Final UXO Cleanup Plan

Unexploded Ordnance (UXO) Model Cleanup
Kaho'olawe Island, Hawaii

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1.0 UXO OPERATIONAL PLAN INTRODUCTION

This Operations Plan is developed to detail the personnel and equipment requirements and approach, methods, and operational procedures to be used in conducting Unexploded Ordnance (UXO) Model Cleanup at Kaho`olawe Island, Hawaii.

1.1 Operations Concept

The integration of the Cultural Resources Team within each phase of the UXO Clearance Plan process is the key element that must be completed prior to any UXO activity be conducted. The protection of Kaho`olawe's cultural resources is integrated into the UXO Cleanup Plan (Annex A). The following section summarizes the concept of the integration of Initial Area assessments and UXO clearance procedure as it relates to the protection and preservation of Kaho'olawe's historical and archaeological properties, cultural sites and natural resources. Specific KIRC concerns for archaeological site protection in the context of UXO cleanup actions can be found in the Site Protection Procedure of the KIRC Procedures, Section IV. The Site Protection Procedures of the KIRC have been reviewed with guidance from the document contained within these Annex's. The procedure described here and in the Site Protection Procedures of the KIRC plans are intended to occur before any intrusive activities conducted by UXO Teams including improvements of the Honokanai'a base camp area. The delicacy of the island's environment and the cultural and historical significance of this island is emphasized during each day's operations. Daily operations will start with an appropriate cultural protocol, the morning 'pule', gathering or prayer.

2.0 GENERAL

The operational overview for the project consists of six major areas designated for operational points. These areas are:

1. Base Camp at Honokanai'a (Smugglers Cove)
2. Hakio`awa
3. Landing Zone (LZ) Seagull
4. K-2 Road Landing Zone 3
5. Landing Zone 1
6. Landing Zone Buzzard.

The project will be mobilized each day from two locations. Location One will be on Maui at the Pu'unene Airfield. This location will be used for personnel departing Maui via helicopter to Kaho`olawe. Personnel will arrive from Maui at Landing Zone Seagull and Hakio`awa. Location Two will be by ground from Base Camp at Honokanai'a to Landing Zone Seagull. Landing Zone Seagull will be the central location for logistics and maintenance. Work crews will deploy each day to four operational points (LZ 1, LZ 3, LZ Buzzard, and LZ Seagull) on the Roads and Trails with a fifth team dedicated to Hakio`awa. Road teams will work by location toward their objective of the Explosive Holding Area. Coastal Zones within the base camp will be accomplished last. Surface sweeps with surface electronic detection equipment will clear all road areas first. Once 1250 feet of

road area has been surfaced cleared, subsurface geophysical image mapping may commence. Once 2500 feet of geophysical mapping has been completed, excavation crews may begin. Demolition activities are planned from 1500 hrs to 1700 hrs each day. Work area collection bags will be collected from recovery points will occur each Friday from 1000 hrs to 1400 hrs. The Hakio'awa area will be self supporting. A dedicated medical aid tent will be fully operational each day with MEDEVAC (medical evacuation) capability. Selective pruning will occur in the Hakio`awa area with support from surface clearance crews, geophysical crews and excavation crews. Every action described above will be supported by the HCR team and Land Survey Team. Protective works will be utilized as directed by the HCR team. The Operational UXO Cleanup Process Review Board and Protocol on pages A-3 to A-6. These Figures depict the decision making process required to fulfill project objectives.

Operational UXO Cleanup Process Review Board and Protocol

REVIEW BOARD
BPI UXO Supervisor
OHM Archaeologist
OHM Natural Resource Specialist (NRS)
(flora & fauna)
KIRC Culturalist
Navy Technical Rep (NTR)

PROTOCOL FOR MAUI HOUSED CREWS

Note: Participation in Pule is voluntary, Respect for Protocol is mandatory

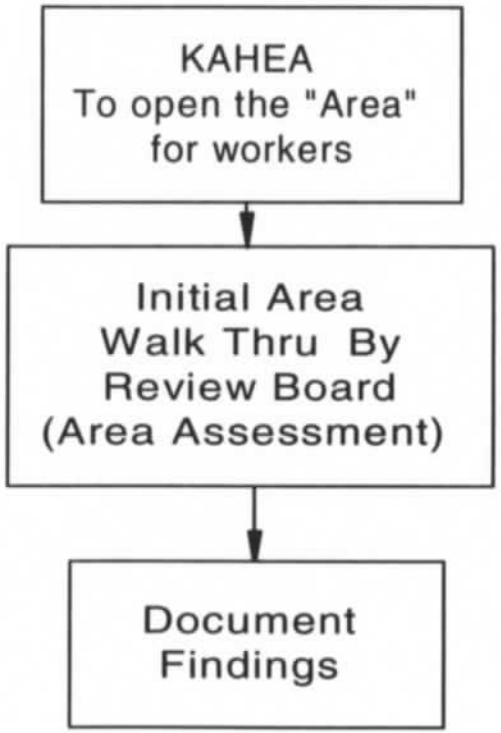
Daily Pule on Maui before coming to Kaho'olawe
Daily Pule before leaving Kaho'olawe
KIRC to provide Kahea, Noa, and Pani for each cultural site encountered

PROTOCOL FOR KAHO'OLAWE HOUSED CREWS

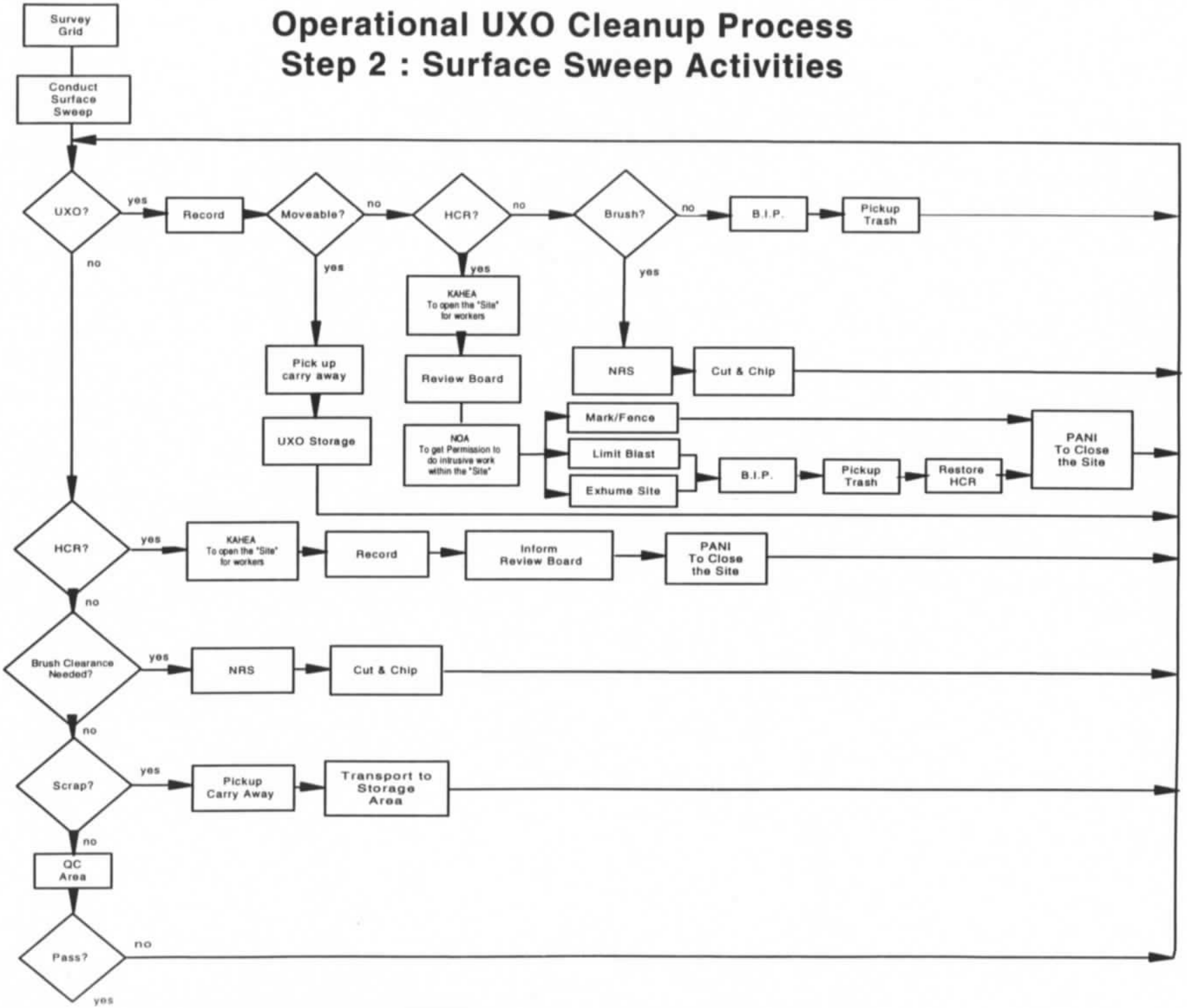
Note: Participation in Pule is voluntary, Respect for Protocol is mandatory

Daily Pule at Base Camp before going to worksite
Daily Pule before leaving Kaho'olawe
KIRC to provide Kahea, Noa, and Pani for each cultural site encountered

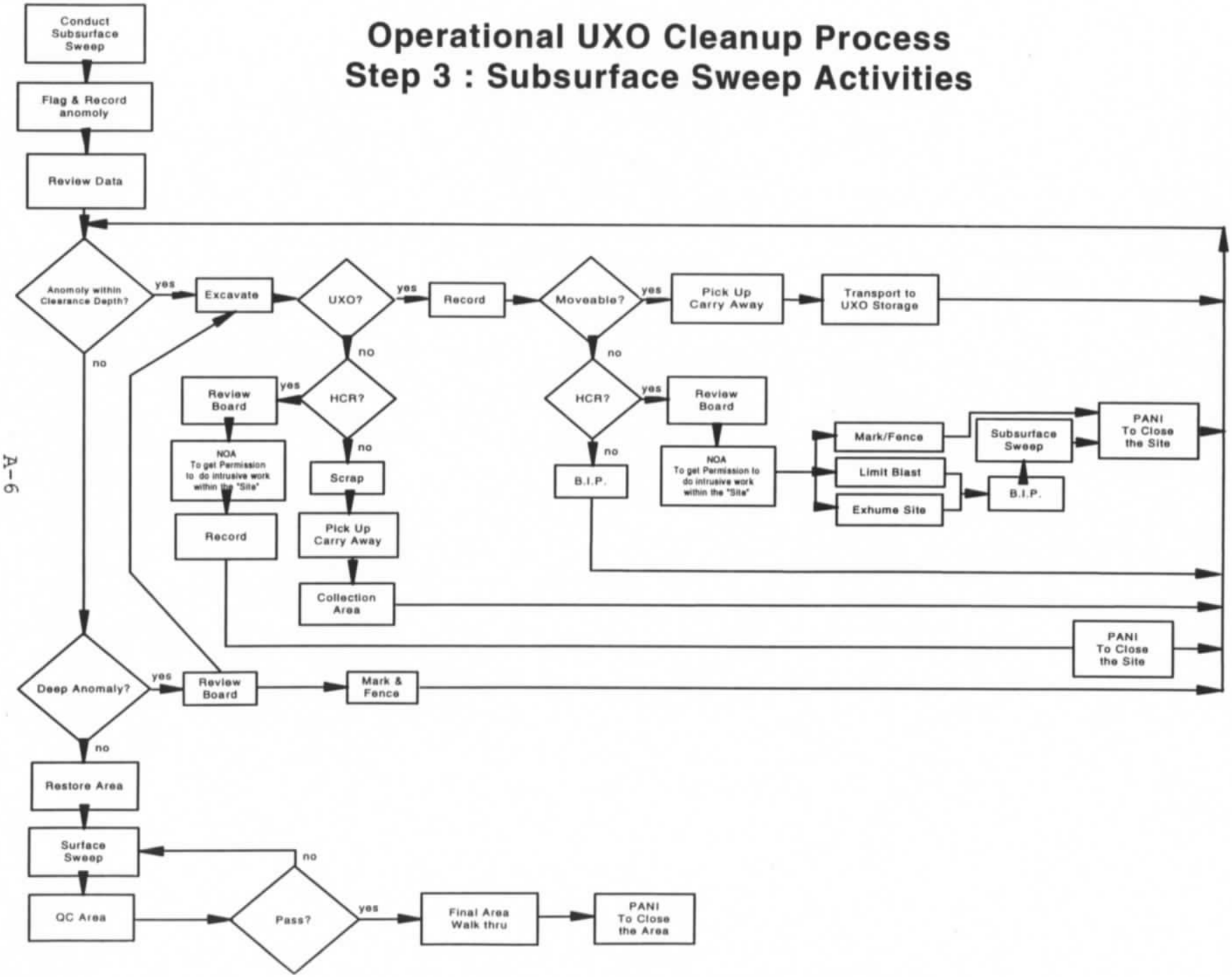
Operational UXO Cleanup Process
Step 1 : Area Characterization



Operational UXO Cleanup Process
Step 2 : Surface Sweep Activities



Operational UXO Cleanup Process
Step 3 : Subsurface Sweep Activities



2.1 Confirm Areas and Boundaries

Boundaries and limits of the UXO model cleanup will be provided by the U.S. Navy. Upon arrival on Kaho`olawe Island, senior management personnel will confirm the accuracies of these areas and boundaries.

2.2 Area Preparation Procedure

Upon mobilization to Kaho`olawe Island, UXO Team personnel will establish the coordination required to sustain operations. The operational actions within the Restricted Area will mainly occur at Landing Zone (LZ) Seagull. At Landing Zone Seagull former buildings will be improved to store and stage equipment and conduct maintenance. Building improvements are screen wire for windows and doors, sweep-out, pad locks and installation of temporary generator. Parking areas for support equipment will be established and maintained. A temporary 55 gallon fuel and hand pump drum pad will be erected and maintained with spill control and fire prevention. Fuel will be used for generator.

Upon receiving the appropriate Initial Area Assessment authorization to proceed, the pre sweep team will be prepared for UXO sweeps by Land survey, selective brush trimming to allow access to the area by surface and subsurface sweep personnel and equipment. Prior to personnel entering an area, an appropriate cultural protocol, as determined by the KIRC, will be conducted to allow work in the area. During the pre-sweep preparation phase additional monitoring by an archaeologist or cultural monitor, as previously determined by the Review Board, may be required in specific localities to ensure that the integrity of the sensitive historical and archaeological properties and cultural sites in the area are preserved in accordance with historic preservation law and cultural protocol. They will also identify and locate any new archaeological or cultural features not found during the field assessment. Some areas without archaeological or cultural features and determined as not having any potential features may be an example of an area designated as not requiring archaeological or cultural monitoring. Upon completion of the pre-sweep preparation, a quick area assessment will determine if anything new is found. If anything new is found, a second area assessment and review meeting will be held before turning the area over to the sweep phase. If nothing new is found, then the area will be turned over to the UXO Operational Phase.

2.3 Pre-Area Investigation

This will include the definition of the area, land use designation, cultural file, search, arc, file search, natural resources file search, data coordination and a pre-area meeting.

The UXO removal process begins with a documentation review (archives search/review) of the grid or area to be worked for potential HCR or Natural Resource problem areas. During this phase the area will be defined and grids established, on paper, for actual establishment during the assessment phase. A packet of information for each grid will be assembled that includes; land use designation, cultural file search, archaeological file search, natural resource file search, potential and expected UXO data, and data coordination for the UXO operational phase. These packets will be used during

a pre-area coordination meeting and the area assessment to gain a comprehensive view of the area to be assessed.

