAs within the APP.

Table 6-1. Range Operations Equipment

Item	Quantity
Range Equipment	
Transport vehicles	2
Camera	1
Toolbox, general hand tools	1
Shovels	2
Galvanometer	1
Firing wire	500 ft.
Blasting machine	1
Blasting cap crimper	1
Tape electricians	1
Knife	3
Demolition kit	1

Item	Quantity
Safety Equipment	
First aid kit	1
Blood borne pathogen kit	1
Air horn, emergency	2
Emergency eye wash	1
Stretcher	2
PPE - non-static producing clothing, gloves, hard hat, and safety glasses.	as needed
Burn kit	1
Radios	3
Water	as needed
Fire Extinguishers (10 ABC)	3

6.4 Emergency Response

Prior to demolition operations of recovered MEC/MPPEH, the Emergency Medical personnel at the Martha’s Vineyard Hospital will be notified that demolition operations are beginning. TtEC will ensure that communication with Martha’s Vineyard Hospital and/or the U.S. Coast Guard has been established and will verify response times.

6.5 Fire Protection

In the event of a range fire, or if explosives are involved in a fire, all personnel will withdraw to greater distance of the blast or fragmentation distances of the ordnance involved. No attempt will be made to extinguish a fire in an area containing explosives or a fire involving explosives until the explosives have been consumed in the fire.

6.6 Exclusion Zone Protocol

Access to an EZ while munitions response operations are occurring is limited to essential personnel and authorized visitors.

The UXOSO is responsible for conducting an operational risk management assessment in accordance with OPNAVINST 3500.39C prior to initiating response actions involving MEC or MDAH. In addition, the UXOSO must determine the maximum number of persons (essential personnel and authorized visitors) that can be in the EZ at one time. The ratio of UXO-qualified escorts to visitors will be determined by the UXOSO based on this site-specific operational risk analysis.

Based on the risk posed by the munitions response operation, the UXOSO may determine that access to the EZ is unsafe for visitors. However, every effort should be made to accommodate the authorized visitor(s) needs.

Persons requiring access to the EZ must demonstrate a legitimate need for access and obtain authorization from the responsible PM and UXOSO. At a minimum, the request for authorization will include:

- name(s) of the person(s) requesting access;
- identification of emergency contacts for this person(s);
- purpose of visit;
- task(s) to be performed; and
- rationale to support EZ access.

Persons requesting access must submit their request to the responsible PM and SUXOS prior to the proposed date of the site visit. This advance notice will allow time for the UXOSO to support the visit request by assigning a qualified escort, conducting an operational risk analysis on the operations planned for the date of the site visit, and preparing a visitor-specific safety briefing.

Prior to entry in the EZ, all authorized visitors must receive a site-specific safety briefing describing the specific hazards and safety procedures to be followed within the EZ for operations underway that work day. Each authorized visitor must acknowledge receipt of this briefing in writing.

Authorized visitors to the EZ must be escorted at all times by a UXO-qualified person. Any authorized visitor that violates the established safety procedures will be immediately escorted out of the EZ for their own protection and to protect essential personnel working on the site.

7.0 TRANSPORTATION OF EXPLOSIVES AND INITIATORS

Pickup trucks, Gator (or equivalent), or other vehicles will be used to transport MEC, MPPEH, and donor explosives to the demolition sites on the island. If a truck is used, it will be configured to be compliant with Section 5-7 of NAVSEA SW023-AG-WHM-010 (*On Station Shipment of Ammunition and Explosive*) and will use either floor blocking or webbing tiedown assemblies to secure the items. If a utility vehicle is used to transport MEC, MPPEH or donor explosives, an operational risk management analysis will be conducted to address unique vehicle features, required safety equipment, and operational restrictions. Section 5-7.2 of NAVSEA SW023-AG-WHM-010 requires the utility vehicle cargo space to have a wooden deck. Additionally, the vehicle inspection and driver training criteria of NAVSEA SW020-AF-HBK-010 will be followed.

8.0 STORAGE AND ACCOUNTABILITY OF EXPLOSIVES

Because of the remoteness of Nomans Land Island, and the absence of explosives storage magazines there, MEC/MPPEH will be treated *in situ* or in a consolidated shot. Similar to

numerous past clearance activities conducted on the site, a one day processing demolition operation is expected. Donor explosives will be transported/stored by the vendor on the delivery boat until needed for demolition shot (s). No overnight storage of donor explosives will occur.

The SUXOS has overall responsibility for the accountability of all recovered MEC/MPPEH material and explosives demolition materials. The SUXOS will maintain an “Explosive Record Log” that records the type and quantity of demolition materials received and used. Further, the SUXOS will ensure that the *UXO Acquisition and Accountability Log* (or equivalent) (contained within Appendix E) is maintained recording each MEC/MPPEH recovered, its disposition, and the quantity of demolition materials used for their destruction.

9.0 ENVIRONMENTAL, ECOLOGICAL, CULTURAL, AND/OR OTHER CONSIDERATIONS RELATED TO THE MANAGEMENT OF MEC

After Nomans Land Island was deforested, the harsh ocean winds, salt spray, and lack of shelter restricted the vegetation on the island to rose, poison ivy, greenbrier, arrowwood, and bayberry in the upland portions of the island, and beach grass, switchgrass, seaside goldenrod, and beach pea on the sand dunes. Canada geese, black ducks and mallards are present on the island and the bayberry plants provide a potential nesting environment for colonial nesting birds like the snowy egrets and black-crowned night-herons. Migrating birds also use the island as a stopover site. The entire island has been designated as a Wildlife Refuge administered by the USFWS. As observed during past events, clearance activities will cause minimal disturbance of wildlife.

Nomans Land Island was occupied during prehistory and historically. However, based upon previous investigations and monitoring, the likelihood of encountering significant, intact archeological deposits reflecting prehistoric Native American or historic period Euroamerican occupation is judged to be very low. However, if items suspected of having historical or archeological significance or human skeletal remains are discovered during the work effort, work will immediately be stopped in the immediate vicinity of the discovery. An archeologist will be consulted and the USFWS will be notified to determine appropriate actions

A USFWS Special Use Permit will be applicable to this scope since work activities are being conducted on a wildlife refuge.

General Comments on Figure 9-1: Figure 9-1 shows areas that have been used in past years by nesting birds, but does not show all the potential nesting areas. Please be aware that nesting sites can shift between years depending on available habitat and this map may be updated as the season progresses. This version was last updated on 4 June 2008, based on a site visit on 30 May 2008.

Common Tern Nesting Areas: Common terns are Massachusetts State-listed as Special Concern. They don’t nest on Nomans Land Island NWR every year, but when they do, they generally begin laying eggs in mid- to late-May. Pedestrian and vehicle disturbance during this time can result in loss of eggs to predators (especially nearby gulls), trampling, and inclement weather. Chicks usually begin hatching by mid-June and are not able to fly until 21-25 days of

age. During this time period, chicks are very vulnerable to disturbance. Chicks are fed and guarded closely by the parents close to the nest site or in nearby vegetation until they are able to fly and feed themselves. A buffer of at least 50 yards around nest sites is specified by the Massachusetts Division of Fisheries and Wildlife to prevent disturbance, but a larger buffer may be necessary if there is not sufficient escape cover or there is a high abundance of potential predators. Also, a no-vehicle buffer within 100 yards of unfledged chicks is specified by the Massachusetts Division of Fisheries and Wildlife. Pedestrian and vehicle access is prohibited within buffers until all terns have completed nesting and all chicks are fledged. A 50-yard buffer has been partially delineated with signs. The shoreline side of the buffer area was not posted because of the rocky substrate and close proximity to rough surf (which will wash signs away).

American Oystercatcher Nesting Areas: Two to three pairs of American oystercatchers nest on Nomans Land Island NWR every year. They are likely to be establishing territories and laying eggs at nesting sites by early May. They do not nest colonially and exact nest locations can be very difficult to determine, but they generally nest in the same areas of shoreline every year. The entire island perimeter has not yet been searched for nesting oystercatchers in 2014. They are generally less tolerant of disturbance from humans compared to common terns. Disturbance during incubation can result in loss of eggs to predators (especially nearby gulls), trampling, and inclement weather. Chicks may begin hatching by the end of May (if 1st nest attempts are successful) and chicks are generally not able to fly until at least 40 days of age. During this time period, chicks are very vulnerable to disturbance. Chicks are fed and guarded closely by the parents but may move large distances from the nest site in search of better cover. The National Park Service enforces a buffer of 150 yards around nests and 200 yards around unfledged chicks. There are no Massachusetts specific guidelines, but a pedestrian buffer of 100 yards and vehicle buffer of 200 yards around unfledged chicks should be sufficient at Nomans Land Island.

Double-crested Cormorant Nesting Areas: Double-crested cormorants are colonial nesters and the main colony is located on the north spit of the island. This colony typically consists of 500-1000 pairs of birds which are usually nesting asynchronously; some pairs may have large chicks while other pairs may still be incubating eggs. Cormorants are not tolerant of human disturbance, and disturbances which cause adults to leave the nesting site even for a few minutes usually results in great loss of eggs and chicks to nearby loafing gulls. Therefore, the entire nesting site should be avoided beginning in May until chicks have fledged (late August). Smaller nesting sites along the perimeter of the island should similarly be avoided until nesting is complete.

Upland Nesting Birds: Nomans Land Island NWR also hosts a number of other nesting birds that are federally protected by the Migratory Bird Treaty Act including hawks, waterfowl, marshbirds, and songbirds. Disturbance can be minimized greatly by taking notice of the presence of birds and not lingering near sites where nesting activity is likely occurring. Visual observation of a nest or young is a great cue to keep moving, but observations of an “angry” adult can also be a tip off to nesting birds.

Seal Haulout Areas: Grey and harbor seals will often use the shores of Nomans Land Island NWR as “haulout” sites. They are most often seen along the northwest shore on the beach or on rocks in the intertidal or near subtidal area, but could be found anywhere along the shoreline

depending on the weather. See the attached guidelines (Appendix F) compiled by the Cape Cod Stranding Network, National Marine Fisheries Service and the Northeast Region Stranding Network regarding the recommended 50-yard buffer.

Turtles: Spotted, painted, and snapping turtles are found on Nomans Land Island NWR and will frequently be seen nesting or traversing across trails during the summer. Extreme care should be taken when driving vehicles.

Rare Plants: (locations are identified on Figure 9-1)

1. *Hydrocotyle verticillata*: (whorled marsh-pennywort or saltpond pennywort)
This plant is considered regionally rare and is Massachusetts State-listed Threatened. A moderate sized colony was found on the east side of the island by botanist A. Haines in 2005.
2. *Polygonum glaucum*: seaside knotweed or sea-beach knotweed
This plant is Massachusetts State-listed Special Concern. A single plant was tentatively identified on the north shore of the island by A. Haines in 2005.
3. *Pityopsis falcate*: sickle-leaved golden-aster
This species is globally rare. A single population was found on the north side of the island by A. Haines in 2005.
4. *Juncus ambiguus*: saltmarsh toad rush
This plant is very rare in this region and has not been seen in New England since 1932. A single plant was found on the west side of the island by A. Haines in 2005.

Other State-listed plants (not identified on the map; locations not known) include *Arethusa bulbosa* (dragon's mouth), *Sisyrinchium arenicola* (sandplain blue-eyed-grass), *Tillaea aquatica* (shore pygmy-weed), and *Cirsium horridulum* (yellow thistle).

10.0 QUALITY CONTROL PROCEDURES

10.1 Quality Documentation

In addition to the discussion of quality documentation in the following sections, the QC program for this project is described in detail in the MEC QAPP.

10.2 Personnel Qualifications

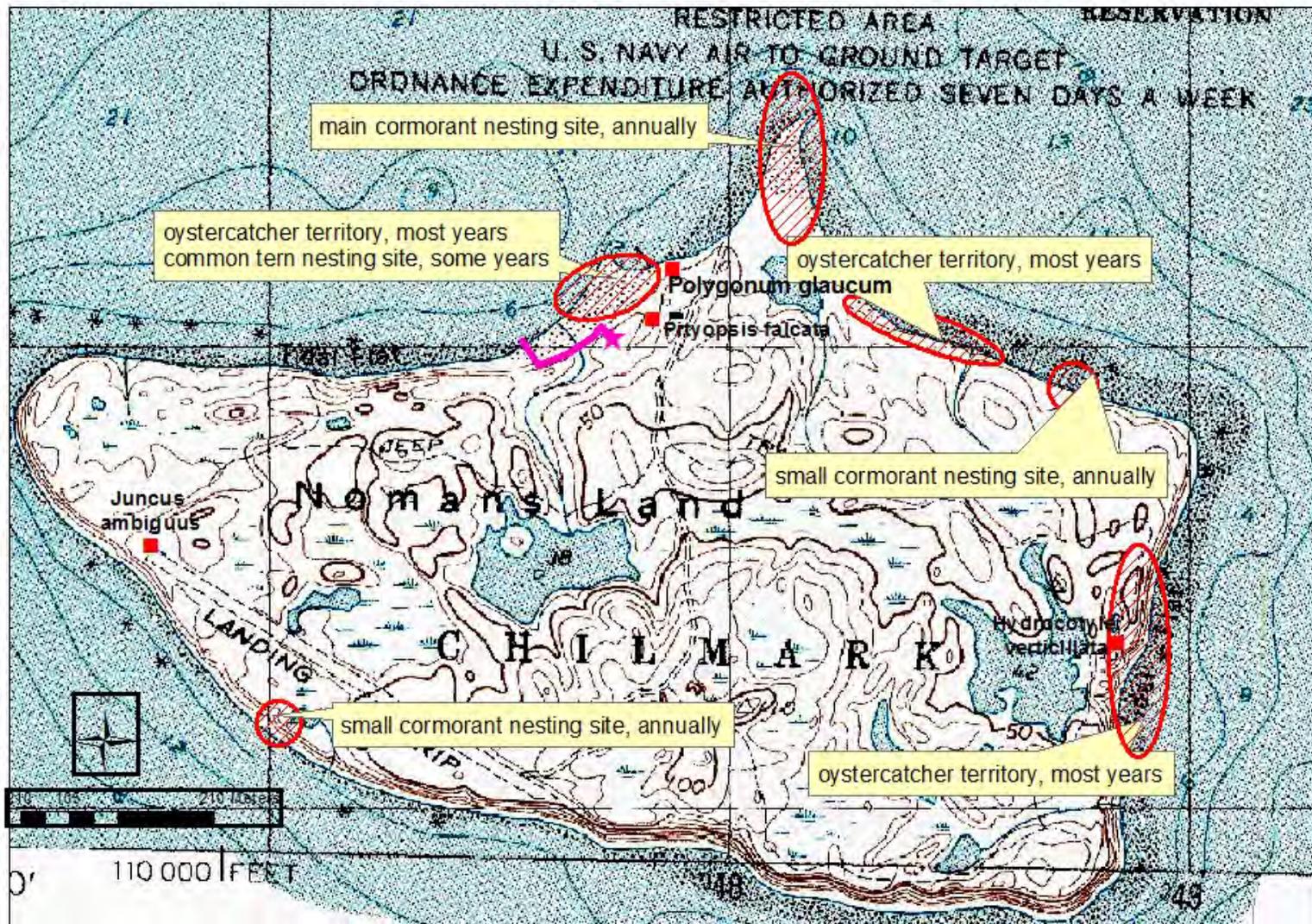
All UXO Technicians performing munitions-related activities will be qualified in accordance with DDESB TP 18. Personnel having actual contact with explosives (and explosive residues) will be trained in the identification, classification, and remediation of explosive hazards. Personnel will possess the requisite experience and will receive site-specific training as appropriate in accordance with the APP.

Figure 9-1
 Nomans Land Island Wildlife Refuge Nest/Colony Locations and Rare Plants Map



U.S. FISH & WILDLIFE SERVICE

Nomans Land Island NWR Nest/Colony Locations and Rare Plants
 4 June 2008 map modified on 28 May 2014



10.3 Quality Control Implementation

QC is a vital component of the project composition and is included in every definable feature of work. The table that follows presents the minimum QC effort that will be accepted. The fundamental principles of the QC plan are to insure that: (1) all MEC, MPPEH, and other debris that are visible on the ground surface are removed; and (2) that no MEC/MPPEH, is contained in the debris shipped off-island. Table 10-1 provides a summary of the QC process.

10.4 Quality Assurance Implementation

Quality Assurance (QA) will be provided by a UXO and QA qualified individual from the Naval Surface Warfare Center Indian Head Explosive Ordnance Disposal Technology Division (NSWC IHEODTD). Table 10-1 provides a summary of the QA Process.

Table 10-1. QC Processes

Activity	Frequency	Pass/Fail Criteria	Corrective Action	Documentation	Notes
Grid Layout	When grid is established, 3 phase inspection, periodic inspection	UXOQCS to check the locations of 10% of grid stakes/flags during installation. If stake location is ≥ 1 foot away from DGPS location, grid fails	Reset grid stake/flag	UXOQC logbook noting equipment, personnel, date and time	The grid stake/flag will be marked with the grid numbers
Locator Checkout	Beginning and end of each day	100% detection of surrogate items in test bed < 11 times the diameter of the item	Re-run the test bed Instrument Verification Strip (IVS) Repair/replace equipment	UXOQC logbook noting equipment, user, date and time	
Surface Sweep	3 phase inspection, periodic inspection	UXOQCS will inspect 10% of lanes swept. If MEC or MPPEH is found in a swept lane, the grid fails	Re-sweep failed grid	UXOQC logbook, entry, Deficiency Notice	Deficiency Notice issued

Activity	Frequency	Pass/Fail Criteria	Corrective Action	Documentation	Notes
MEC Identification	Upon MEC discovery	100% positive ID of MEC items (2-man rule)	Obtain complete publication set	MEC acquisition and accountability log noting: type, nomenclature, condition and location.	Initial discovery and MEC/MPPEH assessment
MEC Disposal	3 phase inspection, periodic inspection	Any element of the demolition operation not conforming to specifications	As necessary. Root cause analysis.	UXOQC logbook, entry, Deficiency Notice	Where appropriate, a Nonconformance report will be issued and a causal analysis/ corrective action will be developed.
Sweep Lanes Inspected	10% of lanes that underwent QC Checks	No MEC or MPPEH	Re-sweep the grid	UXOQC logbook, entry, Deficiency Notice	All MDAS and other debris will receive two inspections before being removed from the island.
Material Documented as Safe Management	Weekly QA Specialist will observe the MDAS Processing procedure Inspect 10% of the debris	Any MEC/Material Documented as Hazardous (MDAH) found in the Scrap Processing Area Any element not conforming to the specifications	Re-inspect failed lot Contractor Quality Incident Report and a causal analysis and corrective action will be developed.	QER	

Activity	Frequency	Pass/Fail Criteria	Corrective Action	Documentation	Notes
Personnel Qualifications	Initial project QA assessment, personnel records review and assigned UXO Technicians interviews	Any element not conforming to specifications in Explosives Safety Submission (ESS) Section 8.2	Immediate notification of PM Contractor Quality Incident Report and a causal analysis and corrective action will be developed.	QER	
General Safety Requirements	Direct observation of the execution of the definable features of work	Any element not conforming to specifications in ESS Sections 6.3, 6.4 and 8.2	Immediate notification of PM Contractor Quality Incident Report and a causal analysis and corrective action will be developed.	QER	
MEC Management	Direct observation of MEC operations, MEC management documentation and interviews with assigned UXO Technicians	Any element not conforming to specifications in ESS Sections 6.3 and 6.4	Immediate notification of PM Contractor Quality Incident Report and a causal analysis and corrective action will be developed.	QER	

Activity	Frequency	Pass/Fail Criteria	Corrective Action	Documentation	Notes
MPPEH Management	Direct observation of MPPEH and MDAH operations and MPPEH and MDAH management documentation.	Any element not conforming to specifications in ESS Sections 6.3 and 6.4.	Immediate notification of PM Contractor Quality Incident Report and a causal analysis and corrective action will be developed.	QER	
QC Implementation	Review of field documentation and direct observation of QC process	Any element not conforming to specifications in ESS Section 7.	Immediate notification of PM Contractor Quality Incident Report and a causal analysis and corrective action will be developed.	QER	

11.0 RECORDS

The SUXOS (along with the data manager) will maintain records of all MEC/MPPEH items recovered within each grid. Data sheets for each grid will include the grid number; the locations where significant MEC/MPPEH items were discovered; a listing of items discovered and their identification; and the disposition of the items. The electronic database to be developed will also include this information.

Non-explosive munitions-related items (i.e., grenade spoons, expended cartridge cases, etc.) also will be noted in the grid sheet and clearly identified as explosive free-scrap material.

12.0 REFERENCES

- DOD (Department of Defense). 2008. DOD Contractor's Safety Manual for Ammunition and Explosives. March 13.
- NAVSEA OP 5. 2001. Ammunitions and Explosives Safety Ashore. Revision 7, Change 11, 1 March 2013.

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APPENDIX A

TETRA TECH PROJECT RULES HANDBOOK (Not included here-in. To be distributed on-site)

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APPENDIX B
CONTRACTOR PROCEDURES/FORMS

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UXO-3:

Explosive Demolition Procedures

Purpose

This document provides basic explosive demolition procedures for the disposal of Munitions and Explosives of Concern (MEC) by open detonation (OD).

Version Date: 09/07/2005 -

New

Approved by: *Donald Rogers*

Original Issue

Date:

Category: Company
Procedures

Sections: UXO

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pline

Document Type: Procedure

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Document Owner: David Keller

Table of Contents

See Below

1.0 PURPOSE

This document provides basic explosive demolition procedures for the disposal of Munitions and Explosives of Concern (MEC) by open detonation (OD).

2.0 SCOPE

The procedures in this document are applicable to all UXO employees of Tetra Tech EC, Inc. (TtEC) ("the Company") and its subsidiaries conducting MEC disposal operations by OD.

3.0 MINIMUM REQUIREMENTS

3.1 Responsibilities

All employees are required to follow the minimum requirements listed in this procedure. Any employee may request permission to vary from these requirements if they are in conflict with our corporate "Operating Philosophies", are unsafe, or are not compatible with contract or site-specific requirements. Permission to vary from this procedure must be obtained from the UXO Discipline Lead. All employees are encouraged to submit comments and/or recommendations to improve this procedure.

All personnel engaged in disposal operations must be thoroughly trained in explosive safety and demolition procedures and capable of recognizing hazardous situations and taking prompt corrective action. Disposal operations will not be conducted without client authorization, approved plans/SOPs, qualified and trained UXO personnel, and proper demolition and safety equipment.

3.1.1 Coordination and Notifications

Coordination should begin with a series of meetings with the client to identify the responsibilities of each organization. The community should be informed of the project schedule and possible impacts through coordination with the client, where clear responsibilities of each organization are identified and agreed upon by all supporting activities. Coordination and notification activities are outlined below:

Coordination Meeting - A coordination meeting will be conducted to establish roles and responsibilities before disposal operations begin. The meeting will address specific elements of planning and organizational responsibilities. Topics will include:

- a. Demolition team make-up and assignments
- b. Explosive handling, storage and transportation
- c. Required support services, fire, medical, security, etc.

- d. Emergency procedures
- e. Notification process
- f. Maintenance of exclusion zones
- g. Community impact

Public Meeting - If required, a public meeting will be held prior to commencing disposal operations. "The Company" representative will conduct a briefing outlining the scheduled operation. Topics will include:

- a. Daily hours of operation
- b. Requirements for evacuations and road closures
- c. Exclusion zones
- d. Community impact

3.1.2 Notifications

"The Company" site office will notify the identified point of contact (POC) for each of the responsible site activities of disposal operations in advance as per the local standard operating procedure (SOP). The notifications should address scheduling, evacuations, road closures, Exclusion Zones (EZ) and any other required support. As a minimum, the following agencies should be notified and be prepared to respond:

- a. Medical
- b. Fire Department
- c. Security/Police Department
- d. Base Operations
- e. FAA

3.1.3 Exclusion Zones, Evacuations and Road Closures

Quantity-Distance arcs for the actual munition(s) will be utilized to calculate the EZ. The Senior UXO Supervisor (SUXOS) will distribute EZ information packets to the identified POC for each responsible site activity as required by the SOP. The packets will include maps with EZs, evacuations and road closures clearly marked. The packet must specify who is responsible for each task. The responsible activity will coordinate evacuations and road closures. Tetra Tech personnel will establish and maintain EZs during disposal operations. Access to the EZ will be coordinated through on-site UXO personnel and comply with visitor control procedures. The EZ will remain intact until proper notification is received from "the Company" site office that disposal operations are complete.

3.1.4 Personnel Requirements

Personnel manning and qualifications for conducting MEC disposal operations must meet service specific requirements. The minimum "Company" requirements are as follows:

- a. A SUXOS responsible for planning, directing and executing all disposal operations.
- b. A UXO ESS/QC to ensure that all work is performed safely and in accordance with the

approved site-specific plans. On sites with more than 15 personnel and separate ESS and QC person will be assigned.

- c. A minimum of three UXO Technicians per team will be used to conduct disposal operations .
- d. One UXO Technician II will be designated as the Demolition Supervisor (DS)
- e. Two UXO Technicians (level I, II or III) will assist the DS, one will act as a safety observer.
- f. The safety observer will be located in the safe area and will maintain in visual contact with the team down range. He will maintain communications with the team and "the Company" site office.
- g. For small projects (one team) the SUXOS may fill the position of the third UXO Technician, or DS.

3.1.5 Training Requirements

All personnel 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. Course attendance sheets, with attached curriculums, will be used to document completion of each orientation session. The topics to be covered during the orientation are listed below:

- a. Project summary
- b. Review Work Plan
- c. Review Site-Specific Health and Safety Plan
- d. Review Demolition SOP
- e. Demolition firing systems and components
- f. Range operations
- g. Disposal charge placement technique
- h. Explosive transportation
- i. Explosives storage and accountability
- j. Site ordnance brief
- k. Emergency response equipment
- l. Emergency procedures
- m. Emergency drill

3.1.6 Equipment/Material Requirements

The Demolition Supervisor will be responsible for ensuring all required equipment and materials are on site. Attached checklists should be modified to meet the requirements of each specific job site. As a minimum, the following will be checked daily prior to commencing disposal operations:

- a. Demolition equipment (Demolition Equipment Checklist, Attachment 1)
- b. Health and Safety Equipment (Health and Safety Equipment Checklist, Attachment 2)
- c. Range/explosive vehicles
- d. Explosives

3.1.7 Required Documents

The following documents are required to be on-site during disposal operations:

- a. Approved work plans
- b. Approved ESS
- c. Locally approved demolition SOP
- d. Range certification
- e. DOD 6055.9
- f. Service directives
- g. State and local directives
- h. 27CFR, Part 555 - Commerce in Explosives
- i. EOD publication set (minimum of 60A-1-1-31)
- j. This procedure

3.2 Disposal Operations

Only qualified UXO personnel will dispose of ordnance and explosives by open detonation. Sites conducting disposal operations must have a locally approved demolition SOP in addition to the work plan. All UXO personnel conducting disposal operations will receive training on the local SOP and demolition procedures.

- a. Items that are safe to move should be transported to a local safe disposal area or approved range for disposal. This will minimize the spread of contamination.
- b. If an item is unsafe to move and the area can withstand a high order detonation, the item should be blown in place (BIP). Do not BIP without proper authorization. Ensure BIP procedures are addressed in the work plan, ESS and the local SOP.
- c. If an item is unsafe to move and the area cannot withstand a high order detonation, consider the use of engineering controls to reduce the hazard and BIP.
- d. If an item is unsafe to move and the hazard cannot be sufficiently reduced with the use of engineering controls, notify the client and the responsible EOD detachment.

3.2.1 Safety Briefs

Conduct the following safety briefs prior to conducting disposal operations:

- a. General Safety Precautions (Attachment 3)
- b. Team assignments
- c. Operation overview
- d. Review of explosive handling procedures
- e. Emergency Procedures
- f. Type and condition of MEC
- g. Two-person rule

3.2.2 Exclusion Zone (EZ)

- a. An EZ will be established for all MEC disposal operations. For approved ranges use the quantity/distance guidance in the range certification. For BIP operations use the distances approved in the ESS and work plans.
- b. Reduction of approved EZ distances will require approval by the client and DoD component

explosive safety personnel.

3.2.3 Engineering Controls

- a. Engineering controls should be employed whenever possible to minimize the damage from disposal operations.
- b. These controls may consist of sandbags, ecology blocks, trenching, buttressing, taping of glass, mounding, flooding and/or venting to reduce the effects of detonations.

3.2.4 Posting of Standard Operating Procedures (SOP)

The locally approved Demolition SOP, with emergency procedures, points of contact, safety precautions and communications protocol, will be posted at the range. For BIP operations they will be available on site.

3.2.5 Communications

- a. Two methods of communications will be utilized during disposal operations. The preferred methods are landline (if available), radios and cellular phones. The work plan and SOP will identify primary and secondary communication methods.
- b. Radio and cellular phone transmissions will be secured whenever electric blasting caps are exposed.

3.2.6 Safety Warnings

- a. Ensure all required notifications have been made.
- b. Set up EZ and man barricades.
- c. Visually inspect the EZ and surrounding area for unauthorized personnel.
- d. Approved ranges should have gates, bravo flags and horns/sirens.
- e. Five-minute warning. The SUXOS will give a five-minute warning on the radio by executing a one-minute series of long blasts on the horn/siren.
- f. One-minute warning. The SUXOS will give a one-minute warning on the radio by executing a series of short blasts on the horn/siren one-minute prior to the shot.
- g. Prior to initiating the shot the SUXOS will give three, loud "Fire in the Hole" warnings then give the fire command on the radio.
- h. All clear signal. A prolonged blast on the horn/siren following the inspection of the blast area.

3.2.7 Range Vehicles

- a. There will be a sufficient number of vehicles to transport all personnel involved in the disposal operation.
- b. Each vehicle must have a seat, with a seat belt, for each person.
- c. Vehicles will be parked in a protected area, free of vegetation, facing away from the detonation site. The keys will remain in the ignition at all times.
- d. Vehicles designated to transport explosives will not be used to transport passengers. Explosive vehicles must comply with the provisions of 49CFR 177.835(e) and (f).

- e. Smoking or flame-producing devices are not permitted within 50 feet of explosive vehicles.
- f. Vehicles will not be driven or parked in areas with dry vegetation that could be ignited by the heat generated from catalytic converters.

3.2.8 Weather and Environmental Considerations

- a. Prior to commencing disposal operations the SUXOS will obtain a local weather report.
- b. Disposal operations will not be conducted if electrical storms are within 10 miles or during any severe weather conditions that would impact safety.

3.2.9 Emergency Medical Support

- a. The telephone number of the responding medical facility will be posted in plain sight at the site office and at the disposal site.
- b. Emergency medical personnel will be notified of the location and duration of disposal operations each day.
- c. All UXO personnel conducting disposal operations will be trained in first aid and CPR.
- d. A first aid kit, portable eyewash and blood borne pathogen kit will be on site at all times. Ensure the first aid kit contains dressings capable of treating the traumatic injuries that could result from an explosion.

3.2.10 Fire Support

- a. The telephone number of the responding fire department will be posted in plain sight at the site office and at the disposal site.
- b. The fire department will be notified of the location and duration of disposal operations each day.
- c. When the fire hazard is high due to dry conditions disposal operations will not be conducted unless mobile fire-fighting equipment is standing by and the fire department is capable of responding within five (5) minutes.
- d. Fire extinguishers, portable water tanks and shovels will be on site to fight small fires. Evacuate the area if the fire approaches ordnance or explosives. Do not fight grass fires in areas where there may be ordnance or kick-outs.

3.2.11 Two-Person Rule

- a. The Two-Person Rule is a safety concept that requires two knowledgeable individuals to perform potentially hazardous operations. These individuals must be capable of recognizing and reporting unsafe, negligent or criminal behavior.
- b. The Two-Person Rule will apply whenever explosives are handled or transported during disposal operations.
- c. No one will handle or assemble explosive components alone.

3.2.12 Personnel Protective Equipment

Unless otherwise directed disposal operations will be conducted in Level "D". PPE will consist of non-static producing clothing, gloves, safety glasses and conductive steel toe boots.

3.2.13 Initiation Systems

- a. The primary firing system will be the Remote Firing Device with Nonel.
- b. The alternate firing system will be the Remote Firing Device with electric blasting caps
- c. The secondary system will be the Scorpion Electronic Blasting Machine with electric or Nonel initiation.
- d. In areas of increased electromagnetic radiation, or a high fire index, a Nonel system should be used.

3.2.14 White Phosphorous (WP)

- a. Protective clothing, to include helmets with full-face shields and welders apron and gloves, will be worn when handling suspected WP ordnance.
- b. Ensure medical support personnel know they are supporting WP disposal operations and have WP first aid treatment materials on hand.
- c. In the field irrigate WP wounds with water, pick out visible pieces of WP (with knife or tweezers), and apply saline soaked dressing. Keep dressing wet until arrival of medical personnel.
- d. Water and sand will be readily available when handling suspected WP ordnance.
- e. WP filled ordnance will be Counter-Charged Bottom Centerline (CCBC) to disperse the WP in the air for complete combustion.
- f. Care must be taken when returning to the disposal side after detonation to ensure that all WP was consumed.
- g. Do not approach the area until all smoke has cleared and the SUXOS has declared the area safe.
- h. Do not conduct WP handling or disposal operations when the ambient temperature is above 95 degrees Fahrenheit.

3.2.15 Range Scrap

- a. An inspection of the disposal site and surrounding area will be conducted after each disposal operation.
- b. All munitions debris will be picked up and containerized for later disposal.

3.2.16 Recordkeeping

Forms and checklists should be generated and/or modified to meet site-specific requirements. For disposal operations the Senior UXO Supervisor or the UXO Demolition Supervisor will, as a minimum, complete the following.

- a. Disposal Operations Checklist (Attachment 4)
- b. Explosive Disposal Log (Attachment 5)

3.3 Blow in Place (BIP) Operations

When MEC is discovered that is unsafe to move and the area can withstand a high order

detonation, the item should be blown in place. MEC that is safe to move should be disposed of on an approved range to minimize the spread of contamination. Notify the client and the responsible EOD detachment if the item is unsafe to move and cannot be blown in place. Demolition methods and procedures for BIP operations are the same as for demolition operations conducted on approved demolition ranges. Prior to conducting BIP operations verify the following:

- a. Authorization has been granted by the client to conduct the disposal operation.
- b. BIP operations are addressed in the ESS, work plan and SOP.
- c. An appropriate EZ for the MEC encountered has been established and evacuation of the area has been confirmed.
- d. Emergency support services; fire, security, and medical have been notified and are either on location or standing by.
- e. Engineering controls to reduce the damage caused by the detonation are in place, if required.
- f. Every effort has been made to establish the firing point in a location where the SUXOS can visually observe the entire EZ.
- g. All BIP operations will be fired by electric or Nonel initiation to maintain positive control up to the point of detonation.

3.4 Range Disposal Operations

The client must give authorization to conduct disposal operations. Routine disposal operations will be conducted on a certified range. A copy of the range certification will be maintained on site. Ensure all requirements on the range certification are incorporated into the ESS, work plan and SOP. A copy of the locally approved SOP will be posted at the range. Prior to the commencement of disposal operations ensure all notifications, safety briefs and equipment checks have been completed in accordance with the SOP.

3.4.1 Initiation Systems

- a. The primary firing system will be the Remote Firing Device with Nonel.
- b. The alternate firing system will be the Remote Firing Device with electric blasting caps.
- c. The secondary system will be the Scorpion Electronic Blasting Machine with electric caps or Nonel.
- d. In areas of increased electromagnetic radiation, or a high fire index, a Nonel system should be used.

3.4.2 Remote Firing Device Preparation

- a. Perform system pre-operational test and set up using the operator's manual. Remove key from controller unit until ready to fire.
- b. Place the remote near the detonation site with the antenna in the vertical position. If using electric caps the remote should be within 100 feet of the shot. Using the unit blast shield, sandbags, or natural cover to protect the remote.
- c. Ensure the remote indicates a READY condition for the selected initiation method (green READY LED on steady, red ARMED LEG off).
- d. If using Nonel, connect the shock tube to the igniter tip. The tube should be wrapped around through holes in the tip's molded casing to keep it from falling out. Prime the shot and return to the safe area.
- e. If using electric caps, cut off a length of firing wire that will reach between the remote and the

- charges (100' or less).
- f. Conduct a continuity check of the firing wire with a galvanometer. Shunt the free ends of the wire to prevent an electric charge from building up in the firing wire.
 - g. Test each electric blasting cap 50 feet downwind of other explosives with a galvanometer.
 - h. Place blasting caps in a hole, behind a barricade or under a sandbag before removing the shunt and testing for continuity.
 - i. Fully extend the leg wires and ensure the cap is pointing away from the person conducting the continuity test.
 - j. Secure the leg wires to prevent the cap from moving during the test.
 - k. Use only a special silver-chloride dry cell battery in the testing galvanometer. Other type batteries may provide sufficient voltage to fire the blasting cap.
 - l. Upon completion of testing, re-shunt the leg wires. The wires will remain shunted until ready to connect to the firing circuit.
 - m. For dual priming connect blasting caps in a parallel circuit to the extension wires.
 - n. Test the circuit with the Galvanometer, and then connect extension wires to the remote.
 - o. Retrieve caps from barricade, prime shot and return to safe area.

3.4.3 Firing the Remote Firing Device

- a. The SUXOS will verify that the exclusion zone is clear and barricades are in place.
- b. The SUXOS will give a "five-minute warning" on the horn/siren and radio.
- c. The SUXOS will give a "one-minute warning" on the horn/siren and radio.
- d. Install the key and engage the "POWER" switch on the controller to the right until the BATTERY LED illuminates.
- e. Momentarily depress the controller STATUS button. The yellow TRANSMIT LED will flash for approximately one second. At the end of this time a green READY LED will come on steady, indicating that the remote is on and in the standby mode. The steady green LED also indicated the remote is within range of the controller.
- f. Push the ARM/DISARM switch to the left and hold for one second. The red ARMED LED will flash for approximately 18 seconds and then come on steady. The remote is now armed.
- g. UXO Demolition Supervisor gives three loud "Fire-in-the-Hole" warnings.
- h. SUXOS gives fire command on the radio.
- i. SUXOS gives permission to fire the shot.
- j. Lift the safety cover on the FIRE switch and push the FIRE switch forward.

3.4.4 Preparation of the Scorpion Electronic Blasting Machine

- a. Perform pre-operational check as per instructions on blasting machine.
- b. Lay out firing wire or Nonel.
- c. Conduct a continuity check of the firing wire with a galvanometer. Shunt the free ends of the wire to prevent an electric charge from building up in the firing wire.
- d. Test each blasting cap with a galvanometer 50 feet downward of other explosives.
- e. Place blasting caps in a hole, behind a barricade or under a sandbag before removing the shunt and testing for continuity.
- f. Fully extend the leg wires and ensure the cap is pointing away from the person conducting the continuity test.
- g. Secure the leg wires to prevent the cap from moving during the test.
- h. Use only a special silver-chloride dry cell battery in the testing galvanometer. Other type batteries may provide sufficient voltage to fire the blasting cap.
- i. Upon completion of testing, re-shunt the leg wires. The wires will remain shunted until ready to connect to the firing circuit.
- j. For dual priming connect blasting caps in a parallel circuit to the firing wire.
- k. Retrieve caps from barricade, prime shot and return to safe area.

3.4.5 Firing the Scorpion Electronic Blasting Machine

- a. The SUXOS will verify that the exclusion zone is clear and barricades are in place.
- b. The SUXOS will give a "one-minute warning" on the horn siren and radio.
- c. The SUXOS will give a "one-minute warning" on the horn siren and radio.
- d. If firing electric check firing wire with a galvanometer.
- e. Connect the firing leads to the terminal posts of the blasting machine.
- f. For Nonel plug in the shock tube adapter and attach Nonel.
- g. UXO Demolition Supervisor gives three loud "Fire-in-the-Hole" warnings.
- h. SUXOS gives fire command on the radio.
- i. SUXOS gives permission to fire the shot.
- j. Degrees and hold CHARGE button (keep depressed throughout sequence).
- k. Press DETONATE button when green ready light comes on. For non-electric shots hold DETONATE button down for one second and release.

3.4.6 Misfire Procedures For The Remote Firing Device

- a. Make three successive attempts to fire.

- b. Turn off the controller and remove the key.
- c. Wait 30 minutes from the last initiation attempt.
- d. After the wait time has elapsed the demolition supervisor and a safety observer will proceed down range to inspect the firing system.
- e. If Nonel was used do not remove the caps from the charge. Disconnect Nonel from the igniter tip on the remote. Place a new, primed explosive charge next to the misfired charge (FM 5-250).
- f. If electric caps were used remove the old blasting caps from charge and disconnect from extension wires. Shunt cap leg wires.
- g. If detonating cord was used cut detonating cord between cap and charge, disconnect cap from extension wires. Shunt cap leg wires.
- h. Set up new firing system.

3.4.7 Misfire Procedures for the Scorpion Electronic Blasting Machine

- a. Make three successive attempts to fire.
- b. If using firing wire and still unsuccessful disconnect wires and check continuity.
- c. If continuity is good reconnect to blasting machine and make three more attempts to fire.
- d. If still unsuccessful check connections of firing wires to terminals and make three more attempts to fire.
- e. Change blasting machine after third unsuccessful attempt.
- f. If unsuccessful with new blasting machine disconnect and shunt firing leads.
- g. If using Nonel disconnect from blasting machine.
- h. Wait 30 minutes from the last initiation attempt.
- i. After the wait time has elapsed the demolition supervisor and a safety observer will proceed down range to inspect the firing system.
- j. If electric caps were used remove the old blasting caps from charge and disconnect from firing wire. Shunt cap leg wires.
- k. If detonating cord was used cut detonating cord between cap and charge, disconnect cap from fire wire. Shunt cap leg wires.
- l. If Nonel was used do not remove the caps from the charge. Place a new, primed explosive charge next to the misfired charge. (FM-5-250).
- m. Set up new firing system.

3.4.8 Shock Tube Firing Systems

Shock tube is a thin plastic tube of extruded polymer with a layer of special explosive dust deposited on its interior surface. The special explosive dust propagates a detonation wave, which

is normally contained within the plastic tubing. Shock tube offers the instantaneous action of electric initiation without the risk of accidental initiation of the blasting cap by radio transmitters in the area or by static electricity discharge. The shock tube medium is extremely reliable.

3.4.8.1 Shock Tube Splicing

The high reliability of shock tube blasting is due to the fact that all of the components are sealed and unlike standard non-electric priming components, cannot be easily degraded by moisture. Cutting the shock tube makes the open end vulnerable to moisture. Care should be taken to keep moisture from the cut end of the shock tube. Use the following procedures to cut and splice shock tube.

Use a sharp knife or razor blade to squarely cut (90 degree angle) approximately 18 inches from a new roll or the cut off end of a partial roll.

Loosely tie the two shock tube ends to be spliced together in a SQUARE KNOT. Leave at least two inches free at the end of each shock tube beyond the knot.

Pull the shock tube lightly to tighten the knot, but not so tight as to significantly deform the shock tube in the knot.

Use only the splicing tubes provided to make splices. Taping the two cut ends of shock tube together does not make a reliable splice.

Push one of the free shock tubes, to be spliced, firmly into one of the pre-cut splicing tubes at last 1/4 inch.

Push the other shock tube end firmly into the other end of the splicing tube at least 1/4 inch. Attempt to push the two ends up against each other or get as close as possible.

Secure splice with electrician's tape.

Each additional splice in shock tube reduces the reliability of the priming system. Minimize the number of splices in a shock tube line to as few as possible.

Spool out the desired length of shock tube and cut off squarely with a sharp knife or razor blade.

Secure the shock tube remaining on the spool by tying a tight overhand knot in the loose end.

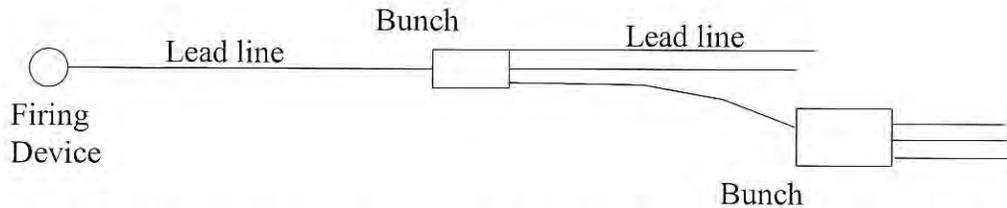
Protect the open end of the shock tube by sealing it with the end caps provided or with electrician's tape.

Attach an initiator to the free end of the shock tube that is spliced into the blasting cap. If a separate blasting cap or detonating cord is used to actuate the shock tube, tie a tight overhand knot in this end.

3.4.8.2 Shock Tube Set Up

Lay out required length of shock tube (trunk line) from demo area back to the firing point.

Attach an EZTL 30 bunch block (or equivalent) using the supplied splicing tube to the lead line at demo site. Secure the bunch block or immobilize with sandbags. Run additional lead line(s) from bunch block to OE (See Figure 1).



Only attach a maximum of six additional leads per bunch block. Use additional bunch blocks, if necessary.

3.4.9 Donor Explosives

The primary donor explosives used for MEC disposal will be the one-pound pentolite booster, plastic explosives, jet perforators, or binary explosives.

3.4.9.1 One Pound Pentolite Booster

Insert 80 grain detonating cord into the detonator well. Insert all the way through and back through other hole and tie an overhand knot to secure it.

When using more than one booster, insert detonating cord through each of the boosters' detonator wells and secure to keep them from sliding along the detonating cord.

3.4.9.2 Plastic Explosives

Set up with blasting cap(s) or detonating cord lead(s) as per EODB 60-1-1-31. Position plastic explosives on MEC.

3.4.9.3 Jet Perforator

Using the detonating cord clip provided to secure detonating cord to the Jet Perforator.

Place the Jet Perforator on the MEC/OE using tape or other suitable methods to prevent it from moving.

For tamped shots, use a box or other suitable material to provide soil from getting between the perforator and MEC/OE item.

3.4.9.4 Binary Explosives

Binary explosives are two part explosives that are not classified as an explosive until mixed. These can be procured in various configurations to include plastic tube containers and pliable paks in varying sizes depending on the required application. The binary should not be mixed until ready for use. After mixing it can be primed as a cap sensitive explosive using Nonel, detonating cord or electric or non-electric blasting caps. Use as any high explosive with a velocity of detonation around 20,000 fps.

3.4.10 Post Demolition Procedures

Wait the designated wait times specified by the SOP. A minimum 5 minutes after single shots or after a series of shot that can be counted. A minimum of 30 minutes after multiple shots that could not be counted.

The demo supervisor and one other UXO technician will return to the detonation site and check the results of the shot. If the procedure was successful the demo supervisor will call in additional

personnel to clean up the site. UXO personnel will conduct a visual sweep of the detonation site and the immediate area to gather fragments and explosive residue, if present.

Explosive residue will be collected and detonated.

Metal fragments will be examined to ensure complete consumption of explosive material.

Intact MEC items that failed to detonate will be disposed of.

After area is swept and cleared the Demo Supervisor will notify the SUXOS and the "All Clear" will be given.

The SUXOS will notify all activities that the disposal operation is complete per the SOP.

4.0 REFERENCES

Please Describe Your Reference Here	Place Your Link In This Column
1. DoD 6055.9-STDDOD Ammunition and Explosives Safety Standards	
2. EODB 60A-1-1-4 EOD Procedures, Protection of Personnel and Property	
3. EODB 60A-1-1 31EOD Disposal Procedures	
4. EP385-1-95A Basic Safety Concepts and Considerations for Ordnance and Explosives Operations	
5. NAVSEA OP-5 Ammunition and Explosives Ashore	
6. 27 CFR Part 555 - Commerce in Explosives	
7. FM 5-250 Explosives and Demolitions	
8.	
9.	
10.	