2.3.1 "Hui Aloha"

Based upon the determination of the KIRC, an appropriate cultural protocol, may be conducted to open the area for an initial area walk thru (area assessment) by an area assessment team.

2.4 Area Assessment

This is a walk through of the work area to check all of the information obtained during the pre-area investigation.

Upon completion of the above steps, the area will be field investigated by an area assessment team that consist of a UXO Specialist, archaeologist, natural resource specialists, KIRC , soils specialist and land survey personnel. Prior to entering the area for assessment, an archaeological briefing concerning site protection will be given by the field archaeologist. The KIRC cultural monitor may provide a cultural briefing if appropriate. The area assessment team will conduct a UXO, cultural, archaeological and natural resources reconnaissance identifying the cultural, historical, religious, archaeological and environmental resources and potential UXO in the area. The land survey personnel will be establishing the grid system previously designed on paper during the pre-investigation phase. The UXO person will evaluate the level and potential of UXO in the area and in conjunction with the rest of the team make recommendations to type of sweep preparation needed to prepare the area for the UXO sweeps (i.e., brush pruning, grass cutting). Notes, still photographs and video may be used to document these conditions. Any archaeological sites/features found in the area will be documented and located to the land survey specification of Annex C, Survey and Mapping Plan. Natural resources will be documented and any threaten or endangered species found in the area will be documented and located, as requested by the KIRC, per survey specifications of the Annex C. Cultural resources will be documents and located per survey specifications of Annex C. These documents, in addition to the pre-investigation packet will be passed to the Review Board, as defined in Section 3.1. If the assessment team evaluates that specific regions within the assessed area need further discussion or review, these regions may be bordered off with flagging tape, and the remaining area recommended to the Review Board as available for clearance operations.

2.5 Review Meeting

Where sweep plans and any modifications, limitations or constraints are discussed.

The Review Board will review the results of the area assessment, discuss options for resolving any problems, issues, or constraints and develop specific plans for carrying out ordnance sweeps. Logistic requirements for follow-on work will be discussed during these sessions. A review of the logistics aspect of the sweep and their potential impact on archaeological sites will also be made. Sites that require further discussion by the Review Board will be cordoned off and access restricted to these sites until a determination by the Review Board can be reached. If a resolution cannot be

reached by the Review Board, this issue will be passed to a higher authority for discussions between the Navy and the KIRC. Areas where the UXO sweep operation will have no impact to any archaeological or historical properties, cultural site or natural resource as determined by Review Board will be turned over to field crews to conduct remediation. The Review Board will evaluate the sensitivity of the site and determine allowed activities within this site for remediation. Specific HCR concerns within an area may require an additional cultural protocol, 'noa', to get permission to do intrusive work within a specific locality as specified by the KIRC. The remaining portion of the assessed area should be available to conduct remediation. The Review Board will also pass to the Site Preparation crews a list of authorized site preparation allowed in that specific area or grid and the type of additional monitoring (i.e. archaeological or cultural) required, if any.

3.0 UXO INVESTIGATION PROCEDURES

The grids where UXO activities are planned will be defined and visually swept for surface UXO contamination and geophysically searched for areas requiring a subsurface investigation. GIS-UXO and basic methods for investigating the areas will be used. These methods are:

Visual Survey - Personnel will visually scan the surface terrain using Explosive Ordnance Reconnaissance (EOR) methods to locate ordnance on the surface or evidence suggesting the presence of subsurface ordnance. Magnetometers will be used to aid in locating metal contacts on the surface in areas where visual search techniques are obstructed by vegetation.

Visual reconnaissance during removal action will be used to complete a non-intrusive technical analysis of the surface within the boundaries. Visual examination is conducted during all UXO surveys to locate, characterize and evaluate UXO and potential ordnance residues. Using EOR procedures, UXO Specialists determine the location, hazard, quantity and disposal actions required for UXO or ordnance residues encountered.

Visual searching relies on a systematic progressive search pattern using evenly distributed search intervals not exceeding the team members' field of view. During a visual search, all UXO contamination observed is marked in place and the position recorded for follow-on disposal actions.

Geophysical Survey - The objective of the geophysical investigation is to accurately locate and record the location of geophysical anomalies (potential UXO). Archival and geophysical investigations will be integrated into the GIS system to identify potential UXO locations for subsequent evaluations, including intrusive investigations. Using either handheld magnetometers or the EM-61, personnel will sweep the areas in a non-intrusive manner to determine the location of subsurface anomalies. Personnel will collect data within lanes or polygons established to subdivide the ranges. Data collected will be recorded electronically on data loggers. At the end of the day, the data loggers will be down loaded and the raw data analyzed and entered into the GIS system.

MODEL CLEANUP UXO CLEARANCE DEPTH MATRIX

UXO clearance shall be executed to the depths cited under "RECOMN'D CLNC LEVEL". Where clearance to the specified depth is not possible the actual clearance depths will be documented together with the reason for more shallow clearance. UXO detection results shall be fully documented to the maximum detection depth of the instruments employed, in addition to the actual clearance level executed. Tier IIB vehicle roads shall be cleared to the required 4 ft depth below finish grade in all cases.

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AREA MAP #	SITE DESCRPT'N WORK AREA	PROJECTED SITE USE	FEATURES	USE LEVEL	6055.9 CH 12 CLNC	RECOMN'D CLNC LEVEL	USE
HAKIOAWA MAP 18	CAMP WK-AREA: A	RECREATION, CAMPING, SOIL DISTUR-BANCE	TREES, BEACH, CAMP SITES, STRUCTURES	INTENSE FOOT ACCESS	4 FT SURFACE RECREAT ION	4 FT MAIN CAMP AREA TIER IIA 4 FT> EXCAVAT'N IN SPECIFIC AREAS TIER IIB*	2 1
HAKIOAWA MAP 18	BEACH FRONT WK-AREA: A	PLANTING, RECREATION, SOIL DISTUR-BANCE	SAND ROCK, TREES, BOAT HOUSE	INTENSE FOOT & BOAT ACCESS	4 FT SURFACE RECREAT ION	4 FT BEACH & PLANTING AREA TIER IIA	2
SHORELINE MAP 19 MAP 1	SHORELINE LOW WATER MARK TO HIGH WATER MARK WK-AREA: A, B1 & B2 WK-AREA: L	RECREATION, NATURAL SOIL/ROCK DISTURBANC E FROM WAVES HAKIOAWA HAKIOAWA WEST SHORE	SAND-ROCK BEACH, STONE CLIFF, SAND & ROCK MOVE IN SURF	INTENSE C FOOT ACCESS	4 FT SURFACE RECREAT ION	4 FT TIER IIA* * document lesser depths in rock	2
HAKIOAWA MAP 18	BURIAL GROUNDS WK-AREA: A	HCR SITE. NO SOIL DISTURBANC E PERMITTED	BURIAL SITES, TREES ROCK/GRASS	MINIMAL FOOT ACCESS	4 FT SURFACE RECREAT ION	1 FT BURIAL GROUNDS TIER I	4
AREA ABOVE HAKIOAWA MAP 18 MAP 16 MAP 14	WATER CATCHMENT WK-AREA: D3 WK-AREA: D1 WK-AREA: D4	WATER CATCHMENT, PLANNED EXCAVATION	FLATS & SLOPE	PERIODIC FOOT ACCESS	4 FT > EXCAVA TION	4 FT > EXCAVAT'N TIER IIB*	1

TRAILS	STATE/KIRC ACCESS & MAKAHIKI TRAILS	WALKING ACCESS, NO PLANNED SOIL DISTUR-BANCE	15' WALKING TRAILS	LOW IMPACT PERIODIC ACCESS	4 FT	4 FT TIER IIA	2
MAP 18	WK-AREA: A	HAKIOAWA					
MAP 18	WK-AREA:B2	HAKIOAWA					
MAP 18	WK-AREA:B1	HAKIOAWA					
MAP 14	WK-AREA:F2	K1-CATCHMT					
MAP 14	WK-AREA:F1	K1-CATCHMT					
MAP 13	WK-AREA: G	MOAULAIKI					
MAP 9	WK-AREA: H	PUU MOIWI					
MAP 1	WK-AREA:M1	MIDWAY					
MAP 1	WK-AREA: M	ROCKY ROAD					
MAP 1	WK-AREA: L	WEST SHORE					
HCR SITES	ARCHAEOLOGICAL SITES	ARCH & USER SITE ACCESS. SOIL DISTUR-BANCE PROHIBITED	FLAT, SLOPE, GRASS TREES BEACH & ROCK	LIMITED PERIODIC LOW IMPACT ACCESS	1 FT LIMITED ACCESS	1 FT TIER I	4
MAP 13	WK-AREA: G1	MOAULAKIKI					
MAP 14	WK-AREA: E2						
MAP 9	WK-AREA: H1	PUU MOIWI					
VEHICLE ROADS	K-1 SEA GULL CISTERN ETC	HEAVY VEHICLE ROADS	33' ROAD & SHOULDERS	PERIODIC LONG TERM	4 FT SURFACE PARKING	4 FT> EXCAVAT'N OR DISTURB'NC TIER IIB	1
MAP 7	WK-AREA: K	SEAGULL RD					
MAP 4	WK-AREA: N	CISTERN RD					
MAP 2	WK-AREA: P	SAILOR HAT					
MAPS 2-15 INCLUSIVE	WK-AREA: E	K-1 RD					
TERTIARY ROADS & TRAILS	TERTIARY ROADS	LIGHT VEHICLES & FOOT ACCESS, NO PLANNED SOIL DISTUR-BANCE	15 FT TRAIL 25 FT ROAD FLATS/SLOPE GRASS	PERIODIC LIGHT USE	4 FT SURFACE PARKING	4 FT> EXCAVAT'N OR DISTURB'NC TIER IIB	1
MAP 10	WK-AREA: I						
PLANTING AREAS & NURSERY	PLANTING AREAS	PLANTS & RE-FORESTATION PLANNED SOIL DISTUR-BANCE	FLATS & SLOPE	PERIODIC FOOT ACCESS	4 FT SURFACE AGRICUL TURE	4 FT TIER IIA	2
MAP 3	WK-AREA: S	NURSERY					
MAP 11	WK-AREA: E1	TREE FARM					

SUPPORT AREAS **MAP 7** **MAP 7** **MAP 7**	STAGING & STORAGE WK-AREA: W WK-AREA: W WK-AREA: W	OPERATIONS & STORAGE DURING CLEANUP VEHICLES MAGAZINE SSA	FLATS, SLOPE, GRASS	HEAVY VEHICLE DURING CLEANUP	4 FT> DEEPEST EXCAV'T N	4 FT> DEEPEST EXCAVAT'N TIER IIB	1
HELO PADS **MAP 11** **MAP 3** **MAP 3** **MAP 6/7**	LANDING PADS WK-AREA: E WK-AREA: S WK-AREA: S WK-AREA: K1	EXISTING PADS LZ-1 LZ-BUZZARD LZ-TURKEY LZ-SEAGULL	EXISTING LZ FLATS, GRASS, NO ADD'TL CONSTR'CT'N	REGUL'R HELO LANDING	4 FT	4 FT TIER IIA	2

Notes:

The Hakioawa and western shoreline areas from the low water mark to the high water mark will be swept and cleared to the recommended depth. Where clearance to the specified depth is not possible the actual depth of clearance will be documented together with the reason for less deep clearance. The shoreline areas are included in work areas A, B1, B2 and L. All anomalies detected below the clearance depth will be documented. Because of the constant movement of sand and rock caused by wave and tidal action, the clearance cannot support certification action.

Tier IIB areas marked with an asterisk require surface sweep and clearance to 4 FT below the maximum planned excavation/soil disturbance based upon the planned land use. If the depth of excavation/soil disturbance is unknown prior to the beginning of work in the specified area, the area will be surface swept and cleared to 4 FT only, with detector data provided for depths of greater than 4 FT where available. Disposition determination for suspected items below 4 FT will be made by an anomaly review board.

REF: DDESB 6055.9 Ch 12

8/16/95:2200 rev

SUPPORT AREAS **MAP 7** **MAP 7** **MAP 7**	STAGING & STORAGE WK-AREA: W WK-AREA: W WK-AREA: W	OPERATIONS & STORAGE DURING CLEANUP VEHICLES MAGAZINE SSA	FLATS, SLOPE, GRASS	HEAVY VEHICLE DURING CLEANUP	4 FT> DEEPEST EXCAV'TN	4 FT> DEEPEST EXCAVAT'N TIER IIB	1
HELO PADS **MAP 11** **MAP 3** **MAP 3** **MAP 6/7**	LANDING PADS WK-AREA: E WK-AREA: S WK-AREA: S WK-AREA: K1	EXISTING PADS LZ-1 LZ-BUZZARD LZ-TURKEY LZ-SEAGULL	EXISTING LZ FLATS, GRASS, NO ADD'TL CONSTR'CT'N	REGUL'R HELO LANDING	4 FT	4 FT TIER IIA	2

Notes:

The Hakioawa and western shoreline areas from the low water mark to the high water mark will be swept and cleared to the recommended depth. Where clearance to the specified depth is not possible the actual depth of clearance will be documented together with the reason for less deep clearance. The shoreline areas are included in work areas A, B1, B2 and L. All anomalies detected below the clearance depth will be documented. Because of the constant movement of sand and rock caused by wave and tidal action, the clearance cannot support certification action.

Tier IIB areas marked with an asterisk require surface sweep and clearance to 4 FT below the maximum planned excavation/soil disturbance based upon the planned land use. If the depth of excavation/soil disturbance is unknown prior to the beginning of work in the specified area, the area will be surface swept and cleared to 4 FT only, with detector data provided for depths of greater than 4 FT where available. Disposition determination for suspected items below 4 FT will be made by an anomaly review board.

REF: DDESB 6055.9 Ch 12

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Table A-1 describes the areas to be cleared as part of this model clearance plan, the clearance level and depth.

In cases in which UXO personnel have identified an anomaly deeper than the clearance level identified in Table A-1, a field determination or an anomaly review board process will be used to determine if the anomaly requires further investigation.

4.0 UXO REMOVAL PROCEDURES

The locations of all confirmed UXO encountered, removed and/or disposed of during the model cleanup will be recorded and mapped in x, y, & z coordinates. Data shall be referenced to the Hawaii State Plane Coordinate System-Zone 2 (5102) Grid System and the North American Datum of 1983 [NAD83] and will serve as the base design file in the GIS.

4.1 Ordnance Sweep Operations

UXO Teams will conduct sweep line procedures taking into consideration the Navy requirement of one UXO Specialist for every five sweep personnel. Surface sweep teams normally consist of one UXO Specialist per five UXO support workers. Surface sweep teams will be assisted by a bag collection team and a UXO demolition team.

NOTE: Sweep team ratio may be modified in accordance with Section E, para 8.1.1(a).

The area to be swept will be identified on the map with coordinates and features.

The need for alertness on the sweep line must be emphasized. No skylarking or excessive conversation is acceptable. If personnel don't pay attention to the area they are about to walk in, ordnance could be overlooked or inadvertently stepped on. Personnel will not be allowed to enter an uncleared area without UXO support. Every effort wil be made to limit the operational impacts to the Islands environment.

Uniforms that provide protection from the sun, wind and vegetation shall be made available and must be worn in the sweep, geophysical and excavation areas. The sun can cause severe sunburn. (Team supervisors) shall ensure that all sweep personnel are appropriately dressed for the harsh conditions). The wind at times exceeds 40 knots and will carry with it particles of sand which may cause problems with unprotected skin and eyes. The sweep will continue in a light drizzle or mist, and should the rain cause cancellation of sweep operations, the uniforms will keep personnel warm during the trip back to LZ Seagull or the base camp at Honokanai'a.

4.1.1 Ordnance Sweep Procedures

Sweep personnel will line up 3 feet apart, depending on terrain, facing in direction of the sweep. The assigned senior sweep person will be positioned on either end of the line with a supply of surveyors tape of any color but red or fiberglass pole flags for marking the sweep line path. The UXO

specialist(s) or supervisor assigned to the sweep line will position him/herself in the center of the line and relay signals from the sweep line monitor to the sweep line.

As the sweep line moves forward, personnel will be picking up all metal. When an ordnance item is encountered, the person nearest the item raises his/her hand and calls "UXO Specialist." A UXO Specialist will come forward and investigate. If the item is determined to be inert, the sweep personnel shall place it in his/her collection bag. If the item is live and safe to move, the UXO Specialist will place it in his/her live collection bag. If the item is not safe to move, it will be marked with red surveyors tape for disposal at the earliest convenience or at the end of the day.

Range marker personnel will place surveyors tape or a fiberglass pin flag in the ground every 25-50 feet, where necessary, to mark the path of the sweep (biodegradable hip chain may be used).

At the end of one sweep, the line will stop and pivot 180 degrees on the designated end. (If bags are full or nearly full (average weight of a full bag is 25 pounds), the UXO Supervisor will have a bag collecting team brought as near to the line as safely possible. All bags will be weighed, recorded and emptied into the open storage area. The UXO Supervisor will keep a running total of all materials collected for inclusion in the daily log.

Depending on the direction of the pivot, one of the range marker personnel will be following the markers he has just placed, and the other range marker person will be marking a new boundary line. This procedure continues until the starting line is reached, at which time the sweep line again pivots 180 degrees and is ready to proceed forward again.

Bag collecion dumping may be required more often in areas of heavy contamination.

4.1.2 Sweep Line Signals

FALL-IN SINGLE FILE: All personnel line up fore and aft in a single line (preparatory for head count or hike).

FORM UP: Line-up facing in the direction of sweep at an arms interval, with sweep personnel positioned as directed by the sweep line supervisor.

HEAD COUNT: Count off in numerical sequence from one end to the other.

READY ON THE RIGHT/LEFT: Preparatory command given to ensure all hands are ready to move the line.

GUIDE RIGHT/LEFT/CENTER: Establish the guide-on, prior to or during forward progress.

MOVE THE LINE: Commence forward progress and commence sweeping.

HOLD THE LINE: Stop forward progress.

SHIFT RIGHT/LEFT: Hold the line, shift perpendicular to the direction of travel in the specified direction and distance.

PICK-UP INTERVALS: Each individual check and adjust their interval as required.

COVER DOWN: Each individual check and adjust their alignment on the guide-on as required.

SINGLE FILE FROM THE RIGHT/LEFT: Form a line abreast, face right/left and cover down to form a single file line.

4.1.3 Ordnance Safety Precautions for the Sweep Line

- Do not pick up, kick, touch, or otherwise disturb an ordnance item.
- Do not throw anything on the sweep line, it could injure someone or hit a piece of ordnance causing it to detonate.
- If there is any question concerning any item, call the UXO specialist.
- No smoking on the sweep line or within the boundaries to be cleared of ordnance. A fire extinguisher must be present where smoking is allowed.

4.1.4 Sweep Line Standards

During the sweep line operation, the following minimum standards will be strictly adhered to:

- Qualified personnel will be employed as sweep line personnel.
- Search Effectiveness Probability (S.E.P.) Validation Tests will be conducted daily.
- Each sweep line person will carry a pick-up bag for collecting metal and ordnance items determined to be inert. The pick-up bags will be routinely dumped as directed by the UXO Supervisor.
- As a minimum, the UXO Supervisor and one other UXO Specialist will carry radios.
- A properly equipped paramedic/medical qualified person will be in the Restricted Zone during all sweeping operations.
- The UXO Supervisor will control movement and direction of the sweep line, from a vantage point behind the UXO Specialists. The UXO Supervisor will circulate through the sweep line as the situation dictates.

- A head count will be taken at the following times: before departing camp, arrival at sweep area, before lunch, after lunch, before departing sweep area, and upon arrival at base camp; also, prior to and after all demolition shots.

- Designated Range Marker personnel will leave an easily identified trail using surveyor's tape or other similar means.

- Kiawe tree thickets, thick grass areas, and areas with limited visibility will be avoided by the sweep line. Kiawe trees may be trimmed as necessary, grasses may be trimmed but not burned until after a test has been approved and certified by the KIRC.

- Only UXO Specialists will assess or dispose of unexploded ordnance.

4.1.5 Sweep Operations Briefing

Prior to sweep operations, the sweep personnel will receive an in-brief by the UXO Supervisor which includes the following:

- Standard sweep line commands, as delineated in the sweep personnel brief, will be utilized to avoid any possible confusion.

- Ordnance safety precautions will be stressed during the in-brief and rigidly enforced by all UXO specialists during sweep operations.

- Emphasize the need for alertness on the sweep line. No skylarking or excessive conversation will be permitted.

- Protective clothing will be worn at the sweep area because of the possible high winds and the intemperate climate. Since sweeping will continue in a light drizzle or mist, it is important that personnel are adequately protected from the weather while in the field or in transit.

- The Search Effectiveness Probability (S.E.P.) test and the need for validation tests will be explained.

- Other pertinent information as required (i.e., terrain, vegetation, HCR).

4.1.6 Calibration Grid and Instrument Check-out Procedure

Equipment will be tested in accordance with the manufacturer's operation instruction manual. During this inspection, the equipment is checked for compliance with minimum operational and safety requirements. In addition to the scheduled maintenance inspections, electronic equipment is tested daily in accordance with the operator's manual to ensure the equipment is calibrated and functioning properly. Equipment log books are maintained to record the results of each test. Electronic

equipment used in geophysical surveys will receive a final function test just prior to operation in the field. Special on-island operational and safety requirements will be addressed during daily safety briefings.

To perform this final function test, a clean area near the work area will be seeded with ferrous and non-ferrous materials at several depths to simulate suspected buried UXO. Test items will be inert ordnance of similar construction to actual UXO expected except the test items will carry no explosive fillers or mechanical actuators of any kind. The equipment will be operated in this calibration grid to verify sensitivity to locate the buried items. The results of the calibration procedures will be recorded in the log sheet. All UXO locating equipment will be tested to ensure proper operation every morning prior to each days use as well as several functional checks during the day.

These readings will serve as a baseline reading. An instrument reading differing more than 25 percent from the baseline reading may suggest equipment failure or procedural error. Equipment that does not function as detailed in the operator manual will be rejected and repaired or re-calibrated by the manufacturer prior to use. Test materials that are buried are only for operator checkout of instruments and will be removed and accounted for prior to departure from the project area.

4.2 UXO Clearance Operations

This model clearance consists of three types of UXO clearance operations: surface, subsurface, and a combination of surface and subsurface.

All UXO clearance areas will be restored as the model clearance progresses.

4.2.1 Surface Clearance

A surface clearance is conducted on Kaho`olawe Island in order to remove all items (trash) foreign to Kaho'olawe Island. The surface clearance also aids in the conduct of any follow-on subsurface clearance.

Large items of trash, such as former targets, will require extensive work in order to classify it as free of UXO prior to turn over to OHM. UXO personnel will inspect the item for UXOs prior to movement; a remote moving system will be used to move the item. All movement will be performed remotely. If necessary, the item may need to be cut into more manageable pieces. UXO personnel will be present at all times during these procedures in order to certify the trash is clear of ordnance.

Small items of trash will be evaluated in a series of steps. The first evaluation is whether the item is or is not a UXO. If not a UXO, the item is removed and staged for ultimate removal by BPI. If the item is a UXO, the second evaluation is whether it can or can not be moved. If the UXO is determined safe to be moved, the UXO is removed and staged separately for ultimate removal by BPI. If the UXO is considered not safe to move, the third evaluation is whether the item can or can not be blown-in place. If it is determined that the UXO can not be blown-in-place because of HCR considerations, a fence is installed around the UXO.

During UXO clearance operations, UXO personnel will remove/dispose of all surface UXO. This will involve removing all UXOs that are visible or partially visible on the surface. This may require minimal hand excavation, which is not considered to be intrusive in nature, to determine positive identification. UXO items will be inspected to conclude if transportation or disposal in place is appropriate.

4.2.2 GIS-UXO Search Methodology

A Geographic Information System (GIS) will be established for each of the clearance areas. Equipment required for this system includes an Intergraph TD-2 GIS Workstation with a Microsoft Windows NT operating system running Microstation PC Version 5 software. The Intergraph Modular GIS Environment (MGE) family of mapping and GIS software products such as MGE Basic Nucleus (MGNUC), MGE Projection Manager (MSPM), and MGE Map Finisher (MGFN) will be utilized.

A copy of recent aerial mapping of Kaho`olawe covering the Hakio`awa Area and the Main Road System and Honokanai'a (Base Camp) Areas will be requested. This mapping, referenced to the Hawaii State Plane Coordinate System - Zone 2 (5102) and the North American Datum of 1983 [NAD83], will serve as the base design file in the GIS. Any available electronic formatted archival mapping (Soil Classifications, Historic, Cultural, and Archaeological Sites, Environmentally Sensitive Areas, Areas of Spiritual Significance, and Military Operational Plans) will be entered into the GIS. The GIS operator will use the MSPM software to rectify and integrate the archival mapping file(s) by matching a minimum of three (3) points common to the archival mapping and the recent aerial mapping and applying a least squares adjustment to the archival mapping file.

Based on this data, a definitive boundary of each operational area will be outlined and a investigation grid alignment superimposed. A "working" map of each Area will be prepared with coordinates for each grid corner listed. The surveyor will establish semi-permanent horizontal control points at each Area and use the working map provided by the GIS operator to survey and mark the location of each the grids. The markers used to define the corners of each grid shall remain throughout the duration of surface and subsurface investigation and removal actions and will be removed only upon completion of these efforts.

Each investigation grid will be further subdivided into search lanes to control surface clearance and geophysical survey operations. A geophysical search will be conducted in all subareas requiring same following completion of the surface clearance action in which all visible UXO and metallic debris will be removed. An EM-61, MK-26, or equivalent geophysical mapping equipment with automated data recording capabilities will be used to complete the geophysical survey in Level II areas. The data recorder will be periodically reviewed during operations to ensure that all systems are functioning and data is being collected Data shall be examined for any inconsistencies during downloading of the data recorder to a portable computer. In addition, the data will be further evaluated when the data from the geophysical survey is formatted, processed, and analyzed. A listing of X, Y, approximate mass and depth, and probable nature of all anomalies will be prepared and entered into the GIS.

Search maps showing the location of each anomaly of interest will be prepared and forwarded to the survey team. The surveyor will stake the location of each anomaly of interest for excavation by the intrusive investigation team. The position of all confirmed UXO items excavated by the intrusive investigation team will be located by the surveyor for entry into an Ordnance Information System level within the GIS. Final mapping of each Area will be completed with all findings and results shown.

4.2.3 Subsurface Clearance

The UXO excavation teams will be provided final versions of dig map coordinates from the GIS operator. The team will re-locate anomalies with magnetometers and excavate the anomalies. Anomalies will be excavated to the prescribed depth to determine their identity. If the anomaly is determined to be ordnance, the item will be inspected to ascertain if transportation or disposal in place is appropriate.

A clearance map will be produced showing the clearance area. The X and Y location of ordnance will be surveyed and photos will be taken and two copies will be provided to the Navy. All data gathered during the excavation will be entered into the UXO knowledge-base (data logger ordnance information system) for association with the geophysical signal by location.

Surface/subsurface contacts identified as UXO will be classified as either safe to move or unsafe to move by the UXO Supervisor. UXO determined unsafe to move will be marked with a red pin-flag for in-place destruction. The UXO Specialist Supervisor will notify the Range Control Officer to schedule the item for the next disposal operation.

If the subsurface contact proves to be non-UXO, it will be removed and the hole rechecked with a magnetometer. If the hole is "clean", it will be refilled and tamped. If metal residue is present in the soil and it is obvious that no ordnance is present, the hole excavation will remain open until the Quality Control (QC) and Quality Assurance (QA) actions have been completed. The open holes will be marked with flagging tape as a warning to personnel transiting the work area. At the conclusion of a successful QA check by the OHM representative, the hole will be refilled and the warning tape removed. All access/excavation/detonation holes will be backfilled in accordance with the criteria reflected in Annex D.

If excavation is required in an area of HCR concern, excavation will proceed only after approval by the OHM representative, the Navy representative, and the KIRC representative. Should BPI not be allowed to excavate a magnetic anomaly because of HCR concerns, that anomaly will be marked on the map as a suspected UXO.

UXO areas on Kaho'olawe Island are not suspected of containing Chemical Surety Materials (CSM). If suspected CSM is encountered during UXO operations, all work will immediately halt and personnel will withdraw upwind from the area and notify the RCO. BPI personnel will stand-by for follow-on instructions by the NTR.

4.2.3.1 Selective Brush Pruning/Restoration

BPI shall take all reasonable measures to insure that the cleanup activities do not result in a measurable increase in soil erosion. BPI shall be responsible for the backfill of excavated areas. Clearance operations will require selective pruning jointly decided during the Review meeting, in each case by BPI Team, OHM, the Navy, and the KIRC representatives. BPI shall provide chipping equipment to deal with trimmings generated during tree cropping activities. Trimmings 2" in diameter and smaller shall be chipped. The mulch generated and the material larger than 2" in diameter will be stockpiled in designated areas. All limbs/branches, etc. will be carried vice dragged along the ground to preclude unnecessary disturbance of any HCR areas and artifacts.

4.2.3.2 Terrain Dependant

The potential exists for the completeness of the UXO survey to be compromised due to the presence of vegetation or other environmental factors which limits access to an area. QC in this situation is not practical; assurance of the completeness and certainty of the survey is acknowledged to be compromised. These areas will be surveyed for the presence of UXO to the best of the abilities of the UXO Specialists, but subject to the limitations imposed by the vegetation. The search area will be mapped and annotated as an area in which the scope of UXO survey/removal (e.g. removal of all UXO to a specified depth) could not be met.

The decision concerning which magnetometer to use in conducting a subsurface clearance is dependant upon the terrain of the area to be cleared.

4.2.3.2.1 Vegetated and/or Sloped Terrain

For an area that is covered with vegetation that can not be prunned and/or is sloped, subsurface clearance operations will require the use of one of the hand-held magnetometers described in Section 7.1.

4.2.3.2.2 Cleared and Flat Terrain

For an area that is both clear of impeding vegetation and is relatively flat, subsurface clearance operations will use the Geonics EM61 High Sensitivity Metal Detector.

4.2.3.3 Subsurface Clearance Excavation Procedures

Anomalies detected through geophysical means (either a handheld magnetometer or the EM61) will be excavated either manually or mechanically, depending upon the desired depth of clearance.

4.2.3.3.1 Manual Excavation

During manual excavation procedures of geophysically imaged items, the UXO subsurface excavation teams will uncover anomalies with the use of hand held shovels. Excavated dirt will be piled to the

outside of the hole at least one half of the width of the hole from the point of excavation. Only UXO qualified personnel will conduct manual excavation.