5.0 ATTACHMENTS

Please Provide a Description of the Attachment	Place Your Attachments Here
1. Demolition Equipment Checklist	 DemoAttach1.doc
2. Health and Safety Equipment Checklist	 DemoAttach2.doc
3. General Safety Precautions	 DemoAttach3.doc
4. Disposal Operations Checklist	 DemoAttach4.doc
5. Explosive Disposal Log	 DemoAttach5.doc

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DEMOLITION EQUIPMENT CHECKLIST

Date _____	Disposal Supervisor _____
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EQUIPMENT	QUANTITY	COMMENTS
Explosive Vehicle		
Personnel Vehicle		
Camcorder/digital camera		
Siren		
Air Horn		
Bravo Flag (Red)		
Handheld Radios		
Cellular Telephone		
Electronic Firing Device		
Radio Controlled Firing Device		
Ruler, 24-inch		
Schonstedt locator		
Shovel, round point, long handle		
Shovel, round point, short handle		
Blasting Machine		
Tape, duct		
Tape, measuring, 50- or 100-meter		
Tape, plastic		
Toolbox, general hand tools		
Galvanometer		
Firing Wire		
Demolition Kit		
Knife		

HEALTH AND SAFETY EQUIPMENT CHECKLIST

Date _____	Disposal Supervisor _____
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ITEM	QUANTITY	COMMENTS
Air horn, emergency		
Burn Blanket		
Burn kit		
Emergency eye wash		
Fire blanket		
Fire extinguisher, 10-pound ABC		
Bloodborne Pathogen Kit		
First aid kit		
Gloves, leather		
Goggles		
Face Shield		
Welders' Gloves		
Welders' Apron		
Rain suit		
Safety vest		
Stretcher		
Water, 5-gal bottle (emergency shower)		
Water, drinking- 1 liter per person		

General Safety Precautions

- Carry blasting caps in approved containers and keep them out of the direct rays of the sun. Keep the caps located at least 25 feet from other explosives until they are needed for priming.
- Do not work with electric blasting caps or other electro-explosive devices while wearing clothing prone to producing static electricity such as nylon, silk, synthetic hair, etc..
- Do not use explosives or accessory equipment that are obviously deteriorated or damaged. They may cause premature detonation or fail completely.
- Always point the explosive end of blasting caps, detonators, and explosive devices away from the body during handling.
- Use only standard blasting caps of at least the equivalent of a commercial No. 8 blasting cap.
- Use electric blasting caps of the same manufacturer for each demolition shot involving more than one cap.
- Do not use improvised methods for initiating blasting caps.
- Do not bury blasting caps. Use detonating cord to transmit the explosive wave from the blasting caps, on the surface, to a buried/tamped explosive charge. Buried blasting caps are subject to unobserved pressures and movement, which could lead to premature firing or misfires.
- Test electric-blasting caps for continuity at least 50 feet from any other explosives prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be shunted by twisting the bare ends of the wires together. The wires will remain shunted until ready to be connected to the firing circuit.
- In the event of a misfire when disposing of explosives by detonation, do not approach the disposal site for at least 30 minutes after the expected detonation time, when firing electrically. When conducting non-electric procedures, the wait time will be at least one hour from the expected time of detonation.
- Items with lugs, strong backs, tail-booms, base plates, etc., should be oriented away from personnel locations.
- Consideration should be given to tamping the UXO to control fragments, if the situation warrants. Fragments will be minimized not only to protect personnel but also property, such as buildings, trees, etc.
- Avoid inhaling the smoke, dust or fumes of burning pyrotechnic or incendiary materials. The smoke, dust and fumes from many of these materials are irritating and/or toxic if

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inhaled.

- Do not use water on incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the mixture.
- Anticipate a high order detonation when burning pyrotechnic or incendiary-loaded MEC. Safety measures for personnel and property must be based upon this possibility.
- Inert ordnance will not be disposed of, or sold for scrap, until the internal fillers have been exposed and unconfined. Heat generated during a reclamation operation can cause the inert filler, moisture, or air to expand and burst the sealed casings. Venting or exposure may be accomplished in any way necessary to preclude rupture due to pressure from being confined. All requirements of the UXO Procedure for the Management and Disposition for Material Potentially Presenting an Explosive Hazard (MPPEH) will be met prior to releasing any inert ordnance material.
- Maintain minimum safe distances between electromagnetic-radiating sources and electro-explosive devices in accordance with EODB/TM-TO 60A-1-1-12.
- Do not conduct blasting or demolition operations during an electrical, dust, sand or snowstorm of severe enough to produce atmospheric static electrical charges, or when such a storm is nearby (within 10 miles). Under such conditions, all operations will be suspended or terminated, cap and lead wires shunted, and personnel removed from the demolition area. Demolition operations will also be terminated if visibility becomes less than 600 feet.
- Loose initiating explosives: lead azide, mercury fulminate, lead styphnate, and tetracene. These explosives manifest extreme sensitivity to friction, heat, and impact. Extra precautions are required when handling these types of explosives. Keep initiating explosives in a water-wet condition at all times until ready for final preparation for detonation. Sensitivity of these explosives is greatly increased when dry.
- Exercise extreme care when handling and preparing high explosives for detonation. They are subject to detonation by heat, shock or friction.
- Do not pack bomb fuze wells with explosives unless it can be positively confirmed that the fuze well does not contain any fuze components.
- Photo flash bombs must be handled with the same care as black powder filled munitions.
- MEC containing white phosphorous will not be detonated into the ground. White phosphorous munitions will be counter-charged on the bottom centerline (CCBC) when possible.
- A search of the detonation site, after the demo operation, will be conducted to assure complete disposal was accomplished.

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- Do not abandon any explosives.
- Do not leave explosives, empty cartridges, boxes, liners or other materials used in the packing of explosives lying around where children, unauthorized persons or livestock can get at them.
- Do not allow any wood, paper or other materials used in packing explosives to be burned in a stove, fireplace or other confined space, or be re-used for any other purpose. Such materials will be destroyed by burning at an isolated location out of doors, with no one allowed within 100 feet of the burning operation.
- Do not fight fires involving explosive material. Evacuate all personnel to a safe location and secure the area.
- Know and observe federal, state, and local laws/regulations, which apply to the transportation, storage and use of explosives.
- Do not permit metal, except approved metal truck bodies, to contact explosive containers.
- Do not transport metal, flammable, or corrosive substances with explosives.
- Do not allow smoking, or the presence of unauthorized personnel, in vehicles transporting explosives.
- Carefully load and unload explosives from vehicles. Never throw or drop explosives from the vehicle.
- Assure the load is blocked and braced to prevent it from movement and displacement.
- Do not drive vehicles containing explosives over public highways until all permits and certifications have been obtained from the state enforcement agencies.
- All routes must be approved in writing prior to transporting explosive materials over public highways.
- Licensed commercial carriers will conduct the shipment of explosive materials over public highways unless Tetra Tech UXO personnel have been specifically licensed and certified to make the shipment.
- Never leave vehicle loaded with explosives unattended.
- Do not store blasting caps, detonators, or other items containing initiating explosives in the same box, container or magazine with other explosives.
- Store explosive materials in military or ATF approved magazines only. Ensure the magazines used for the storage comply with quantity distance requirements, for the class of explosive material they contain. Reference documents include: OP-5, TM 9-1300-206,

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AMCR 385-100, ATF - Explosives Law and Regulation, ATF P 5400.7 and 49 CFR.

- Do not store spark-producing metal/tools in an explosive magazine.
- Do not permit smoking, matches or any source of fire or flame within 100 feet of 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 within 300 feet of an explosive magazine.
- Do not use any alkaline material such as lye, washing soda, or soap to remove TNT exudate. Alkaline materials will react with TNT to render it more sensitive.
- Do not permit smoking, matches or other sources of fire or flame within 100 feet of an area in which explosives are being handled.
- Do not expose explosives or devices containing explosive to prolonged exposure to direct sun light. Such exposure can increase sensitivity and deterioration.
- Ensure all unused explosives are returned to their proper containers and the container closed after use.
- Do not carry explosives or explosive components in pockets or on the body.
- Do not insert anything but time fuse or detonating cord into the open end of a blasting cap.
- Do not strike, tamper with, or attempt to remove or investigate the contents of an electric/non-electric blasting cap, detonator or other explosive initiating device. A detonation may occur.
- Do not pull on the electrical lead wires of electric blasting caps, detonators or their electro-explosive devices. A detonation may occur.
- Do not attempt to remove an unfired or misfired primer or blasting cap from a base coupling. There is a high risk of an explosion.
- Do not allow unauthorized or unnecessary personnel to be present when explosives are being handled.
- Always point the explosive end of blasting caps, detonators and other explosive devices away from the body.
- Do not use pull rings or safety pins to lift or handle explosive devices.

DISPOSAL OPERATIONS CHECKLIST

Date _____ Team _____

FUNCTION	DATE/TIME	SIGNATURE
Senior UXO Supervisor		
Assign Disposal Team		
Brief Disposal Team Review emergency procedures Discuss MEC to be disposed Describe Disposal procedures		
Inspect Range/Exclusion zone upon completion of operations		
Disposal Supervisor		
Verify Bravo Flag is hoisted (dedicated range)		
Verify roads are closed		
Verify exclusion zone boundaries in place		
Complete health and safety and equipment checklists		
Ensure site office has completed the verification checklist Responsible activity Medical Facility Fire Department Security/Police Department		
Disposal Supervisor tailgate safety brief: Designate emergency vehicles Designate emergency evacuation route Review emergency response procedures		
Verify daily equipment inspection		
Verify detonators are separated from explosives		
Verify area has been evacuated		
Notify site office operations are commencing		
Start Disposal activities		
Inspect shot after designated wait time		
Collect all metal fragments for later disposal		
QC check performed		
Stop disposal activities		
QA check (if required)		
Tetra Tech site office will notify the following upon completion: Notify Client Responsible Activity Medical Facility Fire Department Security/Police Department		
Complete MEC Accountability Log		
Demobilize		
Record data in Explosive Disposal Log		

UXO-4:

General UXO Safety Precautions

Purpose

This document provides basic safety precautions for operations related to Munitions and Explosives of Concern (MEC). Adherence to these precautions is mandatory for unexploded ordnance (UXO) qualified personnel on all Tetra Tech EC, Inc. (TtEC) and subsidiaries ("The Company") munitions response actions and any additional Company operations which have the potential to result in contact with MEC.

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Table of Contents

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1.0 PURPOSE

This document provides basic safety precautions for operations related to Munitions and Explosives of Concern (MEC). Adherence to these precautions is mandatory for unexploded ordnance (UXO) qualified personnel on all Tetra Tech EC Inc. (TtEC) and subsidiaries ("the Company") munitions response actions and any additional Company operations which have the potential to result in contact with MEC.

2.0 SCOPE

This document contains safety precautions, which are to be observed during all Company and Company subcontractor munitions response operations. These precautions are general in nature and do not address all site-specific safety considerations.

3.0 MINIMUM REQUIREMENTS

All employees are required to follow the minimum requirements listed in this procedure. Any employee may request approval to vary from these requirements if they are in conflict with our corporate "Operating Philosophies," are unsafe, or are not compatible with contract or site-specific requirements. Approval to vary from this procedure must be obtained in writing from the UXO Discipline Lead. Additionally project related deviations must be covered at the first project review following the authorization to deviate. All employees are encouraged to submit comments and/or recommendations to improve this procedure.

The following apply to the information contained in this procedure:

- Only UXO Qualified Personnel (UXO Personnel) will perform MEC procedures.
- These precautions are intended for trained UXO personnel involved in MEC operations.
- No UXO personnel, in the employment of or subcontracted to ("The Company") and its subsidiaries, will perform render safe procedures (RSP) on any munitions. This includes the disarming or disassembly of remote, auxiliary or secondary firing devices, unless these services are specifically identified in the germane contract. If an RSP is required, assistance will be requested from the responsible military EOD organization through the proper channels.
- Munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard will be considered armed.
- MEC items that are considered armed will not be moved.
- UXO personnel will not conduct diving operations on influence-fired munitions unless specifically identified in our contract and specialized diving equipment is available.

3.1 Definitions

Discarded Military Munitions (DMM) – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term DMM does not include unexploded ordnance, military munitions that are being held for future use of planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations.

Electro-explosive Device (EED) – Any single unit, device or subassembly, whose actuation is caused by the application of electrical energy which, in turn, initiated the explosive, propellant or pyrotechnic mixture contained in the device.

Exclusion Zone (EZ) - Areas where contamination (hazard) is known or likely to be present, including areas where activities being conducted may have the potential to cause harm to personnel. The exclusion zone shall be large enough to protect other personnel from the blast and fragmentation hazards of accidental detonation. The exclusion zone for MEC operations will be in accordance with DOD Standard 6055.9 or as calculated by the United State Army Corps of Engineers (USACE) CEHNC Engineering Branch or NAVFACENGREP.

Expended Ordnance - Ordnance that has functioned as designed, leaving the shell or container behind. This shell or container may or may not contain explosive/pyrotechnic/toxic residue. This material would not be considered inert, and could not be salvaged as scrap without appropriate visual inspection, sampling, and/or treatment.

Explosive Ordnance Disposal (EOD) Personnel - Active duty military personnel who have completed the training course at the U.S. Naval School, Explosive Ordnance Disposal, Elgin Air Force Base, Florida (formerly Indian Head, Maryland) and are currently assigned to a military EOD unit.

Explosives Safety – A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of potential mishaps involving military munitions.

Influence Fired Ordnance – Magnetic, Acoustic Pressure or Seismic fired ordnance. Usually associated with underwater ordnance (Mines, depth charges torpedoes, etc.

Inert Ordnance – Ammunition or ammunition components void of explosive or chemical material. An inert material may be used to represent an explosive filler or material.

Intrusive Investigation - Excavating for suspected MEC items, or for plotted anomalies. Excavation will be by hand, or utilizing heavy equipment as deemed appropriate.

Material Potentially Presenting an Explosive Hazard (MPPEH) – Material potentially containing explosives or munitions (e.g., munitions containers and packing material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

MEC Procedures - Procedures that include, but are not limited to, the following actions performed by an UXO-qualified individual:

- MEC avoidance
- MEC surface clearance
- MEC intrusive operations. Gaining access to (by manual or mechanical excavation) and identifying subsurface anomalies and identifying and assessing the condition of buried MEC.
- Identifying and assessing the condition of surface MEC.
- Recovery and final disposition of all MEC/MC.

MEC-Related Procedures - Procedures that include, but are not limited to, the following actions, which may be performed by a non UXO-qualified individual:

- Locating and marking subsurface anomalies (non-intrusive).
- Locating and marking suspected surface MEC.
- Transporting and storing recovered MEC.

- Utilizing Earth Moving Machinery (EMM) to excavate overburden from suspected MEC.

Military Munitions – Military munitions means all ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the 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, including bulk explosives, and chemical warfare 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. The term does not include wholly inert items; improvised explosive devices; and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear 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)(A) through (C))

Munition with the Greatest Fragmentation Distance (MGFD) - The munition with the greatest fragment distance that is reasonably expected (based on research or characterization) to be encountered in any particular area.

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means: Unexploded Ordnance (UXO), Discarded Military Munitions (DMM) or Munitions Constituents (MC) (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC) – Any materials originating from unexploded ordnance (UXO), discarded military munitions (DMM), or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 U.S.C. 2710(e)(3)).

Munitions Debris – Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Non-Intrusive Investigation – The process of locating subsurface MEC items by use of magnetometers or geophysical survey equipment without digging or otherwise disturbing the medium being surveyed.

Non-Ordnance/Non-Explosive Metal Debris – Metal debris recovered during operations, which is not ordnance related, such as metal rebar, angle iron, sheet metal and bar stock, etc.

Open Detonation (OD) - A method of disposal for explosive ordnance where a donor explosive charge is detonated in contact with the ordnance to achieve a high order detonation of the energetic materials contained within the ordnance.

Open burn (OB) - A method of disposal for explosive ordnance, explosives and RCWM where the materials to be disposed of are placed on a bed of flammable dunnage (scrap wood), all materials are covered with diesel fuel, and then initiated to consume the energetic or toxic materials in the flames.

Practice Ordnance - Munitions that demonstrate similar characteristics, as their high explosive counterparts, but may contain pyrotechnic, explosive, or chemical (e.g., titanium tetrachloride) spotting charges or tracers.

Render Safe Procedures (RSP) – The portion of EOD procedures that involves the application of special disposal methods or tools to interrupt the functioning or otherwise defeat the firing train of UXO from triggering an unacceptable detonation.

Tetra Tech EC Command Center - A designated location staffed by personnel to relay and control all communications/activities of field personnel and other units.

Unexploded Ordnance (UXO) - Military munitions that have been primed, fuzed, armed, or otherwise prepared for action, and have been abandoned, fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material, and remain unexploded either by malfunction, design, or any other cause. The definition of UXO is limited to items larger than 50-caliber.

UXO Qualified Personnel - Personnel who have performed successfully in military EOD positions, or are qualified to perform in the following Department of Labor, Service Contract Act, Directory of Occupations, contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist or Senior UXO Supervisor. For qualification requirements, refer to DDESB TP 18.

UXO Technician – Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III.

3.2 General

3.2.1 Basic Considerations

The following safety considerations and criteria apply to all explosive ordnance, and shall be considered during the planning phase of all munitions response actions:

A UXO team will have a minimum of three personnel, of which two will be qualified UXO personnel, with an UXO Tech III as a team leader, when conducting intrusive operations. On small projects the SUXOS may act as the team leader. UXO avoidance may be conducted with two qualified UXO personnel, with an UXO Tech III as a team leader, for construction support if authorized by the UXO Operations Manager. When two UXO personnel are utilized, no intrusive operations will be authorized. During initial fieldwork, an UXO Tech II will accompany the survey crew for the purpose of UXO avoidance. The UXO Tech II will escort the survey crew into and out of suspect areas, check the point where survey stakes are to be driven, mark or otherwise locate any surface MEC encountered but will not handle or move any UXO or perform any intrusive activities.

When multiple UXO teams are utilized in an area the Senior UXO Supervisor (SUXOS) will ensure a safe team separation distance (TSD) between the teams is maintained during intrusive operations. The minimum TSD will be K40 overpressure distance.

When MEC is located, only the minimum number of personnel necessary to complete the investigation/removal task will remain down-range.

Movement of MEC will be kept to a minimum and only after the MEC has been positively identified, is determined to be unarmed, presents no other hazards and the movement is required to perform disposal procedures. If the ordnance item must be moved for identification purposes or to determine its condition, do so by a remote means from a safe position, only. Ensure the area can withstand a high order detonation before moving an unknown item. The Senior UXO Supervisor will make the final determination when MEC are safe to move.

The responsible military service EOD will be called if an item cannot be positively identified or determined to be unarmed or a Render Safe Procedure (RSP) is required.

UXO personnel must be alert and strictly adhere to applicable safety precautions at all times. They must advise project personnel on the proper precautions for the protection of personnel and property within the damage radius of MEC.

Personnel exposure time at the ordnance site will be limited. Equipment preparation, publication research, and other support activities should be performed at a safe distance from the ordnance.

3.2.2 Basic Safety Precautions for All Military Munitions

DO:

As a general rule, all unexploded ordnance (UXO) will be detonated in the original position found (Blown In Place [BIP]).

MEC operations will not be conducted until all applicable plans (work plan and Health and Safety plan as a minimum) for the site in question are prepared and approved. An Explosive Safety Submission (ESS) is also required for MEC intrusive operations on government contracts. These plans will be based upon the concept of limiting exposure to the minimum number of personnel, for the minimum amount of time, to the minimum amount of MEC consistent with safe and efficient operations. The ESS, work plan, and Health and Safety plan (as a minimum) are the governing documents on site. The Senior UXO Supervisor will insure the following actions are covered in the work plans, if not, those action(s) are prohibited until the plan(s) have been amended and the proper signatures authorizing the action(s) have been obtained.

Establish a Munition with the Greatest Fragmentation Distance (MGFD) for each munitions response site. Establish the Quantity-Distance (QD) criteria for each munitions response area. The QD criteria can be requested from the client based on the MGFD provided by "the Company", or provided to "the Company". An exclusion zone (EZ) can be determined from the MGFD and the QD criteria. The EZ will be implemented prior to conducting MEC operations.

Only UXO-qualified personnel will perform MEC procedures. As an exception, a UXO Technician I may assist in the performance of MEC procedures when under the supervision of a UXO Technician III or an UXO-qualified individual of higher qualification. Non-UXO-qualified personnel who have been determined to be essential for the operations being performed may be utilized to perform MEC-related procedures when supervised by a UXO Technician III or an UXO-qualified individual of higher qualification but will be restricted from handling any explosives or explosive devices. All personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards of the procedures being performed. To ensure that these procedures are performed to standards, all field personnel will be under the direct supervision of a UXO Technician III or an UXO-qualified individual of higher qualification.

Personnel who will be handling MEC items will not wear outer or inner garments having static-electricity-generating characteristics. Materials made of 100-percent polyester, nylon, silk and wool are highly static producing. Refer to DA AR 385-64 for more information regarding non-static-producing clothing.

Prior to any action being performed on an ordnance item, all fuzing will be positively identified. This identification will consist of fuze type by function and condition (armed or unarmed) and the physical state/condition of the fuze, i.e., burned, broken, parts exposed/sheared, etc.

MEC operations will be conducted only during daylight hours.

UXO personnel are not authorized to render inert any MEC items. They may inspect and certify ordnance items not containing fuzing or explosive fillers.

MEC items will not be taken from the site for personal souvenirs. Individual munitions that present no hazards, can be retained for training aids and possibly transferred to other work sites suspected of having like items present to indoctrinate new personnel on site and for geophysical test plot prove-out. If transfer is approved, all inert MEC items shall be serialized, painted blue and include a signed inventory sheet in the shipping box. The transfer of the training aids, from one site to another, must have the approval of the losing and gaining site Project Managers, and conform to the requirements of "UXO-13: Acquisition, Certification, Shipping and Storage of Inert Ordnance Training Materials.

Civil War munitions will be treated in the same manner as any other MEC item.

Assume that a practice MEC item contains a live charge until investigation proves otherwise. Expended pyrotechnic and practice devices can contain red or white phosphorus (R/WP) residue. Due to incomplete combustion, this residue may re-ignite spontaneously if the crust is broken and exposed to air.

Foreign munitions were shipped to the United States for exploitation and subsequent disposal. Every effort will be made to research all applicable documentation prior to commencement of a project involving foreign munitions. If a foreign munitions is located on a site, and it's finding was not supported by historical documentation, more research must be conducted to determine why it is there, where it came from and if more can be expected.

Prior to entering areas/ranges controlled by the Department of the Army, and contaminated with Improved Conventional Munitions (ICMs) or submunitions, a Department of the Army (DA) waiver must be obtained by the affected installation or for FUDS properties, the executing Corps district. If an ICM or submunition is found at a site not previously known to contain ICMs or submunitions, work will cease. The discovered item will be identified, then properly disposed of (including guarding the item if disposition is to be delayed). Work will resume only when an ICM waiver has been obtained. For guidance on the preparation of waiver requests, contact the MEC Mandatory Center of Expertise.

Any time suspect chemical warfare materiel is encountered during conventional MEC site activities; all work will immediately cease. Project personnel will withdraw upwind from the discovery site. A team consisting of a minimum of two personnel will secure the area to prevent unauthorized access. Personnel should position themselves as far upwind as possible while still maintaining security of the area. On possible RCWM sites, ensure NO RCWM is present before the integrity of the munition is violated.

Projects/Sites involving Landmines, Improved Conventional Munitions or Submunitions and Chemical Warfare Materiel will be approved by the UXO Operations Manager prior to Tetra Tech EC agreeing to a scope of work. . In addition, the Work Plan and Health and Safety Plan will be reviewed and approved of by the UXO Operations Manager, and the UXO Health and Safety Manager.

Review electromagnetic radiation (EMR) hazards and precautions, and electrical grounding procedures, prior to conducting MEC operations on munitions containing known or suspected electrically actuated explosive devices.

Observe magnetic, acoustic/seismic and infrared related precautions (See sections 3.2.3, 3.2.4, and 3.2.5) during the approach to all suspect munitions and continue to observe these precautions until it is certain that the munition does not contain magnetic, acoustic/seismic, or infrared fuzing.

When MEC disposal or movement to a safe storage location cannot be performed immediately, the item should be appropriately marked. This will ensure that the item can be easily located. All site personnel should be informed of the location of suspect UXO items.

Conduct any initial movement or jarring of a possibly hazardous item by remote means from a safe position.

Clear debris from obstructed ordnance only enough to perform UXO procedures. If such clearance will disturb the ordnance by moving it, perform the clearance by remote means from a safe position.

Secure the item to prevent movement during UXO procedures.

Note any unusual markings, signs of tampering, or modifications to otherwise familiar munitions. Such items will be considered unknown.

Avoid inhalation of, and skin contact with, smoke, fumes, and vapors from explosives and related hazardous materials. Also avoid contact with hazardous liquids and solids that may result from damaged actuated munitions system components, (i.e. mercury thallium, cadmium dust, depleted uranium, electrolyte). Wear adequate respiratory equipment and protective clothing to preclude skin contact, inhalation and ingestion.

Consider MEC that has been exposed to fire as extremely hazardous. Chemical and physical changes may have occurred to the contents that render the MEC much more sensitive than in its original state.

Remove components from MEC only when absolutely necessary, and by remote means from a safe distance.

Take precautions against boobytraps. Boobytraps can be incorporated into almost any type of munition.

Incorporate adequate protective measures to reduce shock and fragment damage before performing procedures on MEC.

DON'T:

Don't attempt to remove any fuze(s) from MEC items. Do not dismantle or strip components from any MEC items.

Don't disassemble, strip, or subject any munition to unnecessary movement.

Don't depress plungers, turn vanes, or rotate spindles, levers, setting rings, or other external fittings on the ordnance. Such actions may arm or actuate the ordnance, or cause it to function.

Don't attempt to remove bursters from dud fired, abandoned, damaged or leaking toxic chemical munitions.

Don't rely on color-coding of munitions for positive identification of contents.

Don't conduct diving operations in areas that have, or are suspected of having, influence-fired ordnance (ordnance actuated by magnetic, acoustic or seismic means).

3.2.3 Basic Safety Precautions for Magnetic Influenced Ordnance

DO:

Maintain maximum distance from magnetic sensors.

Screen personnel for a magnetic signature with a field magnetometer, if available, before closely approaching the ordnance.

DON'T:

Don't approach the ordnance with any tool or metallic object that is not approved for use on magnetically actuated ordnance.

Don't allow any movement of magnetic or ferrous material near the ordnance.

Don't disturb or move the ordnance.

Don't turn power lines, motors, or generators on or off in the area.

Don't permit compasses, magnetic telephones, or other sources of magnetic field producing equipment near the ordnance.

3.2.4 Basic Safety Precautions for Acoustic and Seismic Influenced Ordnance

DO:

Move with slow, deliberate motions; avoid abrupt moves.

Use some form of cushioning, such as rubber or similar material, between tools or explosive charges and the ordnance.

Refrain from throat clearing, coughing, or vocal emissions.

DON'T:

Don't operate vehicles in the immediate vicinity (300 feet) of suspected acoustic/seismic ordnance.

Don't wear or carry loose equipment, which may rattle, flap, or otherwise cause noise.

Don't permit metal-to-metal contact, scraping or scratching on the ordnance or in the immediate vicinity.

Don't impart vibration to the ordnance or surrounding area.

Don't talk or create noise within 75 feet of the ordnance. Use full acoustic precautions within 30 feet of the ordnance by restricting necessary noise or vibration to a period of one-second duration followed by a minimum period of three seconds of silence.

Don't touch the munition. If the item must be touched, hands should be discreetly placed in the area to be touched, then removed or carefully placed in the general area of the next point of interest. Do not rub the ordnance or slide hands from point to point.

3.2.5 Basic Safety Precautions for Infrared Influenced Ordnance

DO:

None.

DON'T:

Don't permit personnel, vehicles, or any heat-generating source in front of an infrared sensor.

Don't permit personnel, vehicles, or any objects to pass between and infrared source and receiver.

3.3 Explosive Loaded Munitions

3.3.1 Introduction

Explosive loaded ordnance includes high and low explosives from all countries. For descriptive data on explosive materials that may be encountered in ordnance, refer to applicable manuals. Due to the numerous references to shaped charge ordnance (including High Explosive Antitank (HEAT)) precautions, these types of loading are given special coverage in 3.3.3.

3.3.2 Safety Precautions for Explosive Loaded Ordnance

DO:

Protect explosive loaded munitions, and explosive related components, from extreme heat sources, including direct rays of the sun. High temperatures can greatly increase the sensitivity of the explosives.

Exercise extreme caution when dealing with old, damaged, and possibly deteriorated explosive loaded munitions. Certain explosives, notably picric acid and Explosive D (ammonium picrate), may react with metals, other explosives, air, or chemicals in the earth to produce extremely sensitive explosive compounds.

Wear gloves and wash thoroughly with soap and water as soon as possible after handling explosives, including toxic or unknown types of propellants. Severe dermatitis can result from skin contact.

Anticipate a detonation when burning any explosive. Safety measures for personnel and property must be based on this possibility. Certain low explosives, such as black powders, casting powders, and solid propellants having high nitrogen content, can react under certain conditions with violence approaching high order detonation.

Wear appropriate personnel protective equipment. Smoke will penetrate ordinary clothing and may cause severe dermatitis, as well as eye and respiratory irritation. If the smoke cannot be avoided, wear appropriate protective clothing and respiratory equipment.

DON'T:

Don't subject any explosive loaded munition to shock or rough handling. The item and/or its contents may be in an extremely hazardous condition.

Don't inhale gaseous products of high explosive detonations. Some of the gases produced are toxic.

Don't carry explosives or explosive components in pockets or elsewhere on the body.

3.3.3 Shaped Charges and High Explosive Anti-Tank (HEAT) Ordnance

3.3.3.1 Introduction

These munitions have a special type of high explosive (HE) loading employing an explosive of high brisance formed in a manner that leaves a conical or hemispherical cavity in the nose of the

munition. Such a munition, when detonated from the rear (opposite of the open end of the cavity), produces a concentrated explosive jet (Monroe effect) forward of the munition along the central axis of the charge and cone. This jet has great penetrating power and is commonly used to penetrate armor.

3.3.3.2 Uses

This explosive loading is commonly used in an anti-armor role in artillery projectiles, cluster munitions, projected grenades, guided missiles, torpedoes and rocket warheads. The principle is also used in demolition procedures for special effects.

3.3.3.3 Safety Precautions for Shaped Charges and HEAT Ordnance

DO:

Avoid the area forward of the nose of a munition until it can be determined that the item is not a shaped charge munition. The explosive jet can be fatal at great distances forward of the longitudinal axis of the item.

Assume any shape charge munition contains a piezoelectric fuzing system until the fuzing is otherwise identified. Do not touch or move armed munitions except by remote means; it may be extremely sensitive and can fire at the slightest physical change. Avoid creating a temperature changes over one degree when working around piezoelectric fuzes. This minor change in temperature may be enough to cause "stress" in the piezoelectric crystals and thereby produce an electrical charge.

Maintain adequate safe distances when manipulating the shaped charge munition remotely. These charges can project lateral fragments to considerable distances, and some types have been constructed to enhance the lateral fragment effect.

In destroying shaped charges by detonation, initiate the munition to be destroyed in a manner that precludes the explosive jet from forming. This is best accomplished by initiating a charge on the side of the munition, at a point 90 degrees to the axis of the cone. The detonation point should be forward of the base but not so far forward as to fire into the empty cone of the shaped charge.

Dispose of shaped charge munitions individually or in small quantities to reduce the inadvertent formation of a full jet effect.

DON'T:

None.

3.4 Chemical Loaded Munitions

Recovered chemical warfare material (RCWM) and biological agents have been used to fill munitions, and utilize explosive bursters for dissemination. RCWM and bio-agent munitions are addressed briefly below, but are addressed in more detail in separate Company UXO documents.

3.4.1 Introduction

Military munitions may contain chemical material either as the main charge or as a significant component. Chemical materials include toxic chemical agents, riot control agents and smokes. Munitions that may contain chemical agents includes bombs, dispensers, clusters and launchers, projectiles, grenades, rockets, guided missiles, landmines and miscellaneous explosive devices.

3.4.2 Safety Precautions for Chemical Loaded Munitions

DO:

All on-site workers must receive training appropriate for their work assignments and responsibilities. As a minimum, on-site personnel must have received 40 hours formal training (29 CFR 1910.120), an eight-hour annual refresher, three days actual field experience under the direction of a trained/experienced supervisor and be a current participant in a medical surveillance program. If Recovered Chemical Warfare Materiel (RCWM) or other special hazards potentially exist at the site, additional site-specific medical monitoring and training requirements will be met before field activities commence.

Unless the ordnance item can be positively identified, personnel must assume that it contains the most hazardous combination of agent, explosives, and fuzing.

Always approach a suspected chemical munition from the upwind direction.

Always assume the worse case scenario. Any of the following situations will require an immediate upgrade to Level "B" PPE: an item (to include ordnance, glass vials, sample bottles, chemical agent identification set [CAIS] related etc.) is leaking, suspected of leaking, or the outer casing of an item indicates a possible Recovered Chemical Warfare Munition (RCWM).

Ordnance suspected of having a chemical agent filler will not be handled or moved in any way unless "the Company" is properly contracted to do so, all appropriate site plans are in place and personnel are trained/competent to handle these situations. A Chemical Safety Submission (CSS) is required for projects involving RCWM. Contact the UXO Health and Safety Manager for information pertaining to the development of a CSS.

Personal Protective Equipment (PPE) and Personal Protective Clothing (PPC) will be approved by "the Company" Program Manager for the site and the Commander (or designee) of the Military Installation. This provision is strictly enforced at Army Installations. The Army has a list of approved PPE/PPC for agent operations, and the authority to approve at the site level.

An approved agent monitoring plan is required for potential agent operations and will need to address real time monitoring and secondary confirmation monitoring or sample collection for lab analysis procedures.

DON'T:

None.

3.5 Pyrotechnic and Incendiary Loaded Munitions

3.5.1 Introduction

Pyrotechnic mixtures are usually physical mixtures or blends of powdered chemicals, which include fuels and oxidizers so that the mixture burns when ignited to produce light and/or colored displays for signaling purposes. Pyrotechnic loading may be encountered in bombs, clusters, projectiles, rockets, grenades, landmines, hand signaling devices, and all types of training munitions. Incendiary mixtures are usually the hot metal (thermite) types, or of an oil base, such as napalm. Incendiary loading may be encountered in any ordnance class. Ordnance filled with incendiary or pyrotechnic mixtures is subject to deterioration, with a resultant increase in ignition sensitivity if exposed to high temperatures. Some mixtures may ignite spontaneously if exposed to moisture. Ordnance containing these mixtures is a fire hazard, burns with intense heat, and is difficult to extinguish. Most types furnish their own oxygen upon combustion. Photoflash charges detonate with great violence rather than burn. In general, water should not be used to combat incendiary or pyrotechnic fires.

3.5.2 Safety Precautions for Pyrotechnic and Incendiary Loaded Munitions

DO:

Protect the eyes with Number 6 welder's goggles, or equivalent, if visual exposure to burning pyrotechnic materials is probable. Such burning materials can cause serious eye injuries unless the eyes are properly protected.

Use dry sand or Portland cement to smother incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the incendiary mixture.

Bury incendiary loaded munitions in dry sand when transporting them. This will smother any fires until other corrective action can be taken.

Use caution when conducting disposal operations with pyrotechnic munitions. Several pyrotechnic items are water activated. The moisture content of diesel fuel could ignite the igniter of smoke flares and other pyrotechnic munitions

Anticipate a high order detonation when burning pyrotechnic or incendiary loaded ordnance. Safety precautions for personnel and property must be based on this possibility.

Would it be appropriate to add a sentence regarding desensitizing unknown pyrotechnic munitions with oil diesel fuel.

DON'T:

Don't inhale the smoke or fumes of burning pyrotechnic or incendiary materials. The fumes and dust from many of these materials are irritating and/or toxic if inhaled. Wear a protective mask when extensive fumes may be encountered.

Don't approach a pyrotechnic or incendiary burn area for 30 minutes after the cessation of burning. Unconsumed explosive components may be present after burning apparently ceases.

3.5.3 Safety Precautions for Photoflash Munitions

DO:

Photoflash powder should be desensitized by spraying or soaking with oil, diesel fuel, hydraulic fluid, or other nonvolatile lubricants.

DON'T:

Don't attempt to dispose of photoflash munitions by burning.

Don't look directly at photoflash munitions during disposal operations.

Don't remain in the vicinity of damaged photoflash munitions longer than necessary after they have been exposed to excessive moisture. Photoflash powder will react with moisture and generate hydrogen gas, and this reaction may generate sufficient heat or pressure to detonate the munition.

3.5.4 Safety Precautions for Red Phosphorous Loaded Munitions

DO:

Appropriate PPE (welders gloves and face shield, minimum) will be worn when required to handle RP munitions. When handling or working in close proximity to unconfined RP, welders jacket and leggings will be worn in addition to welders gloves and face shield.

Check expended pyrotechnic devices carefully for RP residue, and decontaminate if necessary. Due to incomplete combustion, RP and white phosphorous (WP) may be present and re-ignite spontaneously.

Decontaminate confined spaces in which RP devices have been burned. Incomplete combustion may produce deposits of red and white phosphorous, which may re-ignite spontaneously at any time, emitting fire and smoke.

Isolate, and decontaminate if necessary, any items or equipment which have been associated with burning RP underwater. Such items may be contaminated with phosphorous residue that may re-ignite spontaneously as they dry out.

DON'T:

Don't permit red phosphorous (RP) to come in contact with oxidizing agents (chlorates, perchlorates, etc.). Such mixtures can form very sensitive explosive compounds.

Don't crush or break crusted phosphorous residue that may be present after RP has been burned. This residue is sensitive and may ignite if subjected to friction or if the crust is broken.

3.5.5 Safety Precautions for Fireworks

DO:

Fireworks are extremely sensitive and may be chemically similar to photoflash powder.

Fireworks should be destroyed as soon as practicable after recovery.

Fireworks should be desensitized by spraying or soaking them with oil, diesel fuel, hydraulic fluid, or other nonvolatile lubricants.

Transport desensitized items in plastic bags, preferably 6 mils thick.

If large quantities are to be transported, the bags of desensitized fireworks should be placed in cardboard boxes or suitable substitutes. This will prevent the items from bearing the weight of others and reduce the hazard of friction caused by load shifting.

Disposal of fireworks may be by detonation or burning. Burning should be in a trench and in limited quantities to prevent kick outs from mortar type fireworks.

DON'T:

None.

3.6 Smoke Loaded Munitions

3.6.1 Bursting Smoke

3.6.1.1 Introduction

The properties of plasticized white phosphorous (PWP) are similar to those of WP. Both are solid chemicals, which burn when exposed to air. Vapors that may be present in high concentrations of

the smoke are irritating and poisonous. Burns are deep, painful and continuing unless treated. PWP and WP are found in a wide variety of munitions and are used as screening smokes and incendiary agents. They are also used as igniters in certain types of incendiary munitions.

3.6.1.2 Safety Precautions for Bursting Smoke Munitions

DO:

Appropriate PPE (welders gloves and face shield, minimum) will be worn when required to handle WP or PWP munitions. When handling or working in close proximity to unconfined WP or PWP, welders jacket and leggings will be worn in addition to welder's gloves and face shield.

Assume that WP munitions with explosive bursters are present until investigation proves otherwise. Use protective equipment and have first aid items available and ready for use.

Identify and treat a known or suspected WP munition in accordance with the requirements of its fuzing and overall condition. The fuze may be armed, be of an especially hazardous type, or be in an otherwise hazardous condition.

Submerge a smoking WP munition in water or cover it with wet sand, mud, dirt or foam, as quickly and as gently as possible should it be necessary to handle such an item.

DON'T:

Don't approach smoking WP munitions unless absolutely necessary. Burning WP may detonate the burster or dispersal explosive charge at any time.

Don't transport a smoking WP munition unless it is immersed in water or mud, or is embedded in wet sand or earth.

3.6.2 Safety Precautions for Screening Smoke Munitions

Wear a protective mask in areas where strong concentrations of screening smokes can develop. Strong concentrations generally irritate the eyes and respiratory tract.

3.7 Fuzes and Fuzing Systems

3.7.1 Introduction

Fuzes contain an explosive initiating charge and the means for initiating the charge. Fuzing systems divide these elements and functions among several units. Certain elements of fuzing systems closely resemble fuzes and should be treated in a similar manner to fuzes. Safe and arming (S&A) devices containing explosives, electrical circuits and arming systems are typical of these. Pistols are normally inert items which, when associated with an initiating explosive (detonator) become a fuzing system. Fuzes and fuzing systems are used in a wide variety of surface ordnance, including bombs, clusters, dispensers, launchers, projectiles, grenades, rockets, landmines, guided missiles, pyrotechnic devices, and some types of underwater ordnance. Fuzes and fuzing systems may be mechanical, pyrotechnic, chemical, electrical, electronic, or combinations of these as to their operation. They function in a variety of designed modes, such as impact, long delay, mechanical/electronic time, proximity and anti-disturbance.

3.7.1.1 Fuze Identification

When identification of the fuze is impossible, the type of arming device and type of firing device in the fuze must be determined. When a fuze can be identified only as one of several types, treat the fuze as the most hazardous type.

3.7.1.2 Fuze Condition

Before attempting any operation on a fuze, its condition must be determined. The condition of a fuze can usually be determined through careful inspection of the visible components. However, if the condition is questionable, consider the fuze armed.

3.7.2 Safety Precautions for Fuzes and Fuzing Systems

DO:

Approach and handle fuzes using the following accepted practices. The fuze is considered the most hazardous component of explosive ordnance, regardless of type or condition. Observe magnetic, seismic, infrared and acoustic precautions when approaching an unidentified fuze. A sensitive magnetic, seismic, infrared or acoustic fuzing system may be present.

When site conditions dictate, precautions against booby-traps will be observed.. Some fuzes contain boobytraps that function on fuze removal or handling.

Assume that an electric fuze is sensitive to shock, heat, discharges of static electricity, and stray electric current. Many of these fuzes have a non-electric impact-firing device in addition to an electric firing device. The mechanical impact fuzes are often graze sensitive.

Observe waiting times for electric fuzes. Electrical fuzes retain energy for varying periods of time.

Piezoelectric crystal fuzing systems may remain hazardous for an indefinite period of time. Do not disturb any ordnance with piezoelectric crystal firing systems. This ordnance may function at any time for no apparent reason. Piezoelectric crystal firing systems may be very sensitive to a shock or force that may stress the crystal.

Turn off any source of radio frequency energy in the vicinity of a known or suspected proximity (VT) fuze. A VT fuze may be capable of being fired by radio frequency energy transmitted to the fuze by an outside transmitter.

Observe wait times for VT fuzes.

Keep fuzes separated from other explosive ordnance. A fuze located near another explosive charge may induce its detonation should the fuze accidentally explode.

Observe a 30-minute wait time for powder train time fuzes. If the 30-minute time has obviously passed, no further wait time is required.

DON'T:

Don't allow movement of equipment in the impact area until it is determined to be safe to do so. Some fuzes are designed to function on passage of a predetermined number of targets.

Don't drop, strike or jar an armed fuze. It may be in a very sensitive condition and may be fired by such action.

Don't move an armed fuze.

Don't attempt to reset an adjustable clockwork fuze to an indicated safe position or reinsert any fuze safety device. Clockwork fuzes are susceptible to jamming or damage upon impact. These fuzes may fire if an attempt is made to return them to a safe condition.

Don't walk in front of a VT fuze.

Don't drop, jar, or strike a fuze, or subject it to heat or any force tending to fire a possibly armed fuze. Many fuzes are fired by spring-loaded firing pins. In addition, the firing pin or other metal fuze parts may be embedded in an explosive component.

Don't subject a mechanical time fuze to any unnecessary movement. These fuzes contain a clock mechanism that may be temporarily stopped by a mechanical malfunction, and the firing pin or detonator, which are under spring tension, may be partially released.

3.8 General Safety Precautions for Military Munitions

3.8.1 Bombs

This section includes all military munitions classified as bombs for UXO purposes, regardless of size, type, loading or fuzing. Safety precautions include those of a general nature, which apply specifically to bombs and have not been covered in the general safety precautions of this document.

3.8.1.1 General Safety Precaution for Bombs

DO:

Positively identify the bomb. Some HE filled bombs contain rocket motors for increased penetration; others contain fillers such as chemical agents, photoflash composition, or incendiary material.

Observe all applicable fuze safety precautions during fin removal work.

Observe magnetic, seismic and acoustic precautions during the approach to any bombs; continue to observe these precautions until it is certain that the bomb does not contain magnetic, acoustic or seismic influence fuzing.

Assume the most dangerous fuze or fuzes are installed in the bomb if visual recognition cannot be made due to closure plugs or fin condition.

Be careful around bomb fin assemblies. Some may be mechanically or explosively deployed with considerable force capable of causing severe injury.

Photoflash bombs must be handled with the same care as black powder, and with even greater care than conventional loaded bombs. When loose photoflash powder is observed, stop all work until the loose powder has been desensitized and the leaking bomb has been removed to the safe area.

DON'T:

Don't pack a fuze well with explosives if the well contains a detonator. Detonators are sensitive to heat, shock and friction.

Don't remove any closure plugs, retaining rings, adapter boosters or FMU type fuzing with 3-inch diameter threads from a tritonal filled bomb. There is a possibility that explosive contaminated exudate may be in the fuze wells of tritonal filled bombs.

Don't move or jar a bomb, or attempt any procedure until the type and condition of its fuzing can be determined.

Don't move or jar a bomb initially except by remote means. Some fuzes may contain a hung cocked striker, anti-disturbance device, or the like.

Don't drop a fuze or subject a fuzed bomb to shock or impact. Such action may cause a time fuze to start or resume functioning, or may release a hung cocked striker.

Don't turn arming vanes, insert safety pins or pop out pins, pull or cut arming lanyards.

3.8.2 Clusters, Dispensers, and Launchers

Precautions in this section are applicable to all military munitions classified as dispensers, clusters, and launchers and to the explosive ordnance they contain. The precautions are general in nature, but specific enough to be limited to this class of munition and therefore not included earlier in this document.

3.8.2.1 General Safety Precautions for Clusters, Dispensers, and Launchers

DO:

Observe all safety precautions applicable to the fuze and payload.

Positively identify the dispenser and payload before attempting any MEC procedure. The item may contain random delay fuzing and a payload of HE, chemical, and incendiary or smoke munitions.

Approach a cluster or generator from upwind until certain that no chemical or other toxic agent is present.

Approach and work from the side of a dispenser only. Should an actuation occur, payload items might be ejected with dangerous force.

Always consider a dispenser loaded. The presence or absence of a payload may not be obvious from external examination.

Exercise caution around a dispenser or cluster adapter that contains no payload. The dispenser may contain explosive detents, ejection cartridges, or other explosive devices.

Work on munitions, which are separated from a ruptured cluster adapter before performing any work on the cluster. Individual munitions may be scattered over a wide area. Munitions outside the adapter or dislodged within may be armed.

Handle practice bombs carefully during and after their removal from a dispenser. They contain spotting charges that are hazardous if actuated.

Remain clear of retracted dispenser fins. Actuation may cause injury.

DON'T:

Don't remove munitions from a dispenser. Many munitions are designed to arm as soon as they leave the dispenser.

Don't jar or unnecessarily move the dispenser or fuze. Such action may initiate the dispenser and eject its contents.

3.8.3 Projectiles

Projectiles include mortars, howitzers and rifle ammunition other than small arms, and may be

rocket assisted in some cases. Projectiles may carry almost any type of payload, including high explosive, chemical, incendiary, pyrotechnic, biological, nuclear, inert, training, spotting and test payloads. They use a wide variety of fuzing, both as to functioning and in operating principles. Fuzing may be multiple in a single projectile.

3.8.3.1 General Safety Precautions for Projectiles

DO:

Examine the projectile and determine if it has been fired. Consider it armed if it has been fired.

Positively identify the projectile and its' fuzing. Markings and color codes stenciled or painted on the projectile may identify projectiles. However, the most reliable identification is by the physical characteristics and engraved or stamped markings on the exterior of the projectile body. In addition, the designation of the projectile components, such as fuzes or fin assemblies, may be marked on the exterior surface of the component.

Determine the country of origin of the projectile and compare its color markings against known national markings and color codes, if possible. A thorough knowledge of the various color coding, marking systems, and external configurations and details is required for proper identification.

Examine a projectile for the presence or absence of an unfired tracer. This knowledge may have a bearing on the procedures to be used.

Perform initial movement of a projectile remotely using a line. First movement of an embedded projectile may cause fuze functioning under certain conditions.

Observe rocket motor precautions when dealing with a rocket assisted projectile.

Have appropriate protective clothing and respiratory protection available when handling smoke and/or riot control agent projectiles.

Assume a practice projectile contains a live charge until it can be determined otherwise. A practice projectile should not be regarded as harmless simply because it does not have a live filler. Target practice projectiles may contain small pyrotechnic and explosive charges. Furthermore, personnel should not assume that a projectile does not have hazardous components because it is color coded or marked as dummy. Protect flash cartridges used in practice projectiles from moisture. Some cartridges contain powdered metals that may react violently and liberate explosive or toxic fumes when exposed to moisture.

Exercise extreme care in handling graze sensitive, electric switch actuated, piezoelectric, spring loaded, and cocked striker fuzes. Very little external force is required to function armed fuzes of these categories.

Use extreme care in handling air column fuzes. Many fuzes of this type are always armed.

Exercise extreme caution when handling explosive loaded components that have been separated from the projectile. Some projectile components are held in place by the fuze; removal of the fuze leaves the components unsecured and exposed. In some instances a sensitive lead is exposed. Normally, projectile components, other than the fuze, are not removed or withdrawn from the projectile. Always protect the primer of an unfired cartridge when handling or transporting a fixed round of ammunition or a propellant case. It may contain a percussion primer.

DON'T:

Don't move a projectile to inspect for markings. If required, move the projectile remotely.

Don't drop, strike, jar, or otherwise mishandle a projectile at any time during the munitions response action. A projectile is a sensitive explosive assembly, especially if has been fired or otherwise subjected to unusual stress.

Don't pick up a fired projectile.

Don't under any circumstances dismantle, disassemble, or otherwise strip unexploded projectiles or projectile components.

Don't approach a smoking WP or PWP projectile. It may cook off an associated burster at any time.

Don't attempt to remove base fuzes from projectiles. The fuze may be in direct contact with the explosive, and a chemical reaction may have occurred.

Don't disturb or remove any foreign matter that may be embedded in the nose of an armed fuze. To do so may actuate the fuze.

Don't attempt to replace safety pins or wires in fuzes, or reset them to "Safe". Such action may actuate the fuze.