4.2.3.3.2 Mechanical Excavation

During mechanical excavation procedures, the UXO subsurface teams will uncover anomalies with the use of a backhoe run by a qualified backhoe operator. Positive safety control during this procedure will be maintained by a UXO Specialist observing the bucket of the backhoe as dirt is removed from the excavation. Upon conclusion of excavation, the hole will be backfilled in accordance with re-vegetation procedures. The UXO Specialist will contact the archaeologist, if required, at which time all intrusive operations at the excavation area will cease.

5.0 EXPLOSIVE MATERIAL TRANSPORTATION

During transportation of unexploded ordnance or explosive material, safety is the primary concern. The most obvious requirements are to protect personnel, the general public, and the environment from fire, blast, noise, fragmentation, and toxic releases. Any item encountered while conducting the UXO Model Cleanup will be inspected by a UXO Supervisor to ensure the item is safe to move and is transportable.

All affected agencies will be apprised of any planned transport of UXO and demolition materials. Timely notification will give agencies adequate opportunity to implement or coordinate their support requirements. Movement routes will be established which reduce the number of personnel and facilities that may be exposed to the hazards.

5.1 Air Transportation

Transport of explosive materials to Kaho'olawe Island will be accomplished by helicopter. The helicopter contractor will be required to obtain the necessary licenses and permits to authorize air transport of explosive materials. The helicopter contractor will also provide timely notification to the appropriate agencies to adequately implement or coordinate their support requirements as required by law. All affected agencies on and off Kaho'olawe Island will be apprised of any planned transport of demolition materials. Helicopter movement routes will be established to reduce the number of personnel and facilities that may be exposed to the hazards.

5.2 Ground Transportation

Transportation of demolition materials on Kaho'olawe Island will be accomplished in a vehicle operated by a UXO Supervisor as driver with a UXO Specialist rider. There will be no concurrent transportation of passengers and demolition materials. When it is necessary to transport blasting caps and other demolition materials in the same vehicle, the blasting caps will be transported in a MK 663 container located in the forward compartment of the vehicle, with the remaining demolition materials in the rear compartment of the vehicle. Blasting caps will be removed from the MK 663 container only immediately prior to commencing demolition operations. Non-electric blasting caps will be

carried in a wooden or plastic 10 cap box to the demolition area. The non-electric blasting cap container will be in a padded ammunition container located in the front of the transport vehicle separated from the remaining explosives.

All loads will be visually inspected by the driver to ensure that the load is properly secured and safe to move. When transporting explosives or UXO, vehicles will not exceed the posted speed limit. In many areas, a prudent speed may be less than the posted speed limit, in which case the driver may not exceed a safe and reasonable speed.

Vehicles transporting explosives or UXO will be properly placarded, if placarding is required.

Vehicles must meet the following minimum requirements:

- Exhaust system is maintained in good mechanical condition and not exposed to accumulations of oil, grease, or gasoline; ample clearance from the fuel lines and other combustible materials must be provided
- Electrical system is working, in good repair, and properly attached
- Brakes, steering, and other mechanical systems are working and in good condition
- Fuel tank and piping are secure and not leaking

Operators of transport vehicles will be UXB employees who have been carefully selected, trained, and informed of the explosive hazards involved with the cargo. Prior to movement of explosive laden vehicles, the cargo will be checked to ensure containers are loaded, blocked, braced, tied down, or otherwise secured to the vehicle body to prevent movement. Use care in selecting a method to prevent damage to the containers or explosives. The following general safety precautions will be observed during transport operations:

- No person is permitted to ride on/in the cargo compartment of a motor vehicle transporting explosives
- Explosives will not be transported in the passenger compartment of a vehicle unless contained in a MK663 container
- Explosive laden vehicles will not be left unattended
- Smoking in vehicles transporting explosives will be prohibited
- Refueling of vehicles will be accomplished without the explosive cargo
- Safety chains will be fastened between the tow vehicle and trailer (if used) to transport explosive material

6.0 DEBRIS REMOVAL

All surface debris will receive a 100% inspection and will be segregated and moved to designated UXO remnant staging areas. The weight of the removed UXO remnant will be recorded for each grid.

6.1 Ordnance Related Remnants

UXO remnants will be inspected and determined to be free of explosives by the UXO QC Specialist. A final inspection will be made by OHM QC personnel after which an inspection certificate will be completed. The certificate will state that "the property listed hereon has been inspected and to the best of my knowledge and belief, contains no items of an explosive nature or mechanical actuated hazard". All material turned in will be accounted for by completing a DD Form 1348-2.

6.2 Non-Ordnance Related Debris

Removal of non-UXO related debris will be essential to successfully completing the survey of each grid, especially when conducting a sweep with an ordnance detector. Non-UXO scrap will be removed from the sweep grid for later transport to the OSA.

7.0 UXO DISPOSAL

During disposal of unexploded ordnance and related material, safety is the primary concern. The most obvious requirements are to protect personnel, the general public, and the environment from fire, blast, noise, fragmentation, and toxic releases.

7.1 UXO Disposal Requirements

All personnel directly or indirectly engaged in unexploded ordnance operations will be thoroughly trained and capable of recognizing hazardous explosive exposures. All personnel are required to read, become familiar with, and adhere to the requirements contained in this attachment to assure that all general safety regulations and safe work practices are observed at all times. Absence of a written safety requirement does not indicate that safeguards are not required.

These procedures will be utilized by all personnel engaged in demolition area activities. However, situations may warrant additional safety measures, such as fire trucks, medical personnel, and protective clothing. The Range Control Officer has the overall responsibility to comply with the minimum requirements listed below and the authority to upgrade as the situation dictates.

These procedures provide instructions for the final disposal of unexploded ordnance, HE loaded components, propellants, and pyrotechnics. Operations include removal from storage, transfer to the demolition area, unloading, unpacking, and detonation.

7.2 Demolition Responsibilities

7.2.1 UXO Safety Officer

The UXO Safety Officer is responsible for assuring adequate safety measures and housekeeping are implemented -- all operations are to be carried out in a safe, clean, efficient, and economical manner.

7.2.2 UXO Demolition Supervisor

The disposal shall be under the direct control of an experienced and trained UXO Supervisor charged with the responsibility for all activities within the area. The UXO Demolition Supervisor shall be responsible for training all personnel regarding the nature of the materials handled, the hazards involved, and the precautions necessary. The UXO Demolition Supervisor shall be present during all disposal operations.

7.2.3 Task Assignments

Individuals shall report the completion of tasks to the UXO Demolition Supervisor. The types of tasks which *may be* required are:

- Obtain permission from Range Control to conduct demolition operations
- Secure all access roads to the area
- Visually check area for any unauthorized personnel
- Check firing wire for continuity and shunt, if using an electrical firing system
- Prepare designated pits
- Check continuity of detonators, if using an electrical firing system
- UXO Demo Supervisor will maintain custody of blasting machine or fuze ignitors
- Secure detonators in a safe location
- Place UXO in pit and place charge in desired location

7.3 General Safety Precautions

- Operations shall be conducted in accordance with DOD 6055.9-STD
- Personnel working with electric blasting caps or other electro-explosive devices will not wear static producing clothing such as nylon, silk, or synthetic hair.

- Keep blasting caps in approved containers, located at least 7.62 meters (25.0 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 and other personnel during handling. This will minimize injury should the item explode.

- Test electric blasting caps for continuity at least 25 feet downwind from any explosives prior to connecting them to the firing circuit.

- Blasting caps used for initiation of explosive charges will not be buried.

- If explosive charges are to be covered or tamped with earth, charges will be fitted with detonating cord leads that protrude 1.8 meters (6 feet) through the earth.

- Blasting caps less than the equivalent of a commercial No. 8 cap will not be used unless used with commercial explosives and approved by the explosives manufacturer.

- Non-electric blasting caps will only be handled by their open ends to prevent heating of the explosive contents, which renders them more sensitive.

- Capped safety fuses will be handled to prevent blasting caps from contacting each other.

- Only those explosives or initiators needed to meet the requirement of the operation will be transported to the disposal area.

- Electric blasting caps of different manufacturers or types will not be used in the same system.

- Electric blasting caps will be continuity tested with a galvanometer prior to connection to the firing circuit. The shunt will not be removed from the wires until the individual performing the operation has been grounded. After testing, the wires will be immediately twisted and reshunted until the moment of connection.
- Prior to making connection with the electric blasting cap, the firing circuit will be continuity tested.

- Electric blasting caps will be connected to the firing circuit before connection to the main initiation charge.

- The blasting machine or activating device will not be surrendered to the individual designated to fire the shot until the UXO Demolition Supervisor is assured that the area is clear.

7.4 Procedures

Prior to conducting a disposal operation, safety briefings will be conducted which will include, as a minimum: phases of the operation, review of explosive handling and EMR precautions, location of safe area, emergency notification procedures, area specific characteristics, type of UXO being destroyed, placement and quantity of counter charge, misfire procedures, post-detonation clean up of area, care and handling of explosive materials, personal hygiene, two person rule, potential trip/fall hazards, location of range vehicle (keep engine running), wind direction (toxic fumes), and the location of first aid kit and fire extinguisher.

BPI shall establish radio contact with the OHM Command Center at Honokanai'a (Smugglers Cove) prior to commencing UXO demolition operations who shall ensure that all other parties on the Island are notified and are outside of the fragmentation zone, and that there are no aircraft in the area. BPI shall notify the Command Center of any planned demolition operations and prior to initiating any explosives and inform them of the anticipated detonation time. BPI shall notify the OHM Command Center 30 minutes prior to and immediately before a detonation. The Command Center will make the appropriate notifications including Honolulu FAA. The BPI UXO Supervisor will make an all clear radio report to the OHM Command Center after the detonation has occurred and report the results of the demolition operation inspection.

Control of the area must be maintained during disposal operations. All personnel who are not essential to disposal operations must evacuate to a safe area. Access roads entering the blast area will be blocked during explosive disposal operations to ensure that unsuspecting individuals are not placed in jeopardy by the explosion. Warning signs around the perimeter of the disposal area will be in place and in good repair. The UXO Demolition Supervisor will assure the area is clear of personnel and equipment prior to permitting attachment of the initiation devices to the priming charge. A red warning flag will be displayed at the entrance to the Demolition Area.

An observer will be stationed at a location where there is a good view of the air and surface approaches to the Demolition Area. It shall be the responsibility of the observer to notify the UXO Demolition Supervisor to suspend firing if any aircraft, vehicle, or personnel are sighted approaching the general demolition area.

A minimum of two qualified UXO Specialist, one of which will be the UXO Demolition Supervisor, will conduct disposal operations. An electrical firing system provides better control of the demolition activities, yet, on specific areas, based on the terrain, vegetation and other area parameters, the use of a non-electrical firing system may be acceptable. The UXO Demolition Supervisor will decide which firing system is adequate for the specific task to be accomplished. Control of initiation devices will remain with the UXO Demolition Supervisor until attachment to the firing circuit.

Material awaiting destruction shall be stored in accordance with NAVSEA OP5 volume 1. The material shall be protected against accidental ignition or explosion from fragments, grass fire, burning embers, or detonating impulse originating in materials being destroyed. All dry grass, leaves, and combustible materials within a 15 M (50 foot) radius of the holding area will be removed.

In the event of a fire or unplanned explosion, put out the fire. If unable to do so, evacuate to the Landing Zone and radio for help. Subject to the remoteness of the open detonation area, BPI personnel may be employed as augmentee fire fighters.

Prevailing weather condition information will be obtained from the U.S. Weather Service; this data will be logged before each detonation. Demolition charges will not be primed or connected for electrical firing during the approach or presence of a thunderstorm. Other weather conditions (high winds, dust storms, temperature inversions, low altitude clouds, or a cloud coverage of more than 50%) may adversely impact planned demolition operations. The UXO Demolition Supervisor will take these conditions into consideration when determining whether or not to conduct demolition operations.

The maximum quantity of explosives that may be disposed of at one time will include the net explosive weight of the item(s) to be disposed of plus the weight of the priming charge. The established explosive limit for the area will not be exceeded. If a limit has not been established, the UXO Supervisor will direct a series of detonations be conducted with increasing net explosive weights until an acceptable limit can be established.

Personnel will remain at the area as long as the possibility of fire exists as the result of the operation.

In the event of a misfire or suspected low order detonation of the priming charge, personnel will remain clear of the blasting area for a period of thirty minutes after expected detonation. One qualified UXO Specialist will re-enter the area to inspect the misfire or suspected low order detonation; a second UXO Specialist, remaining clear of the danger area and taking advantage of natural barriers, will act as a safety back-up to aid the person correcting the misfire should an accident occur.

At the conclusion of detonation and after a five minute wait, the UXO Demolition Supervisor will inspect the area prior to allowing other personnel to enter the blast area. BPI employees will conduct a sweep of the detonation area to gather fragments and explosive residue, if present. Intact ordnance items that failed to detonate will be counter-charged and blown in place. Explosive residue will be collected and detonated. Prior to transport to a staging area, metal fragments will be examined to ensure complete detonation of the explosive material.

7.4.1 Kaho'olawe Specific Requirements

UXO determined to contain explosives or explosive residue and classified as "safe-to-move" shall be transported to the Open Storage Area either in the Clines Gulch area or an area designated close to the activity. BPI personnel will blow-in-place all UXO that is deemed unsafe to move. A situation may occur in which an item cannot be blown-in-place because of HCR considerations. In this instance, the item will be fenced-in and the location recorded on the map. WP or pyrotechnic material will not be transported to the UXO Open Storage Area.

7.4.2 Blow-in-Place Procedures

BPI shall conduct disposal operations in accordance with the FAA permit.

BPI will notify the appropriate personnel of its intent to blow-in-place. This notification will take place at least 30 minutes prior to the expected time of detonation.

Detonations will occur only after all unnecessary personnel have left the area, road guards have been posted, and the required post personnel have been notified. Prior to conducting the disposal procedures, the UXO Demolition Supervisor will check the area and available drawings to determine if there are any underground utilities that may be affected by a detonation.

BPI personnel not involved in the disposal operation will act as perimeter guards as directed by the UXO Demolition Supervisor.

During the detonations, a designated emergency vehicle will remain in the area.

The area where disposal operations are being conducted will remain secured until the "all clear" signal is issued by the UXO Demolition Supervisor.

7.4.3 Disposal Operations in the Honokanai'a (Base Camp) Area

If required, Kaho'olawe personnel will be notified to conduct an evacuation. All personnel will be evacuated to a safe location. BPI will determine minimum safe distances, and will establish and control these boundaries.

BPI will conduct disposal operations only after all personnel protective measures have been completed and reported to the UXO Demolition Supervisor.

BPI will take property protective measures such as those outlined in DOD 6055.9-STD -- including but not limited to: sandbagging, tamping with earth, and barricading.

Evacuees will only be permitted to re-enter the area after the demolition point has been inspected and the "all clear" has been given by the UXO Demo Supervisor.

7.4.4 Preparing Explosive Charge for Initiation

- Prime the explosive charge
- Depart to firing point (if using non-electric firing system, obtain head count, yell **"Fire In The Hole"** three times, pull igniters, and depart to designated safe area), or connect firing wires to blasting machine yell **"Fire in the Hole"** three times (if using electric firing system) and initiate charge

- Take cover
- Obtain a head count
- Remain in designated safe area until UXO Demolition Supervisor announces **"All Clear"**.

7.4.4.1 Nonelectric

A nonelectric system is one in which an explosive charge is prepared for detonation by means of a nonelectric blasting cap. The basic priming materials consist of a nonelectric blasting cap, which provides the shock adequate to detonate the explosive, and the safety fuse, which transmits the flame that fires the blasting cap. If more than one charge must be detonated simultaneously, the non-electric system must be connected with detonating cord to ensure the simultaneous firing. (See Nonelectric Priming Safety Precautions.)

- Cut and discard approximately a 6-inch length from free end of safety fuse to prevent a misfire caused by exposed powder absorbing moisture from the air. Then cut off 36-inches of safety fuse to check burning rate. The fuse may be ignited by a match, but a fuse igniter is recommended for greater accuracy. Conduct this test at least 25-feet downwind from any explosives.
- Ignite fuse and note time required for fuse to burn. Then, compute burning rate per foot by dividing time in seconds by length in feet. All fuses in the same roll should burn at the same rate. The burning rate will vary depending upon the type of fuse, i.e., older military types of fuse coils should burn approximately 30-45 seconds per foot, while the new M700 safety fuse should burn uniformly at 40 seconds per foot.
- Cut fuse long enough to permit person detonating the charge to reach a safe distance by walking a normal pace before the explosion. A minimum of 6-feet of safety fuse will be used. Insure that the safety fuse is cut smoothly and squarely before inserting it into a blasting cap. A jagged or rough cut can cause a misfire.
- Attached fuse igniter inserting free end of safety fuse until it rests against primer.
- Take a blasting cap from cap box and inspect it by looking into open end. If any foreign matter or dirt is present, hold it with open end down, and shake it gently or lightly bump hand holding it against other hand. If foreign matter does not come out, discard cap.
- After blasting cap has been seated, hold cap firmly against fuse.

- Slide second finger down outer edge of blasting cap to guide crimpers, and thus obtain accurate crimping.

- Crimp blasting cap at a point approximately 0.125 to 0.25-inch from the open end. If operations are conducted during inclement weather, a second crimp in close proximity to the first may be used to further waterproof/seal blasting cap.

- Insert cap into explosive (donor charge).

- Lay out safety fuse in a straight line and secure it at each end in such a way as to prevent the safety fuse from recoiling itself after ignition.

- Fire the fuse igniter. If a fuse igniter is not available, light safety fuse with a match by splitting the fuse at end, placing head of an unlighted match in powder train, and then lighting the inserted match head with a flaming match.

7.4.4.2 Electric

An electric firing system is one in which electricity is used to fire the primary initiating element. An electric impulse supplied from a power source, usually an electric blasting machine, travels through the firing wire and cap lead wires to fire an electric blasting cap. The chief components of the system are the electric blasting cap/electric squibs, firing wire, and the blasting machine. The preparation of the explosive charge for detonation by electrical means is called electric priming. (See Electric Priming Safety Precautions.)

NOTE: Static electricity is an increased hazard when operating in an extremely cold climate or area of low humidity. Care must be taken to reduce the possibility of premature detonation of electric blasting caps and other electroexplosive devices. Do not wear outer or undergarments made of wood, silk, or synthetic textiles such as rayon and nylon while working with an electric firing system.

NOTE: Radio Frequency Energy, stray currents, and galvanic action all need to be considered when utilizing electric firing systems.

- Prepare and place all explosive charges.

- Lay out the firing wire.

    - After locating a firing position a safe distance away from the charges, lay out the firing wire. (Do not drag firing wire over sand which may generate a static charge.)

- Test the firing wire by using a blasting galvanometer or test set, after you have ensured the testing equipment is functional, and after the firing wire has been unreeled. Ensure ends are twisted together when not testing.

- Separate firing wire conductors at both ends, and touch those at one end of the galvanometer/test set posts. Needle should not move or lamp glow; if either occurs, the firing wire has a short circuit.

- Twist wires together at one end and touch those at other end to galvanometer/test set posts. This should cause a wide deflection of the needle or the lamp to glow. No movement of the needle indicates a break; a slight movement indicates a point of high resistance which may be caused by a dirty wire, loose wire connections, or wires with several strands broken off at connections.

- Ground yourself. Test the blasting caps by removing the short circuit shunt. Touch on end of the cap lead wire to one post and other cap lead wire to other post. If galvanometer's needle deflects slightly less than it did when the instrument was tested, the blasting cap is satisfactory; if not, the cap is defective and should not be used; should read at least half-scale. Ensure cap lead wires are twisted together when not testing.

- Ground yourself. Test entire circuit after inserting caps into the charges and connecting charges with the firing wires and moving to firing position. Touch free ends of firing wire to test instrument posts. This should cause a wide deflection of needle or lamp to glow. If the firing circuit is defective, shunt wire. Then go down-range and recheck circuits. If the splice is found defective, replace wires. If the cap is found defective, replace it. Retest the entire circuit again to make sure that all breaks have been located before attempting to fire.

- Exercise the blasting machine several times before attaching the firing wire. Untwist ends of the firing wire and fasten them to the posts of the blasting machine. Upon one last check of the area, yell **"Fire in the Hole"** three times then function the machine.

7.4.5 Post Demolition/Disposal Procedures

Do not approach a smoking hole or allow personnel out of the designated safe area until cleared to do so.

- After the "All Clear" signal, check pit for low orders or kick outs

- Surface sweep pit and remove any fragmentation

- Back fill hole, as necessary
- Police up all equipment
- Notify police, fire, etc. that the operation is complete

7.4.6 Misfire Procedures

A thorough check of all equipment, firing wire, and detonators will prevent most misfire situations.

In the event of a misfire, the UXO Supervisor will be notified. All other personnel will be notified of the event by radio and instructed to hold their positions until the "all-clear" is given.

7.4.6.1 Electric Misfires

In order to prevent electric misfires, one UXO Specialist must be responsible for all electrical wiring in the circuit. If a misfire does occur, it must be cleared with extreme caution. The UXO Specialist that is most familiar with the circuit will investigate and correct the situation.

- Check the connections to the blasting machine and make a second (and third) attempt to initiate the charge
- If unsuccessful, disconnect the blasting machine and connect to another blasting machine (if available) and attempt to initiate charge
- Commence a 30-minute wait period
- After the wait period has expired, a designated UXO Demolition Supervisor will proceed down range to inspect the firing system; a safety observer must watch from a protected area
- Disconnect and shunt the detonator wires, connect a new detonator to the firing circuit, and prime the charge without disturbing the original detonator
- Follow normal procedures for effecting initiation of the charge

7.4.6.2 Non-Electric Misfires

In the event of a non-electric misfire, the individual who placed the charge should investigate and correct any problems with the system.

After an attempt has been made to fire the charge, investigation of any detonation problem will be delayed for at least 30-minutes plus the burning time of the fuse. Under no circumstances will the demolition be approached before the 30-minute waiting time has elapsed.

For above ground misfires of charges primed with blasting caps, a primed, one-pound charge will be placed next to the misfired charge and detonated. Each misfired charge or charge separated from the firing circuit that contains a blasting cap requires a one-pound counter-charge for detonation. Scattered charges that contain blasting caps will not be touched -- they will be destroyed in place.

For buried charges, the tamping will be removed to within one foot of the misfired charge. Depth checking will be performed constantly while digging to avoid striking the charge. When within one foot of the misplaced charge, a primed, two-pound counter-charge will be placed on top of the original charge and detonated. If digging over the original charge is impractical, a new hole of the same depth will be dug alongside of the original hole, one foot away. A primed, two-pound counter-charge will be placed in the new hole and detonated.

7.5 Record Keeping Requirements

The UXO Demolition Supervisor will ensure the accurate completion of the logs.

The UXO Supervisor will monitor the entries in the log for completeness, accuracy, and compliance with meteorological conditions.

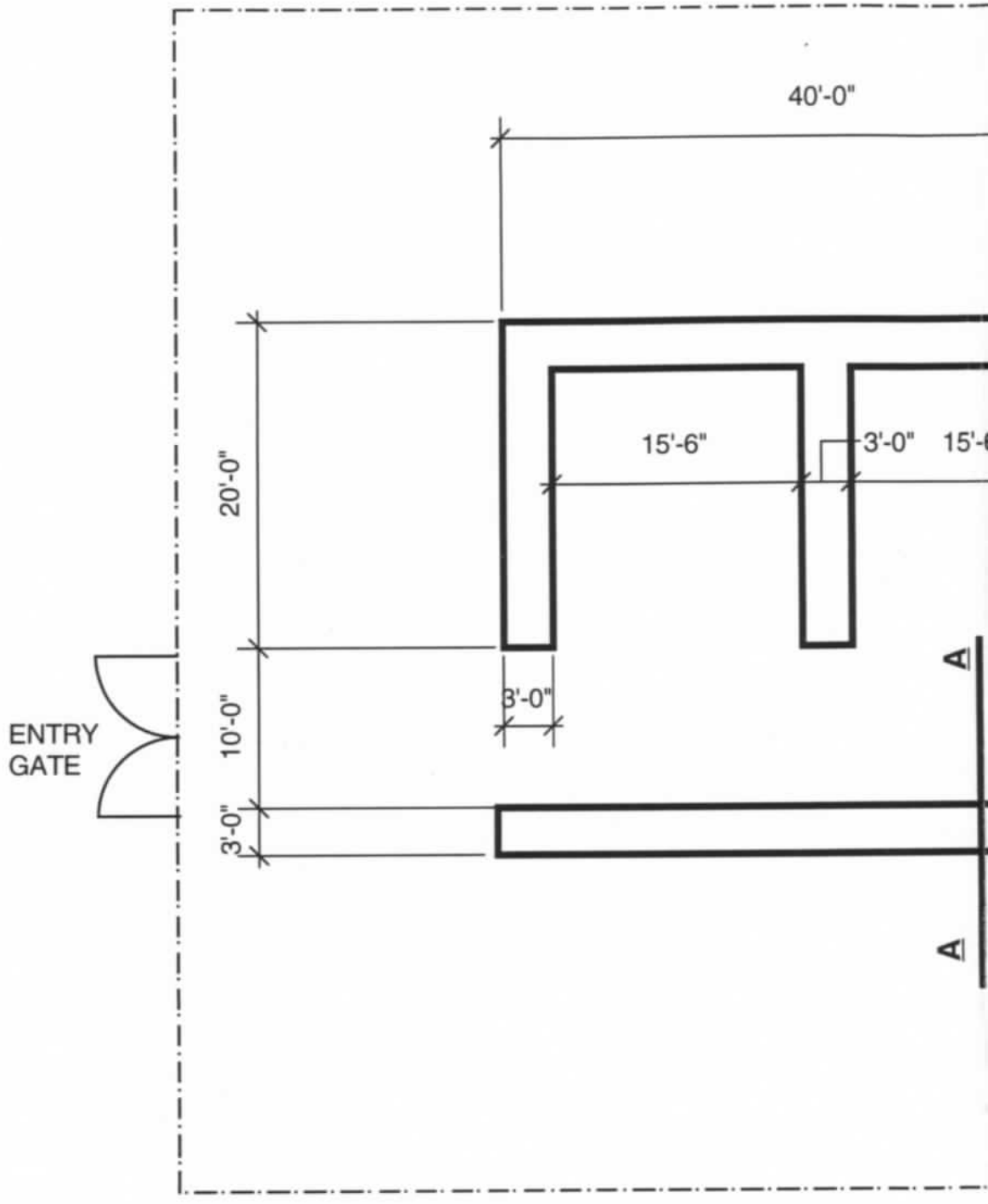
The UXO Demolition Supervisor shall enter data in the Demolition Material Accountability Form to match each Magazine Data Card on which detonation activities have occurred. The quantities recovered should also be the quantities destroyed.

BPI will retain a permanent file of all Demolition Records, including permits, Magazine Data Cards, training records, inspector reports, waste manifests if applicable, and operating logs.

7.6 Explosive Holding Area (EHA)

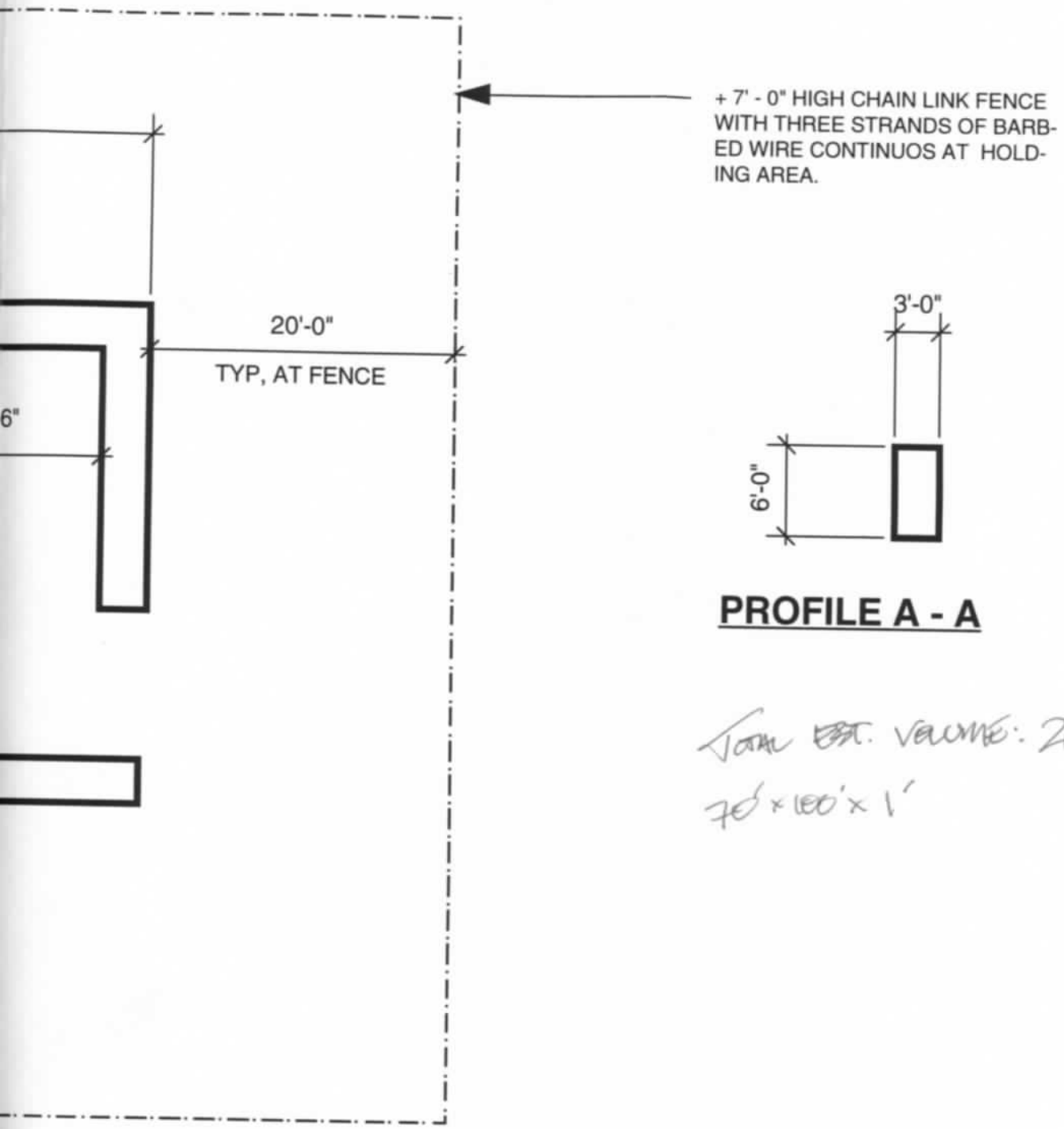
All demolition materials on Kaho'olawe Island will be stored in accordance with NAVSEA OP5, Volume 1. The U.S. Navy will provide two temporary portable explosive magazines for storage of demolition materials on Kaho'olawe Island. BPI Team will clear the EHA designated by the U.S. Navy prior to the emplacement of the portable explosive magazines. Once these areas have been accepted as clear of UXO, OHM will relocate and set-up the temporary explosive magazines. These magazines will be secured by a high security padlock approved for AA&E, with the key under the control of the UXO Supervisor under the RAC contract. At no time will explosives be stored in the base camp area. Blasting caps will be stored in the MK 663 container at all times, and positioned in the designated magazine.