3.8.4 Grenades

Grenades may be designed for hand or rifle projection. They may contain a high explosive main charge or a variety of fillers which include riot control agents, smokes, incendiary and pyrotechnic materials. A variety of fuzing is available. Hand grenades are usually time fired; projected grenades may be time or impact fired. Grenades are not limited to military application, but are widely used by police and other civil authorities. Grenades are easily and frequently boobytrapped.

3.8.4.1 General Safety Precautions for Grenades

DO:

Approach grenades with extreme caution. Dud fired grenades may function at any time. A random delay function may be caused by deterioration, or dampness which prolongs the burning time of the pyrotechnic delay, or by a hung striker overcoming a mechanical obstruction, and actuating the grenade as designed.

Move an embedded grenade by remote means only. Grenades may contain a piezoelectric fuze.

Take proper cover and observe safe distance before detonating a grenade. Fragments may be projected over a radius of 650 feet.

Ensure the fuze body and base of a practice grenade is pointed away from the body. Fuze functioning could cause serious injury.

Manually handle an armed grenade only as a last resort and after considering all methods of remote disposal. An armed grenade is extremely sensitive to movement.

Wear proper protective equipment when dealing with known or suspected chemical grenades.

DON'T:

Don't drop or jar a grenade. This may arm and actuate the fuze.

Don't disturb a grenade, except by remote means, until the condition of the fuze can be

determined. The grenade may be extremely sensitive to movement.

Don't attempt to remove the fuze from a dud grenade. This may actuate the fuze.

Don't attempt to replace the safety pin in a dud grenade. This may actuate the fuze.

Don't approach a smoking WP grenade. It may cook off an associated burster at any time.

Don't attempt to dispose of grenades in a normal manner. Many types are easily boobytrapped for instantaneous firing.

3.8.5 Rockets

Rockets may be launched from aircraft, ships, vehicles, fixed positions, and by individuals. The rocket warhead section may contain a HE main charge or a variety of fillers, which include chemicals, pyrotechnics, incendiaries, or combinations of these agents. The solid propellant rocket motor is used for propulsion in weapons other than rockets. These include guided missiles, bombs, projectiles, underwater weapons, and target missiles. The hazards of a rocket include those related to the warhead section and those related to the propulsion system.

3.8.5.1 General Safety Precautions for Rockets

DO:

Approach and work on an unfired rocket motor from the side. Ignition will create a missile hazard and hot exhaust.

Perform initial movement of an embedded rocket from a safe distance .

Positively identify the fuze, if possible. If it cannot be identified, assume it to be the most hazardous type that can be used in the item.

Where the possibility of charged capacitors exists, wait a sufficient time (1 hour at least) for them to discharge before beginning any operation on the rocket.

Approach from upwind and wear a protective mask if the rocket is suspected of containing smoke or riot control agents.

Wash thoroughly with soap and water after handling rocket motor propellant. Certain solid propellants are toxic and present a skin, eye and respiratory hazard.

DON'T:

Don't jar or otherwise disturb an armed warhead. If it's necessary to move it, do so remotely.

Don't remove weapons from the launcher in an EMR field. There is a risk of functioning the motor igniter in so doing.

Don't under any circumstances dismantle, disassemble or otherwise strip unexploded rockets or rocket components.

Don't approach a smoking WP warhead. It may cook off an associated burster charge at any time.

Don't expose electrically fired rocket motors within 25 feet of exposed electronic transmitting equipment or exposed antenna leads.

Don't transport an unfired rocket unless the motor igniter is shielded from EMR. It may contain electric squibs or other sensitive electro-explosive devices (EED's).

Don't touch an unfired rocket motor without grounding yourself first. A discharge of built up static electricity may occur which may function the rocket motor.

3.8.6 Guided Missiles

Guided missiles may be launched from aircraft, ships, vehicles, fixed positions, and by individuals. They vary from a weapon capable of being carried and fired by one man to intercontinental types fired from large, complex fixed or mobile installations. The warhead section may contain a nuclear or HE main charge, or a variety of fillers that include chemical or biological agents. Propulsion systems may be solid propellant (rocket motors), liquid propellant fuels and oxidizers, or combinations of these. Fuzing systems are usually complex and may be compound.

3.8.6.1 General Safety Precautions for Guided Missiles

DO:

When a guided missile has been located, restrict all vehicle movement as much as possible in the vicinity (300 feet) of the missile.

Avoid entanglement with the wires of a wire guided missile; pulling the wires may jar the missile.

Terminate mobile and other radio equipment transmissions within the critical area as per appropriate recommendations.

Approach an unidentified guided missile from the side. Many missiles have proximity fuzing, and some produce microwave radiation.

When approaching an unidentified guided missile, observe nuclear, chemical, liquid fuel and liquid oxidizer precautions until monitoring has verified that the missile does not contain a nuclear or chemical warhead or a leaking liquid propellant motor.

Approach and work on an unfired rocket motor from the side. Ignition will create a missile hazard and hot exhaust.

Identify the guided missile, if possible, prior to commencing MEC operations.

Perform initial movement remotely.

An air to air missile or surface to air missile generally contains a HE fragmentation warhead. A surface to surface or air to surface missile may contain any type of warhead.

A rocket motor of single piece construction probably contains solid propellant, while a rocket motor of two or three piece construction may be an engine containing liquid propellant. Some liquid propellant engines may have a solid propellant grain (gas generator) for combining fuels and oxidizers.

If possible, wait a period of time after impact before approaching an unknown missile (wait requirements vary widely; 3 hours minimum if possible). This period may allow the missile to self-destruct, shut off, or exhaust its firing power.

Consider a warhead fuzing system armed if the missiles propulsion system has been fired. Some fuzing systems arm by pressure from the propulsion system alone and do not require acceleration.

Take precautions against anti-compromise devices or boobytraps when performing procedures on a foreign guided missile.

Wear appropriate protective clothing and respiratory equipment when performing procedures on a missile that contains a liquid propellant rocket engine. Liquid fuel propulsion systems contain highly caustic and toxic fuels and oxidizers that can cause serious burns or respiratory damage.

Observe maximum fire prevention precautions for the rocket motor.

Remain upwind when working on a missile suspected of leaking fuels and oxidizers.

Take precautions against burns when performing procedures on a missile that contains a thermal battery. These batteries develop an extremely high temperature when activated. They may also be coated with cadmium, which produces toxic dust and gases.

Avoid contact with electrolyte from wet cell batteries. The electrolyte can be extremely corrosive and can cause serious burns, eye injury, and poisoning if ingested.

DON'T:

Don't approach a guided missile that has been in a fire until sufficient time has elapsed for it to cool. If the missile has a specified waiting period, the period should commence after the missile has cooled.

Don't approach an armed guided missile that has proximity fuzing while using a fluorescent light. Fluorescent light has been known to actuate armed proximity fuzes.

Don't strike or jar any missile components. The warhead may contain more than one fuze and may incorporate a self-destruct system. Most proximity fuzes have some type of impact backup. These fuzes may be anywhere throughout the missile system. An impact fuze may incorporate either a sensitive contact switch or piezoelectric crystal. Some systems may also contain an anti-breakup device along the length of the warhead.

Don't disconnect or cut any electrical cable. A fuzing and firing circuit can fire because of a loss or drop in voltage.

Don't allow liquid fuels to mix with oxidizers. Mixture of the two liquids can result in violent hypergolic reactions.

Don't attempt to remove the igniter from a missile motor section.

Don't move, cut, disconnect or bend any high-pressure lines until certain that the system is void of pressure.

Don't touch an unfired missile or exposed wiring without first grounding yourself. A discharge of built up static electricity may occur, functioning the missile.

3.8.7 Landmines and Associated Boobytraps

Landmines are emplaced area denial weapons, which vary from small antipersonnel (APERS) types to larger antitank (AT) or special purpose types. Many landmines are designed to be boobytrapped. They are frequently used as part of boobytrap systems and can use demolition-firing devices similar to boobytraps. Landmines may be loaded with high explosives, chemicals or pyrotechnic materials. They may be fuzed in a variety of ways, including mechanical, electrical, chemical, acoustic, seismic, infrared, magnetic influence, or controlled firing systems.

They may be fired by pressure, tripwire, tension release, explosive pressure pulse, pressure release, magnetic field changes, or direct electrical circuit closure.

3.8.7.1 General Safety Precautions for Landmines and Boobytraps

DO:

All mines will be blown in place unless specific authorization has been specified in writing to conduct minefield clearance. Minefield clearance will be performed on a specific case by case basis when authorized by the UXO Operations Manager. A task specific work plan detailing procedures for each suspected mine to be encountered will be approved prior to conducting mine-clearing operations.

Consider an emplaced landmine to be armed until proven otherwise. It may be intentionally boobytrapped to deceive.

Observe magnetic precautions when approaching or working on landmines with a known or suspected magnetic influence fuze.

Handle all mines and fuzes with care at all times.

Permit only one person at a time to work on one mine.

Probe and examine carefully the area around a mine before starting to work on it.

Take boobytrap precautions.

Before lifting a mine, neutralize all external fuzes.

Perform all initial movement by remote means.

Assume the presence of other mines nearby whenever a landmine is located; also assume that AT mines may be protected by APERS mines, all mines may be protected by boobytraps, and any mine can be emplaced with anti-lift devices.

Consider a mine armed until proven otherwise. It may not be possible to tell, or it may be rigged to intentionally deceive.

Before disarming any mine, first determine the number and types of fuzes/fuzing systems incorporated within the mine. Once a determination has been made, the safety procedures should be followed as appropriate to the fuzes and mine encountered.

Take cover before pulling a mine. Do not come out for at least 60 seconds after you have pulled it. There may be a delay fuze.

If a mine or boobytrap must be left unlifted, mark the location prominently.

Improvised grapnels may be used to clear tripwire actuated mines.

When cutting the wires of an electric detonator, cut and tape them one at a time to avoid closing the circuit with the wire cutters. A mine is harmless if the firing train is broken, but there may be more than one firing train.

Handle training mines with care; many contain firing indicator charges capable of inflicting serious injury.

Many training mines contain spotting charges capable of inflicting serious injury.

If possible destroy all mines loaded with picric acid in place. Extremely sensitive explosive salts may have formed wherever the explosive contacted metal, particularly in threaded areas such as fuze wells.

Observe acoustic and seismic precautions when approaching or working on landmines with a known or suspected acoustic or seismic fuze.

Remotely remove emplaced mines.

Exercise care when disarming wooden AT mines. Frequently, holes are drilled through the bottom of the case and pull wires connected to auxiliary fuzes, which are threaded and anchored to a stake underneath. If the stake is driven deep enough, it is not easy to locate the wire by probing.

A pressure release fuze or pull fuze, with pull wire may be actuated by raising or removing the pressure plate or lid. Some wooden mines have a special mousetrap device that is actuated in this way.

Exercise care with wooden mines that have been buried a long time. Soil conditions may have deteriorated the wood, and the slightest inadvertent pressure on the top may initiate the fuze.

Observe infrared precautions when approaching or working on a known or suspected off-route AT mine.

Neutralize APERS mines by replacing all safety pins, if possible, before lifting the mines.

Exercise care when hand disarming APERS mines with tripwire activation. Before cutting tripwires, trace them from mine to anchor (often the anchor may be another mine). Be alert for small APERS mines laid along the side of, or underneath, the tripwire to hinder disarming.

Always trace the tripwire from the friendly side (do not straddle it) as a safeguard against accidental tripping, or stepping on a small APERS mine laid underneath the tripwire. If possible, insert a safety pin in the fuze before cutting the tripwire.

Be extremely cautious disarming tilt fuzes by hand, especially if they have been partially actuated. There must be no movement of the tilt rod when the fuze is removed from the mine. Some may not have a safety feature, or a safety device may not be available or cannot be applied.

Use extreme caution disarming Belleville spring type fuzes by hand, as there may be partially initiated by contact or blast, and a slight jar or movement will set off the mine. Some may not have a safety feature, or a safety device may not be available or cannot be applied.

DON'T:

Don't walk into a mined area until a UXO mine-clearing team has cleared the area and Quality Control and Quality Assurance have certified the area safe.

Don't manually disturb, drop or strike an armed mine or mine fuze. It may contain a cocked firing system.

Don't pull or cut a taut wire, and never pull a slack one. Look at both ends of a wire before you touch it.

Don't touch an AT mine that has been pulled from its emplacement until closely examining the mine case top to ensure that the case was not deliberately altered to permit separation at its base.

Separation of the mine case from its base and its charge will actuate an internal pressure/pressure release fuze.

Don't use force on a mine or boobytrap. If a part cannot be removed without force, cease removal procedures and destroy the mine in place.

Don't stack fuzed mines. Many types contain pressure actuated fuzing, which may be fired by such action.

Don't remove a mine from its emplacement if the pressure plate is compressed or deformed. The fuze may contain a hung cocked firing pin.

Don't uncover an AT mine until the ground has been thoroughly checked for anti-lift devices. Probe cautiously, for even the disturbance of the earth by the probe may release the fuze striker. A nonmagnetic probe is safer to use, as the mine may have magnetic fuzing.

Don't remove the pressure plate from a metallic AT mine unless the mine can be positively identified as one that is not fitted with a pressure/pressure release fuze.

Don't permit personnel, vehicles, or any heat-generating source in front of an infrared sensor.

Don't permit personnel, vehicles or any objects to pass between an infrared source and receiver in front of the ordnance.

3.8.8 Pyrotechnic Munitions

These are munitions which contain pyrotechnic material and which perform their designed function by burning. They include flares, markers, signals, and smoke generators.

3.8.8.1 General Safety Precautions for Pyrotechnic Munitions

DO:

Remain upwind of a functioning pyrotechnic munition. Some pyrotechnic materials are toxic.

Approach and work on a flare from the side. A functioning flare may eject its candle with sufficient force to cause serious injury.

Maintain thermite filled munitions at temperatures above freezing. If frozen, thermite filled munitions may detonate upon actuation.

DON'T:

Don't drop or roughly handle pyrotechnic munitions. They are easily ignited and present a severe fire hazard.

Don't expose pyrotechnic munitions to excessively high temperatures. High temperatures will increase their sensitivity, induce chemical reactions, and may cause ignition.

Don't pull any lanyards or cables, or touch electric primers on pyrotechnic flares or signals. Such actions may function the item.

Don't look directly at a burning flare, candle or flash signal. Serious eye injury can result unless the eyes are protected by No. 6 shade welder's goggles, or equivalent.

3.8.9 Depleted Uranium (DU) Munitions

These are munitions that contain depleted uranium as a penetrator enclosed by metal ballistic carrier. These penetrators are usually found in projectile munitions.

3.8.9.1 General Safety Precautions for Depleted Uranium Munitions

DO:

Transport fired, separated, cracked or unfired projectiles containing depleted uranium in a closed, padded metal container. The depleted uranium is an alpha and low level beta emitting pyrophoric radioactive material.

Wear adequate protective clothing and respiratory equipment during MEC procedures involving depleted uranium projectiles that have been involved in fires or detonations. This will preclude skin contact, ingestion, inhalation or absorption of toxic and heavy metal smoke.

DON'T:

Don't dispose of projectiles containing depleted uranium by burning or detonation. The depleted uranium expels a toxic (alpha and low level beta emitting) heavy metal smoke.

3.8.10 Submunitions

These are munitions that dispensed from a carrier munition and contain various filler loads. They can be dispensed from Improved Conventional Munitions (ICM), dispensers or cluster bombs. They incorporate a variety of fuzings, either singularly loaded or mixed.

3.8.10.1 General Safety Precautions for Submunitions

DO:

Prior to any work beginning on an Army controlled ICM range; a waiver has to be granted by the Department of the Army (DA) through the Corps of Engineers.

Due to the incorporation of streamers, ribbons and blutes, as stabilizers, wind and meteorological conditions will be considered prior to entering a submunition-contaminated area.

Due to the various fuzings incorporated into mixed loads (random delay, impact, and self-destruct, anti-disturbance) allow for the appropriate time to elapse prior to entering a submunition-contaminated area.

Some submunitions contain piezoelectric fuzing, magnetic influence or acoustic fuzing. Follow the appropriate safety precautions for the fuzing encountered.

DON'T:

None.

3.9 Safety Precautions for MEC Excavation Operations

DO:

Excavations and Trenching will be conducted in accordance with Company Procedure EHS 6-3, Excavation and Trenching. This procedure can be found in the Company Corporate Reference Library.

Hand excavation is the most reliable method for uncovering an MEC item. However, hand excavation exposes personnel to the hazard of detonation. Therefore, only UXO Qualified personnel will be used to perform this task.

Earth-moving machinery (EMM) may be used to excavate overburden from suspected MEC items. EMM will not be used to excavate within 12 inches of a suspected MEC item. Once the EMM is within 12 inches of the suspected MEC item, the excavation will be completed by hand excavation methods. Personnel who are not UXO-qualified may operate EMM only when supervised by a UXO Technician III or an UXO-qualified individual of higher rank.

If more than one earth-moving machine is to be used onsite, the same minimum separation distances required for multiple work teams apply.

EMM operations will be conducted within the guidelines of EM 385-1-1 and 29 CFR 1926, subpart P.

Excavation operations, whether by hand or EMM, will employ a step-down or offset access method. Under no circumstances will any excavation be made directly over suspected MEC.

DON'T:

None.

3.10 Safety Precautions for Exclusion Zone Operations

DO:

It is the responsibility of the UXO Safety Officer (UXOSO) to establish the exclusion zone for each MEC work area.

The purpose of the exclusion zone is to protect nonessential personnel from blast overpressure and fragmentation hazards. Calculate exclusion zones with respect to intentional and unintentional detonations.

The Quantity-Distance (QD), for exclusion zones, will be provided by the client based upon the Munition with the Greatest Fragmentation Distance (MGFD) information provided to them.

Intentional Detonations. The MSD for intentional detonations is the distance that both project personnel and the public will be from the intentional detonation. The MSD for intentional detonations is calculated by taking the greatest value of the following:

- a. Overpressure at K value of 328. Ensure the explosive weight of the donor charge is added to the net explosive weight of the MEC item when making this calculation.
- b. Maximum horizontal fragmentation distance as determined IAW DDESB TP 16, unless engineering controls are being employed. The item having the greatest fragment distance will become the MGFD for intentional detonations for a MRS.

Unintentional Detonations.

- a. The MSD for unintentional detonations is the distance non-essential personnel must maintain from intrusive operations, and they are:
 - 1. For fragment producing munitions, it is the hazardous fragment distance, as identified in DDESB TP 16. UXO items will require a hazard assessment to be documented in the relative explosive safety documents (Explosive Siting Plans (ESP)/Explosive Safety

Submissions (ESS) and approved by HQUSACE, USATCES, and DDESB in accordance with revised chapter 12 and 15 of DoD 6055.0-STD. Contact the Military Munitions Center of Expertise for additional information.

2. For MEC items that do not produce fragments (by design), but contain explosives, use the K40 distance of the item.

b. These distances may be reduced by using DDESB approved engineering controls.

When multiple teams are working onsite, a team separation distance (TSD) will be established. The minimum TSD will be K40 overpressure distance.

While MEC procedures are being conducted, only personnel essential for the operation will be allowed in the exclusion zone. When unauthorized visitors or nonessential personnel enter the exclusion zone, all MEC operations will cease.

DON'T:

None.

3.11 Safety Precautions for UXO Disposal Operations

DO:

Disposal operations will be in accordance with all local, state and federal regulations pertaining to use, transportation, storage and disposal of explosive materials.

Disposal operations will be conducted IAW TM 60A-1-1-31, EP 1110-1-17, and the unnumbered USAESCH publication entitled Procedures for Demolition of Multiple Rounds (Consolidated Shots) on munition response sites. Disposal operations will only be conducted under the direction of personnel licensed in the state the disposal operations are conducted, if required.

The two-man rule will be in effect in all disposal operations. In addition, a third person (UXO Safety Officer) shall be available near the disposal site to act as a safety observer and communications watch in the event of an accident. On small sites the SUXOS may serve as the UXO Safety Officer.

Demolition operations will not be conducted during dust, wind, rain, snow or electrical storms or when visibility is less than 200 meters due to cloud cover.

Premature detonation of electric blasting caps by induced current from radio frequency signals is a possibility. Refer to DA Pam 385-64 for minimum safe distance with respect to transmitter power and indication of distance beyond which it is safe to conduct electric blasting even under the most adverse conditions.

Lightning is a hazard with respect to both electric and non-electric blasting caps. A direct hit or a nearby miss is almost certain to initiate either type of cap or other sensitive explosive elements such as caps in delay detonators. Lightning strikes, even at distant locations, may cause extremely high local earth currents that may initiate electrical firing circuits. Effects of remote lightning strikes are multiplied by their proximity to conducting elements such as those found in buildings, fences, bridges, streams, and underground cables or conduits. The only safe procedure is to suspend all blasting activities when an electrical storm approaches to within 10 miles of the site.

Electric power lines also pose a hazard with respect to electric initiating systems. It is recommended that any disposal operation closer than 155 meters to electric power lines be done

with a non-electric system. The only acceptable disposal method is the one stated in the appropriate TM 60 Series manual for specific ordnance types. Any commercial explosives being used will be equivalent to the military explosive required for the disposal operation.

Minimum separation distances for personnel during MEC disposal will be IAW DOD 6055.9-STD, chapter 5.

Only condition code "A" or "C" military explosive items, or commercial explosives within their shelf life limit, shall be used as donor explosives for disposal operations.

Exercise extreme care in handling and preparing high explosives for detonation. They are subject to detonation by heat, shock, or friction.

Photo flash bombs must be handled with the same care as black powder filled munitions.

MEC containing white phosphorous shall not be detonated into the ground. The MEC shall be counter-charged on the bottom centerline (CCBC) when possible.

Carry blasting caps in approved containers and keep them out of the direct rays of the sun, and located at least 25 feet from other explosives, until they are needed for priming.

Always point the explosive end of blasting caps, detonators, and explosive devices away from the body during handling.

Use only standard blasting caps at least the equivalent of a commercial No. 8 blasting cap.

Use electric blasting caps of the same manufacturer for each demolition shot involving more than one cap.

Test electric-blasting caps for continuity at least 25 feet from any other explosives prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be shunted (short-circuited) by twisting the bare ends of the wires together. The wires will remain shunted until ready to be connected to the firing circuit.

In the event of a misfire when disposing of explosives by detonation, do not approach the disposal site for at least thirty minutes after the expected detonation time when firing electrically. When conducting non-electric procedures, the wait time shall be one hour from the expected time of detonation.

A post-search of the detonation site shall be conducted to assure complete disposal was accomplished. On USACE Project Sites, a magnetometer will be used to conduct the search of the immediate area to ensure a complete disposal was accomplished.

If the situation dictates, protective measures to reduce shock, blast, and fragmentation shall be taken. Army Technical Manual TM 5-855-1, Fundamentals of Protective Design for Conventional Weapons, DOD standard 6055.9 and EODB 60A-1-1-4, Protection of Personnel and Property, contain data on blast effects, ground shock, cratering, ejection, and fragmentation. All exclusion zones for MEC operations will be in accordance with DOD 6055.9 or as calculated by the USACE CEHNC Engineering Branch OR NAVFACENGREP. If specific distances are not specified the following general distances will apply:

- For non-fragmenting explosive materials, evacuation distance should be a minimum of 1250 feet.
- For fragmenting explosive materials, evacuation should be a minimum of 2500 feet.
- For bombs and projectiles with caliber 5 inches or greater, use a minimum evacuation

distance of 4000 feet.

Items with lugs, strong backs, tail plate sections, etc., should be oriented away from personnel locations as fragmentation from these items tends to travel farther than normal. Consideration should be given to tamping the MEC to control fragments, if the situation warrants. Fragments shall be minimized not only to protect personnel but also property, such as buildings, trees, etc.

Open burning of explosives and smokeless powder or chemical decomposition of explosives shall not be accomplished without approval of the contracting officer.

Anticipate a high order detonation when burning pyrotechnic or incendiary-loaded MEC. Safety measures for personnel and property must be based upon this possibility.

Inert ordnance will not be disposed of or sold for scrap until the internal fillers have been exposed and unconfined. Heat generated during a reclamation operation can cause the inert filler, moisture, or air to expand and burst the sealed casings. Venting or exposure may be accomplished in any way necessary to preclude rupture due to pressure from being confined.

DON'T:

Don't pack bomb fuze wells with explosives unless it can be positively confirmed that the fuze well does not contain any fuze components.

Don't handle, use, or remain near explosives during the approach or progress of an electrical storm. All persons should retire to a place of safety.

Don't use explosives or accessory equipment that are obviously deteriorated or damaged. They may cause a premature detonation or fail completely.

Don't bury blasting caps. Use detonating cord to position blasting caps above the ground. Buried blasting caps are subject to unobserved pressures and movement, which could lead to premature firing or misfires.

Don't inhale the smoke or fumes of burning pyrotechnic or incendiary materials. The fumes and dust from many of these materials are irritating and/or toxic if inhaled.

Don't use water on incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the mixture.

3.12 Safety Precautions for MEC Transportation

3.12.1 MEC Transportation, Offsite

In the event that MEC items must be transported offsite, the provisions of chapter 15, EP 1110-1-18, will be followed. In addition, contractors are prohibited from transporting MEC offsite for destruction until the provisions of paragraph 1-9, TB 700-2, have been met.

3.12.2 MEC Transportation, Onsite

DO:

Only appropriately equipped vehicles will be used to transport MEC on the project site.

Only UXO qualified personnel who have completed site-specific explosive driver training will operate vehicles used to transport MEC on the project site. Personnel must also meet local military training requirements for explosive driver's, if required.

If loose pyrotechnic, tracer, flare, or similar mixtures are to be transported, they will be placed in No. 10 mineral oil or equivalent to minimize the fire and explosion hazards.

Incendiary-loaded munitions should be placed on a bed of dry sand and covered with dry sand to help control the burn if a fire should start.

If an unfired rocket motor must be transported, it will be positioned in the vehicle parallel to the rear axle. This will afford maximum protection for the personnel operating the vehicle.

If a base-ejection projectile must be transported to a disposal facility, the base will be oriented in the vehicle such that it is parallel to the rear axle. This will afford maximum protection for the personnel operating the vehicle.

MEC items with exposed hazardous fillers, such as High Explosive, will be placed in appropriate containers with packing material to prevent migration of the hazardous fillers. Padding should be added to protect the exposed filler from heat, shock, and friction. Containers used during the transport of MEC and demolition materials will be properly secured in the back of the vehicle to prevent their movement.

DON'T:

Don't transport WP munitions unless they are immersed in water, mud, or wet sand.

3.13 MEC Storage Safety Precautions

DO:

During MEC projects, explosive storage falls into two categories, (1) on Department of Defense (DOD) installations and (2) off DOD installations.

On DOD installations, DOD 6055.9-STD and service requirements (Army- AR 385-64; Navy-NAVSEA OP5; Air Force- AFM 91-201) will be met. Generally, the installation will have an existing explosive storage facility that meets DOD standards. If not, "the Company" will establish a temporary storage facility. The compatibility of explosives defined in chapter 3, DOD 6055.9-STD, will be followed. Recovered MEC items awaiting final disposal will not be stored with serviceable explosives. Commercial explosives will be assigned a DOD hazard classification (i.e., 1.1, 1.2, etc.) and storage compatibility grouping by the U.S. Army Technical Center for Explosives Safety prior to being stored on a military installation.

Off DOD installations, "the Company" will be responsible for establishing a temporary explosive storage facility. This temporary storage facility will meet local, state, 27 CFR 555, AR 385-64, and DOD 6055.9-STD requirements to the greatest extent practicable.

In cases where the facility cannot meet the intermagazine, inhabited building, and public traffic route quantity-distance requirements specified in DA Pam 385-64 and DOD 6055.9-STD, a barricading plan or other engineering controls to protect the public from accidental detonation must be submitted to and approved by the USAESCH Directorate of Engineering.

Magazines off DOD installations must meet the requirements of 27 CFR 555, and each magazine must have a NET Explosive Weight and hazard classification established for the explosives to be stored.

Each magazine must be provided lightning protection IAW DA Pam 385-64. The provisions of NFPA 780, which are consistent with Army guidance, may be used to supplement Army guidance where necessary.

A physical security survey will be conducted to determine if fencing or guards are required. This survey will be coordinated through local law enforcement agencies. Generally, a fence around the magazine is not needed, IAW 27 CFR 555. However, "the Company" is responsible for providing the degree of protection needed to prevent the theft of MEC and donor explosives.

An on/off installation fire plan for the explosives storage facility will be prepared and coordinated with the local fire department. Placarding of magazines will be IAW local rules and regulations.

DON'T:

None.

4.0 REFERENCES

Please Describe Your Reference Here	Place Your Link In This Column
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EP 385-1-95a, Basic Safety Concepts and Considerations for Ordnance and Explosives Operations	
27 CFR 555, Commerce in Explosives	
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DoD 6055.9-STD, Dod Ammunition and Explosives Safety Standards	
DA Pam 385-64, Ammunition and Explosives Safety Standards	
TM 60A-1-1-31, Explosives Ordnance Disposal Procedures: General Information on EOD Disposal Procedures	
TM 60A-1-1-22, Explosives Ordnance Disposal Procedures: General EOD Safety Precautions	
TB 700-2, Department of Defense Ammunition and Explosives Hazard Classification Procedures	
ER 5-1-11, Program and Project Management	
ER 1110-1-12, Quality Management	
EP 1110-1-17, Establishing a Temporary Open Burn and Open Detonation Site for Conventional Ordnance and Explosives Projects	
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EM 385-1-1, Safety and Health Requirements Manual	

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Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites, U.S. Army Engineering and Support Center, Huntsville, August 1998. http://www.hnd.usace.army.mil/ .	
AFM 91-201, Explosives Safety Standards	
NEPA 780, Standard for the Installation of Lightning Protection Systems	

Tetra Tech EC, Inc.

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UXO-6: Purchase, Receipt, and Accountability of Explosives

Purpose

This document provides procedures for the purchase/receipt and accountability of explosive materials.

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Category: Company Procedures	Sections: UXO
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Keyword Index:	Document Owner: Frank Jones

Table of Contents

See Below

1.0 PURPOSE

This document provides procedures for the purchase/receipt and accountability of explosive materials.

2.0 SCOPE

This document contains procedures that are applicable to all Tetra Tech EC, Inc. (TtEC) projects involved in the purchase/receipt and accountability of explosives. The procedures outlined in this document are in compliance with 27 CFR 555, Commerce in Explosives.

3.0 MINIMUM REQUIREMENTS

3.1 Responsibilities

The UXO Operations Manager is responsible for updating this procedure. Approval authority rests with TtEC's Chief Operating Officer. Suggestions for revision to this document will be submitted to the UXO Operations Manager. All employees are required to follow the minimum requirements listed in this procedure. Any employee may request permission to vary from these requirements if they are in conflict with our corporate "Operating Philosophies," are unsafe, or are not compatible with contract or site-specific requirements. Permission to vary from this procedure must be obtained from the UXO Discipline Lead. All employees are encouraged to submit comments and/or recommendations to improve this procedure.

3.2 Definitions

Ammunition. Small arms ammunition or cartridge cases, primers, bullets, or smokeless propellants designed for use in small arms, including percussion caps, and 3/32 inch and other external burning pyrotechnic hobby fuse. The term does not include black powder.

ATF Officer. An officer or employee of the Bureau of Alcohol, Tobacco and Firearms (ATF) authorized to perform any function relating to the administration or enforcement of 27 CFR 555.

Binary Explosives. A compound of two parts whose individual parts are not classified as explosives until mixed. However, once mixed, binary explosives are considered to be "explosive materials" and are subject to all applicable Federal requirements. A person who regularly combines compounds to create binary explosives for the purpose of sale or distribution or for the person's own use is a "manufacturer" of explosives materials and must be licensed as a manufacturer under the law.

Blasting Agent. Any materials or mixture, consisting of fuel and oxidizer, intended for blasting, not otherwise defined as an explosive.

Business Premises. The property on which explosive materials are manufactured, imported, stored, or distributed. The premises include the property where the records of a manufacturer, importer, or dealer are kept if different than the premises where the explosive materials are manufactured, imported, stored or distributed.

Dealer. Any person engaged in the business of distributing explosive materials at wholesale or retail.

Detonator. Any device containing a detonating charge that is used for initiating detonation in an explosive; the term includes, but is not limited to, electric blasting caps of instantaneous and delay

types, blasting caps for use with safety fuse and detonating cord delay connectors.

Distribute. To sell, issue, give, transfer, or otherwise dispose of. The term does not apply to a mere change of possession from a person to his agent or employee in connection with the agency or employment.

Explosives. Any chemical compound mixture, or device, the primary or common purpose of which is to function by explosion; the term includes, but is not limited to, dynamite and other high explosives, detonators, safety fuse, squibs, detonating cord, igniter cord, and igniters.

Explosive Materials. Explosives, blasting agents, and detonators.

Licensee. Any importer, manufacturer, or dealer licensed under the provisions of 27 CFR 555.

Limited Permit. A permit issued to a person authorizing him to receive for his use explosive materials from a licensee or permittee in his state of residence on no more than 6 occasions during the 12-month period in which the permit is valid.

Manufacturer. Means any person engaged in the business of manufacturing explosive materials for purposes of sale, distribution, or personal use.

Permittee. Any user of explosives for a lawful purpose, who has obtained a user permit under the provisions of 27 CFR 555.

Person. Any government, individual, corporation, company, association, firm, partnership, society, or joint stock company.

Possessor of Explosives. Is someone who has actual physical possession or constructive possession, which means the person has dominion or control over explosives during the course of their employment. Actual possession exists when a person is in immediate possession or control of explosive materials. Constructive possession exists when an employee lacks direct physical control over explosive materials, but knowingly has the power and intention to exercise dominion and control over the explosive materials, either directly or indirectly through others.

Responsible Person. Generally, responsible persons at a corporation include only those corporate officers and directors who direct corporate management and policies as they pertain to explosives. For example, a corporate vice president's duties may include acquiring and approving contracts with explosives distributors. He would be a responsible person. Another vice president may manage solely human resources. He would not typically be a responsible person.

3.3 General

- a) TtEC has an ATF Manufacturer's License (9-WA-033-20-6F-00135), which allows TtEC to purchase, manufacture, and use explosives on federal property, and in interstate commerce. This license is for MEC disposal work only; general demolition or construction blasting is not covered. Each state will have different regulations regarding explosive permitting; these regulations may or may not be identical to ATF regulations. In all cases the appropriate state authority responsible for explosive permitting shall be consulted during the project planning phase. Staff members are available to support the PM in the review of State explosive laws and regulations.
- b) With the incorporation of the provisions of the Safe Explosives Act into 27 CFR 555 Commerce in Explosives, a Federal license is now required for both state and inter-state use of explosives. Additional information on the requirements of the Safe Explosives Act is provided in 27 CFR 555.
- c) A minimum of two senior on-site UXO personnel will be designated as the primary and

alternate representative/agent authorized to order, receive and account for explosive materials. This will generally be the Senior UXO Supervisor and either the UXO Safety Officer or UXO Quality Control Representative, or both. State regulations may require that the primary representative/agent obtained a state explosive license/permit prior to ordering explosive materials. The selection and assignment of these personnel will be made by the UXO Operations Manager.

- d) The Site Manager or Project Manager will provide the following information to the UXO Operations Manager.
 - 1. Project Name
 - 2. Project Duration
 - 3. Project Location
 - 4. Senior UXO Supervisor: Name, current permanent address, date and place of Birth
 - 5. Alternate: Name, Current permanent address, date and place of birth
 - 6. Explosive supplier: Name, address and telephone number

3.3.1 Request for Primary and Alternate Representatives For Purchase, Receipt and Accountability of Explosives

- a) In most cases, only two individuals on a Project Site (Senior UXO Supervisor and Alternate) will be authorized to purchase, receive and account for explosives.
- b) The Senior UXO Supervisor and Alternates will complete a Personal Declaration of Fitness to Receive, Control and Use Explosives (Attachment 1). This Declaration will be forwarded to the UXO Operations Manager. The UXO Operations Manager will prepare a Certification of Permit, List of Representatives/Agents Authorized to Order Explosive Materials, and Statement of Intended Use (Attachment 2) and forward to the Director of Ordnance Programs for signature. The Director of Representatives/Agents Authorized to Order Explosive Materials and Statement of Intended Use to the explosive vendor(s) identified above, with one copy to the project site, and a copy to the UXO Operations Manager. This documentation will be required by any explosive vendor prior to providing explosive materials.

3.4 Authorization

Only the primary representative/agent and alternates are authorized access to the magazines for the purpose of issuing and conducting inventories of explosive materials. Explosives are only authorized to be issued to TtEC employees qualified at a minimum as UXO Supervisors **as defined in the site work plan.**

3.5 Purchase Procedure

- a) All required preparations for storage of explosives must be met prior to ordering the explosives. The requirements of the TtEC Procedure, Storage of Explosive Materials, and all applicable state, federal and military/DoD Regulations will be met prior to taking possession of the explosive on a project site.
- b) The Project Manager should assure that executed copies of a current Certification of Permit, List of Representatives/Agents Authorized to Order Explosive Materials and Statement of Intended Use are submitted to the responsible TtEC procurement official along with the purchase request for explosives.

Note: Before ordering explosives from the local vendor, make arrangements for the return of any unused explosive materials. If the return of unused explosives is not possible, and surplus explosives cannot be destroyed by burning or detonation, the representative/agent authorized to order explosives should take particular care to order exact quantities of required explosives to

complete the project.

3.6 Record Keeping/Accountability

The following procedures for accountability of explosives will be followed at all sites where explosives are used/stored. These procedures are in accordance with ATF regulations, 27 CFR 555.123.

3.6.1 Central Files

Copies of all correspondence, certifications, invoices and current inventories will be maintained at the project site by the Senior UXO Supervisor. Copies of all correspondence and certifications will be maintained by the UXO Operations Manager. At the completion of each munitions response, original documents related to explosive operations, inventories, invoices and accountability will be transferred to the UXO Operations Manager. Copies of these documents will be maintained in the project files. These files must be maintained for a minimum of 5 years per 27 CFR 555.121.

3.6.2 Initial Receipt Inventory

- a. Upon receipt of explosive materials, a complete inventory of the new explosive materials will be conducted with the following information recorded on the form provided in Attachment 3. This form provides the data identified in accordance with 27 CFR 555.125(a).
 1. Date of acquisition
 2. Name or brand name of manufacturer
 3. Manufacturer's marks or identification
 4. Quantity (applicable quantity units, such as pounds of explosive, number of detonators, etc).
 5. Description (dynamite, C4, shape charges, blasting caps, etc.), case or lot numbers, serial numbers, or other specific identification of the explosives received
 6. Name, address, and license number of the person from whom the explosive materials were received.
- b. The initial receipt inventory will be completed for each new delivery of explosive materials. The Senior UXO Supervisor will send a copy of each completed inventory to the UXO Operations Manager for inclusion in TtEC's ATF Central files. The original will be maintained in the project files at the site until completion of explosive operations when it will be forwarded to the UXO Operations Manager for inclusion in TtEC's ATF Central files. This information must be recorded no later than the close of the next business day. Forwarding a copy of the initial Receipt Inventory to the ATF Regional Compliance Officer is not required unless specifically directed by the ATF Compliance Officer.

3.6.3 Expenditure/Receipt Accountability

A dual system of transaction accountability will be maintained. Two sets of Magazine Inventory Cards (Attachment 4) will be used for each type, size and manufacturer of an explosive item. One copy of the Magazine Inventory Card will remain in the magazine with the explosive items. The second card will be kept in a project Log Book by the Senior UXO Supervisor in the site office. The Magazine Inventory Cards will identify the item by name, date code, type and size and maintain a running balance (date of transaction, gain, loss and balance), with signature accountability for all issues. The magazine cards will remain on-site until demobilization or when all explosives are expended. The primary representative/agent will then forward the original magazine cards with the closeout inventory to the UXO Operations Manager where they will be maintained in the TtEC's ATF Central files.

3.6.4 Change of Primary Representative/Agent

Upon a change of the primary and/or the alternate representative/agent a complete inventory of all explosive material will be conducted jointly by the outgoing and incoming representative/agent. The results of the inventory will be forwarded to UXO Operations Manager within five (5) working days after the inventory is conducted.

3.6.5 Closeout Inventory

- a. Upon completion of all explosive operations, where all explosives have been used or returned to the supplier, a closeout inventory (see Attachment 3) will be conducted and recorded in the same manner as the Initial Receipt Inventory described above. The primary representative/agent will send the original Closeout Inventory, a copy of all magazine inventory cards and explosive purchase orders to the UXO Operations Manager for maintenance in TtEC's ATF Central files.
- b. **Note:** Do not send a copy of the Closeout Inventory to ATF Regional Compliance Officer unless requested.

3.6.6 Weekly Inventory

- a. The primary representative/agent or alternate will conduct a physical inventory of all explosive stocks on a weekly basis. The originals will be maintained in the project files at the site until completion of explosive operations when it will be forwarded to the UXO Operations Manager for inclusion in TtEC's ATF Central files. This inventory must be conducted no later than the last business day of the week. The representative will be accompanied by an alternate and the same representative will not sign the inventory on consecutive weeks.
- b. **Note:** These weekly inventories preclude the requirement for an annual inventory as provided in 27 CFR 555, 125(b)(iv).

3.6.7 Binary Explosive Accountability

- a. Binary explosives are not by definition explosives until mixed. Record keeping requirements of 27 CFR 555 are exempt if the explosive materials are manufactured for our own use and used within 24 hours of mixing at the same site. If the binary explosives are not used within the 24 hour period then by the close of the next business day after use the following information must be recorded per 27 CFR 555.123(d):
 - Date of use
 - Quantity (applicable quantity units, such as pounds of explosives, number of packs/sticks, etc).
 - Description (dynamite, kinepak, kinestyk, etc.)
- b. **Note:** Even though the binary explosives are not considered explosive materials until mixed they will be inventoried and accounted for as though they were explosive materials (including weekly inventories and transaction management with magazine cards).

3.7 ATF F 5400.4 Form

This form is used to record explosive transactions between ATF licensees/permittees and non-licensees/permittees. TtEC employees are not authorized to purchase or transfer explosives to/from non-licensees/permittees.

3.8 Safe Explosives Act (SEA)

The Safe Explosives Act of 2002 requires a federal license/permit for all interstate and intrastate

use of explosives. It also requires background checks be completed by the BATF for all responsible personnel and employee possessors or explosives. There are five main provisions of the SEA.

- Adds three new prohibited person categories.
- Requires explosive samples by provided to BATF when requested.
- Requires permits for interstate and intrastate users of explosives.
- Requires more thorough BATF background checks.
- BATF inspections at least once every three calendar years.

3.8.1 Federal Explosive Licenses (FEL)

The UXO Operations Manager will be responsible for the preparation and submission of the federal explosive license application.

3.8.2 Background Checks

Responsible persons are required to submit identifying information, fingerprints, and photographs to the BATF. Employees of licensees and permittees who will have possession of explosive materials, possessor of explosives, must submit the identifying information required on ATF Form 5400.28 (Attachment 5). BATF will issue "Letters of Clearance" to the employer, and to the responsible persons and possessor employees who are not prohibited from possessing explosives. BATF will also notify the employer and any individual who did not pass their background check. This notification will include the reason for prohibition, outline the appeal process and identify availability of relief, if any. The procedures for completing the background checks are outlined below.

- Responsible persons will provide the information required to complete ATF Form 5400.13/5400.16, and forward fingerprint cards and photographs to the UXO Operations Manager for inclusion in the application and submission to the BATF.
- All current UXO employees will complete ATF Form 5400.28 and forward to the UXO Operations Manager for submission to the BATF.
- The UXO Operations Manager or Assistant UXO Operations Manager will be responsible for ensuring all new UXO hires complete ATF Form 5400.28, and submit the form to the BATF. They will also be responsible for notifying BATF when UXO employees leave Tetra Tech EC.
- The UXO Administrative Assistant will maintain a data base to track submission of the ATF 5400.28 Forms, receipt of the BATF Letters of Clearance, and notification of BATF when UXO employees have left the employ of Tetra Tech EC.

3.8.3 TtEC Explosive Operations Responsible Personnel

The responsibility for explosive operations within Tetra Tech EC will be strictly limited to the following personnel:

- President - Is responsible for the approval of all corporate procedures addressing explosive operations within Tetra Tech EC.
- Senior Vice President of Construction - Is responsible for the development of explosive procedures, and hiring the management of suitability qualified personnel to perform explosive operations.
- Vice President of Ordnance Programs - Is responsible for the designation of corporate agents authorized to purchase, receive, store, transport and use explosive materials. The Senior Vice President of Construction will act as an alternate to accomplish these actions in the

absence of the Vice President of Ordnance Programs.

- Corporate Agents - Will normally be the Senior UXO Supervisor as the primary, with the UXO Safety Officer and/or the UXO Quality Representative as alternates. The Senior UXO Supervisor will be responsible for all explosive operations at the site level.

3.9 Reporting the Theft or Loss of Explosive Materials

Upon discovery of any theft or loss of explosive materials you will immediately notify the Senior UXO Supervisor (SUXOS), who will notify the project manager and the UXO Operations Manager. The SUXOS will then contact ATF at the following numbers and report the theft/loss.

(800) 461-8841 - between 8:00 a.m. - 5:00 p.m. EST, or
 (888) 283-2662 - after hours and weekends, or
 (800) 800-3855 for Alaska, Guam, Hawaii, Puerto Rico and the Virgin Islands

Then, the SUXOS will notify the local law enforcement office to report the theft/loss and to obtain a police report. After the notification process described above you will then complete ATF E Form 5400.5 (Attachment 6), attach copies of the police report and the TtEC incident report, and then fax and mail the report to:

Bureau of Alcohol, Tobacco, Firearms and Explosives
 U.S. Bomb Data Center
 P.O. Box #50980
 Washington, D.C. 20091
 Fax: (866) 927, 4570

Keep a copy of the report for the project files, and send a copy to the UXO Operations Manager in the Seattle office.

Note: Section 842(k), 18 U.S.C. Chapter 40 requires this report to be made within 24 hours of the discovery.

4.0 REFERENCES

Please Describe Your Reference Here	Place Your Link in this Column
1. Title 18, United States Code, Chapter 40 - Importation, Manufacture Distribution and Storage of Explosive Materials	
2. Title 27, Code of Federal Regulations Part 555 - Commerce in Explosives 29 CFR 1910.109 Explosives and blasting agents.	

5.0 ATTACHMENTS

Please Provide A Description of Your Attachment	Place Your Attachment Here
1. Personal Declaration of Fitness to Receive, Control and Use Explosives	 Attach1Rev1.doc
2. Certification of Permit, List of Representatives/Agents	

Authorized to Order Explosive Materials, and Statement of Intended Use	 Attach2Rev1.doc
3. Initial Receipt/Closeout Inventory	 Attach3Rev1.doc
4. Magazine Inventory Card	 Attach4Rev1.doc
5. Employee Possessor Questionnaire	 Attach5Rev1.PDF
6. ATF E Form 5400.5	 Attach6.pdf

Tetra Tech EC, Inc.

NOTICE OF OWNERSHIP AND CONDITIONS OF USE

This document is the property of Tetra Tech EC, Inc. (TtEC) and is to be used only for the duration and connection with the performance of work for TtEC. Written deviations to this document may be authorized when appropriate in accordance with the Quality Rule. This document is not to be construed as an employment contract or any binding obligation of TtEC. This document may be modified or rescinded at any time with or without prior notice at the sole discretion of TtEC. Hard copies of this document may not contain the most current information. The current version of this document can be found on the TtEC online Corporate Reference Library.

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Proprietary Information



TETRA TECH EC, INC

PERSONAL DECLARATION OF FITNESS TO RECEIVE, CONTROL AND USE EXPLOSIVES

CERTIFIED STATEMENT BY EMPLOYEE DESIGNATED TO PURCHASE EXPLOSIVES

QUESTION	YES	NO
Are you a fugitive from Justice?		
Are you an unlawful user of, or addicted to, marijuana or any depressant or stimulant drug or narcotic drug?		
Have you been convicted in any court of a crime punishable by imprisonment for a term exceeding one year?		
Are you under charges in an indictment or information in any court for a crime punishable by imprisonment for a term exceeding one year?		
Have you been adjudicated mentally defective or been committed to a mental institution?		
Are you classified as an alien to the United States? If yes, see provision 555.26 (c) (5).		
Have you been discharged from the U.S. armed forces under dishonorable conditions?		
Have you renounced you United States citizenship?		
Are you under 21 years of age?		

CERTIFICATION

I hereby declare that I am authorized to purchase explosive(s) under federal law and have answered "no" to each of the above questions. I understand that a person who cannot certify that the above are not applicable is prohibited by Federal Law from shipping, using or transporting any explosive in interstate or foreign commerce or from receiving any explosive which has been shipped or transported in interstate or foreign commerce. I also understand that the making of any false oral or written statement or the exhibiting of any false or the exhibiting of any false or misrepresented identification with respect to this transaction is a crime punishable as a felony.

NAME:

SIGNATURE:

DATE:

ADDRESS:

DATE OF BIRTH:



TETRA TECH EC, INC.

CERTIFICATION OF LICENSE

LIST OF REPRESENTATIVES/AGENTS AUTHORIZED TO ORDER EXPLOSIVE MATERIALS AND STATEMENT OF INTENDED USE

Tetra Tech EC, Inc. (TtEC) is licensed as a "Manufacturer of High Explosives", (9-WA-033-20-6F-00135), pursuant to 27 CFR 555.41. Attached is a copy of the license.