Figure A-2



PLAN

UXO EXPLOSIVES HOLDING AREA



PROFILE A - A

TOTAL EST. VOLUME: 262 YD3
70' × 100' × 1'

	DATE: AUGUST 31, 1995
	SCALE: 1" = 10' - 0"
	DRAWN: DUX DESIGNS, INC.

7.7 Storage Procedures

7.7.1 Safety

7.7.1.1 General

No explosive, propellant, or other dangerous material with unknown stability shall be stored with other materials of unknown stability or with explosives of proven stability. Segregated storage shall be provided until the stability of the material in question has been determined and approval for appropriately marked storage.. All personnel handling ammunition shall be specially alert for the evidence that the ammunition requires special handling.

7.7.1.2 Standard Operating Procedures

All ordnance handling activities shall be conducted in the safest manner possible. Each process shall comply with technical requirements; explosive safety standards; personnel qualification and certification requirements; occupational safety and health standards; federal, state and local environmental protection requirements; and security and physical security directives. Hazards inherent with processing ordnance or ordnance components must be clearly be identified and potential hazards must be minimized. Where necessary, emergency response, evacuation and contingency plans shall be developed and rehearsed.

7.7.1.3 Reporting Unsafe Conditions

All unsafe conditions or unsafe acts in or around magazines, or explosives areas shall be immediately corrected, if possible and promptly reported by employees to their immediate supervisors. The supervisor shall act positively to eliminate and prevent the recurrence of the potential accident hazards.

7.7.1.4 Tampering With Ammunition, Ammunition Components and Explosives

Any tampering with ammunition, ammunition components and explosives is prohibited. Unauthorized assembly of explosive components into inert ammunition items is prohibited. Excluded from this requirement is the handling and removal of normal samples required for quality control and other inspection requirements.

7.7.1.5 Personnel Protection

No employee shall be permitted to work alone. When establishing personnel limits, provisions shall be made for persons not actually engaged in the work being performed in the area. The inclusion of such personnel will permit the entry of UXO qualified inspectors, supervisors and authorized UXO qualified visitors into posted areas without stopping operations. Unauthorized personnel shall be strictly prohibited. The supervisor or other specifically designated persons shall be responsible to ensure that all unnecessary personnel are removed from within the Quantity-Distance (Q-D) area.

Operations shall be stopped in any operating building or area, if for any reason, unauthorized persons are within the Q-D area.

7.7.2 Aircraft Operations in the Vicinity of Ordnance Facilities

The following restrictions shall be observed during aircraft operations near ordnance facilities.

7.7.2.1 Overfly Restrictions

Aircraft, including helicopters, are not permitted to fly less than five hundred feet over magazines or ammunition staging areas, while ammunition handling is in process. In some cases the landing and takeoff patterns preclude compliance with this requirement, but aircraft should observe the approach-departure zones near explosives prohibited areas.

7.7.3 Construction and Siting

7.7.3.1 General

Construction features and location are important safety considerations when planning facilities that are to be employed as Potential Explosive Areas (PES) or exposed to the damaging effects of potential explosions. The effects of potential explosions may be altered significantly by construction features that limit the amount of explosives involved, attenuate resultant blast overpressure or thermal radiation and reduce the quantity and range of hazardous fragments and debris. Proper location of exposed areas in relations to PESs ensures against unacceptable damage and injuries in event of an accident.

7.7.3.2 Open Storage Area (OSA)

a. As depicted in Figure A-2 (UXO OSA), a module is a barricaded area comprised of a series of connected cells with rigid surface storage pallets separated from each other by barricades. A metal shed or other lightweight fire retardant cover may be used for weather protection for individual cells. Heavy structures or flammable material will not be used.

b. Module storage (open storage) may be used as determined necessary, however from the standpoint of explosives safety as well as reliability, priority shall be given to covered storage for items requiring protection from the elements. Module type storage is considered a temporary expedient and may not be employed in a place of standard methods for long term storage. The module storage facility is designed with two cells.

c. The designed maximum Net Explosive Weight (NEW) to be stored within each cell is 10,000 pounds. The maximum NEW of ammunition to be stored within the open storage area is 20,000 pounds.

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c. The designed maximum Net Explosive Weight (NEW) to be stored within each cell is 10,000 pounds. The maximum NEW of ammunition to be stored within the open storage area is 20,000 pounds.

7.7.3.3 Authorized UXO Storage

a. The UXO items that may be stored in the modules shall be limited to detonators and similar initiating devices, propellants and HE bombs, similarly cased Class/Division 1.1 ammunition, 20 mm and 30 mm ammunition.

b. UXO stocks in each module normally shall be limited to one type of item in the standard shipping configuration unless mixed storage is authorized by the controlling authority.

c. Module storage of UXO ammunition in flammable outer-pack configurations shall be minimized.

d. When fire retardant tarpaulins are used to cover, enough ventilation between the tarpaulin and the stored UXO ammunition shall be provided.

7.7.3.4 Requirements

a. Properly constructed barricades or undisturbed natural earth are effective means for protecting UXO (ammunition, or explosives), structures, or operations against high-velocity, low angle fragments although the barricades may be destroyed in the process. Since such fragments move along ballistic trajectories rather than straight lines, reasonable margins in barricade height and length must be provided beyond the minimum dimensions that block lines of sight. Barricades also provide limited protection against blast in the immediate vicinity. They do not provide any protection against high angle fragments and are ineffective in reducing the blast pressure in the far field.

b. Minimum barricade height required above the top of the stack is influenced by the width or length of the stack (storage pallet size). Heights in Table A-2 represent the minimum requirement for barricade locations based upon storage pallet sizes and separations shown. When feasible, barricade heights shall be increased by using a 5 degree angle above the horizontal instead of the 2 degree angle shown in Figure A-2.

c. The centerline of barricades between cells of the module shall be located at a point halfway between adjacent munitions storage pads. Back and end (outside) barricades shall be located at the same distance from the pads as those between the cells.

d. Maximum advantage shall be taken of natural barricades existing in the topography in siting these modules. If natural barriers are used to substitute for a portion of the module barricade, the protection provided shall be at least equivalent to that of the barricade.

e. Cell storage pallet size may be required to accommodate stocks. Table A-2 gives minimum pallet sizes necessary to handle most items in the explosives quantities given. Storage pallets shall be hard surfaced, if possible, in order to lessen the effects of earth shock from an accidental explosion. No restrictions are imposed on the arrangement of the cells within a

Table A-2 **Intermagazine Separation for Barricaded Storage Modules for Mass-Detonating Explosives**

NET POUNDS OF EXPLOSIVES	MINIMUM EXPLOSIVES-TO-EXPLOSIVES DISTANCE IN FEET (BARRICADED) BETWEEN:	BARRICADE HEIGHT BASED UPON STORAGE PAD SIZE*	
	CELLS AND MODULES $D = 1.1W^{1/3}$	CELL STORAGE PAD SIZE (WIDTH OR DEPTH), IN FEET	MINIMUM HEIGHT OF BARRICADE ABOVE TOP OF STACK IN FEET
COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
50,000	40	30	2
100,000	50	30	2
125,000	55	30	2
150,000	60	30	2
175,000	60	30	2
200,000	65	30	2
200,000	65	40	2½
225,000	65	40	2½
250,000	70	40	2½
250,000	70	50	3

* The barricade height above the explosives stack shown in column 4 will be increased 6 inches for each 10-foot increase in width or depth of the pad size shown in column 3.

module or upon the arrangements of groups of modules, except that the cell openings may not face toward each other unless they are barricaded or meet the standard Q-D criteria for unbaricaded aboveground magazines.

The distance between the foot of the barricade and the stack of UXO or ammunition or explosives is necessarily a compromise. The smaller the distance, the less the height and the length of the barricade required to secure proper geometry for intercepting projections. On the other hand, it may be essential to make the distance great enough to provide access for maintenance and vehicles.

7.7.4 Open Storage Area (OSA) Location and Positioning

7.7.4.1 General

Important safety considerations have been employed in the planning and selection of the UXO OSA. The effects of potential explosions can be altered significantly by construction features that limit the amount of explosives involved, attenuate resultant blast overpressure or thermal radiation and reduce the quantity and range of hazardous fragments and debris.

7.7.4.2 Location

a. The location of the OSA as provided by the Navy will be constructed at a locale below the 4 mile marker southwest of "Clines Gulch" on the Island of Kaho'olawe. The coordinates of this area is SSA/OSA-2B (UTM Coordinates; N2,271,923.72/E745,708.30).

b. The locations of the main road, HCR concerns and other exposed areas in relation to the OSA safeguards against unacceptable damage and injuries in event of an accident.

7.7.4.3 Positioning

Positioning of the UXO Open Storage Area will be such that the effects of potential explosions are altered significantly, by directing the resultant blast overpressure, thermal radiation and the quantity and range of hazardous fragments and debris towards a conspicuously less frequented area further safeguarding against unacceptable damage and injuries in event of an accident.

7.7.5 Quantity-Distance Requirements and Standards

7.7.5.1 Minimum Distances for Other Class/Division 1.1 Items, 1 to 30,000 Pounds

A minimum fragment distance of 1,250 feet shall apply to the quantities of between 1 and 30,000 pounds NEW of class /Division 1.1 explosives.

7.7.6 Segregation of Material

Ammunition material shall be segregated into four categories for safety reasons and ease of accountability. The four groups consist of bombs, projectiles, rocket and small arms.

7.7.7 Security

7.7.7.1 Fences

a. Category I and II missiles, rockets, ammunition and explosives storage areas must be surrounded with security fencing constructed and configured as below;

b. Minimum fence height is six feet, seven feet for new fencing, excluding top guard (outrigger).

c. Fence fabric must be chain link (galvanized, aluminized or plastic coated woven steel) 2-inch square mesh 9-gauge diameter wire, excluding any coating. Gates shall be installed and large enough to accommodate a one ton truck. Additionally, gates shall have installed a design for high security padlocks.

d. Posts, bracing and other structural members will be inside of the fence fabric. 9-gauge steel

7.7.8 Posting Requirements

a. A sign shall be posted at all the entrances of each ammunition storage point. The sign should indicate that every vehicle must stop, that each entrant must present proper credentials and that all articles prohibited within the area must be left outside the boundary of the magazine storage area.

b. The outside boundary of each storage area shall be posted to indicate that the area is a ammunition storage area and warn against unauthorized entry. The signs shall not be attached to the magazine. Boundary sign should state as a minimum:

   I. Danger

   ii. Keep Out

   iii. Unauthorized Entry is Prohibited

7.7.9 UXO Ordnance Storage Accountability

Demolition materials will be inventoried prior to acceptance. Discrepancies in the shipment will be immediately brought to the attention of the UXO Specialist Supervisor.

After receipt, a Demolition Material Accountability Form will be completed on each type of material. The form will be filed at the operations trailer; as operations progress and materials are expended, the form will be annotated to reflect the quantity used and quantity on-hand. A Magazine Data Card will be placed in the storage magazine and annotated to reflect the quantity of each type of material remaining in the magazine. The UXO Specialist Supervisor of demolition operations will be responsible for the accuracy of the information annotated on the form and data card.

7.7.10 Communications

Reliable primary and backup communication will be available for use in the UXO Open Storage Area to permit notification of emergency conditions. The communication system will be accessible to personnel working in the holding area and will be tested at least once during each shift. Call signs can be found in the Introduction section of the Final Work Plan.

a. Testing of radios will be conducted outside the perimeter fence of the OSA, open burn area, open detonation area and ammunition storage points.

7.8 Safing

That portion of an explosive ordnance disposal procedure which is designed to preclude the detonation or functioning of explosive ordnance and which involves the application of special military techniques and tools to interrupt functions or separate essential components of the ordnance. If the procedures involve options they shall be paired off as follows:

Pair A

Procedure - The series of steps implemented in order to prevent detonation or function of explosive ordnance.

Alternate procedure - A different yet equally effective, series of steps implemented to render an ordnance safe. No preference between the procedure and alternate procedure is implied or intended.

Pair B

Primary procedure - The preferred or more effective, method of rendering safe an explosive ordnance.

Secondary procedure - A clearly less effective method than the primary procedure; used only if the primary procedure cannot be used.

Reference: Navy EODB/Army TM Air Force TO 60A-1-1-15

BPI/UXB will, regard first and foremost all HCR concerns prior to conducting any UXO operation, i.e. sweep operations, UXO excavation, blow in place (BIP), routine disposal

BPI- Definitions of safing

These procedures will be used to limit, reduce or control the effect of a high order or low order detonation. These procedures are designed to preclude the detonation or functioning of explosive ordnance which involves the application of field fabricated explosive or mechanical tools. The use of RSP's are not a guarantee for successful demilitarization of an item. A 50/50 chance of high order detonation exists. These procedures will not be used when a significant danger to personnel exists in the attempt of the procedure. Procedures which expose persons to hazards longer than is acceptable to the UXO Safety Officer will not be attempted. All attempts will be done by remote means. Hand entry or removal of explosive or mechanical components in ordnance items is forbidden. Temporary gagging and pin-safe procedures may be acceptable but must be pre-approved in writing by the UXO Safety Officer prior to attempt. All other RSP attempts must be planned with a dry run practice on a chalk board prior to execution. Only Supervisors will attempt a RSP. Safing will not be attempted for any reason on a Sub Munition. Tooling and publications will be requested from NAVEODTECHDIV on a case by case basis.

Field Procedures

1. Gagging
2. Pining
3. Field Dearmer
4. Shape Charge Attack

When a safing procedure is evaluated a consideration will be the use of Protective Works. Protective works will be used to limit, reduce and or control the effects from fragmentation, blast and over pressures generated by a failed RSP attempt. Protective works will also be used during Blow In Place procedures. Protective Works will be used to protect the HCR "site" or to obstruct the shock and blast wave at or near the source of Safing or BIP.

7.8.1 Protective Works

Protective Works will be field fabricated structures, containment or deflectors. Protective works will be tested and evaluated by OHM under the monitoring of NAVEODTECHDIV.

7.9 UXO Disposition Procedures

Specific standard operating procedures for UXO disposition can be found in the Command Center on Kaho'olawe Island.

7.9.1 Open Burn Area

A. Authorized for the following:
   (1) Black powder.
   (2) Certain chemical agents and ammo

(3) High explosives.
(4) Pyrotechnics.
(5) TNT blocks.

B. Open Burn requirements:

(1) Open Burning Area:

(A) Ground has maximum grade of 10°.

Minimum 1800 feet from inhabited buildings and magazine areas.

1 lesser distances authorized with non-fragmenting material.

(B) Non-fragment producing material.

(C) Detonation blast over pressure will not exceed 1.0 psi, based on quantity of material being burned.

(E) Be reasonably free of undergrowth or shrubbery:

1 long grass and undergrowth must be cleared 300 ft radius from area.

2 dry grass and combustible material must be 200 ft border beyond the burn pad.

3 maintain a 50 ft separation (minimum) between burn areas.

(2) Personnel:

(A) qualified and fully informed

(B) minimum number

(C) at no time will one person work alone.

1 a UXO Safety Supervisor and UXO Specialist are required.

(3) Protection:

(A) two fire blankets

(B) adequate personnel shelters

1 100 ft if barricaded.

2 500 ft if not barricaded.

(4) Fire fighting equipment:

(A) manned and equipped in safe location.

(B) be readily available within five minutes.

(5) Communications:

(A) telephone or two-way radio no more than 2500 feet away.

(B) minimum transmitting distance is 100 feet.

(6) Wind velocity:

(A) burning will not be done in winds exceeding 15 mph.

(B) wind velocity indicator present on OB area.

(7) Warning signals:

(A) safety signals, roadblocks, and warning signs used to keep unauthorized personnel clear.

(B) red flag is displayed and/or siren is sounded.

(8) Electrical storms.

(A) burning shall not be undertaken.

(9) Ignition. Accomplished by following:

(A) place squib or safety fuse in small pile of small web smokeless powder (Definition: small web smokeless powder is powder grains for 3" cartridges or smaller.

(B) connecting train between pads:

1 smokeless powder 4-6 inches wide.

2 1 ½ inches deep at center.

(C) ignition of powder will be by:

1 electric squib.

2 safety time fuse and igniter.

(D) Electric squib ignition requirements

1 one operator and one supervisor shall prepare for ignition.

2 a galvanometer shall be used to check continuity.

3 squibs shall be shunted at all times.

4 squibs shall be stored in containers designed to resist the effects of accidental initiation.

5 firing leads shall be shunted at all times.

6 squib wires shall not be connected to electrical source until ready to fire.

7 personnel connecting squib into firing circuit will have positive control of blasting machine.

8 squib shall be placed at the end of ignition train.

9 supervisor and operator shall retreat to shelter prior to ignition.

(E) Safety time fuse ignition requirements:

1 supervisor and one operator shall prepare for ignition.

2 time fuse will be of sufficient length to permit personnel to reach shelter.

3 time fuse length shall never be less than six feet.

4 an appropriate fuse igniter shall be used.

5 time fuse will be test burned at the beginning of each day and each new roll.

(F) Pre-ignition requirements. The following requirements must be satisfied:

1 a red flag displayed and/or siren sounded.

2 proper communication.

3 fire fighting equipment on standby or readily available within five minutes.

4 range is clear, all personnel accounted for and safely sheltered.

5 all equipment of value is in a safe area.

6 all material awaiting destruction is at a safe distance and protected from sparks and flying embers.

(G) Misfires

1 electric squib ignition systems

(a) make several attempts to fire.

(b) check connections at blasting machine.

(c) make several more attempts, if this fails disconnect and shunt firing leads.
(d) if viewing is possible:
1 wait five minutes.
2 supervisor and one operator return to investigate.
(e) if viewing is impossible:
1 wait 30 minutes.
(f) prepare new squib.
1 leave defective squib close so it will be consumed.
2 safety time fuse ignition system:
(a) wait 30 minutes from expected time of ignition.
(b) supervisor and one operator investigate.
(c) prepare a second ignition.

(H) Post burn requirements:
1 remain under cover until all explosives are consumed.
2 wait five minutes after burn is exhausted before returning to the area:
(a) supervisor and one operator investigate.
(b) if no unusual condition exists, commence wet down.
3 wait two hours after wet down before re-using area.
(a) if no water facilities are available wait four hours.
4 successive burn can begin 50 feet upwind from a previous sburn pad, provided the used pad has been wetted down and two hours have elapsed. If the area was not wetted down, the pad may not be used for four hours. These are minimum standards, longer wait times are desirable.

7.9.2 Open Detonation (OD) Area

A. Authorized for the following:
(1) detonators.
(2) dynamite in bulk.
(3) explosive - loaded grenades.
(4) HE bombs.
(5) rocket motors.
(6) rocket/missile warheads.

B. General requirements for demolition operations.
(1) detonation area
(A) all combustible materials shall be removed within a 500 ft radius.
(2) personnel:
(A) will be qualified and fully informed
(B) number will be kept to a minimum.
(C) at no time will one person work alone.

(c) make several more attempts, if this fails disconnect and shunt firing leads.
(d) if viewing is possible:
1 wait five minutes.
2 supervisor and one operator return to investigate.
(e) if viewing is impossible:
1 wait 30 minutes.
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(2) personnel:
(A) will be qualified and fully informed
(B) number will be kept to a minimum.
(C) at no time will one person work alone.

(3) protection:

(A) shall have crew protective area.

1 no direct viewing ports.

2 mirrors or periscopes are allowed.

(B) shall have an emergency area shelter.

1 not used during normal operations.

(4) fire fighting equipment.

(A) properly manned mobile fire fighting equipment, or readily available within five minutes.

(5) weather conditions.

(A) request information from nearest National weather service:

1 cloud conditions.

2 air mass conditions.

(6) warning signals same as burning operations.

C. Post detonation requirements

(1) single shots require a minimum wait time of five minutes.

(A) walk down area.

(2) when multiple shots cannot be individually distinguished, a minimum wait time of 30 minutes is required.

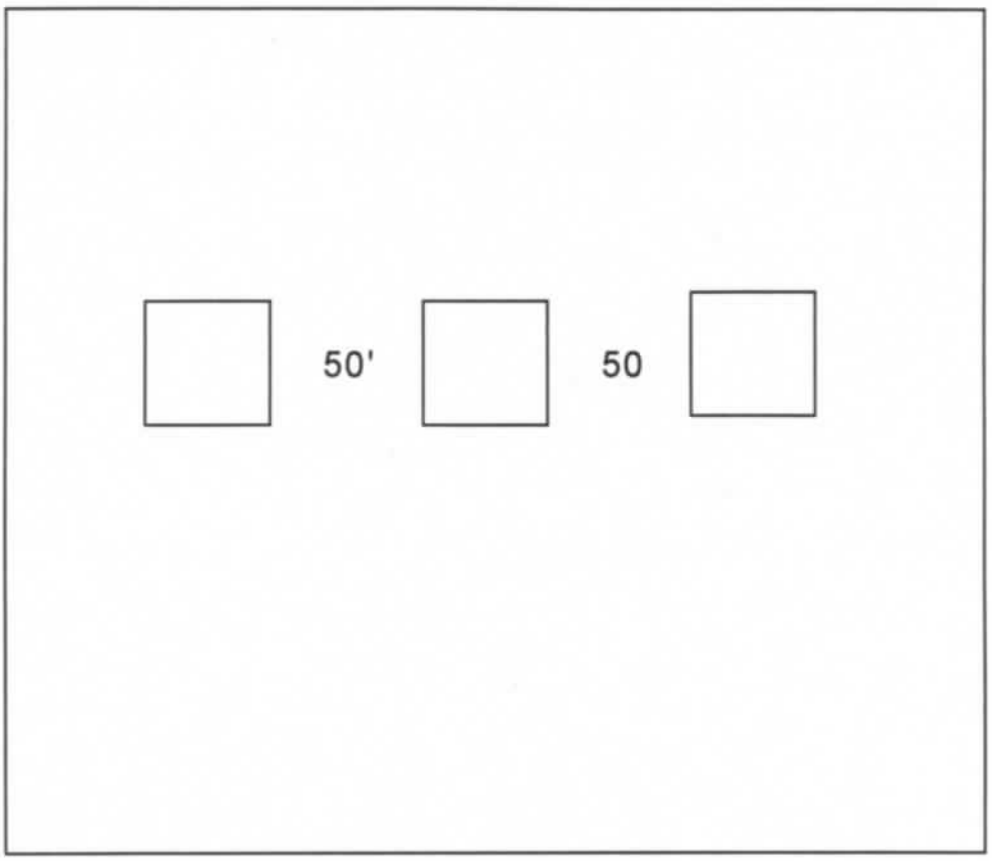
(3) any UXO is detonated in clean-up shot.

8.0 REMOVAL AND TURN-IN OF TARGET MATERIAL

Prior to removing the target, it will be thoroughly inspected to insure it is free from UXO or hazardous related material. The results of the inspection will be recorded in the daily log of the supervisor conducting the inspection. After the target is removed, the area beneath the target will be swept for UXO and related material.

Upon completion of the inspection, the target will be moved by OHM to a designated location to await ultimate disposition arranged by OHM.

OPEN BURN AREA



300' X 300

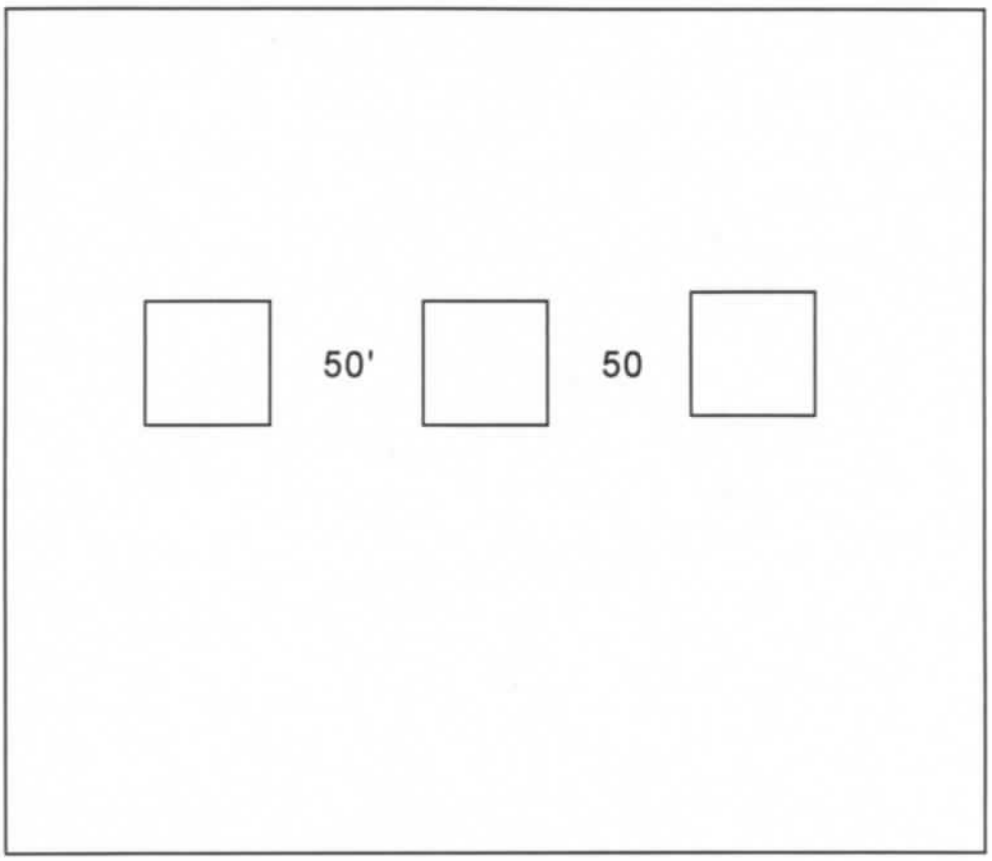
Temp Stockpile
500' from burn
pad

Barricaded Shelter
100' from pad

Note: Refer to OP 5
/OL I for Burn
Site requirement

Figure A-3

OPEN BURN AREA



300' X 300

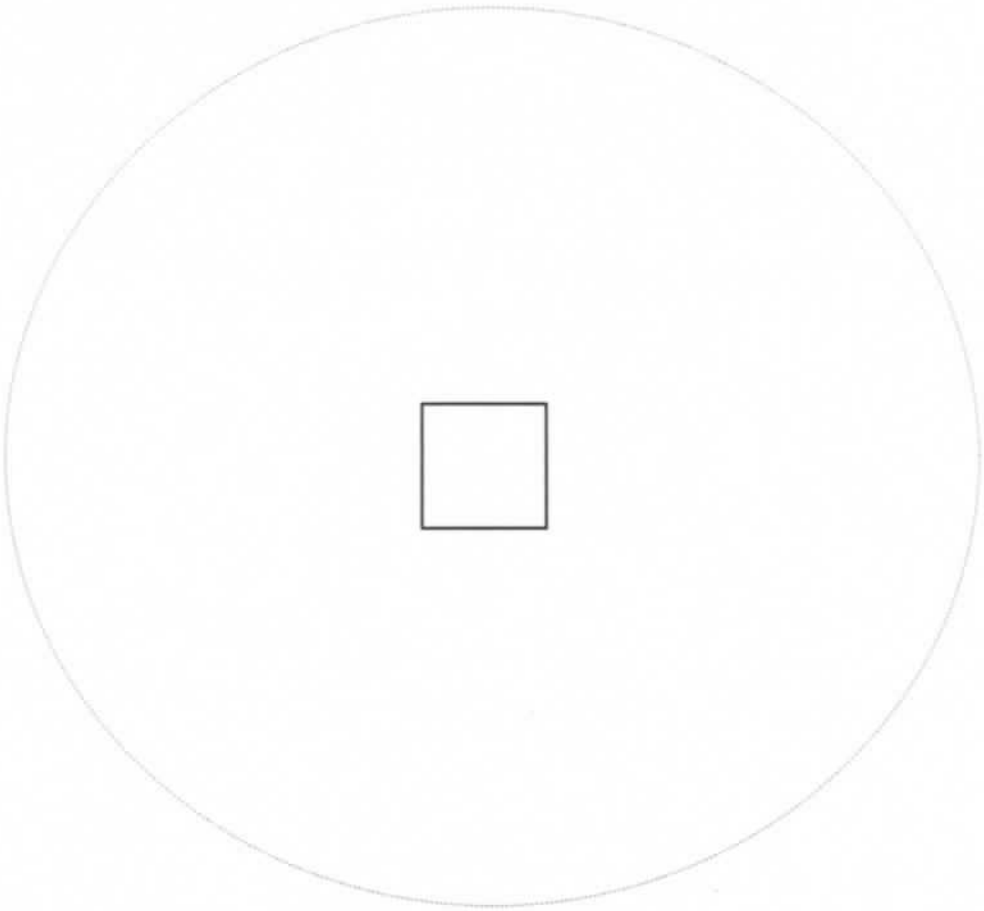
Temp Stockpile
500' from burn
pad

Barricaded Shelter
100' from pad

Note: Refer to OP 5
/OL I for Burn
Site requirement

Figure A-3

OPEN DETONATION AREA



500' Radius

Barricaded Shelter

Explosive Holding Area
1245' from active demo area

Note: Refer to OP 5 VOL
ıble 13-1

Figure A-4

APPENDIX 1

COMMUNICATIONS

Communication and Check-out Procedure

A reliable communication link between all field teams will be maintained during field operations. Teams will conduct radio checks prior to commencing daily operations and throughout the course of the workday. Teams experiencing communications failures will cease work until communications are restored. Communications system used for internal use will be the Motorola HT 1000 radio, or equivalent. A call sign status board will be maintained by the Range Control Officer.

Team Radio Call Signs

Team radio call signs will be established in coordination with the OHM communication net.

Communication Plan

General

Radio communications will be the primary mode of communication. The alternate will be cellular phone. The communication system will be easily accessible to all persons at specific locations and/or work areas and will be tested each morning prior to commencing any operations.