In accordance with 27 CFR 55.103(b), TtEC authorizes employees listed below to purchase and receive explosive materials on behalf of the Corporation and pursuant to the restrictions contained herein.

NAME	ADDRESS	DATE OF BIRTH	PLACE OF BIRTH
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Purchases of explosives by the aforementioned employee(s) are to be made from an U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives Licensed or Permitted individual/entity only.

The following information is provided to address requirements of 27 CFR 555.103 (b):

- Intended Use: _____
- Tax ID Number: 25-1902191
- Principal Business Location: 1000 American Rd, Morris Plains, NJ 07950
- Local Business Location: _____
- This certification is valid from the date indicated below to the completion of the work at _____, or December 31, 200__, whichever occurs first.

APPROVAL:

John Charles McIlrath, Vice President

Date

- Attachments:**
- (1) Signed Certified Copy of License Number 9-WA-033-20-6F-00135
 - (2) Personal Declaration of Fitness to Receive, Control and Use Explosives



TETRA TECH EC, INC.

INITIAL RECEIPT AND CLOSEOUT INVENTORY

DATE OF ACQUISITION	MANUFACTURER	MANUFACTURER'S MARKS	QUANTITY	DESCRIPTION	NAME, ADDRESS, LICENSE # OF PERSON DELIVERING EXPLOSIVES

Note: The initial receipt inventory must be recorded no later than the close of the next business day following the date of acquisition. The closeout inventory must be recorded no later than the close of the next business day following the date of close out.

Employee Possessor Questionnaire

Who needs to complete this form? This questionnaire MUST be completed by EACH employee possessor of a Federal explosives licensee or permittee or applicant, unless otherwise provided. (See reverse for definition of employee possessor.)

For ATF Use Only

RDS KEY:

Employee Possessor Information and Certification

Print the Requested Information in Block Letters.

1. Last Name		Explosives Applicant Business or Operations Name	
2. First Name		14. Name and address of explosives business or operations at which you are an employee possessor. TETRA TECH EC, INC. 12100 N.E. 195TH STREET, SUITE 200 BOTHELL, WA 98011	
3. Middle Name		15. Your position in the explosives business or operations.	
4. Name Suffix, if any (e.g., Sr., Jr., II)		16. Federal explosives license/permit number for explosives business/operations. 9-WA-00135	
5. Other Names Used - Including Maiden Name		17a. What is your Country of Citizenship?	
6. Social Security Number (Voluntary, will help prevent misidentification) <input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		17b. If you have citizenship in additional countries, please list.	
7. Place of Birth (City and State - or - City and Foreign Country)		If you indicated above you are a United States citizen, skip to question 18.	
8. Date of Birth (Month/Day/Year) <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		17c. What is your U.S. Immigration and Naturalization Service (INS)-issued alien number or admission number? <input type="text"/> <input type="text"/>	
9. Race/Ethnicity (Check one or more boxes)		The following questions must be answered with a "YES" or "NO" in the box.	
<input type="checkbox"/> American Indian or Alaskan Native <input type="checkbox"/> Hispanic		18. Are you a fugitive from justice?	
<input type="checkbox"/> Asian <input type="checkbox"/> Native Hawaiian or Other Pacific Islander		19. Are you an unlawful user of, or addicted to, marijuana or any depressant, stimulant, or narcotic drug, or any other controlled substance?	
<input type="checkbox"/> Black or African American <input type="checkbox"/> White		20. Have you ever been convicted in any court of a felony, or any other crime, for which the judge could have imprisoned you for more than one year, even if you received a shorter sentence, including probation? (See Definition 1, Exception 1.)	
10. Sex (Check one box) <input type="checkbox"/> Male <input type="checkbox"/> Female		21. Are you under indictment or information in any court for a felony, or any crime, for which the judge could imprison you for more than one year? (An information is a formal accusation of a crime by a prosecutor. See Definition 1.)	
11. Home Telephone Number (include area code)		22. Have you ever been adjudicated mentally defective (which includes having been adjudicated incompetent to manage your own affairs) or have you ever been committed to a mental institution?	
12. Work Telephone Number (Include area code and extension)		23. Have you ever been discharged from the Armed Forces under dishonorable conditions?	
Home Address		24. Have you ever renounced your United States citizenship?	
13a. Street Address		25. Are you an alien in the United States? If "YES," attach an explanatory statement showing that you are a lawful permanent resident. (See Definition 3, Exception 2.) (Generally, if you are an alien [except for a lawful permanent resident alien], you cannot possess explosive materials.)	
13b. Street Address (Continuation)		<input type="checkbox"/> Statement attached.	
13c. Apt. Number			
13d. City			
13e. State or Province, Country (if outside the United States)			
13f. Zip Code/Postal Code <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>			

Under the penalties imposed by 18 U.S.C. 844, I, _____, certify under penalties of perjury that the answers on this questionnaire are true, correct, and complete.

Print Your Full Name

Your Signature

Date

Report of Theft or Loss - Explosive Materials

Upon discovery of any theft or loss of any of your explosive materials:

- First, contact ATF toll free at 1-800-461-8841 between 8:00 a.m. - 5:00 p.m. EST (or after hours and weekends contact ATF collect at 1-888-283-2662) to report the theft or loss;
- Second, contact your local law enforcement office to report the theft or loss to obtain a police report; and
- Third, complete this form and attach any additional reports, sheets or invoices necessary to provide the required information, and fax then mail the form with additional material(s) to the nearest ATF office listed on the reverse. We suggest you retain a copy of the completed form. Please complete each item, as applicable, to the best of your ability.

NOTE: Section 842(k), 18 U.S.C., Chapter 40, states, "It shall be unlawful for any person who has knowledge of the theft or loss of any explosive materials from his stock to fail to report such theft or loss within twenty-four hours of discovery thereof to the Secretary and to appropriate local authorities." Codified at 27 C.F.R., Section 55.30.

1. Full Name of Person Making the Report (<i>Last, First, Middle</i>)	2. Corporate or Business Name (<i>if applicable</i>)
---	--

3a. Address (<i>Street Address, City, State, and Zip Code</i>)	3b. Telephone Number
4. Address of Location Where Theft Or Loss Occurred (<i>if different from item 3a</i>)	

5. Theft or Loss	Date	Time	6. Name of Local Authority to Whom Reported
a. Discovered			7. Address of Local Authority to Whom Reported
b. Occurred (<i>Show approximate if exact not known</i>)			
c. Reported to ATF by Telephone			8. Police Report Number
d. Reported to Local Authorities			

9. Explosive Materials Lost or Stolen (<i>Attach invoices or additional sheets, if necessary</i>)		
a. Manufacturer or Brand Name (<i>Include date and shift code</i>)	b. Quantity (<i>Pounds of Explosives, Number of Caps</i>)	c. Type and Description (<i>Dynamite, Blasting Agents, Detonators, etc. Include for each type, size, MS delay or length of legwire, as applicable</i>)

10. Theft or Loss Occurred From (*Check applicable box*)

Permanent Magazine
 Portable Magazine
 Truck
 Work Site
 Other (*Explain*) _____

11. Entry to Magazine Made Through (<i>Complete if applicable</i>) Door <input type="checkbox"/> Roof <input type="checkbox"/> Floor <input type="checkbox"/> Foundation <input type="checkbox"/> Wall <input type="checkbox"/> Ceiling <input type="checkbox"/> Vents <input type="checkbox"/> Other (<i>Explain</i>) <input type="checkbox"/> _____	12. Number and Type of Locks Forced (<i>Complete if applicable</i>)
---	---

13. Other Information Pertinent to Theft or Loss

14. Signature of Person Making Report

15. Federal Explosives License or Permit, If Any

For ATF Use Only

Date Received

Time Received

Unique Identifier

Reporting Instructions

Forward or Fax this completed form to the ATF address listed below:

Bureau of Alcohol, Tobacco, Firearms and Explosives
U.S. Bomb Data Center
P.O. Box #50980
Washington, DC 20091
Toll Free Fax: 1-866-927-4570

Questions regarding the completion of this form should be referred to the U.S. Bomb Data Center toll free at 1-800-461-8841.

Privacy Act Information

The following information is provided pursuant to section 3 of the Privacy Act of 1974 (5 U.S.C. § 522a(e)(3))

- 1. Authority.** Solicitation of this information is made pursuant to Title XI of the Organized Crime Control Act of 1970 (18 U.S.C. Chapter 40). Disclosure of a theft or loss of explosive materials is mandatory pursuant to 18 U.S.C. § 842(k) for any person who has knowledge of such theft or loss from his stock.
- 2. Purpose.** The purpose for the collection of this information is to give ATF notice of the theft or loss of explosive materials, and to furnish ATF with the pertinent facts surrounding such theft or loss. In addition, the information is used to confirm and verify prior notification of this theft or loss of explosive materials.
- 3. Routine Uses.** The information will be used by ATF to aid in the administration of laws within its jurisdiction concerning the regulation of explosive materials and other related areas. In addition, the information may be disclosed to other Federal, State, foreign, and local law enforcement of laws within their jurisdiction.
- 4. Effects of not supplying information requested.** 18 U.S.C. § 842(k) makes it unlawful for any person, who has knowledge of the theft or loss of explosive materials for his stock, to fail to report such theft or loss within twenty-four hours of discovery thereof, to the Secretary and to appropriate local authorities. The penalty for violation of this section is a fine of not more than \$1,000 or imprisonment for not more than one year, or both. 18 U.S.C. § 844(b)

Paperwork Reduction Act Notice

This request in accordance with the Paperwork Reduction Act of 1995. The purpose of this information collection is to report the theft or loss of explosive materials. The information is used for investigative purposes by ATF officials. This information is mandatory by statute. (18 U.S.C. § 842)

The estimated average burden associated with this collection of information is 1 hour and 48 minutes per respondent or recordkeeper, depending on individual circumstances. Comments concerning the accuracy of this burden estimate and suggestions for reducing this burden should be addressed to Reports Management Officer, Document Services Branch, Bureau of Alcohol, Tobacco, Firearms and Explosives, Washington, DC 20226.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

UXO-7:

Transportation of Explosive Materials

Purpose

This document provides procedures for the proper transportation of explosive materials.

Version Date: 09/07/2005 -

New

Approved by: *Donald Rogers*

Original Issue Date: 07/25/2005

Date:

Category: Company Procedures

Sections: UXO

Sub Category: Departmental/Discipline

Document Type: Procedure

Keyword Index:

Document Owner: David Keller

Table of Contents

See Below

1.0 PURPOSE

This document provides procedures for the proper transportation of explosive materials.

2.0 SCOPE

The procedures in this document are applicable to all employees of TtEC and its subsidiaries ("the Company") personnel involved in the transportation of explosive materials.

3.0 MINIMUM REQUIREMENTS

The procedures in this document are in compliance with 49 CFR and Department of Transportation regulations. When transporting explosives on DoD installations ensure DoD component and local procedures are reviewed and complied with. In many cases states and local jurisdictions have enacted their own requirements relating to the transportation of explosives. Check with the appropriate state or local authorities for information regarding state and local laws. Compliance with federal law does NOT exempt persons from compliance with state and local regulations. Whenever possible the transportation of explosives over public roads should be contracted out to a commercial carrier.

3.1 Responsibilities

All employees are required to follow the minimum requirements listed in this procedure. Any employee may request approval to vary from these requirements if they are in conflict with our corporate "Operating Philosophies," are unsafe, or are not compatible with contract or site-specific requirements. Approval to vary from this procedure must be obtained in writing from the UXO Discipline Lead. Additionally project related deviations must be covered at the first project review following the authorization to deviate. All employees are encouraged to submit comments and/or recommendations to improve this procedure.

All personnel engaged in the transportation of explosives will be thoroughly trained and properly licensed. They will be capable of recognizing hazardous situations and taking prompt corrective action. Transportation of explosives will not be conducted without client authorization, approved plans/SOPs, and all required forms and documentation.

3.1.1 Responsibilities Of The Project Manager

If the potential to transport MEC or donor explosives is identified in the project scope of work, then these tasks should be identified in the task initiation process. The procedures to address the regulatory and safety hazards associated with the transportation of hazardous materials should receive appropriate internal review and be clearly detailed in the project work plans. It is the project manager's responsibility to ensure that the appropriate level of expertise is identified and applied to any hazard or element of work identified in their project. The project manager will also ensure that the procedures contained in this document are followed.

3.1.2 Responsibilities Of All Employees

All employees are responsible for following the minimum requirements and guidance provided in this document. Additionally, employees are encouraged to submit comments regarding relevant changes to this procedure.

3.1.3 Operator Requirements

- a) The driver will be properly licensed and not be an unlawful user of or addicted to alcohol, narcotics, or other dangerous drugs.
- b) The driver will report to his supervisor when taking any medication, regardless if prescription or over the counter medication.
- c) The driver will inspect the transport vehicle prior to loading and transporting Class 1 materials.
- d) The driver will be familiar with applicable local, state and federal laws and regulations governing the transportation of explosive materials.
- e) The licensed person or another qualified employee will attend the vehicle transporting Class/Division (C/D) 1.1, 1.2 or 1.3 materials at all times.

3.1.4 Vehicle Attendant Requirements

- a) Physically in or on the vehicle, or have it within his field of vision and can reach it quickly without any interference.
- b) Be awake and alert and not engaged in other duties or activities that divert his attention from the vehicle.
- c) Be aware of the C/D explosive materials in the motor vehicle and its inherent dangers.
- d) Be aware of the measures and procedures to be followed in order to protect the public from such inherent dangers.
- e) Be familiar with the vehicle he is assigned to attend.
- f) Be trained, authorized and capable of moving the vehicle when required.
- g) Exception to the above attendant requirements is: a vehicle laden with Class 1 materials may be left unattended if parked in a "safe haven" in accordance with the provisions of 49 CFR Part 397.

4.0 GUIDELINES

4.1 General

When transporting explosives or any hazardous material, it will be properly and accurately documented on shipping papers in accordance with 49 CFR Part 172.

4.1.1 Emergency Response Information

The driver will have the following information as required by 49 CFR Part 172, Subpart G:

- a) Immediate hazard to life and health.
- b) Risks of fire or explosion.

- c) Immediate precautions to be taken in the event of an accident/incident.
- d) Immediate methods for handling fires.
- e) First aid measures.
- f) An emergency response phone number.

4.1.2 Written Route Plan

The driver will have a written route plan that includes all routes to be followed for the transportation of explosives.

4.1.3 DOT Hazmat Security Plan

- a) The plan consists of activities to be implemented by all shippers and transporters of certain types/amounts of specified DOT hazardous materials (hazmat) that will minimize the risk that the hazmat falls into the wrong hands, either before or during transportation. The main components of the Security Plan are:
 - 1) Personnel Security. Measures to confirm the information provided by job applicants.
 - 2) Unauthorized Access. Measures to address the assessed risk that unauthorized personnel may gain access to the site and hazmat.
 - 3) En-route Security. Measures to address the assessed security risks of shipments of hazmat during transport.
 - 4) Information of Security Plans can be found in 49 CFR 172.800 and ZIP Bulletin 104. Any questions should be addressed to the appropriate ESQ Environmental Compliance Specialist (or the DOT Hazmat Security Plan Lead at 617-457-8258).
- b) If the public does not have access to the roads on-site, a security plan is not required. If the public is allowed onto the roads on-site, then the security plan requirements apply.
- c) A security plan is required if the transporting vehicle requires placarding.
- d) All Hazmat employees will receive security awareness training. This will be accomplished by having the hazmat employee attend ("The Company's") DOT Hazardous Materials Transportation training. If a Security Plan is required, the hazmat employees must have "in depth" training on the plan's specifics. A "hazmat employee" is someone who packages, labels, marks and otherwise handles hazmat or supervises hazmat employees who perform these tasks. These employees must be trained to know what security steps to take in the event of a security problem at the site.
- e) Training must be documented and kept on site.

4.1.4 Copy of 49 CFR Part 397, This Procedure, and the Emergency Response Guidebook

The driver will have a copy of the Emergency Response Guidebook, this procedure, and 49 CFR Part 397 that includes:

- a) Transportation of Hazardous Materials.
- b) Driving and Parking Rules, and

- c) Federal Motor Carrier Safety Regulations.

4.1.5 State and Local Explosive and Hazmat Transportation Permits

The driver will have all state and local explosive and hazardous materials transportation permits, if applicable.

4.2 Driving Safety

4.2.1 Repairs

Do not take motor vehicles carrying explosive materials, blasting agents or blasting supplies inside a garage or shop for repairs or service.

4.2.2 Fueling

When a motor vehicle carrying hazardous materials is being fueled, its engine will not be running and a person will be in control of the fueling process at the point where the fuel is being dispensed.

4.2.3 Emergencies

In the event of a breakdown or collision, secure the area and promptly notify the local fire and police departments for assistance.

4.2.4 Parking

Except under emergency provisions, no vehicle transporting explosive materials will be parked:

- a) On or within 5 feet of the traveled portion of a public street or highway.
- b) On private property (including premises of fueling or eating facility) without the knowledge and consent of the person who is in charge of the property and who is aware of the nature of the hazardous materials the vehicle contains.
- c) Within 300 feet of a bridge, tunnel, dwelling or place where people work, congregate or assemble.

4.2.5 Smoking

No person will smoke or carry a lighted cigarette, cigar or pipe on or within 25 feet of a motor vehicle that contains Class 1 material.

4.2.6 Fires

A motor vehicle containing hazardous material will not:

- a) Be operated near an open fire unless the driver has first taken precautions to determine he can pass the fire safely, without stopping.
- b) Be parked within 300 feet of an open fire.

4.2.7 Routes

- a) Unless there is no other practical alternative, a motor vehicle that contains hazardous

materials must be operated over routes that do not go near through heavily populated areas, places where crowds assemble, tunnels, narrow streets, or alleys. Operating convenience is not a basis for determining whether it is practical to operate a motor vehicle in accordance with this procedure.

- b) Before a motor carrier permits a motor vehicle carrying class 1.1, 1.2 or 1.3 explosives to be operated, he will prepare a written plan of a route that complies with the rules of the preceding paragraph. A copy of this plan will be furnished to the driver of the vehicle. The driver may prepare this plan as an agent of the motor carrier in a place other than the terminal.

4.2.8 Railroad Crossings

All placarded vehicles must stop at all railroad crossings.

- a) Stop within 50 feet but no closer than 15 feet.
- b) Cross the tracks only when it is safe to do so.
- c) Do not shift gears while on the tracks.

Stops are not required at:

- a) Streetcar crossings or industrial switching tracks within municipalities.
- b) Crossings where a police officer or flagman is directing traffic.
- c) A crossing, which is controlled by a stop and go traffic light, which is green.
- d) Abandoned rail lines and industrial or spur line crossings clearly marked "EXEMPT."

4.3 Accidents Involving Explosives

In the event of an accident involving any motor vehicle transporting explosives:

- a) Every means available will be employed to prevent unnecessary persons from congregating at the accident scene. Unnecessary persons include: those not employed in the protection of people and property, those not needed for the removal of hazards or wreckage or those not responsible for the cargo.
- b) The same means will be used to prevent people from smoking, to keep flames away, to safeguard against the aggravation of the hazards at hand and to warn others.
- c) In the event any vehicle carrying dangerous explosive materials is entangled with another vehicle or structure, no attempt will be made to disentangle the wreckage until the explosive material and fragments of the material are removed and placed at least 200 feet from the wreckage and any habitation.
- d) In the event of a fire involving carrying explosive material, every effort should be made to give a warning of danger of explosion to habitants in the vicinity and other users of the highway. Employees should attempt to fight the fire, with the fire fighting equipment readily available, until such a time as the fire reaches the compartment the explosives are contained in and possible detonation is imminent.

4.4 Emergency Signals and Warning Devices

4.4.1 Signals

- a) Whenever a vehicle carrying explosive materials is stopped on the roadway for any reason other than a normal traffic stop, emergency flashers will be used until proper devices can be placed.
- b) Emergency flashers will also be used during the time warning devices are being picked up prior to moving the vehicle.
- c) Emergency flashers may be used at other times the vehicle is stopped in addition to, but not in place of, warning devices.

4.4.2 Warning Devices

Whenever a vehicle is stopped upon the traveled portion of the highway or the shoulder for any reason other than normal traffic stops, the driver will place emergency warning devices out as soon as possible. These warning devices will consist of three reflective triangles, three electric emergency lanterns or three red emergency reflectors. These warning devices shall be placed:

- a) Within 10 feet of the vehicle in the direction of oncoming traffic.
- b) At approximately 100 feet in the center of the occupied lane in the direction of oncoming traffic.
- c) At approximately 500 feet in the center of the occupied lane in the direction of oncoming traffic.
- d) The placement of warning devices is not required within the business or residential district of a municipality, except when available lighting is insufficient to make a vehicle clearly discernible at a distance of 500 feet to persons on the highway.
- e) If a motor vehicle is stopped within 500 feet of a curve, crest of a hill, or other obstruction to view, warning devices will be placed in the direction of the obstructed view at a distance of 100 to 500 feet.
- f) No driver will permit a lit road fire, or other flame producing emergency signal, to be attached to or placed within 50 feet of his vehicle.

4.5 Vehicle Requirements

- a) Vehicles used for the transportation of explosive will be strong enough to carry the load.
- b) Be in good mechanical condition.
- c) Have tight floors.
- d) When a vehicle, with an open body (pick-up), transports explosive materials, they will be loaded into a portable magazine or closed container and that portable magazine or container will be securely fastened to the truck bed and protected from the elements with a fire resistant tarpaulin, or metal camper type shell with a locking access opening.
- e) Any exposed spark producing metal on the inside of the body, portable magazine, or closed container, will be covered with wood or other non-sparking material to prevent contact with the explosive material. Exposed spark producing metal need not be covered in a vehicle transporting blasting agents and/or oxidizing agents.
- f) Each motor vehicle transporting explosive material will be equipped with fire extinguisher as

follows:

- Trucks of less than 14,000 lbs. GVW rating: Minimum of 2 extinguishers with a total fire extinguisher rating of at least 4-A: 70-B: C
- Trucks over 14,000 lbs. GVW rating and tractor semi-trailer units: Two or more extinguishers with a total fire extinguisher rating of at least 4-A: 70-B: C
- Only extinguishers listed or approved by a nationally recognized fire equipment-testing laboratory will be used on vehicles carrying explosive materials. They will be designed, constructed and maintained to permit visual determination of whether they are fully charged.
- Extinguishers will be located where they are accessible for immediate use.
- Extinguishers will be examined and recharged periodically in accordance with the manufacturer recommendations, and
- Where trucks are operated in temperatures below 0 degrees Celsius, dry powder extinguishers will be pressurized with nitrogen gas.

4.5.1 Vehicle Inspections

- a) A motor vehicle for transporting explosive materials will be inspected each day before use to determine it is in proper condition for the safe transportation, including:
 - b) The fire extinguishers are charged and ready for use.
 - c) All electrical wiring is protected and fastened to prevent short-circuiting.
 - d) Chassis, motor, pan and underside of body is reasonably clean and free of excess oil and grease.
 - e) Fuel tanks, feed lines and crossover lines are secure and have no leaks.
 - f) Brakes, lights, horns, windshield wipers, and defrosters, and steering apparatus are functioning properly.
 - g) Tires have proper inflation and are free of defects.
 - h) Tires will be checked for proper inflation and general conditions after each 2 hours of travel or 100 miles, whichever comes first, and at every stop. Flat or overheated tires will be removed from the vehicle immediately. After removal of the tire, it will be placed far enough away from the vehicle so that spontaneous ignition of the tire will not endanger the vehicle or its cargo. The tire will not be placed on the vehicle until it has cooled down below the danger level, nor will it be used again until the cause of its overheating has been corrected.
 - i) No metal, tools, oils, matches, firearms, batteries, flammable substances, acids, oxidizing materials or corrosive compounds will be carried on the body of any motor vehicle transporting explosive materials except as permitted by regulations of the U.S. Department of Transportation.

4.5.2 Placarding

- a) Motor vehicles, when used for transporting any quantity of explosive materials over a public

highway, will display the placards and markings required by 49 CFR 172.500 Subpart F.

- b) Before a placarded vehicle transports explosive materials over public roads a DOT Hazmat security plan must be in the driver's possession.
- c) Placard vehicles transporting explosive material on both sides and the front and rear.
- d) When mixed loads are transported, display the placards for the most hazardous cargo.
- e) Explosive placards will be diamond shape and measure 10-3/4 inches on each side. The placards will be orange with a white border and the symbol and print will be black.
- f) Further information on class, division, segregation and compatibility of explosive material can be found in 49 CFR 177.848, and 49 CFR 172.504.

4.5.3 Loading and Unloading

- a) Load hazardous materials in accordance with the compatibility and segregation tables in 49 CFR 177.848.
- b) No bale hooks or other metal tools will be used for the loading, unloading or handling of explosives.
- c) No package, or other container of explosives, except barrels or kegs, will be rolled.
- d) No package of explosives will be dropped or thrown.
- e) Special care will be exercised to ensure packages or containers of explosive material will not catch fire from sparks or hot gasses from the vehicle exhaust tailpipe.

4.5.4 Detonators

Blasting caps, electric or non-electric, contain primary explosives and therefore **MAY NOT** be transported in the same vehicle with other explosives, unless packed in wooden or fiberboard containers as per 49 CFR 173.63, and 177.835. These containers will then be loaded into portable containers or separate compartments that meet the requirements of the Institute of Makers of Explosives IME-22 standard. Or the MK 663 Container maybe used to transport not more than 10 blasting caps in the same vehicle with other explosives in accordance with the provisions of 49 CFR 173.7(a). A copy of the Certificate of Equivalency (NA-02-513) must accompany the container. The container will have DOT Marking as: "DETONATORS FOR AMMUNITION", and will have the "1.4S" DOT Label.

4.5.5 Transporting Explosives with ATVs

- a) Operators must be trained and certified in the operation of ATVs.
- b) Never transport explosives with a two-wheeled vehicle, or a Type 1 ATV (handle bars and one seat, without rollcage).
- c) Thoroughly inspect ATVs and correct all deficiencies before transporting explosives. ATVs must be clean and in good mechanical condition.
- d) Equip ATVs with approved spark arrestors and a portable fire extinguisher.
- e) Do not exceed the manufacturer's load rating and in no case will the weight of the explosives exceed 50 pounds.

- f) Never transport blasting caps on the same ATV with other explosives, unless contained within a MK-663 container.
- g) Explosives will be packaged in the original or equivalent containers and be properly secured in the cargo equipment.
- h) If placarding is required use scaled down placards if necessary to fit the space that is available.
- i) During lightning storms park the ATV and move all personnel a safe distance away.
- j) Do not operate radios while transporting electric blasting caps on an ATV. Check the safe transmitting distances for the radios being utilized.
- k) Keep explosives away from sources of electricity, heat or flames, radio frequency and static electricity.

4.5.6 Transporting Explosives on Boats

- a) Boat operators must be trained and certified in the operation of the craft being utilized.
- b) Explosives will be packaged in the original or equivalent containers and be properly secured.
- c) Situate explosives away from loading booms or other rigging that would expose them to falling objects.
- d) Do not operate radios while transporting electric blasting caps on a small boat. Check the safe transmitting distances for the radios being utilized.
- e) Keep explosives away from sources of electricity, heat or flames, radio frequency and static electricity.
- f) Separate blasting caps and explosives to the maximum extent possible. If this cannot be accomplished safely, transport blasting caps and explosives on different boats, make extra trips, or utilize a MK-663 container for the blasting caps.
- g) Boats carrying explosives must be properly placarded and fly the Bravo flag.

5.0 REFERENCES

Please Describe Your Reference Here	Place Your Link In This Column
49 CFR	
IME Safety Library Publication No. 12, Glossary of Commercial Explosive Industry Terms, April 1997	
IME Safety Library Publication No. 22, Recommendations for the Safe Transportation of Detonators in a Vehicle with Certain Other Explosive Materials, May 1993	
USDA FGS Guide for Using, Storing, and Transporting Explosives and Blasting Materials, 2000 Edition	
2000 Emergency Response Guidebook	

6.0 ATTACHMENTS

None.

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UXO-8: Management and Disposition for Material Potentially Presenting an Explosive Hazard (MPPEH)

Purpose

This document provides procedures for the proper management and disposition of Material Potentially Presenting an Explosive Hazard (MPPEH)

Version Date: 05/05/2006 - New	Approved by: <i>Donald Rogers</i>
Original Issue Date:	Sections: UXO
Category: Company Procedures	Document Type: Procedure
Sub Category: Departmental/Discipline	Document Owner: Frank Jones
Keyword Index:	

Table of Contents

See Below

1.0 PURPOSE

This document provides procedures for the proper management and disposition of Material Potentially Presenting an Explosive Hazard (MPPEH).

2.0 SCOPE

The procedures in this document are applicable to all Tetra Tech UXO personnel involved in the management and disposition of MPPEH. It covers all MPPEH, including material documented as safe, being transferred within, or released from DoD control for disposition.

3.0 MINIMUM REQUIREMENTS

This document is in compliance with DoD guidelines for management and disposition of MPPEH and will be strictly adhered to at all times unless deviations are requested and authorized in the ESS (Explosive Safety Submission), or ESS Waiver. It is intended to prevent the transfer or release of MPPEH that will unintentionally present an explosive hazard to either a qualified receiver or the public.

3.1 Responsibilities

The UXO Operations Manager is responsible for updating this procedure. Approval authority rests with TtEC's Chief Operating Officer. Suggestions for revision to this document will be submitted to the UXO Operations Manager.

All employees are required to follow the minimum requirements listed in this procedure. Any employee may request permission to vary from these requirements if they are in conflict with our corporate "Operating Philosophies", are unsafe, or are not compatible with contract or site-specific requirements. Permission to vary from this procedure must be obtained from the UXO Discipline Lead. All employees are encouraged to submit comments and/or recommendations to improve this procedure.

All personnel engaged in the management and disposition of MPPEH will be thoroughly trained. They will be capable of recognizing hazardous situations and taking prompt corrective action. The storage, processing and disposition of MPPEH will not be conducted without client authorization, approved work plans, ESS, SOPs, and all required forms and documentation.

4.0 GUIDANCE

4.1 Handling

MPPEH is material that is not known with certainty to present an explosive hazard, but may contain hidden or small amounts of explosive material. MPPEH must be assumed to present an explosive hazard until it is visually inspected and/or processed, and certified safe. DoD components and their contractors shall take those actions necessary to ensure that MPPEH that is either transferred within, or released from DoD control is either: (a) initially 100 percent visually inspected and independently re-inspected, or (b) processed by DDESB approved means, with appropriate post-processing inspections (e.g. sampling); and for which the Explosive Safety Status is documented as either "Safe" or "Hazardous". Handling requirements for MPPEH may vary by site, but generally include:

- a) Locations used for collected MPPEH processing operations (e.g. collecting, consolidating, inspecting, segregating, sorting, storing, treating, transferring, releasing, certifying, demilitarizing, etc.) shall be sited as an ES (exposed site) at not less than ILD (intra-line distance) from surrounding PES (potential explosion sites). Storage locations for MPPEH not documented as safe, or documented as hazardous shall be sited as a PES.
- b) Siting approval is not required for locations on operational ranges that are used temporarily during range clearance activities for intermediate management of collected MPPEH prior to transfer to a MPPEH processing point. Ensure MPPEH collection points are located so their ESQD (Explosive Safety Quantity Distance) arcs, based on hazard classification and NEW (Net Explosive Weight), remain within the operational range's impact area and buffer zones.
- c) Maintain an accurate inventory and chain of custody at all times.
- d) Inspect MPPEH and document as safe or hazardous. Attachment 1 provides guidance and definitions to assist with further classification as MEC, MC or Munition Debris.
- e) On Navy sites the material must also be classified as to the degree of explosion hazard. Items will be classified as: **5X** - entirely safe (5X items are not MPPEH). **3X** - items that are expected to be free of explosives, but no enough information is available to certify it safe. (3X material is MPPEH). **1X** - items that are contaminated and are likely to present an explosive hazard (1X material is MPPEH). **0X** - items that were never contaminated and do not pose an explosive hazard. (0X material is not MPPEH). NAVSEA OP 5 Volume 1, Revision 7, Ammunition and Explosive Safety Ashore, Chapter 13 covers this in more detail.
- f) MPPEH not certified safe must be treated as Ammunition and Explosives and must be stored in a sited storage area or magazine. Items certified as safe, but not explosive, must be stored in a secure holding area. Ensure items not yet inspected, items certified as safe and items certified as hazardous are properly labeled and stored separately. If items certified as safe are commingled with other items not yet certified, or items certified as hazardous, those items lose their safe certification and must be re-certified.
- g) Inspect all surfaces.
- h) Vent if necessary
- i) Treat if necessary. Treatment and sampling methods must be DDESB approved and require written procedures.
- j) Demilitarize if required.
- k) Minimize the time MPPEH is accumulated and retained.

4.2 Inspection

MPPEH requires a 100 percent inspection and a 100 percent re-inspection to document the explosive safety status of the material to be transferred within or released from DoD custody. MPPEH will be documented as:

- a) **Safe.** Documented as not presenting an explosive hazard, and safe for unrestricted transfer or release pending any further demilitarization requirements or trade security controls. Material that has been documented as safe (5X for Navy) is no longer considered MPPEH provided the chain of custody remains intact.
- b) **Hazardous.** The explosive hazards of the material is known or suspected and is documented. This material is transferable or releasable only to a qualified receiver.

- c) To be documented as safe all surfaces must be clearly visible and 100 percent inspected. Vent and inspect all cavities and voids. Plan and budget for the time, and for the explosive cutting charges or mechanical means necessary to properly vent MPPEH that is expected to be encountered. When internal cavities of MPPEH items are not vented, they must be certified hazardous and the qualified receiver must be notified in writing of their existence and of the potential explosive hazards.
- d) Visual inspections are not always sufficient to ensure MPPEH does not present an explosive hazard. Other DDESB approved means (e.g. thermal treatment) may be necessary to ensure a release or transfer does not present an explosive hazard to a receiver.
- e) MPPEH will be initially inspected by a qualified UXO III or above.
- f) MPPEH certifications require dual signatures by qualified personnel. For MPPEH going to DRMO the first signature (certifier) may be either qualified DoD personnel or qualified contractor personnel. The second signature (verifier) must be a technically qualified DoD person, and U.S. citizen.
- g) The certification and verification signatures must be directly above the typed or clearly stamped or legibly printed full name, rank/rate, complete organization name and address, and phone number (commercial and DSN) of the personnel that certified and verified the inspection. Each generating activity shall ensure that is servicing DRMO has a current list of the personnel and their sample signatures who are qualified and authorized to inspect, certify and verify MPPEH.

4.3 Inspectors

Personnel who inspect, re-inspect, and document MPPEH as safe, or MPPEH as hazardous shall:

- a) Be trained in the recognition and safe handling of used or unused military munitions and/or specific types of MPPEH.
- b) Be trained in demilitarization and trade security procedures that apply to all material that is to be released from DoD control.
- c) Be trained in identification, management (e.g. marking, segregating, storing), and processing of MPPEH.
- d) Demonstrate or provide proof of adequate training and experience in the recognition and safe handling of used and unused military munitions and other MPPEH, and in the processing of MPPEH.
- e) Be certified in conformance with contract requirements by the DoD component directly responsible for controlling the transfer or release of MPPEH as being technically qualified to perform such functions.

4.4 Storage

Ensure MPPEH is secured, marked and stored in accordance with DoD and service directives.

- a) Locations used for storage of MPPEH shall be sited as an ES at not less than 100 feet from surrounding PES. MPPEH not documented as safe, or documented as hazardous shall be sited as a PES. These locations may be sited in the ESS or by separate siting requests.
- b) MPPEH not certified as safe must be treated as Ammunition and Explosives and must be

stored in a sited storage area or magazine. Items certified as safe must be stored in a secure holding area. Ensure items not yet inspected, items certified as safe and items certified as hazardous are properly labeled and stored separately.

- c) MPPEH, MPPEH containers, MPPEH holding areas and explosive storage magazines must be properly secured and clearly marked to indicate any hazards that may be present.
- d) Use the required labels and placards for all containers, storage sites and magazines. Post all applicable safety precautions.
- e) Maintain the inspection, re-inspection, and explosives safety documentation status of the MPPEH on site.
- f) Post the immediate actions to be taken in the event of an accident/incident and emergency response phone numbers.
- g) Minimize the quantity and time MPPEH is accumulated and retained on site.

4.5 Transfer

Material that has been certified as safe is no longer considered MPPEH provided the chain of custody remains intact. Material documented as hazardous can only be transferred or released to those entities or individuals that:

- a) Have the licenses and permits required to receive, manage, or process the materials.
- b) Have the technical expertise about the known or suspected explosive hazards associated with the MPPEH.
- c) Are qualified to receive, manage, and process MPPEH in accordance with DoD directives.
- d) Have personnel that are experienced in the management and processing of hazardous materials equivalent to the MPPEH.
- e) Have personnel that are trained and experience in the identification and safe handling of used and unused military munitions and/or any potential explosive hazards that may be associated with the specific MPPEH.

4.6 Chain of Custody

- a) Ensure that chain of custody and accountability records are maintained through final disposition MPPEH and of all materials documented as safe. A legible copy of inspection, re-inspection, and documentation must accompany MPPEH through final disposition and be maintained for a period of 3 years thereafter. Material that has been documented as safe is no longer considered MPPEH as long as the chain of custody remains intact.
- b) Attachment 2 can be modified to meet site-specific chain of custody requirements.
- c) Immediately notify the client of any unintentional or unauthorized transfer or release of MPPEH.

4.7 Transporting

Material that has been documented as having an explosive safety status of safe may, from an explosives safety perspective, be transported or shipped over public transportation routes. Documentation must accompany the shipment. MPPEH shall not be transported or shipped over

public transportation routes unless determined safe for transport by personnel certified by responsible authority. A determination that MPPEH is safe for transport must be documented and signed by the individual making the determination. MPPEH that can not be shipped in accordance with an existing hazard classification must not be transported over public transportation routes until an Interim Hazard Classification (IHC) and Certificate of Equivalency (COE) are obtained. IHCs and COEs are required to accompany the shipment.

5.0 REFERENCES

Please Describe Your Reference Here	Place Your Link in this Column
1. DoD Instruction 4140.62 Management & Disposition of Material Potentially Presenting an Explosive Hazard	
2. DoD Instruction 4160.21-M Defense Material Disposition Manual	
3. DoD Instruction 4160.21-M1 Defense Demilitarization Manual	
4. DoD 6055.9-STD DoD Ammunition and Explosive Safety Standards	
5. NAVSEA OP 5 Volume 1 Ammunition and Explosive Safety Ashore	
6.	
7.	

6.0 ATTACHMENTS

Please Provide a Description of the Attachment	Place Your Attachments Here
1. MPPEH Classification Guide and Definitions	 UXO-8 - Attachment1 Revised April 2006.doc
2. MPPEH Chain of Custody Manifest	 UXO-8 ATTACH 2 Rev April 4.doc

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MPPEH CLASSIFICATION GUIDE AND DEFINITIONS

Type of Material (1)	What is it BEFORE it is inspected for explosives hazards? (2)		What is it AFTER it is inspected for explosive hazards...					
			and it presents explosive hazards?			and it does not present explosive hazards?		
	MPPEH	Other	MEC			MC (5)	Munitions Debris	Other
			UXO	DMM (3)	MC (4)			
Used military munition, on a range, fired	X		X				X	
Unused military munition, on a range, apparently discarded	X			X			X	
Used military munition, in a burial pit, on an operational range or on former ranges	X		X (6)				X	
Unused military munition, in a burial pit on an operational range or on former ranges	X			X (6)			X	
Explosives in the soil	X				X (7)	X		
Refrigerator, nails, soft drink cans, old fence wire, etc.		(8)	NA	NA	NA			(8)
Used cartridge cases, from a range, with live unused munitions possibly mixed in	X			X			(9)	
Target from a range (other than small arms range)	X		(10)	(10)	(10)			(11)
Remnants of munitions from an operational range or former range	X		X (12)	X (12)	X (12)		X (13)	
Kicked out military munition from a former open burn or open detonation Ground	X			X (14)			X	
Residual MC in a melt kettle of a former (closed) explosive cast loading Bldg	X		(15)	(15)	X (15)	X		X (16)
Residual MC in a floor drain pipe from an explosives-laden wash water drain of a former (closed) explosives cast loading facility.	X		(15)	(15)	X (15)			X (16)
Residual MC in cracks in floor slab (and in soil underneath floor cracks) in a former explosives manufacturing building	X		(15)	(15)	X (15)	X		X (16)
Small arms bullets or lead particulates in the soil from small arms use at a former small arms range used only for firing small arms ammunition		X (17)	Not Applicable (17)			X		

Note: The examples in this table are not all inclusive. The numbers in the table refer to footnotes that are found on the next page. It is important to read the footnotes, as they provide additional information of importance to understanding.

Footnotes

- (1) DoD has been working to standardize terms related to military munitions. The majority of the terms addressed in this matrix apply to the military munitions response program. However, many also apply to other areas (e.g., operational ranges) outside that program.
- (2) Before material that is considered MPPEH can be either transferred within or released from DoD, its explosives safety status must be determined (see definition--Documentation of the Explosives Safety Status of Material). The type material involved determines the type of inspection (e.g., visual examination, chemical analysis, X-ray) required. Personnel qualified to determine the status of the particular material being examined must perform required inspections. For example, EOD and UXO-qualified personnel may inspect UXO and DMM during a munitions response or during range clearance activities. A QASAS or certified Wage Grade ammunition operator may inspect steamed-out projectiles at a depot's steam-out operation. A laboratory technician may perform a chemical analysis of soil to determine the percent explosives in the soil.
- (3) Munitions generally considered as DMM include: buried munitions; un-recovered kick outs from open detonations; munitions left behind or discarded accidentally during munitions-related activities; munitions intentionally disposed of without authorization during munitions-related activities. Munitions removed from storage for the purpose of disposal that are awaiting disposal are not DMM.
- (4) This is MC that is both (a) an explosive; and (b) present in sufficient concentrations to present explosive hazards.
- (5) This is MC that is either (a) not an explosive (e.g., lead, beryllium, and cadmium); or (b) an explosive not present in sufficient concentrations to present explosive hazards.
- (6) Although military munitions in a burial pit will normally be DMM, some may be UXO. For explosives safety reasons, munitions in a burial pit should be approached as UXO until assessed by technically qualified personnel (e.g., EOD personnel, UXO-qualified personnel) and determined that they are not UXO or that they do not present explosive hazards similar to UXO.
- (7) Explosive soil is typically found in sumps and settling lagoons for explosives-laden wastewater, and in and around drainage ditches and pipes that carry the wastewater to such sumps and lagoons.
- (8) These items are cultural debris.
- (9) After determination of their explosives safety status, used cartridge cases documented as safe would, after any demilitarization required to remove their military characteristics, be available for release from DoD. In addition to these DoD requirements, other regulatory criteria may apply.
- (10) A target is a type of range-related debris. Although a target is not MEC, it may contain UXO, DMM, or MC. Prior to its release from DoD control, its explosives safety status must be documented.
- (11) A target's explosives safety status must be documented and any demilitarization required to remove its military characteristics must be performed prior to its release from DoD control.
- (12) UXO, DMM, or MC may be found on operational ranges and on former ranges (previously referred to as closed, transferring or transferred ranges). An inspection of the material will determine into which category this material falls. For example, if a projectile breaks apart on impact, one could find (a) a sheared-off fuze, which would be UXO or (b) explosive filler, which would be MC, that broke away from the projectile's open body. If during an open detonation of an unserviceable munition that is conducted on an operational range, the donor charge detonates, but the munition being destroyed breaks up, but does not detonate, the remnants of the munition would be DMM or, if explosive residue (e.g., clumps of TNT), MC.
- (13) After determination of its explosives safety status, scrap metal from used munitions on a range that is documented as safe would, after any demilitarization required to remove its military characteristics, be available for release from DoD control. In addition to these DoD requirements, other regulatory criteria may apply.
- (14) Prudent safety practice is to consider kick outs, which have experienced an unknown environment, to be equally dangerous and managed like UXO until technically qualified personnel assess and determine that they are not UXO or do not present explosive hazards similar to UXO.
- (15) Of itself, such material (e.g., mettle kettle, drainpipes, floor slabs) do not present an explosive hazard and would not be classified as UXO, DMM or MC. However, residual MC (e.g., TNT, RDX, HMX) could remain in such material in high enough concentrations to present an explosive hazard.
- (16) After determination of its explosives safety status, such material (e.g., mettle kettle, drainpipes, floor slabs) when documented as safe would be available for release from DoD control. In addition to this DoD requirement, other regulatory criteria may apply.
- (17) At operational ranges or former ranges used exclusively for live fire of small arms ammunition, some unfired small arms ammunition may be found. Although this ammunition is considered DMM and would be MPPEH, it is not considered to present a significant explosive hazard.

Consolidated Military Munitions Response Program Definitions

Anomaly Avoidance. Techniques employed on property known or suspected to contain MEC, or CWM in OTM configurations to avoid contact with potential surface or subsurface explosive or CA hazards, to allow entry to the area for the performance of required operations.

Chain of Custody. The activities and procedures taken throughout the inspection, re-inspection and documentation process to maintain positive control of MPPEH to ensure the veracity of the process used to determine the status of material as to its explosive hazard. This includes all such activities from the time of collection through final disposition.

Chemical Agent (CA). CA means an agent that, through its chemical properties, produces lethal or other damaging effects on human beings, except that such term does not include riot control agents, chemical herbicides, smoke and other obscuration materials.

Chemical Agent (CA) Hazard. A condition where danger exists because CA is present in a concentration high enough to present potential unacceptable effects (e.g., death, injury, damage) to people, operational capability, or the environment.

Chemical Warfare Material (CWM). Items generally configured as a munition containing a chemical substance that is intended to kill, seriously injure, or incapacitate a person through its physiological effects. CWM includes V- and G-series nerve agents or H-series (mustard) and L-series (lewisite) blister agents in other-than-munition configurations; and certain industrial chemicals (e.g., hydrogen cyanide (AC), cyanogen chloride (CK), or carbonyl dichloride (called phosgene or CG)) configured as a military munition. Due to their hazards, prevalence, and military-unique application, chemical agent identification sets (CAIS) are also considered CWM. CWM does not include: riot control devices; chemical herbicides; industrial chemicals (e.g., AC, CK, or CG) not configured as a munition; smoke and flame producing items; or soil, water, debris or other media contaminated with low concentrations of chemical warfare agents where no CA hazards exist.

Chemical Warfare Material (CWM) Response. Munitions responses and other responses to address the chemical safety; explosives safety, when applicable; human health; or environmental risks presented by CWM regardless of configuration. (See munitions response.)

Construction Support. Assistance provided by DoD EOD or UXO-qualified personnel and/or by personnel trained and for operations involving CWM Qualified during intrusive construction activities on property known or suspected to contain MEC, or CWM in OTM configurations to ensure the safety of personnel or resources from any potential explosive or CA hazards.

Chemical Agent (CA) Safety. A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of a mishap involving chemical warfare material (CWM).

Cultural Debris. Debris found on operational ranges or munitions response sites, which may be removed to facilitate a range clearance or munitions response, that is not related to munitions or range operations. Such debris includes, but is not limited to: rebar, household items (refrigerators, washing machines, etc.), automobile parts and automobiles that were not associated with range targets, fence posts, fence wire, and magnetic rocks.

Defense Sites. Locations that are or were owned by, leased to, or otherwise possessed or used by the Department of Defense. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions. (10 U.S.C. 2710(e)(1))

Discarded Military Munitions (DMM). Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2))

Disposal. End of life tasks or actions for residual materials resulting from demilitarization or disposition operations.

Disposition. The process of reusing, recycling, converting, redistributing, transferring, donating, selling, demilitarizing, treating, destroying, or fulfilling other life-cycle guidance, for DoD property.

Documentation of the Explosives Safety Status of Material. Documentation recording that material: (1) does not present an explosive hazard and is consequently safe for unrestricted transfer within or release from DoD control or (2) is MPPEH, with the stated known or suspected explosive hazards, and is consequently is only transferable or releasable to a qualified receiver. This documentation must be signed by a technically qualified individual with direct knowledge of: (1) the results of both the 100 percent inspection and 100 percent re-inspection, and (2) the chain-of-custody of the material originally classified as MPPEH. This certification is followed by a verification signed by a technically qualified individual who inspects the material on a sampling basis (sampling procedures are determined by DoD entity that is generating the MPPEH).

Environmental Regulators and Safety Officials. Include, but may not be limited to environmental regulators, environmental coordinators or hazardous material coordinators, law enforcement officers, and safety personnel of the U.S. Environmental Protection Agency (USEPA), American Indians and Alaska Natives, other Federal Land Managers, and/or the States. When appropriate, public health officials of various agencies may also be involved:

Explosive Hazard. A condition where danger exists because explosives are present that may react (e.g., detonate, deflagrate) in a mishap with potential unacceptable effects (e.g., death, injury, damage) to people, property, operational capability, or the environment.

Explosive Ordnance Disposal (EOD). The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded ordnance and of other munitions that have become hazardous by damage or deterioration.

Explosive Ordnance Disposal (EOD) Personnel. Military personnel who have graduated from the Naval School, Explosive Ordnance Disposal; are assigned to a military unit with a Service-defined EOD mission; and meet Service and assigned unit requirements to perform EOD duties. EOD personnel have received specialized training to address explosive and certain CA hazards during both peacetime and wartime. EOD personnel are trained and equipped to perform Render Safe Procedures (RSP) on nuclear, biological, chemical, and conventional munitions, and on improvised explosive devices.

Explosive Ordnance Disposal (EOD) Unit. A military organization constituted by proper authority; manned with EOD personnel; outfitted with equipment required to perform EOD functions; and assigned an EOD mission.

Explosives or Munitions Emergency Response. All immediate response activities by an explosives and munitions emergency response specialist to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency. An explosives or munitions emergency response may include in-place render-safe procedures, treatment or destruction of the explosives or munitions, and/or transporting those items to another location to be rendered safe, treated, or destroyed. Any reasonable delay in the completion of an explosives or munitions emergency response caused by a necessary, unforeseen, or uncontrollable circumstance will not terminate the explosives or munitions emergency. Explosives and munitions emergency responses can occur on either public or private lands and are not limited to responses at RCRA facilities. (Military Munitions Rule, 40 CFR 260.10)

Explosives Safety. A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of potential mishaps involving military munitions. **Interim Holding Facility (IHF).** A temporary storage facility designed to hold recovered chemical warfare material (RCWM) pending transportation for off-site treatment or storage, or on-site treatment.

Land Use Controls (LUC). LUC are physical, legal, or administrative mechanisms that restrict the use of, or limit access to, real property to manage risks to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and/or physical barriers to limit access to real property, such as fences or signs.

Long-term Management (LTMgt). The period of site management (including maintenance, monitoring, record keeping, 5-year reviews, etc.) initiated after response (removal or remedial objectives have been met (i.e., after Response Complete).

Material Potentially Presenting an Explosive Hazard (MPPEH). Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Military Munitions. Military munitions means all ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the U.S. Coast Guard, the U.S. 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, including bulk explosives, and chemical warfare 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 of the above. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear 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)(A) through (C))

Minimum Separation Distance (MSD). MSD is the distance at which personnel in the open must be from an intentional or unintentional detonation.

Mutual Agreement. A meeting of the minds on a specific subject, and a manifestation of intent of the to do or refrain from doing some parties specific act or acts. Inherent in any mutual agreement or collaborative process are the acknowledgement of each member's role in the process and their differing views of their authorities. The mutual agreement process will provide a means of resolving differences without denying the parties an opportunity to exercise their respective authorities should mutual agreement fail to be achieved.

Munitions and Explosives of Concern (MEC). This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) Unexploded ordnance (UXO), as defined in 10 U.S.C. 101(e)(5)(A) through (C); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC). Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710).

Munitions Debris. Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Munition with the Greatest Fragmentation Distance (MGFD). The munition with the greatest fragment distance that is reasonably expected (based on research or characterization) to be encountered in any particular area.

Munitions Response. Response actions, including investigation, removal actions and remedial actions to address the explosives human health, safety or environmental risks presented by unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC).

Munitions Response Area (MRA). Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

Munitions Response Site (MRS). A discrete location within an MRA that is known to require a munitions response.

One Percent Lethality Distance. A distance calculated from a given CA MCE and meteorological conditions (temperature, wind speed, Pasquill factor) stability and established as the distance at which dosage from that MCE agent release would be 150 mg-min/m³ for H and HD agents, 75 mg-min/m³ for HT agent, 150 mg-min/m³ for Lewisite, 10 mg-min/m³ for GB agent, 4.3 mg-min/m for VX vapor, and 0.1 mg-min/m³ for inhalation and deposition of liquid VX.

On-call Construction Support. Support provided, on an as needed basis, by DoD EOD or UXO-qualified personnel and/or by trained for personnel and qualified operations involving CWM during intrusive construction activities on property known or suspected to contain MEC or CWM in OTM configurations, where the probability of encountering such has been determined to be low. This support can respond from off-site when called, or be on-site and available to provide required construction support.

On-site Construction Support. Dedicated support provided by DoD EOD or UXO-qualified personnel and/or by trained and for personnel qualified operations involving CWM during intrusive construction activities on property known or suspected to contain MEC, or CWM in OTM configurations, where the probability of encountering such has been determined to be moderate to high.

On-call UXO Construction Support. Support provided, on an as needed basis, by DoD EOD or UXO-qualified during intrusive construction Personnel activities on property known or suspected to contain UXO or other munitions that have experienced abnormal environments where the probability of encountering such has been determined to be low. This support can respond from off-site when called, or be on-site and available to provide required construction support.

On-site UXO Construction Support. Dedicated support provided by DoD EOD or UXO-qualified personnel during construction activities on known Property or suspected to contain UXO or other munitions that have experienced abnormal environments where the probability of encountering such has been determined to be moderate to high.

On-the-Surface. A situation in which UXO, DMM or CWM are: (A) entirely or partially exposed above the ground surface (i.e., the top of the soil layer); or (B) entirely or partially exposed above the surface of a water body (e.g., because of tidal activity).

Open Burn (OB). An open-air combustion process by which excess, unserviceable, or obsolete munitions are destroyed to eliminate their inherent explosive hazards.

Open Detonation (OD). An open-air process used for the treatment of excess, unserviceable or obsolete munitions whereby an explosive donor charge initiates the munitions being treated.

Operational Range. A range that is under the jurisdiction, custody, or control of the Secretary of Defense and that is used for range activities; or although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities. (10 U.S.C. 101(e)(3)(A) and (B)). Also includes "military range," "active range," and "inactive range" as those terms are defined in 40 CFR §266,201. (See reference (f)).

Primary Explosives. Primary explosives are highly sensitive compounds that are typically used in detonators and primers. A reaction is easily triggered by heat, spark, impact or friction. Examples of primary explosives are lead azide and mercury fulminate.

Public Access Exclusion Distance (PAED). The PAED is defined as longest distance of the hazardous fragment distance, IBD for overpressure, or the One Percent Lethality Distance. For siting purposes, the PAED is analogous to the IBD for explosives; therefore, personnel not directly associated with the chemical operations are not to be allowed within the PAED.

Qualified Receiver. Entities that have personnel who are, or individuals who are, trained and experienced in the identification and safe handling of used and unused military munitions, and any known or potential explosive hazards that may be associated with the MPPEH they receive; and are licensed and permitted or otherwise qualified to receive, manage, and process MPPEH.

Range. A designated land or water area that is set aside, managed, and used for range activities of the Department of Defense. The term includes firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access, and exclusionary areas. The term also includes airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration. (10 U.S.C. 101(e)(1)(A) and (B))

Range activities. Research, development, testing, and evaluation of military munitions, other ordnance, and weapons systems; and the training of members of the armed forces in the use and handling of military munitions, other ordnance, and weapons systems. (10 U.S.C. 101(e)(2)(A) and (B))

Range Clearance. The recovery, collection, and on-range destruction of used military munitions (e.g., unexploded ordnance (UXO)), munitions debris, and other range-related debris (e.g., targets) on operational ranges to maintain or enhance operational safety or to sustain the continued use of the range for its intended purpose. The term "range clearance" does not include the on-range disposal or burial of military munition and munitions constituents, when the burial is not a result of normal use.

Range-Related Debris. Debris, other than munitions debris, collected from operational ranges or from former ranges (e.g., targets).

Render Safe Procedures (RSP). The portion of EOD procedures that involves the application of special disposal methods or tools to interrupt the functions or separate the essential components of UXO to prevent an unacceptable detonation.

Secondary Explosives. Secondary explosives are generally less sensitive to initiation than primary explosives and are typically used in booster and main charge applications. A severe shock is usually required to trigger a reaction. Examples are TNT, cyclo-1,3,5-trimethylene-2,4,6-trinitramine (RDX or cyclorrite), HMX, and tetryl.

Small Arms Ammunition. Ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns.

Team Separation Distance (TSD). The distance that munitions response teams must be separated from each other during munitions response activities involving intrusive operations.

Technical Escort Unit (TEU). A DoD organization manned with specially trained personnel that provide verification, sampling, detection, mitigation, render safe, decontamination, packaging, escort and remediation of chemical, biological and industrial devices or hazardous material.

Technology-aided Surface Removal. A removal of UXO, DMM or CWM on the surface (i.e., the top of the soil layer) only, in which the detection is process primarily performed visually, but is augmented by technology aids (e.g., hand-held magnetometers or metal detectors) because vegetation, the weathering of UXO, DMM or CWM, or other factors make visual detection difficult.

Time Critical Removal Action (TCRA). Removal actions where, based on the site evaluation, a determination is made that a removal is appropriate, and that less than 6 months exists before on-site removal activity must begin. (40 CFR 300.5)

Unexploded Ordnance (UXO). Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded either by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5)(A) through (C))

UXO Avoidance. Techniques employed on property known or suspected to contain UXO or other munitions that have experienced abnormal environments, to avoid contact with potential explosive or CA hazards, to allow entry to the area for the performance of required operations.

UXO Technicians. Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations, contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III.

UXO-Qualified Personnel. Personnel who have performed successfully in military EOD positions, or are qualified to perform in the following Department of Labor, Service Contract Act, Directory of Occupations, contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor.

Venting. Exposing any internal cavities of MPPEH, to include training or practice munitions (e.g., concrete bombs), using DDESB- or DoD Component-approved procedures, to confirm that an explosive hazard is not present.



TETRA TECH EC, INC.

MPPEH CHAIN OF CUSTODY MANIFEST

1. Generator's Name and Mailing Address				1.a Generator's Phone # ()	
2. Project Location				2.a Project Phone # ()	
3. MEC Contractor Name and Mailing Address				3.a MEC Contractor Phone # ()	
4. Government Assigned Verification Name and Mailing Address				4.a Certifier Phone # ()	
5. Transporter 1 Name and Mailing Address				5.a Transporter 1 Phone # ()	
6. Transporter 2 Name and Mailing Address				6.a Transporter 2 Phone # ()	
7. Recycler Name and Mailing Address				7.a Recycler Phone # ()	
8. Security Seal #	9. Gross Wt. (Lbs)	10. Tare Wt (Lbs)	11. Net Wt. (Lbs)	12. Weight Ticket #	
13. Description		14. Material		15. Quantity	16. Unit (Wt., Vol)

INERT CERTIFICATION

This certifies and verifies that the AEDA residue, Range Residue and/or Explosive Contaminated property listed has been 100 percent properly inspected and to the best of our knowledge and belief, are inert and/or free of explosive related materials.

17. TtEC Senior UXO Supervisor Certification

Signature	Address	Date
Printed/Typed Name		Phone

18. Government Assigned Verification

Signature	Address	Date
Printed/Typed Name		Phone

19. Transporter 1 Acknowledgement of Receipt of Materials (Receiving signature verifies that container was received with seal intact)

Signature	Address	Date
Printed/Typed Name		Phone

20. TtEC Acknowledgement of Receipt of Materials (Signature verifies that container was received with seal intact & contents were loaded to Transporter 1)

Signature	Address	Date
Printed/Typed Name		Phone

21. Transporter 2 Acknowledgement of Receipt of Materials (Receiving signature verifies that containers were received with seals intact)

Signature	Address	Date
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Printed/Typed Name		Phone
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TETRA TECH EC, INC.

MPPEH CHAIN OF CUSTODY MANIFEST
(Continued)

22. Discrepancy Indication Space

Signature	Address	Date
Printed/Typed Name		Phone

23. Recycler Acknowledgement of Receipt of Materials (Receiving signature verifies that containers were received with seal intact)

Signature	Address	Date
Printed/Typed Name		Phone

DEMILITARIZATION CONFIRMATION

This certifies and verifies that each item or items contained have been demilitarized to the minimum requirements of DOD 4160-M-1, Defense Department Demilitarization Trade Security Control Manual.

24. Recycler

Signature	Signature	Signature
Printed/Typed Name	Printed/Typed Name	Printed/Typed Name

25. TtEC Senior UXO Supervisor Certification

Signature	Signature	Signature
Printed/Typed Name	Printed/Typed Name	Printed/Typed Name

26. Government Assigned Verification

Signature	Signature	Signature
Printed/Typed Name	Printed/Typed Name	Printed/Typed Name

27. Final Disposition (Write in form of final disposition; recycle/demil, etc.)

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UXO-13:**Acquisition, Certification, Shipping and Storage of
Inert Ordnance Training Materials**

Purpose

This document provides guidance for the proper acquisition, inspection, inert certification, shipping and storage of inert ordnance training materials.

Version Date: 08/25/2005 -

New

Approved by: *Donald Rogers***Original Issue Date:** 08/25/2005

Date:

Category: Company
Procedures**Sections:** UXO**Sub Category:**
Departmental/Discipline**Document Type:** Procedure**Keyword Index:****Document Owner:** Frank Jones

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See Below

1.0 PURPOSE

This document provides guidance for the proper acquisition, inspection, inert certification, shipping and storage of inert ordnance training materials.

2.0 SCOPE

The procedures in this document are applicable to all Tetra Tech EC (TtEC) personnel and projects involved in the acquisition, inert certification, shipping and storage of inert ordnance training materials. The procedures outlined in this document are in compliance with Department of Defense directives for the proper acquisition, certification, and handling of inert ordnance materials. This procedure will not discuss the inerting of military munitions. TtEC personnel are not authorized to perform inerting procedures on military munitions.

3.0 MINIMUM REQUIREMENTS

3.1 Responsibilities

All employees are required to follow the minimum requirements listed in this procedure. Any employee may request approval to vary from these requirements if they are in conflict with our corporate "Operating Philosophies", are unsafe, or are not compatible with contract or site-specific requirements. Approval to vary from this procedure must be obtained in writing from the UXO Discipline Lead. All employees are encouraged to submit comments and/or recommendations to improve this procedure.

3.1.1 Responsibilities of the Project Manager

If the project will require the use of specific inert ordnance training materials it is the responsibility of the Project Manager to identify the required inert ordnance items and ensure availability with sufficient lead-time to permit acquisition (if the items are not in the current TtEC inventory).

Because the majority of TtEC's inert ordnance items in the inventory are empty ordnance casings—it is imperative that the Project Manager ensures adequate secure storage facilities for the materials exist on the project site. Inert ordnance items will be considered controlled material requiring signature custody from receipt to return to the UXO Equipment warehouse. Inert ordnance items will be kept under lock and key unless placed in the ground as part of a geophysical prove-out.

3.1.2 Responsibilities of All Employees

All employees are responsible for following the minimum requirements provided in this document. Additionally, employees are encouraged to submit comments regarding relevant changes to this procedure.

3.2 Inert Ordnance Used for Geophysical Targets

The use of inert ordnance items is required to provide realistic geophysical representations for comparative analysis during munitions response site investigations. This document outlines procedures to be followed by TtEC personnel to ensure that only inert ordnance items are used as geophysical targets.

3.2.1 Definitions

Explosive material - any chemical material with hazard-producing characteristics, loaded into ammunition and/or ammunition components. This includes, but is not limited to, explosives, propellants, white phosphorus, incendiary mixtures, pyrotechnic mixtures, tracer mix, toxic materials, and riot control agents.

Empty ordnance item - any ammunition item or component whose explosive material has been completely removed, or deliberately left out at the time of manufacture.

Inert ordnance item - any ammunition item or component that has been initially filled (loaded) with inert material and the void left empty or replaced with inert material.

Inert material - any non-hazardous materials (e.g., sand, plaster), which may be loaded into an ordnance item to simulate an explosive filler, or to add weight for ballistic purposes or realism.

Inspecting and Certifying Activity/Personnel - all inspection and certification activities performed by military EOD personnel or by TtEC UXO Technician III or above with the appropriate knowledge of the ordnance item and applicable publications.

Drill ordnance items - actual size ammunition items utilized for training purposes that may or may not contain explosive/pyrotechnic materials, and working mechanisms.

Practice ordnance items - ammunition items designed to provide training or systems testing through actual launching, firing, or dropping. Practice ordnance may be a modification of service ordnance or it may be specifically designed for practice use. Practice ordnance items may contain a small quantity of explosive material (spotting charges, tracers, etc.).

Service ordnance items - ammunition items which: (1) have been specifically manufactured and loaded with a hazard-producing material for the purpose of inflicting damage, causing incapacitation of personnel, or signaling; or (2) utilize explosive or rapid-burning effects for achieving normally non-lethal results.

3.2.2 Acquisition

The acquisition of ordnance items already certified as inert by military EOD personnel should be accomplished whenever possible. When inert ordnance items are recovered during the course of a munitions response action they will be inspected and certified inert as specified below.

Every effort should be made to acquire expended or inert ordnance items similar in design to service ordnance items (base ejecting projectiles/mortars, solid armor piercing projectiles, etc.), which can be easily visually inspected and certified as inert.

3.2.3 Inspection

Assume that all ordnance is service ordnance until proven otherwise. Newly acquired ordnance training items will be inspected and certified as inert as follows:

- Inspect all cavities of the ordnance item to ensure that no explosive materials remain. If a cavity is not readily accessible, utilize explosive perforators to gain access for inspection.
- Four holes, at 90-degree intervals, will be drilled into the location where the explosive filler was located. On larger ordnance items, the holes will be 1/4 inch in diameter. On smaller ordnance items, the holes may be smaller where a 1/4 inch diameter hole is not practical.
- If explosive venting is not possible and/or visual inspection cannot positively determine the condition of the ordnance, treat the ordnance as service ordnance and dispose of it

accordingly.

- Ordnance items certified as inert by military EOD units will be completely reinspected and recertified to ensure they are safe and properly marked. A TtEC inert certification label provided by the UXO Operations Manager will be affixed to the item. A completed copy of Attachment 1, Corporate Record of Certification and Inventory, will be mailed to the UXO Operations Manager who will reenter the information in the master Corporate Record of Certification and Inventory. All inert ordnance items utilized by TtEC will be inspected, certified inert, properly marked and documented by a minimum of two TtEC UXO personnel.

Note: Ordnance items that have ready access to all voids (expended base ejecting rounds, practice bombs with open access through flash tube, etc.) do not require drilling, but will be stamped, labeled, and inventoried.

3.2.4 Marking

Each ordnance item will be permanently stamped or etched with the word "INERT" and the assigned serial number. Then a serialized label will be affixed over the permanent markings. Inert labels may be obtained from the UXO Operations Manager.

3.2.5 Inventory

The UXO Operations Manager will establish and maintain the master Record of Certification and Inventory, shown in Attachment 1. When a new ordnance item is certified inert it will be entered in the Record of Certification and Inventory by the sequential serial number of the attached label. The inventory will identify the ordnance, the serial number, the name and signature of the inspecting UXO Technician, the date of certification, the location, and final disposition.

The INERT label is self-adhering, approximately 1 inch high by 1.5 inches in length, and is made of a weatherproof material. An example is provided below:

Tetra Tech ECI
INERT Ordnance
000x

3.2.6 Shipping

When inert ordnance items are required at a site, a request for the materials will be made to the UXO Operations Manager who will prepare a Shipping Certification Letter, as shown in Attachment 2, which will be packed with the inert materials for shipment. This letter will identify the materials being shipped and provide a corporate point of contact in the event the shipment is damaged or inadvertently opened and questions arise regarding the materials. This letter should be retained for the return shipment. Inert ordnance materials will not be shipped without a certification letter.

3.2.7 Storage

Inert ordnance materials will normally be stored by the UXO Operations Manager and provided when requested. The site UXO or Geophysical Lead is responsible for ensuring adequate security for the inert materials is in place when they are received on site. The materials should be stored under lock and key when not in use unless placed in the ground as part of a geophysical prove-out.

4.0 REFERENCES

Please Describe Your Reference Here	Place Your Link In This Column
1. NAVSEA OP-5 Ammunition and Explosives Ashore	
2. OPNAVINST 8020.14, Department of the Navy Explosive Safety Policy Manual	
3. DA PAM 3885-64 Ammunition and Explosives Safety Standards	
4. DoDINST 4140.62 Management and Disposition of Material Potentially Presenting an Explosive Hazard (MPPEH)	
5. AR 190-11 Physical Security of Arms, Ammunition and Explosives	

5.0 ATTACHMENTS

Please Provide a Description of the Attachment	Place Your Attachments Here
1. Record of Certification and Inventory	 Attach1InertRecord.doc
2. Shipping Certification Letter	 Attach2InertCertlet.doc
3.	
4.	
5.	

Tetra Tech EC, Inc.

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To: Whom it may concern
From:
Date:

SUBJECT: SHIPMENT OF INERT ORDNANCE TRAINING MATERIALS

The materials contained within this shipping container are certified to be free of explosives or hazardous materials. These inert ordnance items are used as geophysical targets while conducting unexploded ordnance investigations. An inventory of the contained materials is provided below:

ITEM	QUANTITY
------	----------

Any questions regarding these materials should be directed to myself at (360) 908-3257, or Mr. Jack McIlrath at (770) 331-4196.

David A. Keller
UXO Operations Manager

CP-7: Construction Tools and Equipment

Purpose

The purpose of this procedure is to identify minimum requirements, and to provide guidance to Tetra Tech EC, Inc. (TtEC) project personnel concerning the management of construction tools and equipment on a construction project incorporating the Corporate operating principles of 'Do It Right[®]', 'Client Service Quality[®]', and 'Shared VisionSM'.

Version Date: 12/28/2007 -

New

Approved by: *Donald Rogers*

Original Issue

Date:

Category: Company
Procedures

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Departmental/Discipline

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Keyword Index:

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6.0	ATTACHMENTS

1.0 PURPOSE

The purpose of this procedure is to identify minimum requirements, and to provide guidance to Tetra Tech EC, Inc. (TtEC) project personnel concerning the management of construction tools and equipment on a construction project incorporating the Corporate operating principles of 'Do It Right[®]', 'Client Service Quality[®]', and 'Shared VisionSM'.

2.0 SCOPE

This procedure applies to all TtEC projects that include a construction, O&M, and/or UXO component, including remediation construction.

3.0 MINIMUM REQUIREMENTS

3.1 Definitions

3.1.1 Construction Equipment

For the purposes of this procedure, construction equipment shall mean heavy equipment, such as excavators, scrapers, off-road trucks, dozers, road graders, compactors, dredges, and cranes; light equipment, such as skid-steers, forklifts, generators, and light plants; and operating systems such as screens, crushers, conveyors, pugmills, mobile treatment plants, and pumps. Any discussion of construction equipment shall be understood not to include cars, pickup trucks, flatbed trucks, etc. registered for use on public roadways, which shall be called vehicles hereinafter. Also for the purposes of this procedure, construction equipment shall be synonymous with Contractor's Equipment, a term also commonly used in the construction industry to designate the types of equipment described above.

3.1.2 Terms

The terms "should, may, and might" as used in statements in this procedure are intended to denote a discretionary consideration; the terms "shall & must" are intended to impose a mandatory requirement. The terms "is, are, & will" as used in statements in this procedure are intended to denote discretionary or mandatory requirements that are addressed in other department/disciplines' procedures. However, nothing contained herein should be interpreted as to prohibit development and approval of project-specific procedures or plans that take exception to mandatory direction presented in this procedure provided that the appropriate level of approval (Executive Vice President of Construction, Business Line Executive Vice President, or the Vice President ESQ Services as appropriate) is obtained for deviations from such requirements.

3.1.3 Tools of the Trade

Specific hand tools and or equipment (e.g., manlifts, trucks, trenchers, and pumps) normally provided by or to workers for the performance of their particular work activity.

3.2 Roles & Responsibilities

3.2.1 Equipment Supervisor

Depending on the project's equipment needs, an individual may be designated as the Equipment Supervisor. Responsibilities of the Equipment Supervisor include:

- Determination of the equipment needs for the project;
- Providing input to the Work Plan concerning equipment;
- Identification of Contract and legal/regulatory requirements for mobilization of equipment on client facilities;
- Submittal of required certifications, inspection reports, and test reports for equipment;
- Arranging for the mobilization/demobilization of equipment in support of the project's schedule, providing required notices, such as mobilization details and dates, and obtaining Contractual or legally required approvals for mobilization;
- Receipt inspection of equipment arriving at the site, including coordination of any client or third party inspection;
- Coordination with equipment yard personnel or vendors regarding equipment maintenance;
- Ensuring implementation of safe work practices for equipment utilization; and
- Assuring that the return of demobilized equipment is performed in accordance with the terms of the rental/lease/PO agreement and documented correctly, or, for TtEC owned equipment, that the equipment transfer form is completed and coordinated with the Equipment Manager; and
- All other responsibilities as assigned by the Project Manager or Site Superintendent.

3.3 **Safe Operation Requirements for Tools**

3.3.1 **Manual T-Post Drivers**

There shall be no use of manual fence post drivers, such as those typically used to drive T-posts, without prior approval from the Project Environmental Safety Manager (PESM) or the Vice President of Construction. Any approval of the use of such a tool shall require the implementation of an Activity Hazard Analysis (AHA) to identify and control the hazards presented by the tool. The AHA shall address appropriate PPE and position for the task in order to avoid injury to the worker.

3.3.2 **Tools**

The Site Superintendent shall determine the nature and quantity of tools required for the construction effort and shall ensure that adequate tools are provided in support of the schedule.

Tools may be assigned to workers or crews for the duration of their activities and shall be stored in gang boxes or other secured storage areas when not in use.

The Site Superintendent may designate certain tools to be issued from a tool control area on a daily basis. These tools should be signed out at the beginning of the work, returned to the tool control area at the end of the work, and signed back in.

3.3.3 **Worker Provided Personal Tools**

Workers may be required to provide personal tools of the trade for their particular work. Master mechanics, for example, may be required to provide tools required for repairs and maintenance of construction equipment and vehicles. Requirements for workers to provide their own tools shall be established based on the project requirements and shall be discussed at the Pre-Job Conference to be held in accordance with the requirements of the Labor Relations Guidelines LR-8, Pre-Job Conferences.

Any worker required or offering to provide personal tools shall be required to present a list of personal tools being provided upon reporting to the project site. The Site Superintendent shall inventory the tools against this list for verification that all listed tools have been provided. The list shall then be maintained for use in performing an inventory of the tools when the worker is to leave the site at the end of the worker's assignment and shall be the basis for any claims for loss or damage.

The Site Superintendent shall ensure that any personal tools brought onto the project site receive a safety inspection. The safety inspection shall include as a minimum, the items addressed in Section 3.3.4 of this procedure.

The Site Superintendent should ensure that secure, lockable facilities are provided for the storage of worker provided personal tools.

The worker shall be responsible for notification of lost or damaged tools immediately on discovery of the loss. The limits of the project's liability (if any) for loss or damage to personal tools provided by the workers should be established at the Pre-Job Conference.

Use of personal tools, other than addressed above, either by manual or by TtEC nonmanual personnel, should not be allowed except as specifically authorized by the Project Manager or Site Superintendent. Project personnel should be notified that TtEC will not be liable for any theft, loss, or damage of unauthorized personal tools on the project site.

3.3.4 Tool Safety Inspection

OSHA 29 CFR Part 1926 Subpart I Tools – Hand and Power provides guidance for tool safety. All tools shall be inspected for the following minimum features by the person using the tool prior to starting the work:

- Proper general condition of tools, electrical cords, and air hoses;
- Presence and serviceability of guards and safety devices;
- Proper electrical grounding or double insulation protection;
- Power tools properly equipped with constant pressure switches;
- Tool retainers installed on pneumatic tools;
- Proper adjustment of the tool; and
- Confirming that the load rating of the tool is sufficient for the work to be performed.

Unsafe tools shall be removed from service and the Site Superintendent advised of the condition for corrective action. An Out of Service tag should be placed on all unsafe or defective tools to prevent their inadvertent use by others. These tools should be physically segregated from the acceptable tools.

3.3.5 Environmental Safety and Quality Policy Implementation

TtEC's Environmental Safety and Quality (ESQ) Policy, as included in Environmental Management System (EMS), shall be considered in the selection and utilization of construction equipment and vehicles for use in association with TtEC's construction projects.

Selection of the construction equipment and vehicles shall consider relevant TtEC-wide and project-specific significant environmental aspects, objectives, and targets, as defined in EMS and as identified by the Project Manager in the project management planning documents required

under Project Initiations/Operations Procedure, PO-1, Project Management Planning.

Selection of construction equipment and vehicles may have significant impacts on the environment, either adverse or beneficial. Proper selection of the size and type of equipment and vehicles can reduce the adverse impacts from their operation.

Project procurement practices for construction equipment, parts, supplies, lubricants, and fuel shall be consistent with the principles of pollution prevention as discussed in the EMS and identified through the TIP process using CRL Procedure PO-2, Task Initiation. (For example, consideration should be given to such factors as rent versus buy options, disposable versus reusable filters, recycled versus virgin oils/fluids, recycling versus disposal of spent fluids and used parts, and fuel efficiency and economy of operation.)

Spent fluids, filters, and used parts shall be recycled to the extent practical, or otherwise disposed of in accordance with the environmental compliance elements of the Work Plan or EHS plan.

Proper utilization of construction equipment and vehicles can also reduce adverse impacts on the environment. (For example, it is TtEC's policy to not allow unattended equipment and vehicles to be left with motors running. This is not only a safety consideration; it reduces adverse environmental impacts and is generally cost effective due to reduced fuel consumption.)

3.3.6 Insurance

The Project Manager shall ensure that all construction equipment, including TtEC-owned or rental/lease equipment, is covered by appropriate insurance policies for the intended use of the equipment. Property insurance on construction equipment is normally arranged by TtEC if TtEC bears the risk of loss or if TtEC is required to arrange such insurance. However, all rented/leased construction equipment valued in excess of \$100,000, and all cranes regardless of their value shall be reported to the Administration and Compliance Department via the 'Insurance Request for Leased Equipment' (Attachment 5, and available in Tetra Links and from procurement) for specific inclusion under the TtEC property insurance policy. The procurement representative should be contacted to ensure that this occurs in each case. Notification is not required for equipment valued under \$100,000 except when the construction equipment provider requests a certificate of insurance be provided, or the equipment is a crane.

The Project Manager, usually through the designated procurement representative, should ensure that duplicate insurance coverage is not provided through the equipment provider since this will increase the rental rates. In those cases where the provider requires insurance certificates to verify coverage by TtEC, the procurement representative should be contacted to obtain the appropriate documentation.

A Vehicle Insurance Form (available from the Vehicle Insurance Coordinator, Tetra Links or procurement) shall be processed and sent to the Vehicle Insurance Coordinator for all vehicles (leased, rented, or owned) which are registered and operated off jobsites on public highways.

3.3.7 Receipt and Inspection

All construction equipment shall be subject to a receipt inspection by a competent person and any Contract or otherwise required additional person(s) prior to acceptance at the project site. The inspections and tests shall be in accordance with the manufacturer's recommendations. Most vendors provide a form for notation of any existing damage to the equipment to be filled out on receipt. The equipment should be inspected carefully to determine its condition, including any damage, missing or non-functional equipment. The agreement should be used as a basis to determine that everything required (e.g., the equipment, its condition, manuals, spares, documentation of inspections, and certifications) has been provided. All discrepancies should be noted on the form. A pre-inspection of the equipment prior to transport to the Project site should

be considered. Particular attention shall be given to the following items:

- All safety equipment and its condition;
- Operator (when provided) certification for the equipment;
- Posted operating and safety instructions;
- All pollution control devices and their condition;
- Safe entry and egress, with steps, ladders, handholds, and platforms provided as required, including safe access to perform routine checks, maintenance, and refueling operations;
- Leaking fluids, such as hydraulic oil, engine oil, transmission fluid, and coolant;
- Deteriorated or cracked hydraulic and coolant hoses which could result in leaks or spills; and
- Presence of the manufacturer operation and maintenance manual.

Equipment or vehicles with deficient conditions relating to safety or protection of the environment shall not be placed into service until the deficiencies have been corrected and documented.

All construction equipment shall be subject to an operational check prior to acceptance at the project site. The operational check should verify that the equipment has the capability to function as intended or as required through the full range of its intended use.

Receipt of construction equipment shall be documented; with a copy of the receipt inspection report provided to the Equipment Supervisor and to the equipment purchase order file. Documentation should include entries for date and time of receipt, condition of equipment, mileage or engine hours at time of receipt, information on next scheduled maintenance, and a record of operating and maintenance manuals received with the equipment. Photographs or a video record of the equipment on receipt should be taken if conditions are noted that would warrant further documentation.

Construction equipment providers will often include terms and conditions on receipt documentation to be signed when construction equipment is delivered to the project site. **Project personnel requested to sign this receipt documentation shall not sign any delivery forms unless authorized to do so by Legal of the Project Manager. Further, if they are required to sign delivery forms, they shall be instructed to cross out all terms and conditions, on both the front and back of the forms, before signing.** Alternately, the person receiving the construction equipment should enter the following statement in the immediate vicinity of their signature: "In lieu of the terms and conditions set forth on this document, the Original Purchase Order (or appropriate form of agreement) terms and conditions apply to the receipt of this item(s)." These actions are necessary to avoid acceptance of additional or different terms and conditions.

Construction equipment delivered to the project site should be accompanied with operating and maintenance manuals. Cranes and lifting equipment shall include certification of satisfactory completion of annual inspection and have load charts posted in the cab. Additionally, some construction equipment may be supplied with common replacement parts, such as filters and belts, and any specialized tools required for routine operation or maintenance. (i.e. forks, buckets, lift arms, and tool carries) These items should be carefully inventoried upon receipt, and documented on the receipt inspection report. Responsibility for protection and maintenance of the construction equipment shall be verified, and all measures necessary to protect the construction equipment from damage or loss will be instituted in accordance with the agreement, operating, and maintenance manuals or other instructions as appropriate.

Disposition requirements for construction equipment found to not be in accordance with the rental/lease/sale agreement when received shall be confirmed with the vendor immediately.

A sample Equipment/Vehicle Inspection Report is included as Attachment 1 to this procedure.

3.3.8 Protection from Environmental Extremes

Consideration shall be given to the environmental conditions to which the construction equipment will be exposed to during its time at the project site or during transportation. The manufacturer's instructions shall be reviewed and followed to ensure adequate protection from damage due to environmental conditions.

Adequate protection to the construction equipment's cooling system shall be verified by ensuring that the appropriate coolant/antifreeze mixture, as recommended by the manufacturer, has been used.

Appropriate procedures for operating or storing construction equipment, such as water treatment systems, shall be developed in accordance with the manufacturer's instructions. Measures such as draining and venting the system, providing auxiliary heat sources (e.g., heat tape), dry storage, shaft rotation, fluid levels, shall be taken to protect construction equipment subject to damage from environmental conditions.

Manufacturer's instructions concerning periodic operation of construction equipment shall be followed.

A means of ensuring that appropriate protective measures are instituted and performed as required should be implemented through the establishment of site procedures, logs, and/or checklists.

3.3.9 Equipment Inspections

All construction equipment shall be inspected daily (when in use) for safety and operability, including manufacturer's recommended daily inspections. The inspection form/checklist should note any deficiencies for correction and serve as documentation of the inspection performance. The Equipment Supervisor shall be notified of any deficiency immediately. A Daily Equipment Inspection form, a sample of which is included as Attachment 2 to this procedure, should be filled out at the start of the shift and provided to the Equipment Supervisor.

Government property control procedures usually require the implementation of a vehicle utilization log for vehicles when used on government projects; other projects should also implement a similar system for logging use of these vehicles. The log should be kept in the vehicle and an entry made for each use, including name of the driver, purpose of the trip, starting mileage, ending mileage, fuel purchased, maintenance performed, and any damage incurred. The log sheets should be transmitted as required in the contract documents and the project's documentation plan. Copies of the log sheets will be maintained and filed as discussed in Section 3.3.12 of this procedure.

A separate Daily Equipment Inspection Report should be filled out for each shift if construction equipment is utilized on multiple shifts.

The Equipment Supervisor should use the information on Daily Equipment Inspection forms to schedule any repairs or preventive maintenance required for the equipment. Equipment with missing or defective safety features should not be put in service until repairs have been performed to bring the equipment into compliance with any applicable TtEC EHS Program and/or regulatory requirements.

Implementation of the daily equipment inspections should be the subject of periodic verification inspections performed by the Project Manager, Site Superintendent, and/or the Environmental and Safety Supervisor (ESS). These periodic inspections should include verification that the required maintenance is being performed in a timely manner to ensure that unsafe conditions or impacts to the environment (e.g., spills, releases, and discharges) are not created by delays in correcting deficiencies noted on the Daily Equipment Inspection Forms.

Rigging equipment, wire rope, nylon or KEVLAR slings and chokers shall be inspected by a competent person prior to use each shift; particular attention shall be paid to the rigging condition and presence of load/certification tags.

Cranes (weight handling equipment) shall be subjected to annual and certification inspections per OSHA guidelines. Mobile and crawler cranes shall be inspected on a monthly basis; a sample checklist form is included as Attachment 3 to this procedure.

Construction equipment to be demobilized shall be given a final inspection, similar to the receipt inspection, to identify and document, by means of written description and pictures, the condition of the equipment as it leaves the project site. Where possible, a concurrent inspection by the vendor is preferred. Additionally, some projects, particularly USACE projects, require a certificate of decontamination prior to the equipment leaving the site.

3.3.10 Operator Qualifications

TtEC employees operating vehicles or construction equipment on public rights of way shall be required to have in their possession a valid driver's license appropriate to the location where the item is being operated and containing the appropriate endorsement for the type of vehicle or construction equipment being operated. A Commercial Driver's License (CDL) may be required for operation of some construction equipment on public rights of way, or as a specific requirement of a client's safety program. In addition, individual states may require specific licenses or certifications for operators of certain equipment, such as forklifts, and hoisting equipment. Additionally, the client's safety program may include license or certification requirements for personnel operating equipment on their property. The contract documents should be reviewed carefully to ensure that any such requirements are incorporated into the project's Work Plan or EHS Plan. The Site Superintendent shall verify that the operator possesses the required license(s). Copies of licenses should be maintained in the on-site project employee file.

Any agreements for the rental or lease of vehicles or equipment should be reviewed for any provider's requirements for licensing or certification of operators to ensure that any such requirements are incorporated into the project's Work Plan or EHS Plan.

Operators shall be required to demonstrate their proficiency in operating the construction equipment to be assigned to them prior to being allowed to work. Crane operators shall have qualifications for the type of crane to be operated.

Operator proficiency may be demonstrated through a performance test such as those developed by the International Union of Operating Engineers, or by equipment manufacturers such as Caterpillar. These performance tests include exercises developed to demonstrate operator proficiency in various aspects of equipment operation, including daily operator inspections, ability to follow directions, ability to understand equipment limitations and operating guidelines, safety, and productivity. Also included are checklists that assist an observer in evaluating all of the various aspects of equipment operation. Attachment 4 is an example of Operator/Driver Observation Checklist.

Where it is not possible or practical to demonstrate operator proficiency through a performance test as described above, there should be a period of observation of the operator during the initial period of performance, whether the operator is a new employee or a current employee who is

being assigned to a different type of equipment than previously operated on the project site. This observation may be performed by a knowledgeable member of the management team or a designated craft employee such as a foreman or steward. The above referenced checklists could be used for this observation in lieu of the performance test.

3.3.11 Repairs

All construction equipment shall be repaired as necessary and maintained in good working order. Repairs to rented/leased construction equipment shall be in accordance with the terms of the rental/lease agreement. Repairs to rented/leased and TtEC's construction equipment shall be documented and a record of the repairs maintained in the project files. Copies of the repair records are to be forwarded to the equipment yard for TtEC-owned equipment.

Construction equipment with deficiencies noted on the Daily Inspection Report should be repaired promptly. The Equipment Supervisor, with input from the Environmental and Safety Supervisor as appropriate, should evaluate if a piece of equipment or a vehicle should be removed from service until the deficiency is corrected.

Construction equipment that develops a fluid leak such as engine oil, hydraulic oil, transmission fluid, or coolant shall be removed from service until the deficient condition has been corrected.

Construction equipment with missing or inoperable exhaust systems, including spark or flame arrestors, mufflers, and catalytic converters, shall be removed from service until the deficient condition has been corrected.

Tampering with, removal, modification, or otherwise rendering inoperable any pollution control device on construction equipment shall not be allowed except as specifically authorized by the equipment manufacturer or appropriate authority and the Project Manager or Superintendent's concurrence

Only trained, qualified personnel shall be allowed to repair equipment. The project's Work Plan should address repairs to equipment by designating required actions in the event of an equipment failure.

An Authorization for Capital Expenditure or Lease (AFCEL) is to be completed for all major repair work (i.e., \$1500.00 and over) performed on TtEC-owned construction equipment in accordance with Accounting/Finance Procedure AF-8, Fixed Assets. (Note that on some construction equipment, the cost of a specific item, a replacement tire for example, may require the processing of an AFCEL due to the item cost.)

Costs for major repairs, as well as repairs for deficiencies, to TtEC-owned construction equipment shall be charged back to the project releasing the equipment if the need for repairs is identified within 30 days of the equipment's release and removal from a project and there are indications that the repairs are needed as the result of lack of maintenance or failure of the releasing project to otherwise keep the equipment in good working order.

No repair shall be undertaken for damage covered by an insurance claim until the damage is reported to the Administration and Compliance Department and the insurer approves the repairs.

3.3.12 Documentation and Record Keeping

A file shall be established and maintained for each operator which contains documentation that the operator has the proper qualifications, licenses/certificates, and training to perform his/her job function. Records may include training identified in EHS plans (e.g., OSHA, DOT, Waste Management training), vehicle operator licenses, results of site-administered proficiency testing, and any other special licenses/certificates required by state/local law or the client.

A file shall be established and maintained for each piece of construction equipment, and all records relating to that equipment shall be placed in the file, including the Receipt Inspection Report, annual inspections (for cranes), record of the date the equipment was first placed in service, Daily Equipment Inspection records, maintenance records, repair records, record of the last date that the equipment was in service, demobilization inspection report, and the decontamination certificate, if applicable. For ease of retrieval, all records pertaining to pieces of equipment should be maintained in separate folders for each piece of equipment.

Additional copies of inspection reports and records may be required to be maintained in other project files, such as the procurement files and/or the Environmental Health and Safety files, based on the project's Documentation Plan.

The Equipment Supervisor should ensure that complete and accurate record of equipment utilization, including a list of idle equipment, is provided to the Quality Control Site Manager on a daily basis for inclusion in the Quality Control Daily Report.

It may be useful to maintain equipment utilization information on a spreadsheet depending on the size of the project. Information such as equipment mobilization date, date of first use, utilization of equipment by rental period (for example, if rental rate is based on hourly usage and is billed on a monthly cycle, there should be an entry for the number of hours the equipment was used in each billing period), scheduled equipment release date, actual release date, and demobilization date. This information may be useful in verification of vendor invoices, in review of production rates, for preparation of requests for change orders or equitable adjustment, or for backup for use in support of (or defense against) claims.

Copies of all maintenance and repair records for TtEC-owned construction equipment shall be forwarded to the TtEC Equipment Manager at the regional equipment yard on a periodic basis. This period should be monthly, and in no circumstances should it exceed quarterly. An Equipment Service Form is available from the Equipment Manager. This form shall be used to report unscheduled and preventative maintenance on TtEC-owned construction equipment.

The Equipment Manager produces a spreadsheet for TtEC-owned construction equipment that is distributed to the projects on a monthly basis. The Equipment Supervisor shall ensure that reports of mileage or meter readings and routine maintenance for all TtEC-owned construction equipment and vehicles assigned to the project are provided to the Equipment Manager for inclusion on the spreadsheet on a monthly basis. A Meter/Mileage Reading Update Form, available from the Equipment Manager, shall be used to report the required information.

The Equipment Supervisor should review the availability date included on the spreadsheet for TtEC-owned equipment and vehicles assigned to the project and inform the Equipment Manager of any required revisions to these dates.

The Equipment Supervisor shall complete an Equipment Transfer Report, available from the Equipment Manager, for all TtEC-owned construction equipment and vehicles to be mobilized to, and demobilized from the project. Copies of the Equipment Transfer Reports shall be provided to the Equipment Manager at the regional equipment yard.

There shall be no equipment disposal action (junk or sale) for TtEC-owned construction equipment or vehicles without prior notification and approval from the TtEC President.

4.0 GUIDANCE

4.1 Additional Considerations

4.1.1 Control of Government Property

Activities involving the use of Government property are to be controlled in accordance with Project Initiation/Operations Procedure PO-12, Government Property Control or by specific procedures negotiated with the Client in accordance with the contract's terms and conditions; such procedures shall be consulted where appropriate. Such activities may involve the handling or installation of Government property, whether furnished by the Government to TtEC or acquired by TtEC for use in the performance of work and for which the Government has retained title.

Government property may include construction tools and equipment purchased as a project cost, as well as permanent materials or equipment purchased for incorporation into the work. Project-specific procedures for control of Government property are to address issues relevant to the use, storage, inventory control, maintenance, and/or final disposition of the Government property.

4.1.2 Spill Control and Emergency Response Dedicated Tools and Equipment

The project's Emergency Response Plan, or Emergency Action Plan (refer to the Environmental, Health & Safety - Programs Procedure EHS 2-1, Emergency Preparedness, for discussion of when each is required) is to identify dedicated personal protective equipment and emergency response tools and equipment to be available for an emergency response to a spill or discharge of hazardous material.

Dedicated emergency response tools and equipment are to be segregated and identified for use in emergency response situations. In accordance with the requirements of EHS Procedure 2-1, Emergency Preparedness the use of dedicated emergency response tools or equipment for any other activity is not to be permitted.

4.1.3 Inventory Control

An individual should be designated as the Material Control Supervisor and should be responsible for inventory control of all tools issued from the tool control area. A log should be maintained for all tools issued and should record, as a minimum, the identification by name and employee number of the individual signing out the tool, the date and time the tool was signed out, the intended use of the tool (by area or system), an indication of when the tool is to be returned, and the time and date when the tool is returned.

Inventory control of tools assigned to individuals or crews should be performed on a daily basis as the tools are returned to the gang box or storage area. The crew foreman should be responsible for inventory control of tools assigned to the foreman's crew.

The Site Superintendent should immediately be made aware of any missing tools and should take the appropriate action to investigate and/or replace the missing tools.

4.1.4 Disposition of Tools at Project Completion

The Project Manager should make a determination of the disposition of tools remaining at the end of the project. The project may not be reimbursed by the client for the purchase of tools on certain cost reimbursable and lump sum projects. On other projects, a dollar value for individual tools may establish whether or not the client provides any reimbursement. The terms and conditions of the contract should provide direction as to the required disposition of the tools.

Tools for which the project has been reimbursed by the client are to be dispositioned in accordance with the client's preferences and the contract terms and conditions.

Tools purchased for the project as a project cost, and which are not to be turned over to the client, should be dispositioned by the Project Manager. Means of disposition may include, but not be limited to, declaring the tools surplus, sale of the tools, or providing the tools to another project. The Project Manager should consult with the appropriate Business Line Executive Vice Presidents, concerning disposition of project tools.

TtEC owned tools (i.e., not purchased as a project cost) should be dispositioned by the Project Manager based on consultation with the appropriate Business Line Executive Vice Presidents. Means of disposition of TtEC-owned tools may include, but not be limited to, declaring the tools surplus, sale of the tools, return of the tools to an equipment yard, or providing the tools to another project.

4.1.5 **Company-Owned Equipment**

TtEC utilizes regional equipment yard(s) for the temporary storage and maintenance of TtEC-owned construction equipment and vehicles when not currently assigned to a project. Available TtEC-owned equipment should be considered for support of a project's construction effort based on an analysis of the benefits to the project and/or TtEC. When evaluating TtEC owned equipment the requirements discussed in 4.1.6 below should be considered when making the equipment selection.

4.1.6 **Rental/Lease Equipment**

Agreements for rental/lease of construction equipment should be coordinated through an authorized procurement representative to ensure that appropriate terms and conditions are included in the agreement. The Scope of Work for the agreement should be developed and reviewed carefully, including review by the Site Superintendent or Equipment Supervisor for inclusion of sufficient detail in order to clearly define the scope of work.

The Equipment Supervisor, or requisitioner if there is no designated Equipment Supervisor, should review the terms and conditions of all rental/lease agreements to determine that the following topics are adequately addressed:

- Receipt and return of the rental or leased equipment and any required accessories;
- Inspection and documentation of receipt and release;
- Provision of documentation required to be submitted, such as Occupational Safety and Health Administration (OSHA) accredited inspection reports, NDE reports, test reports (i.e. load test for cranes), typically annual inspections, and wire rope certification.
- Provision of all safety equipment and accessories, as required, such as fire extinguishers, seat belts, Roll Over Protection Structures (ROPS), Falling Object Protection Structures (FOPS), access steps, handholds, platforms, and anti two-block devices and load moment indicator (cranes);
- Provision of documentation demonstrating operator certification;
- Provision of Certificate of Compliance when required, for instance by NAVFAC P-307 Management of Weight Handling Equipment, Appendix P - Contractor Crane Requirements.
- Provision and requirements of routine and non-routine maintenance and repairs, including payment for labor, parts, filters, lubricants, and fluids;
- Documentation requirements for the above maintenance and repairs;
- Disposal/recycling requirements for used parts, filters, lubricants, and fluids;

- Items such as point of delivery, costs of delivery and return, rental charges during idle time, notification requirements for demobilization, and point of return;
- Appropriate rental rate provisions for straight time and overtime;
- Responsibility for damage to equipment;
- Insurance;
- Indemnification (if included);
- Payment for replacement of parts subject to normal wear and tear, such as tires, tracks, cutting edges, and teeth; and
- Documentation requirements required in support of invoices for basic rental rates and overtime rates, as well as labor, parts, filters, lubricants, and fluids.