Project Communications

Island communications among all work crews, the MEDIVAC helicopter, Navy representatives, the MICT, and the OHM Command Center will be by radio. Communications shall be tested daily prior to the commencement of work.

Evacuation Procedures

Evacuation from work areas, if required, will be directed along approved paths. During evacuation, any equipment left will be placed so as not to impede emergency escape and evacuation along cleared pathways. Evacuation routes from each work area will be discussed by the work supervisor as part of the daily briefing.

Other Emergency Services

For other emergency services, each work crew will have radio communications with the OHM Command Center, who will contact other emergency response personnel as required.

APPENDIX 2

GEOPHYSICAL SURVEY

INSTRUMENT DESCRIPTIONS

Schonstedt Magnetic Locator

Schonstedt Heliflux® Magnetic Locators (Models GA-52Cx and GA-72CV) are used for detecting subsurface ferrous metal items. The technology is based upon fluxgate sensors organized in a gradiometer format. The Schonstedt locator is a hand-held unit that employs two (2) fluxgate magnetometers that are aligned and mounted a fixed distance apart to detect changes in the earth's ambient magnetic field caused by ferrous metal (the sensors are fixed and aligned to eliminate a response to the earth's ambient field). The Magnetic Locators respond with an audio output and a meter deflection (GA-72CV) when either one of the two sensors is exposed to a disturbance of the earth's ambient field associated with a ferrous target and/or the presence of a permanent field associated with a ferrous target (in most cases, it will be a combination of both circumstances). The Schonstedt Magnetic Locators are highly portable magnetometers that will be used to quickly screen surface and near-surface areas for ferrous content.

Foerster Ferex Electromagnetic Detector

The Foerster Ferex Ordnance Locator, designated the MK 26 Ordnance Locator, is the most recent military-approved locator in use by U.S. Military EOD forces for detecting subsurface ordnance items. The locator is a hand-held unit that incorporates two flux-gate magnetometers, aligned and mounted a fixed distance apart to detect changes in the earth's ambient magnetic field caused by ferrous metal or disturbances caused by soil conditions.

A ferromagnetic object present in the ground is magnetized by the earth's magnetic field, thus acting similarly to a magnetic dipole. The magnetic interference field of the dipole is measured by the Foerster probes fitted in the unit.

Both an audio and metered signal are provided to the operator. The metered signal indicates whether the disturbance is geodetic or metal-related. The detection capability of the Foerster Ferex is dependent on an item's size, position, and depth.

The Geonics EM61 High Sensitivity Metal Detector

The EM61 has coplanar time-domain transmitter and receiver coils which induce and measure secondary EM field in the ground. The decay of the induced secondary field is measured between transmitted pulses which generate the primary field. The secondary fields are induced in both earth materials and metallic objects. The secondary field formed in earth materials decays rapidly following

the completion of the energizing cycle, whereas the field produced in metallic objects persists much longer. Between each pulse, the EM61 waits for the induced field from the earth to dissipate, and then measures the prolonged field generated by buried metallic objects. By sensing the response from the buried metal, the EM61 functions as a sensitive metal detector.

The EM61 consists of a control console and two antenna coils. The antenna coils are arranged in a vertically stacked configuration with the antenna dipoles oriented vertically. The system can be operated while being carried using a shoulder harness system or can be mounted on a wheeled cart which is towed over the survey area by hand. Data from the EM61 is stored in a data logger which can be programmed to record the instrument location and measurements. The EM61 measurements are made in units of millivolts (mV) of the induced electric field decay.

The EM61 has several distinct advantages over the EM31 and conventional metal detectors in the search for ordnance. As with the EM31, the response of the EM61 does not require that buried metal be iron or steel. However, unlike the EM31, the depth to metal targets can be estimated with the EM61. Compared with conventional metal locating devices, the EM61 provides a quantitative measure of the response, is more sensitive and has a greater depth of investigation. As with other geophysical instruments, the depth which the EM61 can detect buried metallic objects is a function of the size of the object. Larger targets can be detected at greater depths than smaller targets. The EM61 can detect a single 55-gallon drum to a depth of up to 12 feet. Small individual pieces of ordnance can be detected at depths of one to three feet, and larger ordnance can be detected at a depth of five feet or more.

The EM61 is focused and has high lateral resolution which permits it to resolve closely spaced anomalies. For high resolution of small, shallow, closely spaced targets, data should be collected at very closely space intervals down to as little as a foot apart. For general work, a separation between reading stations of approximately three to five feet will typically provide good results. Where larger spacings are used, larger buried metallic targets will be detected, but smaller near-surface targets could be missed.

EM61 data is typically collected in profile form or from gridded stations. The data can be contoured, and anomalies can be evaluated on an individual basis, along with their estimated depth, from modeling calculations. Data shall be referenced to the Hawaii State Plane Coordinate System-Zone 2 (5102) Grid System and the North American Datum of 1983 [NAD 83] and will serve as the base design file in the GIS.

Vallon Ferrous Locator

The Vallon Ferrous Locator, designated the EL 1302A1, is a portable differential magnetometer used for detecting subsurface unexploded ordnance and other ferromagnetic objects. The locator is a hand-held unit that incorporates two magnetic field sensors mounted a fixed distance apart with their longitudinal axis in perfect geometrical alignment to detect changes in the earth's ambient magnetic field caused by ferrous metal.

A ferromagnetic object present in the ground is magnetized by the earth's magnetic field, thus acting similarly to a magnetic dipole. The magnetic interference field of the dipole is measured by the Vallon's sensors mounted in the unit. Both an audio and metered signal are provided to the operator. The detection capability is dependent on an item's size, position, and depth.

Equipment Detection Standards

Subsurface objects of greater than, or equal to, the target population density as set forth on the following table will be intrusively investigated and disposed of. The equipment detection standards for the Kaho`olawe Model Cleanup Project are shown on figure A-20.

EQUIPMENT DETECTION STANDARDS

Depth	Maximum Target Population Density
0" - 11"	20 mm Projectile with Casings
12" - 23"	3" Projectile
24" - 35"	5" Projectile
36" - 48"	250 lb. G.P. Bomb

APPENDIX 3

UXO SAFETY ESCORT OPERATIONS

Due to the hazardous nature of transiting most of Kaho'olawe Island, UXO safety escorts are required for all non-EOD personnel except those designated as self-escorts. The UXO safety escorts will be coordinated by the OHM Range Control Officer. The UXO safety escort responsibilities are as follows:

- OHM will provide escort for their personnel involved in the model cleanup and others as directed by the manager or resident project manager (RPM).

- Architect-Engineer (A-E) contractor will provide escort for PACNAVFACENGCOM personnel and others as directed by PACNAVFACENGCOM project design engineer (PDE).

The primary function of the UXO safety escort is to ensure safety during the transit of persons being escorted. This is accomplished by scanning the area visually in the immediate path of the escorted party, and redirecting the party as necessary to avoid unexploded ordnance and other hazards. In most cases, the escorted party will be civilians, therefore, the escorts will have no legal jurisdiction over that party. Nevertheless, the escort must tactfully control the escorted party to ensure that they do not become spread apart or wonder off beyond the UXO safety escort's control and that they do not endanger themselves or others. If the escorted party refuses to obey the recommendations of the UXO safety escort to a point where safety is jeopardized, the island manager/security personnel should be notified immediately of the intent to escort the party back to the point of origin or to an area advised and agreed to by the manager.

Special Considerations

Personnel Assignments

For more than 3 visitors, a minimum of 2 personnel will always be assigned for the escort operations, unless previously arranged by the responsible party. Escorts will be UXO Specialists. The UXO Specialist will be at the front to scan the path way and the second escort will be at the rear to ensure all visitors remain in the cleared pathway. For small groups not more than three (3), one escort may be used provided he or she is the UXO Specialist.

Hakioawa Operations

During most Hawaiian religious ceremonial access periods, a minimum of two escorts will be assigned to be on station at Hakioawa throughout the access period. These personnel will be augmented by

additional personnel as necessary to cover hikes or other escort requirements during the access period. Food and camping equipment will be required for the entire period. Most equipment is pre-staged at Hakioawa, however, manager at Smuggler's Cove should be contacted prior to traveling to Hakioawa to ensure adequate supplies are available. The two escorts will be moved into Hakioawa by helicopter on the day prior to arrival of the Hawaiian religious group in order to allow sufficient time to set up camp and to give the area a general sweep for ordnance. The Hakioawa escorts will be returned to Base Camp at Honokanai'a by helicopter or land after the Hawaiian religious group has departed.

UXO Safety Escort Briefs

Escorts will be thoroughly briefed by the UXO Specialist Supervisor on the nature of the escort in advance of the operation. Escorts for religious purposes may receive an additional brief from the manager. Escorts will be responsible for understanding and complying with orders and instructions regarding escort duties and responsibilities and any concerns they may have are addressed prior to commencement of their escort duties. Specifically, they should know:

- Date, time and location of escort.
- Nature of operations being conducted by the escorted party.
- Call signs and communications procedures.
- Transportation requirements.
- Meal requirements for escorted party as well as themselves.

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- Nature of operations being conducted by the escorted party.
- Call signs and communications procedures.
- Transportation requirements.
- Meal requirements for escorted party as well as themselves.

APPENDIX 4

CONTROL AND ACCOUNTABILITY

An Ordnance Data Sheet provided in volume II annex I, appendix X will be annotated for each UXO or related item excavated from the work area. All required information will be filled in by the individual in charge of the excavation. The form will be used to reflect the location and depth found, nomenclature, quantity, status (temporary storage or left in place) and final disposition. The remarks block will be used to record additional information the responsible individual feels may be significant.

The forms will be turned over to the UXO Specialist Supervisor at the end of each work day for incorporation into the GIS data base.

Control of Personnel

Personnel assigned to or visiting Kaho'olawe Island will be accounted for through the OHM Command Center. The center will be faxed a list of personnel requesting access to the Island by COMNAVBASE prior to entry. The OHM Command Center will issue a badge which displays a color indicating the level of access and movement within zones.

Personnel accessing the Island from the BPI Helicopter landing area on Maui will accomplish the following:

The BPI Maui Manager will fax the helicopter transport manifest to the Range Control Officer each morning. Each movement by helicopter will be tracked by the Range Control Officer by location. The pilot of the helicopter will notify the Range Control Officer when the personnel have off-loaded by LZ number or name.

Personnel departing the Island to Maui will give their badge number to the pilot to notify The Range Control Officer of their departure by badge number.

Personnel accessing the Island by Landing Craft re-supply vessel will check-in and out with the Range Control Officer when entering the Base Camp. The landing craft Captain shall notify the Range Control Officer of anticipated time of arrival at Honokanai'a prior to landing.

Personnel will be issued a badge which authorizes a person to enter specific areas or zones. Badges will be consecutively numbered and color coded to indicate the level of access.

Color Code:

Personnel	Badge Color
UXO Specialists	GREEN
UXO Support Personnel	YELLOW
SELF-ESCORT	YELLOW-GREEN STRIPE
Construction Personnel	YELLOW-RED STRIPE
Visitors	RED

Air Traffic Control

Air Traffic Control for aircraft entering Kaho'olawe air space will be managed by the Range Control Officer. Air traffic flight routes will be regulated over the water at all times unless otherwise directed by the Range Control Officer. Helicopter pilots will notify the Range Control Officer of ingress to the island and upon departure from the island. Helicopter pilots will notify the Range Control officer of ingress, two miles out from the island.

APPENDIX 5

LETTER OF AGREEMENT

HONOLULU COMBINED CENTER/RADAR APPROACH CONTROL (CERAP)
COMMANDER, NAVAL BASE PEARL HARBOR (COMNAVBASE)

LETTER OF AGREEMENT

EFFECTIVE DATE: July 10, 1995

SUBJECT: SCHEDULING AND USE OF THE KAHO'OLAWE CONTROLLED FIRING AREA (CFA)

1. **PURPOSE.** This Agreement establishes procedures and assigns responsibilities for the scheduling and use of the Kaho'olawe Controlled Firing Area (CFA). Use of the Kaho'olawe CFA is expressly limited to, and shall only be scheduled concurrent with, ground-based activities associated with ordnance disposal/demolition operations performed by, or on behalf of, the United States Navy, Kaho'olawe, Hawaii. This Agreement supplements, and is in accordance with the Federal Aviation Administration (FAA) Letter of Authorization, regarding Aeronautical Case No. 94-AWP-8NR, Authorization - Control Firing Area (CFA) Kaho'olawe, Hawaii, dated October 13, 1994 (see Attachment 1).

2. **GENERAL.**

a. The Kaho'olawe CFA is designated as that area from the surface up to and including 5,000 feet MSL within the lateral limits depicted in Attachment 1.

b. Honolulu CERAP is designated as the Controlling Agency for the Kaho'olawe CFA.

c. The United States Navy is designated as the Using Agency.

3. **RESPONSIBILITIES.** COMNAVBASE Pearl Harbor agrees to cease, upon notification that an aircraft may be approaching the CFA, any activity which may create a hazard. To ensure that adequate safety precautions are established for the use of the Kaho'olawe CFA, prior to initiating any activity that may be hazardous to aircraft, COMNAVBASE Pearl Harbor shall ensure that:

a. The weather ceiling within the entire CFA is at least 1,000 feet above the highest altitude of fire or other activity that could be hazardous to aircraft in the area, and

b. Visibility shall be sufficient to maintain visual surveillance of the entire CFA and for a distance of 5 miles therefrom in all directions immediately prior to and during the time that activity hazardous to aircraft is in progress.

4 **PROCEDURES.** Unless otherwise coordinated, COMNAVBASE Pearl Harbor shall:

a. Ensure that Honolulu CERAP is advised of the Kaho'olawe CFA schedule no later than (NLT) 5 working days prior to intended use.

b. Ensure that the following NOTAM is issued through the appropriate FAA Flight Service Station at least 24 hours prior to ordnance detonation/disposal activities:

"KAHO'OLAWE CFA ACTV WITHIN A FIVE NAUTICAL MILE RADIUS OF LNY107025. DETONATION/DISPOSAL OF LIVE ORDNANCE WILL BE CONDUCTED FROM THE SURFACE UP TO AND INCLUDING 5000 FEET MSL BY THE US NAVY. EFFECTIVE (DTG)-(DTG). BE ADVISED THAT COLORED FLARE/SMOKE INDICATES IMMINENT DETONATION."

c. Appoint a safety officer who shall ensure the following:

(1) Surveillance of the CFA and for a distance of 5 miles therefrom is maintained immediately prior to and during the time that activity hazardous to aircraft is in progress. Surveillance shall be accomplished by ground observers or a combination of ground observers supplemented by radar, surface vessels, or patrol aircraft. Each observer shall be thoroughly briefed of his/her duties and responsibilities as an observer.

(2) Each observer shall have continuous effective communications with the safety officer.

(3) Any activity that may create a hazard to air traffic shall cease immediately upon notification that an aircraft may be approaching the CFA.

(4) Provide Honolulu CERAP notice:

(a) 20 minutes advance of each ordnance detonation activity

(b) immediately prior to initiating detonation activity

(c) when "all clear."

(5) Advise Honolulu CERAP of any changes to the scheduled use of the Kaho'olawe CFA. Use of the Kaho'olawe CFA shall not extend beyond the scheduled times.

for Larry T. Anderson
Air Traffic Manager,
Honolulu Combined Center/Radar
Approach Control

G. S. Holder
Rear Admiral, U. S. Navy
Commander, Naval Base Pearl Harbor