Rental agreements should be structured to include normal wear and tear on the equipment in the basic rental rate. In all cases, there should be mutual agreement with the equipment vendor as to the condition of the equipment as it is delivered. This should include items such as the life expectancy of the parts subject to wear and tear, their condition on receipt (i.e., percentage of usable life remaining), and the expected condition on return of the equipment. There should be agreement on minor versus major repairs and on what constitutes normal wear and tear. Mutual agreement is essential to mitigate potential claims from vendors for excessive wear and tear.

4.1.7 Mobilization of Equipment

Mobilization of construction equipment may be a long lead time item and may require client or third party involvement or approvals to gain site access, depending on the required equipment. The Site Superintendent or Equipment Supervisor should determine the lead time required, including Contract submittal and advance notice/approval requirements, and plan for the mobilization of equipment to support the project's schedule.

- Planning for mobilization of equipment should include a thorough review of Contract requirements for utilization of each equipment and site access requirements.
- Documentation of certification, and OSHA compliant annual inspection, load testing, safety devices (e.g., anti two-block) installed, wire rope certification, and operator's certification for cranes (weight handling equipment) should be reviewed prior to initiating mobilization of cranes.

4.1.8 Equipment Maintenance

The Equipment Supervisor should be responsible for administration of a construction equipment maintenance program for the project. A spreadsheet of all TtEC-owned equipment, titled the Status of All Project Equipment, is maintained by the Construction Department providing notification of the scheduled maintenance requirements for each piece of equipment. Either this spreadsheet, or a project specific spreadsheet, should be maintained and statused on a periodic basis. Specific maintenance requirements may also be contained in specific contract negotiated property procedures or in other TtEC corporate procedures.

As construction equipment is received on site, it should be added to the spreadsheet for tracking of the required maintenance.

A review of the scheduled maintenance should be performed for all construction equipment to be used in the Exclusion Zone to determine the desirability of performing any upcoming scheduled maintenance prior to placing the equipment in service. It may be difficult and expensive to perform the maintenance under the conditions required in the Exclusion Zone, or to decontaminate the construction equipment in order to perform the maintenance under clean

conditions. When the maintenance of equipment in the Exclusion Zone is anticipated, the Site Superintendent should ensure that qualified personnel are available with the appropriate medical clearances and certifications to work in the Exclusion Zone.

4.1.9 Construction Equipment Safe Operation Requirements

Standards for safe operation of equipment are contained in the documents identified herein, inclusive and in particular of the requirements for safe operation of lifting and rigging equipment and weight handling equipment. The Contract typically will specify certain documents/codes to be followed for the project. Accessibility of the identified documents is provided in section 5.0 References.

- The United States Army Corps of Engineers (USACE) Safety and Health Requirements Manual, EM 385-1-1, Chapters 16, 17, and 18, provide guidance concerning the safe operation of construction equipment.
- Safe operation of earth drilling equipment is addressed in the Environmental Health & Safety-Program Procedure EHS 6-2, Drill Rigs.
- Safe operation of hand and power tools is addressed in OSHA standard 29CFR Part 1926 Subpart I.
- Safe operation of cranes, derricks, hoists, elevators and conveyors is addressed in OSHA standard 29CFR Part 1926 Subpart N.
- Safe operation of motor vehicles, mechanized equipment and marine operations is addressed in 29CFR Part 1926 Subpart O.
- Rollover protective structures and overhead protection is addressed in 29CFR Part 1926 Subpart W.
- The American Society of Mechanical Engineers (ASME) provides guidance in the B30 committee volumes – Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings.
- The United States Department of Energy (DOE) provides guidance for safe lifting operations in Technical Standard DOE-STD-1090 – Hoisting and Rigging.
- The United States Navy publication NAVFAC P-307 – Management of Weight Handling Equipment includes requirements for Contractor Cranes (see appendix P). Navy facilities issue Instructions specific to particular facilities such as 'NAVSHIPYDPUGET INSTRUCTION 11262.4A' which provides requirements for weight handling equipment at all Navy facilities within the Puget Sound.

4.1.10 Demobilization of Equipment

Construction equipment should be demobilized when no longer required for the work. The Executive Vice President of Construction should be provided with a status of TtEC-owned construction equipment and scheduled release dates in order to coordinate availability of equipment with other projects.

The Project Manager or designee should request demobilization instructions from the Executive Vice President of Construction or designee to determine the location to receive TtEC-owned equipment.

Construction equipment leaving the Exclusion Zone of a remediation construction project will be

decontaminated in accordance with the requirements of the Environmental Health & Safety-Programs, Procedure EHS 3-4, Site and Contamination Control, and the site specific EHS Plan.

Individual state regulations may require cleaning of construction equipment leaving a site, not limited to remediation construction, in order to control the spread of microorganisms contained in the soil. Such requirements are to be identified in the project EHS plans.

5.0 REFERENCES

Please Describe Your Reference Here	Place Your Link in this Column
1. Accounting/Finance Procedure AF-8, Fixed Assets	
2. ASME B30 committee publications "Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings" available at www.ihserc.com Note that this is a commercial subscription and requires a User ID and Password available from the TtEC Librarian	
3. DOE Technical Standard DOE-STP-1090 Hoisting and Rigging available at www.directives.doe.gov (select the Tech Standards tab, select DOE Technical Standards, select Approved Standards and select DOE_STD_1090 from the menu)	
4. Environmental, Health & Safety - Programs Procedure EHS 2-1, Emergency Preparedness	
5. Environmental, Health & Safety -Programs Procedure EHS 3-4, Site and Contaminant Control	
6. Environmental, Health & Safety -Programs Procedure EHS 6-2, Drill Rigs	
7. Environmental Management System (EMS)	
8. Labor Relations Guidelines LR-8, Pre-Job Conferences	
9. NAVFAC P-307 Management of Weight Handling Equipment, Available via http://www.safetycenter.navy.mil/instructions/osh/navfacP307.pdf#search=%22NAVFAC%20P-307%22	
10. The OSHA publications below are available at www.osha.gov/ select Regulations, select OSHA Regulations (Standards - 29 CFR), select Part 1926 Safety and Health Regulations for Construction	
11. OSHA 29 CFR Part 1926 Subpart I Tools - Hand and Power	
12. OSHA 29 CFR Part 1926 Subpart N Cranes, Derricks, Hoists, Elevators and Conveyors	
13. OSHA 29 CFR Part 1926 Subpart O Motor Vehicles, Mechanized Equipment and Marine Operations	
14. OSHA 20 CFR Part 1926 Subpart W Rollover Protection Structures Overhead Protection	
15. Project Initiation/Operations Procedure PO-1, Project Management Planning	
16. Project Initiation/Operations Procedure PO-2, Task Initiation	
17. Project Initiation/Operations Procedure PO-12, Government Property Control	
18. USACE Safety and Health Requirements Manual, EM 385-1-1 (Available on-line at www.usace.army.mil/net/usace-docs	
19.	

6.0 ATTACHMENTS

Please Provide a Description of the Attachment	Place Your Attachments Here
1. Sample Equivalent/Vehicle Inspection Report	 CP-7 Att-1 FJ.doc
2. Sample Daily Equipment Inspection Form	 CP-7 Att-2 Daily Equip Insp.doc
3. Mobile and Crawler Crane Monthly Checklist	 CP-7 Att-3 FJ.doc
4. Operator/Driver Task Observation Checklist	 CP-7 Att-4 Operator Observation Checklist.doc
5. Insurance Request for Leased Equipment	 CP-7 Att-5 FJ.doc

Tetra Tech EC, Inc.

NOTICE OF OWNERSHIP AND CONDITIONS OF USE

This document is the property of Tetra Tech EC, Inc. (TtEC) and is to be used only for the duration and connection with the performance of work for TtEC. Written deviations to this document may be authorized when appropriate in accordance with the Quality Rule. This document is not to be construed as an employment contract or any binding obligation of TtEC. This document may be modified or rescinded at any time with or without prior notice at the sole discretion of TtEC. Hard copies of this document may not contain the most current information. The current version of this document can be found on the TtEC online Corporate Reference Library.

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Tetra Tech EC, Inc.

Proprietary Information



TETRA TECH EC, INC.

Equipment/Vehicle Inspection Report

Date: _____ Unit Number: _____ Description: _____

_____ Miles or _____ Hours: _____ MFG: _____

Unit to be taken from: _____ to: _____

	Good	Satisfactory	Repair Req.	N/A		Good	Satisfactory	Repair Req.	N/A
1. Tires/Track %*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	17. Interior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Brakes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	18. Glass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Steering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	19. Wipers/Review Mirrors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Undercarriage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20. Heater/AC/Defroster	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Suspension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	21. Safety Equipment/Belts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Engine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	22. Signal Lights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Drive Train	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	23. Mounted Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Fuel System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24. Mounted Attachments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Cooling System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25. Blade/Bucket	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Electrical System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26. Boom	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Exhaust System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27. Outriggers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Hydraulic System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	28. Fire Ext./First Aid Kit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Transmission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	29. Horn/Backup Alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Clutch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30. Manufacturer Operating Manual	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Body	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	31. Head/Tail/Brake Lights	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. ROP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	32. Cleanliness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

* Note estimated percentage of tread/track usefulness remaining

Comments: _____

Inspected By: _____

DISTRIBUTION: (1) Sent with equipment (2) Tetra Tech EC, Inc. Equipment Department (3) Receiving Copy (4) Originator's Copy

EQUIPMENT TRANSFER REPORT MUST ACCOMPANY THIS FORM



DAILY EQUIPMENT INSPECTION

PROJECT _____

MANUFACTURER TYPE _____

UNIT # _____ MODEL _____ DATE _____

ENGINE HRS/MILEAGE _____ / _____ SHIFT _____

Check appropriate column and describe correction needed.

	If Good (✓)	NA	Correction Needed
Steering Mechanisms ^{1*}	_____	_____	_____
Service Brakes ²	_____	_____	_____
Emergency Brakes ¹	_____	_____	_____
Parking Brake ¹	_____	_____	_____
Transmission & Controls	_____	_____	_____
Suspension & Springs	_____	_____	_____
Hydraulic Leaks	_____	_____	_____
Exhaust System	_____	_____	_____
Warning Gauges	_____	_____	_____
Windshield ¹ & Wipers	_____	_____	_____
Lights (Head & Tail)	_____	_____	_____
Brake Lights ¹	_____	_____	_____
Mirrors	_____	_____	_____
Seat and Seat Belts ¹ (w/ ROPS)	_____	_____	_____
Tires/Tread ¹	_____	_____	_____
Regular Horn	_____	_____	_____
Audible Back-up Alarm ¹	_____	_____	_____
Steps, Hand-holds	_____	_____	_____
Fire Extinguisher	_____	_____	_____
Engine Coolant	_____	_____	_____
Engine Oil	_____	_____	_____
Hydraulics & Operating Controls	_____	_____	_____
Fenders/Mudflaps	_____	_____	_____
Heater/defroster	_____	_____	_____
	_____	_____	_____
	_____	_____	_____
	_____	_____	_____

Remarks:

¹ Items required to be operational by OSHA 1926.602 before use.

² Service brake must be capable of stopping and holding equipment fully loaded. _____

Operator Name (Printed) _____

Operator Signature _____

Review : SSO: _____ Superintendent _____

Date Repairs or adjustments completed: _____

Equipment Supervisor/Mechanic: _____

MOBILE AND CRAWLER CRANE MONTHLY CHECKLIST

Crane Number / ID _____

Date _____

Project Name/No: _____

Item	Consideration	Comments
Crane Structure	Cracks, Corrosion, Deformation	
Foundations to support loads	Cracks, Settlement	
Booms	Cracks, Corrosion, Deformation	
Bolts & Rivets	Tightness, Corrosion	
Boom Angle Indicator & Chart	Accuracy, Visibility	
Load Indicator (s)	Accuracy	
Anti-Two Block Device	Functional	
Engine or Motor	Performance & Safety Compliance	
Chain & Sprocket	Wear and Stretch	
Pawls or Dogs	Wear, Cracks, Distortion	
Pins, Shafts & Axles	Wear, Cracks, Distortion	
Bearings & Rollers	Wear, Cracks, Distortion	
Gears	Wear, Cracks	
Tires & Wheels	Excessive Wear, Damage	
Wire Ropes/Lines	Condition, Lay	
Main Drum Brake	Function, Adjustment	
Lining	Excessive Wear	
Drum Braking Surface	Wear, Cracks, Distortion	
Linkage & Pins	Wear, Cracks, Distortion	
Actuating Cylinders & Fittings (if any)	Leakage or Deterioration	
Auxiliary Drum Brake	Function, Adjustment	
Lining	Excessive Wear	
Drum Braking Surface	Wear, Cracks, Distortion	
Linkage & Pins	Wear, Cracks, Distortion	
Actuating Cylinders & Fittings (if any)	Leakage or Deterioration	
3 rd , Drum Brake (if any)	Function, Adjustment	
Lining	Excessive Wear	
Drum Braking Surface	Wear, Cracks, Distortion	
Linkage & Pins	Wear, Cracks, Distortion	
Actuating Cylinders & Fittings (if any)	Leakage or Deterioration	
Boom Hoist Brakes	Function, Adjustment	

MOBILE AND CRAWLER CRANE MONTHLY CHECKLIST

Crane Number / ID _____

Date _____

Project Name/No: _____

Item	Consideration	Comments
Lining	Excessive Wear	
Drum Braking Surface	Wear, Cracks, Distortion	
Linkage & Pins	Wear, Cracks, Distortion	
Actuating Cylinders & Fittings (if any)	Leakage or Deterioration	
Travel Brake or Locks	Function, Adjustment	
Lining	Excessive Wear	
Drum Braking Surface	Wear, Cracks, Distortion	
Linkage & Pins	Wear, Cracks, Distortion	
Actuating Cylinders & Fittings (if any)	Leakage or Deterioration	
Lead Block	Function	
Hooks	Cracks, Distortion	
Hook, Swivel	Cracks, Wear, Function	
Sheaves	Wear, Cracks, Distortion, Rope Fit	
Computers	Calibrated	
Counterweight System	Attaching Linkage OK	

Print Name

Signature

OPERATOR/DRIVER TASK OBSERVATION CHECKLIST

Project Name _____ Project Number _____
 Operator's Name _____ Observer's Name _____
 Date of observation _____ Type/make of equipment operated _____

Operating Safety Observations	S	U	NA	Comments
A. Pre-use inspection prior to starting				
1. Conducts daily pre-use inspection.				
2. Mounts & dismounts carefully-3 point contact.				
3. Uses the seat belt all times while seated. Sounds horn before starting engine.				
4. Checks equipment warning devices.				
5. Checks hydraulic systems (if so equipped). Ensures system is filled and free from leakage.				
6. Checks air system (if so equipped). Ensures all connections are tight.				
7. Checks engine oil level. Ensures all plugs, filler caps, and other fittings are secure and not leaking.				
8. Checks for broken, missing, excessively worn or damaged parts, and reports immediately.				
9. Checks tires. Looks for serious cuts, bulges, irregularities and abnormal wear. Checks inflation pressures and keeps valve caps in place. Checks for tires rubbing.				
10. For dump trucks, checks front wheel seal oil levels.				
11. Checks fuel level and for fuel system leaks.				
12. Coolant check—Should never open a hot system or pour cold coolant into radiator if the engine is very hot.				
13. For safe visibility, cleans the windshield, mirrors and light lenses.				
14. For articulating machines, checks to ensure that the steering frame lock or link have been removed and properly stored.				
15. Checks for and maintains safe access to the cab (3 point contact). For safe mounting, clears the steps, grab rails, and floor and seat of mud and water.				
16. Secures tools and keeps the floor free of debris.				
17. For safe operation wipes steering wheel, foot pedals, hand levers and knobs clean of oil and grease.				
18. Checks first aid kit and fire extinguisher. Reports missing items to the foreman or supervisor.				
19. Checks equipment for warning tags.				
B. Starting				
1. Mounts & dismounts carefully-3 point contact.				
2. Uses the seat belt at all times while seated. Sounds horn before starting engine.				
3. Checks equipment warning devices.				
4. Uses job specific PPE (e.g., hard hats, safety shoes, safety glasses, overalls, gloves, traffic vests, and ear protection).				
5. Ensures the bowl, bucket, etc. is on the ground.				
6. For starting, checks all controls to be sure they are in proper position.				
7. Does not crank an electric starter for more than 30 seconds. Allows two minutes to cool prior to next attempt.				
8. For steering safety, tests before moving. Turns the wheels to full left and full right.				
9. Checks service and parking breaks for proper operation.				
10. Checks the backup alarm.				
11. Ensures head lamps and safety lighting are in working order.				

Operating Safety Observations	S	U	NA	Comments
C. Operation				
1. Before moving, places the bucket, bowl, blade, etc., into the transport position and secures all accessory equipment.				
2. Obeyes traffic & other posted/published site safety practices & rules.				
3. Maintains control of equipment at all times.				
4. Gives right-of-way to loaded machines or trucks.				
5. Minimizes engine overspeed on downgrades & when shifting.				
6. Does not transport passengers without proper provisions.				
7. Does not engage in horseplay.				
8. Crosses ditches at an angle, proceeding slowly.				
9. Avoids large obstacles, deep holes & soft edges.				
10. Slows down before turning.				
11. Stays in gear on a downgrade.				
12. When running across a hillside, proceeds slowly. Never turns sharply uphill or downhill.				
13. Obeyes flagmen & spotter signals.				
14. Maintains safe stopping distance behind other equipment.				
15. Shifting				
a. Always stops the machine/truck and runs the engine at low idle speed to shift from forward into reverse.				
b. Downshifts one speed range at a time.				
c. Applies the retarder and/or service brakes to reduce speed before entering sharp turns, fill areas, and downgrades.				
d. For machines, always leaves the shift lever in neutral position when stopped.				
16. Braking				
a. Avoids applying brake continuously on a downgrade unless system is so designed.				
b. Uses the engine for additional brake force-or, if so equipped, the auxiliary retarder.				
c. Anticipates grade and selects proper gear range accordingly.				
d. Brakes firmly in one application. Avoids fanning the brake pedal.				
e. Uses each brake system only for its intended purpose.				
17. Turning				
a. Does not cut corners too close when making sharp turns.				
b. Maintains engine speed high enough for normal steering.				
c. Downshifts when necessary or appropriate.				
d. For machines, carries the load as low as conditions permit to maintain stability.				
18. Hauling				
a. Regulates speed to road conditions. Reduces speed before turning. Avoids over speeding the engine.				
b. Downshifts when approaching a downgrade. Downshifts when necessary on an upgrade to avoid stalling the engine.				
c. Obeyes traffic rules and spotters.				
19. Parking Precautions				
a. Selects level ground whenever possible.				
b. When parking on a grade, positions equipment at right angles to the slope; and sets parking brake if so equipped in addition to lowering bowl, bucket, etc.				
c. Parks a reasonable distance from other equipment.				
d. When parking on haul roads, picks the safest place, where the equipment is visible from both directions.				



Operating Safety Observations	S	U	NA	Comments
20. Demonstrates proficiency through smooth operation of controls (e.g., speed of operation appropriate for the conditions, not jerky or hesitant).				
21. Maintains eye contact with other operators, drivers, and ground personnel.				
22. Responds appropriately to signals from flaggers, spotters, operators directing equipment movements.				
23. Stops operation when ground personnel are out of line-of-sight.				
24. Positions and orients machine for safe operation (e.g., safe distance from edge of excavations, tracks perpendicular to excavation, clear distance maintained to fixed obstructions).				
25. Barricades, cones, tape set up to maintain clear zone within swing radius of counterweight.				
26. Maintains safe work area (e.g., windrow at edge of stockpiles, safe slopes).				
D. Shutdown				
1. Lowers the bowl, bucket, etc. to the ground. Lowers and secures the bed on dump trucks.				
2. Reduces engine speed. Sets parking brake.				
3. On machines, places transmission in neutral and locks shift lever if so equipped.				
4. Allows hot engine to cool gradually before stopping it.				
5. Secures equipment to prevent unauthorized starting and movement.				
6. Bleeds the air tanks, if so equipped.				
7. Dismounting—doesn't jump off, uses handrails and steps, and faces the machine/truck when getting off.				
8. Warning tags—attaches appropriate warning tags to steering wheel to prevent accidents.				
E. Overall Appraisal				
Overall appraisal of operator/driver				

S = Satisfactory

U = Unsatisfactory

NA = Non applicable

Note: For unsatisfactory observations also indicate the immediate corrective action taken (e.g., training, verbal or written warning, or reassignment).

Tetra Tech EC, Inc.
Insurance Request for Leased Equipment

FROM:

LOCATION:

TO: **Dan Fisher**

LOCATION: **Morris Plains**

1.	IS THIS ITEM A LICENSED VEHICLE? IF YES, PLEASE PROCESS THE "TTECIVEHICLE INSURANCE REQUEST FORM"	
2.	DATE FORM COMPLETED	
3.	REQUESTOR NAME, PHONE NUMBER AND OFFICE LOCATION	
4.	JOB SITE CONTACT (Name and Phone Number)	
5.	PROJECT NAME	
6.	LESSOR'S COMPLETE NAME AND ADDRESS	
7.	TERM OF THE LEASE (please be specific, i.e., 6/15/98 to 6/15/99)	
8.	TYPE OF EQUIPMENT & SERIAL NUMBER **Please contact Dan Fisher ASAP regarding insurance for cranes**	
9.	DECLARED VALUE OF EQUIPMENT	
10.	CHARGE NUMBER (FOR VALUE OF EQUIPMENT OVER \$500,000)	
11.	HAS LESSOR SPECIFICALLY REQUESTED LOSS PAYEE STATUS? IF YES, PLEASE SPECIFY DATE DUE.	

PO/Subcontract attached

Terms and conditions attached

If guidance is needed, please call Dan Fisher @ (973) 630-8198.

Version 6.

CP-13:

Critical Lifts

Purpose

The purpose of this procedure is to provide a means to ensure that critical lift operations are planned, reviewed, and conducted with specific documented instructions that identify appropriate additional, special, and/or unusual precautions, methods, and/or safety requirements that must be accounted for before or during any lifting operation.

Version Date: 10/04/99 -

Revised

Approved by: *Donald Rogers*

Original Issue Date: 06/03/96

Date:

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Procedures

Sections: Construction

Sub Category:
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Document Type: Procedure

Keyword Index: Field
Activities/Environmental H&S, Critical Lifts, Field Activities/Science, Training, Operational Control, Field Activities/Const/Remd/D&D

Document Owner: Frank Jones

Table of Contents

Section

- 1.0 PURPOSE
- 2.0 SCOPE
- 3.0 MAINTENANCE
- 4.0 DEFINITIONS
- 5.0 DISCUSSION
- 6.0 ATTACHMENTS
- 7.0 REFERENCES

1.0 PURPOSE

The purpose of this procedure is to provide a means to ensure that critical lift operations are planned, reviewed, and conducted with specific documented instructions that identify appropriate additional, special, and/or unusual precautions, methods, and/or safety requirements that must be accounted for before or during any lifting operation.

2.0 SCOPE

2.1 This procedure applies to all Tetra Tech EC, Inc. (TtEC) projects that include a construction component, including remediation construction, that involve critical lifts, as defined in Section 4.0, Definitions. This procedure applies to lifting operations performed by TtEC's personnel and to lifting operations performed using crane operators provided with rented or leased cranes. This procedure may be applicable to work performed by subcontractors; however, the applicability shall be addressed in the subcontract agreement terms and conditions.

2.2 The terms "crane" and "lifting equipment" are used throughout this procedure. It shall be understood that these terms are inclusive of any equipment or tools utilized for lifting operations, including, but not limited to, crawler cranes and truck mounted cranes, including those with lattice booms or telescoping booms; forklifts; backhoes; excavators; loaders; derricks; chainfalls; tuggers; and come-alongs. It is the intent that the requirements or guidance set forth in this procedure are to be applied to any device used for lifting activities, with appropriate adjustment to the instructions as required to address the specific situation. (For example, when using a chainfall for a lift of more than 75% of its rated capacity, the Critical Lift Plan checklist entry for "Foundation Support Checked" would require checking the structural integrity for the supporting member to which the chainfall is attached.)

3.0 MAINTENANCE

The Vice President Remedial Construction is responsible for updating this procedure. Approval authority rests with TtEC's Chief Operating Officer. Suggestions for revision shall be submitted to both the department responsible for updating the procedure and the Executive Director Compliance and Corporate Counsel.

4.0 DEFINITIONS

4.1 Competent Person

One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. (OSHA 29 CFR 1926)

4.2 Crane Operator Aids

Devices which are used to assist a crane operator in the safe operation of a crane, including: two-block warning devices, two-block prevention devices, load and load moment indicator devices, boom angle and radius indicators, boom and jib stops, boom hoist disengaging devices, limit switches, drum rotation indicators, etc.

4.3 Critical Lift

A non-routine lift requiring additional detailed planning and additional or more than normal safety precautions. Critical lifts include lifts made when the load weight is 75% or more of the rated capacity of the lifting equipment at a specific configuration (boom angle, lift radius, swing, etc.); lifts which require the load to be lifted, swung, or placed out of the operator's view; lifts made with more than one piece of lifting equipment; lifts involving non-routine or technically difficult rigging arrangement(s); hoisting of personnel with a crane or derrick; or any lift which the lifting equipment operator believes should be considered critical. Any lift of 30,000 pounds or more should be considered a critical lift, regardless of the crane capacity. The 30,000 pound criteria should be evaluated by the Project Manager and the Project Environmental and Safety Manager (PESM) for the advisability of lowering the criteria based on project-specific factors such as capacity of the lifting equipment to be employed on the project, frequency and nature of the lifting activities, and availability of experienced personnel, among other factors. Establishment of project-specific criteria for determination of critical lifts should be documented by the Project Manager.

4.4 Critical Lift Plan

A plan prepared by the crane operator, Lift Supervisor, Project Engineer (or designee), and rigger, as applicable, prior to making a critical lift. The Critical Lift Plan shall be documented, and shall be reviewed and signed by all personnel involved with the lift.

4.5 Failure Mode

There are two generally recognized modes of failure of cranes when the rated capacity is exceeded, depending on the crane configuration: a structural failure occurs when the boom, jib, or other component of the crane suddenly fails (there is usually no advance warning of an impending structural failure); an overturning failure occurs when the crane is pulled over by the weight of the load (there may be advance warning of an impending overturning failure as weight is transferred from the outboard tires, crawler track, or outriggers, causing these to rise as the back side of the crane becomes "light").

4.6 Lift Supervisor

A competent person who has extensive knowledge and experience in lifting operations.

4.7 Qualified Operator

An operator who is qualified to operate the crane in accordance with the standards promulgated in 29 CFR 1926.550, who is licensed or certified to operate the crane, or who has extensive knowledge and experience, and who has successfully demonstrated the ability to operate the equipment and to solve or resolve problems related to operation of the equipment.

4.8 Qualified Person

One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project. (OSHA 29 CFR 1926)

4.9 Tailing Crane Lift

A procedure sometimes used in erecting large vessels or structural elements in which one crane (lead crane) lifts the top of the load and a second crane (tail crane), rigged to the bottom of the load, either secures the bottom of the load from movement or assists in the horizontal positioning of the load. (USACE Safety and Health Program Manual)

4.10 Tandem Crane Lift

The use of two or more cranes to lift a load. (USACE Safety and Health Program Manual)

4.11 Two-blocking

A condition which occurs when the lower load block or hook assembly comes in contact with the upper load block, or when the load block comes in contact with the boom tip. (USACE Safety and Health Program Manual)

5.0 DISCUSSION

5.1 Qualifications

5.1.1 Lift Supervisor Qualifications

5.1.1.1 The Lift Supervisor shall have the capability of determining the total weight and center of gravity of the load; selecting the appropriate lifting equipment and rigging materials rated for the load and the particular lifting configuration; evaluating the lifting configuration and conditions affecting the lift; and evaluating the condition of the equipment and rigging. The Lift Supervisor shall have demonstrated the ability to solve or resolve problems related to lifting operations through experience, certification, or other means to the satisfaction of the Vice President Remedial Construction and the Project Manager.

5.1.2 Crane Operator Qualifications

5.1.2.1 Individual states and/or municipalities may have licensing requirements for crane operators. Where there are no licensing requirements, a certification of competency is recommended. Requirements for competency certification shall be included in subcontracts or purchase orders if this is to be a requirement of the project. The Project Manager should coordinate with the TtEC

Labor Relations Representative for the project to ensure inclusion of the competency certification requirement in the Project Labor Agreement as appropriate.

5.1.2.2 The Lift Supervisor shall be responsible for determining the applicable qualification requirements for the crane operator in accordance with this procedure, state and local licensing agency requirements, OSHA requirements, ANSI/ASME B30 standards, Client requirements, or equipment manufacturer's recommendations. The U.S. Army Corps of Engineers (USACE), for example, requires proficiency qualification of operators, which includes a written examination and a physical examination, on USACE projects. Assistance in determining state and local licensing agency requirements may be obtained from a TtEC Regulatory Specialist.

5.1.2.3 Crane operators shall be physically, mentally, medically, and emotionally qualified for performing the duties required of the position. Some factors to be considered in determining qualifications of crane operators are strength, endurance, agility, coordination, and visual and hearing acuity.

5.1.2.4 TtEC crane operators shall be required to demonstrate to the satisfaction of the Lift Supervisor their knowledge of the following:

- Responsibilities of the operator, rigger, signalpersons, and lift supervisor;
- Knowledge of crane safety requirements (such as required safety equipment, clearance from power lines, overhead lifts, etc.) and the crane's operator manual;
- Ability to determine the crane configuration, to determine the weight and center of gravity of loads, and to determine the crane's capacity using the load chart;
- Ability to determine whether the crane would be in either the structural and overturning failure mode for the crane's configuration and the lift radius, using the crane's load chart;
- Use and limitations of the crane operator aids;
- Crane inspection, testing and maintenance requirements;
- Determination of ground conditions and outrigger matting requirements;
- Crane set-up, assembly, dismantling, and demobilization procedures;
- Signaling and communication procedures; and
- Factors which reduce rated capacity.

5.1.2.5 TtEC crane operators shall pass a practical operating examination, conducted by the Lift Supervisor, which demonstrates their ability to perform the following:

- Inspecting the crane (refer to Construction Procedure CP-7, Construction Tools and Equipment, Attachment 2, for a Daily Equipment Inspection checklist);
- Establishing a stable foundation and leveling the crane;
- Raising, lowering, extending, retracting and swinging the boom;
- Raising and lowering the load line;
- Attaching the load, holding the load, and moving the load;
- Reading and understanding the signs, load charts, signals and operating instructions in use; and

- Reading the load, boom angle, and other indicating devices.

During the practical examination the crane operators should demonstrate the ability to operate the crane smoothly, with no sudden starts, stops or impact loading.

- 5.1.2.6** Results of crane operators' qualification examinations should be documented by the Lift Supervisor in the cranes' log books and/or other appropriate on-site project file.

5.1.3 Rigger Qualifications

- 5.1.3.1** The rigger shall demonstrate, to the satisfaction of the Lift Supervisor, a knowledge of safe rigging practices and the abilities to select the proper rigging hardware, slings and accessories of adequate capacity; to inspect the rigging and determine its condition, acceptability for use and load capacity; and to position the load in the lifting devices, assuring that the load is well secured, stable and balanced.

5.1.4 Signalperson Qualifications

- 5.1.4.1** The signalperson shall demonstrate, to the satisfaction of the Lift Supervisor, the ability to communicate, verbally and through the use of standard signals, with the crane operator, other workers, and the Lift Supervisor. The signalperson shall possess the visual and hearing acuity required for the performance of the duties associated with the position. The signalperson shall demonstrate a knowledge of the operation of any radio or other communication devices required for the lifting operation.

5.2 Responsibilities

- 5.2.1** The Vice President Remedial Construction is responsible for providing qualified personnel to support the project as requested by the Project Manager.

- 5.2.2** The Project Manager is responsible for ensuring that a qualified Lift Supervisor and Project Engineer are assigned to the project for the performance of critical lifts. The Project Engineer may delegate authority to perform functions relative to critical lifts to a qualified Field Engineer but should maintain oversight of activities. The Project Manager is responsible for communicating to the Site Superintendent and the Lift Supervisor that the Lift Supervisor is to be assigned the authority to take any actions, including but not limited to exercising Stop Work Authority, required for the safe execution of the critical lift.

- 5.2.3** The Site Superintendent is responsible for ensuring that no critical lifts are performed without the completion and approval of a Critical Lift Plan in accordance with this procedure, that no critical lifts are scheduled without the knowledge of the Lift Supervisor, and that the Lift Supervisor is assigned the authority discussed in Section 5.2.2, above.

- 5.2.4** The Lift Supervisor is responsible for the execution of critical lifts, including selection of appropriate equipment of sufficient capacity, selection of qualified operators, and direct supervision of the critical lift operation and all personnel involved in the critical lift, including the operator, rigger, and signalperson. The Lift Supervisor is responsible for ensuring that all personnel associated with the critical lift are aware of their responsibilities as addressed in this procedure, any applicable project procedure(s), and/or the Critical Lift Plan.
- 5.2.5** The crane operator is responsible for the performance of the pre-operational inspections prior to each use of a crane, safe operation of the crane, and the performance of the critical lift in accordance with the requirements of the Critical Lift Plan and the instructions of the Lift Supervisor. The crane operator is responsible for ensuring that the following documents are with the crane at all times, and that the documents are completed as required:
- 5.2.5.1** A copy of the operating manual developed by the manufacturer for the specific make and model of crane.
- 5.2.5.2** A copy of the operating manual for any crane operator aids with which the crane is equipped.
- 5.2.5.3** The load rating chart for the crane. The US Army Corps of Engineers (USACE) Safety and Health Requirements Manual, EM 385-1-1, requires the following information to be included on the load rating chart for lifting equipment to be used on a USACE project:
- The crane make and model, serial number and year of manufacture;
 - Load ratings for all crane operating configurations, including optional equipment;
 - Wire rope type, size and reeving; line pull, line speed and drum capacity; and
 - Operating limits in windy or cold weather conditions.

When circumstances are encountered where all of the required information listed above is not included on the load rating chart for lifting equipment to be used on a USACE project, the USACE's project representative shall be requested to provide direction. For lifting equipment to be used on projects where the requirements of EM 385-1-1 do not apply, the Lifting Supervisor should determine the project's requirements concerning the information listed above.

- 5.2.5.4** The crane's log book which shall be used to record operating hours and all crane inspections, tests, maintenance and repair. The log shall be updated daily as the crane is used and shall be signed by the operator and supervisor. Service mechanics shall sign the log after conducting maintenance and repairs on the crane.
- 5.2.6** The Lift Supervisor is responsible for the selection of rigging slings, spreaders, shackles, and miscellaneous rigging materials in accordance with the requirements of the Critical Lift Plan. The Lift Supervisor is responsible for the arrangement and configuration of the rigging, and the attachment of the rigging to the load and to the lifting hook in accordance with safe rigging practices and the Critical Lift Plan.

- 5.2.7 The signalperson is responsible for familiarity with the proper use of hand signals, radio communications, or other signal devices as appropriate for the Critical Lift Plan.
- 5.2.8 Roles and responsibilities of TtEC personnel for lifting activities performed by subcontractors, vendors and suppliers shall be as established in the subcontract agreement terms and conditions and site-specific procedures.

5.3 Critical Lift Plan Preparation, Review and Approval

- 5.3.1 Prior to commencing any lift meeting the requirements of a critical lift, as defined in Section 4.0 of this procedure, the Site Superintendent shall ensure that a Critical Lift Plan is prepared, reviewed and approved. The Critical Lift Plan shall be prepared with appropriate input from the Lift Supervisor, Project Engineer (or designee), crane operator, rigger and the Environmental and Safety Supervisor (ESS). The Critical Lift Plan shall be approved by the Project Manager or designee, and shall be signed by all personnel involved in the lift.
- 5.3.2 The Project Manager shall ensure that personnel performing calculations for total lift weight, determination of center of gravity, and capacity of the crane at the operating radius, as well as all other calculations required for the critical lift, possess the necessary qualifications. The Project Engineer may establish requirements for the performance of calculation reviews by a checker, and an independent verification of calculations, in accordance with the TtEC Engineering Procedures. State and/or federal regulations may require a Professional Engineer to stamp the calculations for the Critical Lift Plan. Assistance in determining specific regulations applicable to a project may be obtained from a Regulatory Specialist.
- 5.3.3 Attachment 1, Critical Lift Plan Forms, provides a standard form which may be utilized to document the Critical Lift Plan. Other forms or project generated formats may be utilized provided that they address all of the areas required by this procedure.
- 5.3.4 After completion of the Critical Lift Plan, and immediately before the lift, the Lift Supervisor shall hold a meeting to be attended by all personnel involved in the lift. The purpose of the meeting is to communicate the roles and responsibilities of the personnel, particularly the role of the Lift Supervisor as the person with the overall responsibility for the lift and the authority to direct the actions of all personnel involved in the lift; and to review the lift equipment selection, rigging selection, lift configuration, lift operation sequence, and all hazards involved in the lift. The pre-lift meeting should be documented in the crane's log book.
- 5.3.5 For multiple, repetitive lifts with the same basic crane configuration and only minor variations in load weight, lift radius, or other variables, as determined by the Lift Supervisor, the Project Manager or designee may authorize the use of a single Critical Lift Plan to document all of the involved lifts. In those cases, the Lift Supervisor shall analyze the various lifts and ensure that the Critical Lift Plan adequately addresses the worst case combination of all of the variables involved.
- 5.3.6 For multiple, repetitive lifts utilizing one Critical Lift Plan, as described in Section 5.3.4 above, and conducted during the same work shift, The Project Manager or designee may determine that only

one pre-lift meeting is required. Waiver of the pre-lift meeting should be documented in the crane's log book. Critical lifts performed on separate shifts or workdays should require additional, documented pre-lift meetings as described in Section 5.3.3 above.

5.4 Critical Lift Plan Content

- 5.4.1** The Critical Lift Plan shall specify the exact size and weight of the load to be lifted as well as all crane and rigging components which add to the weight. Calculations required for determination of total weight, lift radius, % of crane's capacity, and center of gravity shall be included in or attached to the Critical Lift Plan. Documentation of any required calculation checks and independent verifications shall also be attached to the Critical Lift Plan.
- 5.4.2** The Critical Lift Plan shall specify the lift geometry and procedures, including the crane position, height of the lift, the load radius or boom angle, and the boom length, for the entire range of the lift. Sketches may be used when appropriate to adequately describe the layout.
- 5.4.3** The Critical Lift Plan shall designate the crane operator, Lift Supervisor, and rigger. The Lift Supervisor shall be identified as the person in charge of the lift.
- 5.4.4** The Critical Lift Plan shall include a rigging plan which shows the lift points and forces and describes the rigging procedures and the hardware requirements. Sketches may be used when required to adequately describe the configuration and attachment points to the load.
- 5.4.5** The Critical Lift Plan shall include the sequence of the lift operation's activities, including verification of preparation activities (setup, inspections, testing).
- 5.4.6** The Critical Lift Plan shall describe the ground conditions, outrigger or crawler track requirements, and, if necessary, the design of cribbing or mats, necessary to achieve a level, stable foundation of sufficient bearing capacity for the lift. For floating cranes or derricks, the Critical Lift Plan shall describe the operating base (platform) condition.
- 5.4.7** The Critical Lift Plan shall list the environmental conditions (rain, snow, ice, lightning, reduced visibility, etc.) under which the lift operations shall be curtailed or stopped.
- 5.4.8** The Critical Lift Plan shall specify the coordination and communication requirements for the lift operation.
- 5.4.9** For tandem or tailing crane lifts, the Critical Lift Plan shall specify the make and model of the cranes, the line, boom and swing speeds, and requirements for an equalizer beam.
- 5.4.10** The Project Engineer or designee shall review and approve the strength and stability of the foundation or supports to receive the load. Refer to Section 5.6 of this procedure for additional discussion of this subject associated with all lifts.

5.5 Special Considerations for Critical Lifts

- 5.5.1 When two or more cranes are used to lift a load, the responsibility of the Lift Supervisor as the one person in charge of the lift shall be emphasized to all personnel involved in the lift. If the Lift Supervisor delegates any authority to a crane operator, this delegation shall be clearly communicated to all personnel involved in the lift.
- 5.5.2 When two or more cranes are used in a lift, the total capacity of the cranes shall be at least equal to or greater than the total weight to be lifted including the load, lifting beams, rigging, hooks and attachments. Particular attention shall be given to the distribution of the load between the cranes to eliminate the overloading of a crane due to unbalanced load distribution. The Lift Supervisor shall consider the rigging configuration to ensure that there is no possibility of an unacceptable load transfer between cranes, such as when one of the cranes sets the load prior to the other crane. Such a load transfer may overload a crane. For tandem lifts, no crane should be loaded to more than 75% of its net capacity.
- 5.5.3 Consideration shall be given to the possibility that the load may not be successfully placed in its intended location due to unanticipated occurrences (wind, obstacles, etc.). The Critical Lift Plan shall address contingency plans to return the load to its original or an alternate location. Refer to Section 5.6 of this procedure for additional discussion on this subject.
- 5.5.4 Consideration shall be given to the performance of a test lift to demonstrate the ability to safely perform a lift when, in the judgment of the Project Manager or the Lift Supervisor, there is a significant risk of a loss occurring during the actual lift. In evaluating the need for a test lift, consideration should be given to the complexity of the lifting operation, the value of the component being lifted, the potential impact to other installations, and potential schedule impacts, among other factors.

5.6 General Considerations for All Lifts

- 5.6.1 Cranes should be positioned as near as possible to the load, maintaining a safe operating distance, without contacting the boom and outriggers, and with consideration for minimizing the swing and the setting radii. The operator shall verify that the load line is vertical and over the load's center of gravity prior to lifting the load to ensure that the load does not drift when lifted.
- 5.6.2 The immediate area of the lift should be checked for any electrical wires. A minimum safe distance of 10 feet shall be maintained from power lines rated 50 kV or less. The USACE Safety and Health Requirements Manual, Section 11, shall be consulted for minimum safe distances from electric lines with a higher system voltage. Alternately, the minimum safe distance may be calculated as follows:

minimum safe distance = 10 ft + 0.4 in for each 1 kV of lines rated over 50 kV;

or

twice the length of the line insulator (but never less than 10 feet).

Refer to ANSI/ASME B30.5a for specific guidance concerning the operation of cranes in proximity to electrical transmission lines. Special precautions including de-energizing and grounding the lines may be required depending on the proximity and possibility of the crane, the load line, or the load becoming a conductive path.

- 5.6.3** The required bearing capacity for the ground or foundation supporting the crane should be calculated, and the actual bearing capacity should be verified to be sufficient to support the crane and the load being lifted.
- 5.6.4** The Lift Supervisor should also ensure that:
 - 5.6.4.1** The swing area of the crane is barricaded to protect personnel in the immediate area;
 - 5.6.4.2** Loads are not lifted over personnel;
 - 5.6.4.3** All loose load objects are secured or removed;
 - 5.6.4.4** Tag lines are used to control loads except where their use will create a hazard;
 - 5.6.4.5** The crane is not subjected to sudden lifting, stopping or impact loading;
 - 5.6.4.6** Riding on loads, hooks, buckets, material hoists, or other material hoisting equipment not meant for personnel use is absolutely prohibited;
 - 5.6.4.7** Rigging attachment points are as specified by the equipment vendor, if applicable, or as specified in the Critical Lift Plan; and
 - 5.6.4.8** Softeners are used at contact points between rigging and load as necessary to avoid damage to the load or the rigging.
- 5.6.5** Environmental conditions under which lifting operations should not be performed, such as wind, precipitation, reduced visibility, etc., should be established and communicated to project personnel through the Work Plan, Environmental, Health, and Safety (EHS) Plan, and by verbal instructions.
- 5.6.6** Prior to performing any lift, the Lift Supervisor should give consideration to a contingency plan should conditions prohibit the load from being placed in its intended position. Contingency plans could include placement back in its original position or an alternate temporary location, and should include ensuring that adequate cribbing, dunnage, or tie downs are provided for the alternate location.

- 5.6.7 The Lift Supervisor shall determine that the foundation or supports to receive any load have been reviewed for stability and strength prior to performing the lift. This may be considered as a risk sensitive item, and if so, calculations performed shall be checked and have an independent verification prior to use in accordance with CP-11, Field Engineering. Temporary supports such as dunnage, cribbing, tie downs, and falsework shall be reviewed with consideration given to the load's weight, center of gravity, and resistance to overturning forces. Stability and bearing capacity of soils to support loads shall be verified.

- 5.6.8 Review and approval of permanent foundations or supports is performed as part of the design; however, there may be instances where a load is to be placed in it's final, designed location prior to completion of all construction associated with support of that load. (Examples: Backfill may not have been placed against foundations, concrete may not have achieved full design strength, or structural steel framing may not be complete.) These instances shall require review and approval by the Project Engineer prior to the lift being performed.

- 5.6.9 Prior to placement of any load in storage or otherwise temporarily staged prior to placement in its final, designed location, consideration shall be given to any access requirements, maintenance activities, ability to perform future lifting or handling, and construction activities to be performed in the vicinity of the stored or staged load.

5.7 Rigging Requirements

- 5.7.1 Certification of all lift accessories, including the results of proof tests for custom designed accessories, shall be available at the on-site project offices and maintained in a file as part of the project filing system.

- 5.7.2 The total weight of the load to be lifted, including all lifting beams, rigging, hooks and attachments, shall be determined before a safe lift can be planned.
- 5.7.3 The determination of the exact location of the center of gravity of the load is critical in ensuring that the load is rigged in a stable configuration. The location of the attachments of the rigging to the load should be above the center of gravity where possible. Where the location of attachments is below the center of gravity, extreme care must be taken to ensure stability of the load. Special precautions shall be taken in the selection of sling lengths and attachment configurations to ensure that the load is stable. Rigging of loads in this configuration should only be performed by personnel with extensive experience in rigging.
- 5.7.4 Consideration shall be made in any lifting operation for the possibility of a load becoming unstable during lifts intended only to reposition a load, such as uprighting or turning a load over. The center of gravity shall be calculated for the load in all positions anticipated in order to ensure stability.
- 5.7.5 The load shall be safely rigged within the rated capacity of all rigging equipment.
- 5.7.6 Sling capacities shall be reduced from their full rated capacities based on sling configuration (vertical, choker or basket hitch) and sling leg angle, as well as based on sling condition. Only personnel with extensive experience in rigging should be given the authority to determine the capacity of slings showing signs of wear or other deterioration.
- 5.7.7 Custom designed grabs, hooks, clamps, or other lifting accessories shall be marked to indicate the safe working loads and shall be proof-tested prior to use to 125% of their rated load.

5.8 Crane Inspections

- 5.8.1 Inspection Classification: Crane inspections are divided into two classifications by the ANSI/ASME B30 standards:
 - 5.8.1.1 Initial Inspection: Prior to initial use, all new and altered cranes shall be inspected by a qualified person to verify compliance with the applicable provisions of the ANSI/ASME B30 standards.
 - 5.8.1.2 Regular Inspection: The inspection procedure for cranes in regular service is further divided into two general classifications based on the intervals at which inspections should be performed. The intervals are dependent in turn on the nature of the critical components of the crane and the degree of their exposure to wear, deterioration, or malfunction. The two general classifications of regular inspections are designated as "frequent" and "periodic", with respective intervals between inspections defined as:

- Frequent Inspection - intervals from one to thirty days, performed by a person designated by the Lift Supervisor; and
- Periodic Inspection - intervals from one to twelve months (or as specifically recommended by the manufacturer or by a qualified person), performed by a qualified person.

5.8.1.3 Specific requirements for each of the above inspections are included in the ANSI/ASME B30 standards.

5.8.2 Implementation of the inspection requirements listed above for TtEC projects shall be in accordance with the following:

5.8.2.1 Prior to initial use, all new and altered cranes to be used by TtEC shall be inspected (initial inspection) by a certified crane inspector to ensure compliance with the applicable portions of the ANSI/ASME B30 standards, or the Power Crane and Shovel Association Standard #4 for draglines.

5.8.2.2 Cranes to be used by TtEC shall receive pre-operational inspections (frequent inspections) performed by the crane operator daily, prior to every use. Refer to the USACE Safety and Health Requirements Manual, Appendix H, Crane and Derrick Inspection, for a checklist of items to be inspected. Pre-operational inspections of rented or leased cranes, performed by a TtEC employee (e.g. either a certified crane inspector, the Lift Supervisor, or the crane operator) should not be documented or used in lieu of or as a periodic inspection.

5.8.2.3 Cranes to be used by TtEC shall receive periodic inspections conducted by a qualified person on an annual basis, or more frequently if recommended by the manufacturer. Because of liability considerations, the vendor renting or leasing the crane shall be responsible for performing and documenting the periodic inspections.

5.8.2.4 Cranes which have been idle for a period of one month or longer, but less than six months, shall be given a pre-operational inspection, conforming to the requirements for frequent crane inspections and frequent wire rope inspections, by a qualified person before being placed into service.

5.8.2.5 Cranes which have been idle for a period of over six months shall be given a complete inspection, conforming to the requirements for frequent and periodic crane inspections and for frequent and periodic wire rope inspections, by a qualified person prior to being placed into service.

5.9 Crane Performance Load Tests

5.9.1 Cranes to be used by TtEC shall receive performance load tests by a qualified person under the following circumstances:

5.9.1.1 Prior to initial use of cranes in which load sustaining parts have been altered, replaced, or repaired

(excluding replacement of the rope);

5.9.1.2 Every time it is reconfigured or reassembled after disassembly; and

5.9.1.3 Every four years.

5.9.2 A crane boom stop field test shall be conducted to verify the proper setup of the boom stops and functioning of the boom hoist disengaging device. This test shall be conducted, and deficiencies noted shall be corrected, prior to initiating the load performance test. Refer to the USACE Safety and Health Program Manual, Appendix I, for a checklist for the crane boom stop field test.

5.9.3 Performance load tests shall be conducted in accordance with the manufacturer's recommendations. Test loads shall not exceed 100% of the manufacturer's load rating capacity chart for any configuration of the test, except where a specific requirement exists.

5.9.4 Written reports of the load test, showing test procedures and confirming the adequacy of repairs or alterations, shall be maintained with the crane or at the on-site project office.

5.10 Applicability to Subcontractors

5.10.1 Subcontractors performing work on TtEC projects are required (by subcontract addendum) to comply with the requirements of the TtEC Safety Plan(s) for the site work, or to develop and implement a Site Safety Plan in accordance with TtEC requirements (in accordance with the TtEC Health and Safety Program, Procedure HS 1-4, [Subcontractor Selection and Management](#)).

5.10.2 This critical lift procedure is not applicable to subcontractors unless specifically addressed in the subcontract terms and conditions. The Project Manager may provide copies of this procedure to subcontractors for their use in developing their own Critical Lift Plans; however, this should only be done with the express, written agreement that TtEC has no responsibility or liability for the acceptability and/or implementation of this procedure in the subcontractors' plans.

6.0 REFERENCES

American National Standards Institute, ANSI/ASME B30 standards, B30.1 through B30.25, including the B30.5a-1995 Addenda to ASME B30.5-1994
Health and Safety Program, Procedure EHS 1-4, Subcontractor [Selection and Management](#) 
Mobile and Locomotive Cranes
OSHA 29 CFR 1926 Subpart N - Cranes, Derricks, Hoists, Elevators, and Conveyors 7
Power Crane and Shovel Association Standard #4
USACE Safety and Health Requirements Manual, Publication EM 385-1-1, October 1992, or latest issue

7.0 ATTACHMENTS

Attachment 1 - Critical Lift Plan Forms

**ATTACHMENT 1
Tetra Tech EC, Inc.
CRITICAL LIFT PLANFORMS**

Click the icon below to download and complete.



CP13-Att1.doc

Select the "Detach" button in the pop-up window to save a copy to a disk or hard drive.

Tetra Tech EC, Inc.

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Proprietary Information

ATTACHMENT 1, PAGE 1 OF 3

TETRA TECH EC, INC

CRITICAL LIFT PLAN

Project: _____ Date: _____
Load Description: _____

Sketches Attached: Lift Layout Rigging Configuration

Assigned Personnel	Name	Signature
Environmental and Safety Supervisor		
Lift Supervisor		
Project Engineer (or designee)		
Crane Operator 1		
Crane Operator 2 (if required)		
Rigger		
Signalperson 1		
Signalperson 2 (if required)		
Other		

Approved: _____
Project Manager

ATTACHMENT 1, PAGE 2 OF 3

CRITICAL LIFT PLAN

Weight Calculations	Weight (lbs)	Comments
Weight of Object Empty		
Weight of Contents		
Weight of Block		
Weight of Spreader Bar		
Weight of Jib (stored or erect)		
Weight of Rigging		
Weight of Jib Headache Ball		
Weight of Boom Extension		
Weight of Rope Below Sheaves		
Other		
Total Weight		
Crane/Lift Data	Data	Comments
Mfg/Model No.		
Boom Length		
Boom Angle		
Hoisting from Main-Aux-Jib		
Crane Capacity		
Rated Cap. for Lift-over front		
Rated Cap. for Lift-over rear		
Dist. from Center Pin to Center of Load (Boom Radius)		
% of Crane's Capacity		
Cable Capacity		
Number of Parts		
Size of Rigging		
Rigging Arrangement		
Communications		



FIELD CHANGE REQUEST	
Project Information	
Project Name: _____	Date: _____
Charge Number: _____	Change No.: _____
Location: _____	
Project Manager: _____	
Information on Change	
Description of Change: _____ _____ _____ _____ _____ _____ _____ _____ _____	
Reason for Change: _____ _____ _____	
Recommended Disposition: _____ _____	
FCR Review & Distribution	
SUXOS: _____	Date : _____
UXOSO : _____	Date : _____
PM: _____	Date : _____
PESM: _____	Date : _____
Distribution: <input type="checkbox"/> SUXOS <input type="checkbox"/> UXOSO <input type="checkbox"/> UXOQC <input type="checkbox"/> PESM <input type="checkbox"/> CLIENT	





SHSP FIELD CHANGE DOCUMENTATION

Project Information

Project Name: _____ Date: _____
 Field Change No.: _____
 Effective Date: _____

Information on Change

Pen & Ink Changes to be made to the EHSP to alert readers of the field change: _____

Reason for Change to be Incorporated in the EHSP: _____

Text of Change to be Incorporated: _____

Verification of Changes

UXOSO : _____ Date : _____
 SUXOS: _____ Date : _____



Appendix B
Contractor Forms

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INITIAL RECEIPT AND CLOSEOUT INVENTORY

DATE OF ACQUISITION	MANUFACTURER	MANUFACTURER'S MARKS	QUANTITY	DESCRIPTION	NAME, ADDRESS, LICENSE # OF PERSON DELIVERING EXPLOSIVES

Note: The initial receipt inventory must be recorded no later than the close of the next business day following the date of acquisition. And the closeout inventory must be recorded no later than the close of the next business day following the date of close out.



TETRA TECH EC, INC.

CONTRACTOR AND SUBCONTRACTOR PRODUCTION REPORT
TETRA TECH EC (TTEC)

DATE: _____ CONTRACT # 0T ÚÆG3 €
 Task Order 0006 REPORT # _____
 SITE MANAGER: _____ TO TITLE/LOCATION: _____
 AM WEATHER:temp: _____ max: _____ min: _____ cover: _____ precip: _____
 PM WEATHER:temp _____ max: _____ min: _____ cover: _____ precip: _____
 TIME FIELD TEAM ONSITE: 0700 TIME OFFSITE: 1730

WORK PERFORMED TODAY

PERSONNEL / (UXO ID number)	WORK DESCRIPTION	TITLE	EMPLOYER	HOURS

Additional Hours
 WAS A JOB SAFETY MEETING HELD THIS DATE? _____ TOTAL WORK HOURS ON JOB SITE THIS DATE: _____
 WERE THERE ANY LOST TIME ACCIDENTS THIS DATE? _____ CUMULATIVE TOTAL OF PREVIOUS WORK HOURS: _____
 WAS TRENCHING/SCAFFOLDING/ELECTRICAL WORK DONE? _____ TOTAL HOURS FROM START OF CONSTRUCTION: _____
 WAS HAZARDOUS MATERIAL WASTE RELEASED INTO THE ENVIRONMENT: _____

LIST SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED
 USAESCH OE Safety Gi dYfj jgcf Onsite: _____

QUALITY CONTROL ISSUES:

EXCLUSION ZONES
 TIME REQUIRED TO SET UP EXCLUSION ZONES _____ TIME REQUIRED TO BREAK DOWN EXCLUSION ZONES _____
EXCLUSION ZONE VIOLATIONS: YES (IF YES, GIVE DETAILS) or NO
 Name of Individual(s): _____
 License Plate Number: _____ Number of Work Hours Lost Due to Violation: _____
 Comments: _____

SITE VISITORS

NAME / COMPANY	TIME ONSITE	TIME OFFSITE	SUMMARY OF VISIT

EQMT/MATERIAL RECEIVED THIS DATE

	VENDOR	PO#	CHARGE#

CONSTRUCTION AND PLANT EQUIPMENT ON JOB SITE TODAY

	HRS USED	HRS IDLE	PO#

PRODUCTION

DESCRIPTION	DAILY QTY		PREV QTY		TOTAL QTY		COMMENTS
	(actual)	%	(actual)	%	(actual)	%	
Land surveying	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
GPO	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Brush Clearing	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Surface Clearance	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Digital Geophysical Mapping (DGM) Transects	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Anomaly Reacquisition	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Intrusive (DIGS) manual excavation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Intrusive (DIGS) mechanical excavation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
QC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Demolition Operations (BIP)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
MC Sampling	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
MEC Items Recovered	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Munitions Debris Recovered (pounds)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Cultural Debris Recovered (pounds)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

TRANSECT PRODUCTION (for details, see Transect Count worksheet)
 In Progress: _____ Completed: _____
Comments:

PROBLEMS ENCOUNTERED/LESSONS LEARNED:

TTEC SUXOS/Site Manager _____ TTEC UXOSO/UXOQCS _____

DAILY DATA

WEEK #	Daily Report Date	Daily Data	EZ Violations lost time (min)	Comments
1				
2				
3				
4				
5				
6				
7				

TOTALS _____

Intrusive Work Days _____

Avg. count per day _____

_____ HOURS of lost time

 TETRA TECH EC, INC.		INTRUSIVE INVESTIGATION DATA/ MEC ACCOUNTABILITY FORM	
FOR UXO TEAM USE			
Site Name:		Team Leader:	
Grid or Lane Number:	Work Area:	Date:	
Location: X (Lat): _____ Y (Long): _____		Location Type (UW or UG): __	
Other Location Information: _____			
Depth (feet): _____		Inclination (Degrees): _____ Orientation (N-S, E-W): _____	
TARGET/ANOMALY CHARACTERISTICS			
Type of Target/Find:		<input type="checkbox"/> Surface Find	<input type="checkbox"/> Mag & Dig Target
Validation (QA/QC) <input type="checkbox"/> No Dig		<input type="checkbox"/> Primary Geo Target	<input type="checkbox"/>
Type of Anomaly:		<input type="checkbox"/> UXO	<input type="checkbox"/> MEC
		<input type="checkbox"/> Inert	<input type="checkbox"/> Practice
		<input type="checkbox"/> MC (waste)	<input type="checkbox"/> MD (scrap)
		<input type="checkbox"/> Metal Waste	<input type="checkbox"/> No Find
		<input type="checkbox"/> Rock	<input type="checkbox"/> Rust Layer
		<input type="checkbox"/> Oxidation	<input type="checkbox"/> Misc.: _____
Diameter/Width:		Length:	Estimated Weight:
DIGITAL PHOTO RECORD			
Was photo taken? <input type="checkbox"/> Yes <input type="checkbox"/> No		Camera No.:	Frame No.:
File Name:			
MUNITIONS NOMENCLATURE (If Known, Record Below and record fuze condition and disposition)			
Munitions Mark/Mod:	Fuze Mark/Mod:	N.E.W. Total:	
	<input type="checkbox"/> Nose: _____	<input type="checkbox"/> Tail: _____	
	<input type="checkbox"/> Transverse: _____	<input type="checkbox"/> Casing: _____	
MUNITIONS CHARACTERISTICS			
Munitions Filler:		<input type="checkbox"/> Explosive	<input type="checkbox"/> Inert
		<input type="checkbox"/> Propellant	<input type="checkbox"/> Pyrotechnic
		<input type="checkbox"/> Unknown	<input type="checkbox"/> Other: __
Munitions Category:		<input type="checkbox"/> Depth Charges	<input type="checkbox"/> Land Mine
		<input type="checkbox"/> Projectiles	<input type="checkbox"/> Sea Mines
		<input type="checkbox"/> Bombs	<input type="checkbox"/> Grenades
		<input type="checkbox"/> Misc. Explosive Devices	<input type="checkbox"/> Pyrotechnics and Flares
		<input type="checkbox"/> Clusters/Dispensers	<input type="checkbox"/> Guided Missiles
		<input type="checkbox"/> Mortars	<input type="checkbox"/> Rockets
		<input type="checkbox"/> Torpedoes	
FUZE CHARACTERISTICS			
Fuze Location(s) (check all that apply):		Breaks in Fuze Body?	Fuze Markings:
<input type="checkbox"/> Nose <input type="checkbox"/> Tail <input type="checkbox"/> Transverse <input type="checkbox"/> Casing		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Fuzing Type(s):		<input type="checkbox"/> Hydrostatic	<input type="checkbox"/> MT Long Delay
		<input type="checkbox"/> Powder Train Time Fuze	<input type="checkbox"/> Nose MT/Tail Impact Inertia
		<input type="checkbox"/> All-ways Acting	<input type="checkbox"/> Impact
		<input type="checkbox"/> MT Superquick	<input type="checkbox"/> Pressure
		<input type="checkbox"/> Base Detonating	<input type="checkbox"/> Influence
		<input type="checkbox"/> Piezo-Electric	<input type="checkbox"/> Proximity (VT)
		<input type="checkbox"/> Electric	<input type="checkbox"/> Mech Time (MT)
		<input type="checkbox"/> Point Detonating (PD)	<input type="checkbox"/> Nose MT/Tail Pressure
Fuze Length:		Fuze Diameter:	Diameter of Fuze Well:
MEC STATUS & PHYSICAL CONDITION (Check all that apply)			
<input type="checkbox"/> Armed	<input type="checkbox"/> Unarmed	<input type="checkbox"/> Fired	<input type="checkbox"/> Unfired
<input type="checkbox"/> Intact	<input type="checkbox"/> Broken Open	<input type="checkbox"/> Filler Visible	<input type="checkbox"/> Soil Staining
FOR SUXOS USE			
Disposition: (Clarify Under Remarks)			Date:
<input type="checkbox"/> Transferred <input type="checkbox"/> Transported <input type="checkbox"/> Left In Place <input type="checkbox"/> Destroyed			
<input type="checkbox"/> BIP <input type="checkbox"/> Other: _____			
Client Notifications By:	Signature:	Date:	
Transferred To:	Signature:	Date:	
Destroyed By:	Signature:	Date:	
Remarks:			
SUXOS Signature:			Date:



TETRA TECH EC, INC.

PREPARATORY PHASE INSPECTION REPORT

Project Name: _____ Project #: _____ Report No: _____
 UXO Team: _____ Location: _____ Date: _____

I. Definable Feature of Work

- | | | | |
|--|--|--|---|
| <input type="checkbox"/> Project Management | <input type="checkbox"/> Geophysical Mapping | <input type="checkbox"/> Data Management | <input type="checkbox"/> Brush Clearing |
| <input type="checkbox"/> Intrusive Investigation | <input type="checkbox"/> UXO Avoidance | <input type="checkbox"/> Demolition | <input type="checkbox"/> Survey |
| <input type="checkbox"/> Surface Clearance | <input type="checkbox"/> Anomaly Reacquisition | <input type="checkbox"/> Transect Activity | <input type="checkbox"/> MPPEH Mgt. |
| <input type="checkbox"/> GIS Management | <input type="checkbox"/> Mobilization/Demobilization | <input type="checkbox"/> Acceptance Sampling | <input type="checkbox"/> Other: |

II. References (USACE DID's, Corporate references, SOPs, etc.):

III. Personnel Present (employees performing the work) Attach supplemental sheet if necessary

Name	Position	Company

IV. Submittals Reviewed (Work Plan, EHSP, Permits, etc.)

Submittals Reviewed.	Item No. (Rev No.)	Date	Approval Authority

Have all submittals been approved? Yes No

If No, what items have not been submitted/ approved?

Are all submittals on hand? Yes No

If No, what items are missing?

Check approved submittals against delivered material. (This should be done as material arrives.)

Comments:

V. Resources (Personnel & Equipment)

Are adequate resources on hand to effectively conduct work? Yes No

If No, what action will be taken?

VI. Procedures (Project Manger should be involved in this stage of the inspection)

Review contract specifications. (List special requirements such as location accuracy, format for deliverables, etc.)



TETRA TECH EC, INC.

PREPARATORY PHASE INSPECTION REPORT

Project Name: _____ Project #: _____ Report No: _____

UXO Team: _____ Location: _____ Date: _____

Discuss procedure for accomplishing the work (Reference WP Section or SOP).

Clarify any differences (revisions needed).

VII. Resolve Differences (What did you do to resolve outstanding issues/problems)

Comments:

VIII. Testing/ Surveillance

Identify Tests/ Surveillance to be performed, frequency, and by whom.

Where will the testing to take place (in the test bed, at a selected monument, etc.)?

Is the Testing/ Surveillance Plan Adequate?

IX. Safety

Review applicable portion of the Health and Safety Plan.

Has the Activity Hazard Analysis been approved? Yes No

X. Results of Inspection

Acceptable Unacceptable NCR #: _____

Name: _____ Signature: _____ Date: _____

QCM Comments

QCM Review

Concur Non-Concur Signature: _____ Date: _____

XI. Distribution

PM SITE MGR UXOQC SUXOS CLIENT REP



UXO-03 Version 3 4/27/2005



TETRA TECH EC, INC.

INITIAL PHASE INSPECTION REPORT

Project Name: _____ Report No: _____
 Project No: _____ Location: _____ Date: _____

I. Definable Feature of Work

- | | | | |
|--|--|--|---|
| <input type="checkbox"/> Project Management | <input type="checkbox"/> Geophysical Mapping | <input type="checkbox"/> Data Management | <input type="checkbox"/> Brush Clearing |
| <input type="checkbox"/> Intrusive Investigation | <input type="checkbox"/> UXO Avoidance | <input type="checkbox"/> Demolition (BIP) | <input type="checkbox"/> Land Survey |
| <input type="checkbox"/> Surface Clearance | <input type="checkbox"/> Anomaly Reacquisition | <input type="checkbox"/> Transect Activity | <input type="checkbox"/> Scrap Processing |
| <input type="checkbox"/> GIS Management | <input type="checkbox"/> Mobilization/Demobilization | <input type="checkbox"/> BIP Soil Sampling | <input type="checkbox"/> Other: |

II. References (USACE DID's, Corporate references, SOPs, etc.):

III. Personnel Present (employees performing the work) Attach supplemental sheet if necessary

Name	Position	Company

IV. Preparatory Work (equipment set up & testing, EZ set up, logbook entries, etc.)

Is preliminary work complete and correct? Yes No

If No, what action(s) will be taken?

V. Task Execution

Is work being completed in accordance with plans and specifications? Yes No

If No, what corrective action(s) will be taken?

Is workmanship acceptable? Yes No

If No, what action(s) will be taken?

V. Resolve Differences

Comments:



TETRA TECH EC, INC.

INITIAL PHASE INSPECTION REPORT

Project Name: _____ Report No: _____

Project No: _____ Location: _____ Date: _____

VI. Safety (Review work conditions using EHSP and AHAs)

Comments:

VII. Results of Inspection

Acceptable Unacceptable NCR #:

Name: _____ Signature: _____ Date: _____

QC Manager Comments

QC Manager Review

Concur Non-Concur Signature: _____ Date: _____

VIII. Distribution

PM SITE MGR UXOQCS SUXOS CLIENT REP



UXO-04 Version 3 4/27/2005



TETRA TECH EC, INC.

FOLLOW-UP INSPECTION/SURVEILLANCE REPORT

Project Name: _____ Report No: _____
 Project No: _____ Location: _____ Date: _____

I. Definable Feature of Work

- | | | | |
|--|--|--|---|
| <input type="checkbox"/> Project Management | <input type="checkbox"/> Geophysical Mapping | <input type="checkbox"/> Data Management | <input type="checkbox"/> Brush Clearing |
| <input type="checkbox"/> Intrusive Investigation | <input type="checkbox"/> UXO Avoidance | <input type="checkbox"/> Demolition (BIP) | <input type="checkbox"/> Land Survey |
| <input type="checkbox"/> Surface Clearance | <input type="checkbox"/> Anomaly Reacquisition | <input type="checkbox"/> Transect Activity | <input type="checkbox"/> Scrap Processing |
| <input type="checkbox"/> GIS Management | <input type="checkbox"/> Mobilization/Demobilization | <input type="checkbox"/> BIP Soil Sampling | <input type="checkbox"/> Other: |

II. Type of Inspection

- Follow-up Surveillance

II. References (USACE DIDs, Corporate references, SOPs, etc.):

III. Activities/Conditions Observed

Conducted By: _____ Signature: _____ Date: _____

X. UXOQCS Review

- Acceptable Unacceptable NCR #: _____

Comments:

Name: _____ Signature: _____ Date: _____

XI. Distribution

- PM SUXOS UXOSO UXO Quality Manager Client Rep



UXO-05 Version 3 4/27/2005



TETRA TECH EC, INC

DAILY QUALITY CONTROL REPORT

Project Name: _____ Report No: _____

Project No: _____ Location: _____ Date: _____

Sunday Monday Tuesday Wednesday Thursday Friday Saturday

Weather/Precipitation:	High Temperature:	Wind:	Humidity
	Low Temperature:		

I. Personnel Present (Reference/attach superintendent's daily report if applicable)

Name	Position	Company

II. Work Performed

III. Quality Control Activities (Reference/attach inspection/surveillance reports):

IV. Problems Encountered / Corrective Actions Taken

V. Directions Given / Received:

VI. Special Notes / Lessons Learned

VII. Visitors

VIII. Approval

Name and Signature:	Title/Company:	Date:
---------------------	----------------	-------





TETRA TECH EC, INC

NON-CONFORMANCE REPORT

Project Name: _____ Report No: _____

Project No: _____ Location: _____ Date: _____

Description of Process : _____

I. Description of Non-conformance (Items involved: specification, code or standard to which the items do not conform) (Provide sketch if applicable)

Name & Signature of Person Reporting Non-conformance:	Title/Company:	Date:
---	----------------	-------

II. Root Cause Analysis

Immediate Causes: What actions and conditions contributed to this event? Check all that apply:

Substandard Acts

- | | |
|--|---|
| <input type="checkbox"/> Operating equipment without authority | <input type="checkbox"/> Inadequate inspection/peer review |
| <input type="checkbox"/> Failure to follow/improper execution of procedure | <input type="checkbox"/> Poor judgment |
| <input type="checkbox"/> Using equipment improperly | <input type="checkbox"/> Failure to communicate—written and/or verbal |
| <input type="checkbox"/> Improper servicing/maintenance of equipment | <input type="checkbox"/> Acceptance of defective equipment/material |
| <input type="checkbox"/> Under influence of alcohol/drugs | <input type="checkbox"/> Other substandard acts |
| <input type="checkbox"/> Horseplay | |

Substandard Conditions

- | | |
|--|---|
| <input type="checkbox"/> Personnel not properly qualified or trained | <input type="checkbox"/> Inadequate oversight |
| <input type="checkbox"/> Defective equipment/material | <input type="checkbox"/> Inadequate procedure/instruction |

Enter brief explanation of each *immediate cause* below:

Basic Causes: What specific personal or job management system factors contributed to this event? Check all that apply:

Personal Factors

Job Factors

- | | |
|---|---|
| <input type="checkbox"/> Inadequate physical/physiological capability | <input type="checkbox"/> Inadequate leadership and/or supervision |
| <input type="checkbox"/> Inadequate mental/psychological capability | <input type="checkbox"/> Inadequate engineering |
| <input type="checkbox"/> Physical or physiological stress | <input type="checkbox"/> Inadequate purchasing |
| <input type="checkbox"/> Lack of knowledge | <input type="checkbox"/> Inadequate maintenance |
| <input type="checkbox"/> Lack of skill | <input type="checkbox"/> Inadequate tools and equipment |
| <input type="checkbox"/> Improper motivation | <input type="checkbox"/> Inadequate work standards |
| <input type="checkbox"/> Other personal factors | <input type="checkbox"/> Excessive wear and tear |
| | <input type="checkbox"/> Abuse and misuse |
| | <input type="checkbox"/> Change |
| | <input type="checkbox"/> Other job factors |

Enter brief explanation of each *basic cause* below:

Name & Signature of Person Conducting RCA:	Title/Company:	Date:
--	----------------	-------



TETRA TECH EC, INC

NON-CONFORMANCE REPORT

Project Name: _____ Report No: _____

Project No: _____ Location: _____ Date: _____

Description of Process : _____

III. Recommended Disposition *(Provide sketch if applicable)*

Name & Signature of Person Recommending Disposition:	Title/Company:	Date:
--	----------------	-------

IV. Corrective Action Required Not Required

V. Verification of Disposition/Corrective Action Required Not Required

Name & Signature of Person Verifying Disposition/CA:	Title/Company:	Date:
--	----------------	-------

VI. Approvals

<input type="checkbox"/> QCM	<input type="checkbox"/> PM	<input type="checkbox"/> Client	<input type="checkbox"/> Other
Name(Signature):	Name(Signature):	Name(Signature):	Name(Signature):
Date:	Date:	Date:	Date:
<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments	<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments	<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments	<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments

Distribution

PM SITE MGR SUXOS CLIENT UXO Quality Manager



UXO-05 Version 5 10/25/2007

Root Cause Analysis

Both the deficiency and nonconformance report forms contain an area for the entry of information regarding the cause of the problem and proposed resolution. Determining the root cause of a deficiency or nonconformance is an integral part of the QC process. The depth and extent of the root cause analysis depends on the situation; it may be as simple (minor) as an overlooked step or procedure, or it may be quite complicated. Root cause analysis is the responsibility of the UXOQC for quality related items. Input can be obtained as necessary from field personnel and technical advisors in order to identify the factors that led to the problem. RCA is a tool designed to help identify not only *what* and *how* an event occurred, but also *why* it happened. Only when investigators are able to determine why an event or failure occurred will they be able to specify workable corrective measures that prevent future events of the type observed. Understanding why an event occurred is the key to developing effective recommendations and identifying prevention strategies.

Root causes are specific underlying causes.

- The investigator's goal should be to identify specific underlying causes. The more specific the investigator can be about why an event occurred, the easier it will be to arrive at recommendations that will prevent recurrence.

Root causes are those that can reasonably be identified.

- Occurrence investigations must be cost beneficial. It is not practical to keep valuable manpower occupied indefinitely searching for the root causes of occurrences. Structured RCA helps analysts get the most out of the time they have invested in the investigation.

Root causes are those management has control to fix.

- Avoid using general cause classifications such as operator error, equipment failure or external factor. Such causes are not specific enough to allow management to make effective changes. Management needs to know exactly why a failure occurred before action can be taken to prevent recurrence.

Root causes are those for which effective recommendations for preventing recurrences can be generated.

- Recommendations should directly address the root causes identified during the investigation. If the investigator arrives at vague recommendations such as, "Improve adherence to written policies and procedures," then they probably have not found a basic and specific enough cause and need to expend more effort in the analysis process.

The RCA is a four-step process involving the following:

1. Data collection.

- The first step in the analysis is to gather data. Without complete information and an understanding of the event, the causal factors and root causes associated with the event cannot be identified. The majority of time spent analyzing an event is spent in gathering data.

2. Causal factor charting.

- Causal factor charting provides a structure for investigators to organize and analyze the information gathered during the investigation and identify gaps and deficiencies in knowledge as the investigation progresses. The causal factor chart is simply a sequence diagram with logic tests that describes the events leading up to an occurrence, plus the conditions surrounding these events. Preparation of the causal factor chart should begin as soon as investigators start to collect information about the occurrence. They begin with a skeleton chart that is modified as more relevant facts are uncovered. The causal factor chart should drive the data collection process by identifying data needs.

3. Root cause identification.

- After all the causal factors have been identified, the investigators begin root cause identification. This step involves the use of a decision diagram called the Root Cause Map to identify the

underlying reason or reasons for each causal factor. The map structures the reasoning process of the investigators by helping them answer questions about why particular causal factors exist or occurred. The identification of root causes helps the investigator determine the reasons the event occurred so the problems surrounding the occurrence can be addressed.

4. Recommendation generation and implementation.

- The next step is the generation of recommendations. Following identification of the root causes for a particular causal factor, achievable recommendations for preventing its recurrence are then generated. The root cause analyst is often not responsible for the implementation of recommendations generated by the analysis. However, if the recommendations are not implemented, the effort expended in performing the analysis is wasted. In addition, the events that triggered the analysis should be expected to recur. Organizations need to ensure that recommendations are tracked to completion.

Root Cause Analysis Checklist

Activity or Factor	Comment	Completed or N/A
Client Input		<input type="checkbox"/> Completed <input type="checkbox"/> N/A
Evidence of previous occurrence		<input type="checkbox"/> Completed <input type="checkbox"/> N/A
Documentation		<input type="checkbox"/> Completed <input type="checkbox"/> N/A
Schedules and Project Plans		<input type="checkbox"/> Completed <input type="checkbox"/> N/A
Equipment / Machinery		<input type="checkbox"/> Completed <input type="checkbox"/> N/A
Personnel / Staff		<input type="checkbox"/> Completed <input type="checkbox"/> N/A
Measuring / Test Instruments		<input type="checkbox"/> Completed <input type="checkbox"/> N/A
Material		<input type="checkbox"/> Completed <input type="checkbox"/> N/A
Environment / workspace		<input type="checkbox"/> Completed <input type="checkbox"/> N/A
Communication		<input type="checkbox"/> Completed <input type="checkbox"/> N/A

The Root Cause Analysis Checklist provides an overall framework to guide your analysis so you don't overlook an area that contributed to the final solution. The Checklist has 3 columns: 1) Activity or factor, 2) Comment and 3) Completed or not applicable.

As you start to analyze the problem, it determines which activities or factors have any possible bearing on the problem/ Mark the rest as "Not Applicable."

Work your way through the remaining items. For instance, under "client input," you would look into client requirements, complaints, purchase orders, etc., searching for breakdown and causes.

Under "personnel," investigate if workers made a mistake, if they had proper procedures, training, etc.

In the "comments" column, record the findings under each activity or factor and check the completed box.

Additional RCA Tools:

The Five WHYS is a very simple technique that requires the investigator / analyst to ask "WHY?" five consecutive times. This forces the investigation deep into the problem area.

When Useful:

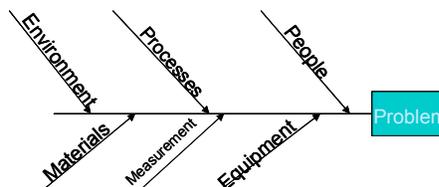
1. At the beginning of an investigation asking five WHYS can get the investigator started.
2. When events are known, but conditions and causal factors are not clear, asking five WHYS can help the investigator / analyst to understand factors relating to the event.
3. When human performance problems are suspected, asking five WHYS forces the investigator / analyst to look deep into the situation for factors associated with inadequate performance or human error.
4. State the problem, causal factor, condition, or other information to be analyzed. Ask WHY that problem, causal factor, condition, or information exists or occurred. Answer the WHY question. Ask WHY the answer is so. Repeat the process until WHY has been asked five times through the sequence. Ask more WHY questions if there is reason to expect useful information in the answers.
5. Continue asking the "WHY" sequences until all problems, causal factors, conditions or other information of interest is analyzed.

Remember the following cautions in using The Five WHYS:

- Answers could become silly. Ensure you are answering the questions properly.
- Be sure you do not follow one track to the exclusion of others. If a WHY question has more than one answer follow each answer separately with follow up WHY questions.
- Don't stop at five WHY questions if the answer indicates further useful information can be obtained. Five is a recommendation not a maximum.

Cause and Effect Diagram

- Cause and Effect Diagram Defined
 - The cause and effect diagram is also called the Ishikawa diagram or the fishbone diagram.
 - It is a tool for discovering all the possible causes for a particular effect.
 - The major purpose of this diagram is to act as a first step in problem solving by creating a list of possible causes.
- Constructing a Cause and Effect Diagram
 - First, clearly identify and define the problem or effect for which the causes must be identified. Place the problem or effect at the right or the head of the diagram.
 - Identify all the broad areas of the problem. Typical starting points are People, Processes, Environment, Equipment, and Materials.
 - Write in all the detailed possible causes in each of the broad areas.
 - Each cause identified should be looked upon for further more specific causes. Use the five whys.
 - Why is that a problem
 - Why is that a problem? and so on until you have done this five times for each step.
 - View the diagram and evaluate the main causes.
 - Set goals and take action on the main causes.





Field Change Request (FCR) Form

Project Name:		Project Number:	
Client:		Request Number: FCR-	
Field Change Request Title:			
I. Description			
II. Reason for Change			
III. Recommended Disposition			
Field Operations Lead (or designee)		Signature	Date
IV. Disposition			
V. <input type="checkbox"/> PESH (FCR Concerns Safety issues) <input type="checkbox"/> QC Manager (FCR Concerns Quality issues)		<input type="checkbox"/> Operations Manager	<input type="checkbox"/> TtEC Project Manager
		<input type="checkbox"/> Client Project Manager	
Name (<i>Signature</i>)	Name (<i>Signature</i>)	Name (<i>Signature</i>)	Name (<i>Signature</i>)
Date	Date	Date	Date
<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments	<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments	<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments	<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments
Comments:	Comments:	Comments:	Comments:
VI. Distribution			
Client Project Manager Project Manager QA/QC Field Operations Lead Project File		Other:	

LESSONS LEARNED REPORT FORM

Client:	Project Number:	
Project:	Location:	
Type Of Project: RI/FS		
I. TOPIC		
II. DESCRIPTION (Narrative of relevant events, problem, impact)		
III. LESSON(S) LEARNED (e.g. Project Specific, Location Specific, Company-wide):		
IV. RECOMMENDED FUTURE ACTION (e.g., Revise Project Procedures, Company Procedures, Additional Training):		
V. EVALUATION BY DEPARTMENT HEAD (e.g., Support Recommendation, Alternate Recommendation):		
VI. List supporting data/ references (if applicable)		
Reference/ Supporting Data:	Location:	
VII. <input type="checkbox"/> PM	<input type="checkbox"/> QCM	<input type="checkbox"/> VP of Munitions Response Operations
Name (<i>Signature</i>)	Name (<i>Signature</i>)	Name (<i>Signature</i>)
Date	Date	Date
<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments Comments:	<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments Comments:	<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments Comments:
VIII. Forward Approved Lessons Learned Report to VP of Support Services		
Name (<i>Signature</i>)	Date	<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Accepted with Comments Comments:



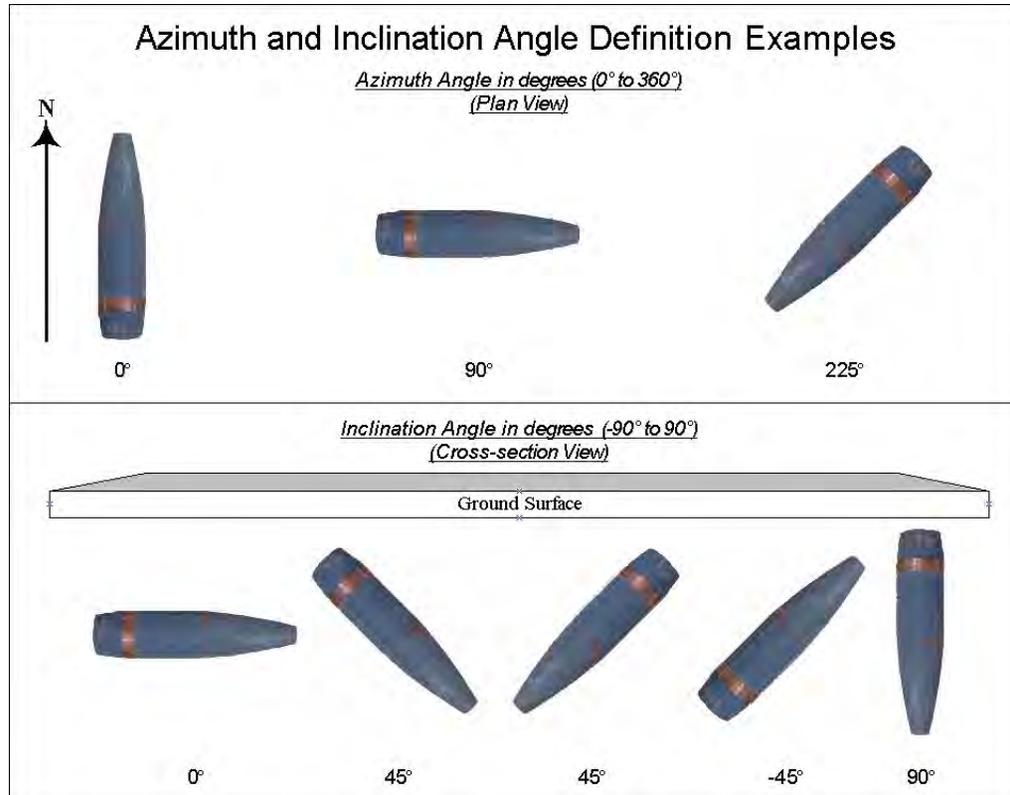
SEEDING CHECKLIST/ LOG



Area	No. of Transects Investigated	No. of Grids for Seeding (minimum @ 10%)	Type of Seed (simulated caliber)	Max Depth	Comments

NOTES:

1. Randomly select Grids from Grids to be investigated
2. Bury inert ordnance items at locations in the randomly selected grids where geophysical surveys or mag and dig operations will be performed.
3. The seeded items should be painted blue and tagged with a non-biodegradable label identifying the items as inert and providing a point of contact address, phone number, and a unique target identifier.
4. The items will be placed at depths and orientations that, when surveyed effectively, will cause instrument responses that indicate the presence of a buried metallic item.
5. A log will be maintained documenting the exact location, depth Azimuth and Inclination of every seeded item.
6. If the seeded item is not detected, a Nonconformance report will be issued and a causal analysis/corrective action will be developed.





TETRA TECH EC, INC.

DAILY INSTRUMENT PROVE-OUT REPORT

Project Name: _____ Project #: _____ Location: _____ Date: _____
 Sunday Monday Tuesday Wednesday Thursday Friday Saturday

I. Test Plot Information

Location: _____

Item Number	Inert Item/Surrogate Description	Depth (inches)	Azimuth/ Inclusion Angle(Degrees)	Comments
1				
2				
3				
4				
5				

II. Instrument Information

Instrument Type/Manufacture	Instrument Serial Number	Test Plot Items Instrument Tested on (List Item Numbers)	Setting On Instrument Tested (As Per WP)	Test Results, <input checked="" type="checkbox"/> indicates good for operation	Personnel Testing Equipment	Comments
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		
				<input type="checkbox"/>		

III. Problems Encountered / Corrective Actions Taken.

explain in space below:

IV. Supervisor

Name and Signature: _____ Title/Company: _____ Date: _____





STOP WORK REQUEST (SWR)

		Stop Work Request No.	
Project:	Project Number:	Contract Number: W912DY-04-0011	Date:
Written Notice Issued to:			
Name:	Title:	Organization:	
Activity:		Location of Work Process:	
Name and Signature of Person Issuing SWR		Title/Company	
Verbal Notice Issued to:			
Name:	Title:	Date/Time Issued:	
NCR Issued:		Non Conformance Report Number:	CAR Issued
<input type="checkbox"/> YES <input type="checkbox"/> NO			<input type="checkbox"/> YES <input type="checkbox"/> NO
Corrective Action Request Number:			
Description of Stop Work Condition: (attach supporting documentation if necessary)			
Remedial Action Required:			
Remedial Action to be completed by:		Date to be Completed	
Remedial Action Determined By:		Name:	Date
<input type="checkbox"/> Responsible Organization <input type="checkbox"/> PESH <input type="checkbox"/> QA/QC <input type="checkbox"/> Operations Manager <input type="checkbox"/> Project Manager			
Follow-up of Remedial Action Taken: (attach supporting documentation)			
Verbal Notice to Resume Operations Given to:			
Name:		Date/Time:	
Stop Work Order Cancellation Authorized by			
Name and Signature of Person Recommending CA		Title/Company	Date



TETRA TECH EC, INC.

OPERATOR PROFICIENCY TEST REPORT

Project Name: _____ Project #: _____ Location: _____ Date: _____
 Sunday Monday Tuesday Wednesday Thursday Friday Saturday

I. Test Plot Information

Location: _____ Total Targets Emplaced: _____ Required Min. _____

II. Instrument/Operator Information

Operator	Instrument Type/ Manu facture	Instrument Serial Number	Total Targets Missed	Results	Comments
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	
				<input type="checkbox"/> Passed <input type="checkbox"/> Failed	

III. Problems Encountered / Corrective Actions Taken.

explain in space below:

IV. Supervisor

Name and Signature: _____

Title/Company: _____

Date: _____



UXO-34 Version 1 05/20/2007



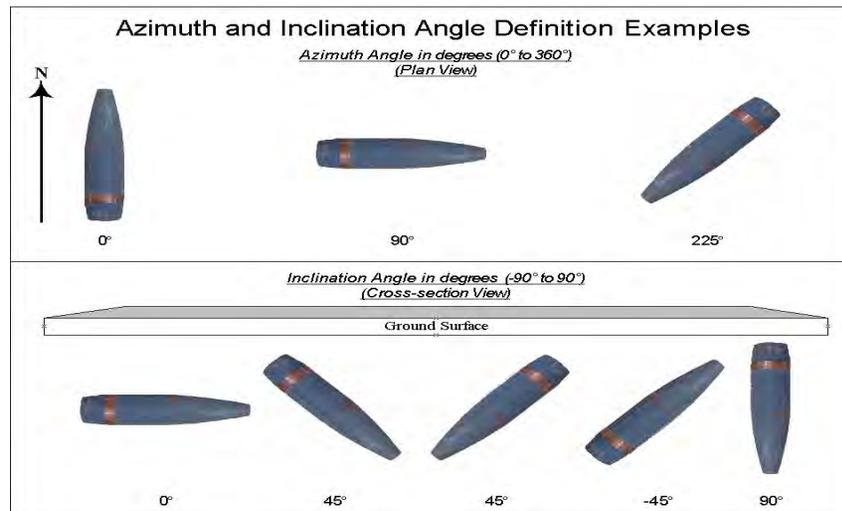
Project Name:

Project No:

Location:

Instructions:

1. The seed items should be painted blue and tagged with a non-biodegradable label identifying the items as inert and providing a point of contact address, phone number, and a unique target identifier.
2. The item should then be photographed with the depth, Azimuth, and Inclination Angle clearly marked on a small white board prior to burial.
3. Holes are excavated with a shovel and/or a small backhoe.
4. The seed items are placed in the respective hole and the depth measured using a rigid measuring tape. Measurements are recorded to the end(s) and/or centroid of each item using a metal bar (or equivalent) placed across the hole at ground level for reference. A picture is taken of the item in the open hole.
5. A DGPS antenna < 3 ft in height above the ground surface is used to survey the x-y-z location of the centroid of each item, and the ends of larger items depending upon the orientation (dip) of the item.
6. The items will be placed at depths and orientations that, when surveyed effectively, will cause instrument responses that indicate the presence of a buried metallic item.
7. This list will be considered confidential information and shall be maintained by the UXO Quality Control Specialist onsite in secured storage.



Item Number	Item Description	Location Ft (N) Ft (E/W)	Exact Location Easting/Northing	Depth (Inches)	Azimuth Angle	Inclination Angle	Comments
1							
2							
3							
4							
5							
6							



TETRA TECH EC, INC.

OPERATOR TEST PLOT SETUP REPORT



Item Number	Item Description	Location Ft (N) Ft (E/W)	Exact Location Easting/Northing	Depth (Inches)	Azimuth Angle	Inclination Angle	Comments
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
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23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							

Note: The setup information for the Instrument Operator Test Plot is strictly confidential and should only be handled by the UXOQCS onsite. If this document is found by other project personnel please contact the UXO Program Quality Manager Don Welch at (256)454-4451 immediately.



TETRATECH EC, INC.

INDIVIDUAL OPERATOR PROFICIENCY TEST SHEET

Project Name:	Project #:	Location:	Date:
<input type="checkbox"/> Sunday <input type="checkbox"/> Monday <input type="checkbox"/> Tuesday <input type="checkbox"/> Wednesday <input type="checkbox"/> Thursday <input type="checkbox"/> Friday <input type="checkbox"/> Saturday			

I. Test Plot Information

Location of Test Strip:	Total Targets Emplaced:	Required Min.
-------------------------	-------------------------	---------------

II. Instrument/Operator Information

Operator	Instrument Type/ Manu facture	Instrument Serial Number

III. Field Test Results

Time Started	Time Completed	Number of Flags Emplaced	Number of Test Items Missed	<input type="checkbox"/> Passed <input type="checkbox"/> Failed

Item	Flagged	Item	Marked
1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

Flagged
 Not Flagged

IV. Problems Encountered / Corrective Actions Taken.

explain in space below:

V. Supervisor

Name and Signature:	Title/Company:	Date:
---------------------	----------------	-------



Root Cause Analysis – Areas of Inquiry Worksheet

This worksheet is meant to be utilized as part of the incident investigation procedure and to determine areas requiring further analysis via root cause analysis (i.e. SCAT Chart, “The 5 Whys”). After conducting the incident investigation and collecting the necessary information, answer the following “Areas of Inquiry” questions providing comments as appropriate to ensure clarification of the answer. Note: It is possible that additional investigation may be identified as necessary during completion of this worksheet.

Summary Statement of the Incident		
Summary;		
A. Personnel		
Question	Response	Comment
1. Wereworkers experienced / trained in the tasks they were assigned to?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
2. Wereworkers performing tasks in accordance with training/project plans/directions provided?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
3. Was the work adequately staffed?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
4. Wereworkers using equipment / tools /PPE/ materials properly?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
5. Wereworkers physically capable of safely performing the work?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
6. Was there evidence of worker fatigue or undue stress?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
7. Was there evidence of possible substance abuse?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	

B. Management		
Question	Response	Comment
1. Was there an adequate process for Identifying safety & health and quality concerns and hazards	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
2. Were safety/quality requirements and expectations effectively communicated to employees?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
3. Was safety/quality involved and integrated into project planning and performance?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
4. Were safety/quality related roles and responsibilities adequately defined, assigned, and communicated?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
5. Were safety/quality requirements effectively monitored and enforced?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
6. Was supervision at the worksite adequate?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
7. Were measures taken to ensure that safety & health hazards and quality concerns would be recognized, evaluated and controlled?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
8. Was management oversight of subs / visitors / other Non-Tt personnel relevant to the work adequate?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	

B. Management (Continued)		
Question	Response	Comment
9. Were regular safety/ quality communications and inspections assigned and implemented?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
10. Were processes in place to address H&S/ quality concerns identified during inspections / communications?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
11. Did project / site management foster effective leadership and example pertaining to health and safety and quality?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
12. Other management related direct causes?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	

C. Task		
Question	Response	Comment
1. Was a task hazard analysis performed (HASP/JSA/ AHA/ other)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
2. Was the task hazard analysis appropriate / complete / communicated?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
3. Was the activity addressed in the HASP/JSA/ AHA/ or other?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
4. Was a safe work practice / procedure available and used?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
5. Was the safe work practice/ procedure appropriate for the task?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
6. Had conditions changed that affected the validity of the safe work practice / procedure?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
7. Were the appropriate equipment, tools, PPE and materials available?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
8. Were they properly used?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
9. Were safety devices available / used / working properly?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
10. Was the task conducted in accordance with relevant project plans?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
11. Were directions outside of the relevant plans given to project personnel?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
12. Were there other task related direct causes?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	

D. Tools / Materials / Equipment		
Question	Response	Comment
1. Were the appropriate materials and equipment identified and used for the task involved in the incident?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
2. Was there an equipment malfunction?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
3. Was the equipment / material used in accordance with the manufacturer's intentions?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
4. Was the equipment / material used in accordance with company policies/procedures and applicable project plans?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
5. Was the equipment / calibrated in accordance with the manufacturer's specifications?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
6. Were there other material / equipment related direct causes?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	

D. Work Environment		
1. Werethere extreme weather conditions in the work area at the time of the incident?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
2. Was housekeeping in the area adequate?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
3. Were there high ambient Noise levels in the work area?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
4. Were there client / other contractor activities ongoing adjacent / concurrent with the Tt work area?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
5. Werethere temperature extremes issues in the work area?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
6. Wasthere adequate illumination in the work area?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
7. Werehazardous substances present in the work environment?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
8. Werethere other environment-related direct causes?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	

5 Why Process

After the investigation has been conducted (interviews, inspection of accident scene, review of documents etc.) answer the question sets in the RCA Areas of Inquiry (AOI) Worksheet to systematically evaluate the data collected and areas for in-depth root cause analysis. Use the table below to document the 5 Why process for each area of inquiry that is relevant to the incident (where answers to a question or group of questions resulted in an undesirable outcome). Rewrite the area of inquiry of concern as a statement rather than a question and ask why. Then continue to ask why to the answers of each proceeding question until you reach root causes. NOTE: There may be two answers to a particular question, in which case you should continue the 5 why process with each answer separately.

Statement:

1. Why?	
2. Why?	
3. Why?	
4. Why?	
5. Why?	

Immediate Causes

What actions and conditions contributed to this event? Check all that apply:

Substandard Acts

<input type="checkbox"/> Operating equipment without authority	<input type="checkbox"/> Horseplay
<input type="checkbox"/> Failure to warn	<input type="checkbox"/> Using equipment improperly
<input type="checkbox"/> Failure to secure	<input type="checkbox"/> Failure to follow procedure/improper execution of procedure
<input type="checkbox"/> Operating at improper speed	<input type="checkbox"/> Personnel NOT properly qualified
<input type="checkbox"/> Making safety devices inOperable	<input type="checkbox"/> Failure to communicate—written and/or verbal
<input type="checkbox"/> Removing safety devices	<input type="checkbox"/> Operating equipment outside of specified parameters
<input type="checkbox"/> Using defective equipment	<input type="checkbox"/> Failure to check equipment prior to acceptance
<input type="checkbox"/> Failure to use PPE properly	<input type="checkbox"/> Acceptance of defective equipment/material
<input type="checkbox"/> Improper loading	<input type="checkbox"/> Failure to provide proper equipment
<input type="checkbox"/> Improper placement	<input type="checkbox"/> Improper servicing/maintenance of equipment
<input type="checkbox"/> Improper lifting	<input type="checkbox"/> Other substandard acts
<input type="checkbox"/> Improper position for task	<input type="checkbox"/> Servicing equipment in operation
<input type="checkbox"/> Under influence of alcohol/drugs	<input type="checkbox"/> Inadequate inspection/peer review
<input type="checkbox"/> Poor judgment	<input type="checkbox"/> Other substandard acts

Substandard Conditions

<input type="checkbox"/> Guards or barriers	<input type="checkbox"/> Exposure to hazardous materials
<input type="checkbox"/> Protective equipment	<input type="checkbox"/> Extreme temperature exposure
<input type="checkbox"/> Tools/equipment or materials	<input type="checkbox"/> Illumination
<input type="checkbox"/> Congestion	<input type="checkbox"/> Ventilation
<input type="checkbox"/> Warning system	<input type="checkbox"/> Visibility
<input type="checkbox"/> Fire and explosion hazards	<input type="checkbox"/> Radiation
<input type="checkbox"/> Poor housekeeping	<input type="checkbox"/> Hazardous environmental conditions
<input type="checkbox"/> NOise exposure	<input type="checkbox"/> Personnel NOT properly qualified or trained
<input type="checkbox"/> Inadequate oversight	<input type="checkbox"/> Inadequate procedure/instruction
<input type="checkbox"/> Defective equipment/material	<input type="checkbox"/> Other substandard conditions

Enter brief explanation of each **immediate cause** below:

Basic Causes	
What specific personal or job management system factors contributed to this event? Check all that apply:	
Personal Factors	Job Factors
<input type="checkbox"/> Inadequate physical/physiological capability	<input type="checkbox"/> Inadequate leadership and/or supervision
<input type="checkbox"/> Inadequate mental/psychological capability	<input type="checkbox"/> Inadequate engineering
<input type="checkbox"/> Physical or physiological stress	<input type="checkbox"/> Inadequate purchasing
<input type="checkbox"/> Lack of kNOwledge	<input type="checkbox"/> Inadequate maintenance
<input type="checkbox"/> Lack of skill	<input type="checkbox"/> Inadequate tools and equipment
<input type="checkbox"/> Improper motivation	<input type="checkbox"/> Inadequate work standards
<input type="checkbox"/> Other personal factors	<input type="checkbox"/> Excessive wear and tear
	<input type="checkbox"/> Abuse and misuse
	<input type="checkbox"/> Change
	<input type="checkbox"/> Other job factors
Enter brief explanation of each basic cause below:	



TETRA TECH EC, INC.

VEHICLE/HEAVY EQUIPMENT INSPECTION CHECKLIST – Attachment 2

Project:	_____	Equipment Type:	_____
Equipment No.:	_____	Model:	_____
Manufacturer:	_____	Date:	_____
Engine	_____		
Hrs/Mileage	_____	Team Number:	_____

Equipment Checklist (Check all that apply and provide description of corrections needed)

	Condition Good	Correction Needed
Steering	_____	_____
Service Brakes	_____	_____
Emergency Brakes	_____	_____
Retarder	_____	_____
Transmission	_____	_____
Controls	_____	_____
Hydraulic Leaks	_____	_____
Exhaust System	_____	_____
Warning Gauges	_____	_____
Windshield	_____	_____
Lights	_____	_____
Mirrors	_____	_____
Seat and Seat Belts	_____	_____
Tires/Tread	_____	_____
Regular Horn	_____	_____
Back-up Alarm	_____	_____
Steps, Hand-holds	_____	_____
Fire Extinguisher	_____	_____
Rollover Cage	_____	_____
Other:	_____	_____
Other:	_____	_____
Remarks:		

Approvals

Operator's Signature (Team Leader):	Date:
SUXOS Signature:	Date:
Equipment Supervisor's Signature (Repairs or Adjustments Completed):	Date:

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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Tetra Tech EC Inc DAILY OPERATIONS REPORT

Date:

CONTRACT & PROJECT NO	Project Title: Project Location:	REPORT #
AM WEATHER CONDITIONS	PM WEATHER CONDITIONS	MAX. TEMP. MIN. TEMP.

WORK PERFORMED TODAY

WORK LOCATION AND DESCRIPTION	EMPLOYER	NO.	TRADE	HRS
1.				

JOB SAFETY	Was a Job Safety Meeting held this date?	Total Work Hours On Job Site This Date:
	Were there any lost time accidents this date?	Cumulative Total of Previous Work Hrs:
	Was Trenching / Scaffolding / Electrical Work Done?	Total Hrs From Start of project:
Was Hazardous Material Waste released into the environment?		

List Safety Actions Taken Today / Safety Inspection Conducted:

EQUIPMENT / RENTALS	VENDOR	P.O. #	CHARGE #	UNIT RATE	HRS	INCURED COST	
MATERIALS / SUPPLIES RECEIVED	VENDOR	P.O. #	CHARGE #	UNIT RATE	QTY REC'D	INCURED COST	P.O. QTY
NEW ONGOING COSTS	VENDOR	P.O. #	CHARGE #	First or Last Day	UNIT RATE		
SUB. / SERVICES DESCRIPTION	VENDOR	P.O. #	CHARGE #	F/P or L/S (type)	COST INCUR	% COMPLETE	ACCU M % COMP LETE

Comments:

ID	DESCRIPTION	GRID/TRANSECT	GRID COORDINATES	DEPTH	ORIENTATION	TYPE

TETRA TECH EQUIPMENT MAINTENANCE/REPAIR

MAINTENANCE/REPAIR NO. _____

NECESSARY ATTACHMENTS _____ PACKING SLIP, and/or _____ MRR, abd _____ LOGS

TYPE OF EQUIPMENT	SERIAL NO.			
MAKE:	MODEL:			
P O NUMBER	DELIVERY ORDER NO.			
STANDARD MAINTENANCE	DATE			
DESCRIPTION OF PROBLEM (if any)				
_____ _____ _____				
MAINTENANCE/REPAIRS TO BE PERFORMED				
IN-HOUSE REPAIRS	DATE			
SENT OUT TO	COST ESTIMATE AIRBILL NO. P O NO. DATE RET'D			
CORRECTIVE ACTION				
_____ _____ _____ _____				
PARTS LIST				
PART DESCRIPTION	Q	UANTITY	CO	ST/EA
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
TOTAL LABOR (hours)			DATE	
PERFORMED BY				
RETURNED TO WHICH JOB SITE/WAREHOUSE				

EXPLOSIVE DISPOSAL LOG

Project Information

Project Name: _____ Start Time: _____
Project _____ Stop time: _____

MEC and/or MPPEH Disposed of on this date (List items, quantity of each item, transect #, NEW)

Donor explosives used (List types, quantity, and NEW)

Remarks

Approval

Demolition Supervisor: _____ Date: _____



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APPENDIX C

GRID SHEET

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Tetra Tech EC, Inc.
Nomans Land Island
Quality Control Inspection
Grid Follow-Up Inspection

Inspection Item	Date	Pass	Fail	Comments
Grid number:				
1. Grid sheet completed				
2. QC check of H&S equipment				
3. Personnel in proper PPE				
4. All Surface MEC removed				
5. All flags removed				
6. MEC staged				

Signature: _____ Date: _____

**RECOVERY OPERATIONS COMPLETED 30 JUL 98 / UXO STAGED
NOMANS LAND ISLAND GRID SHEET**

Grid Number: _____ **UXO Specialist:** _____ **Date:** _____

NORTH

W
E
S
T

E
A
S
T

SOUTH

GRID	DATE	NUM	DESCRIPTION	QTY	PHOTO NO.	COND CODE
		1				
		2				
		3				
		4				
		5				

CONDITION CODES: LS=LIVE SAVE TO MOVE LNS=LIVE NOT SAFE TO MOVE I=INERT

NOMANS LAND ISLAND GRID SHEET

Grid Number: _____ UXO Specialist: _____ Date: _____

GRID	DATE	NUM	DESCRIPTION	QTY	PHOTO NO.	COND CODE
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				

CONDITION CODES: LS=LIVE SAVE TO MOVE LNS=LIVE NOT SAFE TO MOVE I=INERT

GRID	DATE	NUM	DESCRIPTION	QTY	PHOTO NO.	COND CODE
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

CONDITION CODES: LS=LIVE SAVE TO MOVE LNS=LIVE NOT SAFE TO MOVE I=INERT

APPENDIX D
MDAS CERTIFICATION MANIFEST

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GENERAL		Material Documented As Safe (MDAS) Certification Manifest					
		1. Generator's Name and Mailing Address				1.a Generator's Ph # ()	
		2. Project Location				2.a Project Ph # ()	
		3. MPPEH Contractor Name and Mailing Address				3.a MPPEH Contractor Ph # ()	
		4. Government Assigned Verification Name and Mailing Address				4.a Certifier Ph # ()	
		5. Transporter 1 Name and Mailing Address				5.a Transporter 1 Ph # ()	
		6. Transporter 2 Name and Mailing Address				6.a Transporter 2 Ph # ()	
		7. Recycler Name and Mailing Address				7.a Recycler Ph # ()	
MEC Contractors and Government Certifier		8. Security Seal #	9. Gross Wt. (Lbs)	10. Tare Wt (Lbs)	11. Net Wt. (Lbs)	12. Weight Ticket #	
		13. Description		14. Material	15. Quantity	16. Unit (Wt., Vol)	
Transmitters		MDAS CERTIFICATION					
		This certifies that the Material Potentially Presenting and Explosive Hazard listed has been 100% properly inspected and to the best of my knowledge and belief, does not present an explosion hazard					
		17. Senior UXO Supervisor (or designee) Certification					
		Signature		Address		Date	
		Printed/Typed Name				Phone	
		18. TTEC UXOQC Inspector Verification					
		Signature		Address		Date	
		Printed/Typed Name				Phone	
		19. Transporter 1 Acknowledgement of Receipt of Materials (Receiving Signature Verifies that Container was Received with Seal Intact)					
		Signature		Address		Date	
Printed/Typed Name				Phone			
20. TTEC Acknowledgement of Receipt of Materials (Signature Verifies that Container was Received with Seal Intact and Contents Loaded to Transporter 1)							
Signature		Address		Date			
Printed/Typed Name				Phone			
21. Transporter 2 Acknowledgement of Receipt of Materials (Receiving Signature Verifies that Drums were Received with Seals Intact)							
Signature		Address		Date			
Printed/Typed Name				Phone			
22. Discrepancy Indication Space							
Signature		Address		Date			
Printed/Typed Name				Phone			
Demil / Recycle Facility		23. Recycler Acknowledgement of Receipt of Materials (Receiving Signature Verifies that Drums were Received with Seal Intact)					
		Signature		Address		Date	
		Printed/Typed Name				Phone	
		DEMILITARIZATION CONFIRMATION					
		This certifies and verifies that each item or items contained have been demilitarized to the minimum requirements of DOD 4160-M-1, Defense Department Demilitarization Trade Security Control Manual.					
		24. Recycler					
		Signature		Signature		Signature	
		Printed/Typed Name		Printed/Typed Name		Printed/Typed Name	
		25. TTEC UXO Technician Inspector Certification					
		Signature		Signature		Signature	
Printed/Typed Name		Printed/Typed Name		Printed/Typed Name			
26. Senior UXO Supervisor Verification							
Signature		Signature		Signature			
Printed/Typed Name		Printed/Typed Name		Printed/Typed Name			
27. Final Disposition							

GENERAL	Material Documented As Hazardous (MDAH) Certification Manifest					
	1. Generator's Name and Mailing Address				1.a Generator's Ph # ()	
	2. Project Location				2.a Project Ph # ()	
	3. MPPEH Contractor Name and Mailing Address				3.a MPPEH Contractor Ph # ()	
	4. Government Assigned Verification Name and Mailing Address				4.a Certifier Ph # ()	
	5. Transporter 1 Name and Mailing Address				5.a Transporter 1 Ph # ()	
	6. Transporter 2 Name and Mailing Address				6.a Transporter 2 Ph # ()	
7. Recycler Name and Mailing Address				7.a Recycler Ph # ()		
MEC Contractors and Government Certifier	8. Security Seal #	9. Gross Wt. (Lbs)	10. Tare Wt (Lbs)	11. Net Wt. (Lbs)	12. Weight Ticket #	
	13. Description		14. Material		15. Quantity	16. Unit (Wt., Vol)
	MDAH CERTIFICATION					
	This certifies that the Material Potentially Presenting and Explosive Hazard listed has been 100% properly inspected and to the best of my knowledge and belief, presents an explosion hazard					
	17. Senior UXO Supervisor (or designee) Verification					
	Signature		Address		Date	
	Printed/Typed Name				Phone	
	18. TTEC UXO UXOQC Inspector Certification					
Signature		Address		Date		
Printed/Typed Name				Phone		
Transporters	19. Transporter 1 Acknowledgement of Receipt of Materials (Receiving Signature Verifies that Container was Received with Seal Intact)					
	Signature		Address		Date	
	Printed/Typed Name				Phone	
	20. TTEC Acknowledgement of Receipt of Materials (Signature Verifies that Container was Received with Seal Intact and Contents Loaded to Transporter 1)					
	Signature		Address		Date	
	Printed/Typed Name				Phone	
	21. Transporter 2 Acknowledgement of Receipt of Materials (Receiving Signature Verifies that Drums were Received with Seals Intact)					
	Signature		Address		Date	
	Printed/Typed Name				Phone	
	22. Discrepancy Indication Space					
Signature		Address		Date		
Printed/Typed Name				Phone		
Demil / Recycle Facility	23. Recycler Acknowledgement of Receipt of Materials (Receiving Signature Verifies that Drums were Received with Seal Intact)					
	Signature		Address		Date	
	Printed/Typed Name				Phone	
	DEMILITARIZATION CONFIRMATION					
	This certifies and verifies that each item or items contained have been demilitarized to the minimum requirements of DOD 4160-M-1, Defense Department Demilitarization Trade Security Control Manual.					
	24. Recycler					
	Signature		Signature		Signature	
	Printed/Typed Name		Printed/Typed Name		Printed/Typed Name	
	25. TTEC UXO Technician Inspector Certification					
	Signature		Signature		Signature	
Printed/Typed Name		Printed/Typed Name		Printed/Typed Name		
26. Senior UXO Supervisor Verification						
Signature		Signature		Signature		
Printed/Typed Name		Printed/Typed Name		Printed/Typed Name		
27. Final Disposition						

APPENDIX E

UXO DEMOLITION PROCEDURES STANDARD OPERATING PROCEDURE

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1. This Standard Operating Procedure (SOP) provides the basic demolition procedures that are specific to Nomans Land Island. An SOP cannot cover every possible contingency, but is a general guide to safely accomplish demolition operations. This SOP will be used in conjunction with approved site work and safety plans as well as those documents referenced therein.
2. All personnel assignments, qualifications and positions will be in accordance with DDESB TP 18. The Senior UXO Supervisor (SUXO) is responsible for planning, directing and executing all explosive disposal operations and ensuring the safety of all personnel.

A minimum of three (3) UXO specialists will be used in conducting explosive ordnance disposal operations. The UXOSO/QCS will serve as safety observer, the SUXO or Demolition Supervisor and his assistant will perform the demolition set up and fire the shot.

The UXOSO/QCS will ensure that all work is done safely and IAW approved procedures.

3. When it becomes necessary to perform demolition operations the SUXO will make the required notifications and begin the Explosive Disposal Activities Checklist (page 12). The SUXO will give the MEC accountability sheets (page 15) to the Demolition Supervisor for those items to be disposed of, and the Explosive Disposal Log (page 13).

The Demolition Supervisor will gather his team and, with the UXOSO/QCS and SUXO, brief the operation. Because the island is the exclusion zone it is not necessary to close roads or set barricades. It is, however, necessary to ensure there are no boats or air traffic within the exclusion zone. Safety precautions will be briefed using pages 8-11 of this SOP as well as the approved WP and HASP.

We will be using a radio controlled firing device (RFD) coupled with a Nonel/ Shock Tube initiation system which will allow the greatest degree of control and safety available. The RFD will be tested prior to being deployed. All personnel will be trained on the use of the RFD prior to performing demolition operations.

Equipment checklists (pages 6 and 7) will be utilized to ensure all disposal and safety equipment is available.

Copies of the Site Specific Work Plan and the Health and Safety Plan will be available to the Demolition Team and used in conjunction with this SOP.

4. Transportation and communication are critical to the successful accomplishment of demolition operations. Explosives will be transported and delivered to the island by the explosives vender (Pioneer). We will receive the explosives and place them in our day box for transportation to the demolition area. At the conclusion of demolition we will return any unused material to the explosives vender for storage at his site.

Two forms of communication will be available prior to performing demolition operations. We will use handheld radios as the primary means with cell phones as a backup.

5. Disposal operations will only be conducted during daylight hours. The weather forecast will be checked prior to conducting demolition operations. Operations will be cancelled upon the approach of inclement weather and/or lightening.

6. The following steps will be observed in the preparation of a Nonel/Shock Tube firing system.
 - a. Determine the length of shock tube required to keep the RFD receiver out of harm's way. Ensure all cuts made to the shock tube are square and cap the cut ends or cover them with tape. Keep the number of splices in a shock tube firing system to a minimum. Every splice reduces the reliability of the system.
 - b. Place Nonel initiator under a barricade, i.e. sandbag, in a hole in the ground, etc., and lay out its attached shock tube. Depending on the set up, you may attach the initiator to a bunch block if there will be multiple shots or you may splice directly to the shock tube lead-in-line.
 - c. Attach the shock tube lead-in-line to the RFD igniter and plug the igniter into the RFD receiver. Ensure the RFD is set up in the shock tube mode and the key is in the on position.
 - d. After the initiator has been set up, check the set up of the shot to determine proper placement of the donor charge. When satisfied with the setup, ask the SUXO for permission to prime the shot.
 - e. Once permission has been received to prime, remove the initiator from under the barricade and prime the shot. Once the shot is primed, return to safe area.
 - f. At the safe area the five (5) minute stand-by will start. Personnel assigned to watch the air and water will report all clear, if that is the case. Any boat or air traffic in the area will necessitate stopping demolition operations until they have cleared the exclusion zone.
 - g. At the four (4) minute mark another check will be made to ensure all is clear to fire. The RFD transmitter will be turned on and the demolition supervisor will observe the self check of the system.
 - h. At the expiration of the five (5) minutes, if all is clear, the demolition supervisor will fire the shot. Turn the RFD transmitter off and remove the key after the shot is fired.
 - i. There will be a five (5) minute wait prior to going down range to check the shot. The Demolition Supervisor and the UXOSO/QCS will check the area to ensure all items were consumed and look for any kick-outs. The team will be called in when all is clear to pick up fragments.
7. With any system there is always the possibility of misfire. If a misfire condition presents itself, the demolition supervisor will take steps necessary to isolate the problem.
 - a. With a shock tube system the igniter is most often the cause. If after two (2) or three (3) attempts the shot will not fire, a wait time of one (1) hour will be observed.
 - b. After the wait time, the UXOSO/QCS and Demolition Supervisor will proceed down range to check the system beginning with the RFD receiver. Ensure the power is on and the system is configured properly. If there is no obvious problem turn off the receiver and unplug the igniter.
 - c. Cut a section of shock tube from the system near the igniter. Hold one end over the palm of your hand and gently blow out the contents of the shock tube. If a fine powder is blown from the tube, it igniter is likely the cause of the misfire. If nothing is in the shock tube, the problem is further down the line. There may be a blow out in the shock tube or a failure of the initiator.
 - d. Once the cause has been determined, take the steps necessary to fix the system or build up another complete system leaving the original in place. Perform steps 6.a. through 6.i. again.
8. After the successful completion of the shot the demolition supervisor will communicate the all clear to all personnel and complete all the required reports.

DEMOLITION EQUIPMENT CHECKLIST

Date _____	Disposal Supervisor _____
------------	---------------------------

EQUIPMENT	QUANTITY	COMMENTS
Explosive Vehicle		
Personnel Vehicle		
Camcorder/digital camera		
Siren		
Air Horn		
Bravo Flag (Red)		
Handheld Radios		
Cellular Telephone		
Electronic Firing Device		
Radio Controlled Firing Device		
Ruler, 24-inch		
Schonstedt locator		
Shovel, round point, long handle		
Shovel, round point, short handle		
Blasting Machine		
Tape, duct		
Tape, measuring, 50- or 100-meter		
Tape, plastic		
Toolbox, general hand tools		
Galvanometer		
Firing Wire		
Demolition Kit		
Knife		

HEALTH AND SAFETY EQUIPMENT CHECKLIST

Date _____	Disposal Supervisor _____
------------	---------------------------

ITEM	QUANTITY	COMMENTS
Air horn, emergency		
Burn Blanket		
Burn kit		
Emergency eye wash		
Fire blanket		
Fire extinguisher, 10-pound ABC		
Bloodborne Pathogen Kit		
First aid kit		
Gloves, leather		
Goggles		
Face Shield		
Welders' Gloves		
Welders' Apron		
Rain suit		
Safety vest		
Stretcher		
Water, 5-gal bottle (emergency shower)		
Water, drinking- 1 liter per person		

General Safety Precautions

- Carry blasting caps in approved containers and keep them out of the direct rays of the sun. Keep the caps located at least 25 feet from other explosives until they are needed for priming.
- Do not work with electric blasting caps or other electro-explosive devices while wearing clothing prone to producing static electricity such as nylon, silk, synthetic hair, etc..
- Do not use explosives or accessory equipment that are obviously deteriorated or damaged. They may cause premature detonation or fail completely.
- Always point the explosive end of blasting caps, detonators, and explosive devices away from the body during handling.
- Use only standard blasting caps of at least the equivalent of a commercial No. 8 blasting cap.
- Use electric blasting caps of the same manufacturer for each demolition shot involving more than one cap.
- Do not use improvised methods for initiating blasting caps.
- Do not bury blasting caps. Use detonating cord to transmit the explosive wave from the blasting caps, on the surface, to a buried/tamped explosive charge. Buried blasting caps are subject to unobserved pressures and movement, which could lead to premature firing or misfires.
- Test electric-blasting caps for continuity at least 50 feet from any other explosives prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be shunted by twisting the bare ends of the wires together. The wires will remain shunted until ready to be connected to the firing circuit.
- In the event of a misfire when disposing of explosives by detonation, do not approach the disposal site for at least 30 minutes after the expected detonation time, when firing electrically. When conducting non-electric procedures, the wait time will be at least one hour from the expected time of detonation.
- Items with lugs, strong backs, tail-booms, base plates, etc., should be oriented away from personnel locations.
- Consideration should be given to tamping the UXO to control fragments, if the situation warrants. Fragments will be minimized not only to protect personnel but also property, such as buildings, trees, etc.
- Avoid inhaling the smoke, dust or fumes of burning pyrotechnic or incendiary materials. The smoke, dust and fumes from many of these materials are irritating and/or toxic if inhaled.
- Do not use water on incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the mixture.
- Anticipate a high order detonation when burning pyrotechnic or incendiary-loaded MEC. Safety measures for personnel and property must be based upon this possibility.
- Inert ordnance will not be disposed of, or sold for scrap, until the internal fillers have been exposed and unconfined. Heat generated during a reclamation operation can cause the inert filler, moisture, or air to expand and burst the sealed casings. Venting or exposure may be accomplished in any way necessary to preclude rupture due to pressure from being confined. All requirements of the UXO

Procedure for the Management and Disposition for Material Potentially Presenting an Explosive Hazard (MPPEH) will be met prior to releasing any inert ordnance material.

- Maintain minimum safe distances between electromagnetic-radiating sources and electro-explosive devices in accordance with EODB/TM-TO 60A-1-1-12.
- Do not conduct blasting or demolition operations during an electrical, dust, sand or snowstorm of severe enough to produce atmospheric static electrical charges, or when such a storm is nearby (within 10 miles). Under such conditions, all operations will be suspended or terminated, cap and lead wires shunted, and personnel removed from the demolition area. Demolition operations will also be terminated if visibility becomes less than 600 feet.
- Loose initiating explosives: lead azide, mercury fulminate, lead styphnate, and tetracene. These explosives manifest extreme sensitivity to friction, heat, and impact. Extra precautions are required when handling these types of explosives. Keep initiating explosives in a water-wet condition at all times until ready for final preparation for detonation. Sensitivity of these explosives is greatly increased when dry.
- Exercise extreme care when handling and preparing high explosives for detonation. They are subject to detonation by heat, shock or friction.
- Do not pack bomb fuze wells with explosives unless it can be positively confirmed that the fuze well does not contain any fuze components.
- Photo flash bombs must be handled with the same care as black powder filled munitions.
- MEC containing white phosphorous will not be detonated into the ground. White phosphorous munitions will be counter-charged on the bottom centerline (CCBC) when possible.
- A search of the detonation site, after the demo operation, will be conducted to assure complete disposal was accomplished.
- Do not abandon any explosives.
- Do not leave explosives, empty cartridges, boxes, liners or other materials used in the packing of explosives lying around where children, unauthorized persons or livestock can get at them.
- Do not allow any wood, paper or other materials used in packing explosives to be burned in a stove, fireplace or other confined space, or be re-used for any other purpose. Such materials will be destroyed by burning at an isolated location out of doors, with no one allowed within 100 feet of the burning operation.
- Do not fight fires involving explosive material. Evacuate all personnel to a safe location and secure the area.
- Know and observe federal, state, and local laws/regulations, which apply to the transportation, storage and use of explosives.
- Do not permit metal, except approved metal truck bodies, to contact explosive containers.
- Do not transport metal, flammable, or corrosive substances with explosives.
- Do not allow smoking, or the presence of unauthorized personnel, in vehicles transporting explosives.
- Carefully load and unload explosives from vehicles. Never throw or drop explosives from the vehicle.
- Assure the load is blocked and braced to prevent it from movement and displacement.

- Do not drive vehicles containing explosives over public highways until all permits and certifications have been obtained from the state enforcement agencies.
- All routes must be approved in writing prior to transporting explosive materials over public highways.
- Licensed commercial carriers will conduct the shipment of explosive materials over public highways unless Tetra Tech UXO personnel have been specifically licensed and certified to make the shipment.
- Never leave vehicle loaded with explosives unattended.
- Do not store blasting caps, detonators, or other items containing initiating explosives in the same box, container or magazine with other explosives.
- Store explosive materials in military or ATF approved magazines only. Ensure the magazines used for the storage comply with quantity distance requirements, for the class of explosive material they contain. Reference documents include: OP-5, TM 9-1300-206, AMCR 385-100, ATF - Explosives Law and Regulation, ATF P 5400.7 and 49 CFR.
- Do not store spark-producing metal/tools in an explosive magazine.
- Do not permit smoking, matches or any source of fire or flame within 100 feet of 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 within 300 feet of an explosive magazine.
- Do not use any alkaline material such as lye, washing soda, or soap to remove TNT exudate. Alkaline materials will react with TNT to render it more sensitive.
- Do not permit smoking, matches or other sources of fire or flame within 100 feet of an area in which explosives are being handled.
- Do not expose explosives or devices containing explosive to prolonged exposure to direct sun light. Such exposure can increase sensitivity and deterioration.
- Ensure all unused explosives are returned to their proper containers and the container closed after use.
- Do not carry explosives or explosive components in pockets or on the body.
- Do not insert anything but time fuse or detonating cord into the open end of a blasting cap.
- Do not strike, tamper with, or attempt to remove or investigate the contents of an electric/non-electric blasting cap, detonator or other explosive initiating device. A detonation may occur.
- Do not pull on the electrical lead wires of electric blasting caps, detonators or their electro-explosive devices. A detonation may occur.
- Do not attempt to remove an unfired or misfired primer or blasting cap from a base coupling. There is a high risk of an explosion.
- Do not allow unauthorized or unnecessary personnel to be present when explosives are being handled.
- Always point the explosive end of blasting caps, detonators and other explosive devices away from the body.
- Do not use pull rings or safety pins to lift or handle explosive devices.

DISPOSAL OPERATIONS CHECKLIST

Date _____	Team _____
------------	------------

FUNCTION	DATE/TIME	SIGNATURE
Senior UXO Supervisor		
Assign Disposal Team		
Brief Disposal Team Review emergency procedures Discuss MEC to be disposed Describe Disposal procedures		
Inspect Range/Exclusion zone upon completion of operations		
Disposal Supervisor		
Verify Bravo Flag is hoisted (dedicated range)		
Verify roads are closed		
Verify exclusion zone boundaries in place		
Complete health and safety and equipment checklists		
Ensure site office has completed the verification checklist Responsible activity Medical Facility Fire Department Security/Police Department		
Disposal Supervisor tailgate safety brief: Designate emergency vehicles Designate emergency evacuation route Review emergency response procedures		
Verify daily equipment inspection		
Verify detonators are separated from explosives		
Verify area has been evacuated		
Notify site office operations are commencing		
Start Disposal activities		
Inspect shot after designated wait time		
Collect all metal fragments for later disposal		
QC check performed		
Stop disposal activities		
QA check (if required)		
Tetra Tech site office will notify the following upon completion: Notify Client Responsible Activity Medical Facility Fire Department Security/Police Department		
Complete MEC Accountability Log		
Demobilize		
Record data in Explosive Disposal Log		



TETRA TECH EC, INC

MEC INTRUSIVE DATA AND ACCOUNTABILITY FORM

FOR UXO TEAM USE

Site Name: Nomans Land Island Range Clearance		Team Leader:
Grid or Lane Number:	Work Area: Range	Date:
Location: X (Lat): _____	Y (Long): _____	Location Type (UW or UG): _____
Other Location Information: _____		
Depth (feet): _____	Inclination (Degrees): _____	Orientation (N-S, E-W): _____

TARGET/ANOMALY CHARACTERISTICS

Type of Target/Find:	<input type="checkbox"/> Surface Find	<input type="checkbox"/> Mag & Dig Target	<input type="checkbox"/> Primary Geo Target	<input type="checkbox"/> Validation (QA/QC)	<input type="checkbox"/> No Dig
Type of Anomaly:	<input type="checkbox"/> UXO	<input type="checkbox"/> MEC	<input type="checkbox"/> Inert	<input type="checkbox"/> Practice	<input type="checkbox"/> MC (waste)
	<input type="checkbox"/> No Find	<input type="checkbox"/> Rock	<input type="checkbox"/> Rust Layer	<input type="checkbox"/> Oxidation	<input type="checkbox"/> Misc.: _____
Diameter/Width:	Length:	Estimated Weight:			

DIGITAL PHOTO RECORD

Was photo taken? <input type="checkbox"/> Yes <input type="checkbox"/> No	Camera No.:	Frame No.:	File Name:
---	-------------	------------	------------

MUNITIONS NOMENCLATURE (If Known, Record Below and record fuze condition and disposition)

Munitions Mark/Mod:	Fuze Mark/Mod:	N.E.W. Total:
	<input type="checkbox"/> Nose: _____	
	<input type="checkbox"/> Tail: _____	
	<input type="checkbox"/> Transverse: _____	
	<input type="checkbox"/> Casing: _____	

MUNITIONS CHARACTERISTICS

Munitions Filler:	<input type="checkbox"/> Explosive	<input type="checkbox"/> Inert	<input type="checkbox"/> Propellant	<input type="checkbox"/> Pyrotechnic	<input type="checkbox"/> Unknown	<input type="checkbox"/> Other: _____
Munitions Category:	<input type="checkbox"/> Depth Charges	<input type="checkbox"/> Land Mine	<input type="checkbox"/> Projectiles	<input type="checkbox"/> Sea Mines	<input type="checkbox"/> Bombs	<input type="checkbox"/> Grenades
	<input type="checkbox"/> Misc. Explosive Devices	<input type="checkbox"/> Pyrotechnics and Flares	<input type="checkbox"/> Small Arms	<input type="checkbox"/> Clusters/Dispensers	<input type="checkbox"/> Guided Missiles	<input type="checkbox"/> Mortars
	<input type="checkbox"/> Rockets	<input type="checkbox"/> Torpedoes				

FUZE CHARACTERISTICS

Fuze Location(s) (check all that apply):	Breaks in Fuze Body?	Fuze Markings: None
<input type="checkbox"/> Nose <input type="checkbox"/> Tail <input type="checkbox"/> Transverse <input type="checkbox"/> Casing	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Fuzing Type(s):	<input type="checkbox"/> Hydrostatic	<input type="checkbox"/> MT Long Delay
<input type="checkbox"/> All-ways Acting	<input type="checkbox"/> Impact	<input type="checkbox"/> MT Superquick
<input type="checkbox"/> Base Detonating	<input type="checkbox"/> Influence	<input type="checkbox"/> Piezo-Electric
<input type="checkbox"/> Electric	<input type="checkbox"/> Mech Time (MT)	<input type="checkbox"/> Point Detonating (PD)
	<input type="checkbox"/> Powder Train Time Fuze	<input type="checkbox"/> Nose MT/Tail Impact Inertia
	<input type="checkbox"/> Pressure	<input type="checkbox"/> Pt-initiating-Base-detonating
	<input type="checkbox"/> Proximity (VT)	
	<input type="checkbox"/> Nose MT/Tail Pressure	
Fuze Length:	Fuze Diameter:	Diameter of Fuze Well:

MEC STATUS & PHYSICAL CONDITION (Check all that apply)

<input type="checkbox"/> Armed	<input type="checkbox"/> Unarmed	<input type="checkbox"/> Fired	<input type="checkbox"/> Unfired
<input type="checkbox"/> Intact	<input type="checkbox"/> Broken Open	<input type="checkbox"/> Filler Visible	<input type="checkbox"/> Soil Staining

FOR SUXOS USE

Disposition: (Clarify Under Remarks)	Date:	
<input type="checkbox"/> Transferred <input type="checkbox"/> Transported <input type="checkbox"/> Left In Place <input type="checkbox"/> Destroyed <input type="checkbox"/> BIP <input type="checkbox"/> Other: _____		
Client Notifications By:	Signature:	Date:
Transferred To:	Signature:	Date:
Destroyed By:	Signature:	Date:
Remarks: _____		
SUXOS Signature:	Date:	

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APPENDIX F
SEAL WATCHING GUIDELINES

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Notify your local stranding network to report sick or injured seals.

MAINE

College of the Atlantic (Camden, north)
207-288-5644

Marine Animal Lifeline (Rockland, south)
207-773-7377

MAINE - NEW HAMPSHIRE- MASSACHUSETTS

New England Aquarium
617-973-5247

CAPE COD

Cape Cod Stranding Network
508-743-9548

RHODE ISLAND - CONNECTICUT

Mystic Aquarium
860-572-5955

NEW YORK

Riverhead Foundation for Marine Research
631-369-9829

NEW JERSEY

Marine Mammal Stranding Center
609-266-0538

DELAWARE - MARYLAND

Marine Animal Rescue Program
National Aquarium in Baltimore
410-576-1098

VIRGINIA

Virginia Marine Science Museum
757-437-6159

Report violations of the MMPA to NMFS Enforcement
1-800-853-1964

NMFS Website:
www.nmfs.gov/prof_res/MMWatch/MMViewing.html

We gratefully acknowledge the assistance of:

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Massachusetts Audubon Sanctuary at Wellfleet Bay
Keith Lincoln, Captain of the *Rip Ryder*

Compiled & written by Elizabeth Pomfret
Cape Cod Stranding Network
for the Protected Resources Division —
National Marine Fisheries Service
and the Northeast Region Stranding Network

Designed and illustrated by Linda Bound
International Wildlife Coalition



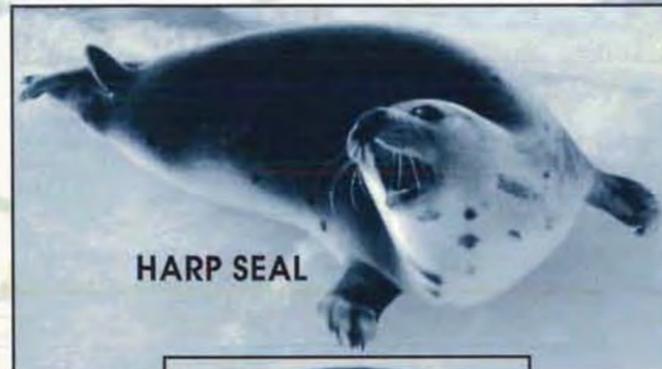
Photo: Elizabeth Pomfret/CCSN

Seal WATCHING GUIDELINES



HARBOR SEAL

Protect Seals —
Become a
Responsible Observer!



HARP SEAL



GRAY SEALS

Whether you are watching seals
from land or boat —

Be a Responsible Viewer!

Comply with seal watching guidelines!

❖ Seals are protected by the Marine Mammal Protection Act (MMPA). It is against the law to touch, feed, or otherwise harass seals. Harassment occurs when *YOUR* behavior changes *THEIR* behavior.

❖ Never get in the water with seals. Seals are large, wild animals and can be extremely dangerous. If they feel threatened they may become aggressive in order to defend themselves.

Harassment Warning Signs: If your presence causes any of the following reactions, on land or in the water, you are too close.

- Increased vocalizations by seals
- Movement back into the water (single animal or the herd)
- All eyes are on you (single animal or several in the herd)
- Disturbance from normal resting position (lifting their head to watch you)

❖ Never attempt to feed seals.

- You could get seriously injured.
- Feeding seals is against the law; you could be arrested and/or fined.
- Food that isn't a normal part of their diet will do more harm than good!
- Feeding negatively impedes their ability to hunt and locate food on their own.
- Feeding encourages seals to approach boats looking for handouts. This behavior has resulted in injuries from boat propellers.

❖ Kayaks & Canoes

Close approaches to haul-out sites by these engineless craft should be avoided as they may elicit an alarm response, causing seals to rapidly enter the water.

❖ Jet skis

High speed water craft should avoid seal haul-outs to minimize potential collisions.

❖ Stay at least 50 yards away from resting seals.

- Seals that are continually being approached, never get a chance to rest.
- Repeated interaction can exhaust seals, leaving them vulnerable to predation and illness.

- Increased contact with people will eventually lead seals to habituate to humans. Habituated seals are more likely to suffer from negative human interactions and less likely to avoid dangerous situations.

- Continued disturbance of mother/pup pairs could lead to abandonment and subsequent mortality of the pup.

❖ Limit your viewing time: maximum 30 minutes. Your continued presence can cause the animal unnecessary stress.

❖ Keep pets on a leash.

Inquisitive dogs are likely to startle a resting seal, causing an aggressive, defensive response, that might injure your pet or the seal.



❖ Entanglements

Reports of seals entangled in fishing gear, bait bags, and plastic debris such as ring frisbees, are on the rise! When seals get entangled, they may be unable to feed or defend themselves against predators. These entanglements often cause the animal to suffer and ultimately die.



Photo: Katie Touhey/CCSN

❖ Vessel Collisions

Increasing numbers of seals (like the gray seal above) are being sighted with propeller wounds. Seals are likely to surface unexpectedly. When entering and leaving a viewing area, maneuver your vessel slowly, watching for seal heads that are continually popping up around you!



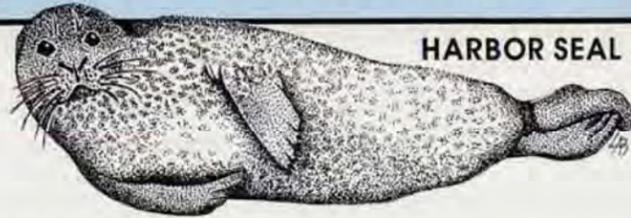
Seals will bite!

Serious infections can be transmitted to you or your pet.

Pinniped Identification Key

Five **species** (types) of seals are seasonally seen in New England waters. Harbor seals and gray seals are the most familiar and abundant species, and are seen year round. They are social animals, that are usually seen in large **herds** (groups), either in the water or **hauled out** (resting on shore).

The remaining three species (harp, hooded, and ringed seals), known as **ice seals**, are also seen seasonally in New England. The term "ice seal" refers to where these



HARBOR SEAL

HARBOR SEALS - *Phoca vitulina*

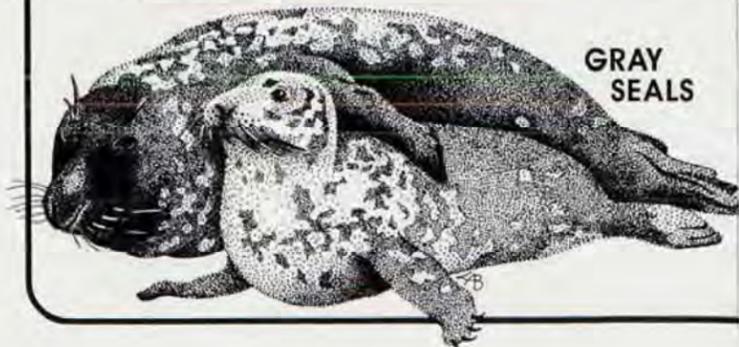
PHYSICAL DESCRIPTION: The average size for a male or female adult is approximately 4 - 5 feet in length and 220-250 lbs. Their coloration ranges from dark gray to tan and is overlaid with many spots. They have small heads, very large eyes, and a face that resembles a cocker spaniel!

BEHAVIOR: They will usually retreat to the water when approached. Commonly seen resting on their side in a "banana" shape, on rocks along the coast.

PUPPING: In New England, pupping occurs between mid-May to mid-June along the coasts of Maine and New Hampshire. Mothers nurse their pups for 4-6 weeks and will temporarily leave them during foraging trips.

GRAY SEALS - *Halichoerus grypus*

PHYSICAL DESCRIPTION: Males are characteristically larger than females. The average size of a male gray seal is approximately 7-8 feet in length and weighs between 660-770 lbs. Females will average approximately 6.5 feet and weigh between 330-450 lbs. Male's coloration is typically darker than females. Males are dark brown, gray, or black with smaller lighter spots and females have a tan background with darker spots. The most distinctive feature is the shape of their head. They have been nicknamed "Horseheads" because of the long, straight, slope of their profile.



GRAY SEALS

seals are born. **Pupping** (birthing) takes place on ice floes or pack ice off the eastern coast of Canada and extending north toward Greenland. During the winter, many **juvenile** (immature) ice seals **migrate** (move from one region to another) south and are frequently seen in New England. Although they are social animals in their northern territory, they are **solitary** (alone) when we view them.

Reminder! Stay at least 50 yards away from the seal. Use binoculars when observing field marks for identifying species.

BEHAVIOR: They may or may not retreat to the water when approached. They can be very vocal and aggressive.

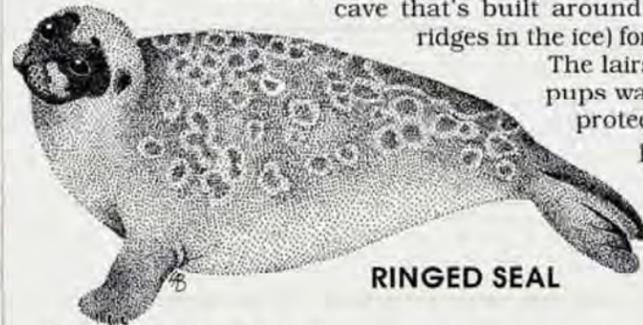
PUPPING: Born from mid-December to early February. In the United States, pupping takes place on islands in Penobscot Bay and Frenchman Bay, Maine, and on Muskeget, Tuckernuck, and Monomoy Islands in Nantucket Sound, Massachusetts. Their nursing period lasts for approximately 16 days, during which mothers will temporarily leave their pups during foraging trips.

RINGED SEAL - *Phoca hispida*

PHYSICAL DESCRIPTION: Males and females are similar in size, ranging from 4-5 feet in length and weighing between 100-200 lbs. They have small heads with a short muzzle and large eyes. Their coloration may appear mottled with pale rings scattered over a dark gray body.

BEHAVIOR: The most abundant species in Arctic waters, they are seen only occasionally in our region. They tend to be cautious of humans, lifting their heads to keep watch but not necessarily returning to the water.

PUPPING: Pups are born in the Canadian arctic, from March to late April. Females build snow lairs (a snow cave that's built around pressure ridges in the ice) for birthing.



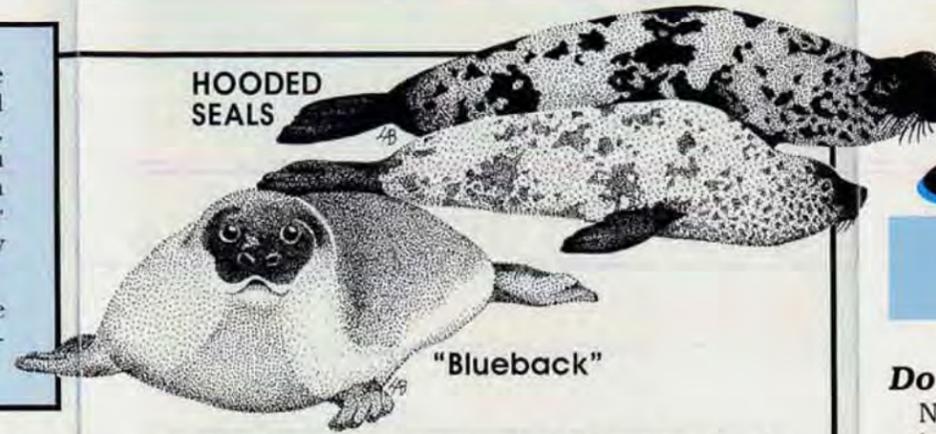
RINGED SEAL

The lairs offer the pups warmth and protection from predators. Pups nurse for 6-7 weeks.

HOODED SEAL - *Cystophora cristata*

PHYSICAL DESCRIPTION: Males and females differ in their appearance. The male hooded seal grows to be an average of 8.5 feet in length and weighs approximately 700 lbs. They are darker in overall color, with silvery-gray blotches throughout their fur. Only adult males have a nasal sac, which hangs down over their nose and mouth. When the sac is inflated, it forms a hood on the top of the animal's head, a strategy to make their head appear larger and more intimidating. A second sac, which can be inflated through their nostril, looks like a red balloon and hangs down over their mouth. Females do not have a hood. Their average

HOODED SEALS



"Blueback"

size is 7.5 feet and approximately 400 lbs. Female coloration is similar to that of males, but females tend to be lighter in contrast. In the northeast, "Bluebacks" are the most common age group sighted. Their coloration is a bluish/gray on the dorsal (back) surface and creamy white on the ventral (belly) surface. Because of this fuzzy coat, they are often mistaken as abandoned newborns, but in actuality they are about one year old!

BEHAVIOR: They will not retreat to water when approached. They can be extremely aggressive and will bite if they feel threatened.

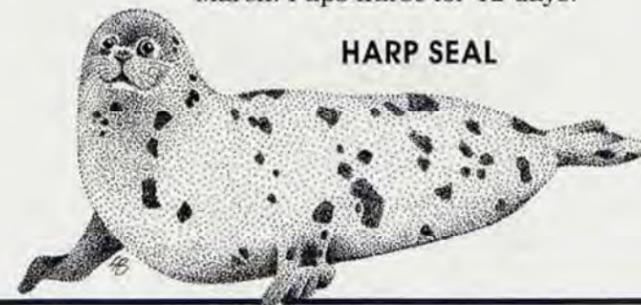
PUPPING: Born on offshore pack ice off the eastern Canadian provinces during late March. They have the shortest nursing period of any seal, 4 days in total!

HARP SEAL - *Phoca groenlandica*

PHYSICAL DESCRIPTION: Adults have a silvery, white coloration with a black wishbone shaped marking on the dorsal surface and a black head. Both males and females average 5-6 feet in length and weigh up to 300 lbs. The stages of development we are most likely to see are the "Beaters" ranging in age from 25 days up to a year and the "Bedlamers" whose age ranges between 1-4 years. During these stages, their coloration appears gray on the dorsal surface and silvery-white on the ventral surface with an inconsistent array of black-brown spots of irregular shape and size.

BEHAVIOR: All age classes are typically not afraid of people. They will not necessarily retreat to the water when approached. Often they will raise their head to follow you with their eyes. They are aggressive and should not be closely approached. Open-mouth displays and vocalizations are signs that you are too close (see photo on front panel).

PUPPING: Mothers birth their pups on pack ice off the eastern Canadian provinces from late February to mid-March. Pups nurse for 12 days.



HARP SEAL

Seal FACTS

Do seals need to eat everyday?

No, a seal's body stores enough fat in the blubber layer to allow the animal to go for extended periods of time without eating. In addition, most seals are opportunistic feeders and will consume a variety of fish, shellfish, and crustaceans.

Is it normal for them to be on land?

Yes, it is absolutely normal for them to be on land. Seals are semi-aquatic animals, which means they often spend a portion of each day on land.

Don't they need to be wet?

No, they do not need to be wet constantly. Seals need to haul out for a variety of reasons: to rest, pup, and **moult** (annual shedding of old hair).

Is it normal for seals to be seen alone?

Yes, many times seals will be sighted alone. Ice seals, in particular, are almost always sighted alone in this region.

How do seals and sea lions differ?

Seals and sea lions are both pinnipeds or "fin-foots," but they belong to different families. Here is how they are classified:

Suborder — Pinnipedia (latin for "fin-footed")

Families — Odobenidae (Walrus)
Otariidae (Fur Seals and Sea Lions)
Phocidae (True Seals or Hair Seals)



True Seal/Hair Seal



Fur Seal/Sea Lion

Ear hole, no visible ear flaps

Hind flippers not used for walking

Streamlined body, short front and hind flippers

Common in our region

Visible ear flaps

Hind flippers rotate forward for walking on land

Elongated neck, longer front and hind flippers

Not native to the North Atlantic